THE TAXONOMY AND BIOLOGY OF THE BRITISH CHRYSOMELIDAE

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by

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CONTENTS

1. INTRODUCTION

The Chrysomelidae are the second largest family of beetles with over 55,000 World species in seventeen subfamilies. In Britain there are 260 species in eleven subfamilies. They are phytophagous, feeding in the larval and adult state on the primitive Equisetaceae, Monocotyledons and the more specialised Dicotyledons. Each species usually feeds on a strictly limited range of host plants with a few species confined to a single plant species. Many are pests of cultivated plants causing direct injury by reducing the leaf area or indirect injury by transmitting plant viruses. 24 species are known to be capable of transmitting plant viruses and of these all but four belong to the subfamilies Galerucinae and Halticinae. Other beneficial weed feeding species have been used to control weeds.

In the present study an attempt is made to show the relationships between the subfamilies, genera and species of the British Chrysomelidae using adult, larval, pupal and biological studies. Keys are also compiled where necessary.

The adult characters, the aedeagus, spermatheca, wing venation and claw structure were chosen as these had not been studied in detail by previous workers.

2. HISTORICAL

The first attempts to classify the Clythrides and Chrysomelids, later termed the Eupodes and Cycliques respectively, established these as two separate families of phytophagous beetles. Each of these families had two tribes (Latreille, 1806). Later the term Phytophaga was applied to Latreille's two families and the Chrysomelids (Cyclica) were divided into three subfamilies, the Cassidinae, Galerucinae and Chrysomelinae (Westwood, 1839). The two principal subdivisions Criocerides and Chrysomelines were recognised but the Phytophaga was re-arranged into 11 equal tribes (Lacordaire, 1845). The Bruchidae were later included in the Phytophaga and the Phytophaga proper divided into four groups, the Eupoda, Camptosomata, Cyclica and Cryptostomata, each of which contained several tribes (Fowler, 1890). Later the Chrysomelidae was divided into five subfamilies essentially similar to Fowler's groups of the Phytophaga proper (Reitter, 1912). The family Chrysomelidae was raised to the rank of superfamily (Chrysomeloidea) in the Phytophaga on the basis of the characters of the tarsi, maxillary palps, submentum and antennae of the adults (Pierce, 1917). The Cerambycidae and Chrysomelidae were ranked equally as families of the superfamily Cerambycoidea and the Chrysomelidae subdivided into ten subfamilies (Stickney, 1923; Leng, 1920). From a study of hind wing venation, orientation of the head and shape of the anterior coxae, the Galerucinae and Halticinae were evidently allied to the Chrysomelinae and were placed with these in one division, the Trichostomata (Chen , 1934). The Galerucinae were divided into two tribes, the Galerucini and Luperini on the position of the insertion of the antennae, and the disposition of the anterior epimeres (Laboissiere, 1934).

Various attempts have been made to classify the chrysomelids on larval character. The larval forms of the Chrysomelidae were divided into four sections according to their habits (Latreille, 1806). Later five groups were recognised on general larval morphology and development (Lacordaire, 1845).

The single family was later divided into five sections and 16 subfamilies (Chapuis & Candeze, 1853). From a study of larval morphology a classification was established in which chrysomelids were no longer retained in a single family but divided into a number of families, to form with the Bruchidae, a superfamily Chrysomeloidea. The subfamilies Clytrinae and Cryptocephalinae formed a single family, the Camptosomatidae, the Criocerídae were placed close to the true Chrysomelids and the Galerucidae were divided into three subfamilies, the Galerucinae, Diabroticinae and Halticinae (Boving & Craighead, 1931). Later, the larvae were divided into seven groups, the Sagrid, Donaciid, Chrysomelid, Galerucid, Camptosomatic, Eumolpid and Cryptostomic groups on general larval morphology and position of feeding (Chen, 1940).

3. THE ANATOMY OF THE MALE REPRODUCTIVE SYSTEM AND THE VALUE OF THE AEDEAGUS AS A TAXONOMIC CHARACTER

A. General Structure. (Fig. 1)

The male reproductive system is considered under two headings.

(i) The efferent system.

The testes lie dorso-laterally to the alimentary canal. Each extends through one or more of the abdominal segments, between the first and the seventh. From each testis a fine duct, the *vas deferens* leads posteriorly, to open with that from the opposite side, into the ejaculatory duct. At the point where the *vasa efferentia* and ejaculatory ducts unite, one or more pairs of accessory glands open, either into the *vasa deferentia* or into the ejaculatory duct. A pair of vesiculae seminales may be present as dilations of the *vasa deferentia*, or there may be a common vesicula into which both vesiculae seminales open (Fig.1).

In the present study, the structure of the efferent system was not investigated. Donia (1958), studied this system in detail in nineteen species of Chrysomelidae from seven subfamilies. The characters of greatest systematic significance were testis structure and accessory gland number and shape. In Donacia the testis has two lobes enclosed in a common sheath. In the Chrysomelinae there are generic and specific variations. The testis is multilobed in Phaedon and Timarcha while in other species each testis has a pair of lobes. In the Galerucinae and Halticinae the testes are in the middle of the abdominal cavity and all four lobes are enclosed in a simple sheath. The testes lie in the posterior half of the abdominal cavity in Cassidinae. The *vas deferens* is usually short and thin, and variations in its structure generally occur at specific level. The vesicular seminalis is small and round in Timarcha and Cassida and is formed as a diverticulum from the *vas deferens*. The ejaculatory duct is either short or long and divided into three distinct regions. There are two pairs of sac-like accessory glands in

PLATE A 1

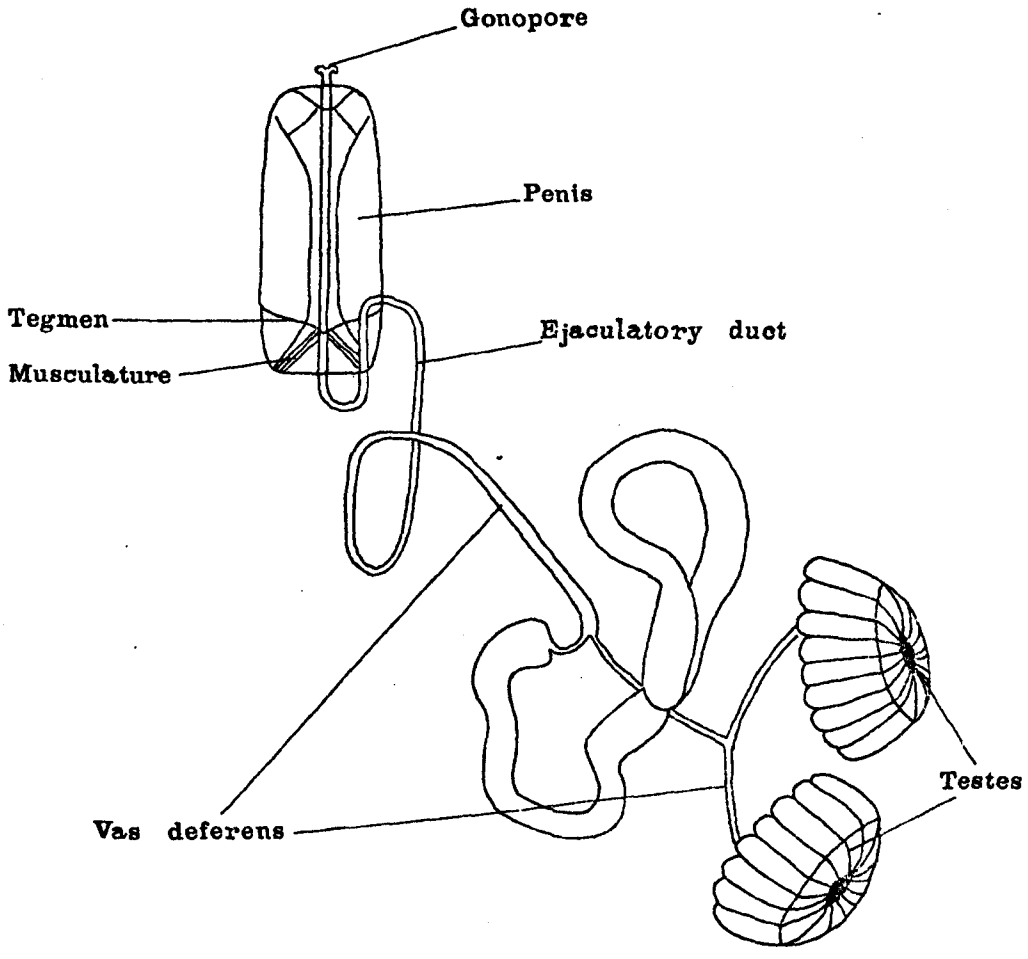


FIG. 1

THE EXTERNAL & INTERNAL ORGANS OF THE REPRODUCTIVE SYSTEM OF A MALE CHRYSOMELID (C. varians Schal.)

Donaciinae and Criocerinae, but only one pair in the other British subfamilies. Differences in the structure at the specific or subfamily levels may exist, but generally the glands are tubular, while in the Cassidinae they are spherical.

(ii) The external organs or copulatory apparatus. (Figs. 2, 3, 4)

Various nomenclatures have been used by previous authors for the parts of the copulatory apparatus and these are listed in Table 1.

In the Chrysomelidae the copulatory apparatus lies under the anus and is an invagination of the body wall. The invagination is called the genital pocket (Singh-Pruthi, 1925; Metcalfe, 1932). The structure within the genital pocket varies considerably within the Chrysomelidae but basically it consists of the following parts.

The aedeagus (Muir & Sharp, 1912; Metcalfe, 1932) or median lobe (Muir, 1918; Singh-Pruthi, 1924, 1925) is a median tubular piece, variously shaped and curved in the Chrysomelidae. A part of the genital pocket near the middle of the aedeagus is chitinised and forms the tegmen (Sharpe & Muir, 1912; Metcalfe, 1932), which partially or wholly surrounds the aedeagus. This structure usually has the form of a Y with its lateral folds extending around the aedeagus from below while the remainder projects anteriorly below the aedeagus. This Y-shaped structure forms the lateral lobes (Singh-Pruthi, 1924), or parameres (Verhoeff, 1893). The spiculum gastrale is a Y, U, V, or ring-shaped chitinous structure in the posterior ventral portion of the genital pocket. It varies in size and shape and is sometimes absent. It serves as an attachment for the powerful muscles which control the copulatory apparatus. At its apical end the aedeagus possesses an opening called the apical orifice or median aperture (Sharp & Muir, 1912). A basal foramen or median foramen (Sharp & Muir, 1912) which varies in size is found ventrally at the anterior end of the aedeagus. An internal

TABLE 1. Nomenclatures used by authors for the parts of the male genitalia.

Structure		Author		Alternative term
Aedeagus	Invaginated part of body wall	Singh Pruthi	1925	Genital Pocket
	Median lobe & tegmen + lateral lobes if present	Muir & Sharp	1912	Aedeagus Intromittent organ
Median lobe proper		Muir	1918	Median lobe
		Singh Pruthi	1924,1925	" "
		Verhoeff	1893	Penis
		Zander	1899,1900, 1901,1903	"
		Metcalfe	1932	Aedeagus
		Christophers	1922	Phallasome
Parameres & median lobe		Sharp & Muir	1912	Tegmen
Tegmen & Parameres		Singh Pruthi	1924,1925	Lateral lobes
		Verhoeff	1893	Parameres
		Muir	1918	"
		Walker	1919,1922	"
		Zander	1899,1900 1901,1903	Inner and Outer Valves
		Christophers	1922	Androapodite or Parameres
		Sharp & Muir	1912	Spiculum gastrale
		Singh Pruthi	1924,1925	" "
		Metcalfe	1932	" "

PLATE A 2

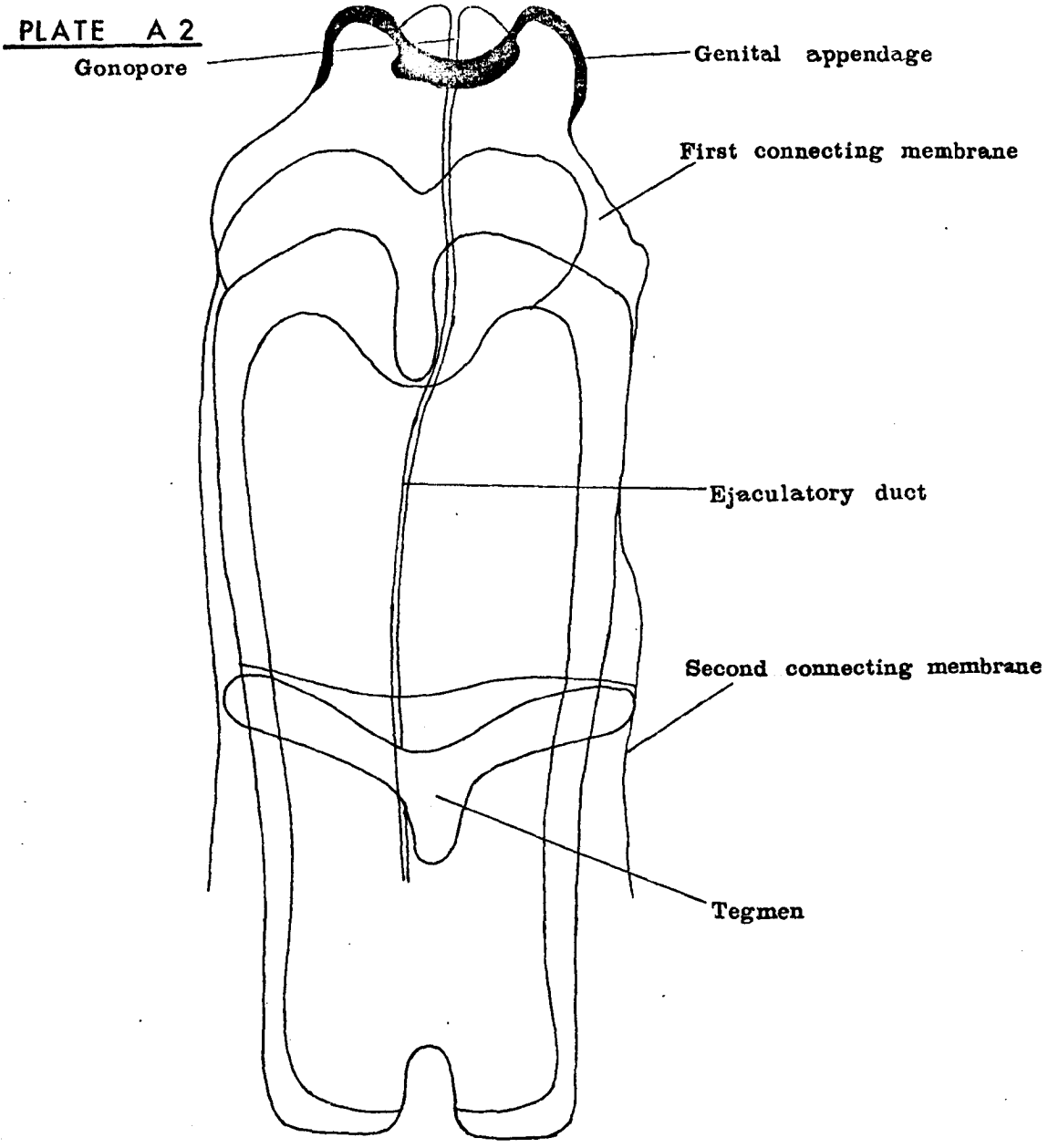


FIG. 2 THE COPULATORY APPARATUS OF G. polygoni (L.)

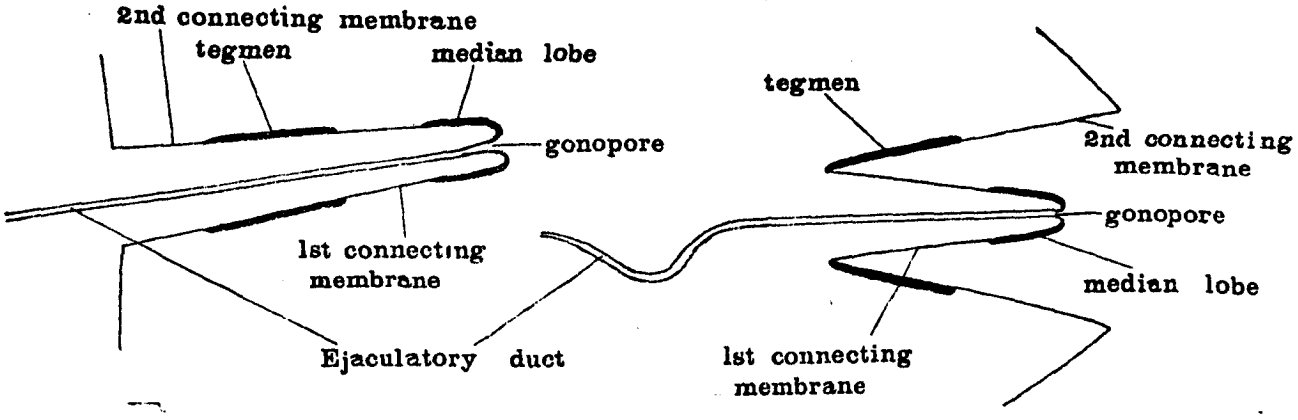


FIG. 3a
AEDEAGUS EXTENDED

FIG. 3b
AEDEAGUS RETRACTED

PLATE A3

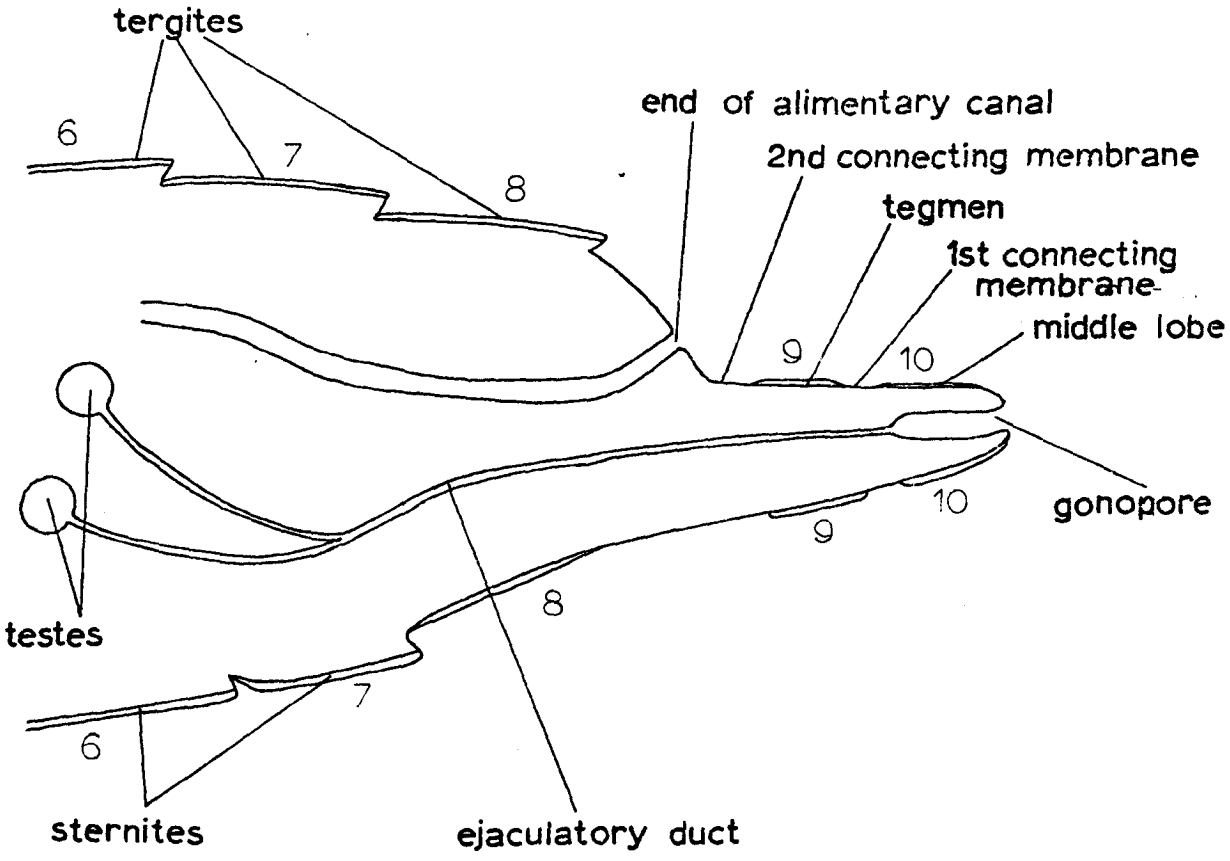


FIG. 4 A SCHEMATIC DRAWING SHOWING THE PARTS OF THE AEDEAGUS OF A BEETLE

sac (Sharp & Muir, 1912) lies within the aedeagus and is continuous posteriorly with it at its apical orifice. The walls of this sac may be uniformly very lightly chitinised or, more often, have individual chitinised plates. A chitinous projection from the junction of the internal and dorsal walls of the aedeagus may extend posteriorly above the apical orifice. This apical hood (Powell, 1941) cannot be retracted into the aedeagus. In other species there may be retractile dorsal plates, dorso-lateral plates or no chitinous structures at this point. The distance the internal sac extends anteriorly within the aedeagus varies in different species. An ejaculatory duct pierces the sac at its closed anterior end and may extend posteriorly within it.

B. The value of the aedeagus as a taxonomic character.

The aedeagus has been used as a taxonomic character in many subfamilies and genera of the British Chrysomelidae (Appendix 1). The median-dorsal depression or central channel, lateral depressions, sulcation of the ventral face and size of the median lobe are the most valuable taxonomic characters in the separation of species in the genera Haltica and Longitarsus (Kevan, 1962, 1967). The shape of the apex of the median lobe is useful in species separation in the genus Galerucella (Hincks, 1950). Freude, Harde and Lohse (1966) used the shape of the apex of the median lobe as a specific character in nearly all the British subfamilies.

A detailed study of variations in the structure of the median lobe, tegmen, lateral lobes and spiculum gastrale should not only help to indicate the relationships of the subfamilies to one another, but also aid the identification of genera and species. It is with this object that a study of these structures was undertaken in all the subfamilies and genera of the British Chrysomelidae. The aedeagus has been dissected, mounted on white card and drawn for 240 species.

Most species have aedeagi which when newly extracted are parallel in form, or practically so, but a few are naturally sinuate or constricted

at the sides and appear somewhat 'waisted'. When drying, they often contract and the edges curl over dorsally (occasionally to the point of distortion), allowance has to be made for this factor. It is best, therefore to examine the aedeagi when wet i.e. when newly extracted. Distortion was found to occur on drying out,especially with the aedeagi of those Cryptocephalus species with two or three-lobed apices. In these species, the lobes, normally straight, become curved on drying and therefore had to be drawn wet.

C. Species descriptions of the male genitalia.

I. DONACIINAE

Genus Donacia

Donacia simplex F. (Figs. 5, 32, 37)

The long, thin median lobe is uniformly chitinised and the proximal part is not divided into median struts. The apex of the median lobe is rounded. The apex of the lateral lobe is only slightly bilobed and bears numerous long setae. The tegmen is enlarged ventrally into a basal piece extending nearly to the apex of the median lobe. The spiculum gastrale is large, v-shaped and asymmetrical (Fig. 37). It consists of one long and one short arm connected together by connective tissue at their apices.

Median lobe

Donacia simplex F. Fig. 5. Length 1.643mm, greatest width 0.343mm.

Donacia marginata Hoppe. Fig. 6. Length 2.057mm, greatest width 0.40mm.

Donacia bicolora Zsch. Fig. 7. Length 2.028mm, greatest width 0.351mm.

Donacia dentata Hoppe. Fig. 8. Length 1.871mm, greatest width 0.366mm.

Donacia aquatica (L.) Fig. 9. Length 1.363mm, greatest width 0.357mm.

Donacia clavipes F. Fig. 10. Length 1.857mm, greatest width 0.437mm.

Donacia semicuprea Pz. Fig. 11. Length 1.628mm, greatest width 0.291mm.

Donacia sparganii Ahr. Fig. 12. Length 2.6mm, greatest width 0.371mm.

Donacia thalassina Germ. Fig. 13. Length 1.986mm, greatest width 0.38mm.

Donacia vulgaris Zsch. Fig. 14. Length 1.886mm, greatest width 0.331mm.

Donacia versicolorea Brahm. Fig. 15. Length 1.643mm, greatest width 0.343mm.

Donacia cinerea Hbst. Fig. 16. Length 1.657mm, greatest width 0.354mm.

Donacia crassipes F. Fig. 17. Length 2.028mm, greatest width 0.4mm.

Donacia impressa Pk. Fig. 18. Length 2.143mm, greatest width 0.3mm.

Donacia obscura Gyll. Fig. 19. Length 1.794mm, greatest width 0.351mm.

Genus Plateumaris

Plateumaris sericea (L.) (Figs. 20, 31, 38)

As in Donacia but the basal piece of the tegmen is larger and the apex of the lateral lobe is bilobed and bears numerous long setae. Spiculum gastrale as in Donacia (Fig. 38). Apex of the median lobe rounded, never bilobed.

Plateumaris sericea (L.) Fig. 20. Length 1.543mm, greatest width 0.428mm.

Plateumaris discolor (Pz.) Fig. 21. Length 1.543mm, greatest width 0.443mm.

Plateumaris affinis (Kunz.) Fig. 22. Length 1.40mm, greatest width 0.294mm.

Plateumaris braccata (Scop.) Fig. 23. Length 2.543mm, greatest width 0.528mm.

Genus Haemonia

Haemonia appendiculata (Pz.) Figs. 24, 30, 39

As in Donacia but the basal piece of the tegmen which is flattened is smaller and apex of lateral lobe exceeds apex of the median lobe and is rounded, not bilobed and bears 13 setae. Apex of median lobe yellow brown and bearing a small rounded lip. The spiculum gastrale is v-shaped and dorsal to the aedeagus, (Fig. 39).

M. appendiculata (Pz.) Fig. 24. Length 1.124-1.486mm, greatest width 0.446mm.

M. mutica (F.) Fig. 25. Length 1.228mm, greatest width 0.30mm.

ii. ORSODACNINAE

Genus Orsodacne

Orsodacne cerasi (L.) Figs. 26, 27

The aedeagus is of the complete or generalised bilobed type. The proximal part of the median lobe is divided into a pair of long lamiform median struts. The median lobe is uniformly chitinised and the apex is distinctly bilobed. The tegmen is united dorsally and forms the lateral lobe (distal lobe, styli, or tegmental cap) over the posterior portion of the median lobe. Apex of the lateral lobe is bilobed. A basal piece formed by the arms of the ring piece of the tegmen fusing lies ventrally to the median struts. The internal sac is very large and the spiculum gastrale is large and consists of 2 parts, a larger Y-shaped part and a smaller U-shaped part which lie dorsal to the aedeagus.

Orsodacne cerasi (L.) Figs. 26, 27. Length median lobe 1.663mm, greatest width 0.32mm.

Orsodacne lineola (Pz.) Fig. 35.

iii. ZEUGOPHORINAE

Genus Zeugophora

Zeugophora subspinosa (F.) Figs. 28, 33, 40

Similar to Orsodacne cerasi (L.) However, the median struts are rod-like and not laminar in cross section. The median lobe is not uniformly chitinised as the middle part is not so strongly chitinised as in the lateral and apical portions of the same lobe. The apex of the median lobe is not bilobed but rounded or square. The spiculum gastrale is Y-shaped.

Z. subspinosa (F.) Fig. 28. Median lobe apex square. Length 1.192, greatest width 0.25mm.

Z. turneri Pow. Fig. 29. Median lobe apex rounded, greatest width 0.172mm.

Z. flavicollis (Marsh) Fig. 34. Median lobe apex rounded.

iv. CRIOCERINAE

Aedeagus of the incomplete type lacking the lateral lobe. Base of tegmen rather strongly laterally broadened and flattened. Tegmen attached to median lobe at some distance from the ventral or posterior edge of the median foramen. Flagellum not protruding. Spiculum gastrale consisting of four arms.

Genus Crioceris

Crioceris asparagi (L.) Figs. 62, 51, 57.

Median lobe tubular and curved. Apex of median lobe rounded and with two lobes laterally. Apical orifice almost terminal. Basal foramen about one third the length of the median lobe, its anterior margin recurved and forming a pocket. The tegmen is Y-shaped with a large keel-like strut possessing a tooth on its dorsal margin (Fig. 57). Spiculum gastrale consisting of 4 arms, 2 of which are weakly chitinised (Fig. 51). Internal sac short; a narrow median dorsal plate and a prominent lateral plate at each side of the orifice.

Genus Lilioceris

Lilioceris lilii (Scop.) Figs. 67, 50, 56.

As in Crioceris but basal foramen much smaller and apex of median lobe rounded. Spiculum gastrale consisting of 4 arms, joined in the form of a ring (Fig. 50). Tegmen Y-shaped, base strongly laterally flattened (Fig. 56). Length median lobe 1.779mm, greatest width 0.423mm.

Genus Lema

Spiculum gastrale as in Crioceris and Lilioceris but tegmen less strongly laterally flattened.

Lema lichensis Voet. Figs. 65, 55, 60. As in Crioceris but apex of median lobe rounded. Length of median lobe 0.961mm, greatest width 0.263mm.

Lema melanopa (L.) Figs. 64, 54, 61. Apex of median lobe square. Length of median lobe 1.356mm, greatest width 0.321mm.

Lema puncticollis Curt. Figs. 63, 53, 59. Apex of median lobe slightly bilobed. Length of median lobe 0.942mm, greatest width 0.269mm.

Lema erichsoni Suf. Figs. 66, 52, 58. Apex of median lobe rounded as in L. lichensis.

v. CRYPTOCEPHALINAE

Cryptocephalus

Aedeagus of the incomplete type lacking a lateral lobe. Tegmen Y-shaped attached to the ventral or posterior edge of the median foramen. Base of tegmen partly laterally and partly dorso-ventrally flattened. Flagellum usually not protruding. Internal sac long and chitinous. Basal foramen large. The apical hood, a distinctly chitinised projection from the junction of the internal sac and the dorsal wall of the aedeagus may extend posteriorly above the apical orifice. This hood cannot be retracted into the aedeagus. The apex of the median lobe may bear setae as in C. aureolus Suf. and C. hypochoeridus Suf. The spiculum gastrale is Y-shaped, with the free arms short. The apex of the median lobe varies in shape and species groups are shown in Table 2 using this character.

TABLE 2. Species groups in Cryptocephalus.

Apex truncate and setate	Apex trilobed	Apex lanceolate without lateral lobes	Apex lanceolate with lateral lobes
C. aureolus Suf.	C. pusillus F.	C. decemmaculatus (L.)	C. nitidulus F.
C. hypochoeridis Suf.	C. frontalis Marsh	C. parvulus Müll.	C. moraei (L.)
	C. punctiger Pk.		C. coryli (L.)
	C. fulvus Goez.		C. primarius Har.
	C. bilineatus (L.)		C. bipunctatus (L.)
	C. labiatus (L.)		C. biguttatus Scop.
	C. exiguus Schn.		

Median lobe

C. aureolus Suf. Fig. 83. Length 2.436mm, greatest width 0.973mm. Spiculum gastrale Y-shaped Fig. 42.

C. hypochoeridis Suf. Fig. 84. Length 1.808mm, greatest width 0.673mm. spiculum gastrale Y-shaped Fig. 43.

C. pusillus F. Fig. 74. Length 1.077mm, greatest width 0.248mm.

C. frontalis Marsh. Figs. 75, 81. Length 1.157mm, greatest width 0.262mm.

C. punctiger Pk. Fig. 76. Length 0.894mm, greatestwidth 0.221mm.

C. fulvus Goez. Fig. 71. Length 0.932mm, greatest width 0.262mm.

C. bilineatus (L.) Fig. 72. Length 0.592mm, greatest width 0.177mm.

C. labiatus (L.) Fig. 73. Length 0.961mm, greatest width 0.263mm. spiculum gastrale Y-shaped Fig. 41.

C. decemmaculatus (L.) Fig. 70. Length 1.231mm, greatest width 0.467mm.

C. parvulus Müll. Fig. 77. Length 1.048mm, greatest width 0.311mm.

C. nitidulus F. Fig. 68. Length 1.385mm, greatest width 0.452mm.

C. moraei (L.) Fig. 69. Length 1.161mm, greatest width 0.385mm.

C. coryli (L.) Fig. 86. Length 1.635mm, greatest width 0.548mm.

C. primarius Har. Fig. 78. Length 1.635mm, greatest width 0.538mm.

C. sexpunctatus (L.) Fig. 85. Length 1.711mm, greatest width 0.861mm.

C. bipunctatus (L.) Fig. 79. Greatest width 0.596mm.

C. biguttatus Scop. Fig. 80.

C. exiguus Schn. Fig. 82.

vi. CLYTRINAE

Genus Clytra

Clytra quadripunctata (L.) Figs. 87, 46, 47.

Similar to *Cryptocephalus*. Apex of median lobe much broader than the proximal part, bearing long setae and a small rounded lip terminally. Complex armature of the internal sac distinct. Spiculum gastrale stout, Y-shaped with the 2 free arms short, (Fig. 47). Tegmen similar to spiculum gastrale (Fig. 46). Length of median lobe 2.25mm, greatest width 0.658mm.

Genus Labidostomis

Labidostomis tridentata (L.) Figs. 89, 44, 45.

Similar to *Cryptocephalus*. Apex of median lobe lanceolate, slightly broader than the proximal part. Median lobe parallel-sided, no constriction at the mid-point, only slightly curved in lateral view. Apical hood a simple plate, not greatly elevated. Spiculum gastrale stout, T-shaped with the free arms longer than the fused arm (Fig. 45). Tegmen similar to spiculum gastrale (Fig. 44). Length of median lobe 2.096mm, greatest width 0.673mm.

Genus Gynandrophthalma

Gynandrophthalma affinis (Hell.) Figs. 90, 48, 49.

Similar to *Labidostomis*. Apex of median lobe spatulate, much broader than proximal part. Median lobe with constriction at mid-point and slightly more curved in lateral view than *Labidostomis*. Spiculum gastrale Y-shaped, more slender and smaller than in *Clytra* and *Labidostomis* (Fig.49). Tegmen Y-shaped, stouter than spiculum gastrale (Fig. 48). Length of median lobe 1.15mm, greatest width 0.317mm.

vii. CASSIDINAE

Genus Cassida

Aedeagus of the incomplete type without lateral lobes. Tegmen Y-shaped and attached to the ventral or posterior edge of the median foramen. Base of tegmen almost entirely dorso-ventrally flattened. Internal sac usually shorter than the median lobe. Median lobe strongly curved in side-view. Flagellum not protruding. Spiculum gastrale absent.

Cassida flaveola Thunb. (Fig. 91) Apex of median lobe rounded and median lobe parallel-sided. Length 1.21mm, greatest width 0.32mm.

Cassida viridis L. (Fig. 92) Apex of median lobe rounded bearing a small rounded lip. Length 1.44mm, greatest width 0.36mm.

Cassida fastuosa Schal. (Fig. 93) Apex of median lobe square, bearing a small lip with the posterior edge straight. Length 1.009mm, greatest width 0.29mm.

Cassida sanguinolenta Müll. (Fig. 94) Apex of median lobe square bearing a small lip with the posterior edge straight. Length 1.163mm, greatest width 0.23mm.

Cassida nebulosa L. (Fig. 95) Apex bearing a broad lip with the posterior edge slightly concave. Length 1.086mm, greatest width 0.298mm.

Cassida murraea L. (Fig. 99) Proximal and apical parts yellow brown mid-part dark brown. Apex as in C. viridis but tip slightly bilobed. Length 1.574mm.

Cassida vittata Vill. (Fig. 96) Apex of median lobe rounded, bearing a small round lip. Length 1.106mm, greatest width 0.231mm.

Cassida rubiginosa Müll. (Fig. 97) Apex of median lobe spatulate. Length 1.44mm, greatest width 0.25mm.

Cassida vibex L. (Figs. 98 & 143) Apex of median lobe as sanguinolenta but less constricted proximally. Length 1.301mm, greatest width 0.276mm.

viii. CHRYSOMELINAE

Aedeagus of the incomplete type lacking the lateral lobe. The tegmen is attached to the median lobe at some distance from the ventral or posterior edge of the median foramen. The base of the tegmen is not distally laterally broadened and flattened. The ejaculatory duct connects with or passes through a heavily chitinised and larger tube-like structure, the flagellum,which sometimes protrudes from the apical orifice.

Genus Timarcha

(Figs. 100, 36, 265).

The tegmen is ring-like and forms the lateral lobe dorsal to the median lobe. The lateral lobe (tegmental cap) bears numerous setae at its apex and does not reach the apex of the median lobe. Ventrally the tegmen forms a small basal piece. The heavily chitinised median lobe is divided proximally into two lami form struts, which are over 1/3 the length of the median lobe. The internal sac is long, uncomplex and protrudes between the two median struts. An elongated stout flagellum lies within the internal sac, but does not protrude from the apical orifice. The basal foramen is 1/3, while the apical orifice is about 1/4 the length of the median lobe. The spiculum gastrale is complex. It consists of 2 chitinised pieces. A T-shaped piece lying dorsal to a larger V-shaped piece. These lie dorsal to the apex of the median lobe as in Fig. 36.

T. tenebricosa (F.) Figs. 100, 36.

Apex of median lobe truncate, posterior edge slightly bilobed. Median lobe after apex gradually broadening to about 1/5 the length after which it is parallel-sided. Median lobe length 3.981mm, greatest width 1.154mm.

T. coriaria (Laich.) Fig. 101.

Apex of median lobe pointed, posterior edge slightly bilobed. Median lobe after apex gradually broadening to about 1/4 the length after which it is almost parallel-sided. Median lobe length 2,308mm, greatest width 0.76mm.

Genus Chrysolina

Spiculum gastrale Y or V-shaped, when V-shaped consisting of 2 arms equal in length and joined by connective tissue. Flagellum may be curved and slender and may protrude from the apical orifice. Tegmen V-shaped. Apex of median lobe variable in shape.

Chrysolina cerealis (L.) Fig. 103.

Apex of median lobe nearly straight, consisting of 3 small lobes, median lobe almost parallel-sided. Length 2.025mm, greatest width 0.604mm.

Chrysolina marginalis (Duft.) Fig. 104.

Apex of median lobe rounded, median lobe broadening very slightly to apex. Length 2.354mm, greatest width 1.00mm.

Chrysolina staphylea (L.) Fig. 105.

Apex of median lobe a semi-hexagon, median lobe broadening slightly to apex. Length 2.104mm, greatest width 0.604mm.

Chrysolina banksi (F.) Fig. 106.

Apex of median lobe bilobed, median lobe almost parallel-sided. Length 2.33mm, greatest width 0.573mm.

Chrysolina hyperici (Forst.) Fig. 107.

Apex of median lobe spatulate, broadening just behind apex, median lobe almost parallel-sided. Length 1.70mm, greatest width 0.458mm.

Chrysolina polita (L.) Fig. 108.

Apex of median lobe gently rounded, median lobe almost parallel-sided. Length 1.833mm, greatest width 0.475mm. Spiculum gastrale V-shaped but consisting of 2 arms united by connective tissue at the base.

Chrysolina goettingensis (L.) Fig. 109.

Apex of median lobe very gently rounded, median lobe parallel-sided. Length 3.146mm, greatest width 0.875mm.

Chrysolina fastuosa (Scop.) Figs. 110, 261.

Apex of median lobe indistinctly bilobed, with a wing-like expansion just behind each lobe, median lobe broadening gently from the expansion to the proximal end. Length 1.466mm, greatest width 0.416mm.

Chrysolina graminis (L.) Fig. 111.

Apex of median lobe rounded, median lobe parallel-sided. Spiculum gastrale stout and Y-shaped. Length 2.566mm, greatest width 0.85mm.

Chrysolina menthastri (Suf.) Fig. 112.

Apex of median lobe rounded. Median lobe with constriction just behind apex and broadening to proximal end. Length 1.846mm, greatest width 0.625.

Chrysolina orichalcea (Müll.) Fig. 113.

Apex of median lobe very gently rounded, median lobe broadest behind apex, narrowest at mid-point. Apical hood bilobed. Flagellum protruding from apical orifice. Length 1.75mm, greatest width 1.00mm.

Chrysolina brunsvicensis (Gr.) Fig. 114.

Apex of median lobe rounded, median lobe almost parallel-sided, slightly narrower behind apex. Flagellum broad and may protrude. Length 2.896mm, greatest width 0.55mm.

Chrysolina haemoptera (L.) Fig. 115.

Median lobe broad, apex slightly bilobed, constriction at mid-point. Length 1.583mm, greatest width 0.979mm.

Chrysolina marginata (L.) Fig. 116.

Apex of median lobe truncate, this part representing almost 1/5 the length of the median lobe, then broadening becoming parallel-sided but with proximal constriction. Length 1.958mm, greatest width 0.604mm.

Chrysolina varians (Schal.) Fig. 117.

Apex of median lobe straight, lateral edges gently rounded, median lobe almost parallel-sided. Flagellum may protrude. Length 1.80mm, greatest width 0.483mm.

Chrysolina sanguinolenta (Müll.) Figs. 118, 262.

Apex of median lobe similar to C. marginalis (Duft.), but more pointed and with constriction proximally. Flagellum protruding. Apical hood distinct.

Genus Phytodecta

Median lobe not strongly curved in lateral view. Flagellum usually long and slender and protruding from the apical orifice. Spiculum gastrale V-shaped.

P. rufipes (Deg.) Fig. 119.

Apex of median lobe greatly truncated, posterior edge straight, apex about 1/5 the length of the median lobe. Median lobe parallel-sided. Flagellum long, slender and protruding. Length median lobe 2.30mm, greatest width 0.44mm.

P. viminalis (L.) Fig. 120.

Apex of median lobe truncated, posterior edge gently rounded, constriction behind apex. Median lobe gradually broadening from constriction to posterior end. Flagellum with apex bilobed, protruding slightly. Length of median lobe 2.22mm, greatest width 0.52mm.

P. pallida (L.) Figs. 121, 263.

Apex of median lobe straight. Median lobe gently broadening from behind apex to about 1/5 the length, then narrowing gently to the proximal end. Flagellum with apex bifid, protruding slightly. Length of median lobe 1.98mm, greatest width 0.44mm.

P. olivacea (Forst.) Figs. 122, 264.

Median lobe asymmetrical, apex distorted to one side. Flagellum not protruding. Length of median lobe 1.40mm, greatest width 0.43mm.

Genus Chrysomela

Tegmen Y-shaped. Spiculum gastrale delicate, broadly U-shaped, not separated into two arms. Flagellum not protruding.

C. populi L. Figs. 124, 266.

Apex of median lobe straight, rapidly broadening after apex, and then more gently broadening to the proximal end. Median lobe length 2.385mm, greatest width 1.009mm.

C. aenea L. Fig. 126

Apex of median lobe straight, gradually broadening and becoming parallel-sided for most of its length. Median lobe length 1.949mm, greatest width 0.443mm.

C. tremulae F. Fig. 125

Apex of median lobe rounded, broadening behind apex into two wing-like expansions. Constricted behind expansions and then broadening gently to the proximal end. Median lobe length 2.467mm, greatest width 1.012mm.

Genus Phyllodecta

Tegmen Y-shaped. Spiculum gastrale V-shaped, consisting of one long and one short arm not fused together but joined by connective tissue. Median lobe strongly curved in lateral view and flagellum not protruding.

P. vulgatissima (L.) Fig. 136

Apex of median lobe a round lip, behind lip rapidly broadening, and then gently narrowing to a constriction about mid-way along the median lobe. Broadening gently proximally after constriction. Median lobe length 1.731mm, greatest width 0.508mm.

P. vitellinae (L.) Figs. 137, 268

Apex of median lobe a small lip with posterior edge very slightly concave. Behind apex gently broadening and then narrowing to a slight constriction about mid-way along the median lobe. Median lobe length 1.373mm, greatest width 0.481mm.

P. laticollis Suf. Fig. 138

Apex of median lobe almost straight, gradually broadening after apex and then gently narrowing to proximal end. Median lobe length 1.019mm, greatest width 0.442mm.

P. polaris Schn. Fig. 143

Apex of median lobe a slightly bilobed lip, afterwards gently broadening and narrowing to a constriction about 0.3mm from the apex. Median lobe length 1.442mm, greatest width 0.433mm.

Genus Phaedon

Median lobe curved almost in the form of a semi-circle in lateral view. Central or median channel on dorsal surface very broad. Spiculum gastrale V-shaped, one arm slightly longer than the other. Arms not fused but joined together by connective tissue.

P. tumidulus (Germ.) Figs. 129, 269

Apex of median lobe rounded spatulate. Median lobe broadening after the middle to the proximal end. Median lobe length 0.808mm, greatest width 0.283mm.

P. armoraciae (L.) Fig. 130

Apex of median lobe gently rounded, spatulate, broader than P. tumidulus (Germ.) Median lobe not broadening after the middle but narrowing slightly. Median lobe length 0.817mm, greatest width 0.346mm.

P. concinnus Steph. Fig. 131

Apex of median lobe gently rounded, spatulate, broader than P. tumidulus (Germ.) but narrower than P. armoraciae (L.) Median lobe broadening after apex to proximal end. Median lobe length 0.846mm, greatest width 0.288mm.

P. cochleariae (F.) Fig. 132

Apex of median lobe very gently convex, broad. Median lobe broadening after apex to mid-poin t and then broadening slightly to proximal end. Median lobe length 0.654mm, greatest width 0.311mm.

Genus Hydrothassa

Central channel of median lobe broad. Tegmen Y-shaped. Spiculum gastrale V-shaped, one arm slightly longer than the other. Arms not fused together but joined by connective tissue. Flagellum not protruding.

H. marginella (L.) Figs. 133, 270

Apex of median lobe round, spatulate. Median lobe gradually broadening after apex to proximal end. Median lobe length 0.706mm, greatest width 0.25mm.

H. hannoverana (F.) Fig. 134

Apex of median lobe square. Median lobe gradually broadening after apex to proximal end. Median lobe length 0.765mm, greatest width 0.294mm.

H. aucta (L.) Figs. 135, 271

Apex of median lobe square but not as broad as H. hannoverana (F.) Median lobe broadening after apex and then almost parallel-sided to mid-point. Broadening after mid-point to proximal end. Median lobe length 0.735mm, greatest width 0.256mm.

Genus Prasocuris

Proximal 1/3 of median lobe curved at nearly 90° to apical part. Central channel of median lobe broad. Spiculum gastrale not dissected.

P. phellandrii (L.) Fig. 127

Apex of median lobe spatulate. Median lobe slightly constricted after apex but then broadening slightly to proximal end. Median lobe length 0.981mm, greatest width 0.269mm.

P. junci (Brahm.) Fig. 128

Apex of median lobe spatulate, narrower than P. phellandrii (L.) Median lobe parallel-sided, not constricted after apex. Median lobe length 0.577mm, greatest width 0.181mm.

Genus Gastroidea

G. polygoni (L.) Figs. 2, 140

Apex of median lobe square, bearing a small central lobe. Median lobe very gradually broadening to proximal end. Upper surface of apex with a deep, broad groove in the median line from the orifice to the apex. The lateral margins of the groove elevated in sharp ridges. Apical hood broad, bilobed at the posterior end and its side margins bent downward extending posteriorly above the orifice. Basal foramen large, almost half length of the median lobe. Anterior margin of foramen with a short cleft in the median line. Tegmen Y-shaped. Spiculum gastrale not dissected.

Internal sac short, bearing pairs of curved and looped plates near its closed end. Flagellum short, tubular, lying between the plates in the median line. A slender ejaculatory duct passes through the flagellum. Median lobe length 1.048mm, greatest width 0.423mm.

Gastroidea viridula (De G.) Figs. 141, 142

Apex of median lobe more pointed than in G. polygoni (L.) and the central apical lobe longer. Median lobe after apex almost parallel-sided. Spiculum gastrale not dissected. Median lobe length 1.163mm, greatest width 0.490mm.

Genus Plagiodera

P. versicolora (Laich.) . Figs. 139, 267

Apex of median lobe pointed. Median lobe after apex broadening and then narrowing to almost the mid-point. Parallel-sided after the mid-point. Apical hood broad, partly covering the apical orifice. Basal foramen more than 1/3 the length of the median lobe. Tegmen Y-shaped, the extremities pointed. Spiculum gastrale, slender U-shaped, one arm longer than the other. Spiculum about 3/4 the length of the aedeagus. The internal sac with a chitinous piece at its closed end. Flagellum broad posterior to the chitinous piece and not protruding. A slender ejaculatory duct with a thistle-shaped end projects into the flagellum. Median lobe length 0.961mm, greatest width 0.254mm.

IX. LAMPROSOMATINAE

Genus Lamprosoma

L. concolor (Stm.) Fig. 123

Apex of median lobe spatulate, median lobe narrowed at the mid-point. Apex bearing a few short setae, surrounding the apical orifice. Tegmen stout, Y-shaped, dorso-ventrally flattened. Spiculum gastrale absent.

x. GALERUCINAE

Aedeagus of the incomplete type, lacking the lateral lobe. The median lobe is usually a strongly chitinised piece with the tegmen V- or Y-shaped, the base of which may be in the form of a hook. The tegmen is attached to the median lobe far from the ventral or posterior edge of the median foramen. The base of the tegmen is not distally laterally broadened or flattened. The flagellum is indistinct and never protrudes. The basal foramen is comparatively small and the spiculum gastrale when present is Y-shaped or V-shaped, one arm usually being longer than the other.

Genus Sermyla

S. halensis (L.) Figs. 145, 161

Apex of median lobe gently rounded bearing a small central lip. Median lobe narrowing slightly from behind apex to proximal end and slightly curved in lateral view. Tegmen Y-shaped, arms equal in length. Spiculum gastrale V-shaped, smaller than tegmen, (Fig. 161), the 2 arms equal in length and joined by connective tissue. Median lobe length 1.788mm, greatest width 0.385mm.

Genus Phyllobrotica

P. quadrimaculata (L.) Figs. 144, 162

Apex of median lobe pointed, broadening and narrowing slightly behind apex. Median lobe broadening slightly from mid-point to proximal end. In lateral view median lobe curved almost in the form of a semi-circle. Tegmen Y-shaped, one arm slightly longer than the other. Spiculum gastrale Y-shaped larger than tegmen, one arm slightly longer than the other (Fig. 162). Median lobe length 1.869mm, greatest width 0.385mm.

Genus Luperus

Median lobe slender, usually not heavily chitinised, Apex of median lobe curved upwards.

Luperus longicornis F. Figs. 156, 165

Apex of median lobe bilobed, laterally bearing a wing-like expansion. Median lobe broadening very gradually from behind expansions to proximal end. Tegmen and spiculum gastrale Y-shaped and almost equal in size, (Fig. 165). Median lobe length 0.798mm, greatest width 0.125mm.

Luperus flavipes L. Figs. 157, 164

Apex of median lobe bilobed, lateral expansions smaller than in L. longicornis F. Median lobe broadening from behind apex to proximal end. Tegmen Y-shaped. Spiculum gastrale V-shaped, the two arms joined by connective tissue. The spiculum gastrale may be Y-shaped with one arm shorter than the other, and the two arms are fused together over half their length. Median lobe length 0.548mm, greatest width 0.103mm. (Fig. 164).

Luperus circumfusus Marsh. Figs. 158, 163

Apex of median lobe rounded, without wing-like expansions. Median lobe parallel-sided in apical half, then gradually broadening to proximal end. Apex of median lobe curved upwards. Tegmen stout, Y-shaped, arms fused over half their length. Spiculum gastrale Y-shaped, larger than tegmen and 2 arms fused over one eighth of their length (Fig. 163).

Genus Agelastica

Agelastica alni (L.) Figs. 146, 166

Apex of median lobe lanceolate, broadening and narrowing slightly to mid-point, then gradually broadening to proximal end. In lateral view median lobe only slightly curved. Apex curved downwards. Tegmen stout, Y-shaped, one arm slightly longer than the other (Fig. 166). Spiculum gastrale absent. Median lobe length 1.85mm, greatest width 0.338mm.

Genus Galeruca

Galeruca tanaceti (L.) Figs. 147, 169

Apex of median lobe spatulate, blunt, narrow. Median lobe broadening rapidly behind apex, but becoming almost parallel-sided from the mid-point to the proximal end. Apex curved downwards. In lateral view not as strongly curved as in P. quadrimaculata (L.) Tegmen V-shaped, one arm longer than the other and the arms bowed inwards in the middle (Fig. 169). Spiculum gastrale absent. Median lobe length 2.42mm, greatest width 0.815mm.

Galeruca circumdata Duft. Fig. 148

Apex of median lobe lanceolate. Median lobe slightly constricted behind apex, but broadening gradually from before the mid-point to the proximal end. Apex curved downwards. Curvature in lateral view as with G. tanaceti (L.) Median lobe length 1.985mm, greatest width 0.646mm.

Genus Galerucella

Tegmen Y-shaped bearing basal hook. Spiculum gastrale absent.

Galerucella viburni (Pk.) Figs. 149, 167

Apex of median lobe pointed, bearing centrally a lip. Lip with apical edge straight. Median lobe parallel-sided for the majority of its length. Tegmen Y-shaped (Fig. 167). Median lobe length 1.481mm, greatest width 0.404mm.

Galerucella lineola (F.) Figs. 150, 170

Apex of median lobe lanceolate. Median lobe gradually broadening from apex to mid-point and thereafter narrowing to proximal end. Tegmen as in Fig. 170. Median lobe length 1.358mm, greatest width 0.338mm.

Galerucella grisescens (Joan.) Fig. 151

Apex of median lobe lanceolate, more pointed than G. lineola F. Median lobe broadest before mid-point and thereafter almost parallel-sided. Tegmen, Y-shaped, arms almost equal in length. Arms fused over half their length and with a hook at the apex of this fused arm. Median lobe length 1.481mm, greatest width 0.288mm.

Galerucella tenella (L.) Fig. 152

Apex of median lobe gently rounded. Median lobe broadening gradually from apex to just after the mid-point and thereafter almost parallel-sided. Median lobe length 0.985mm, greatest width 0.30mm.

Galerucella calmariensis (L.) Figs. 153, 168

Apex of median lobe spatulate. Median lobe broadening very gradually from behind apex to mid-point and then narrowing slightly to proximal end. In lateral view median lobe almost straight in apical 2/3, curved almost at 90° in the proximal 1/3. Apex of median lobe curved downwards. Median lobe length 1.673mm, greatest width 0.269mm. Tegmen Y-shaped as in Fig. 168.

Galerucella pusilla (Duft.) Fig. 154.

Apex of median lobe lanceolate, slightly less pointed than G. lineola F. Median lobe broadening very slightly from behind apex to just after mid-point and thereafter narrowing slightly to proximal end. Median lobe length 1.269mm, greatest width 0.315mm.

Galerucella nymphaeae (L.) Fig. 155

Apex of median lobe lanceolate. Median lobe almost parallel-sided from just behind apex. Median lobe length 2.11mm, greatest width 0.279mm.

Genus Lochmaea

Median lobe weakly chitinised. In lateral view median lobe bent acutely before the mid-point. Apex of median lobe curved upwards or almost straight. Tegmen large Y-shaped about 2/3 the length of the aedeagus, bearing basal hook. Spiculum gastrale absent.

Lochmaea crataegi (Forst.) Figs. 160, 171

Apex of median lobe spatulate bearing a small lip centrally. Median lobe constricted slightly behind apex and broadening slightly to just after the mid-point. Broadening from just after mid-point to the proximal end. In lateral view the apical half of the median lobe is curved upwards whereas in all other species it is either straight or curved downwards. Median lobe length 1.706mm, greatest width 0.234mm. Spiculum gastrale absent. Tegmen Y-shaped as in Fig. 171.

Lochmaea capreae (L.) Figs. 159, 172

Shape of median lobe in dorsal view similar to that of L. crataegi Forst. In lateral view the apical half of the median lobe is curved downwards and the apex curved upwards. Tegmen Y-shaped as in Fig. 172. Median lobe length 1.67mm, greatest width 0.229mm.

Lochmaea suturalis (Th.)

Tegmen Y-shaped, arms unequal in length and fused along less than half their length.

xi. HALTICINAE

Aedeagus of the incomplete type, lateral lobes absent . Tegmen Y-shaped, attached to the median lobe at some distance from the ventral or posterior edge of the median foramen. Base of tegmen not usually distally laterally broadened and flattened. Spiculum gastrale present, usually V-shaped, composed of 2 free arms, one longer than the other, or sometimes Y-shaped when distinct fusion of the arms occurs.

Genus Haltica

Median lobe almost straight in lateral view, sometimes distinctly sulcate.

H. oleracea (L.) Figs. 174, 287, 308

Apex of median lobe broad, slightly pointed, without lip. Median lobe narrowing behind apex and almost parallel-sided to the proximal end. Tegmen stout Y-shaped, inner sides of free arms crenate. Spiculum gastrale Y-shaped, arms fused over 1/3 their length. Median lobe length 1.09mm.

H. britteni Shp. Fig. 175

Apex of median lobe more blunt, bearing centrally a rounded lip. Median lobe narrowing gently from apex to proximal end. Median lobe length 1.12mm.

H. palustris Weise Fig. 176

Apex of median lobe as H. britteni Shp. but median lobe narrower and narrowing more gently from apex to proximal end. Median lobe length 1.024mm.

H. brevicollis Foud. Fig. 177

General shape very similar to H. britteni Shp. but median lobe slightly smaller, and lip not so distinct in lateral view. Median lobe length 1.057mm.

H. pusilla Duft. Fig. 178

Apex of median lobe pointed, bearing centrally a small rounded lip. Median lobe narrowing more sharply to proximal end. Median lobe length 0.991mm.

H. lythri Aub. Fig. 179

General shape of median lobe similar to H. oleracea L. but apex more blunt and bearing a distinct central lip. Also lateral sulcations very distinct. Median lobe length 1.288mm.

Genus Chalcoides

Median lobe quite strongly curved in lateral view and without sulcations.

C. plutus (Lat.) Fig. 180

Apex of median lobe lanceolate. Median lobe narrowing slightly behind apex gradually broadening to the proximal end. Median lobe length 0.634mm.

C. fulvicornis (F.) Fig. 181

Apex of median lobe lanceolate, but less sharply pointed than in C. plutus (Lat.) Median lobe also not laterally broadened behind apex but broadening very gradually to the proximal end. Median lobe length 0.651mm.

C. aurata (Marsh) Figs. 182, 298, 309

Apex of median lobe rounded. Median lobe slightly constricted behind the apex and very gradually broadening to the proximal end. Tegmen Y-shaped, arms fused along half their length. Spiculum gastrale V-shaped, arms curved. Median lobe length 0.68mm.

C. aurea (Geof.) Fig. 183

Apex of median lobe slightly bilobed. Median lobe almost parallel-sided from behind apex to mid-point. After mid-point broadening strongly to proximal end. Apical hood distinct in lateral view. Median lobe length 0.805mm.

C. nitidula (L.) Fig. 184

Apex of median lobe spatulate and strongly curved upwards.

Genus Psylliodes

Median lobe quite strongly curved in lateral view. Apical hood usually distinct. Tegmen Y-shaped, base strongly laterally flattened and

2 free arms reduced in length. Spiculum gastrale V-shaped, the 2 arms only weakly fused by connective tissue.

P. affinis (Pk.) Figs. 185, 315

Apex of median lobe rounded bearing a small central lip. Median lobe broadening very gradually from just behind apex to proximal end. Length 0·86mm

P. marcida (Ill.) Fig. 186

Apex of median lobe lanceolate. Median lobe with a slight constriction at the mid-point. Apical hood very distinct. Median lobe length 0.884mm.

P. picina (Marsh) Figs. 187, 273, 311

Apex of median lobe similar to P. affinis (Pk.) but more blunt. Median lobe with slight constriction at the mid-point. Apical hood absent. Median lobe length 0.85mm.

P. dulcamarae (Koch.) Fig. 188

Apex of median lobe lanceolate, bearing a broad central lip. Median lobe gently constricted at the mid-point. Apical hood very distinct. Median lobe length 1.122mm.

P. napi (F.) Figs. 189, 272, 310

Apex of median lobe round. Median lobe broadening very slightly from the apex to the proximal end. Median lobe length 0.793mm.

P. cuprea (Koch.) Fig. 190

Apex of median lobe lanceolate. The apical hood almost reaching the apex. Median lobe constricted slightly before the mid-point and broadening gradually to the proximal end. Median lobe length 0.805mm.

P. chrysocephala (L.) Figs. 191, 274, 314

Apex as cuprea (Koch.) Median lobe length 1.07mm.

P. attenuata (Koch.) Fig. 192

Apex lanceolate, as marcida but more pointed. Median lobe length 0.790mm.

P. cyanoptera (Ill.) Fig. 193

Apex distinctly bilobed. Median lobe length 1.198mm.

P. chalcomera (111.) Fig. 194

Apex rounded, slightly more pointed than hyoscyami (L.) Median lobe length 1.11mm.

P. hyoscyami (L.) Fig. 195

Apex rounded,spatulate. Median lobe length 1.000mm.

P. luteola (Müll.) Fig. 196

Apex rounded, spatulate but slightly pointed. Median lobe length 1.012mm.

Genus Chaetocnema

Median lobe quite strongly curved in lateral view. Apical hood distinct. Tegmen Y-shaped, the 3 arms equal in length. Spiculum gastrale V-shaped.

C. concinna (Marsh) Figs. 199, 285, 321

Apex of median lobe pointed,bearing a small central lip. Median lobe narrowing gently from apex to mid-point and then gradually broadening to proximal end. Median lobe length 0.73mm.

C. hortensis (Geof.) Fig. 201

Apex of median lobe pointed,bearing a small central lip. Median lobe almost parallel-sided. More strongly curved in lateral view than C. concinna. Median lobe length 0.653mm.

C. subcoerulea Kuts. Fig.197.

Apex rounded, with distinct lip with apical edge straight.

C. conducta Mots. Fig.198.

Apex lanceolate, without lip. Median lobe almost straight in lateral view.

C. sahlbergi (Gyll.) Fig.200.

Apex lanceolate with lip, larger than C. subcoerulea and with apical edge rounded.

C. arida (Foud.) Fig. 202

Apex as sahlbergi but narrower throughout.

C. confusa Boh. Fig. 203

Apex rounded, but slight lip present, with apical edge straight.

Genus Phyllotreta

Median lobe weakly to quite strongly curved in lateral view. Tegmen Y-shaped, 3 slender arms almost equal in length. Spiculum gastrale V-shaped, sometimes Y-shaped.

P. vittula Redt. Fig. 205

Apex of median lobe rounded, bearing a central lip. Median lobe almost parallel-sided. Median lobe length 0.634mm.

P. undulata Kuts. Fig. 207

Apex of median lobe straight. Median lobe broadening behind apex and becoming almost parallel-sided. Median lobe length 0.80mm.

P. nemorum (L.) Figs. 206, 289, 312

Apex of medium lobe trilobed, the central lobe the largest and with posterior edge straight. Median lobe gently narrowing from apex to mid-point and gently broadening to the proximal end. Spiculum gastrale Y-shaped, arms fused along 1/8 of their length and apex of free arms curved. Median lobe length 0.89mm.

P. ochripes Curt. Fig. 204

Apex of median lobe sinuate, bearing a central lip. Median lobe narrowed slightly behind apex but very gradually broadening to the proximal end. Median lobe length 0.762mm.

P. tetrastigma Com. Fig. 210

Apex of median lobe rounded. Median lobe gently broadening from apex to proximal end. Median lobe length 1.042mm.

P. nigripes (F.) Fig. 208

Apex of median lobe pointed, bearing a large central lobe. Median lobe almost parallel-sided, and almost straight in lateral view. Median lobe length 0.721mm.

P. nodicornis (Marsh.) Fig. 209

Apex of median lobe lanceolate. Median lobe broadening gently from the apex to the proximal end. Median lobe length 0.689mm.

P. consobrina Curt. Fig. 211

Apex of median lobe rounded. Median lobe narrowing gently from apex to mid-point and then broadening gently to the proximal end. Median lobe length 0.593mm.

P. exclamationis (Th.) Fig. 212

Apex of median lobe almost straight, bearing a central rounded lip. Median lobe almost parallel-sided. Median lobe length 0.609mm.

P. punctulata Brit.Cat. Fig. 213

Apex of median lobe rounded, bearing a small central lip. Median lobe very slightly constricted at the mid-point. Median lobe length 0.746mm.

P. atra (F.) Fig. 214

Apex of median lobe round. Median lobe slightly broader in the apical half. Median lobe length 0.63mm.

P. cruciferae (Goez.) Figs. 215, 290, 313

Tegmen Y-shaped, slender, 3 arms almost equal in length. Spiculum gastrale V-shaped, arms sinuate. Median lobe length 0.59mm.

P. sinuata Steph. Fig. 216

Apex as cruciferae, but median lobe longer and more narrowed behind apex. Median lobe length 0.82mm.

P. flexuosa (Ill.) Fig. 217

Apex rounded. Median lobe length 0.98mm.

Genus Sphaeroderma

S. rubidum Graëlls. Figs. 219, 278, 318

Apex of median lobe lanceolate. Median lobe almost parallel-sided. Apical hood indistinct in lateral view. Tegmen Y-shaped. Spiculum gastrale V-shaped, arms apparently fused. Median lobe length 0.89mm.

S. testaceum (F.) Figs. 220, 277, 317

Apex of median lobe lanceolate, bearing a broad rounded lip centrally. Median lobe slightly constricted before the mid-point. Apical hood very distinct in lateral view. Tegmen Y-shaped, arms only weakly joined. Median lobe length 0.96mm.

Genus Crepidodera

C. transversa (Marsh.) Fig. 223

Apex of median lobe lanceolate, pointing upwards. Median lobe broadening behind apex, then gently narrowing to the proximal end. Median lobe length 1.906mm.

C. ferruginea (Scop.) Figs. 224, 293, 305

Apex of median lobe lanceolate, broadening more rapidly than C. transversa. Median lobe narrowing gently behind apex and becoming almost parallel-sided. Tegmen stout, Y-shaped, arms fused along almost 2/3 of their length. Spiculum gastrale V-shaped, arms apparently fused. Median lobe length 1.41mm.

C. impressa (F.) Fig. 222

Apex as in C. ferruginea but more pointed and more strongly constracted posterior to apex.

Genus Derocrepis

D. rufipes (L.) Figs. 225, 297, 307

Apex of median lobe spatulate. Median lobe broadening gently after apex and becoming almost parallel-sided. Median lobe strongly curved in lateral view. Tegmen Y-shaped, more slender than in C. ferruginea and arms fused along more than half their length. Spiculum gastrale Y-shaped, arms fused along almost an eighth of their length. Median lobe length 1.32mm.

Genus Mantura

M. rustica L. Figs. 228, 283, 304

Apex of median lobe spatulate. Median lobe broadening very gradually from the apex to the mid-point and then gently narrowing. Median lobe strongly curved in lateral view. Tegmen Y-shaped. Spiculum gastrale V-shaped, arms joined weakly by connective tissue. Median lobe length 0.506mm.

M. matthewsi Steph. Fig. 229

Apex of median lobe spatulate. Median lobe narrowing gradually from the apex to the proximal end. Median lobe slightly curved in lateral view. Median lobe length 0.49mm.

M. chrysanthemi (Koch) Median lobe length 0.49mm.

Genus Hippuriphila

H. modeeri (L.) Figs. 218, 288, 300

Apex of median lobe lanceolate. Median lobe constricted behind apex and broadening before the mid-point after which it is almost parallel-sided. Median lobe only slightly curved in lateral view. Tegmen Y-shaped, arms equal in length. Spiculum gastrale V-shaped, arms apparently fused. Median lobe length 0.64mm.

Genus Mniophila

M. muscorum (Koch) Fig. 221

Apex of median lobe spatulate bearing a central lip. Median lobe narrowing gently from the apex to the proximal end. Median lobe strongly curved in lateral view. Median lobe length 0.67mm.

Genus Batophila

B. rubi (Pk.) Figs. 226, 281, 324

Apex of median lobe slightly pointed. Median lobe narrowing gently behind apex and then gradually broadening to the proximal end. Median lobe moderately curved in lateral view. Tegmen Y-shaped. Spiculum gastrale Y-shaped, arms fused along almost 1/4 of their length. Median lobe length 0.61mm.

B. aerata (Marsh) Fig. 227

Apex of median lobe spatulate. Median lobe narrowing gently behind apex and then gradually broadening to the proximal end. Median lobe moderately curved in lateral view. Median lobe length 0.556mm.

Genus Ochrosis

O. ventralis (Ill.) Figs. 259, 292, 303

Apex of median lobe lanceolate. Median lobe broadening gently from the apex to the proximal end. Median lobe almost straight in lateral view. Tegmen Y-shaped. Spiculum gastrale V-shaped, arms only weakly joined. Median lobe length 0.51mm.

Genus Apteropeda

A. globosa (Ill.) Fig. 230

Apex of median lobe lanceolate, bearing 2 large lateral wing-like expansions. Median lobe broadening from the apex to the proximal end. Median lobe strongly curved in the lateral view. Median lobe length 1.0 mm.

A. orbiculata (Marsh) Figs. 231, 282, 322

Apex of median lobe lanceolate, bearing a rounded central lip. Median lobe broadening gradually to mid-point and then narrowing gradually to the proximal end. Tegmen Y-shaped, base slightly laterally flattened and free arms short. Spiculum gastrale V-shaped, weakly joined by connective tissue. Median lobe length 0.85mm.

Genus Hermaeophaga

H. mercurialis (F.) Figs. 232, 284, 306

Apex of median lobe lanceolate and tip curved upwards. Median lobe narrowing behind apex before the mid-point and then broadening gradually to the proximal end. Median lobe sinuate in lateral view. Tegmen stout Y-shaped, 3 arms almost equal in length but the 2 free arms broader. Spiculum gastrale V-shaped, arms apparently fused. Median lobe length 0.80mm.

Genus Epitrix

E. atropae Foud. Figs. 233, 275, 299

Apex of median lobe lanceolate, apical edge straight. Median lobe broadening gradually from apex to proximal end. Median lobe almost straight in lateral view. Tegmen Y-shaped, 3 arms equal in length. Spiculum gastrale V-shaped, arms only weakly joined. Median lobe length 0.427mm.

E. pubescens (Koch.) Figs. 234, 276

Apex as in E. atropae but less sharply pointed. Median lobe length 0.520mm.

Genus Podagrica

P. fuscicornis (L.) Figs. 235, 279, 301

Apex of median lobe spatulate, apical edge slightly bilobed. Median lobe broadening gradually from apex to proximal end. Median lobe strongly curved in lateral view. Tegmen stout, Y-shaped, arms fused along 1/3 of their length. Spiculum gastrale V-shaped, arms only weakly joined. Median lobe length 0.95mm.

P. fuscipes (L.) Figs. 236, 280, 302

Apex of median lobe as for P. fuscicornis. Tegmen smaller and less stout than fuscicornis and arms fused along less than half their length. Spiculum gastrale V-shaped, arms tending towards fusion. Median lobe length 0.91mm.

Genus Longitarsus

Median lobe usually almost straight or only slightly curved in lateral view. Apical hood indistinct.

L. luridus (Scop.) Fig. 237

Apex of median lobe lanceolate. Median lobe with marked constriction behind the apex, then broadening before the mid-point and gradually narrowing to the proximal end. Median lobe only slightly curved in lateral view. Median lobe length 0.562mm.

L. quadriguttatus (Pont.) Fig. 238

Apex of median lobe lanceolate. Median lobe broadening gradually after apex and becoming almost parallel-sided. Median lobe moderately curved in lateral view. Median lobe length 0.865mm.

L. rubiginosa Foud. Fig. 239

Apex of median lobe slightly pointed. Median lobe almost parallel-sided and almost straight in lateral view. Median lobe length 0.803mm.

L. tabidus (F.) Fig. 241

Apex of median lobe lanceolate. Median lobe with marked constriction behind the apex, then broadening to the mid-point and gradually narrowing to the proximal end. Median lobe moderately curved in lateral view. Median lobe length 0.914mm.

L. agilis Rye. Fig. 242

Apex of median lobe rounded, bearing a rounded lip centrally. Median lobe almost parallel-sided to mid-point and then gradually broadening and narrowing to proximal end. Median lobe moderately curved in lateral view. Median lobe length 0.766mm.

L. exoletus (L.) Fig. 249

Apex of median lobe lanceolate and distinctly upwardly curved. Median lobe broadening gradually from the apex to the proximal end. Median lobe sinuate in lateral view. Median lobe length 0.821mm.

L. jacobaeae Wat. Figs. 246, 325, 291

Apex of median lobe lanceolate. Median lobe slightly constricted before the mid-point. Median lobe almost straight in lateral view. Tegmen stout Y-shaped, arms equal in length. Spiculum gastrale consisting of 2 free arms. Median lobe length 0.84mm.

L. suturellus Duft. Fig. 240

Apex of median lobe lanceolate bearing a small lip centrally. Median lobe slightly constricted at the mid-point. Median lobe almost straight in lateral view. Median lobe length 0.655mm.

L. melanocephalus (De G.) Fig. 243

Apex of median lobe lanceolate. Median lobe almost parallel-sided but constricted slightly at the mid-point. Median lobe length 0.766mm.

L. atricillus (L.) Fig. 244

Apex of median lobe similar to L. luridus but central lip more pronounced and constriction behind apex continuing to after the mid-point. Median lobe almost straight in lateral view. Median lobe length 0.679mm.

L. membranaceus Foud. Fig. 239

Apex of median lobe lanceolate, with indistinct central lip. Median lobe almost parallel-sided and moderately curved in lateral view. Median lobe length 0.506mm.

L. succineus Foud. Fig. 245

Apex of median lobe similar to luridis Scop. but constriction behind the apex less pronounced and continuing up to the mid-point after which the median lobe broadens slightly. Median lobe as L. luridus in lateral view. Median lobe length 0.661mm.

L. pellucidus Foud. Fig. 248

Apex of median lobe lanceolate, bearing an indistinct central lip. Median lobe slightly constricted as L. luridus but broadening more, proximally. Median lobe almost straight in lateral view. Median lobe length 0.574mm.

L. ochroleucus (Marsh) Fig. 247

Apex of median lobe similar to L. luridus but broader. Median lobe constricted as L. luridus, but broadening more proximally. Median lobe almost straight in lateral view. Median lobe length 0.704mm.

L. pratensis (Panz.) (= pusillus Gyll.) Fig. 251

Apex of median lobe similar to L. luridus but narrower. Median lobe with slight constriction behind apex to the mid-point. Median lobe almost straight in lateral view. Median lobe length 0.525mm.

L. reichei All. Fig. 252

Apex of median lobe gently rounded, bearing a distinct central upward curved lip. Median lobe broadening gradually to the mid-point and then narrowing gradually to the proximal end. Median lobe almost straight in lateral view. Median lobe length 0.469mm.

Genus Lythraria

L. salicariae (Pk.) Figs. 260, 286, 316

Tegmen stout, the 2 free arms short and stout. Spiculum gastrale V-shaped, arms joined by connective tissue basally. Median lobe identical with O. ventralis .

Genus Aphthona

Median lobe slightly curved in lateral view and apical hood indistinct.

A. lutescens (Gyll.) Fig. 253

Apex of median lobe bearing a central broad spatulate lip. Median lobe broadening after apex and gradually narrowing to the mid-point after which it broadens gradually to the proximal end. Median lobe almost straight inlateral view. Median lobe length 0.691mm.

A. coerulea (Geof) Figs. 254, 294, 319
(= nonstriata Har .)

Apex of median lobe lanceolate with apical edge straight. Median lobe narrowing gradually to mid-point after which it is almost parallel-sided. Median lobe moderately curved in lateral view. Tegmen Y-shaped, arms almost equal in length. Spiculum gastrale, Y-shaped, the basal 1/3 of the two arms touching but not fused. Median lobe length 0.74mm.

A. herbigrada (Curt.) Fig. 255

Apex of median lobe lanceolate. Median lobe almost parallel-sided. Median lobe slightly sinuate in lateral view. Median lobe length 0.648mm.

A. venustula Kuts. Figs. 256, 295, 320

Apex of median lobe lanceolate bearing a central rounded lip. Median lobe constricted at mid-point. Median lobe slightly curved in lateral view. Tegmen Y-shaped. Spiculum gastrale Y-shaped, the 2 arms free. Median lobe length 0.64mm.

A. euphorbiae (Schr.) Figs. 258, 296, 323

Tegmen Y-shaped. Spiculum gastrale V-shaped, the 2 arms free. Median lobe length 0.47mm.

A. nigriceps Redt. Fig. 257

Median lobe length 0·60mm.

IN THE FOLLOWING AEDEAGAL FIGS.

A = DORSAL VIEW

B = SIDE VIEW

PLATE A4

GENUS DONACIA AEDEAGI – DORSAL VIEW 35·0 = 1·0 mm.

FIG. 5
D. simplex F.

FIG. 6
D. marginata Hopp.

FIG. 7
D. bicolora Zsch.

FIG. 8
D. dentata Hopp.

FIG. 9
D. aquatica(L)

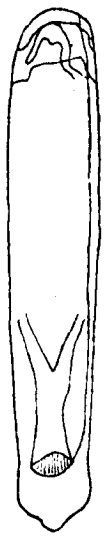


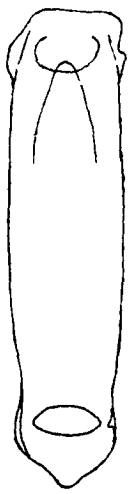
FIG. 10
D. clavipes F.

FIG. 11
D. semicuprea Pz

FIG. 12
D. sparganii Ahr.

FIG. 13
D. thalassina Germ.

FIG. 14
D. vulgaris Zsch



0·5mm.

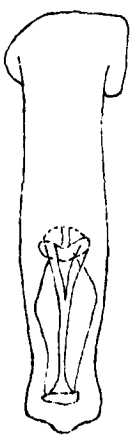
FIG. 15
D. versicolorea Brahm.

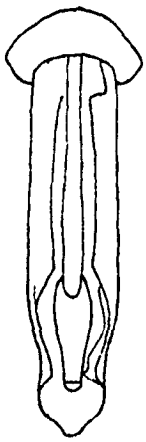
FIG. 16
D. cinerea Hbst

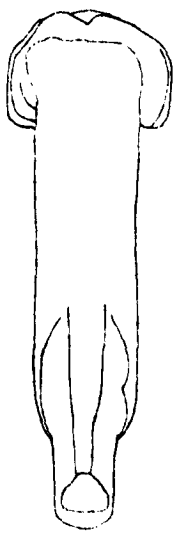
FIG. 17
D. crassipes F.

FIG. 18
D. impressa Pk.

FIG. 19
D. obscura Gyll







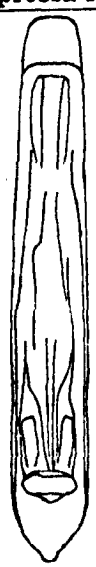


PLATE A 5

GENUS PLATEUMARIS AEDEAGI DORSAL VIEW

35·0 = 1·0mm

FIG. 23 P braccata (Scop.)

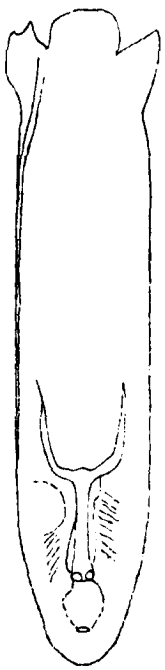


FIG. 20

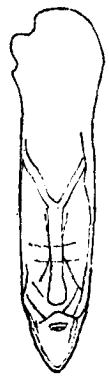
P. sericea (L.)

FIG. 21

P. discolor (Pz.)

FIG. 22

P. affinis (Kunz.)



GENUS MACROPLEA AEDEAGI DORSAL VIEW

FIG. 24

M. appendiculata (Pz.)

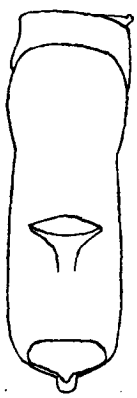


FIG. 25

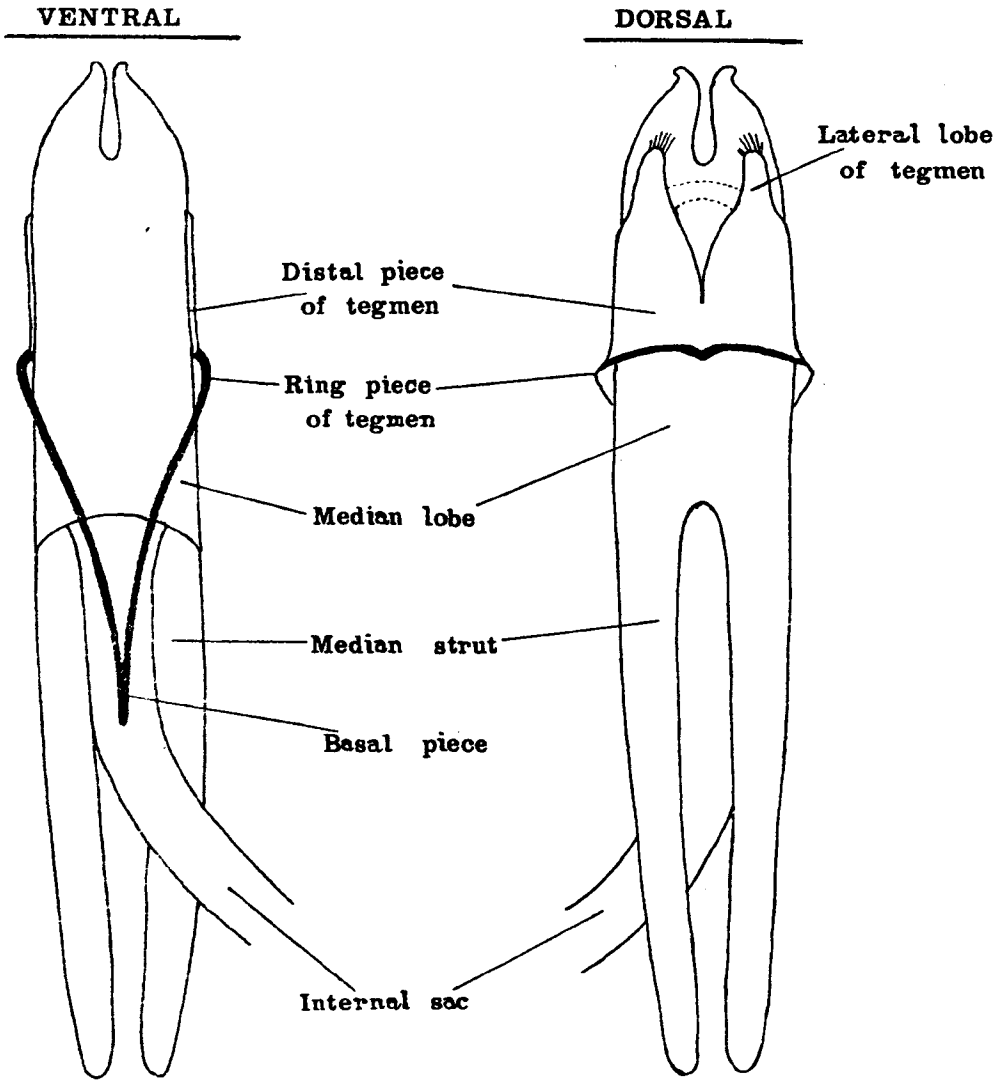
M. mutica (F.)

PLATE A 6

ORSODACNINAE
GENUS ORSODACNE

AEDEAGI DORSAL VIEW

ZEUGOPHORINAE
GENUS ZEUGOPHORA



DIAGRAMATIC

FIG. 26 THE MALE GENITALIA OF O.cerasi(L.)

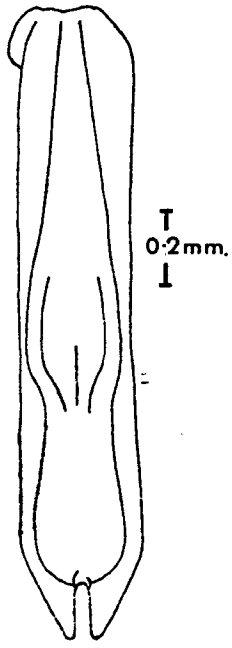


FIG.27 Median lobe of O. cerasi (L.)

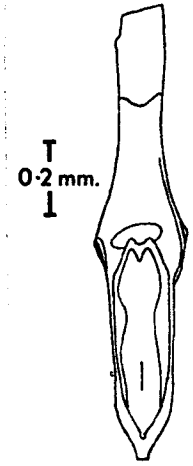


FIG. 28
Z. subspinosa (F.)

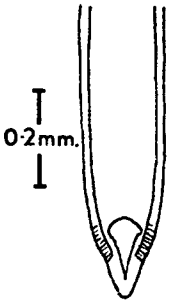


FIG. 29
Z. turneri Pow.

PLATE A 7

DONACIINAE

FIG. 30 Macroplea appendiculata (Pz.)

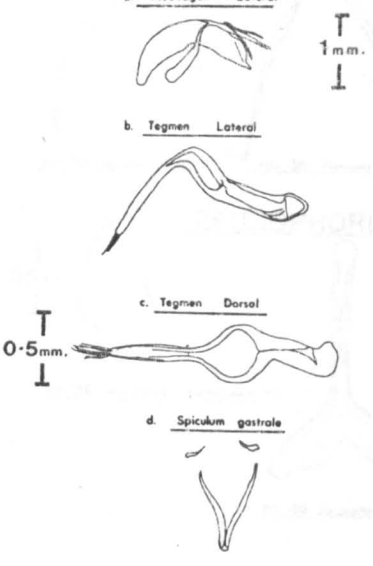
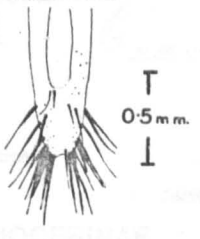


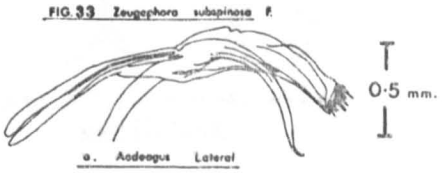
FIG. 31 Plateumaris sericea (L.)

FIG. 32 Donacia simplex F.



ZEUGOPHORINAE

FIG. 33 Zeugophora subspinosa F.



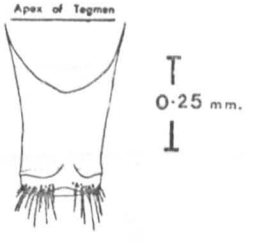
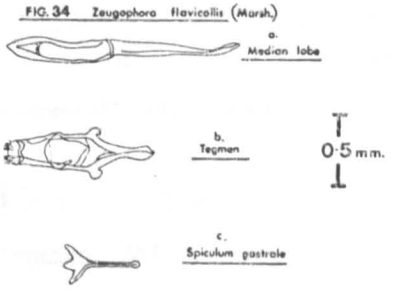
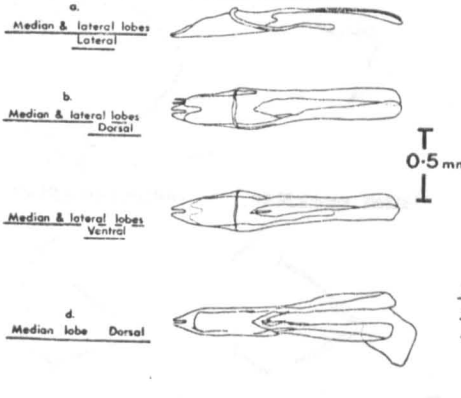


FIG. 34 Zeugophora flavicollis (Marsh.)



ORSODACNINAE

FIG. 35 Orsodacne lineola (Pz.)



CHRYSOMELINAE

FIG. 36 Timarcha tenebricosa (F.)

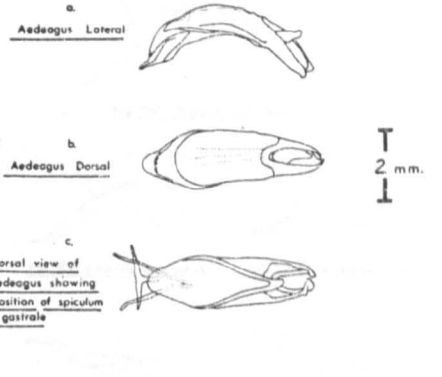


PLATE A8

THE SPICULUM GASTRALE

DONACIINAE

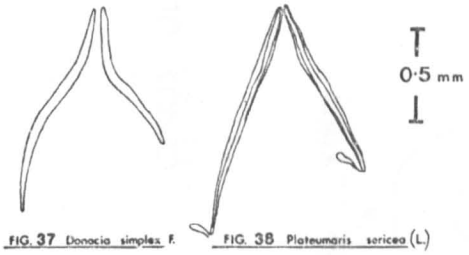


FIG. 37 Donacia simplex F. FIG. 38 Plateumaris sericea (L.)

ZEUGOPHORINAE

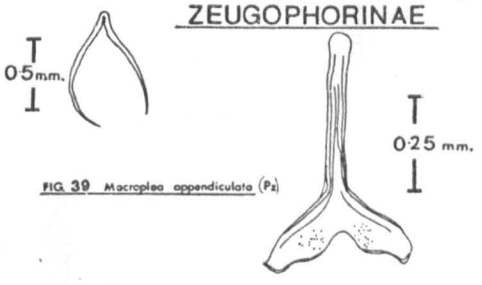


FIG. 39 Macroplea appendiculata (Pz)

FIG. 40 Zeugophora subspinosa (F.)

CRYPTOCEPHALINAE

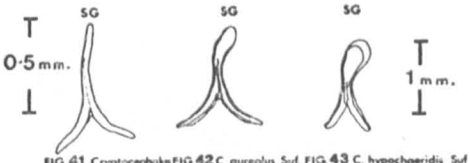


FIG. 41 Cryptocephalus labiatus (L.) FIG. 42 C. aureolus Suf. FIG. 43 C. hypochoeridis Suf

CLYTRINAE

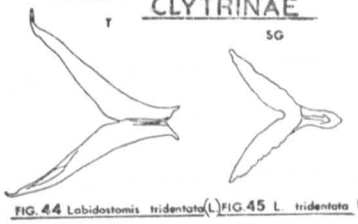


FIG. 44 Labidostomis tridentata (L.) FIG. 45 L. tridentata (L.)

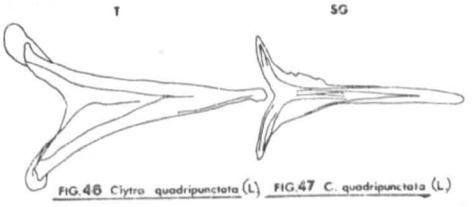


FIG. 46 Clytra quadripunctata (L.) FIG. 47 C. quadripunctata (L.)

FIG. 48 Gyndrophthalma affinis (Hell.) FIG. 49 G. affinis (Hell.)

CRIOCERINAE

THE SPICULUM GASTRALE

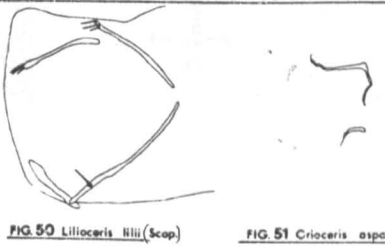


FIG. 50 Lilioceris lilii (Scop.) FIG. 51 Crioceris asparagi (L.)

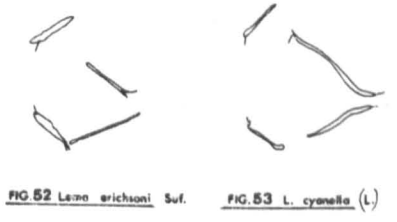


FIG. 52 Lema erichsoni Suf. FIG. 53 L. cyanella (L.)

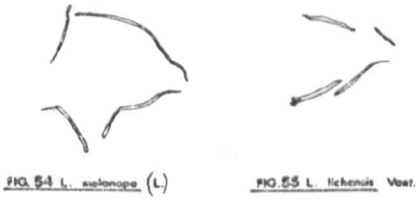


FIG. 54 L. melanopa (L.) FIG. 55 L. lichenis Voet.

THE TEGMEN

FIG. 56 Lilioceris lilii (Scop.)

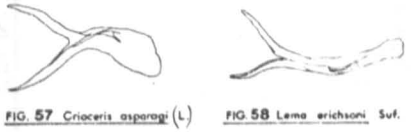


FIG. 57 Crioceris asparagi (L.) FIG. 58 Lema erichsoni Suf.

FIG. 59 L. cyanella (L.) FIG. 60 L. lichensis Voet

FIG. 61 L. melanopa (L.)

PLATE A 9

CRIOCERINAE

GENUS CRIOCERIS

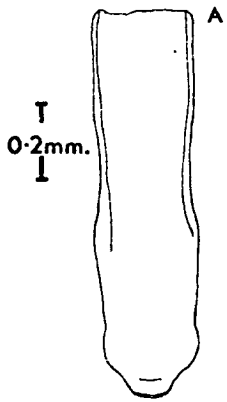
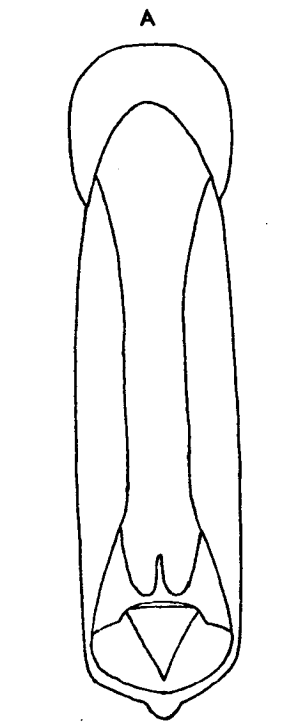


FIG. 62
C. asparagi (L.)

GENUS LILIOCERIS



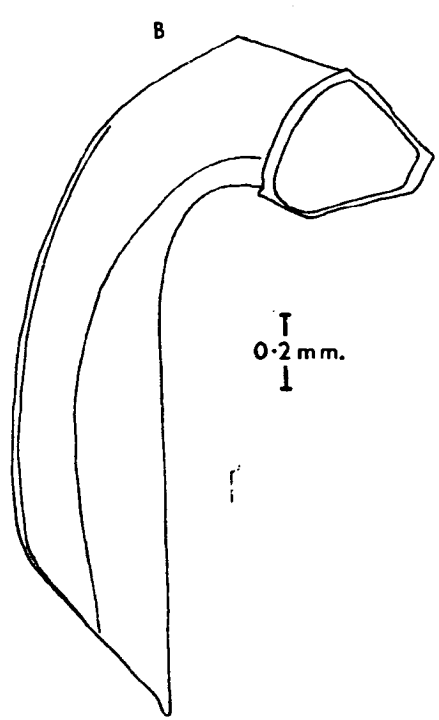


FIG. 67 L. lilii (Scop.)

GENUS LEMA

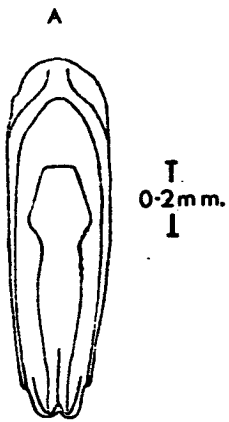


FIG. 63
L. puncticollis Curt.

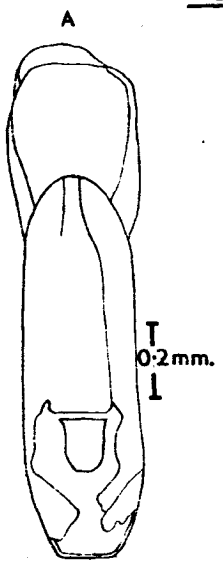


FIG. 64
L. melanopa (L.)

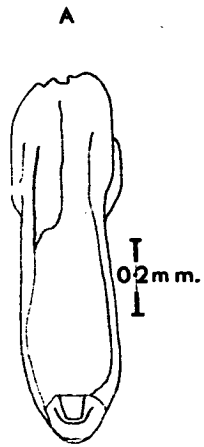


FIG. 65
L. lichensis Voet.

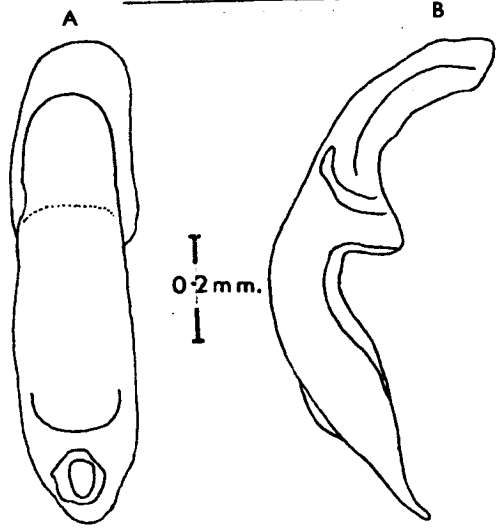


FIG. 66
L. erichsoni Suf.

PLATE A 10

GENUS CRYPTOCEPHALUS AEDEAGI DORSAL VIEW

52·0 = 1·0 mm.

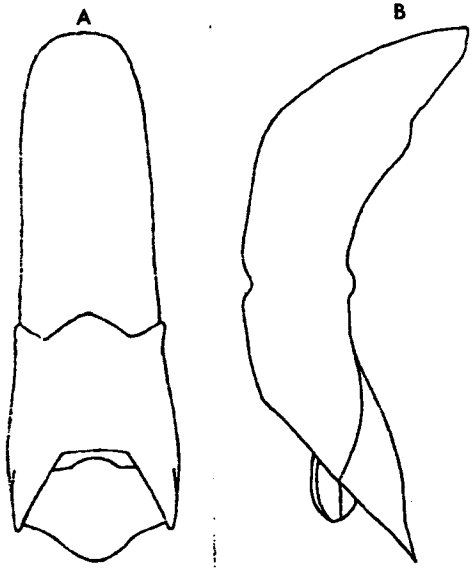


FIG. 68 C. nitidulus F.

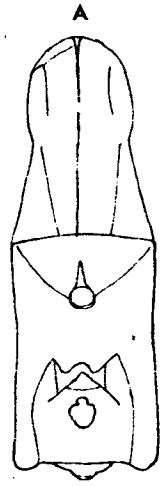


FIG. 69
C. moraei (L.)

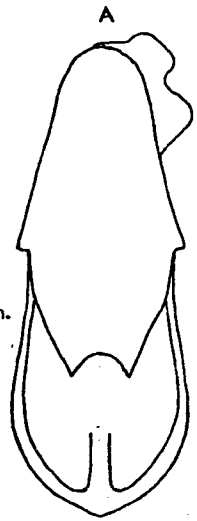


FIG. 70
C. decemmaculatus (L.)

FIG. 71
C. fulvus Goez.

FIG. 72
C. bilineatus (L.)

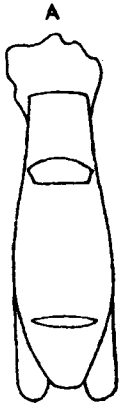


FIG. 73
C. labiatus (L.)

FIG. 74
C. pusillus F.

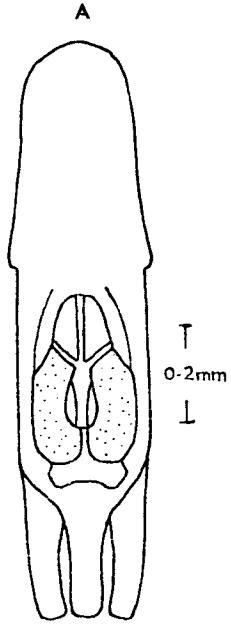


FIG. 75
C. frontalis Marsh.

FIG. 76
C. punctiger Pk.

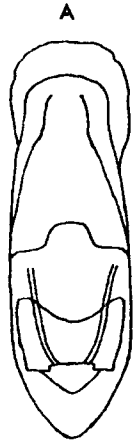


FIG. 77
C. parvulus Müll.

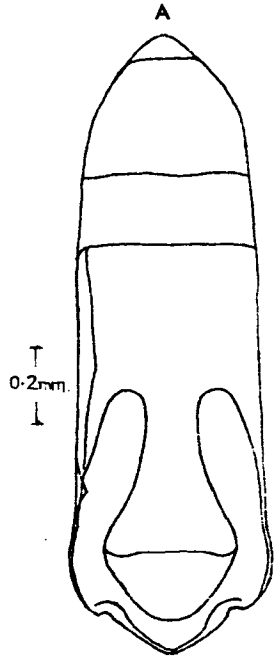


FIG. 78
C. primarius Har.

68·0 = 1·0 mm.

PLATE A II

CRYPTOCEPHALUS

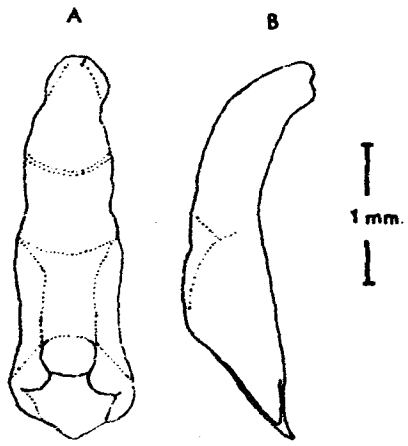


FIG. 79 C. bipunctatus (L)

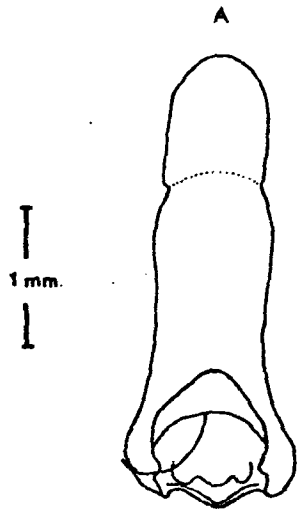


FIG. 80 C. biguttatus Scop.

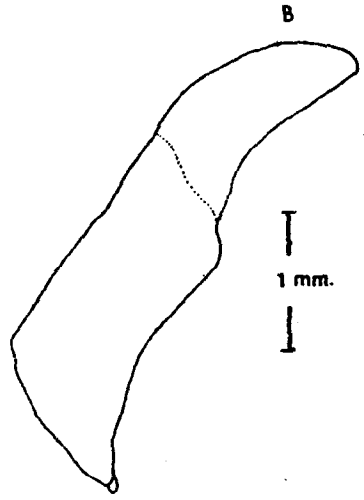
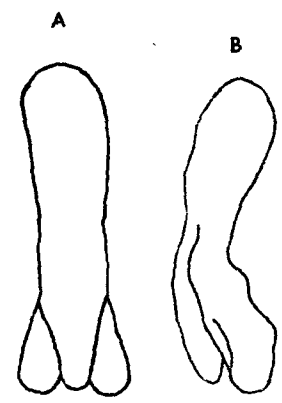


FIG. 81 C. frontalis Marsh.



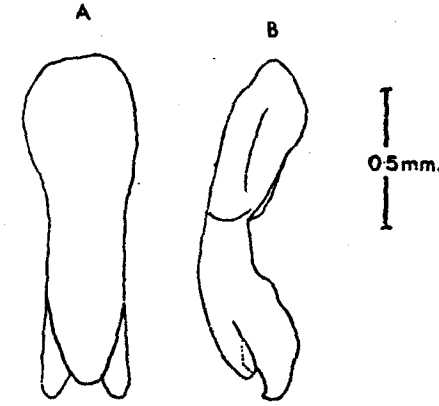


FIG. 82 C. exiguus Sch.

PLATE A 12

GENUS CRYPTOCEPHALUS AEDEAGI DORSAL VIEW

52·0 = 1·0mm

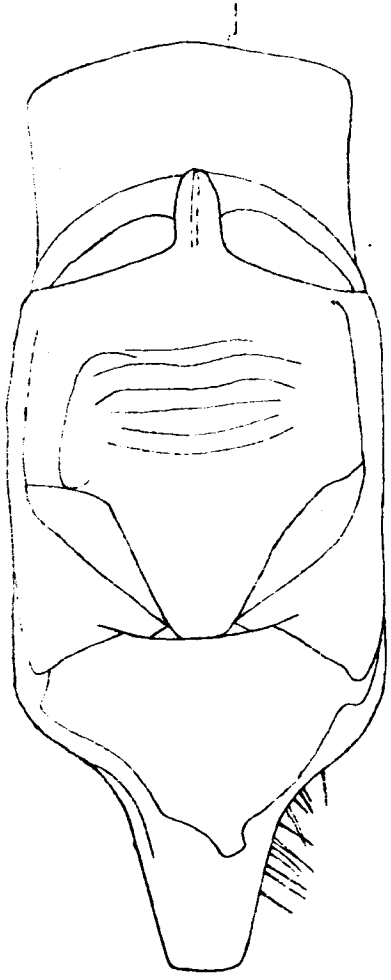


FIG. 83
C. aureolus Suf.

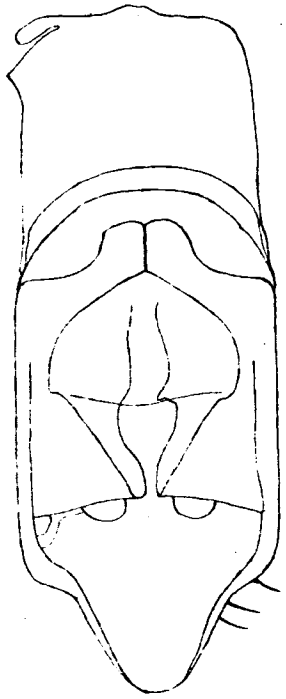


FIG. 84
C. hypochoeridis Suf.

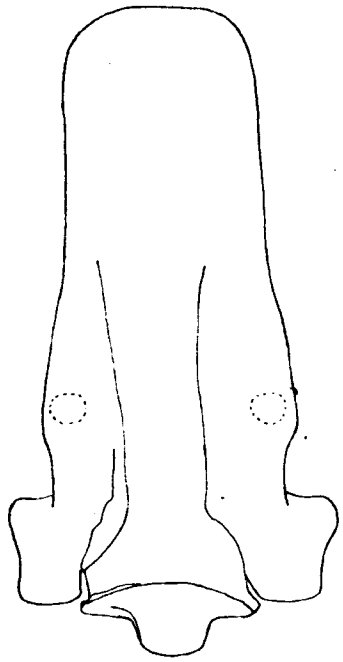


FIG. 85
C. sexpunctatus (L.)

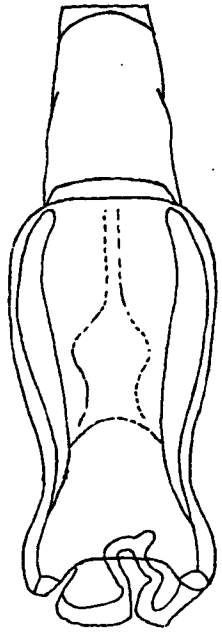


FIG. 86
C. coryli (L.)

GENUS CLYTRA AEDEAGI DORSAL VIEW

52·0 = 1·0 mm.

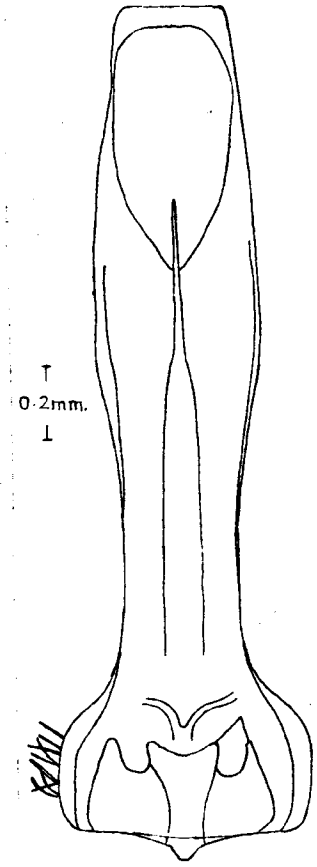


FIG. 87
C. quadripunctata (L.)

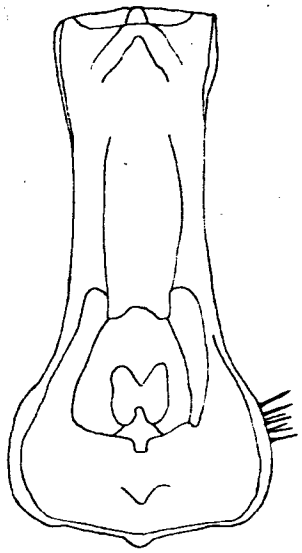
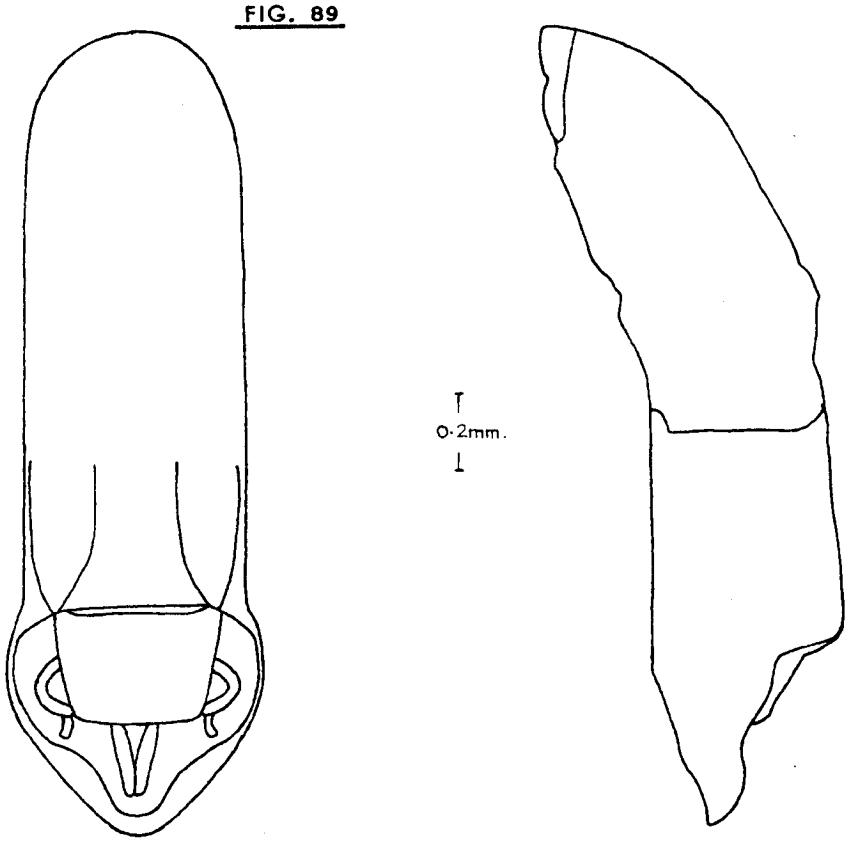


FIG. 88
C. laeviuscula Ratz.

PLATE A 13

GENUS LABIDOSTOMIS AEDEAGUS (L. tridentata (L) 52 = 1 mm.

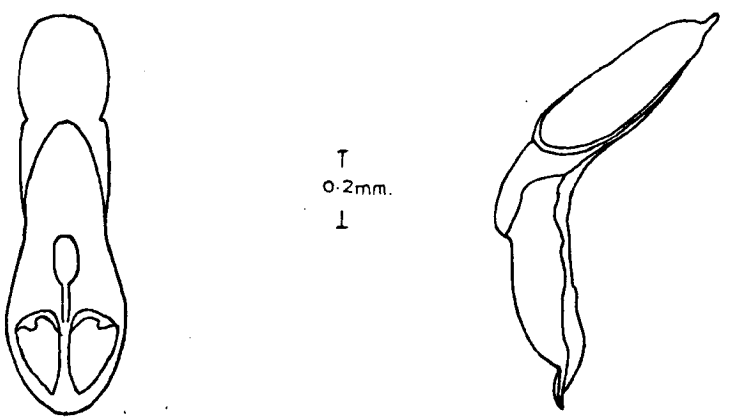
FIG. 89



DORSAL VIEW SIDE VIEW

GENUS GYNANDROPHALMA AEDEAGUS (G. affinis (Hell.)

FIG. 90



DORSAL VIEW SIDE VIEW

PLATE A 14 SUBFAMILY CASSIDINAE GENUS CASSIDA - AEDEAGI a. DORSAL VIEW b. SIDE VIEW 52·0 = 1·0mm

FIG. 91 C. flaveola Thunb.

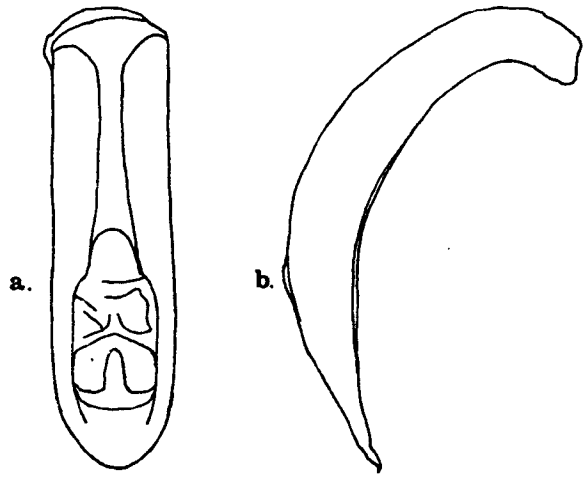


FIG. 92 C. viridis L.

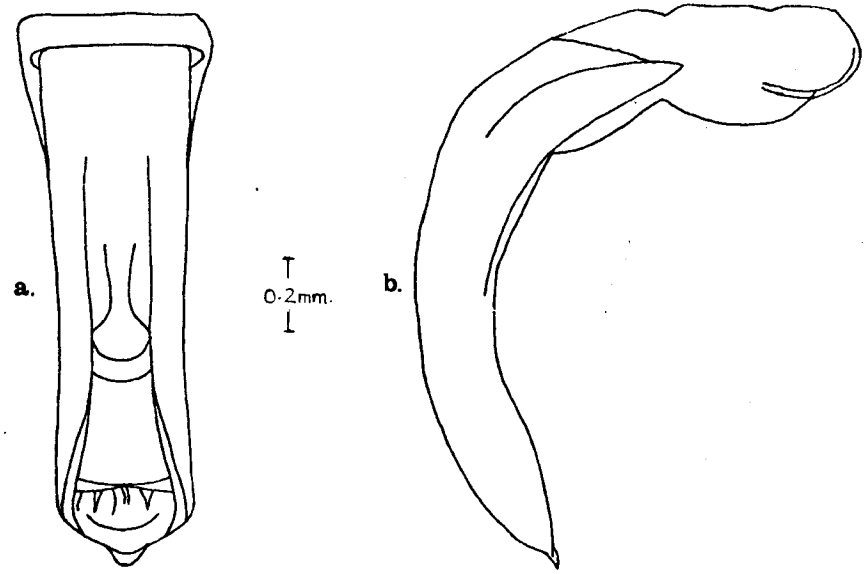


FIG. 93
C. fastuosa Schal.

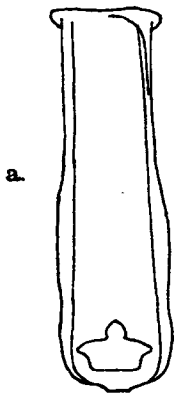


FIG. 94
C. sanguinolenta Müll.

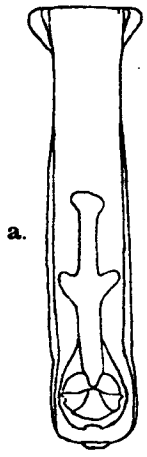


FIG. 95
C. nebulosa L.

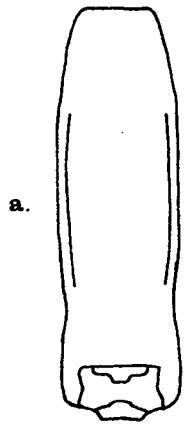


FIG. 96
C. vittata Vill.

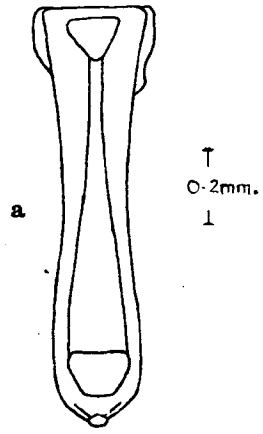


FIG. 97
C. rubiginosa Müll.

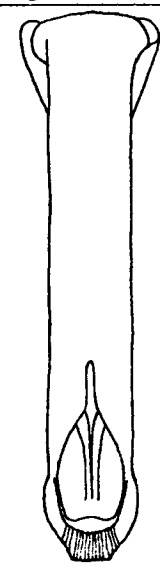


FIG. 98
C. vibex L.

FIG. 99 C. murraea L.

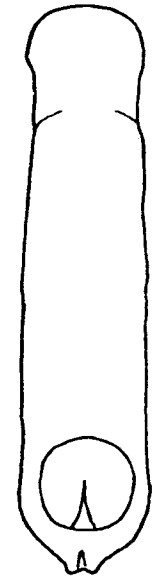
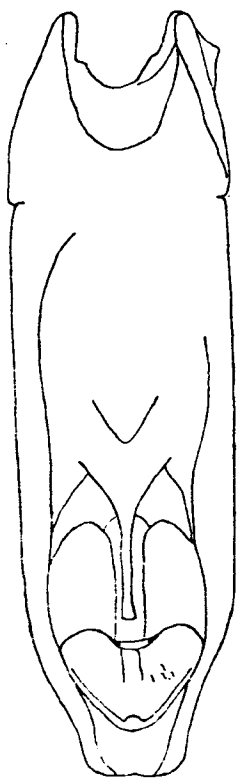


PLATE A 15

GENUS TIMARCHA AEDEAGI 26·0 = 1·0 mm



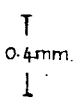


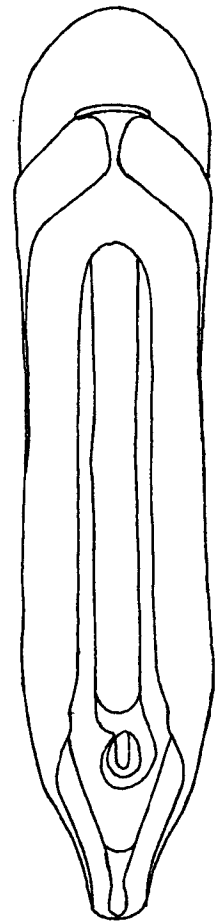
FIG. 100
T. tenebricosa (F.)

FIG. 101
T. coriaria (Laich.)

GENUS LEPTINOTARSA AEDEAGUS 52 = 1mm.

DORSAL VIEW

SIDE VIEW



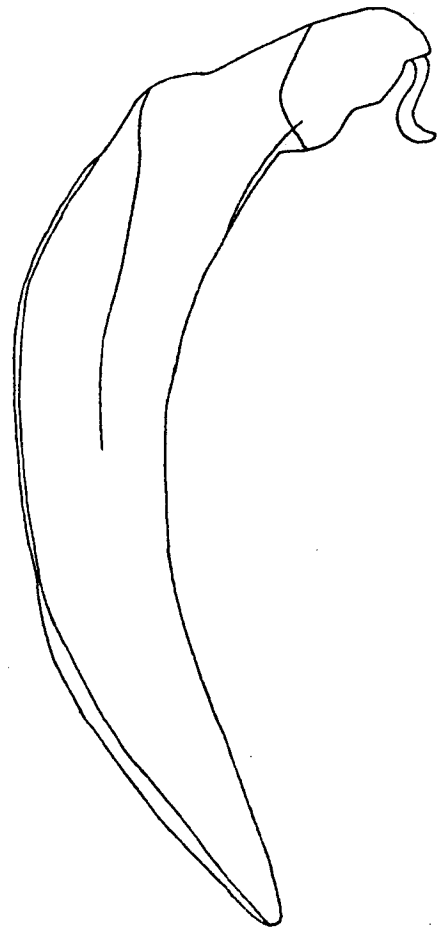


FIG. 102 L.decemlineata (Say.)

PLATE A 16

GENUS CHRYSOLINA AEDEAGI-DORSAL VIEW

FIG. 103
C. cerealis (L.)

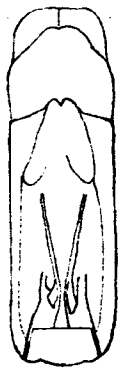


FIG. 104
C. marginalis (Duft.)

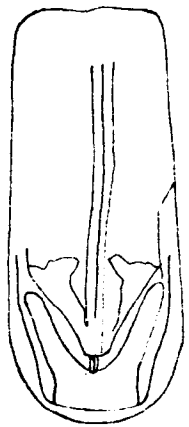
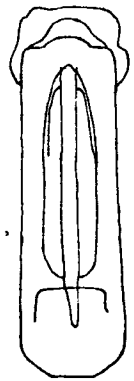


FIG. 105
C. staphylea (L.)



24·0 = 1·0 mm

FIG. 106 C. banksi (F.)

0·5 mm.

FIG. 107
C. hyperici (Forst.)

1·0 mm.

FIG. 108
C. polita (L.)

FIG. 109
C goettingensis (L.)

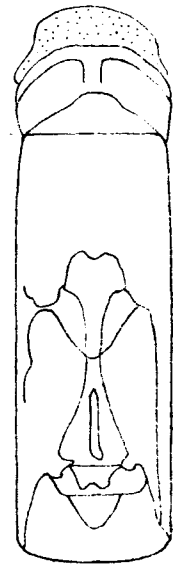


FIG. 110
C. fastuosa (Scop.)

FIG. 111
C. graminis (L.)

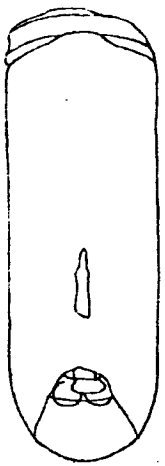


FIG. 112
C. menthastri (Suf.)

FIG. 113
C. orichalcea (Müll.)

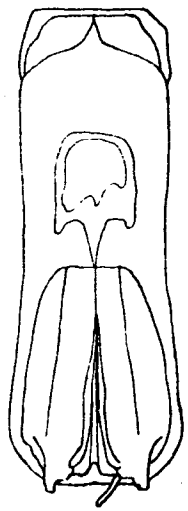


FIG. 114
C. brunsvicensis (Gr.)

0·5 mm.

FIG. 115
C. haemoptera (L.)

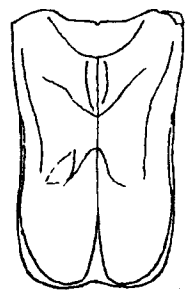


FIG. 116
C. marginata (L.)

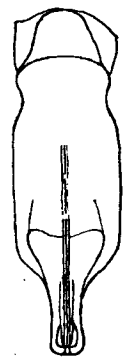


FIG. 117
C. varians (Schal.)

0·5 mm

FIG. 118
C. sanguinolenta (L.)

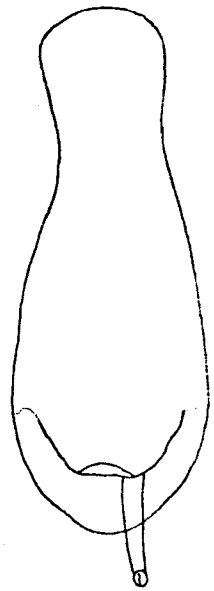


PLATE A 17

GENUS PHYTODECTA AEDEAGI DORSAL VIEW 50 = 1 m.m.

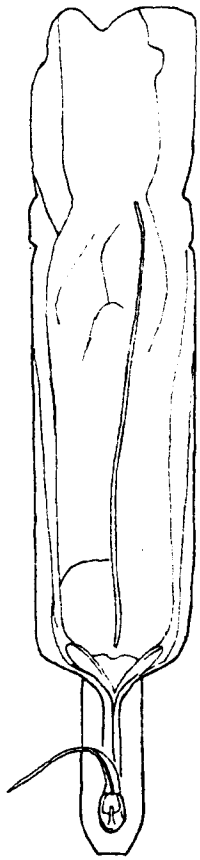


FIG. 119
P. rufipes (De G.)

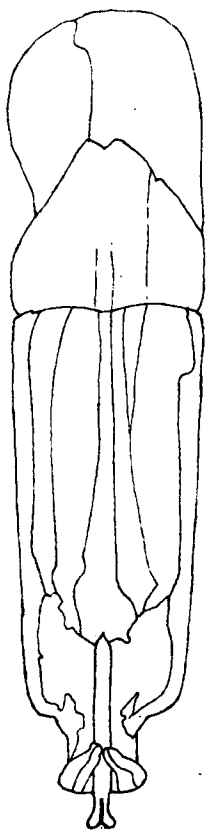


FIG. 120
P. viminalis (L.)

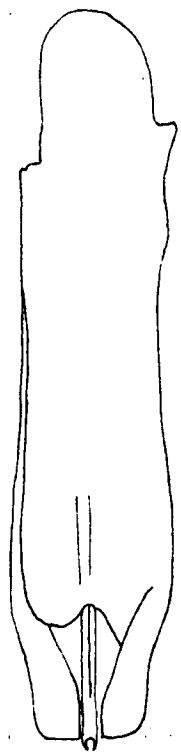


FIG. 121
P. pallida (L.)

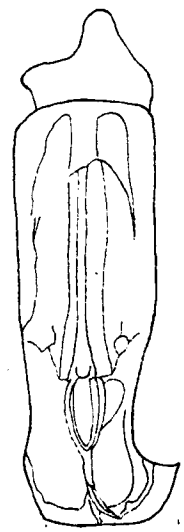


FIG. 122
P. olivacea (Forst.)

LAMPROSOMATINAE

GENUS LAMPROSOMA

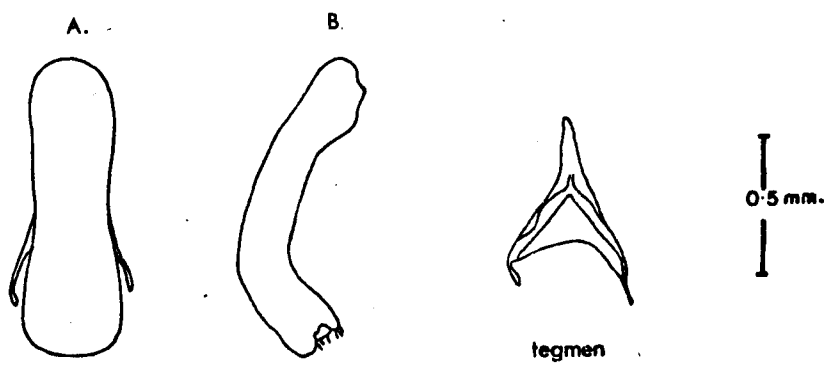


FIG. 123 L. concolor (Stm.)

PLATE A 18

GENUS CHRYSOMELA AEDEAGI DORSAL VIEW

52 = 1 mm.

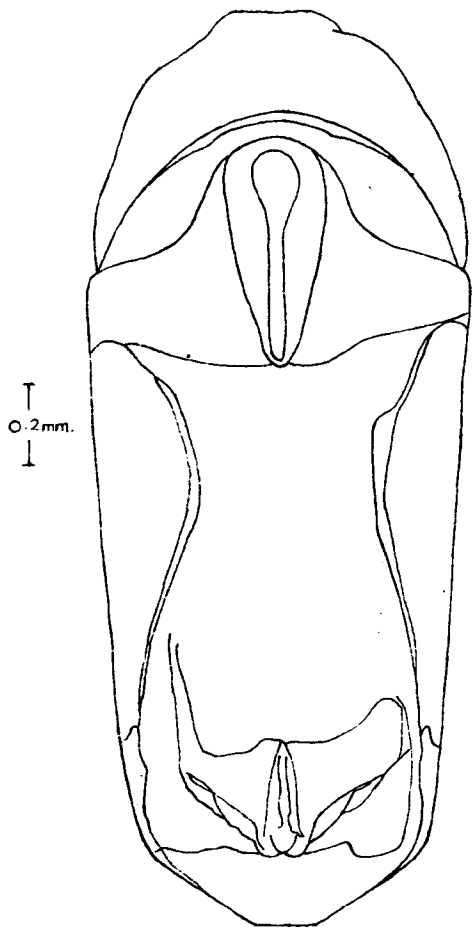


FIG.124 C. populi L.

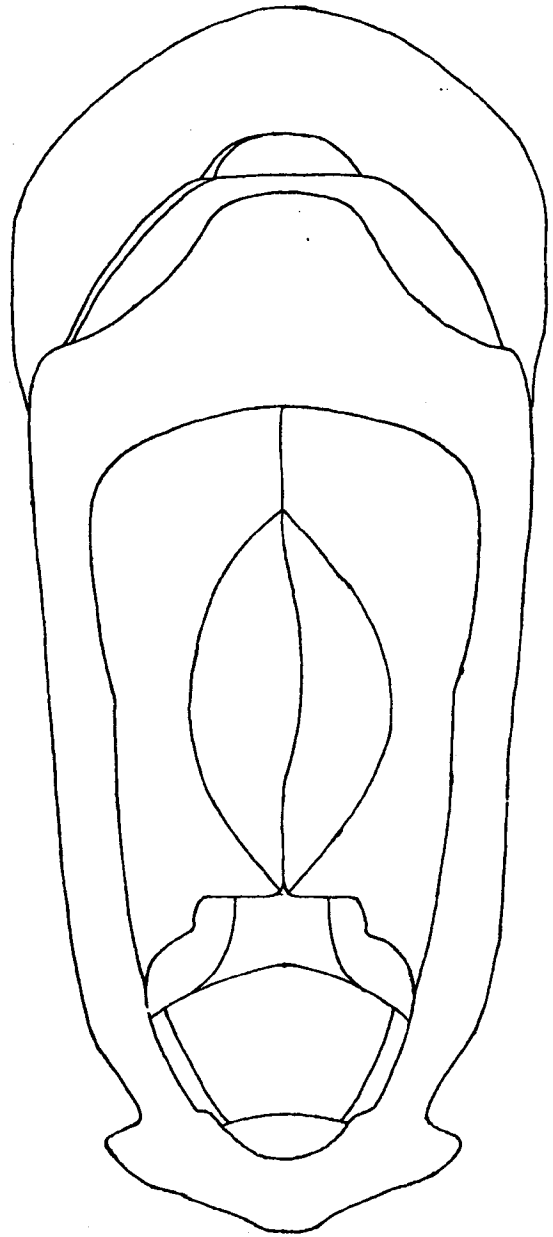


FIG. 125 C. tremulae F.

67·7 = 1 mm.

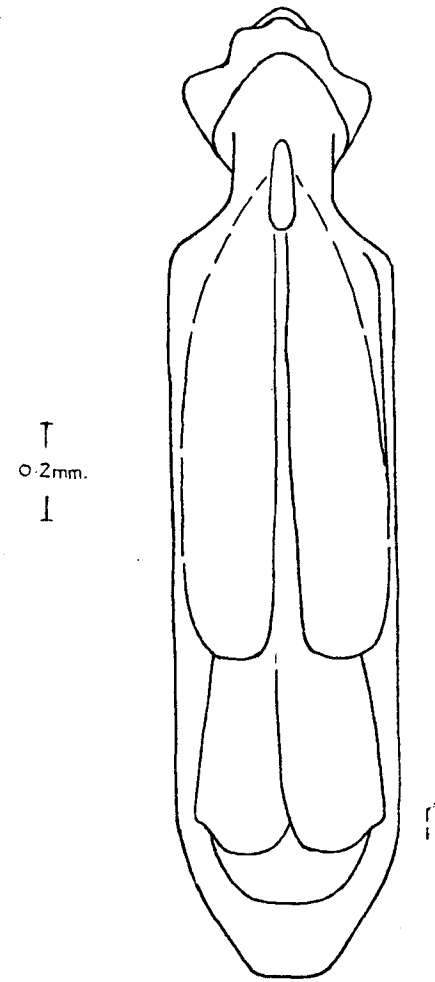
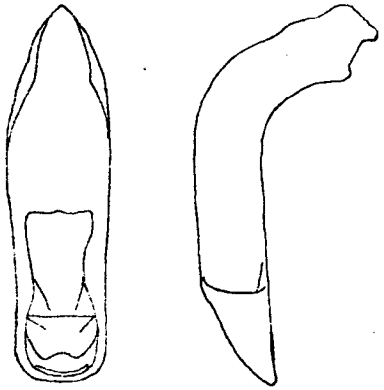


FIG. 126 C. aenea L.

PLATE A 19

GENUS PRASOCURIS AEDEAGI

a. DORSAL VIEW b. SIDE VIEW



a. b.

FIG.127 P. phellandrii (L.)

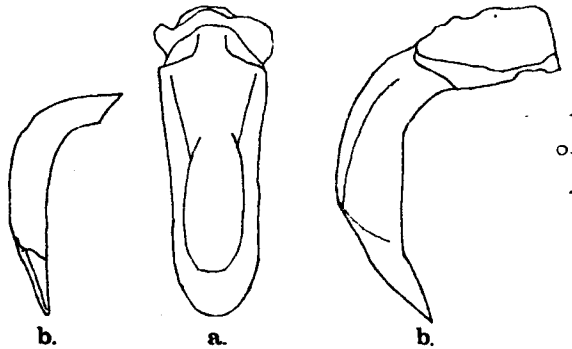
GENUS PHAEDON AEDEAGI

52 = 1 mm.

a. DORSAL VIEW b. SIDE VIEW

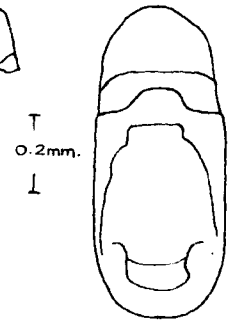
a.

FIG.128 P. junci (Brahm.)



b. a. b.

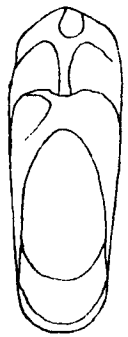
FIG.129 P. tumidulus (Germ.)



0·2mm.

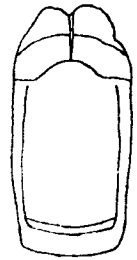
a.

FIG. 130
P. armoraciae (L.)



a.

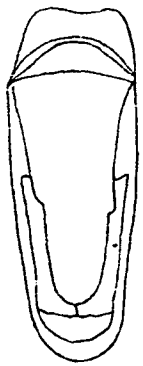
FIG. 131
P. concinnus Steph.



a.

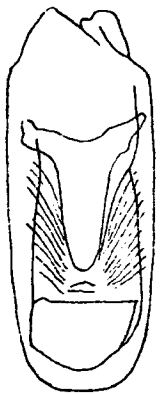
FIG. 132
P. cochleariae (F.)

GENUS HYDROTHASSA AEDEAGI



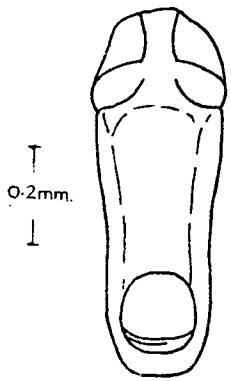
a.

FIG. 133
H. marginella (L.)



a.

FIG. 134
H. hannoverana (F.)



0·2mm.

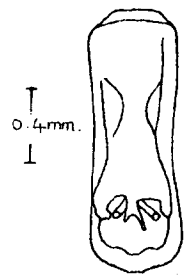
FIG. 135
H. aucta (L.)

68 = 1mm

GENUS PHYLLODECTA AEDEAGI

a.

FIG. 136
P. vulgatissima (L.)

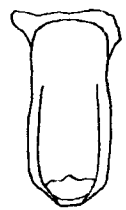


0·4mm.

a.

FIG. 137
P. vitellinae (L.)

26 = 1 mm

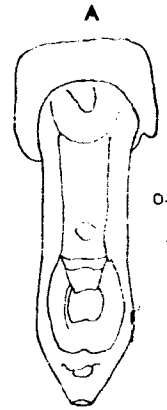


a.

FIG. 138
P. laticollis Suf.

GENUS PLAGIODERA

AEDEAGUS



A

0·2mm.

52 = 1 mm.

FIG. 139 P. versicolora (Laich.)

PLATE A 20

AEDEAGI

CHRYSOMELINAE

GENUS GASTROIDEA DORSAL VIEW

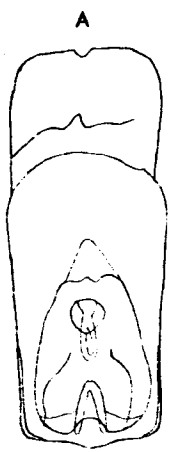


FIG. 140
G. polygoni (L.)

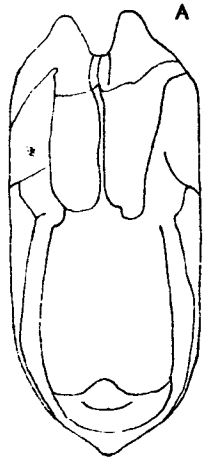


FIG. 141
G. viridula (De G.)

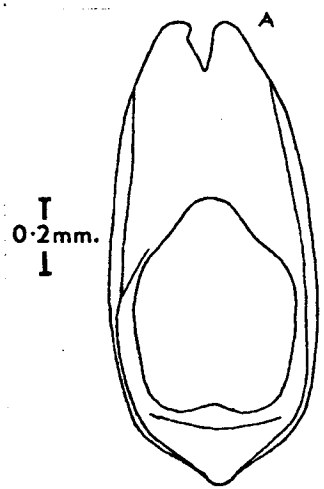
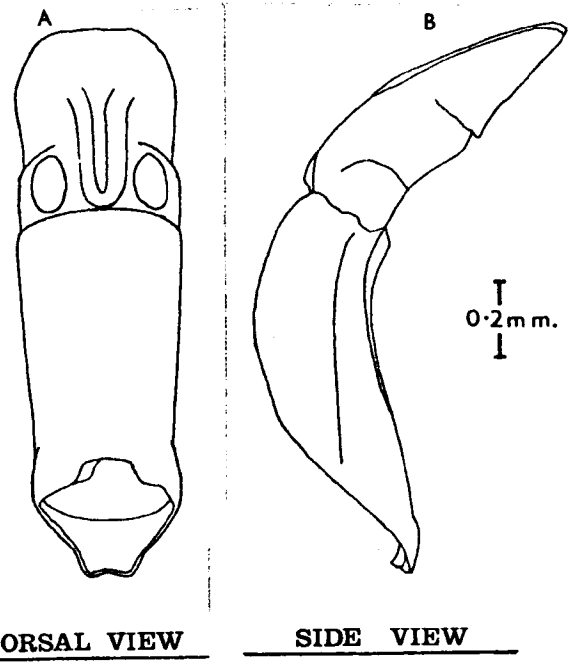


FIG.142 G. viridula (De G.)
(specimens from Holland)

GENUS PHYLLODECTA



DORSAL VIEW SIDE VIEW

FIG. 143 P. polaris Schn.

PLATE A 21

FIG.144 Phyllobrotica quadrimaculata (L.)

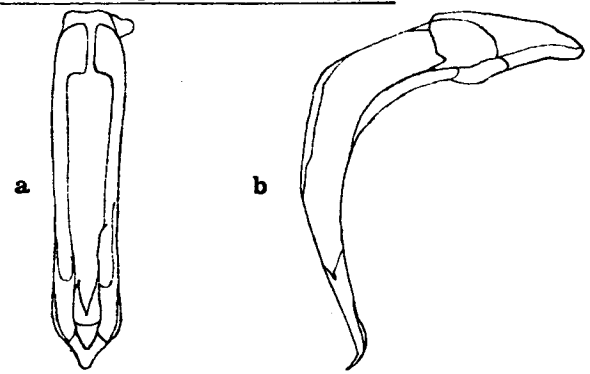


FIG.145 Sermyla halensis (L) 26 = 1 mm.

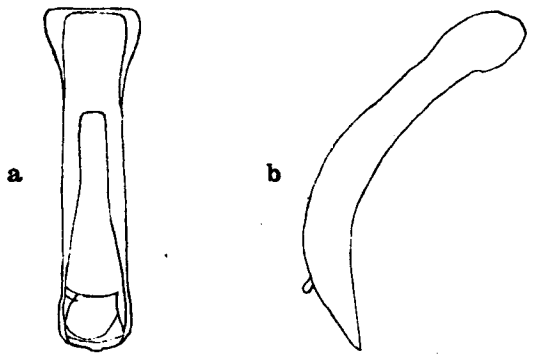
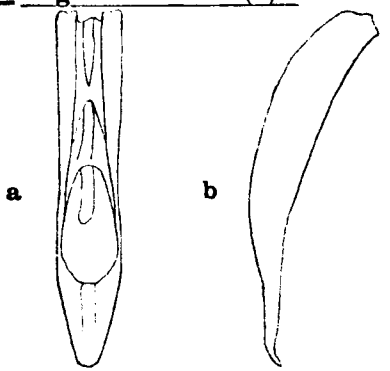


FIG.146 Agelastica alni (L.)



a. Dorsal view

b. side view

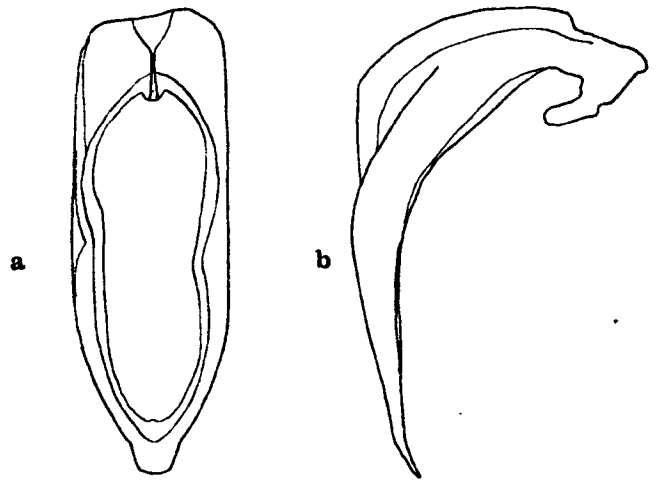


FIG.147 Galeruca tanaceti (L.)

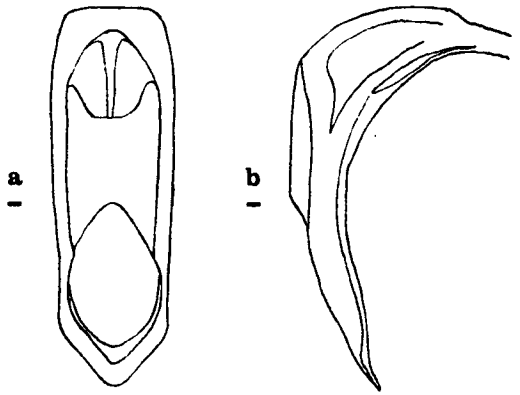


FIG.148 Galeruca circumdata Duft.

GENUS GALERUCELLA

34 = 1 mm.

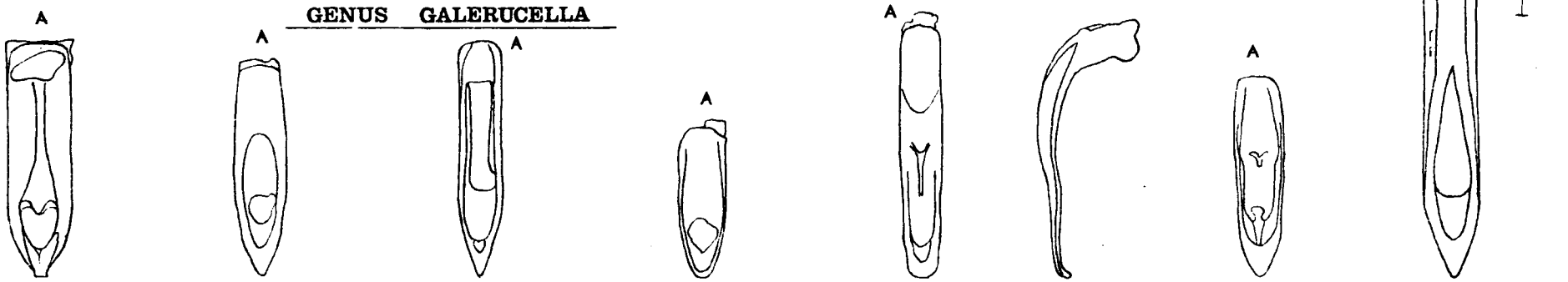


FIG. 149 G. viburni (Pk.)

FIG. 150 G. lineola (F.)

FIG. 151 G. grisescens (Joan.)

FIG. 152 G. tenella (L.)

FIG. 153 G. calmariensis (L.)

FIG. 154 G. pusilla (Duft.)

FIG. 155 G. nymphaeae (L.)

PLATE A 22

GENUS LUPERUS

52=1 mm.

FIG. 156
L. longicornis F.

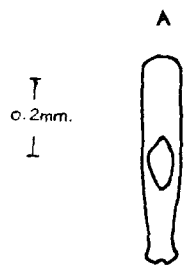


FIG. 157
L. flavipes L.

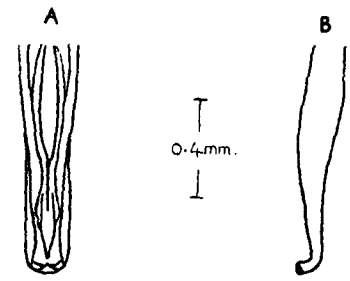


FIG. 158
L circumfusus Marsh. 34 = 1mm

GENUS LOCHMAEA

34 = 1mm

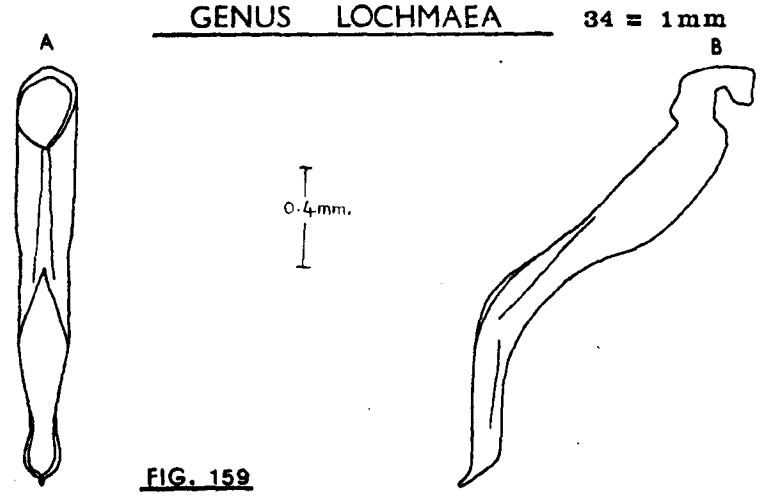


FIG. 159
L. capreae (L.)

PLATE A 23 GENUS LOCHMAEA

FIG. 160 L. crataegi (Forst.)

PLATE A 24

SUB FAMILY GALERUCINAE

THE TEGMEN

THE SPICULUM GASTRALE

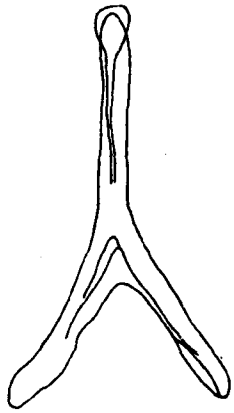
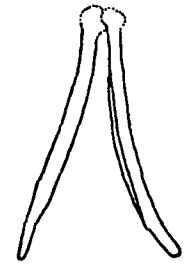


FIG. 161
Sermyla halensis (L.)



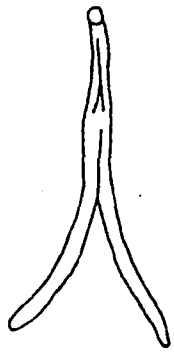
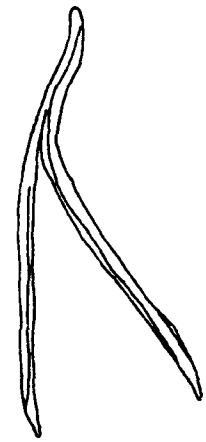


FIG. 162
Phyllobrotica quadrimaculata (L.)



0·1mm.

FIG. 163
Luperus circumfusus Marsh.

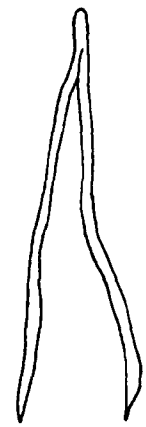


FIG. 164
L flavipes L.

FIG. 165
L longicornis F.

PLATE A 25

SUB FAMILY GALERUCINAE

THE TEGMEN

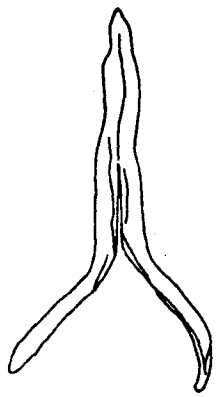


FIG.166 Agelastica alni (L.)

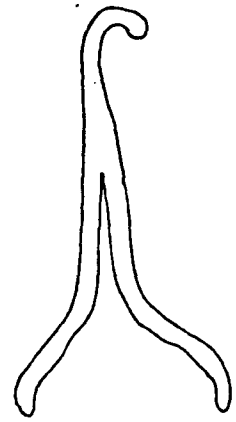


FIG. 167 Galerucella viburni (Pk.)

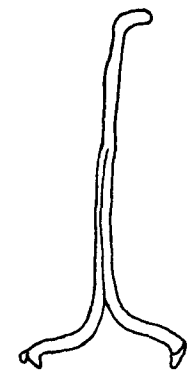


FIG. 168
G. calmariensis (L.)

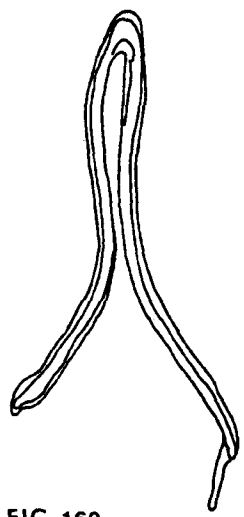


FIG. 169
Galeruca tanaceti (L.)

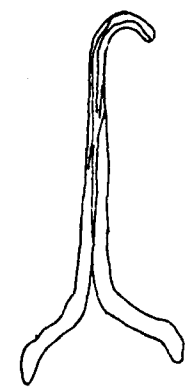


FIG.170 Galerucella lineola (F.)

0·1mm

FIG. 171 Lochmaea crataegi (Forst.)

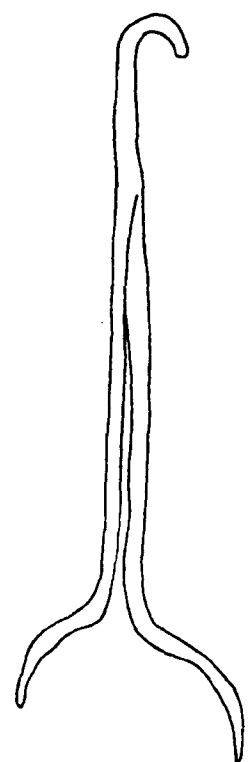


FIG. 172 L. capreae (L.)

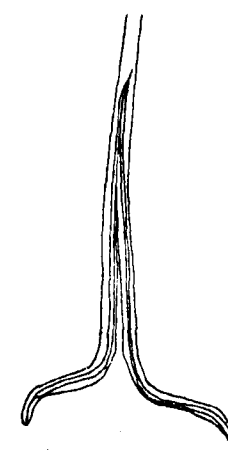


FIG. 173 L. suturalis (Th.)

PLATE A 26

GENUS HALTICA

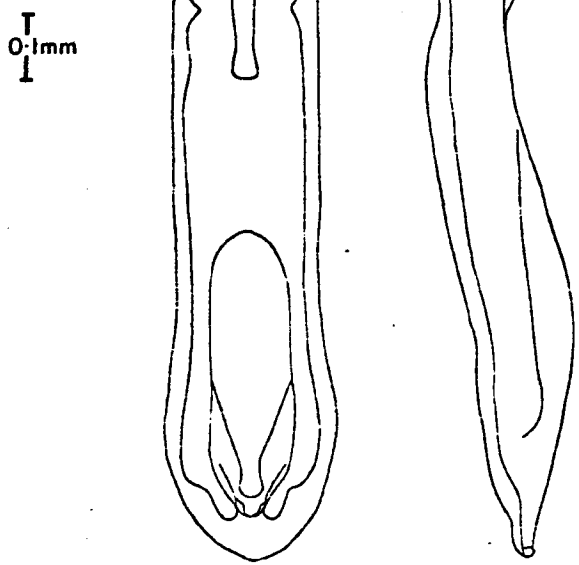


FIG. 174 H. oleracea (L.)

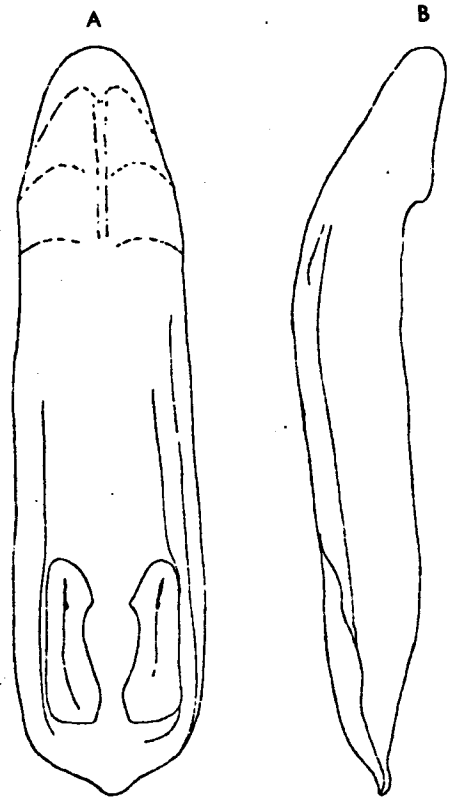


FIG. 175 H. britteni Shp.

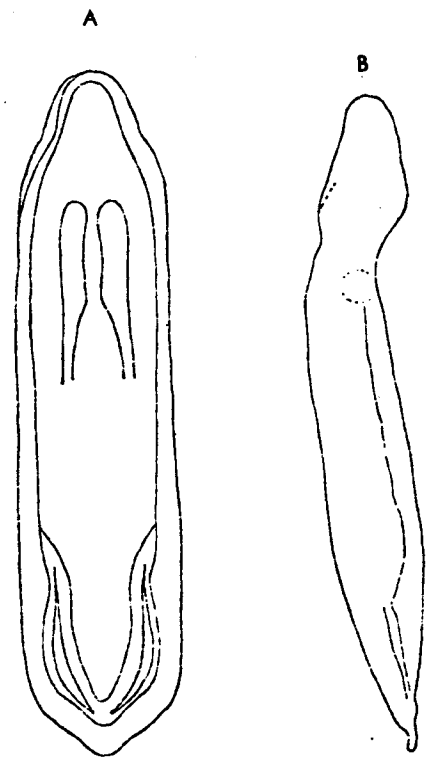
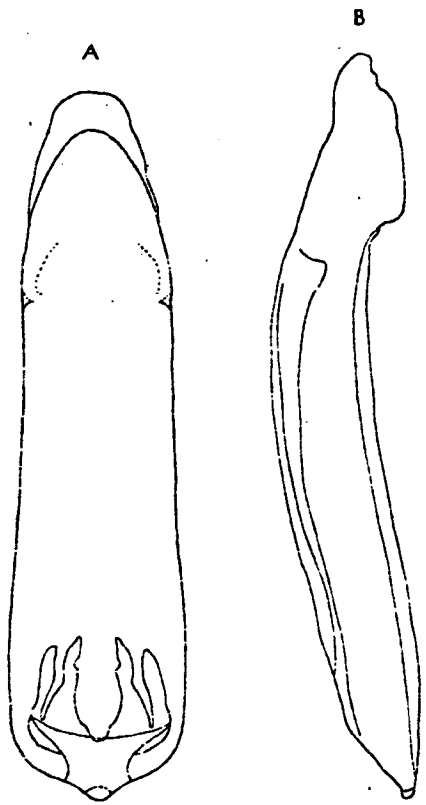


FIG. 176 H. palustris Weise

PLATE A 27

GENUS HALTICA



T
0·1mm.
⊥

FIG. 177 H. brevicollis Foud.

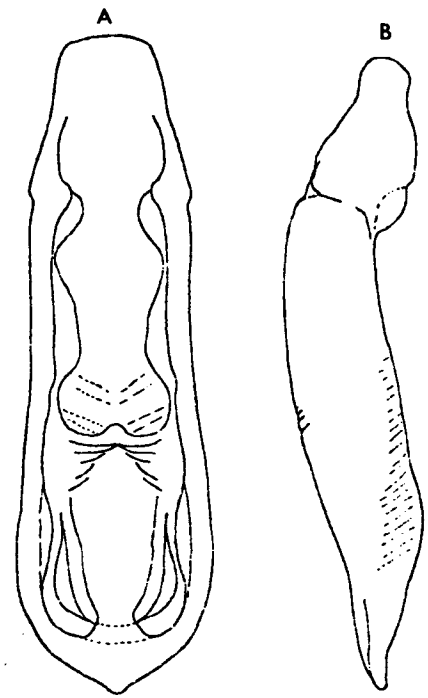


FIG. 178 H. pusilla Duft.

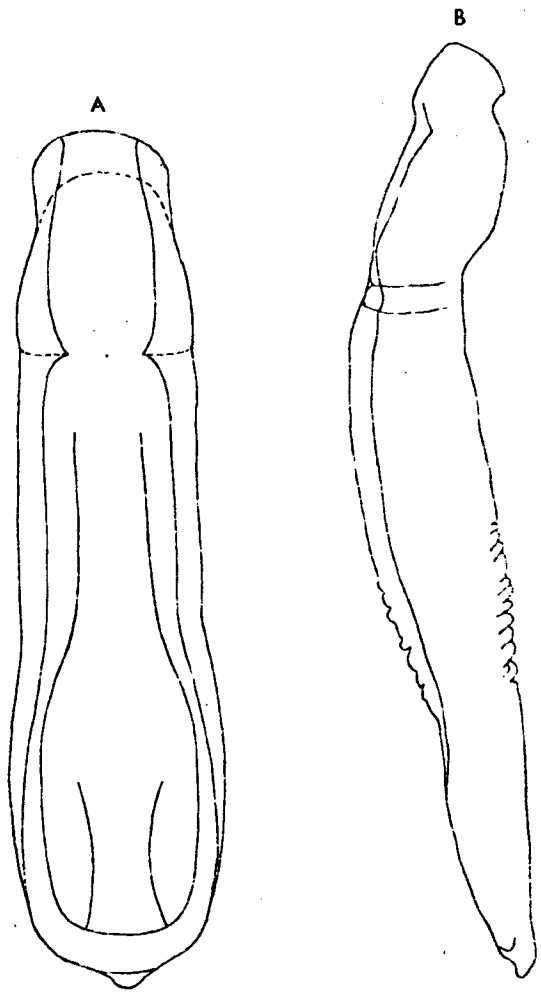


FIG. 179 H. lythri Aub.

PLATE A 28

GENUS CHALCOIDES

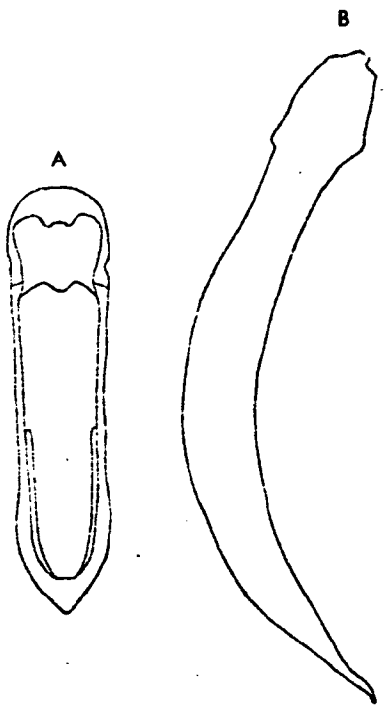


FIG.180 C. plutus (Lat.)

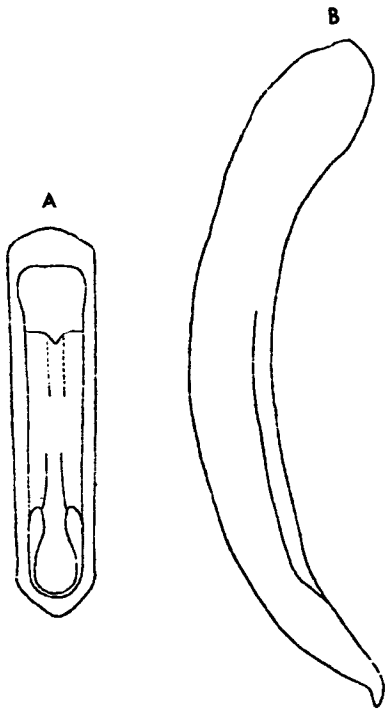


FIG.181 C. fulvicornis (F.)

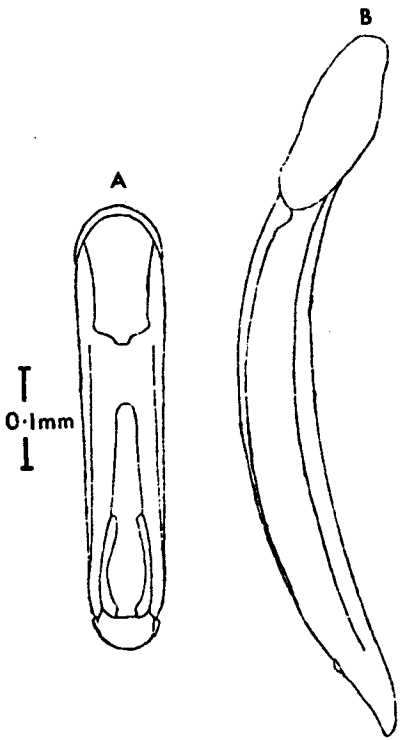


FIG.182 C. aurata (Marsh)

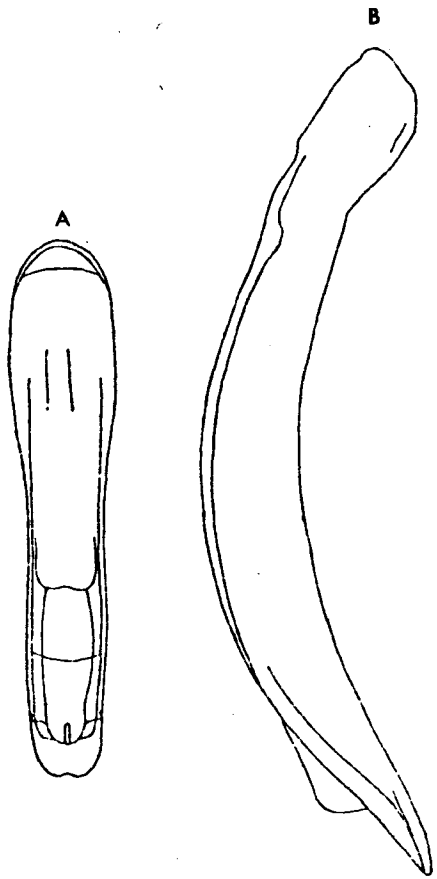


FIG.183 C. aurea (Geof.)

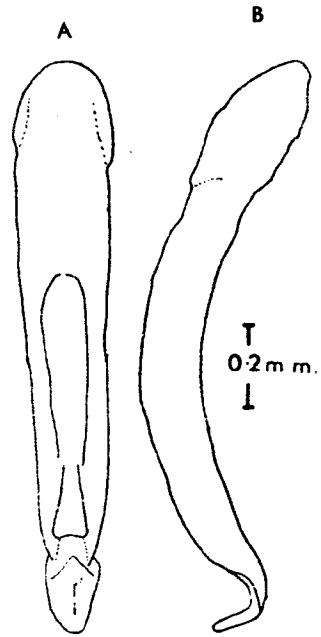


FIG.184 C. nitidula (L.)

PLATE A 29

GENUS PSYLLIODES

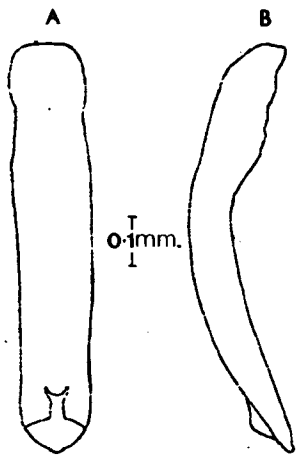


FIG. 185
P. affinis (Pk.)

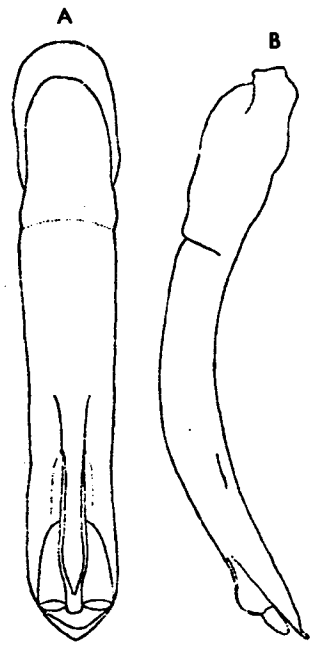


FIG. 186
P. marcida (Ill.)

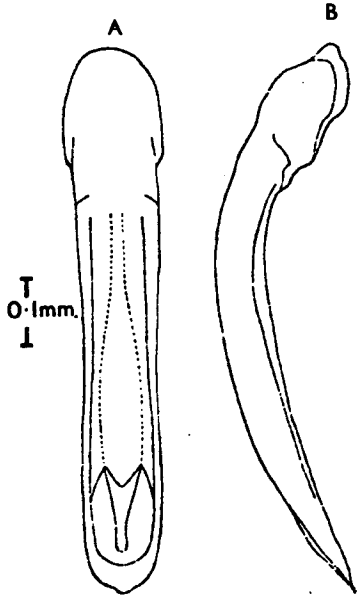


FIG. 187
P. picina (Marsh)

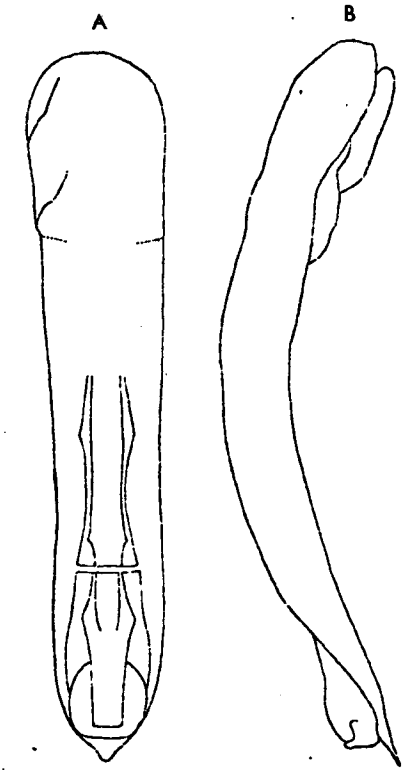


FIG. 188
P. dulcamarae (Koch)

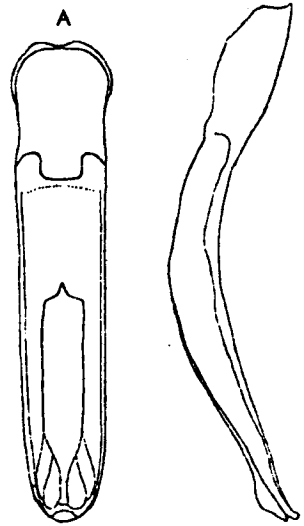


FIG. 189
P. napi (F.)

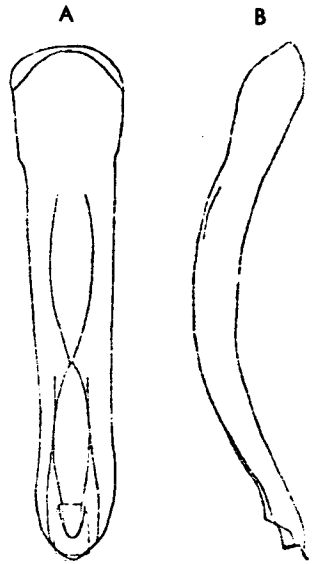


FIG. 190
P. cuprea (Koch.)

PLATE A 30

GENUS PSYLLIODES

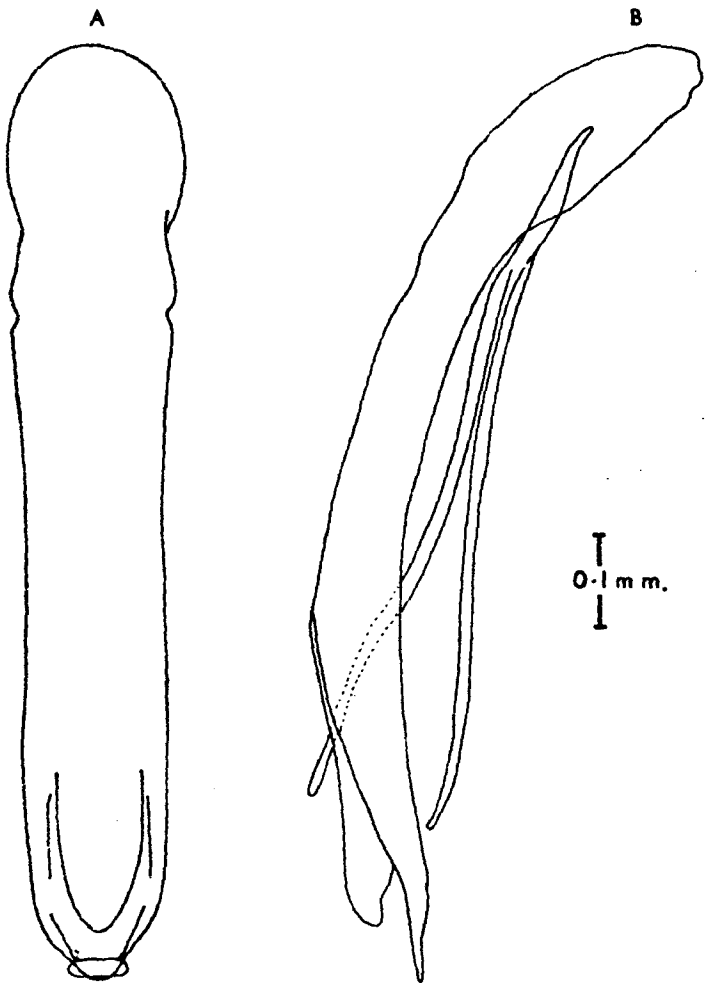


FIG. 191 P. chrysocephala (L.)

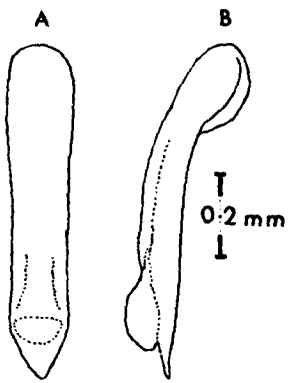


FIG.192 P. attenuata (Koch.)

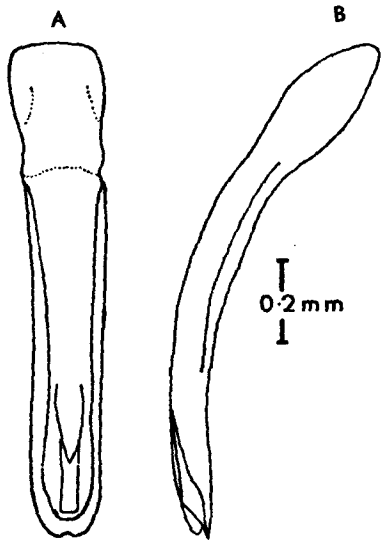


FIG.193 P. cyanoptera (Ill.)

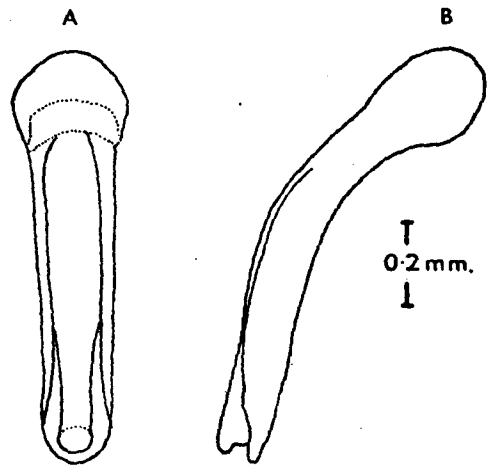


FIG. 194 P. chalcomera (Ill.)

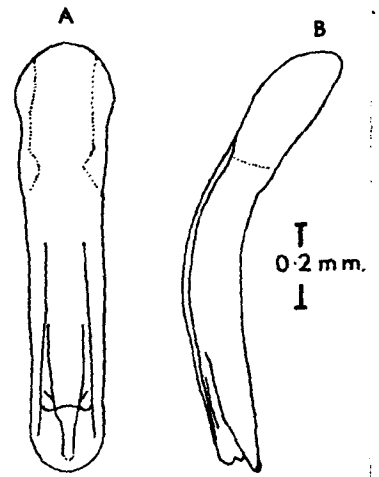


FIG. 195 P. hyoscyami (L.)

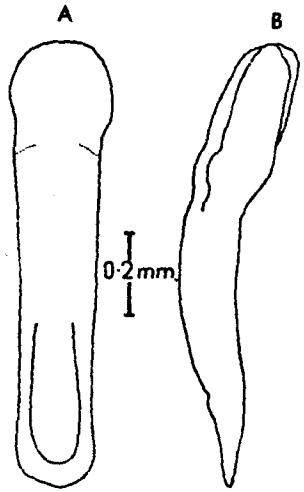


FIG.196 P. luteola (Müll.)

PLATE A 31

GENUS CHAETOCNEMA

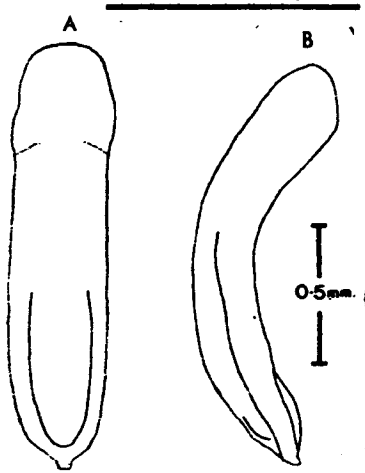


FIG. 197 C. subcoerulea Kuts.

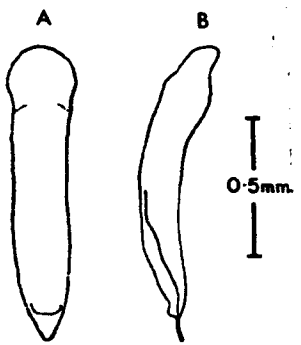


FIG. 198 C. conducta Mots.

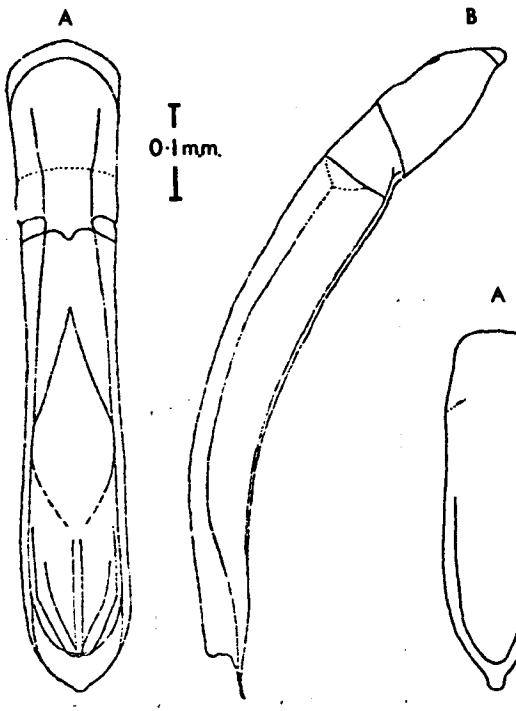


FIG. 199 C. concinna (Marsh.)

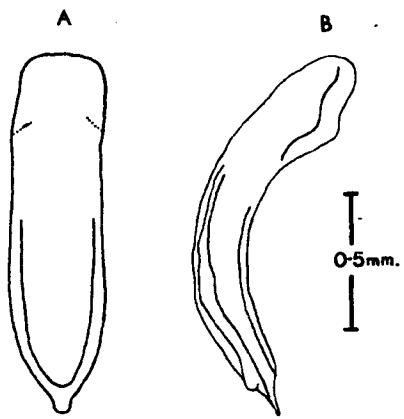


FIG. 200 C. sahlbergi (Gyll.)

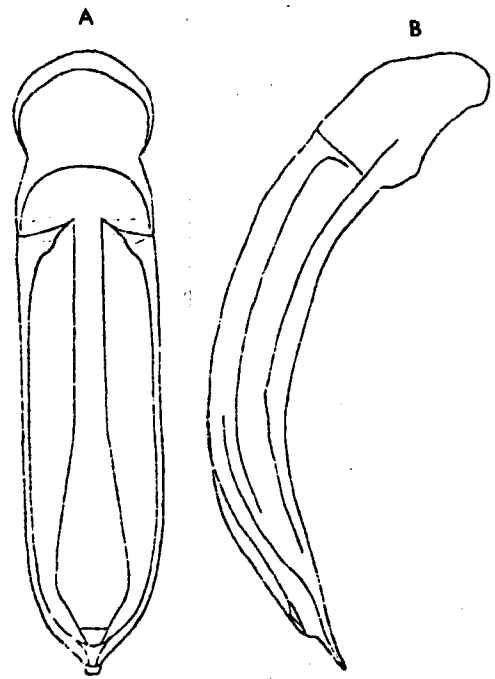


FIG. 201 C. hortensis (Geof.)

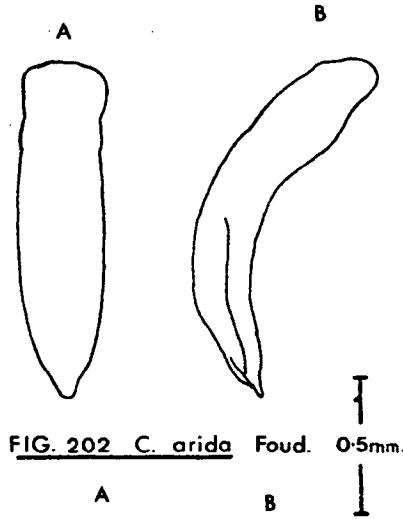


FIG. 202 C. arida Foud.

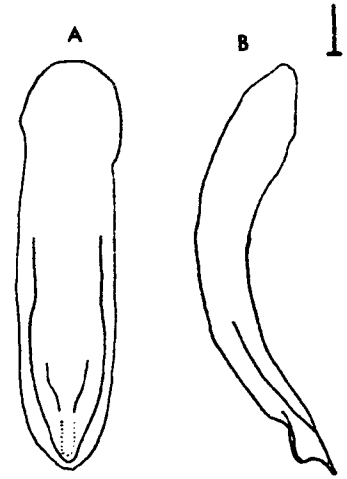


FIG. 203 C. confusa Boh.

GENUS PHYLLOTRETA

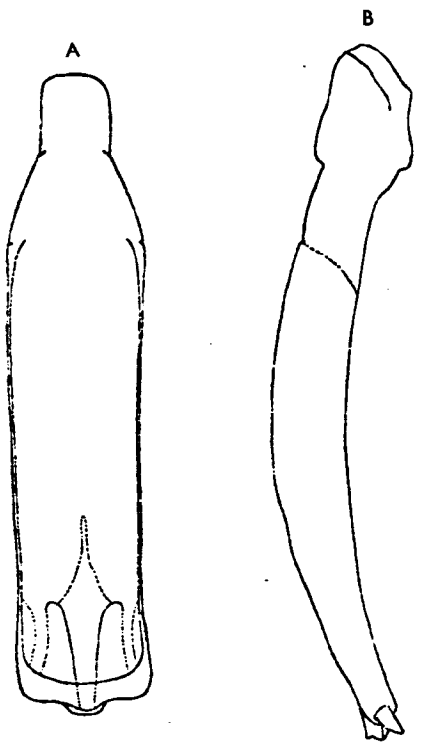


FIG.204 P. ochripes Curt.

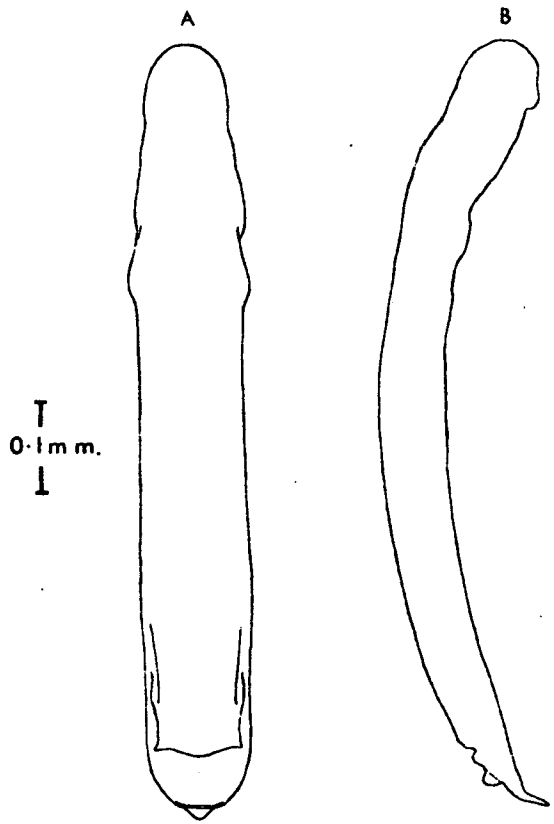


FIG.205 P. vittula Redt.

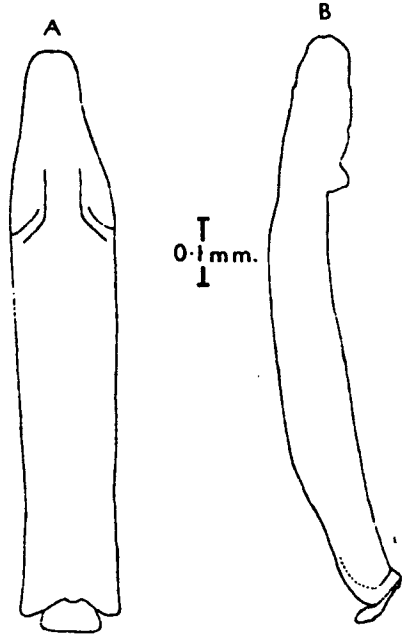


FIG. 206 P. nemorum (L.)

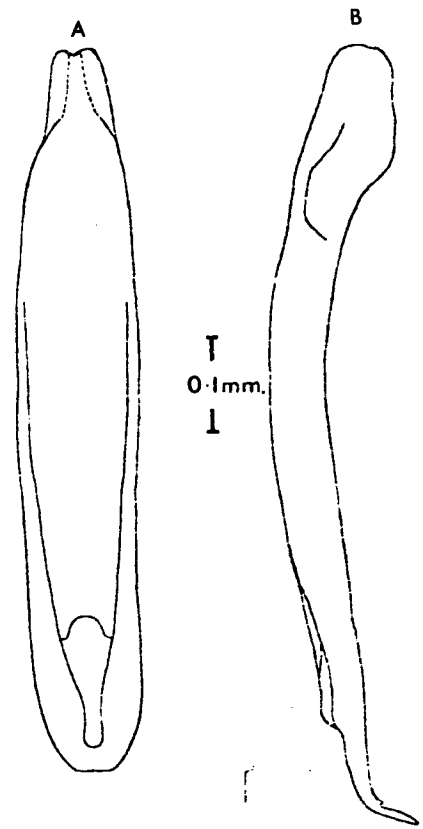


FIG. 207 P. undulata Kuts.

PLATE A 33

GENUS PHYLLOTRETA

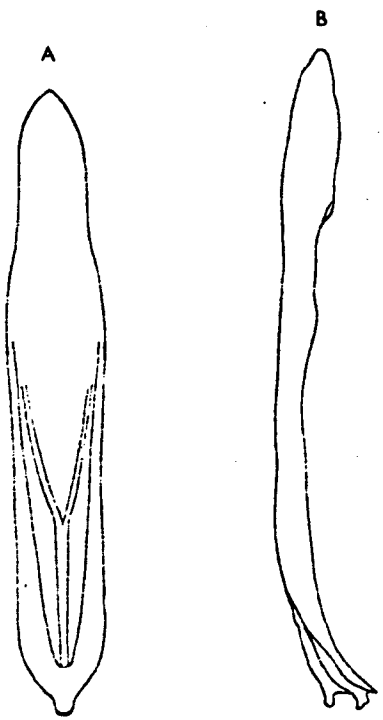


FIG. 208 P. nigripes (F.)

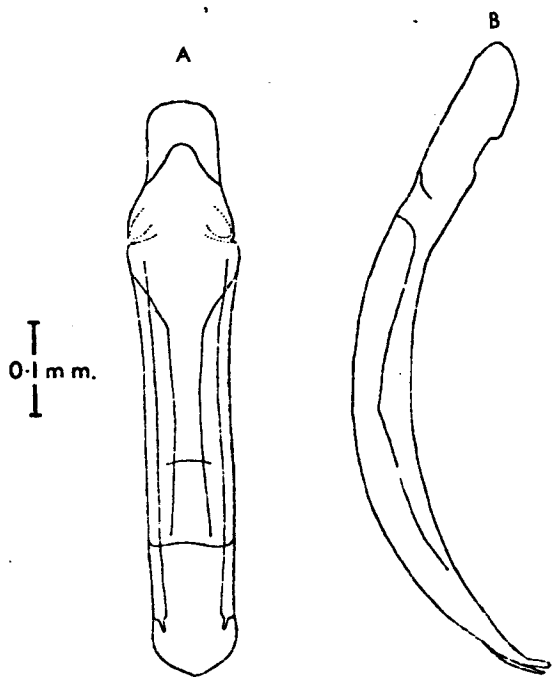


FIG. 209 P. nodicornis (Marsh.)

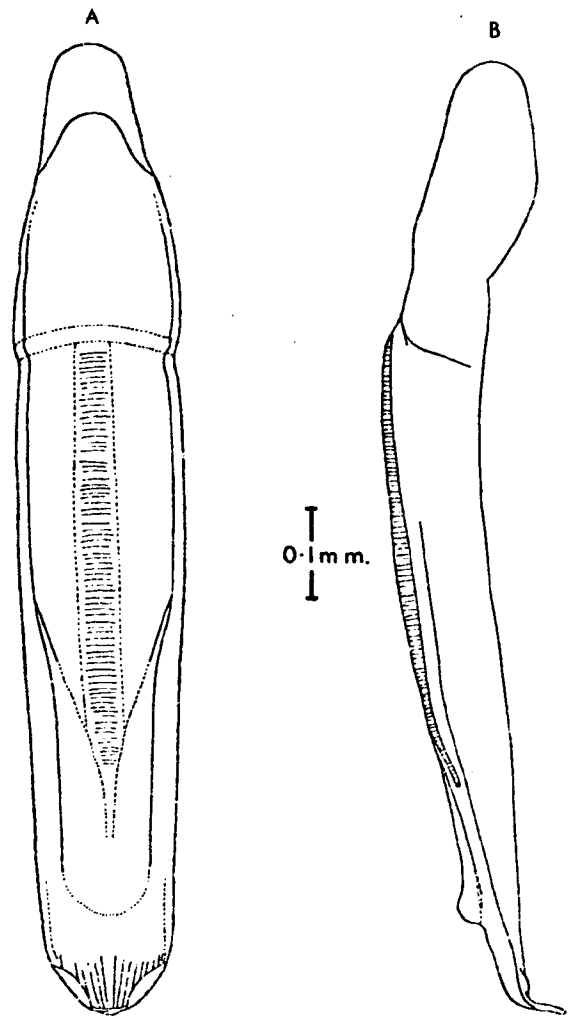


FIG. 210 P. tetrastigma Com.

PLATE A 34

GENUS PHYLLOTRETA

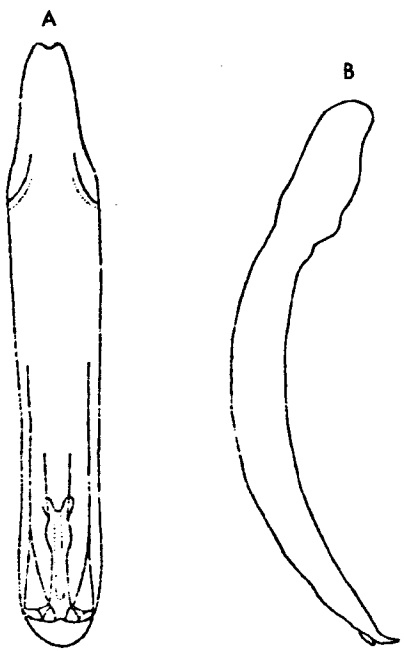


FIG. 211 P. consobrina Curt.

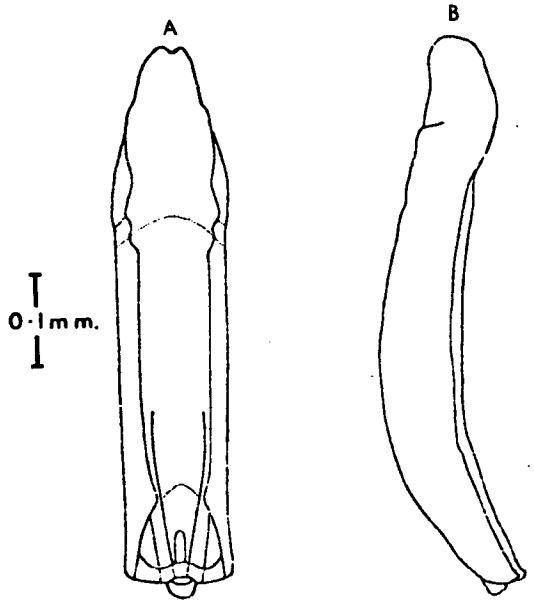


FIG. 212 P. exclamationis (Th.)

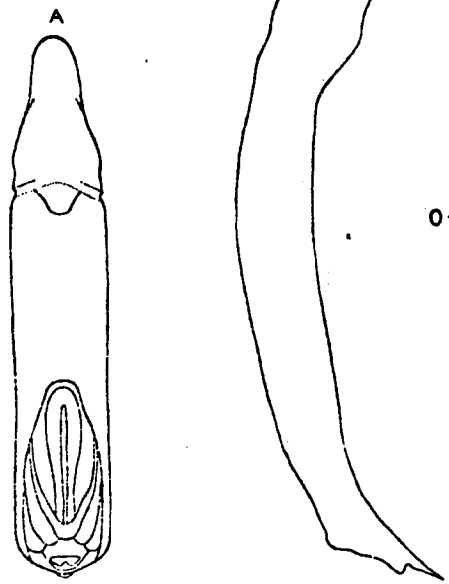


FIG. 213 P. punctulata Brit Cat.

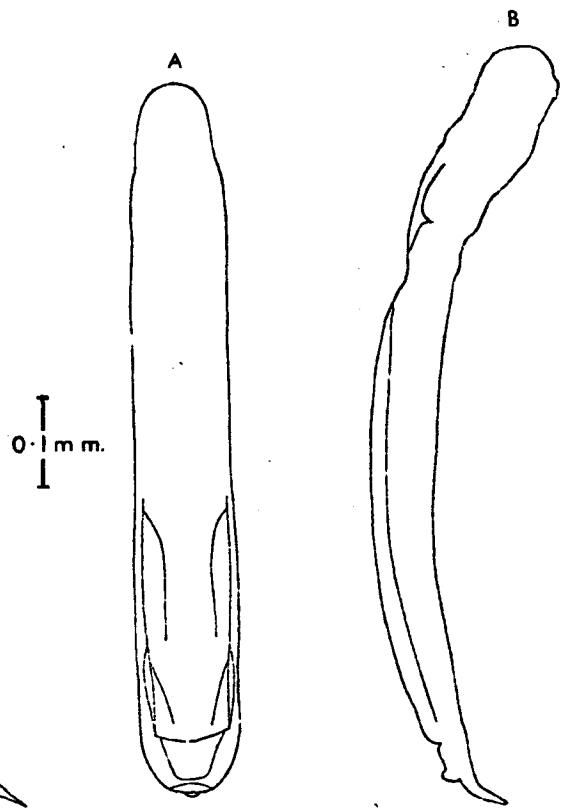


FIG. 214 P. atra (F.)

PLATE A 35

GENUS PHYLLOTRETA

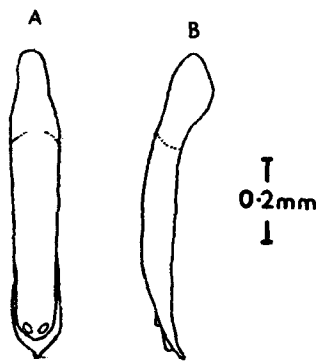


FIG. 215 P. cruciferae (Goez.)

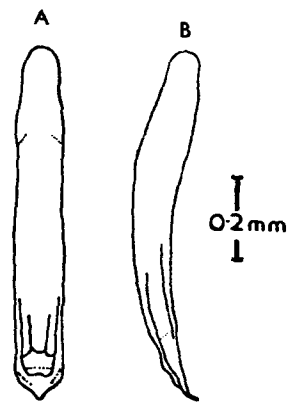


FIG. 216 P. sinuata Steph.,

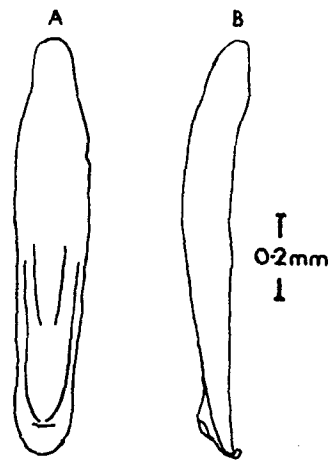


FIG. 217 P. flexuosa (Ill.)

PLATE A 36

GENUS HIPPURIPHILA

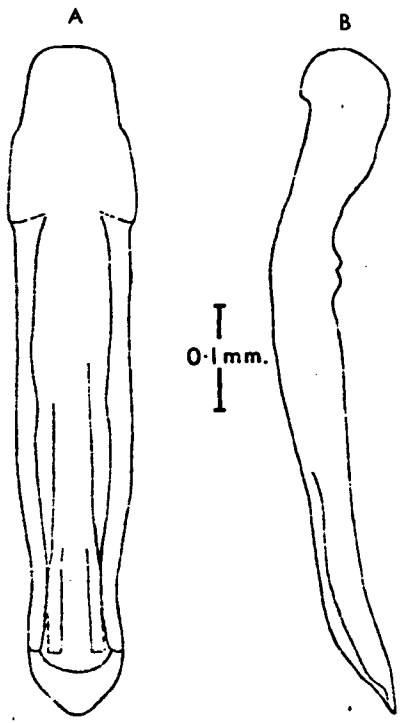


FIG. 218 H. modeeri (L.)

GENUS SPHAERODERMA

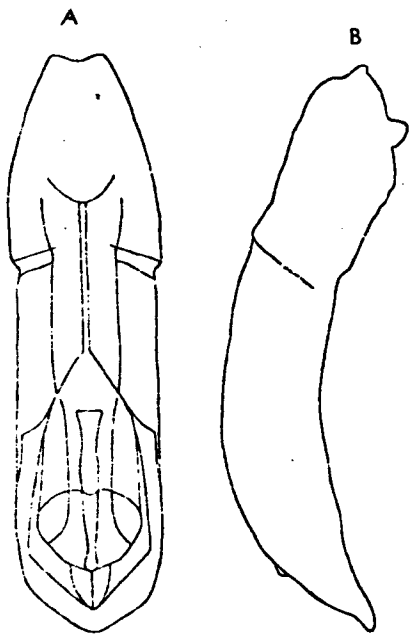


FIG. 219 S. rubidum Graells.

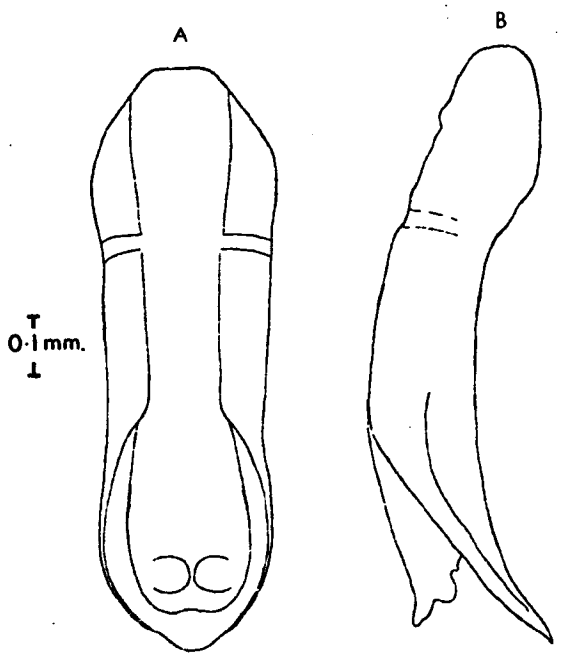


FIG. 220 S. testaceum (F.)

GENUS MNIOPHILA

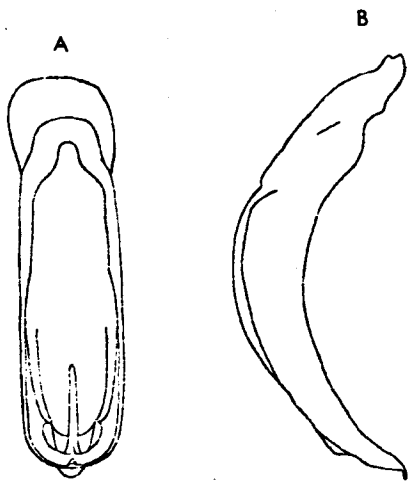


FIG. 221 M. muscorum (Koch.)

PLATE A 37

GENUS CREPIDODERA

GENUS DEROCREPIS

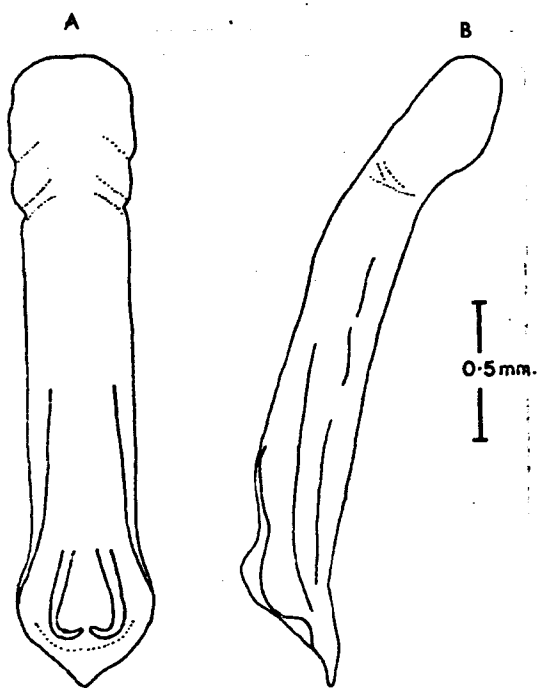


FIG. 222 C. impressa (F.)

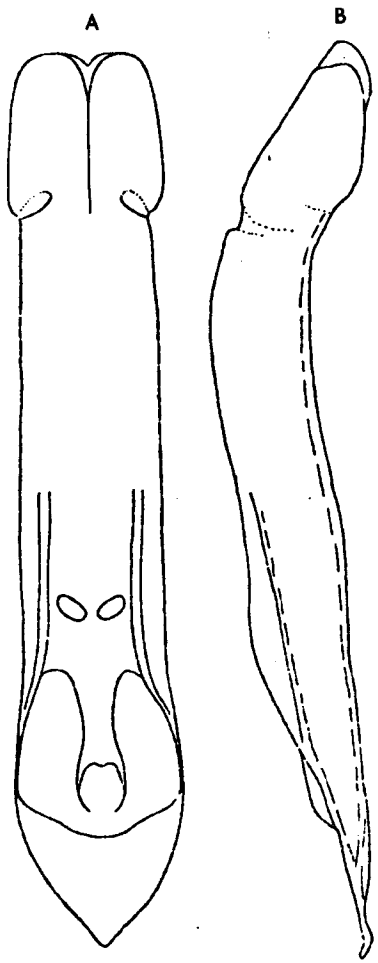


FIG. 223 C. transversa (Marsh.)

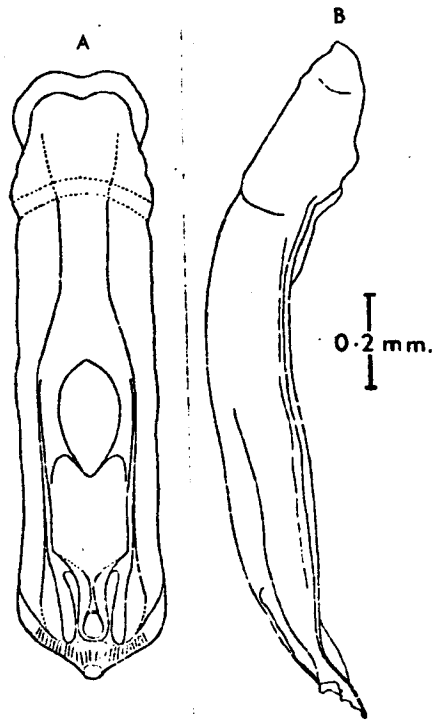


FIG. 224 C. ferruginea (Scop.)

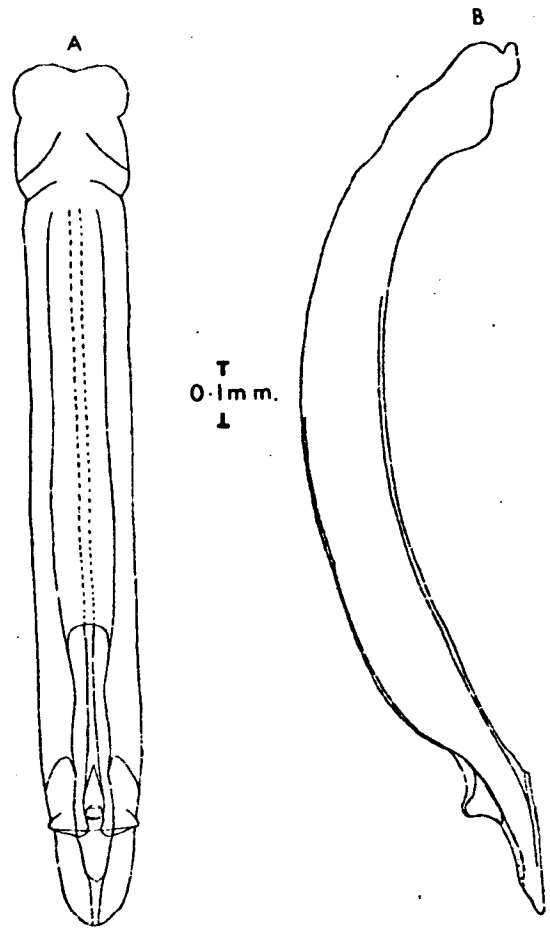


FIG. 225 D. rufipes (L.)

PLATE A 38

GENUS BATOPHILA

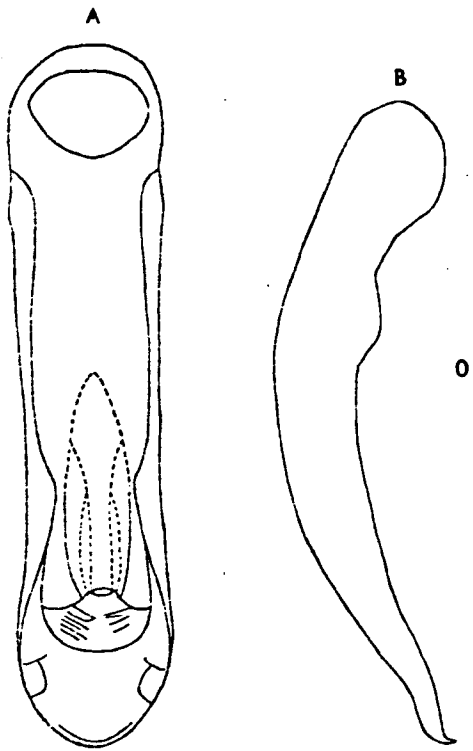


FIG. 226 B. rubi (Pk.)

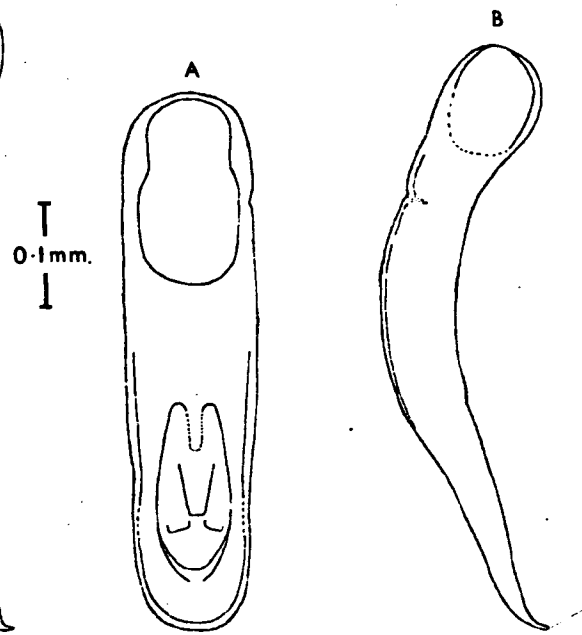


FIG. 227 B. aerata (Marsh.)

GENUS MANTURA

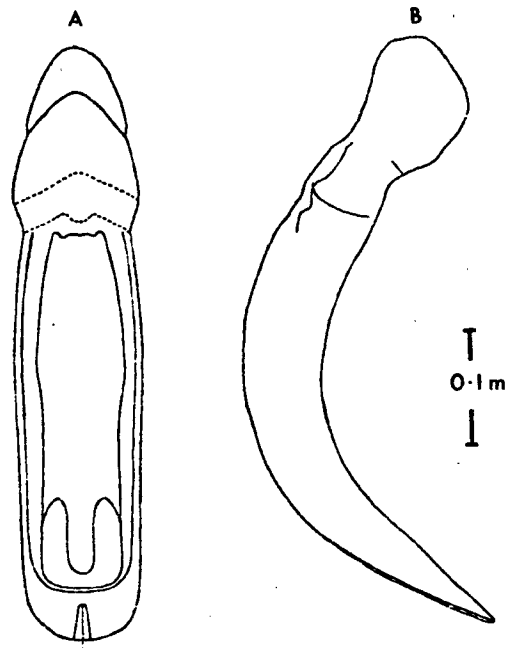


FIG. 228 M. rustica (L.)

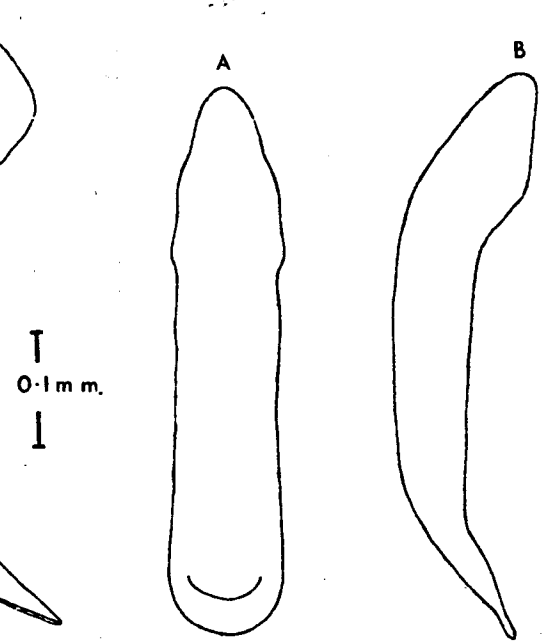


FIG. 229 M. matthewsi Steph.

PLATE A 39

GENUS APTEROPEDA

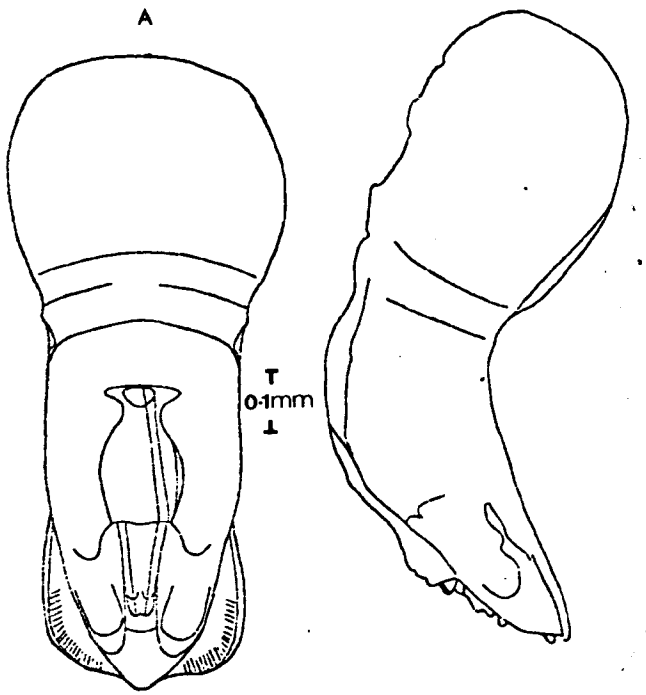


FIG. 230 A. globosa (Ill.)

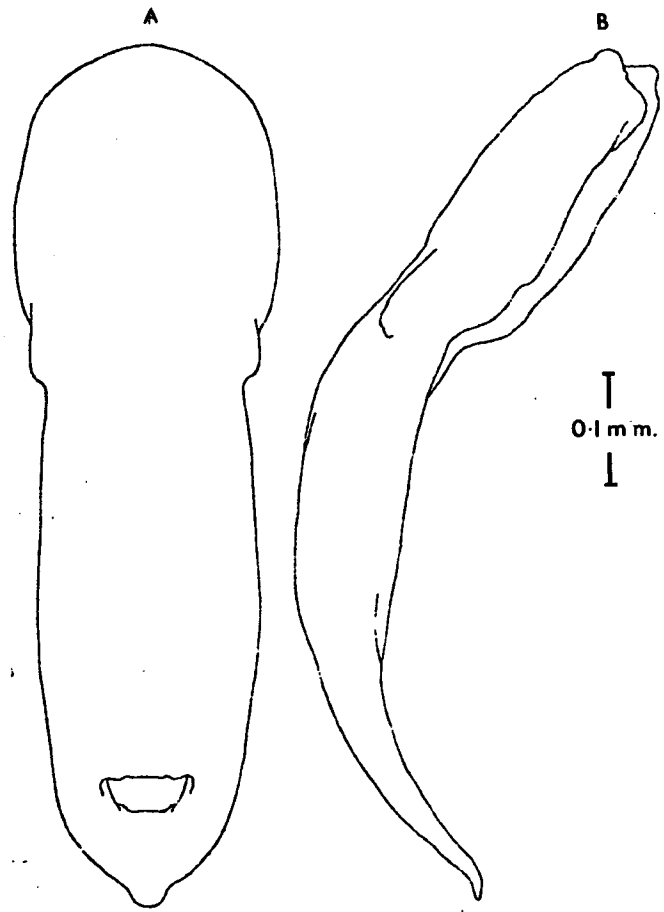


FIG. 231 A. orbiculata (Marsh.)

GENUS HERMAEOPHAGA

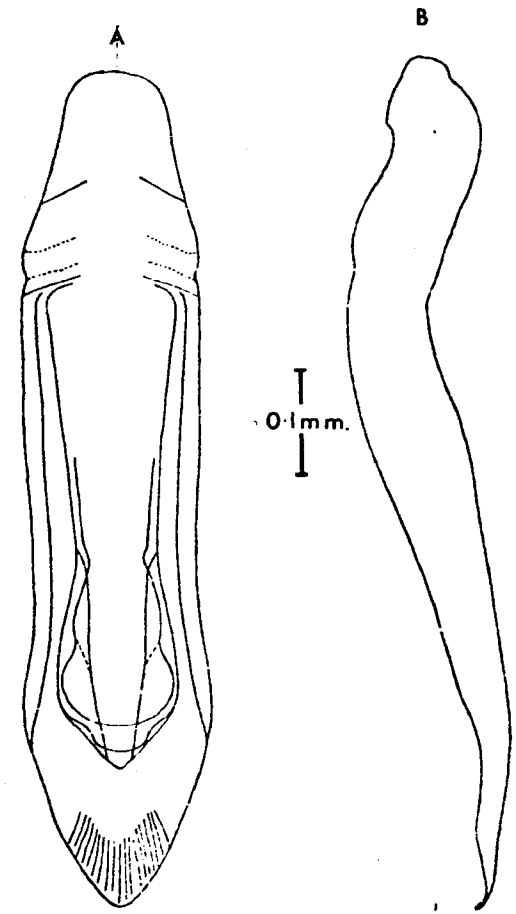


FIG. 232 H. mercurialis (F.)

PLATE A 40

GENUS EPITRIX

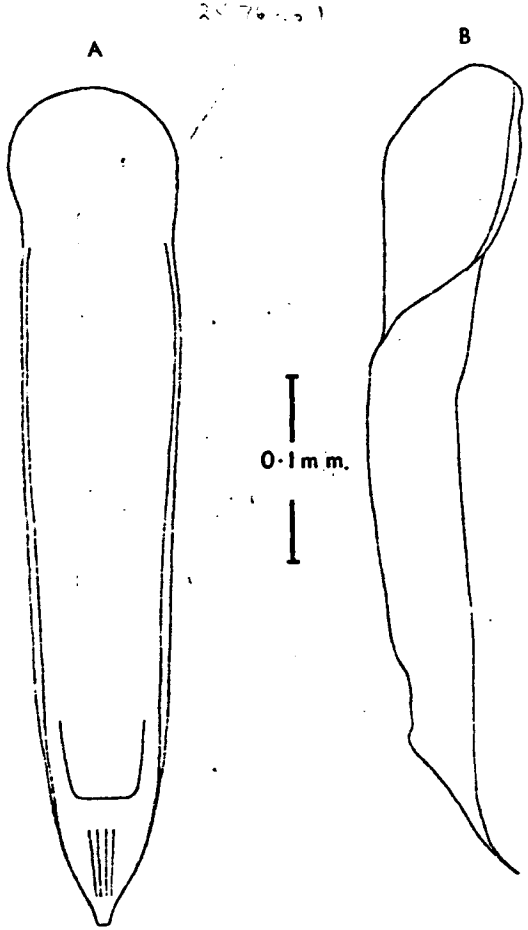


FIG. 233 E. atropae Foud.

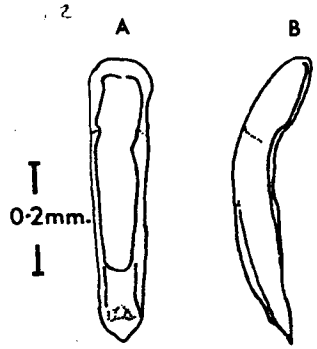


FIG. 234 E. pubescens (Koch.)

GENUS PODAGRICA

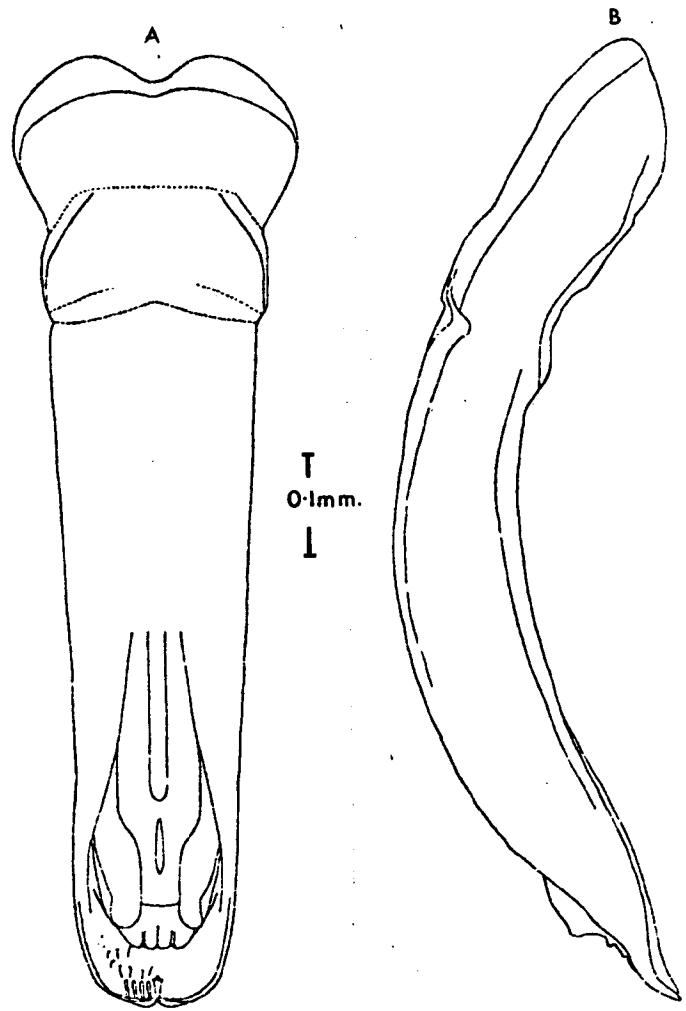


FIG. 235 P. fuscicornis (L.)

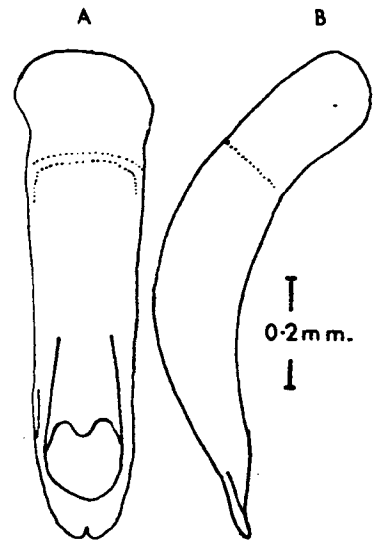


FIG. 236 P. fuscipes (L)

PLATE A 41

GENUS LONGITARSUS

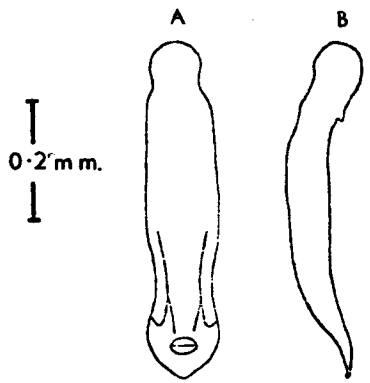


FIG. 237
L. luridus (Scop.)

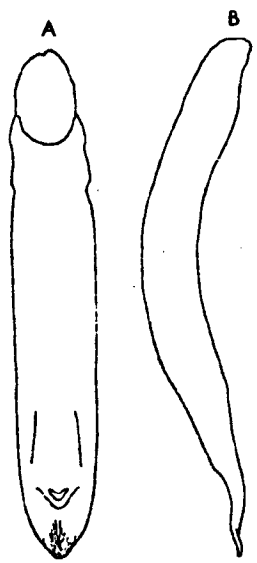


FIG. 238
L. quadriguttatus (Pont.)

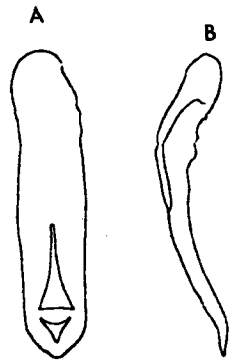


FIG. 239
L. membranaceus Foud.

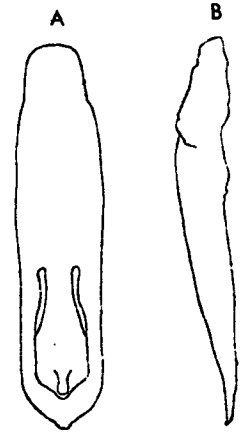


FIG. 240
L. suturellus Duft.

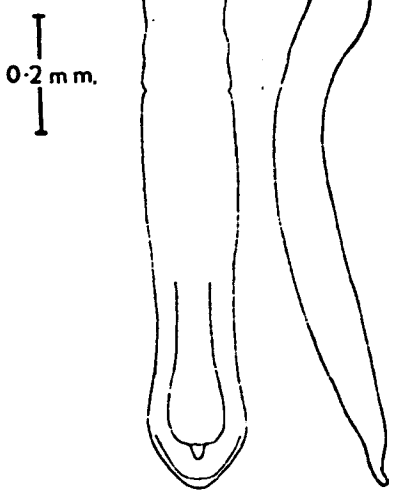


FIG. 241
L. tabidus (F.)

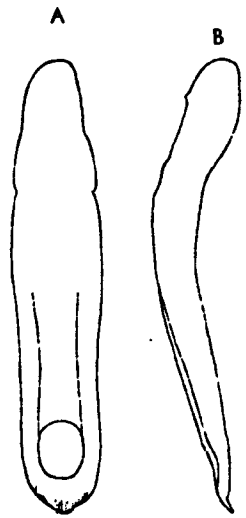


FIG. 242
L. agilis Rye.

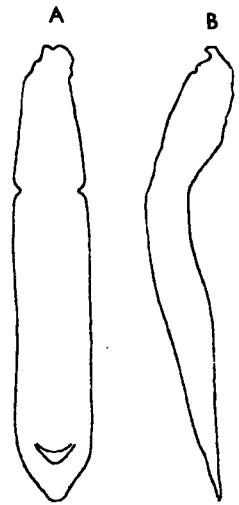


FIG. 243
L. melanocephalus (De G.)

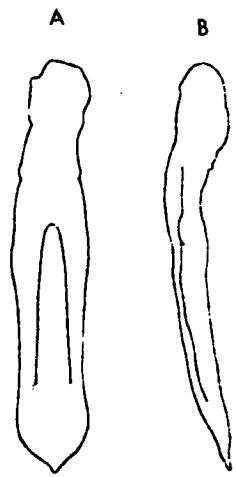


FIG. 244
L. atricillus (L.)

PLATE A 42

GENUS LONGITARSUS

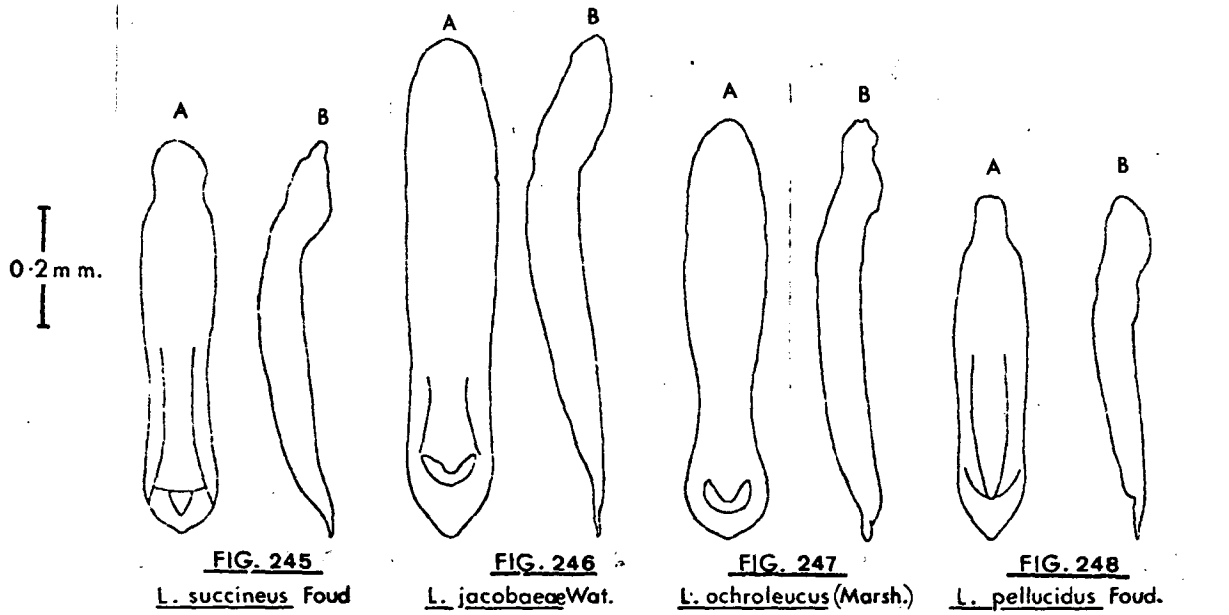


FIG. 245
L. succineus Foud

FIG. 246
L. jacobaeaeWat.

FIG. 247
L. ochroleucus (Marsh.)

FIG. 248
L. pellucidus Foud.

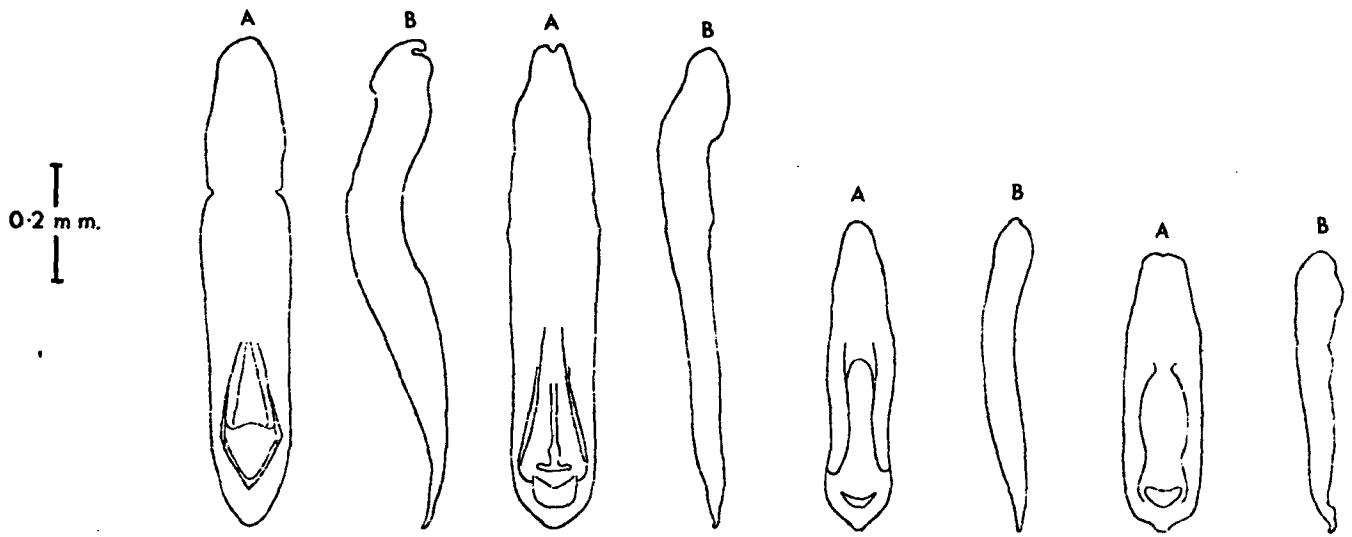


FIG. 249
L. exoletus (L)

FIG. 250
L. rubiginosis Foud.

FIG. 251
L. pusillus III.

FIG. 252
L. reichei All.

PLATE A 43

GENUS APHTHONA

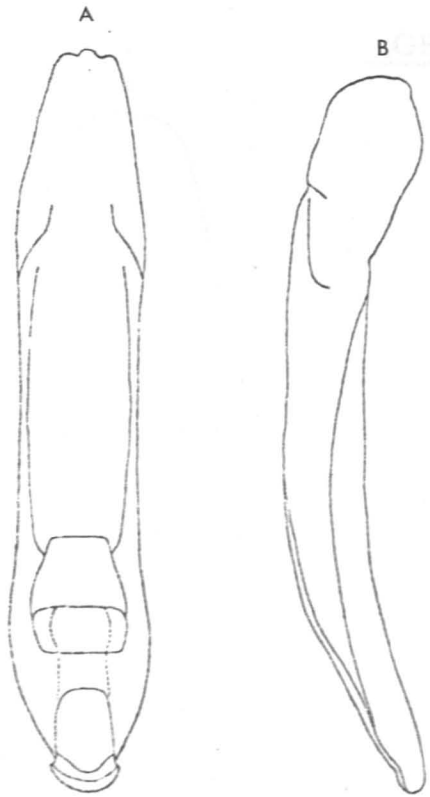


FIG. 253 A. lutescens (Gyll.)

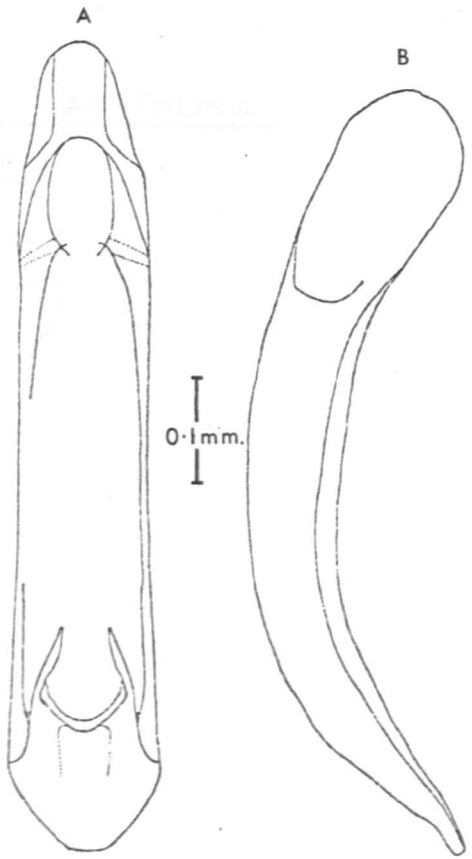


FIG. 254 A. coerulea (Geof.)

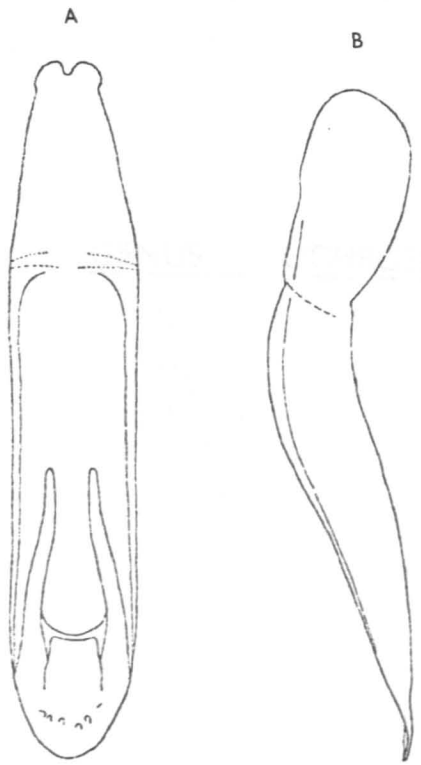


FIG. 255 A. herbigrada (Curt.)

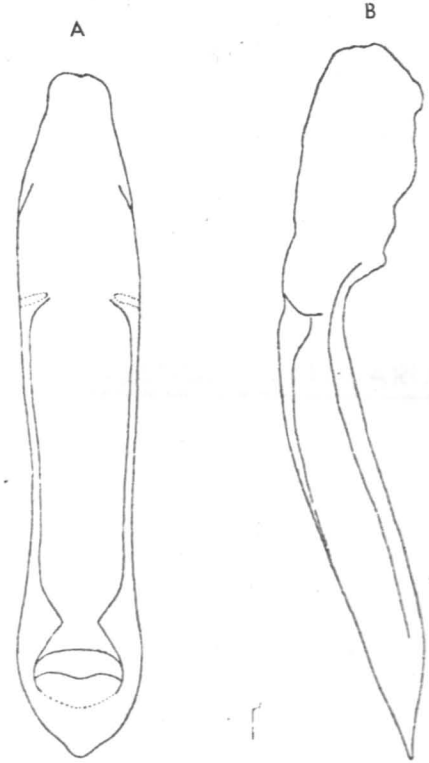


FIG. 256 A. venustula Kuts.

PLATE A 44

GENUS APHTHONA

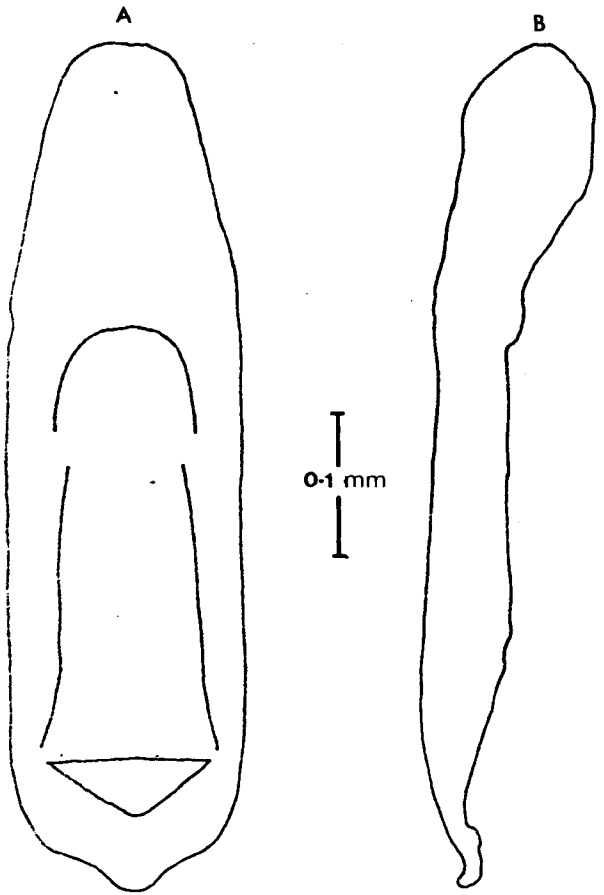


FIG. 257 A. nigriceps Redt.

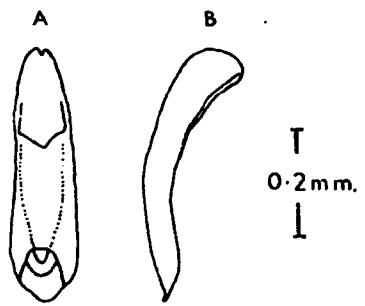


FIG.258A. euphorbiae (Schr.)

GENUS OCHROSIS

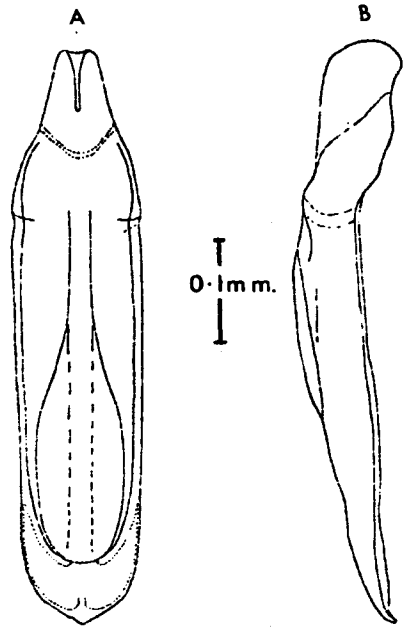


FIG. 259 O. ventralis (Ill.)

GENUS LYTHRARIA

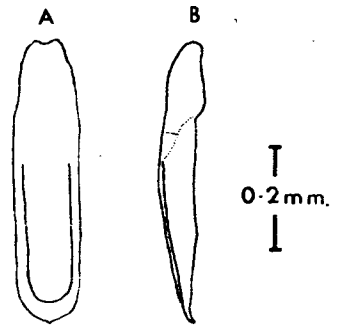


FIG.260 L. salicariae (Pk.)

PLATE A45

CHRYSOMELINAE THE SPICULUM GASTRALE

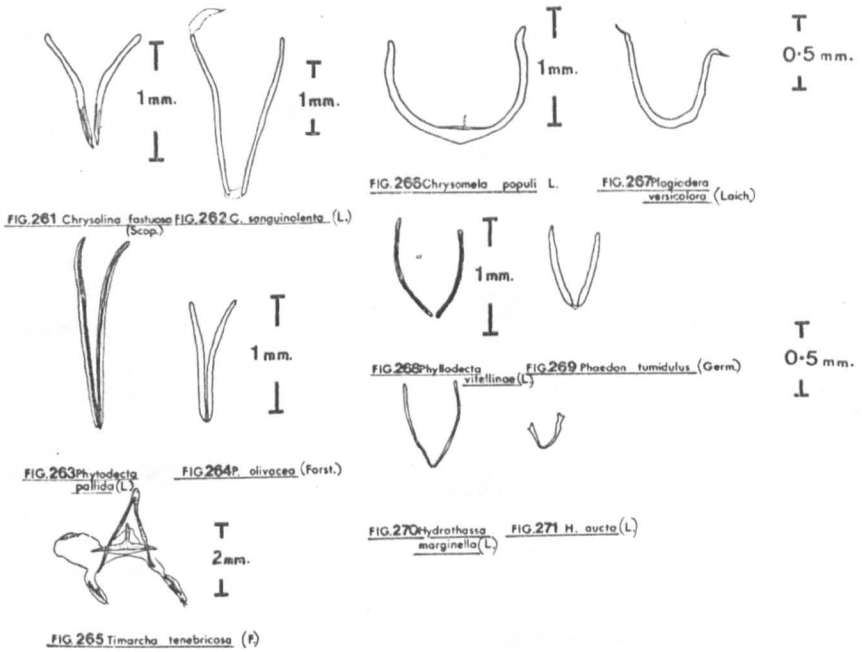


FIG.261 Chrysolina fastuosa (Scop.) FIG.262 C. sanguinolenta (L.)

FIG.265 Chrysomela populi L. FIG.267 Plagiodera versicolora (Laich)

FIG.263 Phytodecta pallida (L.) FIG.264 P. olivacea (Forst.)

FIG.268 Phyllodecta vitellinae (L.) FIG.269 Phaedon tumidulus (Germ)

FIG.265 Timarcha tenebricosa (F.)

FIG.270 Hydrothassa marginella (L.) FIG.271 H. aucta (L.)

HALTICINAE THE TEGMEN

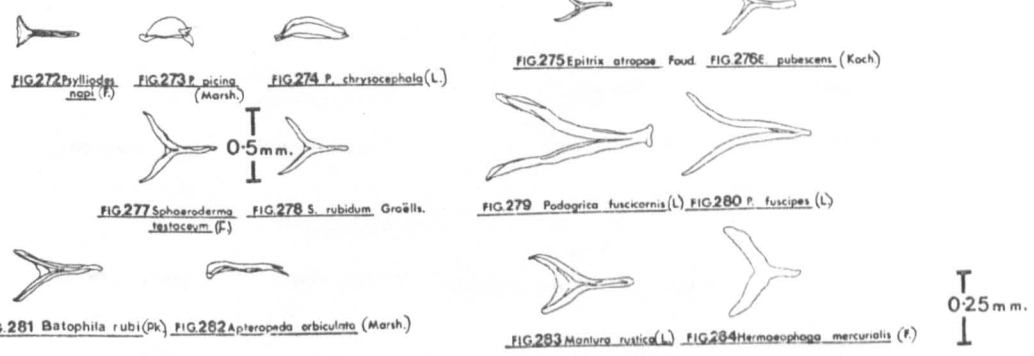


FIG.272 Psylliodes napi (F.) FIG.273 P. picina (Marsh.) FIG.274 P. chrysocephala (L.)

FIG.275 Epitrix atropae Foud. FIG.276 E. pubescens (Koch)

FIG.277 Sphaeroderma testaceum (F.) FIG.278 S. rubidum Graëlls.

FIG.279 Podagrica fuscicornis (L.) FIG.280 P. fuscipes (L.)

FIG.281 Batophila rubi (Pk.) FIG.282 Apteropeda orbiculata (Marsh.)

FIG.283 Mantura rustica (L.) FIG.284 Hermaeophaga mercurialis (F.)

FIG.285 Chaetocnema concinna (Marsh.) FIG.286 Sphaeroderma testaceum (F.)

FIG.287 Haltica oleracea (L.) FIG.288 Hippuriphila modeeri (L.)

FIG.289 Phyllotreta nemorum (L.) FIG.290 P. cruciferae (Goez.) FIG.291 Longitarsus jacobaeae Wat.

FIG.292 Ochrosis ventralis (Ill.) FIG.293 Crepidodera ferruginea (Scop.)

FIG.294 Aphthona nonstriata Har. FIG.295 A. venustula Kuts. FIG.296 A. euphorbiae (Schr.)

FIG.297 Dercorepis rufipes (L.) FIG.298 Chalcoides aurata (Marsh.)

FIG.299 Epitrix atropae Foud.

FIG.300 Hippuriphila modeeri (L)

FIG.301 Podagrica fuscicornis (L)

FIG.302 P. fuscipes (L)

FIG.303 Ochrosis ventralis (Ill.)

FIG.304 Mantura rustica (L)

FIG.305 Crepidodera ferruginea (Scop.)

FIG.306 Hermaeophaga mercurialis (F.)

FIG.307 Derocrepis rufipes (L)

FIG.308 Haltica oleracea (L)

FIG.309 Chalcoides aurata (Marsh.)

0·25 mm.

FIG.310 Psylliodes napi (F.)

FIG.311 P. picina (Marsh)

FIG.312 Phyllotreta nemorum (L)

FIG.313 P. cruciferae (Goez.)

FIG.314 P. chrysocephala (L)

FIG.315 P. atfinis (Pk)

FIG.316 Lythraria salicariae (Pk)

FIG.317 Sphaeroderma testaceum (F.)

FIG.318 S. rubidum Graells.

FIG.319 Aphthona nonstriata Goez.

FIG. A. venustula Kuts. 320

FIG.321 Chaetocnema concinna (Marsh.)

FIG.322 Apteropeda orbiculata (Marsh)

FIG.323 A. euphorbiae (Schr.)

FIG.324 Batophila rubi (Pk)

FIG.325 Longitarsus jacobaeae Wat.

D. Relationships indicated by the male genitalia.

Many authors believe that the genital structures were originally paired appendages but there is disagreement as to the homologies of the individual parts. Work on the embryology of Gastroidea polygoni (L.) and Tenebrio confirmed this view (Metcalfe, 1932; Singh Pruthi, 1924). Several groups can be made using the morphology of the male genitalia.

Orsodacninae, Donaciinae, Zeugophorinae Group.

It is probable that the genitalia which are divided into two distinct parts belong to the most primitive or ancestral form . This condition is shown by the Cerambycidae, Bruchidae and some subfamilies of the Chrysomelidae. The complete type of aedeagus is shown by the Orsodacninae, Zeugophorinae, Donaciinae and rarely in the Chrysomelinae. In these, the tegmen is extended dorsally to form the lateral lobe and ventrally to form a basal piece. The Orsodacninae and Zeugophorinae are probably closely related as in the genera Orsodacne and Zeugophora the proximal part of the median lobe is divided into a pair of long median struts whereas it is not in the genera Donacia, Plateumaris and Macroplea of the Donaciinae. However the apex of the lateral lobe is rounded or square in Zeugophora, rounded in Macroplea, whereas it is bilobed in Orsodacne and Plateumaris and tending towards this condition in Donacia. The spiculum gastrale is well developed in all genera and varies from V-shaped in Donaciinae, Y-shaped in Zeugophora and consisting of a Y and U-shaped piece in Orsodacne. The aedeagus of Orsodacne atra var. childreni because of the bilobed apex of the median lobe, divided proximal part and bilobed apex to the lateral lobe indicated a double origin and was considered the most primitive (Powell, 1941). The presence of the lateral lobe and poorly specialised internal sac in the aedeagi of Orsodacne species suggests that is the most primitive form within the Chrysomelidae, and this genus should be removed from this family and placed below the Bruchidae. Although this was conceded it was believed that the aedeagus had a single origin (Sharp & Muir, 1912).

Criocerinae

In the Criocerinae the Y-shaped tegmen is attached to the median lobe far from the ventral or posterior edge of the median foramen. The base of the tegmen is rather strongly laterally broadened and flattened. The spiculum gastrale is ring-shaped and consists of four arms, two of which are weakly chitinised. It somewhat resembles the spiculum gastrale of Orsodacne. The apex of the median lobe is rounded in Lilioceris and in some Lema species while it is bilobed in Lema puncticollis Curt. and Crioceris asparagi (L.) The position of attachment of the tegmen to the median lobe is similar in Criocerinae, Chrysomelinae, Galerucinae and Halticinae which are probably related (Chen, 1940).

Crytocephalinae and Clytrinae.

In the Cryptocephalinae and Clytrinae the tegmen is Y-shaped and attached to the ventral or posterior edge of the median foramen. The spiculum gastrale is Y-shaped and well developed. In the genus Cryptocephalus a number of species groups can be made on the shape of the apex of the median lobe. In C. aureolus Suf. and C. hypochoeridis Suf. the apex is truncate and setate, in C. pusillus F. C. frontalis Marsh, C. punctiger Pk. C. fulvus Goez. C. bilineatus (L.) and C. labiatus (L.) it is trilobed, while in C. demmaculatus (L.) and C. parvulus Müll. it is lanceolate. In Clytra the apex of the median lobe differs from that of Cryptocephalus species as it is much broader than the proximal part but is setate and thus resembles the aedeagi of C. aureolus and C. hypochoeridis. In the genus Cryptocephalus the aedeagus possesses a peculiar apical hood and a complex armature of the sac at the orifice. The general form of the aedeagus, tegmen and spiculum gastrale are similar in Cryptocephalus and Clytra (Powell, 1941). The aedeagi of Labidostomis tridentata (L.) and Gynandrophthalma affinis (Hell.) are very similar and indicate a close relationship between these two genera.

Chrysomelinae.

The aedeagus of the Chrysomelinae resembles that of Criocerinae as the Y or V-shaped tegmen is attached to the median lobe in a similar position. However, the base of the tegmen is not distally laterally broadened and flattened as it is in the Criocerinae and the spiculum gastrale may be Y, V or U-shaped.

The aedeagus of Timarcha tenebricosa is very similar to that of Orsodacne cerasi and O. lineola. The ciliated lateral lobe of the tegmen is present, the proximal part of the median lobe is divided into two struts and the spiculum gastrale is similar in both genera. This indicates that Timarcha is as primitive as Orsodacne and as this type of aedeagus does not occur in other genera of the Chrysomelinae, Timarcha is considered the most primitive genus in this subfamily. However, the general similarity in the form of the median lobe and tegmen across the family was indicative of a common origin (Powell, 1941). Timarcha geniculata possesses an aedeagus similar to that of Orsodacne and should hold a position nearer Orsodacne than others of the Chrysomelidae. The presence of a lateral lobe in Donacia piscatrix and Macroplea nigricornis and the apex of the median lobe not bilobed possibly places them nearer Timarcha than others of the family (Sharp & Muir, 1912).

In the genus Chrysolina the apex of the median lobe varies in shape between the species and no species groups can be delimited. The general structure and size of the median lobe, tegmen, internal sac and spiculum gastrale are similar in Leptinotarsa and Chrysolina. These show a closer relationship to each other than to other genera (Powell, 1941). In Phytodecta, P. olivacea possesses an asymmetrical median lobe whereas it is symmetrical in P. rufipes (Deg.), P. viminalis (L.), and P. pallida (L.) which are probably related. The spiculum gastrale is V-shaped in Chrysolina and Phytodecta. The spiculum gastrale in G. polygoni and G. viridula and Prasocuris species was not present . However, in G. polygoni it is

V-shaped and closely attached to the genital pocket (Metcalfe, 1932). It was not observed in G. polygoni (Powell, 1941). The genera Chrysomela and Plagiodera possess a U-shaped spiculum gastrale and may be closely related. The genera Prasocuris, Hydrothassa and Phaedon are probably closely related as all species have the apex of the median lobe rounded. The apex of the median lobe in Phyllodecta, Plagiodera, Gastroidea and Chrysomela is tending towards being pointed and also the internal sac is larger in the last three genera. Plagiodera and Gastroidea have similar aedeagi, apical hoods and chitinisation of the internal sac. Chrysomela presents some similarity to these genera in the shape of the aedeagus, tegmen and spiculum gastrale (Powell, 1941).

Galerucinae.

In the Galerucinae the Y or V-shaped tegmen is attached in a similar position to that in Criocerinae and Chrysomelinae and as in the latter it is distally broadened and flattened. The presence or absence of the spiculum gastrale can be used to divide the subfamily into two generic groups. In Sermyla, Phyllobrotica and Luperus the spiculum gastrale is present whereas it is absent in Agelastica, Galeruca, Galerucella and Lochmaea. This latter group can be further divided on the shape of the tegmen. In Lochmaea and Galerucella the tegmen possesses a basal hook which is absent in Agelastica and Galeruca.

Halticinae.

In the Halticinae the Y-shaped tegmen is similar in shape and point of attachment to the median lobe to that in the Galerucinae. The V or Y-shaped spiculum gastrale is always present. In the genera Haltica, Derocrepis, Batophila and some Aphthona species the spiculum gastrale is Y-shaped whereas it is V-shaped in the remainder. No distinct generic groupings can be made on the morphology of the aedeagus.

Cassidinae

In the Cassidinae, genus Cassida the Y-shaped tegmen is attached to the median lobe in a similar position to that in Cryptocephalinae and Clytrinae and also its base is similarly dorso-ventrally flattened. However, in Cassida, the spiculum gastrale is absent. Two species, C. viridis L. and C. rubiginosa Mull. thought to be allied, show the maximum range of variation in the structure of the median lobe, whereas C. sanguinolenta F. and C. vibex F. have similar aedeagi, external characters and foodplants.

Lamprosomatinae

The presence of a setate apex to the median lobe may suggest affinities between the Lamprosomatinae, Cryptocephalinae and the Clytrinae. However, the absence of the spiculum gastrale is a character common to the Cassidinae.

The aedeagus is a good character at subfamily, generic and specific level. Although it is variable in size, the constant shape of the apex is a useful specific character. The shape and point of attachment of the tegmen is important at the subfamily level but only rarely at the generic level. The shape of the spiculum gastrale is variable intraspecifically and therefore not a good character for species determination.

4. THE SPERMATHECA

A. INTRODUCTION

The spermatheca has not received as much attention as the aedeagus in the identification of species except in the genera Haltica and Longitarsus (Kevan, 1962; 1967). The spermatheca can be used as a systematic character for subfamilies but the structure of the spermatheca is not constant and other parts of the reproductive system may be of equal significance in the classification of the family (Spett & Lewitt, 1925; 1927). The shape and size of the spermathecal capsule may distinguish genera and species (Varma, 1955). The greatest contribution to taxonomy would probably be derived from a detailed examination of the spermatheca rather than that of the ovaries, vagina, bursa copulatrix (Donia, 1958). The spermatheca is similar in all Haltica species but two species groups can be formed. However, species cannot be identified using the spermatheca (Kevan, 1962). The spermatheca is usually more diagnostic than the aedeagus in the genus Longitarsus (Kevan, 1967).

Previous taxonomic works on the spermatheca of the British Chyrsomelidae are listed in Appendix 2.

It thus appears that the spermatheca may constitute a useful generic character and be useful in showing relationships between the different subfamilies. It is with this object that the spermatheca has been dissected and drawn from all subfamilies and genera of the British Chrysomelidae, a total of 200 species.

B. GENERAL STRUCTURE

The spermatheca consists of three parts, the spermathecal capsule, the spermathecal duct and the spermathecal gland. The spermathecal capsule is covered by a thin layer composed of an outer circular muscle layer and an inner longitudinal muscle layer. The capsule consists basically of four parts, the cornu, nodulus, collum and ramus. These may remain as

discrete parts or fusion may occur between them. Spermathecal muscles extend between the collum and the cornu. The spermathecal duct usually enters the spermathecal capsule at the collum and varies in length, diameter and coiling. The position of the opening of the spermathecal duct varies, although usually it lies dorsally in the middle of the vagina. The spermathecal gland usually opens into the ramus, or when the ramus is absent directly into the spermathecal duct. The gland varies in shape and size.

Variations in the structure of the spermathecal capsule, spermathecal duct and spermathecal gland described with reference to the subfamilies, genera and species of the British Chrysomelidae.

C. SPECIES DESCRIPTIONS.

i. SUBFAMILY CASSIDINAE

Genus *Cassida* Plate S1, S2

The spermathecal capsule is usually U-shaped and expanded basally. The collum and ramus are fused while the cornu and nodulus remain distinct. The long spirally coiled spermathecal duct arises anteriorly from the bursa copulatrix and enters the spermathecal capsule at the fused ramus and collum. The spermathecal gland is small (about the same length as the capsule) and joins the spermathecal capsule at the fused ramus and collum.

Cassida rubiginosa Müll. Fig. 1.

Spermathecal capsule U-shaped, expanded apically.

Cassida viridis L. Fig. 8.

Spermathecal capsule U-shaped, slightly expanded basally and apically.

Cassida murraea L. Fig. 4.

Spermathecal capsule V-shaped, slightly smaller than *C. viridis* L. but greater in diameter.

Cassida nobilis L. Fig. 7.

Spermathecal capsule U-shaped, slightly dilated and curved basally.

Cassida fastuosa Schal. Fig. 5.

Spermathecal capsule U-shaped, apical arms shorter, slightly more

expanded basally, than apically.

Cassida nebulosa L. Fig. 3.

Spermathecal capsule V-shaped, dilated basally but acuminate apically.

Cassida flaveola Thunb. Figs. 2, 9

Spermathecal capsule U-shaped, dilated basally.

Cassida vittata Vill. Fig. 10.

Spermathecal capsule U-shaped, not dilated basally.

ii. SUBFAMILY DONACIINAE Plate §3.

Spermathecal capsule is usually U-shaped and expanded basally. The cornu, nodulus, collum and ramus remain as discrete parts. The relatively short and thick spermathecal duct enters the capsule at the collum. The spermathecal gland is as long as in Orsodacne and is over twice the length of the spermathecal capsule.

Donacia vulgaris Zsch. Fig. 14.

Plateumaris sericea (L.) Fig. 13.

iii. SUBFAMILY ORSODACNINAE

Genus Orsodacne Plate §3.

Orsodacne cerasi (L.) Fig. 11.

Spermathecal capsule is U-shaped and dilated basally. The cornu, nodulus, ramus and collum remain separate. The spermathecal duct is relatively short and thick and enters the capsule at the collum. The spermathecal gland is large and enters the capsule very near the entrance of the spermathecal duct, both are enclosed in a common membrane.

iv. SUBFAMILY ZEUGOPHORINAE

Genus Zeugophora Plate 53.

Z. subspinosa (F.) Fig. 12.

Spermathecal capsule is C-shaped and expanded basally. The cornu, nodulus, collum and ramus remain as discrete parts. The long, fine, coiled spermathecal duct enters the capsule at the collum. The spermathecal gland is short and curved behind the capsule apparently fusing with the point of attachment for the spermathecal muscles.

v. SUBFAMILY CRYPTOCEPHALINAE

Genus Cryptocephalus Plate 54.

Spermathecal capsule is usually U or V-shaped. The collum and ramus remain distinct while the cornu and nodulus are fused. The very long and much coiled spermathecal duct extends into the fused cornu and nodulus. The spermathecal gland is moderately long, about the length of the spermathecal capsule, and joins the spermathecal duct at the spermathecal opening.

C. exiguus Schn. Figs. 16, 20.

Spermathecal capsule U-shaped dilated basally, apical arm acuminate and shorter than the basal arm.

C. sexpunctatus (L.) Fig. 17.

Spermathecal capsule U-shaped, not dilated basally.

C. pusillus F. Fig. 18.

Spermathecal capsule U-shaped, basal arm dilated, sinuate and larger than the apical arm.

C. coryli (L.) Fig. 21.

Spermathecal capsule U-shaped, basal arm slightly dilated, sinuate.

C. punctiger Pk. Fig. 22.

Spermathecal capsule V-shaped, basal arm slightly dilated.

C. frontalis Marsh. Figs. 19, 23.

Spermathecal capsule similar to C. pusillus but basal arm straight.

C. querceti Suf. Fig. 24.

Spermathecal capsule V-shaped, basal arm slightly dilated.

C. labiatus (L.) Fig. 25.

Spermathecal capsule similar in shape to C. pusillus F.

C. biguttatus Scop. Fig. 26.

Spermathecal capsule similar in shape to C. coryli L.

vi. SUBFAMILY CLYTRINAE

Genus Clytra Plate §5.

C. quadripunctata (L.) Fig. 27

Spermathecal capsule U-shaped with the basal arm dilated. Apical arm acuminate at the apex. Spermathecal duct uncoiled.

Genus Labidostomis Plate §4.

L. tridentata (L.) Fig. 15.

Spermathecal capsule U-shaped, slightly dilated basally. Apical arm slightly longer than the basal arm. Spermathecal duct long and fine.

Genus Gynandrophthalma Plate §5.

G. affinis (Hell.) Fig. 28

Spermathecal capsule U-shaped, very slightly dilated basally, acuminate apically. Both arms equal in length. Spermathecal duct very long, tightly coiled in basal half, but broader and uncoiled near the vagina.

vii. SUBFAMILY CRIOCERINAE Plate §6.

The spermathecal capsule is usually anchor-shaped and divisible into two parts. The collum and ramus remain distinct but fusion occurs between the cornu and nodulus. The collum is long, sometimes coiled, but the ramus is usually undifferentiated. The spermathecal duct is relatively long, uncoiled and enters the spermathecal capsule at the collum. The spermathecal gland is usually small, less than the length of the spermathecal capsule.

Genus *Lilioceris*

L. lilii (Scop.) Fig. 29

Spermathecal capsule C-shaped, basal arm longer than the apical arm. Spermathecal duct, short, broad, uncoiled and entering the fused collum and ramus. Duct of spermathecal gland entering the cornu at the base of the apical arm. Collum uncoiled.

Genus *Crioceris*

C. asparagi (L.) Fig. 30.

Cornu and nodulus fused and U-shaped. Spermathecal gland small, duct entering an undifferentiated ramus. Collum very long, coiled, with 2 twists, slightly dilated apically. Spermathecal duct, short, fine and uncoiled.

Genus *Lema*

Lema melanopa (L.) Fig. 34.

Collum variable in shape with 0-3 twists.

Lema erichsoni Suffr. Fig. 32.

Cornu and nodulus fused and U-shaped. Duct from spermathecal gland entering the ramus. Collum moderately long and with 3 twists, dilated apically. Spermathecal duct entering the apex of the collum.

Lema puncticollis Curt. Fig. 31.

Cornu and nodulus fused and V-shaped. Duct from spermathecal gland entering the ramus. Spermathecal gland small. Collum short and U-shaped, uncoiled and not dilated apically. Spermathecal duct moderately long, fine, uncoiled and entering the capsule at the apex of the collum.

Lema lichensis Voet. Fig. 33.

Cornu and nodulus fused and V-shaped. Duct from spermathecal gland entering the ramus. Collum long and with 5 twists with apex dilated. Spermathecal duct entering the capsule at the apex of the collum.

viii. SUBFAMILY CHRYSOMELINAE

The spermathecal capsule is usually U-shaped, with the cornu, nodulus, collum and ramus distinct in some species. The spermathecal duct is variable and may be narrow and weakly coiled or long and coiled and enters the capsule at the collum. The spermathecal gland is very variable in shape and size.

Genus Gastroidea Plate S9.

G. viridula (De G.) Figs. 50, 51.

Spermathecal capsule U-shaped, apical arm distinctly longer than the basal arm and slightly dilated.

G. polygoni (L.) Figs. 52, 53.

Spermathecal capsule U-shaped, apical arm slightly larger than the basal arm and ramus not differentiated. The cornu and nodulus are fused. Spermathecal duct moderately long and bearing 2 lateral diverticulaebefore the entrance into the vagina. Spermathecal gland moderately long, entering the collum near the entrance of the spermathecal duct.

Genus Plagiodera Plate S8.

P. versicolora (Laich.) Fig. 49.

Spermathecal capsule U-shaped, dilated slightly basally and the apical arm slightly longer than the basal arm.

Genus Hydrothassa Plate S9.

H. marginella (L.) Fig. 57.

Spermathecal capsule U-shaped, base not dilated.

H. aucta (F.) Fig. 59.

Spermathecal capsule U-shaped, base not dilated.

H. hannoverana (F.) Fig. 58.

Spermathecal capsule U-shaped, base dilated and basal arm shorter than apical arm and curved inwards.

Genus Prasocuris Plate S9.

P. phellandrii (L.) Fig. 60.

Spermathecal capsule similar to H. hannoverana but basal arm straight.

Genus Phyllodecta

The 4 parts remain discrete in this genus.

P. vulgatissima (L.)

Spermathecal capsule U-shaped, acuminate at the apex.

P. polaris Schn.

Similar in shape to P. vulgatissima but smaller.

Genus Phaedon Plates 9.

P. tumidulus (Germ.) Fig. 55.

Ramus and collum fused, long with 2 coils, nodulus and cornu separate. Spermathecal capsule U-shaped, basal arm straight and as long as apical arm.

P. cochleariae (F.) Fig. 56.

Spermathecal capsule U-shaped, basal arm curved inwards and slightly shorter than the apical arm.

P. armoraciae (L.) Fig. 57.

Spermathecal capsule U-shaped, basal arm almost straight and as long as the apical arm.

Genus Chrysomela Plates 8.

C. populi L. Fig. 45.

Spermathecal capsule U-shaped, basal and apical arms dilated and basal arm slightly the shorter. Ramus and collum separate, cornu and nodulus fused.

C. tremulae F. Fig. 46.

Spermathecal capsule U-shaped, basal arm dilated and slightly the shorter. Apical arm curved.

Genus Phytodecta

The spermatheca is absent in all 4 British species, and is characteristic of viviparous or potentially viviparous species. The spermatozoa are stored in the sperm chamber at the top of the pedicel of the ovariole.

Genus Chrysolina Plate 57.

C. hyperici (Forst.)

Spermatheca absent .

C. brunsvicensis (Gr.)

Spermatheca absent .

C. varians (Schal.)

Spermatheca absent.

C. staphylea (L.) Fig. 43.

Spermathecal capsule U-shaped, slightly dilated basally and apical arm slightly longer than the basal arm.

C. banksi (F.) Fig. 38.

Spermatheca U-shaped, dilated basally and apical arm usually curved and slightly longer than the basal arm.

C. polita (L.) Fig. 44.

Spermatheca U-shaped, apical arm much shorter than basal arm.

C. graminis (L.) Fig. 39,

Spermatheca U-shaped, both arms equal in length.

C. menthastri (Suf.) Fig. 40.

Similar to C. graminis but smaller. Ramus and collum fused, cornu and nodulus fused.

C. fastuosa (Scop.) Fig. 41.

Similar to C. graminis but smaller.

C. cerealis (L.) Fig. 42.

Similar to C. graminis but smaller.

C. orichalcea (Müll.) Fig. 35.

Spermathecal capsule C-shaped, apex straight.

C. marginata (L.) Fig. 36.

Spermathecal capsule C-shaped, apex straight.

C. sanguinolenta (L.) Fig. 37.

Spermathecal capsule C-shaped, apex acuminate.

Genus Timarcha Plate S8.

T. tenebricosa (F.) Fig. 48.

Spermathecal capsule U-shaped, the apical arm may be the same length or slightly longer than the basal arm. The spermathecal duct which is moderately long and tightly coiled enters the capsule at the fused ramus and collum. The spermathecal gland is large, almost the same size as the capsule and its duct enters the capsule at the fused ramus and collum.

T. coriaria (Laich.) Fig. 47.

Similar to T. tenebricosa.

ix. LAMPROSOMATINAE

Genus Lamprosoma Plate S9.

L. concolor (Stm.) Fig. 63.

Spermathecal capsule C-shaped, apical arm much shorter than the basal arm. Fused ramus and collum long, with 2 coils, nodulus and cornu separate.

x. SUBFAMILY Galerucinae

The spermathecal capsule consists of the separate cornu and nodulus and the collum and ramus are fused and extend into the nodulus. The nodulus is usually greatly dilated and the cornu U-shaped. The spermathecal duct and spermathecal gland open directly into the fused collum and ramus.

Genus Sermyla Plate S 11

S. halensis (L.) Fig. 76.

Nodulus greatly dilated, cornu U-shaped with apex acuminate.

Genus Phyllobrotica Plate S 11

P. quadrimaculata (L.) Fig. 75

Spermathecal capsule C-shaped, nodulus not dilated, cornu with apex acuminate.

Genus Luperus Plate S 11

L. longicornis F. Fig. 78.

Spermathecal capsule L-shaped, nodulus slightly dilated, cornu with rounded apex.

L. flavipes L. Fig. 77b. Similar to L. longicornis.

L. circumfusus Marsh. Fig. 77a

Spermathecal capsule similar to L. longicornis but nodulus slightly more dilated.

Genus Agelastica Plate S 11

A. alni (L.) Fig. 79.

Nodulus greatly dilated, cornu U-shaped with apex rounded.

Genus Galeruca Plate S 10

G. tanaceti (L.) Fig. 64.

Nodulus greatly dilated, cornu with apex acuminate.

Genus Lochmaea Plate S 10

L. suturalis (Th.) Fig. 71

Nodulus greatly dilated, cornu curving outwards and slightly narrower apically than basally.

L. capreae (L.) Fig. 72.

Nodulus greatly dilated, cornu with apical part dilated.

L. crataegi (Forst.) Fig. 70.

Nodulus greatly dilated, cornu of the same diameter throughout.

Genus Galerucella Plate S 10

G. nymphaeae (L.) Fig. 67.

Nodulus greatly dilated, cornu the same diameter along almost all its length but acuminate at the apex.

G. sagittariae Brit.Cat. Fig. 73.

Spermathecal capsule U-shaped. Nodulus greatly dilated, cornu slightly dilated apically and rounded at apex.

G. viburni (Pk.) Fig. 74.

Spermathecal capsule L-shaped. Nodulus greatly dilated and cornu acuminate at the apex.

G. calmariensis (L.) Fig. 69.

Nodulus usually less strongly dilated than in other Galerucella sp. and cornu acuminate at the apex.

G. pusilla (Duft.) Fig. 68.

Nodulus less strongly dilated and cornu with apex rounded.

G. lineola (F.) Fig. 65.

Shape as G. calmariensis L.

G. tenella (L.) Fig. 66.

Shape as G. calmariensis (L.)

xi. SUBFAMILY HALTICINAE

Spermatheca very similar in structure to that in the Galerucinae and the cornu, nodulus and fused collum and ramus are distinct. The nodulus is usually dilated and sometimes lengthened. The cornu varies from nearly straight to C-shaped. The length of the fused collum and ramus varies but it is usually much longer than in the Galerucinae and also may be straight or coiled. The spermathecal duct is long and narrow in diameter and enters the capsule at the fused collum and ramus. The spermathecal gland is usually long and enters the fused collum and ramus above the entrance of the spermathecal duct.

Genus Haltica Plate S 12

The spermathecal capsule is very similar in all speces and there is a loop in the fused collum and ramus. However, the length of the fused collum and ramus ('the stem') before the loop varies from species to species.

H. lythri Aub.

Stem short.

H. brevicollis Foud. Fig. 80.

Stem short.

H. britteni Shp. Fig. 81.

Stem short.

H. ericeti All. Fig. 82.

Stem short.

H. oleracea (L.)

Stem long.

H. pusilla Duft.

Stem long.

Genus Chalcoides Plate S 13.

Nodulus weakly to strongly dilated. Fused collum and ramus uncoiled and varying in length. Cornu varying in curvature and amount of dilation.

C. nitidula (L.) Fig. 84.

Nodulus strongly dilated. Fused collum and ramus very long, not touching nodulus. Cornu dilated and weakly curved.

C. plutus (Lat.) Fig. 87.

Nodulus strongly dilated. Fused collum and ramus moderately long and not touching nodulus. Cornu weakly dilated basally and moderately curved.

C. aurea (Geof.) Fig. 86.

Nodulus weakly dilated. Fused collum and ramus slightly shorter than in C. plutus but not touching nodulus. Cornu not dilated and strongly curved.

C. aurata (Marsh.) Fig. 85.

Nodulus weakly dilated. Fused collum and ramus short, touching nodulus along its length. Cornu not dilated and curved as in C. plutus.

C. fulvicornis (F.) Fig. 83.

Nodulus strongly dilated. Fused collum and ramus very short, touching nodulus along its length. Cornu not dilated and strongly curved.

Genus Psylliodes Plates S 14, S 15.

Nodulus usually weakly dilated. Fused collum and ramus usually uncoiled and short to long. Cornu usually not dilated, and varying in length and curvature.

P. affinis (Pk.)

Fused collum and ramus long and with 2 coils. Cornu short, strongly curved and with rounded apex.

P. hyoscyami (L.) Fig. 89.

Fused collum and ramus long and with 2 coils. Cornu short, almost straight and with rounded apex.

P. marcida (Ill.) Fig. 98.

Fused collum and ramus uncoiled and moderately long. Cornu moderately long weakly curved and acuminate at apex.

P. picina (Marsh.) Fig. 88.

Fused collum and ramus uncoiled and short. Cornu long almost straight and acuminate at apex.

P. attenuata (Koch.) Fig. 91.

Fused collum and ramus uncoiled and short. Cornu moderately long and weakly curved.

P. luteola (Müll.) Fig. 99.

Fused collum and ramus uncoiled and moderately long. Cornu long, strongly curved and acuminate at apex.

P. cyanoptera (Ill.) Fig. 94.

Fused collum and ramus uncoiled and moderately long. Cornu long, weakly curved and with apex rounded.

P. napi (F.) Fig. 92.

Fused collum and ramus uncoiled and moderately long. Cornu long, weakly curved and with apex rounded.

P. cuprea (Koch.) Fig. 95.

Fused collum and ramus uncoiled and moderately long. Cornu short, strongly curved and with apex rounded.

P. chrysocephala (L.) Fig. 96.

Fused collum and ramus uncoiled and moderately long. Cornu long, strongly curved and with apex acuminate.

P. dulcamarae (Koch.) Fig. 90.

Fused collum and ramus with one twist.

P. chalcomera (Ill.) Fig. 93.

Fused collum and ramus with one or two twists.

Genus Chaetocnema Plate S 16.

Nodulus usually weakly dilated. Fused collum and ramus coiled or uncoiled and short to long. Cornu short, weakly curved, dilated or undilated and partly sunk into the nodulus.

C. concinna (Marsh.) Fig. 108.

Fused collum and ramus sh r and uncoiled. Nodulus curved, not dilated. Cornu short, acuminate at apex.

C. hortensis (Geof.) Fig. 107.

Fused collum and ramus short and with one coil. Nodulus slightly dilated. Cornu short, rounded at apex.

C. subcoerulea Kuts. Fig. 115.

Fused collum and ramus moderately long and with one coil. Nodulus curved, not dilated. Cornu short, weakly curved.

C. confusa Boh. Fig. 113.

As C. subcoerulea.

C. sahlbergi (Gyll.) Fig. 114.

As C. subcoerulea.

C. conducta Mats. Fig. 116. As C. subcoerulea.

C. arida Foud. Fig. 117. As C. subcoerulea.

Genus Phyllotreta Plate S 17.

Nodulus long and weakly dilated. Fused collum and ramus short and uncoiled. Cornu short, weakly curved, partly sunk into nodulus.

P. vittula Redt. Fig. 118.

Nodulus slightly dilated basally. Cornu very short, almost straight.

P. undulata Kuts. Fig. 126.

P. nemorum (L.) Fig. 119.

Nodulus dilated slightly. Cornu short.

P. tetrastigma Com. Fig. 128.

Nodulus slightly dilated basally. Cornu moderately long, slightly curved.

P. ochripes Curt. Fig. 129.

Nodulus slightly dilated basally. Cornu short.

P. exclamationis (Th.) Fig. 130.

Nodulus slightly dilated basally. Cornu very short.

P. atra (F.) Fig. 131.

Nodulus very slightly dilated basally. Cornu moderately long.

P. cruciferae (Goez.) Fig. 132.

Nodulus slightly dilated basally. Cornu moderately long.

P. nodicornis (Marsh.) Fig. 133.

Nodulus slightly dilated. Cornu moderately long.

P. diademata Foud. Fig. 120.

As P. consobrina.

P. consobrina Curt. Fig. 121.

As P. punctulata, nodulus less strongly dilated.

P. punctulata Brit.Cat. Fig. 122.

Nodulus shorter, strongly dilated.

P. nigripes (F.) Fig. 123.

Nodulus relatively longer.

P. sinuata Steph. Fig. 124.

Nodulus narrow, cornu more curved than in other species.

P. flexuosa (Ill.) Fig. 125.

Nodulus relatively larger.

Genus Mantura Plate S 16.

Nodulus usually moderately strongly dilated. Fused collum and ramus moderately long and coiled. Cornu moderately long and fairly strongly dilated.

M. matthewsi Steph. Fig. 100.

Fused collum and ramus with 2 twists.

M. chrysanthemi (Koch.) Fig. 101.

As M. matthewsi.

M. obtusata (Gyll.) Fig. 102.

As M. matthewsi.

M. rustica (L.) Fig. 103.

As M. matthewsi but nodulus larger.

Genus Sphaeroderma Plate S 19.

Nodulus strongly dilated. Fused collum and ramus uncoiled and short. Cornu long, narrow and strongly curved.

S. testaceum (F.) Fig. 134.

Spermathecal capsule similar in shape to S. rubidum, but slightly larger.

S. rubidum Graëlls. Fig. 135.

Genus Crepidodera Plate S 19.

Nodulus weakly dilated. Fused collum and ramus uncoiled and short. Cornu long, narrow and strongly curved.

C. ferruginea (Scop.) Fig. 136.

Nodulus slightly more dilated than in C. transversa Marsh. and spermathecal capsule smaller.

C. transversa (Marsh.) Fig. 137.

As for C. ferruginea.

C. impressa (F.) Fig. 138.

As for C. ferruginea.

Genus Derocrepis Plate S 16.

D. rufipes (L.) Fig. 104.

Nodulus weakly dilated basally. Fused collum and ramus uncoiled and short. Cornu long, narrow and strongly curved.

Genus Epitrix Plates S 16, S 20.

E. atropae Foud. Fig. 138.

Nodulus moderately dilated. Fused collum and ramus uncoiled and short. Cornu moderately long and strongly curved.

E. pubescens (Koch.) Fig. 109.

As E. atropae but collum and ramus longer.

Genus Podagrica Plates S 16, S 20.

P. fuscipes (L.) Figs. 111, 139.

Nodulus moderately dilated. Fused collum and ramus uncoiled and short. Cornu long and strongly curved.

P. fuscicornis (L.) Fig. 112.

As P. fuscipes but cornu more strongly dilated.

Genus Hermaeophaga Plate S 20.

H. mercurialis (F.) Fig. 140.

Nodulus strongly dilated. Fused collum and ramus uncoiled and short. Cornu moderately long and strongly curved.

Genus Hippuriphila Plate S 16.

H. modeeri (L.) Fig. 105.

Nodulus weakly dilated. Fused collum and ramus short and with 1 coil. Cornu moderately long and apex acuminate.

Genus Dibolia Plate S 21.

Dibolia cynoglossi (Koch.) Fig. 144.

Nodulus weakly dilated. Fused collum and ramus short and uncoiled. Cornu short, strongly curved and apex rounded.

Genus Apteropeda Plate S 21.

A. orbiculata (Marsh.) Fig. 141.

Nodulus strongly dilated. Fused collum and ramus moderately long, uncoiled. Cornu long, strongly curved.

Genus Batophila Plate S 21.

B. rubi (Pk.) Fig. 142.

Nodulus weakly dilated. Fused collum and ramus moderately long, with 1 coil. Cornu short, weakly curved.

B. aerata (Marsh.) Fig. 143.

Similar to B. rubi but slightly smaller.

Genus Lythraria Plate S 16.

L. salicariae (Pk.) Fig. 106.

Nodulus weakly dilated. Fused collum and ramus moderately long and with 2 coils. Cornu moderately long and strongly curved.

Genus Ochrosis

O. ventralis (Ill.) Fig. 110.

Nodulus strongly dilated. Otherwise as L. salicariae.

Genus Mniophila Plate S 17.

M. muscorum (Koch.) Fig. 127.

Nodulus weakly dilated. Fused collum and ramus short and uncoiled. Cornu long, narrow and strongly curved.

Genus Longitarsus Plate S 22.

Nodulus usually weakly dilated. Fused collum and ramus short to long and uncoiled to many coiled. Cornu usually moderately long, weakly to strongly curved.

L. dorsalis (F.) Fig. 145.

Fused collum and ramus with 5 coils. Cornu weakly curved.

L. tabidus (F.) Fig. 146.

Fused collum and ramus uncoiled. Cornu weakly curved.

L. rubiginosus Foud. Fig. 147.

Fused collum and ramus with 2 coils. Cornu weakly curved.

L. membranaceus Foud. Fig. 148.

Fused collum and ramus with 8 coils. Cornu strongly curved.

L. gracilis Kuts. Fig. 149.

Fused collum and ramus with 1 coil. Cornu strongly curved.

L. suturellus Duft. Fig. 150.

Fused collum and ramus with 2 coils. Cornu weakly curved.

Genus Aphthona Plate S 23.

Nodulus weakly to strongly dilated. Fused collum and ramus short to moderately long and uncoiled. Cornu short to moderately long, narrow and weakly to strongly curved.

A. atrovirens Forst. Fig. 151.

Nodulus weakly dilated. Fused collum and ramus moderately long.

A. venustula Kuts. Fig. 152.

Nodulus strongly dilated. Fused collum and ramus very short.

A. lutescens (Gyll.) Fig. 154.

Nodulus weakly dilated. Fused collum and ramus short.

A. nigriceps Redt. Fig. 155.

Nodulus weakly dilated. Fused collum and ramus very short.

A. coerulea (Geof.) Fig. 156.

Nodulus moderately strongly dilated. Fused collum and ramus short. Cornu long.

A. herbigrada (Curt.) Fig. 157.

Nodulus moderately strongly dilated. Fused collum and ramus short.

A. euphorbiae (Schr.) Fig. 153.

Similar to A. atrovirens.

LIST OF ABBREVIATIONS USED IN THE FOLLOWING SPERMATHECAL FIGURES

cm	COLLUM
cu	CORNU
n	NODULUS
r	RAMUS
sd	SPERMATHECAL DUCT
sg	SPERMATHECAL GLAND
sm	SPERMATHECAL MUSCLE
bc	BURSA COPULATRIX

PLATE S1 SPERMATHECAE GENUS CASSIDA 69·7 = 1mm.

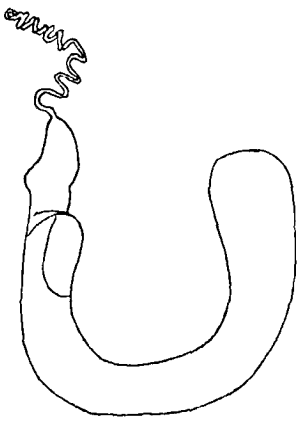


FIG. 1
C. rubiginosa Müll.

FIG. 2
C. flaveola Thunb.

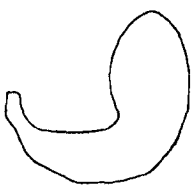
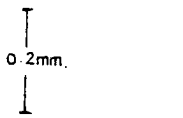


FIG. 3
C. nebulosa L.



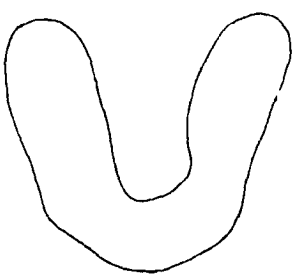


FIG. 4
C.murraea L.

FIG. 5
C. fastuosa Schal.

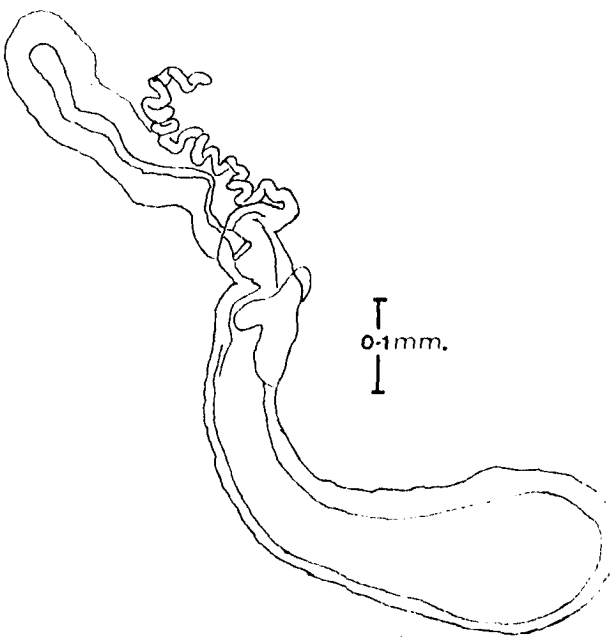


FIG. 6
C. sanguinosa
Suf.

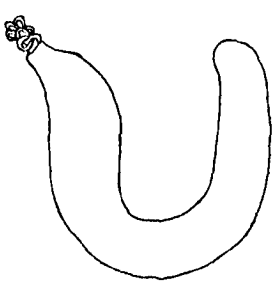


FIG. 7
C. nobilis L. 67·8 = 1mm.

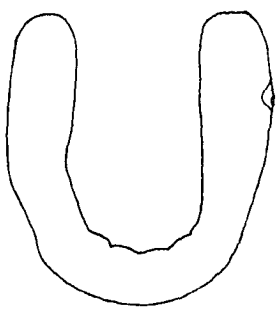


FIG. 8
C.viridis L.

PLATE S2 SPERMATHECAE CASSIDINAE

CASSIDA

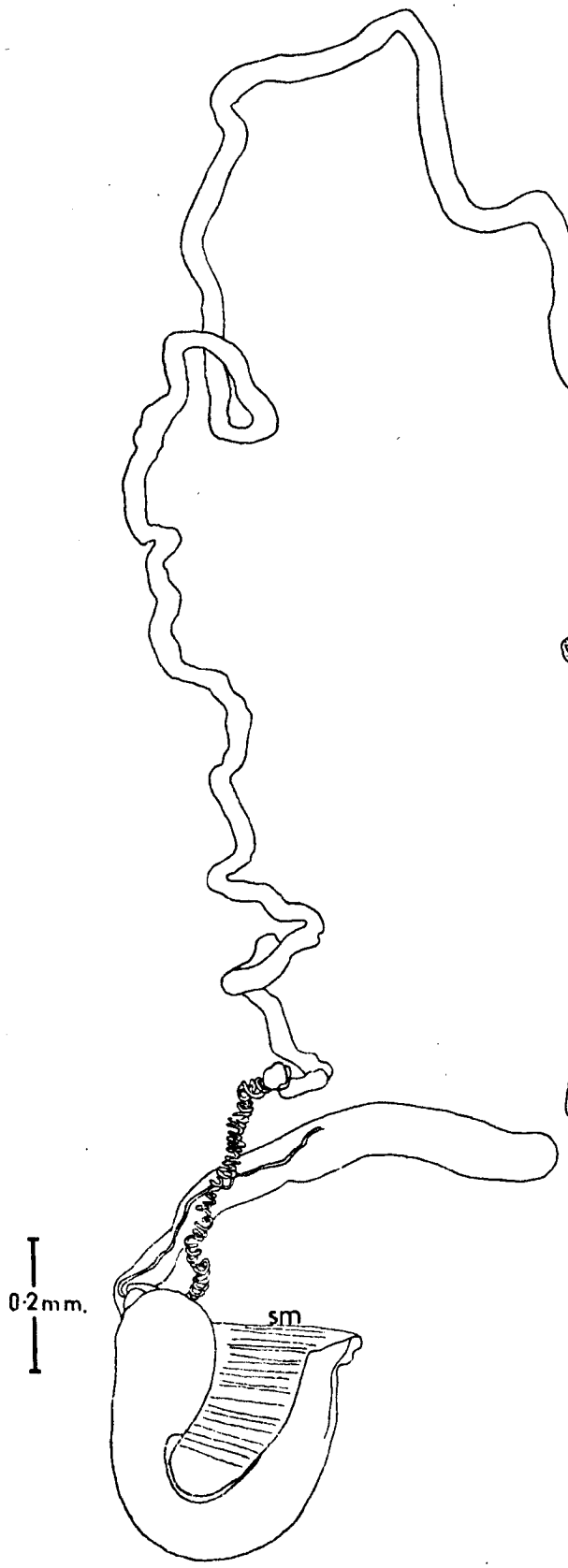


FIG. 9 C. flaveola Thunb.

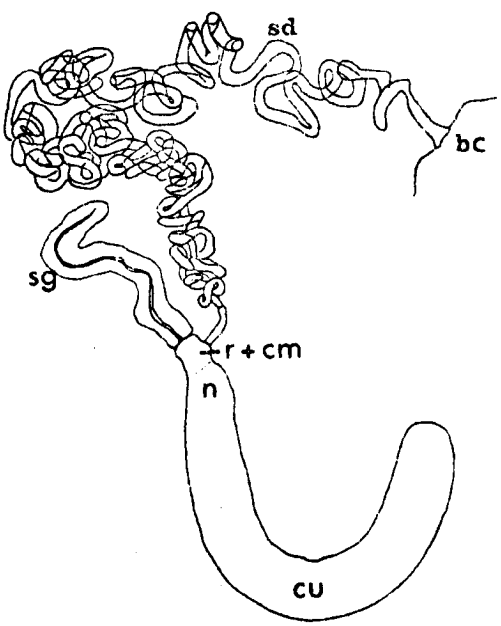


FIG. 10 C. vittata Vill.

PLATE S3

ORSODACNINAE

ZEUGOPHORINAE

DONACIINAE

ORSODACNE

ZEUGOPHORA

PLATEUMARIS

DONACIA

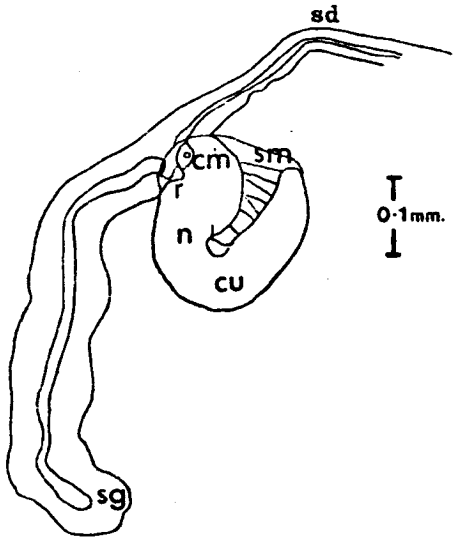


FIG.11 O. cerasi (L.)

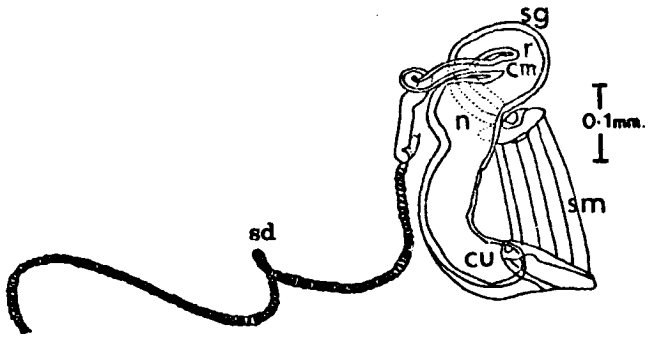


FIG. 12 Z. subspinosa (F.)

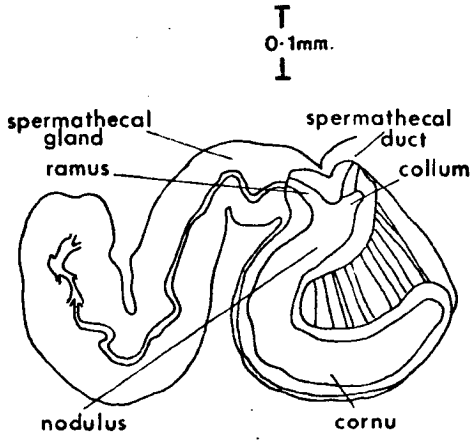


FIG. 13 P. sericea (L.)

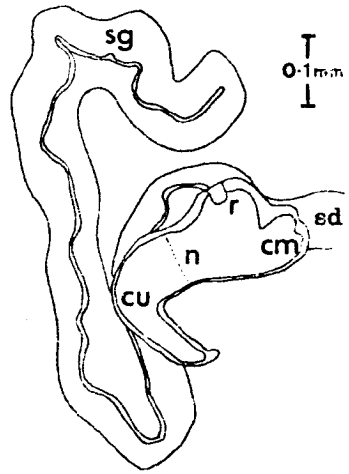


FIG. 14 D. vulgaris Zsch.

PLATE S 4 SPERMATHECAE 74 = 1 m.m.

GENUS LABIDOSTOMIS

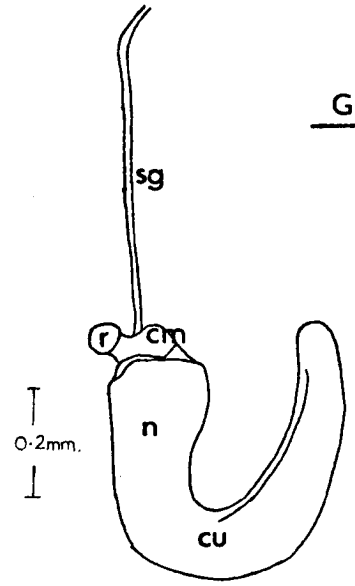


FIG. 15
L. tridentata (L.)

GENUS CRYPTOCEPHALUS

FIG.16 C. exiguus Schn.

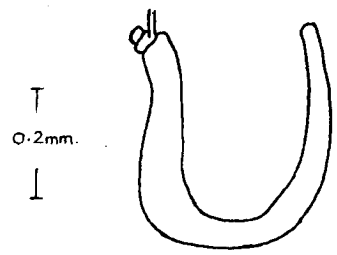


FIG.17 C. sexpunctatus (L.)

FIG.18 C. pusillus F.

FIG. 19 C. frontalis Marsh. FIG. 20 C. exiguus Sch.

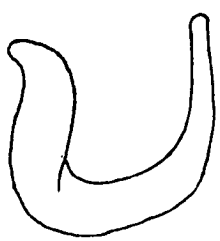


FIG. 21 C. coryli (L.)

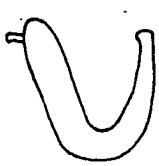


FIG. 22
C. punctiger Pk.

FIG. 23
C. frontalis Marsh.

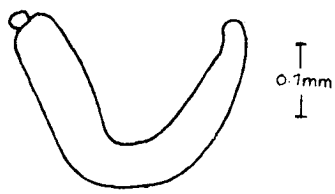


FIG. 24
C. querceti Suf.

100 = 1 mm.

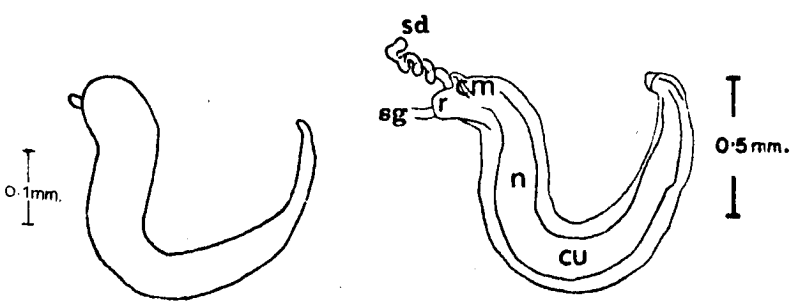


FIG. 25 C. labiatus (L.) 100 = 1 mm FIG. 26 C. biguttatus Scop.

CLYTRA

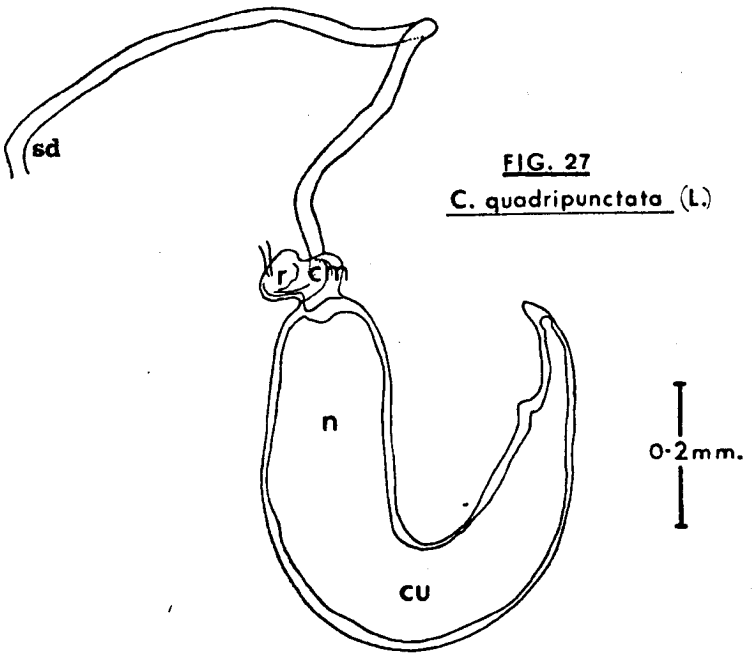


FIG. 27
C. quadripunctata (L.)

GYNANDROPHTHALMA

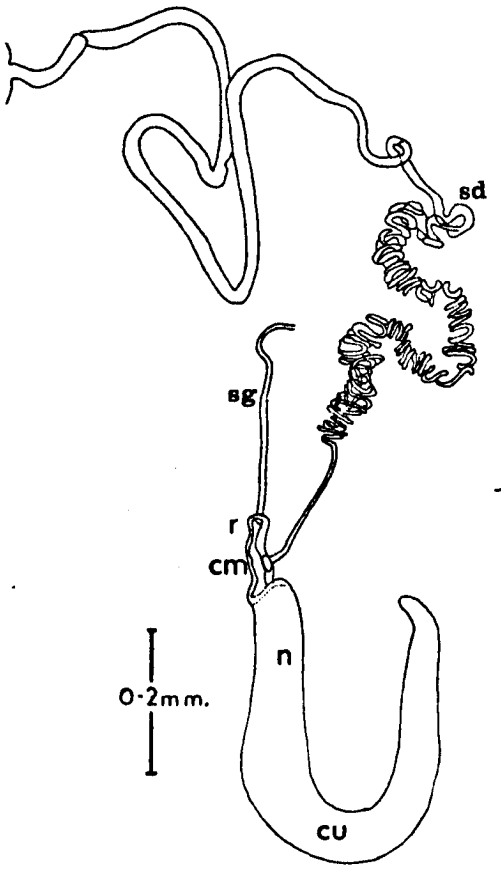


FIG. 28
G. affinis (Hell.)

PLATE S6 CRIOCERINAE

LILIOCERIS

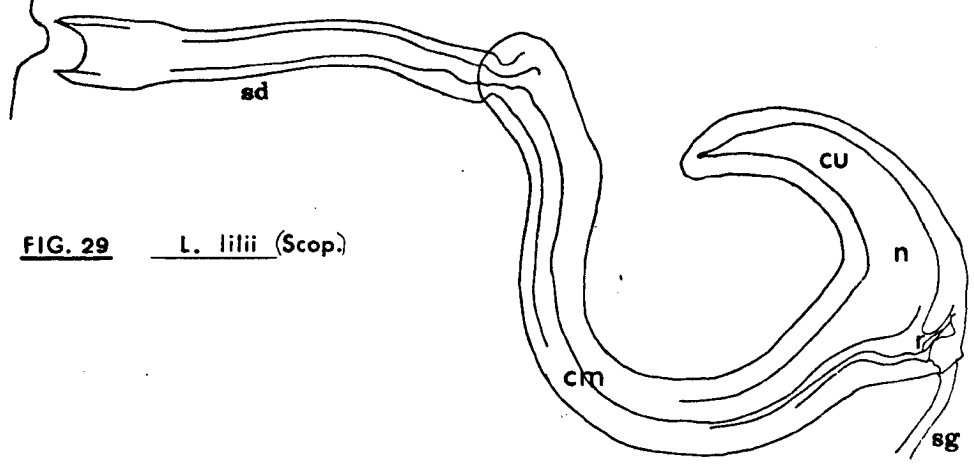


FIG. 29 L. lilii (Scop.)

CRIOCERIS

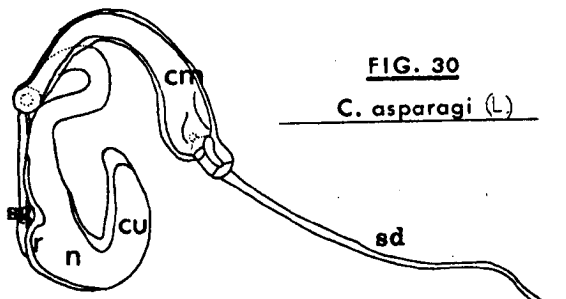


FIG. 30
C. asparagi (L.)

0·2mm.

LEMA

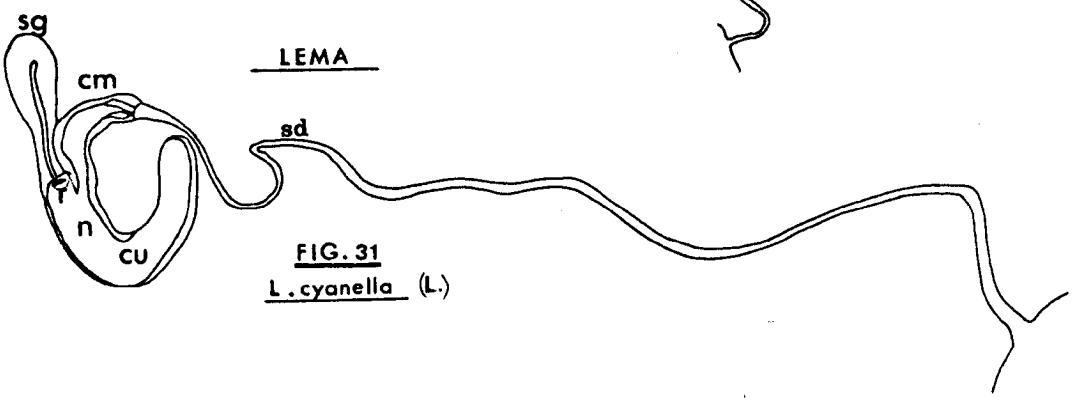


FIG. 31
L. cyanella (L.)

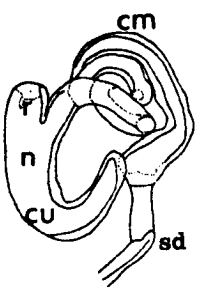


FIG. 32 L. erichsoni Suffr.

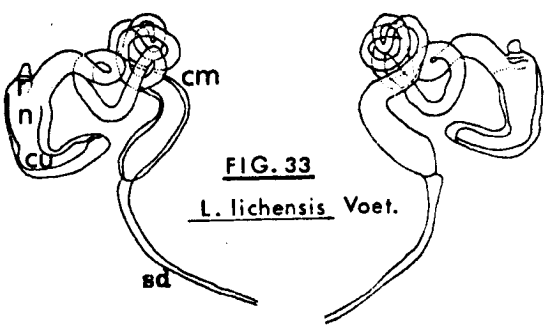
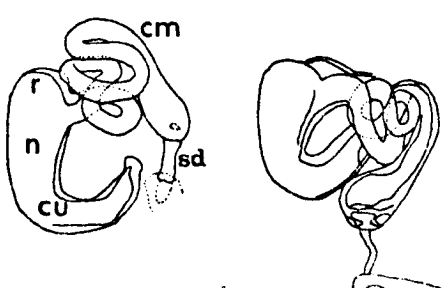


FIG. 33
L. lichensis Voet.



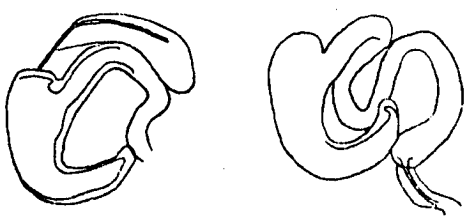


FIG. 34 L. melanopa (L.)

PLATE S7

GENUS CHRYSOLINA SPERMATHECAE

73·6 = 1mm.

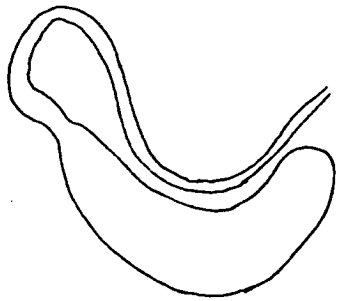


FIG. 35
C. orichalcia (Müll.)

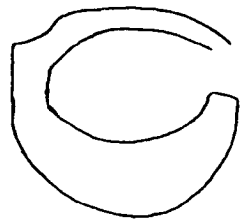


FIG. 36
C. marginata (L.)

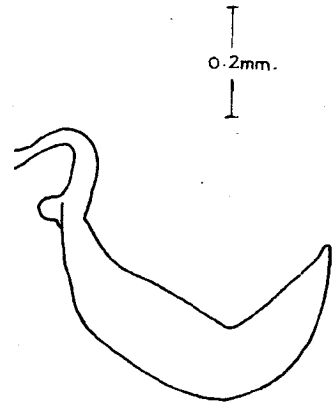


FIG. 37
C. sanguinolenta (L.)

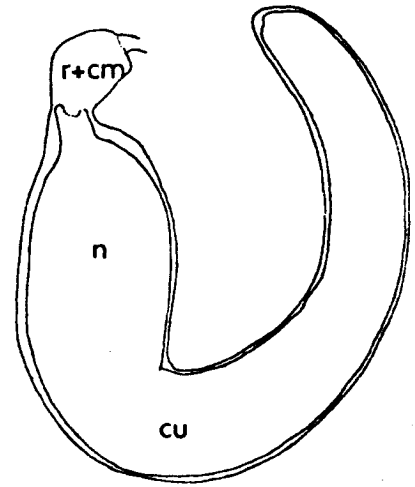


FIG. 38 C. banksi (F.)

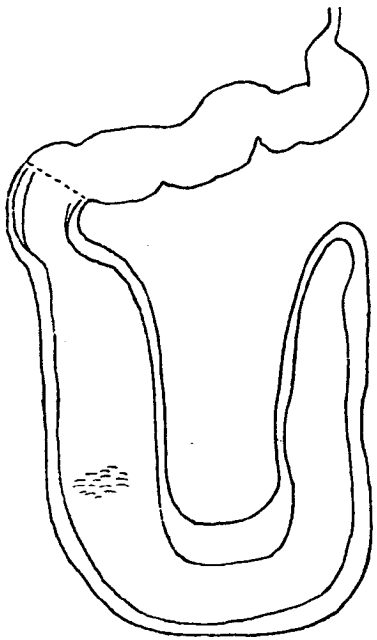


FIG.39 C. graminis (L.)

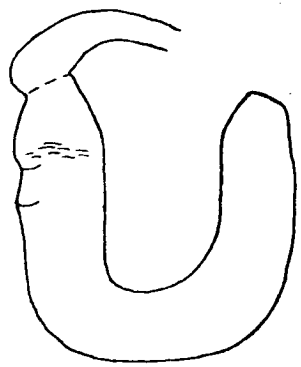


FIG. 40
C. menthastri (Suf.)

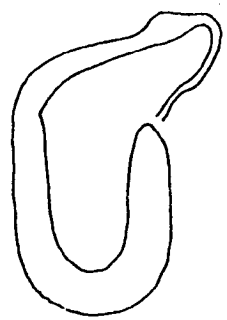


FIG. 41
C. fastuosa (Scop.)

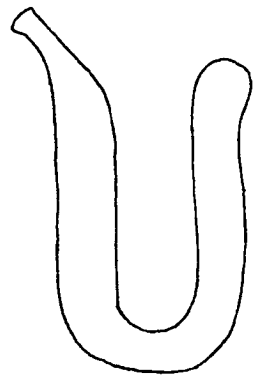


FIG. 42
C. cerealis (L.)

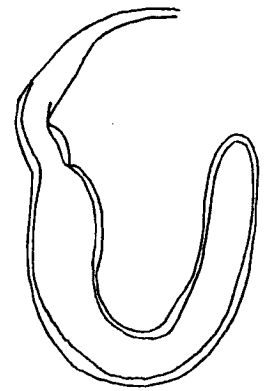


FIG. 43
C. staphylea (L.)

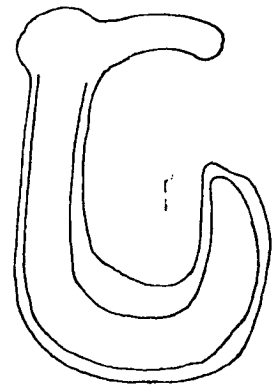


FIG. 44
C. polita (L.)

GENUS CHRYSOMELA

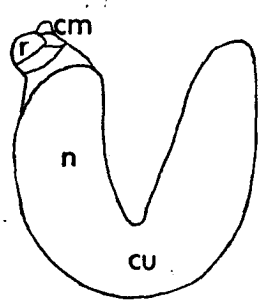


FIG. 45 C. populi L.

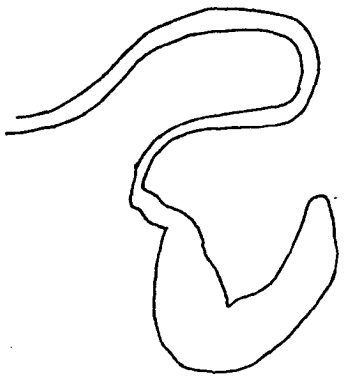


FIG. 46 C. tremulae F.

GENUS TIMARCHA

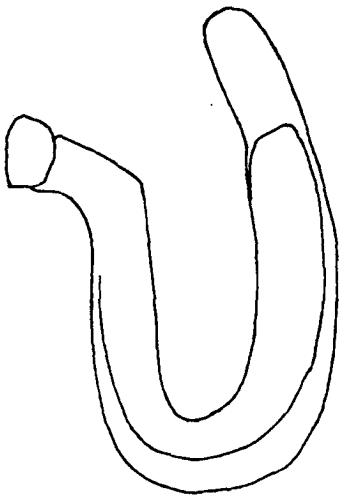
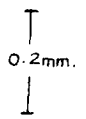


FIG. 47 T. coriaria (Laich.)



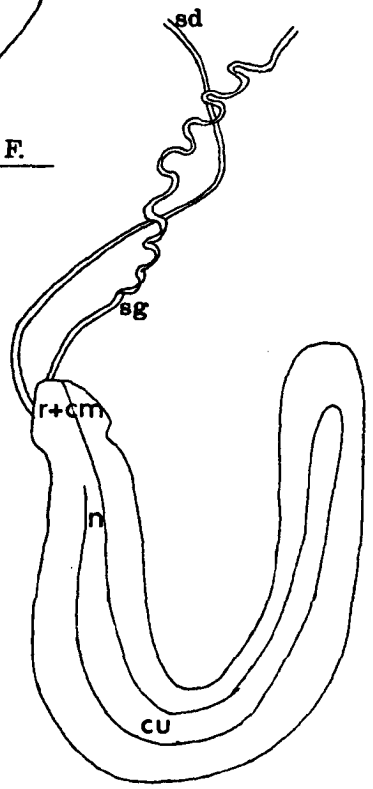


FIG. 48 T. tenebricosa (F.)

GENUS PLAGIODERA

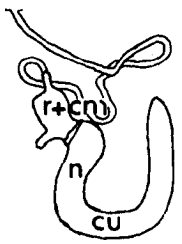


FIG. 49 P. versicolora (Laich.)

GENUS GASTROIDEA SPERMATHECAE 74 = 1 mm.

PLATE S 9

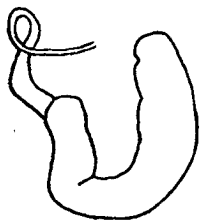


FIG. 50 Specimens collected in Holland

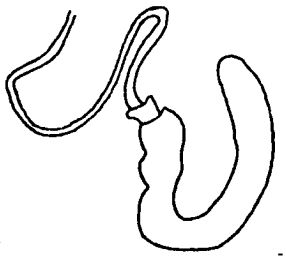


FIG. 52

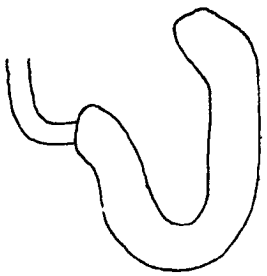
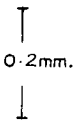


FIG. 51
G.viridula (De G.)



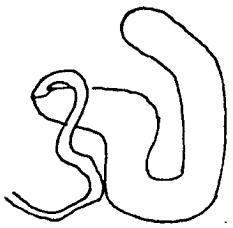


FIG. 53 G. polygoni (L.)

GENUS PHAEDON

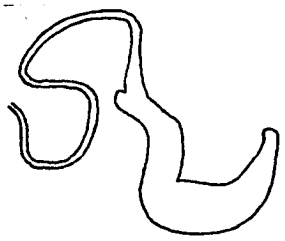


FIG. 54
P. armoraciae (L.)

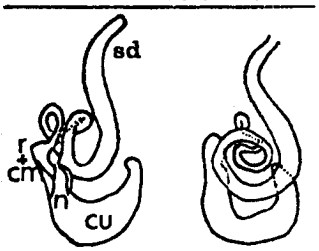


FIG. 55
P. tumidulus (Germ.)

FIG. 56
P. cochleariae (F.)

GENUS HYDROTHASSA

GENUS PRASOCURIS

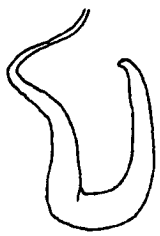


FIG. 57
H. marginella (L.)

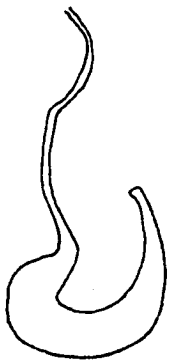


FIG. 58
H. hannoverana (F.)

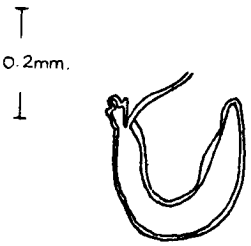
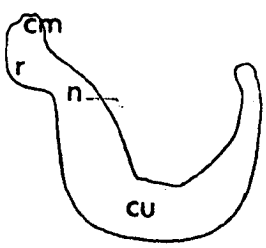


FIG. 59
H.aucta (L.)

FIG. 60
P. phellandrii (L.)

GENUS PHYLLODECTA 148 = 1mm. GENUS LAMPROSOMA



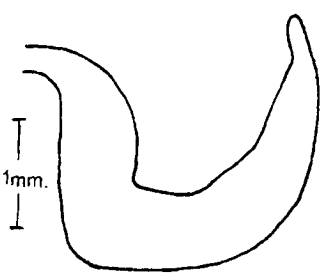


FIG. 61
P. polaris Schn.

FIG. 62
P. vulgatissima (L.)

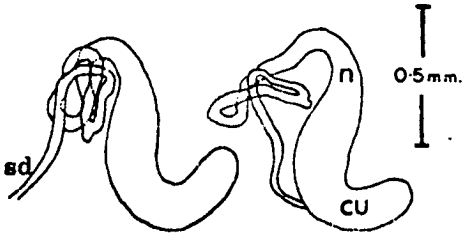


FIG. 63 L. concolor (Stm.)

PLATE S10

GENUS GALERUCA

34 = 1 m.m.

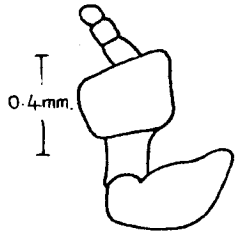


FIG. 64 G. tanaceti (L.)

GALERUCELLA

FIG. 65
G. lineola (F.)

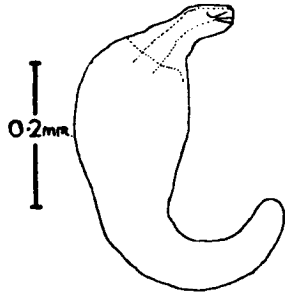


FIG. 66
G. tenella (L.)

GENUS GALERUCELLA SPERMATHECAE 200 = 1m.m.

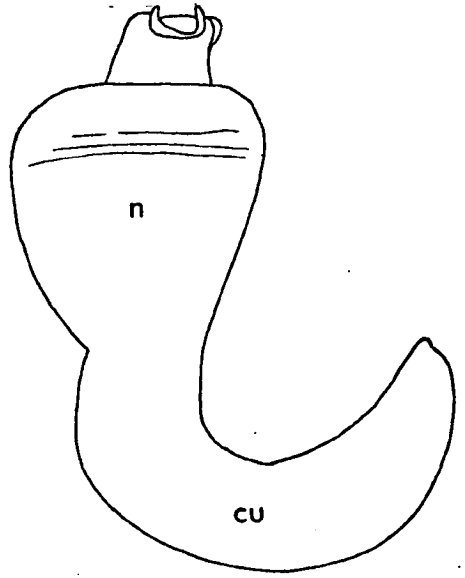


FIG. 67 G. nymphaeae (L.)

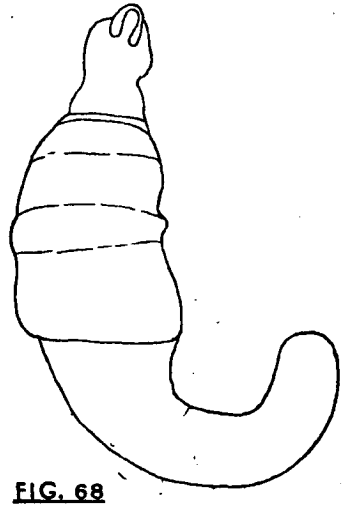


FIG. 68
G. pusilla (Duft.)

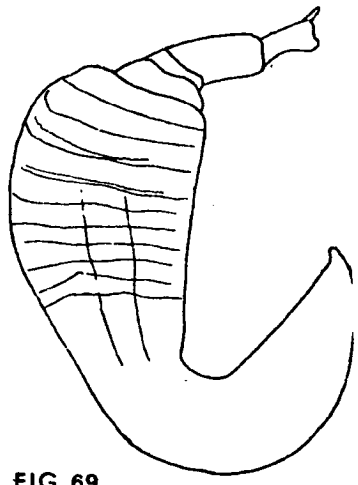


FIG. 69
G. calmariensis (L.)

GENUS LOCHMAEA

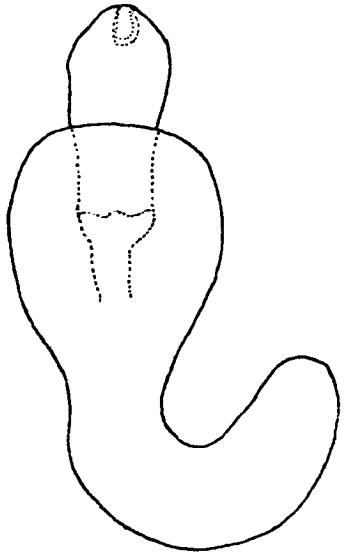


FIG. 70 L. crataegi (Forst.)

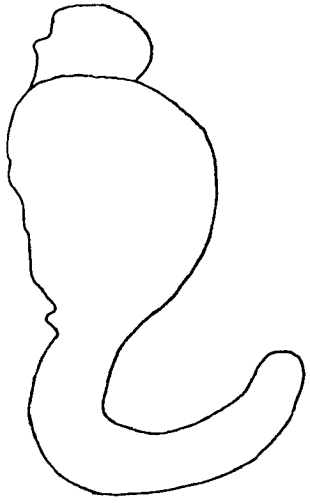


FIG. 71
L. suturalis (Th.)

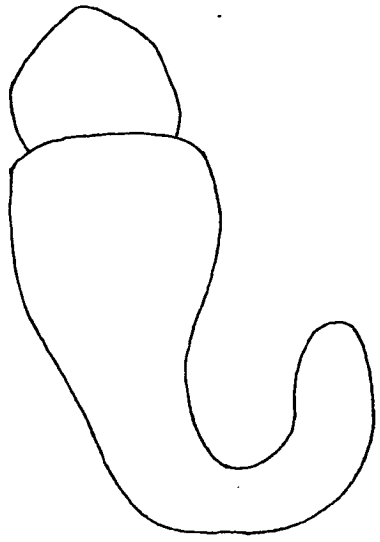


FIG. 72 L. capreae (L.)

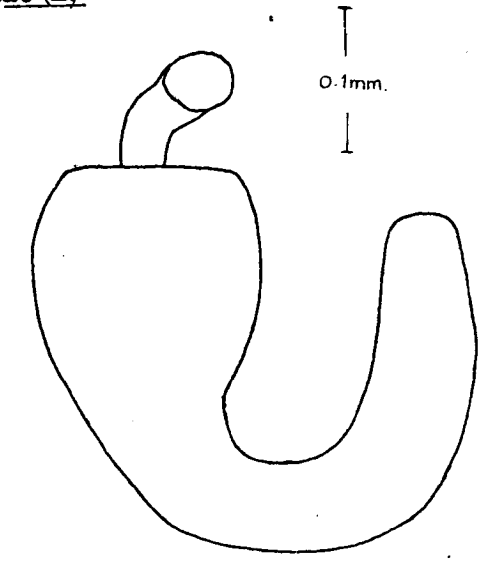


FIG. 73 G. sagittariae Brit. Cat.

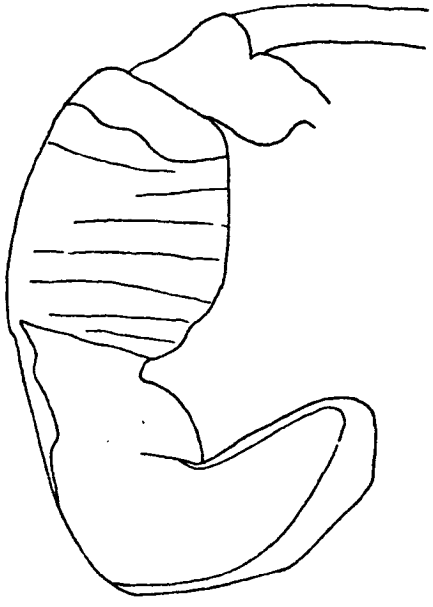


FIG. 74 G. viburni (Pk.)

PLATE S 11

SPERMATHECAE

GENUS SERMYLA

100 = 1mm.

GENUS PHYLLOBROTICA

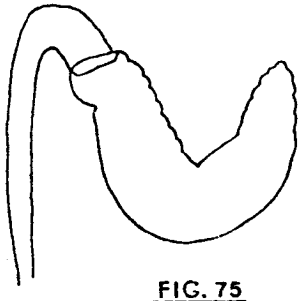


FIG. 75
P. quadrimaculata (L.)

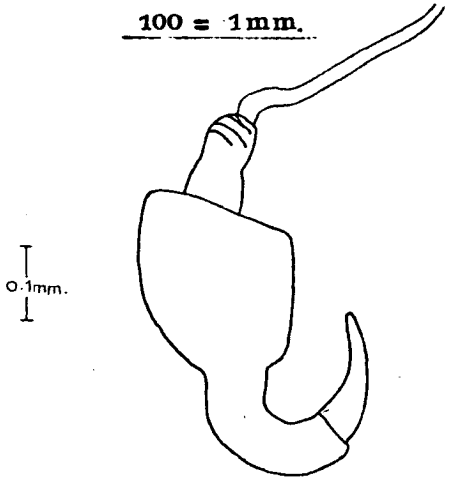


FIG. 76 S. halensis (L.)

GENUS LUPERUS

FIG. 77 a L. circumfusus F. b. L. flavipes L.

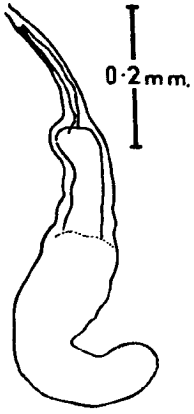


FIG. 78 L. longicornis F.

AGELASTICA

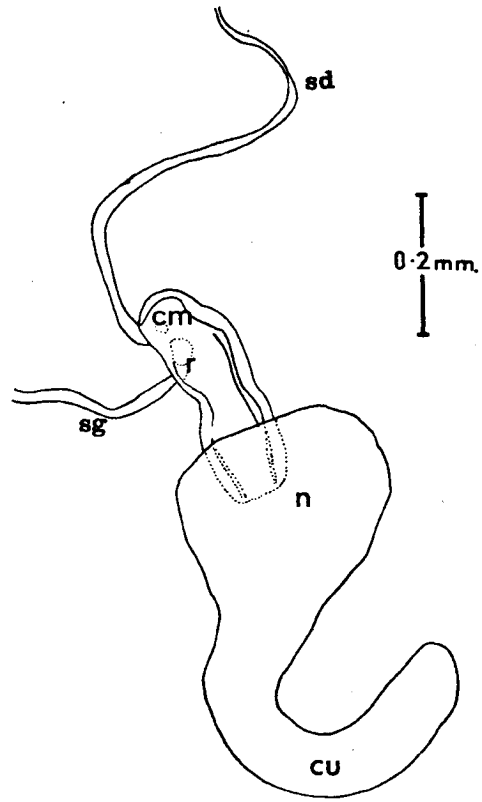


FIG. 79 A. alni (L.)

PLATE S 12

GENUS HALTICA·

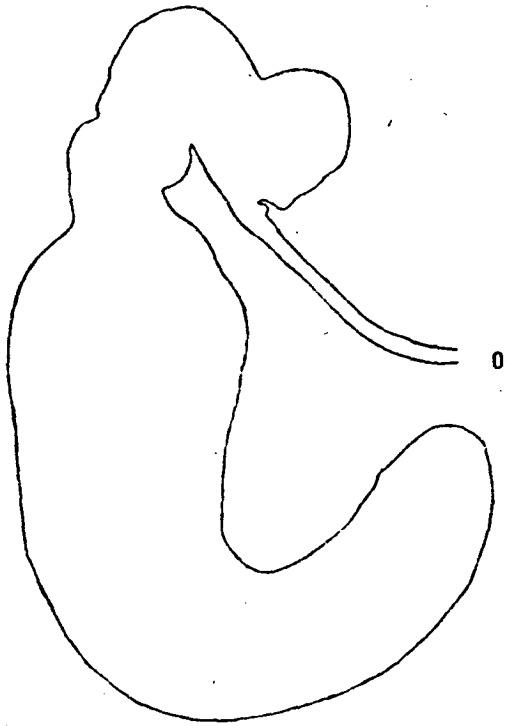


FIG. 80 H. britteni Shp.

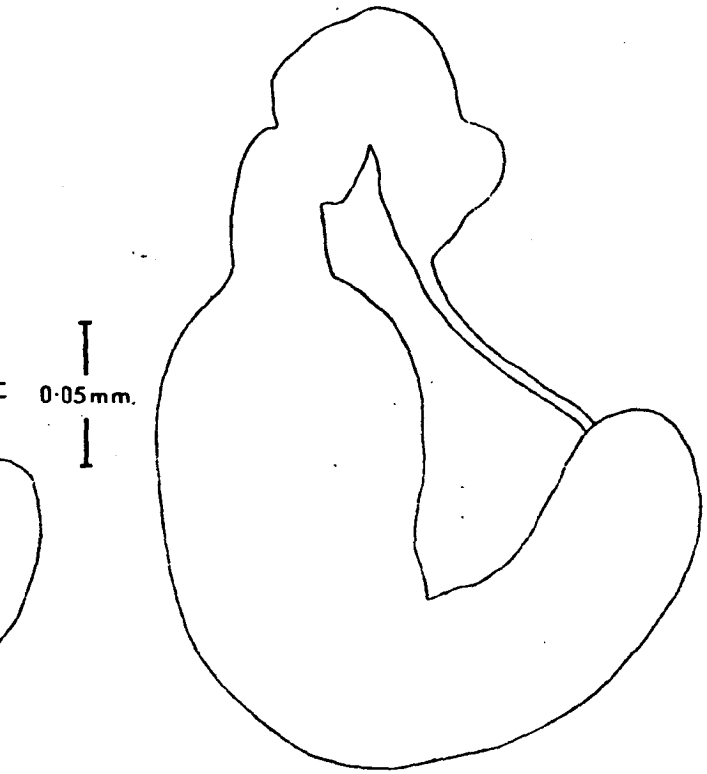


FIG. 81 H. brevicollis Foud.

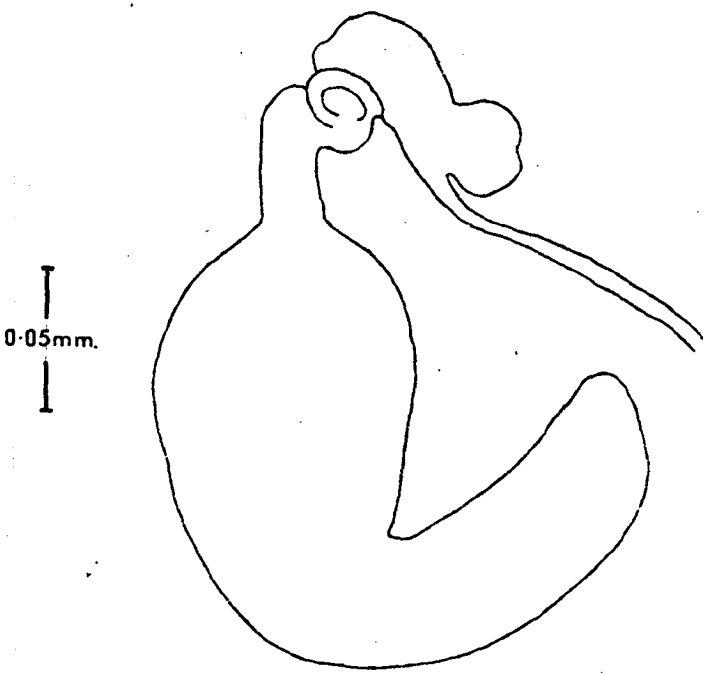


FIG. 82 H. ericeti All.

PLATE S 13

GENUS CHALCOIDES

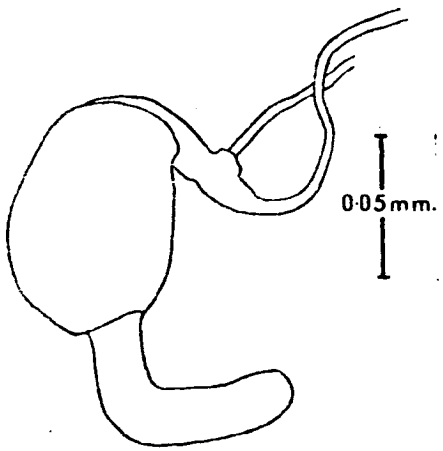


FIG. 83
C. fulvicornis (F.)

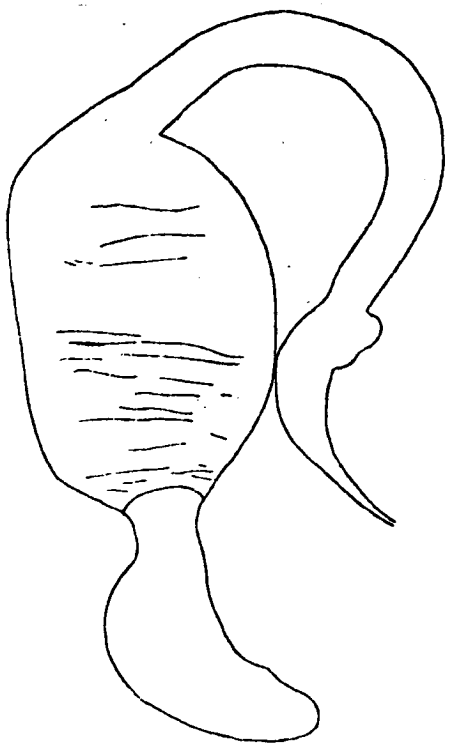


FIG. 84 C. nitidula (L.)

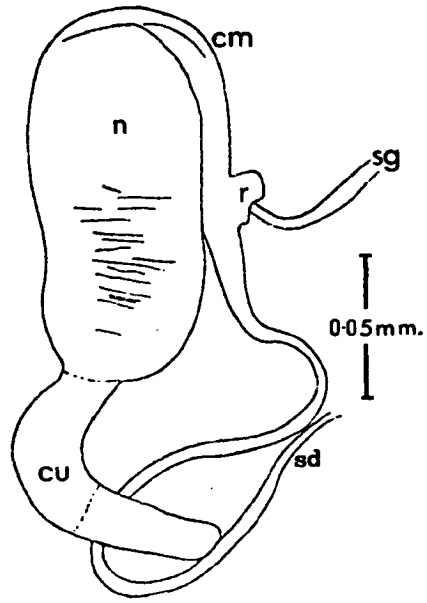


FIG. 85 C. aurata (Marsh.)

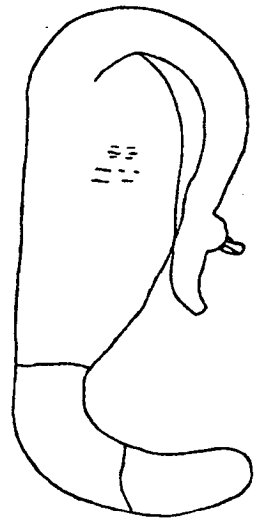


FIG. 86 C. aurea (Geof.)

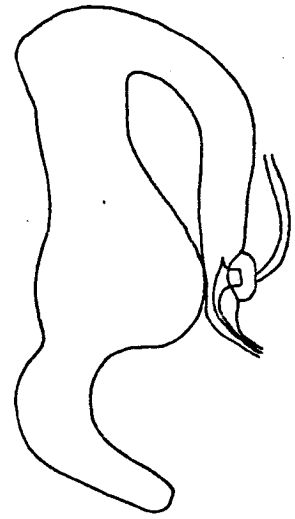


FIG. 87 C. plutus (Lat.)

PLATE S 14

GENUS PSYLLIODES

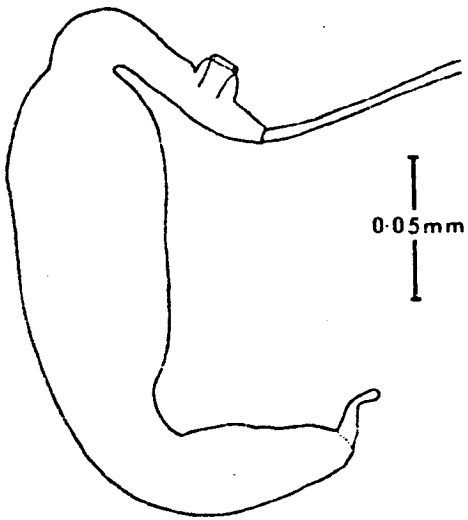


FIG. 88 P. picina (Marsh.)

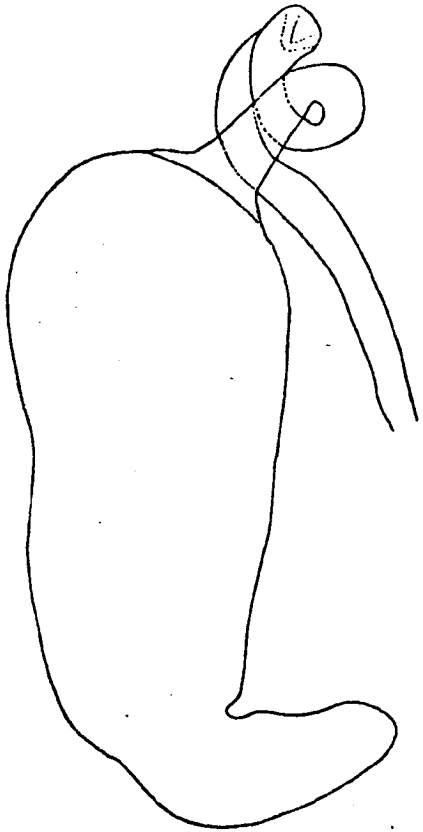


FIG. 89 P. hyosyami (L.)

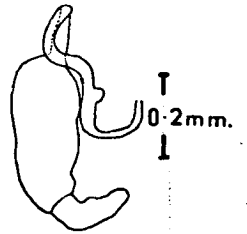


FIG. 90 P. dulcamarae (Koch.)

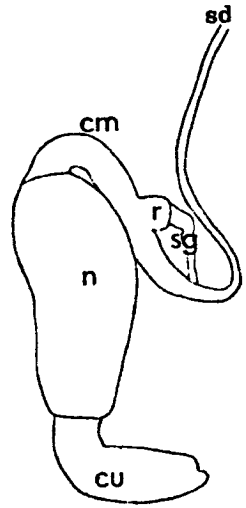


FIG. 91 P. attenuata (Koch.)

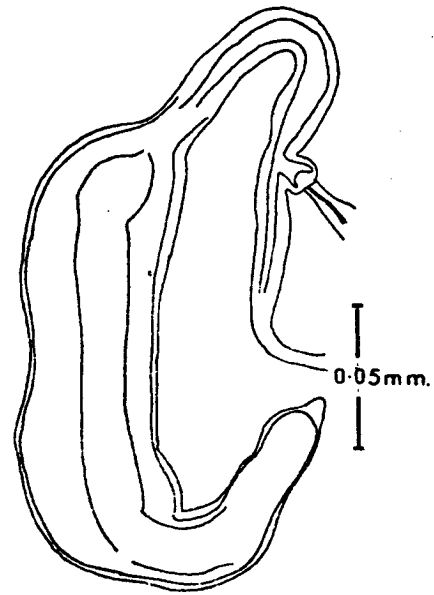


FIG. 92 P. napi F.

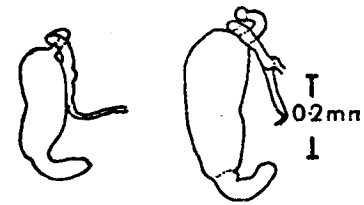


FIG. 93 P. chalcomera (Ill.)

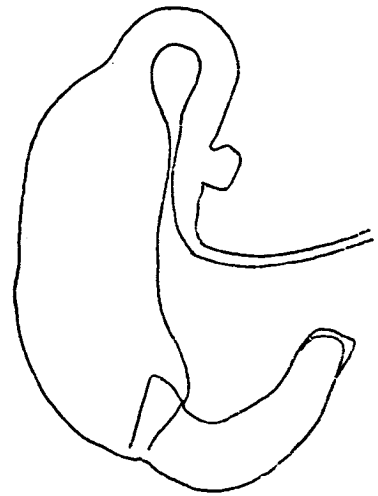


FIG. 94 P. cyanoptera (Ill.)

PLATE S 15

GENUS PSYLLIODES

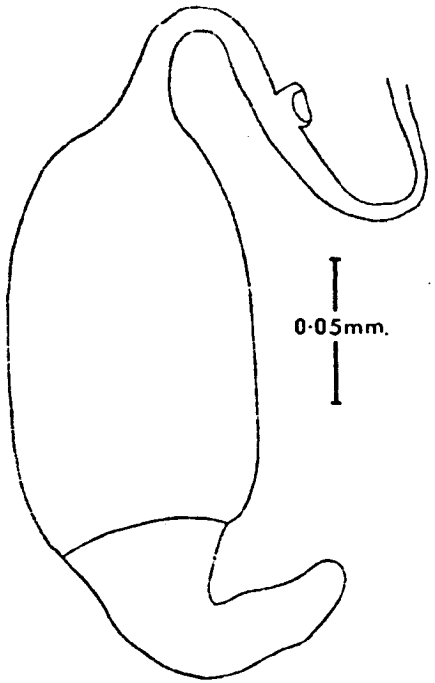


FIG. 95 P. cuprea (Koch.)

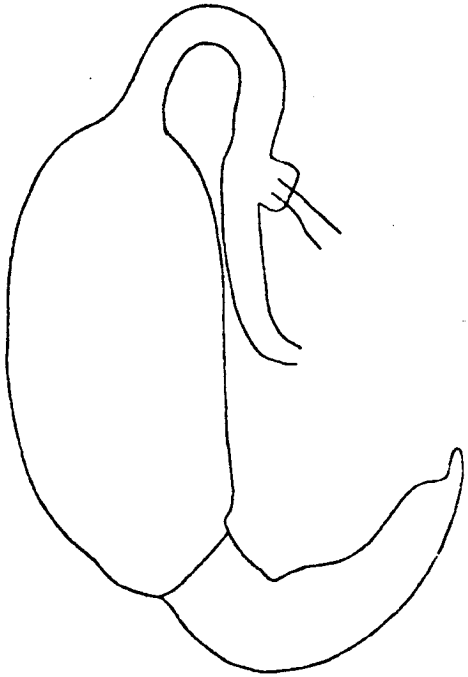


FIG. 96 P chrysocephala (L.)

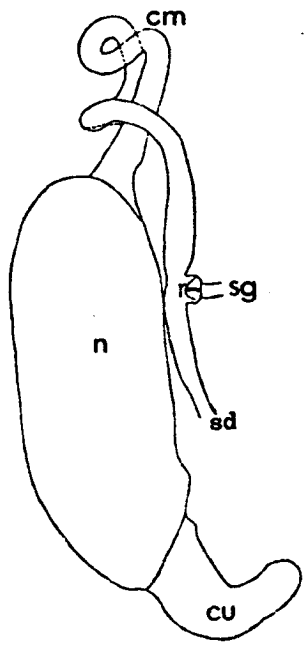


FIG. 97 P. affinis (Pk.)

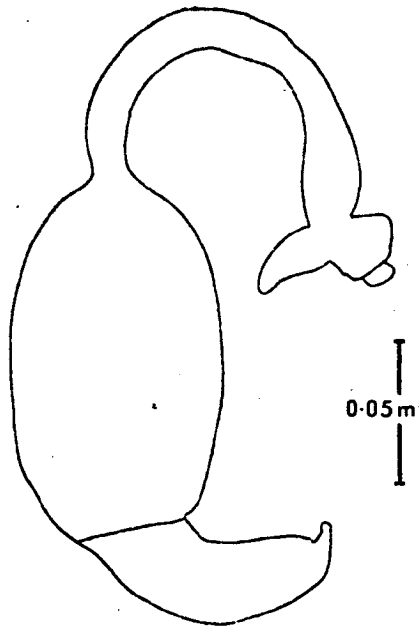


FIG. 98 P. marcida (Ill.)

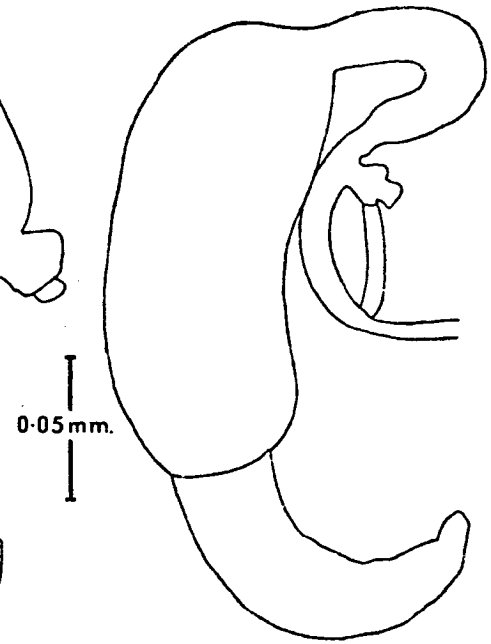


FIG. 99 P. luteola (Mu!l.)

PLATE S 16

SPERMATHECAE HALTICINAE

MANTURA

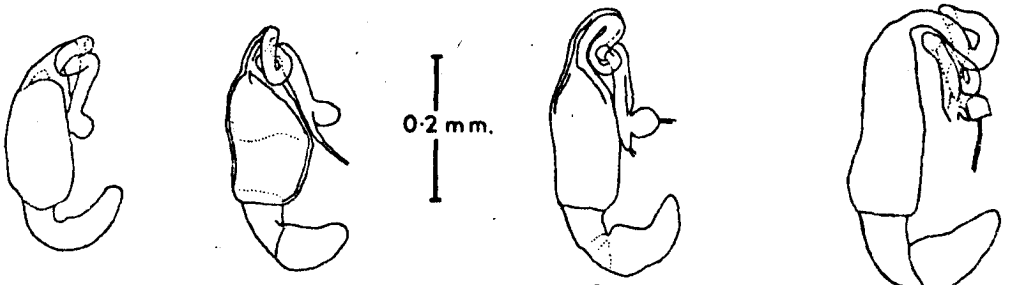


FIG. 100 M. matthewsi Steph.

FIG. 101 M. chrysanthemi (Koch.)

FIG. 102 M. obtusata (Gyll.)

FIG. 103 M. rustica (L.)

DEROCREPIS

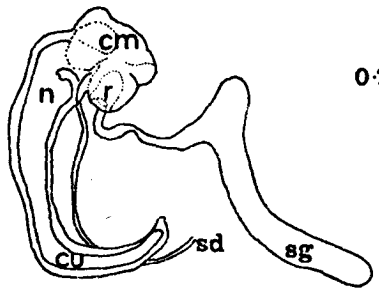


FIG. 104 D. rufipes (L.)

HIPPURIPHILA

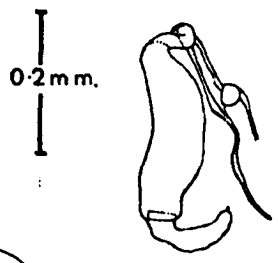


FIG. 105 H. modeeri (L.)

LYTHRARIA

FIG. 106 L. salicariae (Pk.)

CHAETOCNEMA

FIG. 107 C. hortensis (Geof.)

FIG. 108 C. concinna (Marsh.)

EPITRIX

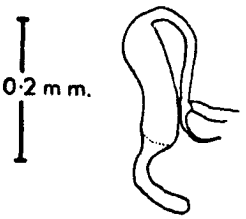


FIG. 109 E. pubescens (Koch.)

OCHROSIS

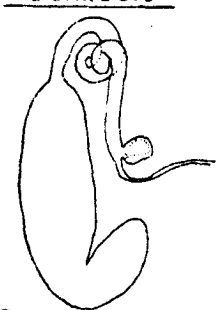


FIG. 110 O. ventralis (Ill.)

PODAGRICA

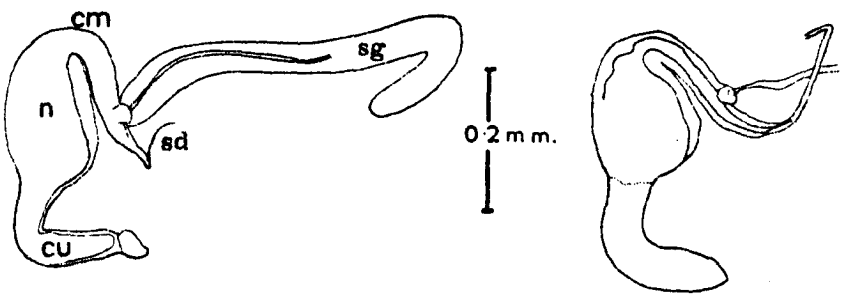


FIG. 111 P. fuscipes (L.)

FIG. 112 P. fuscicornis (L.)

CHAETOCNEMA

FIG. 113 C. confusa Boh. FIG. 114 C. sahlbergi (Gyll.) FIG. 115 C. subcoerulea Küts. FIG. 116 C. conducta Mots. FIG. 117 C. grida Foud.

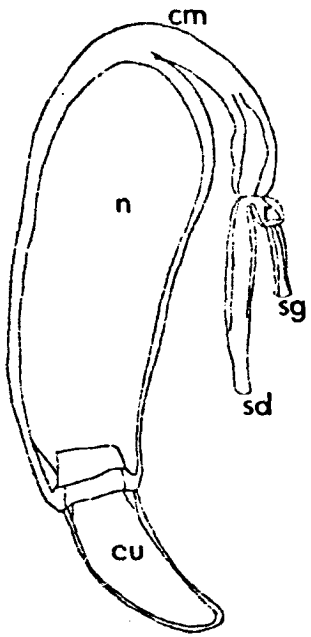


FIG. 118 P. vittula Redt.

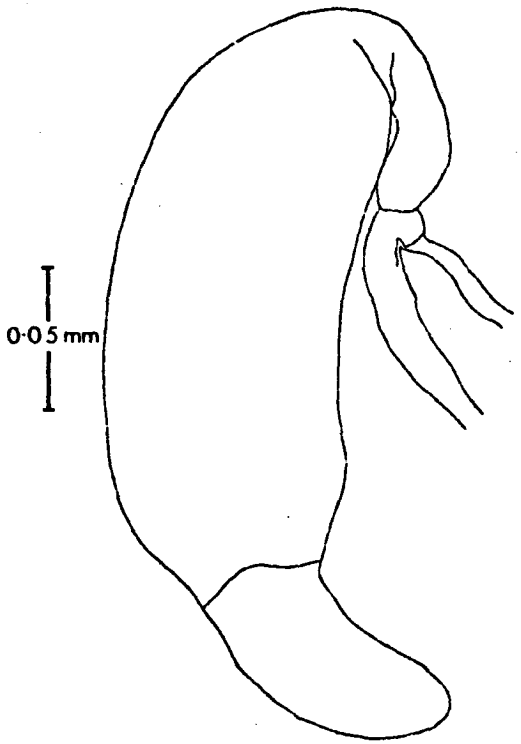


FIG. 119 P. nemorum (L.)

FIG. 120

FIG. 121

FIG. 122

P. diademata Foud. P. consobrina Curt. P. punctulata Brit.Cat.

FIG. 123

FIG. 124

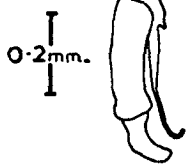


FIG. 125

FIG. 126

P.nigripes (F.) P.sinuata Steph. P. flexuosa (III.) P.undulata Kuts.

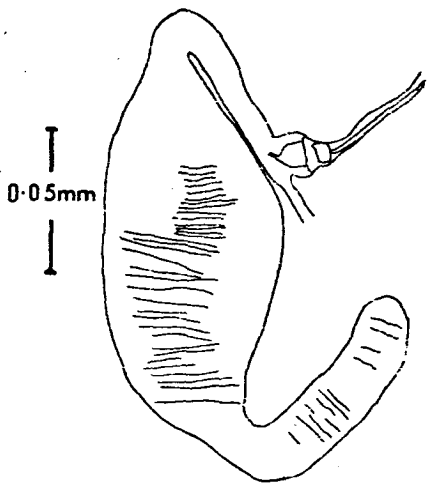


FIG. 127 M. muscorum (Koch)

PLATE S 18

GENUS PHYLLOTRETA

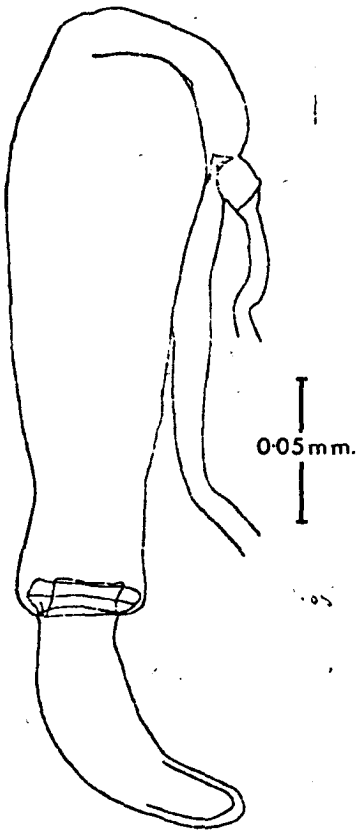


FIG. 128
P. tetrastigma Com.

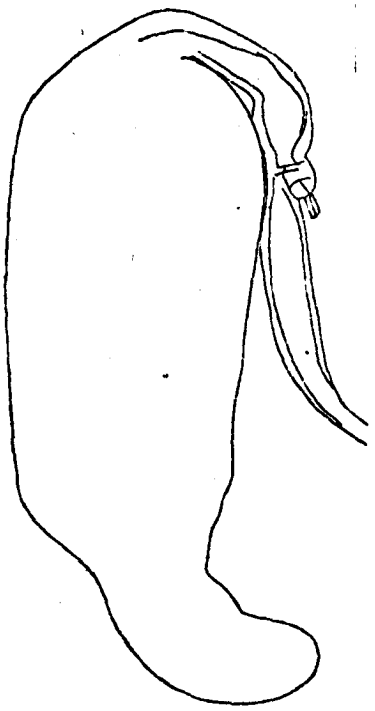


FIG. 129
P. ochripes Curt.

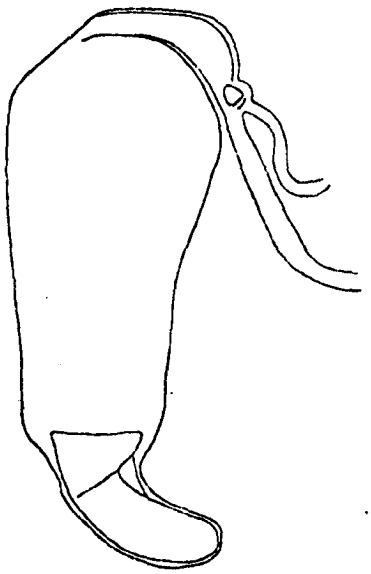


FIG. 130
P. exclamationis (Th.)

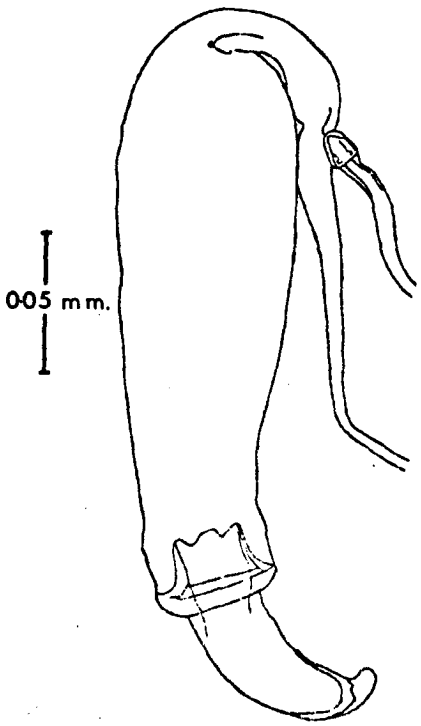


FIG. 131
P. atra (F.)

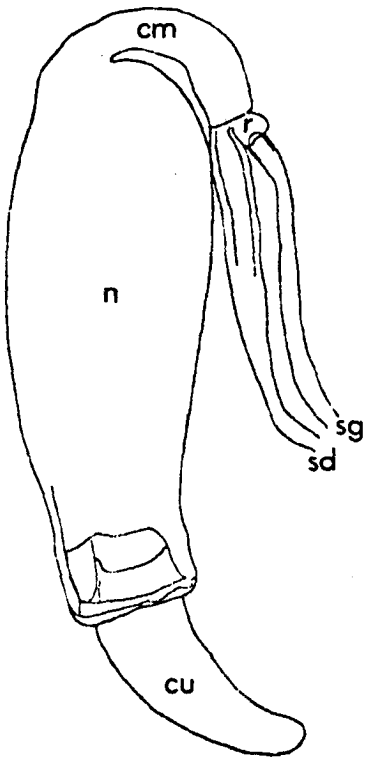


FIG. 132
P. cruciferae (Goez.)

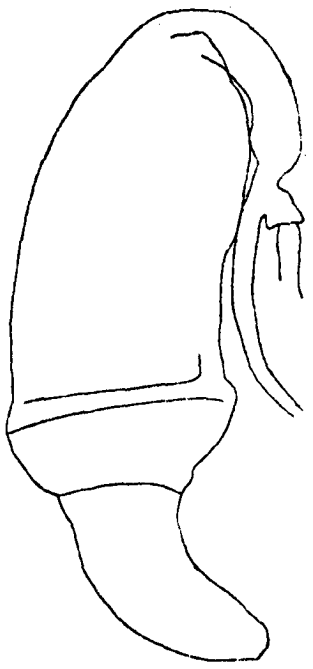


FIG. 133
P. nodicornis (Marsh.)

PLATE S 19

GENUS SPHAERODERMA

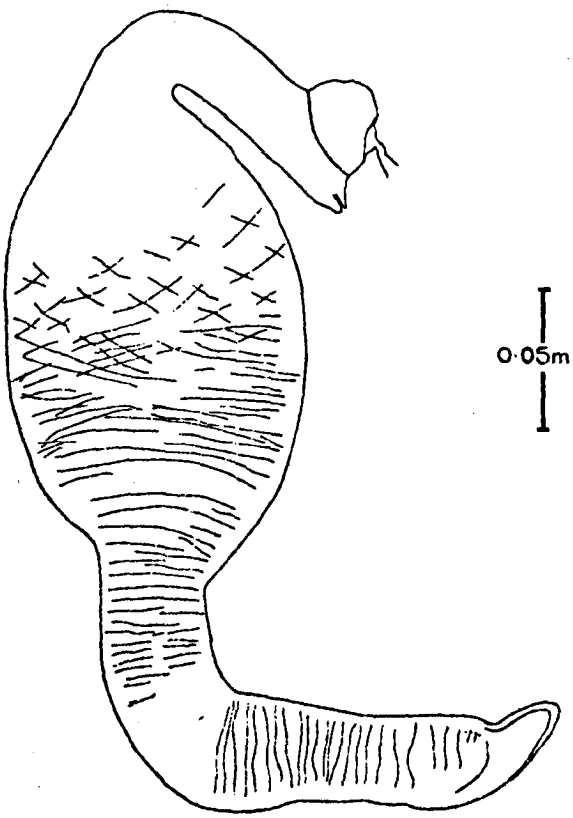


FIG. 134 S. testaceum (F.)

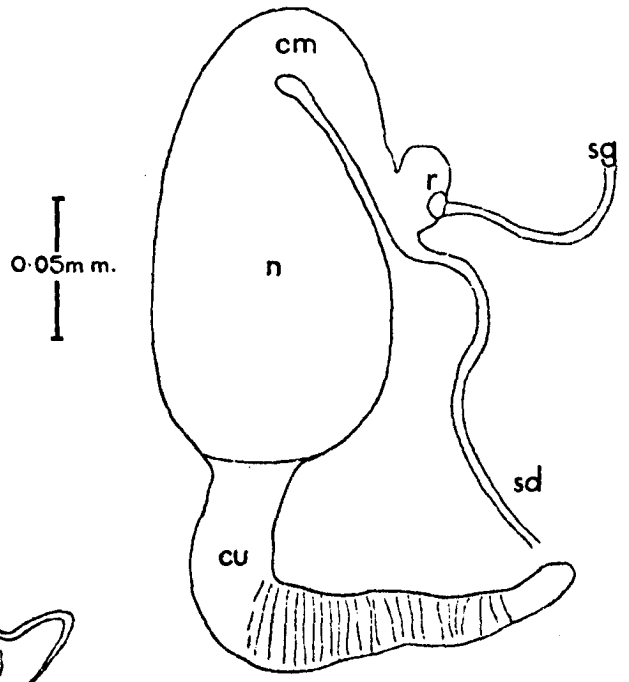


FIG. 135 S. rubidum Graëlls.

GENUS CREPIDODERA

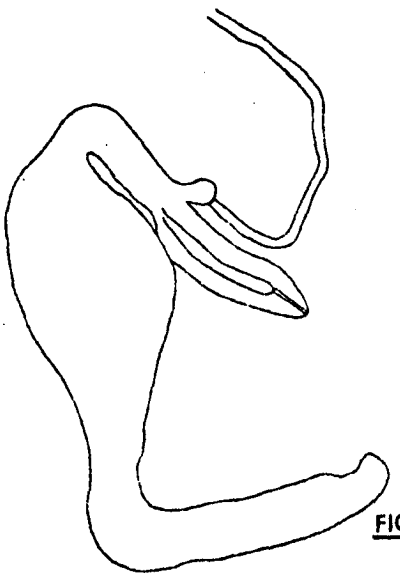


FIG. 136 C. ferruginea (Scop.)

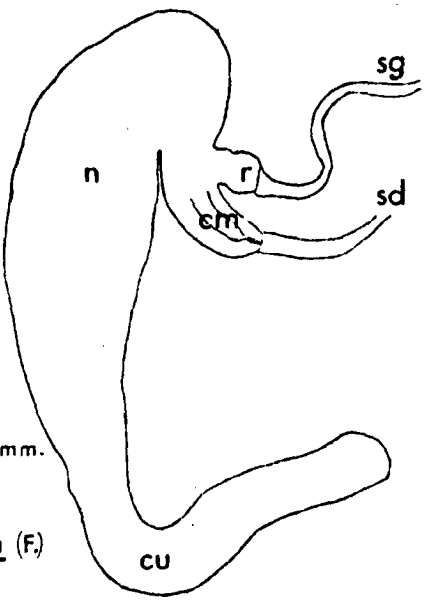


FIG. 137 C. transversa (Marsh.)

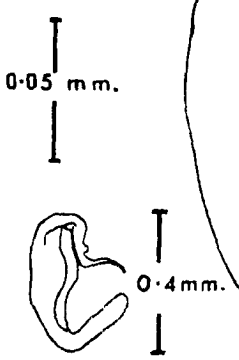


FIG. 138 C. impressa (F.)

PLATE S 20

GENUS EPITRIX

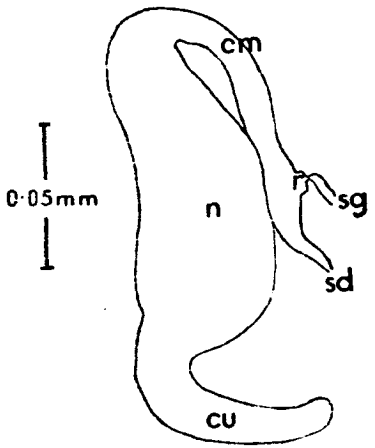


FIG. 138 E. atropae (Foud.)

GENUS PODAGRICA

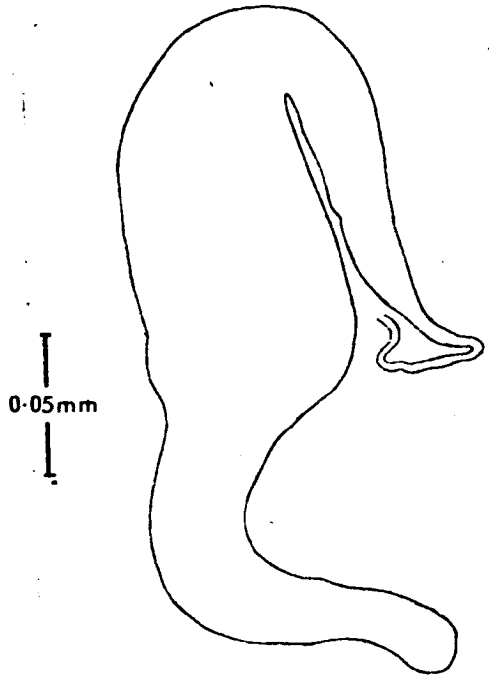


FIG. 139 P fuscipes (L.)

GENUS HERMAEOPHAGA

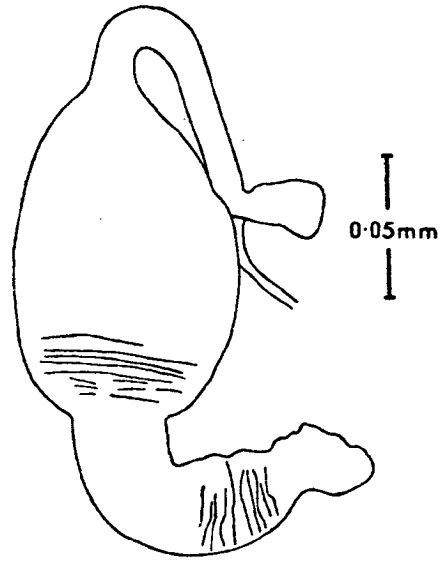


FIG. 140 H. mercurialis (F.)

PLATE S 21

GENUS APTEROPEDA

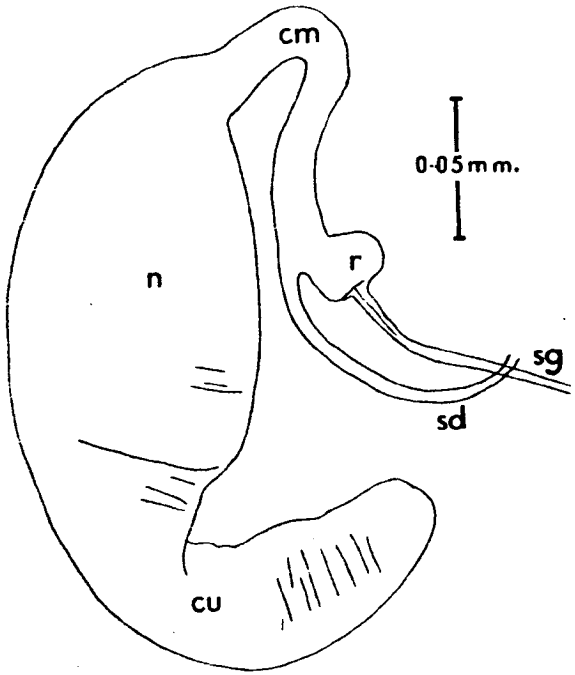


FIG. 141 A orbiculata (Marsh.)

GENUS BATOPHILA

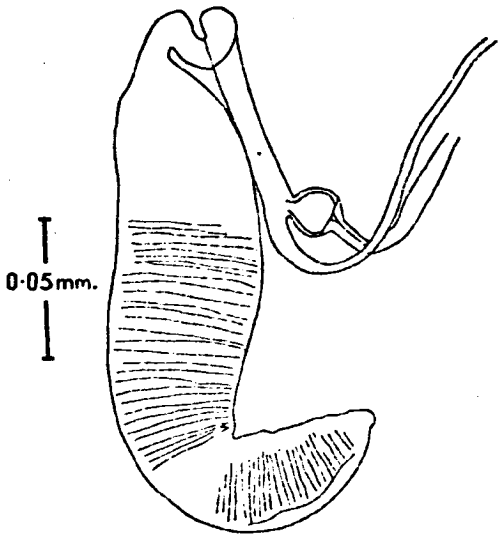


FIG. 142 B. rubi (Pk.)

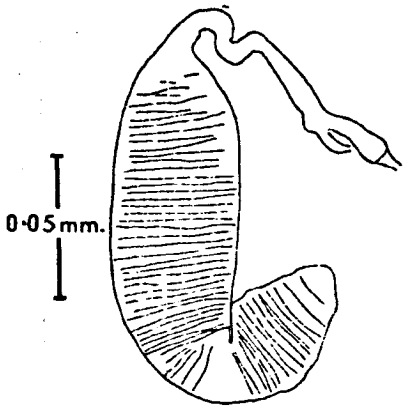


FIG. 143 B. aerata (Marsh.)

GENUS DIBOLIA

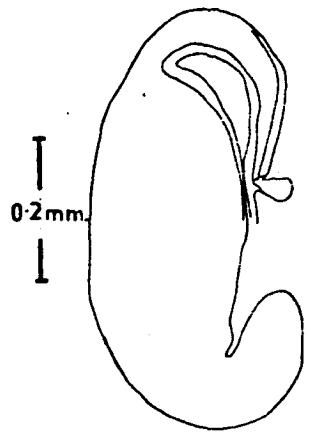


FIG. 144 D. cynoglossi (Koch.)

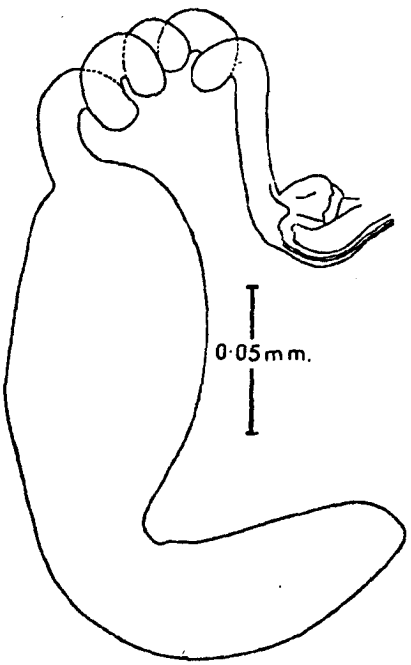


FIG. 145
L. dorsalis (F.)

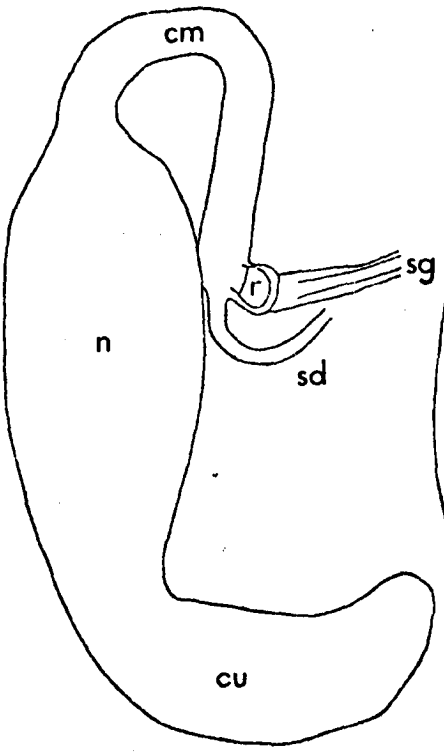


FIG. 146
L. tabidus (F.)

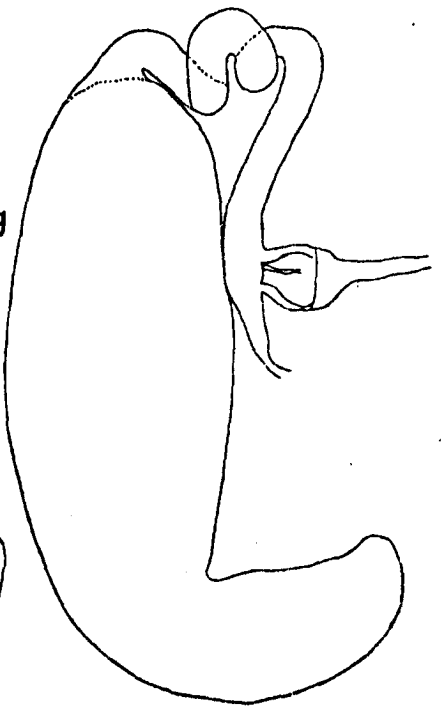


FIG. 147
L. rubiginosus Foud.

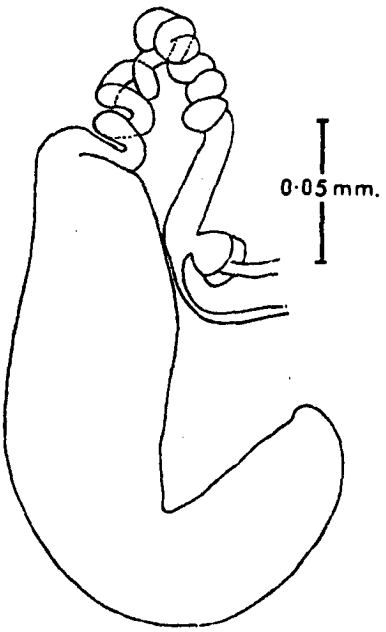


FIG. 148
L. membranaceus Foud.

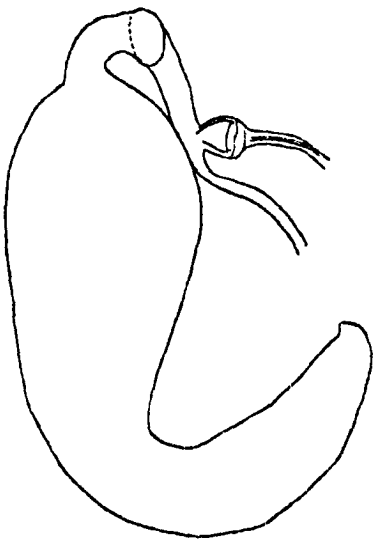


FIG. 149
L. gracilis Kuts.

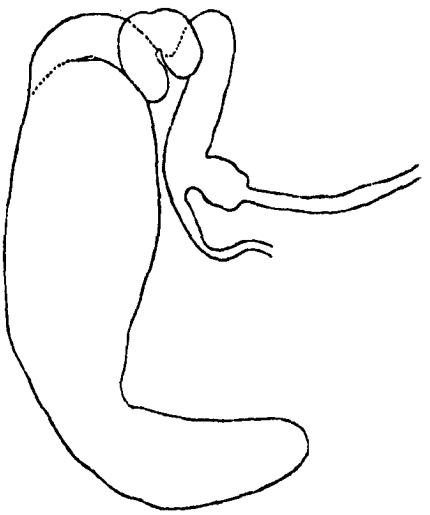


FIG. 150
L. suturellus Duft.

PLATE S 23

GENUS APHTHONA

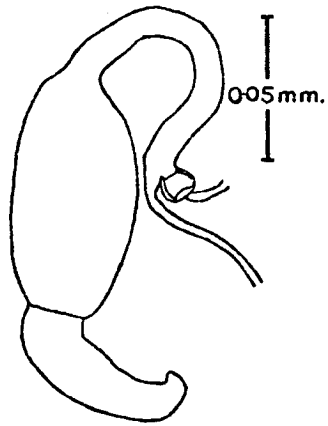


FIG. 151
A. atrovirens Foerst.

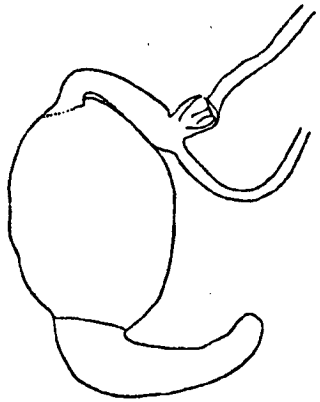


FIG. 152
A. venustula Kuts.

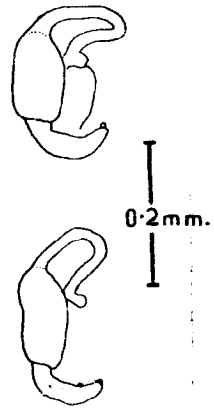


FIG. 153
A. euphorbiae (Schr.)

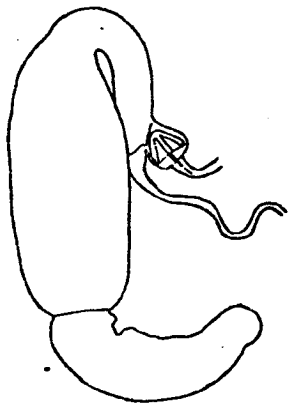


FIG. 154
A. lutescens (Gyll.)

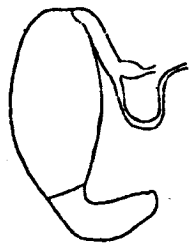


FIG. 155
A. nigriceps Redt.

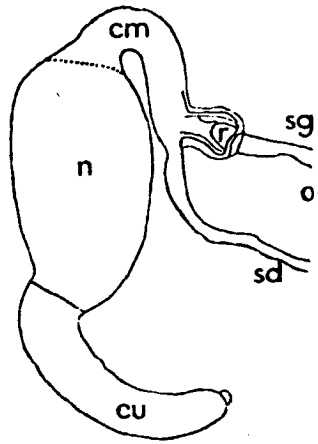


FIG. 156
A. coerulea (Geof.)

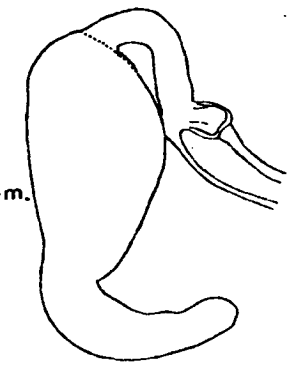


FIG. 157
A. herbigrada (Curt.)

D. Relationships shown by the spermatheca.

In the Donaciinae, Orsodacninae and Zeugophorinae the cornu, nodulus, collum and ramus are separate. The spermathecal gland is relatively long and over twice the length of the spermathecal capsule. The spermathecal duct is relatively short and thick and enters the capsule at the collum.

The spermatheca of Orsodacne cerasi and O. lineola is distinct from that of Donaciinae and Criocerinae (Spett & Lewitt, 1928).

The ramus and collum are separate whereas the cornu and nodulus are fused in the Cryptocephalinae and Clytrinae. The spermathecal gland is relatively short, about the same length as the spermathecal capsule and the spermathecal duct is usually long, either coiled or uncoiled.

The spermatheca in the Criocerinae is similar to that in the Cryptocephalinae and Clytrinae as the cornu and nodulus are fused. However, the ramus is undifferentiated and the collum is long, uncoiled or coiled, as in the Chrysomelinae. Lilioceris lilii possesses a spermatheca similar to that of Lema cyanella (L.) as the collum is uncoiled. In the Criocerinae the spermathecal gland is short and less than the length of the spermathecal capsule. The spermathecal duct is relatively short and uncoiled.

In the Chrysomelinae the cornu, nodulus, collum and ramus are separate in some species whereas the cornu and nodulus or ramus and collum may be fused in others. In Chrysolina both types of fusion are shown. Three species groups can be delimited by the form of the spermatheca. In the graminis, menthastri, polita, fastuosa, banksi, staphylea and cerealis group the spermathecal capsule is U-shaped while in the orichalcea, sanguinolenta, marginata group it is more C-shaped. In the third group comprising C. varians, hyperici and brunsvicensis the spermatheca is absent. The spermatheca is absent in the genus Phytodecta and as in the genus Chrysolina this is associated with ovoviviparity. Timarcha possesses a spermatheca similar to that of the first generic group in Chrysolina.

In the genus Gastroidea and Chrysomela the cornu and nodulus are fused.

The spermatheca in the genera Phaedon, Hydrothassa, Prasocuris, Chrysomela, Plagiodera, Gastroidea and Phyllodecta are very similar in shape but vary somewhat in size.

The subfamilies Galerucinae and Halticinae are related as the nodulus is usually greatly dilated. However, in the Halticinae the collum is elongated and sometimes coiled. In the genera Agelastica, Galeruca, Sermyla, Galerucella and Lochmaea the nodulus is strongly dilated whereas it is only weakly dilated in Phyllobrotica and Luperus.

In the Halticinae the spermatheca is remarkably uniform in shape between the genera. There are differences in the length and amount of coiling of the collum, the amount of dilation of the nodulus and the length and curvature of the cornu varies between and within genera. In the genera Haltica, Lythraria, Mantura, Hippuriphila, Batophila, Ochrosis, some Longitarsus, some Chaetocnema and some Psylliodes species there is a coil or several coils in the collum whereas in all other genera the collum is uncoiled. The spermatheca is very similar in structure in the genera Crepidodera and Derocrepis as the nodulus us only weakly dilated. The apex of the cornu is long and straight in the general Crepidodera, Derocrepis and Sphaeroderma.

In the Cassidinae the collum and ramus are fused but the cornu and nodulus are distinct. The spermathecal duct is long and spirally coiled and the spermathecal gland is about the same length as the spermathecal capsule

E. The value of the spermatheca as a taxonomic character.

The spermatheca is a useful character especially when aedeagi and external morphology are similar in species within the same genus. The spermatheca is useful at the subfamily level and its shape is usually constant within a genus, thus it can be used to separate genera. However, it is not as good a specific character as the shape of the apex of the

median lobe of the aedeagus. The spermatheca is variable in form and size from one part of a beetles distribtuion to another. The spermathecae from Dutch and English specimens of Gastroidea viridula and Gastroidea polygoni (Figs. 50, 51, 52, 53), were examined and found to differ according to the country of origin. This reduces the usefulness of the spermatheca as a taxonomic character. Size and shape of the spermatheca also varies considerably within a species from the same locality. The spermatheca in Haltica is very similar in all species but all show the generic form of a loop in the collum. However, this loop occurs in varying positions and species cannot be separated using this character. Two species groups can be formed using the length of the cornu before the coil (Kevan, 1962). In the genus Longitarsus it is more diagnostic than the aedeagus and is useful in species with very similar aedeagi. Size of the spermathecal capsule and the form of the cornu are the most useful characters. Size between species varies very slightly but in species with identical coiling of the cornu any clear differences in size of the capsule usually indicates a different species. The coil however within the same species can occur in different positions (Kevan, 1967).

I have found that the cornu is delicate and is often damaged on removal of the spermatheca. This reduces its usefulness as a taxonomic character.

In the genus Cryptocephalus, species with very similar aedeagi also have very similar spermathecae. Within the genus the aedeagus is highly variable, whereas the form of the spermatheca is reasonably constant. Hence in the genus Cryptocephalus it is the most useful character. In those Longitarsus species with very similar aedeagi in which the apex and central channel correspond then the spermathecaeare also similar (Kevan, 1967).

5. WING VENATION IN THE CHRYSOMELIDAE

A. Materials and Methods.

Dry and alcohol preserved specimens were used in this study. Specimens preserved in 70% alcohol were preferred because the wings from dry set specimens are difficult to unfold and remove without damage. The wings from dry specimens were first gently heated in 10% potassium hydroxide. The left hindwings were mounted in Berlese's Mountant and drawings made using a Wilde binocular microscope and drawing tube.

Representative drawings of all the British genera are shown in Plates W2 - W17 and Figs. 6 - 55. The apterous and brachypterous species of the Chrysomelinae and Halticinae are listed in Table 3.

TABLE 3. Brachypterous and Wingless Chrysomelids.

Subfamily	Species	Brachypterous	Wingless
Lamprosomatinae	Lamprosoma concolor	Brachypterous	
Chrysomelinae	Timarcha Tenebricosa		Wingless
	Timarcha goettingensis		Wingless
Halticinae	Podagrica fuscipes	Brachypterous	
	Hermaeophaga mercurialis	Brachypterous	
	Derocrepis rufipes	Brachypterous	
	Mniophila muscorum		Wingless
	Apteropeda orbiculata		Wingless
	Apteropeda globosa		Wingless
	Batophila rubi		Wingless
	Aphthona coerulea	Brachypterous	

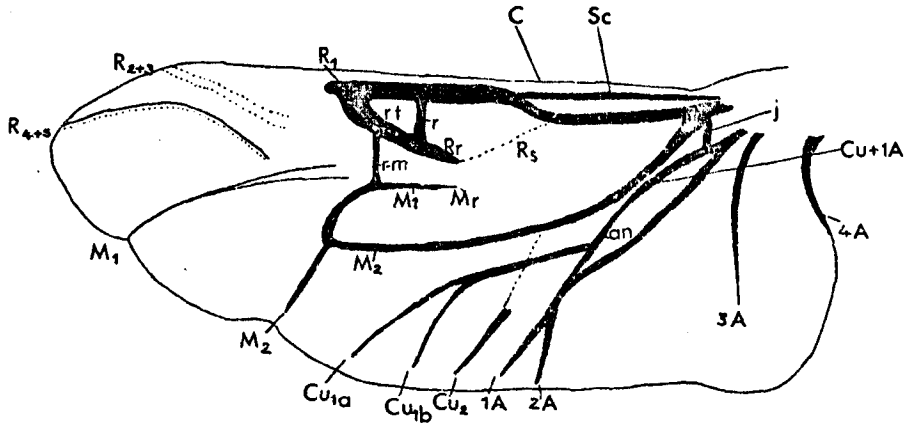
B. General Wing Venation.

The wing venation of the Phytophaga exhibits great diversity. A study of the wings of the families indicates that they are all derived from a common ancestor with a primitive or generalised type of venation Plate W1 (Chen, 1940). Chen's nomenclature is used in naming the veins

PLATE WI

FIG. 1 THE PRIMITIVE OR GENERALISED PHYTOPHAGAN WING VENATION

(After CHEN 1940)



C	Costa
Sc	Subcosta
R	Radius
rt	Radial triangle
Rr	Radial recurrent
Rs	Radial spur
M	Median
Mr	Medial recurrent
Cu	Cubitus
A	Anal
an_1	First anal cell
an_2	Second anal cell

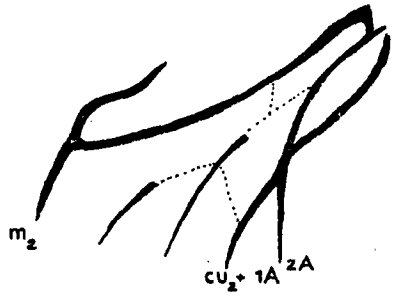


FIG. 2 Generalised venation for Donaciinae, Orsodacninae Zeugophorinae & Criocerinae

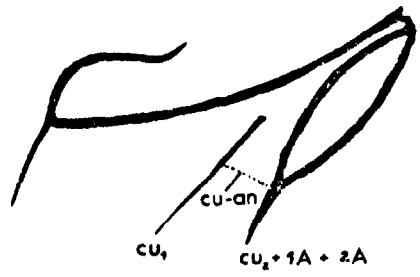


FIG. 3 Generalised venation for Criocerinae, Chrysomelinae, Galerucinae & Halticinae

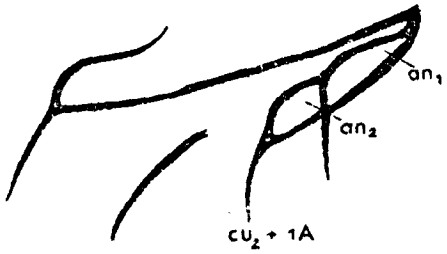


FIG. 4 Generalised venation for Cryptocephalinae & Clytrinae

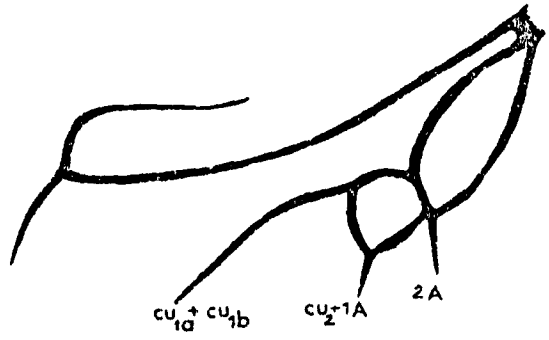


FIG. 5 Generalised venation for Cassidinae

in the species descriptions which follow.

The wings of the Phytophaga are characterised as follows (Fig. 2). The longitudinal veins are well developed but the cross veins are rare. The costal vein (C) is simple, more or less confluent with the subcosta (Sc) which is fused at its extremity, especially distally with the radial vein R. R, is strongly chitinised especially distally where it forms a radial triangle (rt) or central cell with a cross vein (r). There are two radial branches: R, not reaching the distal edge and the section radial (Rs). r connects R, to Rs. Rs is atrophied proximally but is represented at the apex by two branches which may be visible, obliterated or divided into two (R_{2+3} and R_{4+5}). The two median veins are M_1 and M_2, the first disappearing proximally. Between rt and M_1 is the cross vein r-m with m_{1a} as the remains of the perpendicular vein. Between M_1 and M_2 is the cross vein m. M_1 and M_2 have distal branches. M_2 is joined basally to the cubital (Cu + 1A) by a small transverse vein (j). The basal part of the cubital (Cu) is probably fused with 1A. Distally there are three branches of the cubital Cu_{1A}, Cu_{1b} and Cu_2. The venation in the Chrysomelidae deviates from the generalised one by the reduction of the second cubital vein Cu_2. However, usually it is replaced by a distinct cross vein (cu-an) connecting Cu_1 and 1A. There is a simplification of the anal region and of the veins 1A, 2A, 3A and 4A only 4A is rudimentary. Vein coloration varies in the different species. In Leptinotarsa, Chrysolina and Lilioceris they are red to red-orange whereas they are golden yellow in Sermyla, Agelastica, Gastroidea and Phyllodecta.

The wings of all genera in the Chrysomelidae except Galeruca and Phyllobrotica of the Galerucinae and all the genera of the Chrysomelinae, have a fringe of short setae along the posterior margin of the wing extending almost to the apex. In the brachypterous species these setae are long and cover the apex. The anterior margin usually has very few long setae. It is doubtful if these species actively fly although it is

possible that the presence of these long hairs may assist passive transport by air currents. In the Chrysomelidae the mechanism of wing folding appears to be constant. Lines along which folding occurs are shown in Galeruca tanaceti L. Figs. 34,35.

C. Species Descriptions.

i. SUBFAMILY CASSIDINAE

GENUS Cassida Plate W 17

Cassida rubiginosa Müll Fig. 54

Cubito-anal veins forming two anal cells. Vein Cu_1 is continuous or almost continuous with the second anal cell. The cross veins r-m, cu-an are absent. However r-m may be indistinct. Setae present along posterior edge from M_2 past 2A. Setae short and sparse.

ii. SUBFAMILY DONACINAE Plate W 2

GENUS Plateumaris

Plateumaris discolor (Pz.) Fig. 6

Vein M_1 is distinctly chitinised, r-m is present and bears a spur exteriorly. An elongated anal cell (an 1) is formed from Cu and the first two anal veins which are separated near the wing margin. Vein Cu_1 is present but not separated into Cu_{1a} and Cu_{1b}, and cross vein cu-an is absent. Vein Cu_2 is present. A dense fringe of minute setae occurs along the posterior edge of the wing from vein 1A to nearly the apex

GENUS Donacia

Donacia vulgaris Zsch. Fig. 7

Identical with Plateumaris discolor Pz.

GENUS Macroplea

Macroplea appendiculata (Pz.) Fig. 8

Cross vein r-m less distinct and exterior spur from this vein

indistinct. Vein Cu + 1A is unbranched, and hence the anal cell (an 1) and cross vein cu-an are absent. Vein M_2 is much shorter than in Plateumaris and Donacia.

iii. SUBFAMILY ORSODACNINAE Plate W 3

GENUS Orsodacne

Orsodacne cerasi (L.) Fig. 9

Cross vein r-m present but indistinct. Vein M_2 is long and nearly reaches the wing margin. An elongated anal cell (an_1) is formed from Cu and from the first two anal veins which are separated into veins Cu_2 + 1A and 2A. The cross vein cu-an links Cu_2 + 1A with veins Cu_{1b} and Cu_{1a}. A dense fringe of small setae occur on the posterior edge of the wing from vein 2A to the apex.

iv.. SUBFAMILY ZEUGOPHORINAE Plate W 3

GENUS Zeugophora

Zeugophora subspinosa (F.) Fig. 10

Cross vein r-m absent. An elongated anal cell (an_1) is formed from Cu and the first two anal veins which become fused to form vein Cu_2 + 1A + 2A. Veins Cu_{1a} and Cu_{1b} are present but cross vein cu-an is absent. A dense fringe of small setae occur on the posterior edge of the wing from vein 3A to the apex.

v. SUBFAMILY CRYPTOCEPHALINAE Plate W 3

GENUS Cryptocephalus

Cryptocephalus pusillus F. Fig. 11

Cross vein r-m absent. An elongated anal cell (an_1) is formed from Cu and the first two anal veins which become fused to form vein Cu_2 + 1A + 2A. Veins Cu_{1a}, Cu_{1b} and cross vein cu-an are absent. Posterior wing edge fringed as in Orsodacne.

Cryptocephalus aureolus Suffr.

Venation identical with C. quadripunctata (L.)

vi. SUBFAMILY CLYTRINAE Plate W 4

GENUS Clytra

Clytra quadripunctata (L.) Fig. 12

Cross veins r-m and cu-an absent. Two anal cells are formed from the cubito-anal veins. Vein Cu_1 is undivided and does not join the second anal cell (an_2). Posterior wing margin fringed with small setae from vein 2A to M_2.

GENUS Labidostomis

Labidostomis tridentata (L.) Fig. 13

Similar to Clytra but posterior wing margin fringed with small setae from 2A to nearly the apex.

GENUS Gynandrophthalma

Gynandrophthalma affinis (Hell.) Fig. 14

Identical with Labidostomis and Clytra

vii. SUBFAMILY CRIOCERINAE Plate W 5

GENUS Lilioceris

Lilioceris lilii (Scop.) Fig. 15

Cross veins r-m, cu-an absent. An elongated anal cell (an_1) is formed from Cu and the first two anal veins which are separated into veins Cu_2 + 1A and 2A. Vein Cu_1 present but undivided. Posterior wing margin fringed with small setae from 2A to apex.

GENUS Crioceris

Crioceris asparagi (L.) Fig. 16

Cross vein r-m indistinct, probably present, but cu-an absent. An elongated anal cell (an_1) is formed from Cu and the first two anal veins which become fused to form vein Cu_2 + 1A + 2A. Vein Cu_1 present but undivided.

GENUS Lema

Lema melanopa (L.) Fig. 17

Cross vein r-m indistinct, only partly present. Otherwise similar to Crioceris.

SUBFAMILY CHRYSOMELINAE Plates W 6, W 7, W 8

GENUS Gastroidea

Gastroidea viridula (De G.) Fig. 21

Cross vein r-m, and cu-an are absent. An elongated anal cell (an_1) is formed from Cu and the first two anal veins which become fused to form vein Cu_2 + 1A + 2A. Vein Cu_1 is present but undivided. Posterior wing margin without setae.

GENUS Plagiodera

Plagiodera versicolora (Laich.) Fig. 22

Identical with Gastroidea.

GENUS Hydrothassa

Hydrothassa marginella (L.) Fig. 23

Identical with Gastroidea

GENUS Prasocuris

Prasocuris junci (Brahm.) Fig. 24

Similar to Gastroidea but cross vein r-m present but indistinct.

GENUS Phyllodecta

Phyllodecta vitellinae (L.) Fig. 25

Cross veins r-m and cu-an absent. An elongated anal cell (an_1) is formed from Cu and the first two anal veins which are separated into veins Cu_2 + 1A and 2A. Vein Cu_1 present but undivided.

GENUS Phaedon

Phaedon cochleariae (F.) Fig. 26

Similar to Phyllodecta but cross vein r-m partly present.

GENUS Chrysomela

Chrysomela aenea L. Fig. 27

Similar to Phyllodecta but vein 2A slightly reduced.

GENUS Phytodecta

Phytodecta olivacea (Forst.) Fig. 18

Cross vein r-m and cu-an present. Mr well developed. An elongated anal cell (an_1) is formed from Cu and the first two anal veins which become fused to form the reduced vein Cu_2 + 1A + 2A. Veins Cu_{1A} and Cu_{1B} are joined by cross vein cu-an to anal cell (an_1).

GENUS Chrysolina

Chrysolina hyperici (Forst.) Fig. 20

Cross vein r-m present, but cu-an absent. An elongated anal cell (an_1) is formed from Cu and the first two anal veins which become fused to form the vein Cu_2 + 1A + 2A. Vein Cu_1 undivided.

GENUS Leptinotarsa

L. decemlineata (Say.)

As Phytodecta. Cross veins r-m, cu-an present.

GENUS Timarcha

Timarcha tenebricosa (F.)

Hindwings absent.

ix. SUBFAMILY LAMPROSOMATINAE

GENUS Lamprosoma

Lamprosoma concolor Stm. Fig. 19

Brachypterous, only veins R, M, Cu and A possibly present.

x. SUBFAMILY GALERUCINAE Plates W 9, W 10, W 11

GENUS Sermyla

Sermyla halensis (L.) Fig. 28

Cross vein r-m absent, but cu-an present. An elongated anal cell (an_1)

is formed from Cu and the first two anal veins which become fused to form the vein Cu_2 + 1A + 2A. Vein Cu_1 is undivided but nearly reaches vein M_2. Posterior wing margin with short, sparse setae from the anal area to the apex.

GENUS Phyllobrotica

Phyllobrotica quadrimaculata (L.) Fig. 29

Similar to Sermyla but Cu_1 does not approach M_2 and the posterior wing margin has no setae.

GENUS Luperus

Luperus longicornis F. Fig. 30

Similar to Phyllobrotica but posterior wing margin with a dense fringe of short setae from the anal area to the apex.

GENUS Agelastica

Agelastica alni (L.) Fig. 31

Cross veins r-m and cu-an present. Vein Mr well developed. An elongated anal cell (an_1) is formed from Cu and the first two anal veins which become fused to form the vein Cu_2 + 1A + 2A. Vein Cu_1 is undivided. Posterior wing margin with short, sparse setae from anal area to the apex.

GENUS Galeruca

Galeruca tanaceti (L.) Figs. 34 & 35

Similar to Agelastica but Cu_1 and cu-an lie near M_2 and the posterior wing margin has no setae, also 3A more distinct.

GENUS Lochmaea

Lochmaea crataegi (Forst.) Fig. 33

Cross vein r-m only partly present, reduced, but cu-an present. An elongated anal cell (an_1) is formed from Cu and the first two anal veins which become fused to form the vein Cu_2 + 1A + 2A. Vein Cu_1 is undivided and is not extended past cu-an towards vein M_2. Posterior wing margin with a dense fringe of short setae from anal area to apex.

GENUS Galerucella

Galerucella tenella (L.) Fig. 32

Cross vein r-m present but indistinct, weakly chitinised. An elongated anal cell (an_1) is formed from Cu and the first two anal veins which become fused to form the vein Cu_2 + 1A +2A. Vein Cu_1 is undivided but extends past cross vein cu-an and unites with vein M_2. Posterior wing margin with a sparse fringe of short setae from anal area to apex.

xi. SUBFAMILY HALTICINAE Plates W 12 - W 16

GENUS Haltica

Haltica lythri Aub. Fig. 36

Cross vein r-m weakly developed, reduced. Radial triangle well-developed. An elongated anal cell (an_1) is formed from Cu and the first two anal veins which become fused to form vein Cu_2 + 1A + 2A. Veins Cu_1 and cross vein cu-an absent. Vein 3A well-developed. Posterior wing margin with a dense fringe of short setae from anal area to apex.

GENUS Chalcoides

Chalcoides aurea (Geof.) Fig. 37

Identical with Haltica

GENUS Psylliodes

Psylliodes marcida (Ill.) Fig. 38

Identical with Haltica but cross vein r-m more strongly developed.

GENUS Chaetocnema

Chaetocnema concinna (Marsh.) Fig. 39

Identical with Psylliodes

GENUS Phyllotreta

Phyllotreta tetrastigma Com. Fig. 40

Identical with Psylliodes

GENUS Sphaeroderma

Sphaeroderma testaceum (F.) Fig. 41

Identical with Psylliodes

GENUS Crepidodera

Crepidodera ferruginea (Scop.) Fig. 42

Identical with Psylliodes.

GENUS Mantura

Mantura rustica (L.) Fig. 43

Cross vein r-m present but indistinct. Radial triangle moderately well-developed. One cubital vein present but anal veins 1 and 2 absent. Posterior wing margin with a dense fringe of short setae from anal area to the apex.

GENUS Hippuriphila

Hippuriphila modeeri (L.) Fig. 44

Identical with Mantura

GENUS Dibolia

Dibolia cynoglossi (Koch.) Fig. 45

Similar to Mantura but radial triangle less well chitinised.

GENUS Longitarsus

Longitarsus jacobaeae Wat. Fig. 46

Cross vein r-m absent. Radial triangle moderately developed. The cubital vein and one anal vein are present but do not form an anal cell.

GENUS Aphthona

Aphthona coerulea (Geof.) Fig. 47

Identical with Longitarsus. Sometimes brachypterous.

GENUS Epitrix

Epitrix atropae Foud. Fig. 48

Cross vein r-m absent. Radial triangle reduced. Veins M_2 and cubital vein present but anal veins absent.

GENUS Lythraria

Lythraria salicariae (Pk.) Fig. 49

Similar to Epitrix but radial triangle absent.

GENUS Ochrosis

Ochrosis ventralis (Ill.) Fig. 50

Similar to Lythraria but cubital vein absent.

GENUS Derocrepis

Derocrepis rufipes (L.) Fig. 51

Brachypterous. Subcosta, radius, and median veins well developed. Cubitus and one anal vein also present but reduced. Radial triangle indistinct.

GENUS Podagrica

Podagrica fuscipes (L.) Fig. 52

Brachypterous. Subcosta, radius and median veins well developed. Other veins and radial triangle absent. Apex of wing bearing numerous setae.

GENUS Hermaeophaga

Hermaeophaga mercurialis (F.) Fig. 53

Brachypterous. Radius and median veins well developed. Other veins and radial triangle absent. Posterior margin of wing bearing long setae.

GENUS Mniophila

Mniophila muscorum (Koch.)

Apterous.

GENUS Apteropeda

Apteropeda orbiculata (Marsh.)

Apterous.

Apteropeda globosa (Ill.)

Apterous

GENUS Batophila

Batophila rubi (Pk.)

Apterous.

PLATE W2

DONACIINAE

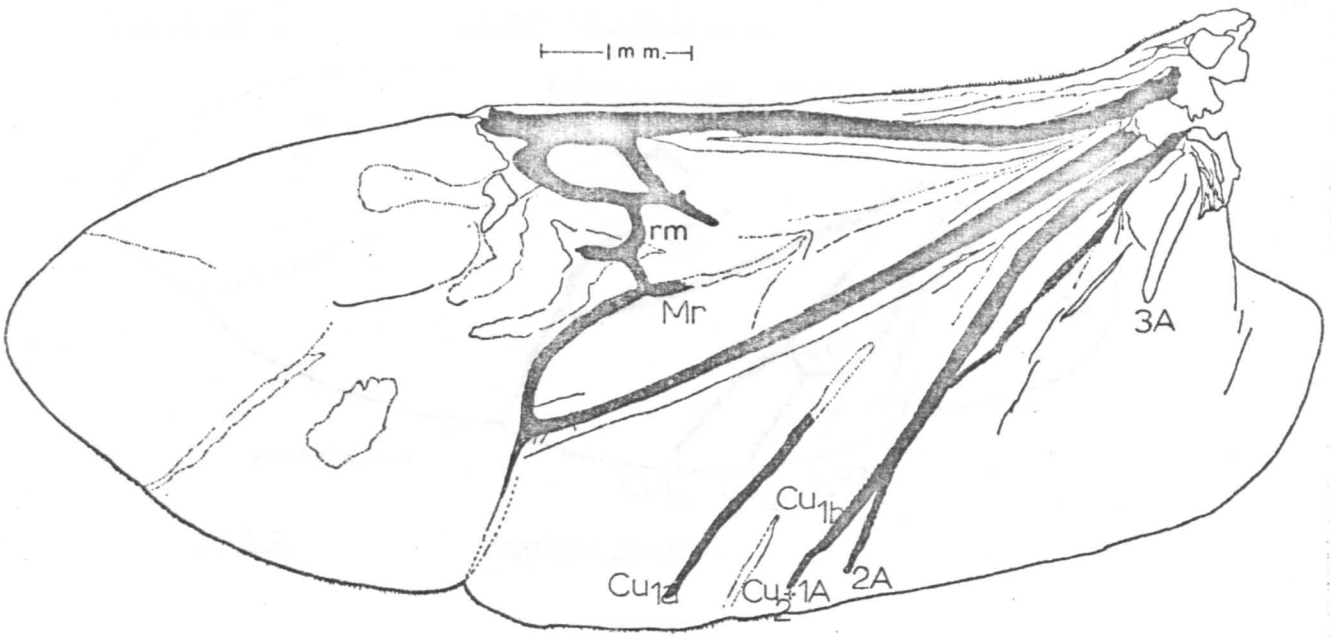


FIG. 6 Plateumaris discolor (Pz.)

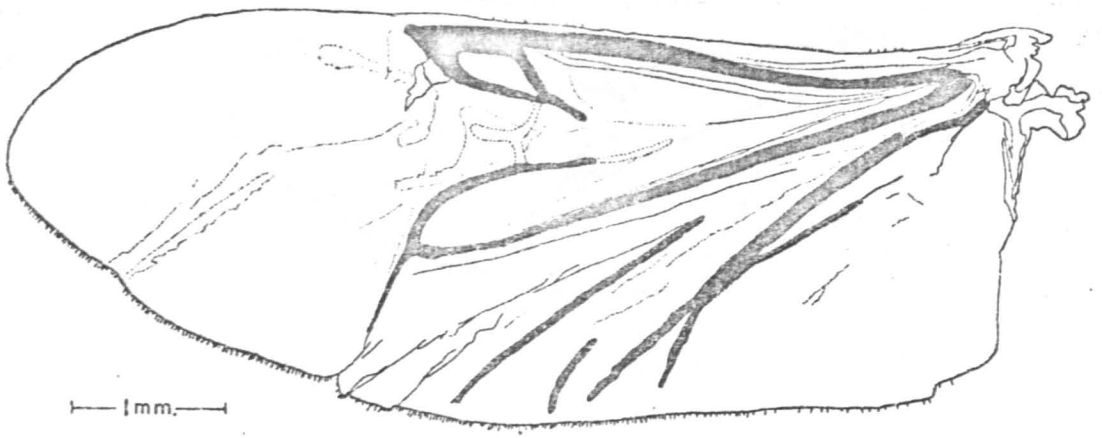


FIG. 7 Donacia vulgaris Zsch.

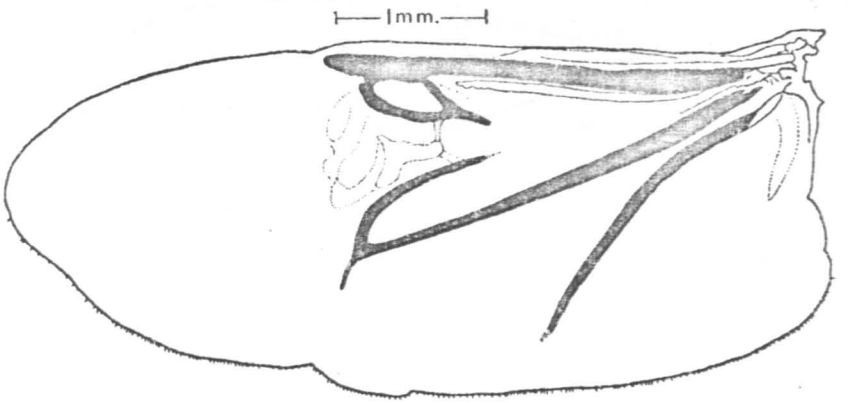


FIG. 8 Macroplea appendiculata (Pz.)

PLATE W 3

ORSODACNINAE

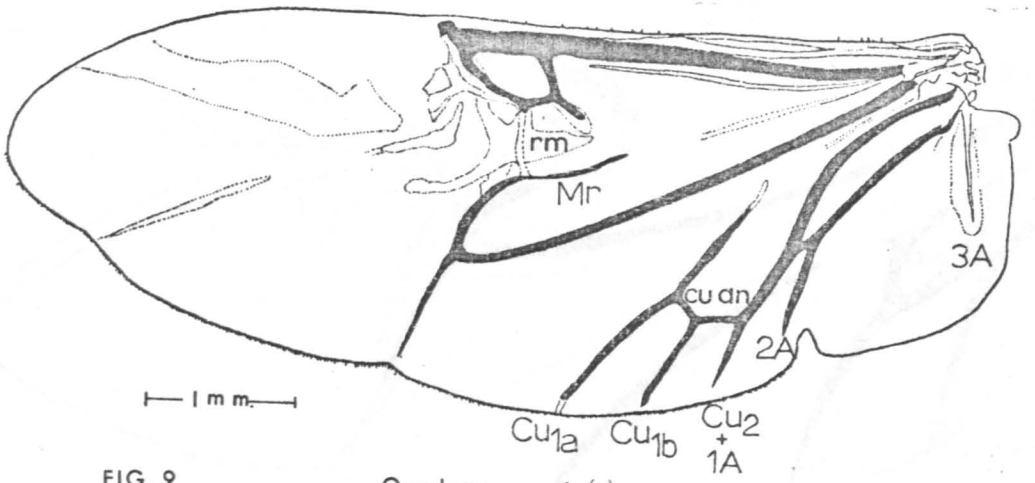


FIG. 9 Orsodacne cerasi (L.)

ZEUGOPHORINAE

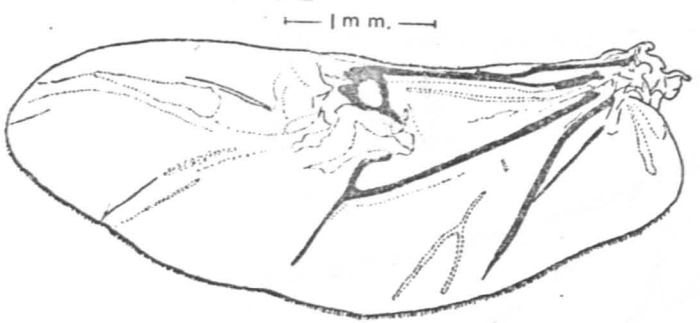


FIG. 10 Zeugophora subspinosa (F.)

CRYPTOCEPHALINAE

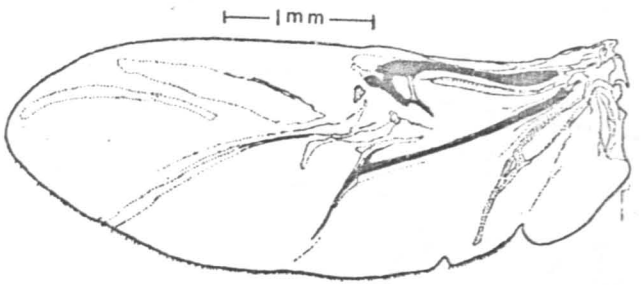


FIG. 11 Cryptocephalus pusillus F.

PLATE W4

CLYTRINAE

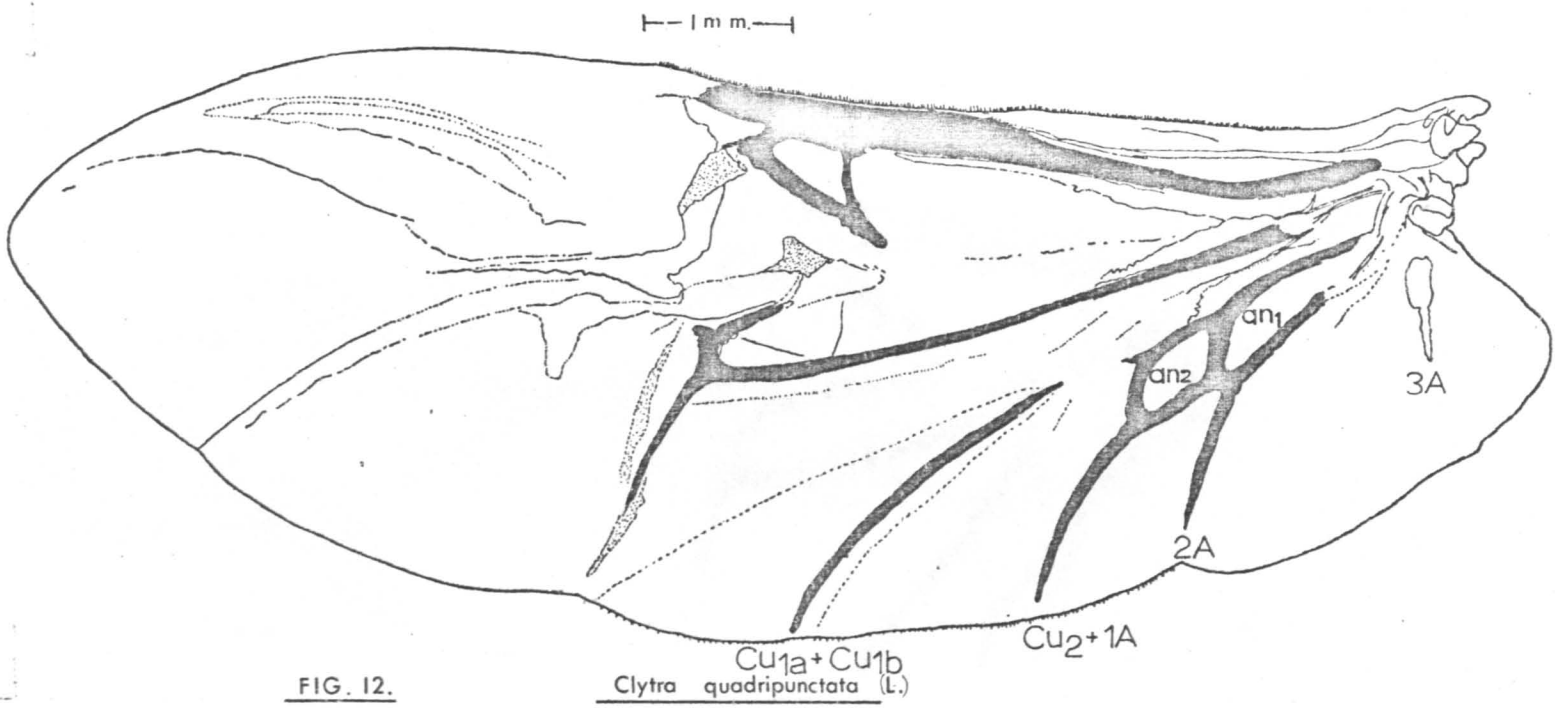


FIG. 12. Clytra quadripunctata (L.)

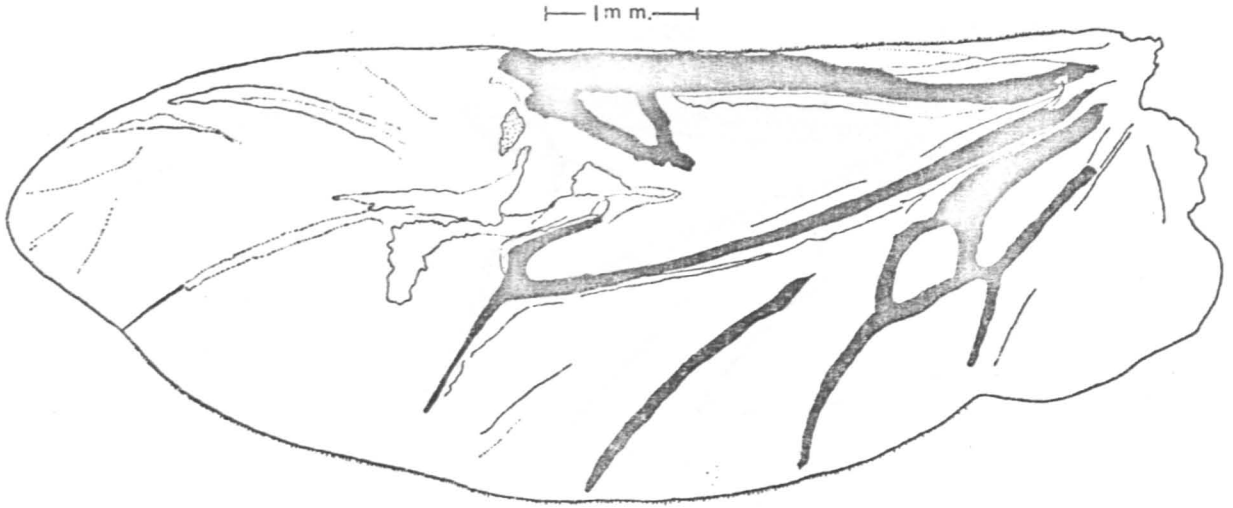


FIG. 13. Labidostomis tridentata (L.)

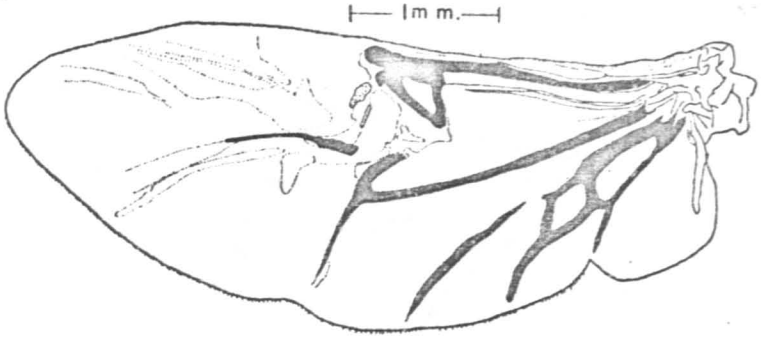


FIG. 14 Gynandrophthalma affinis (Hell.)

PLATE W5

CRIOCERINAE

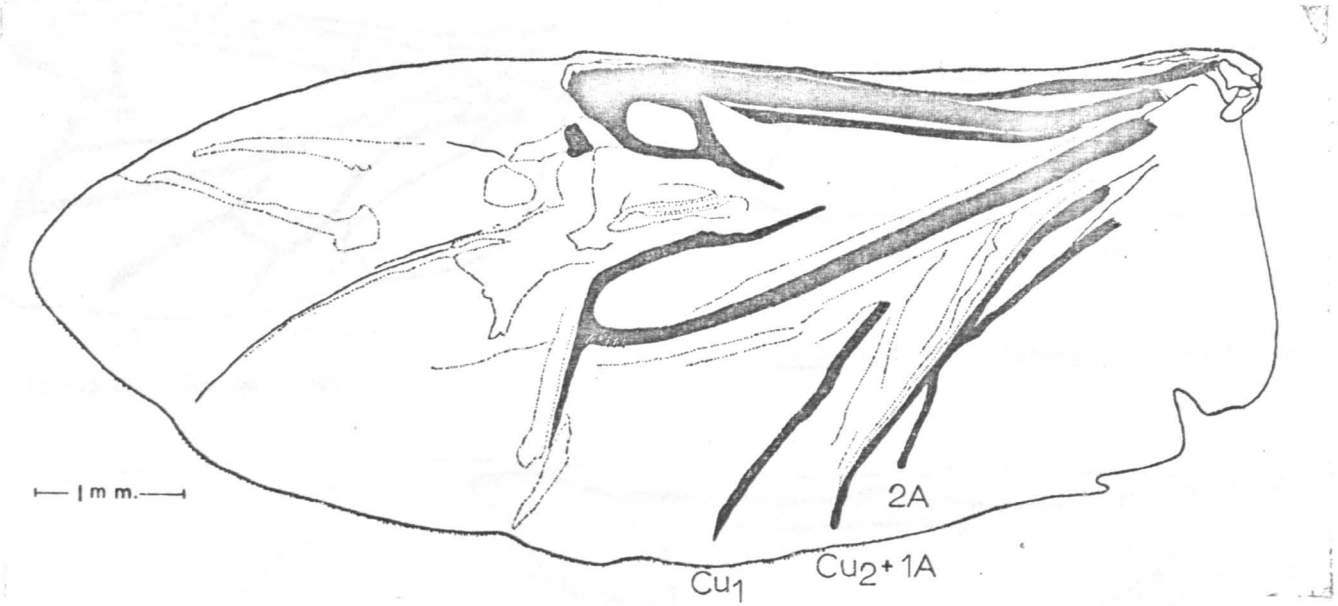


FIG. 15 Lilioceris lilii (Scop.)

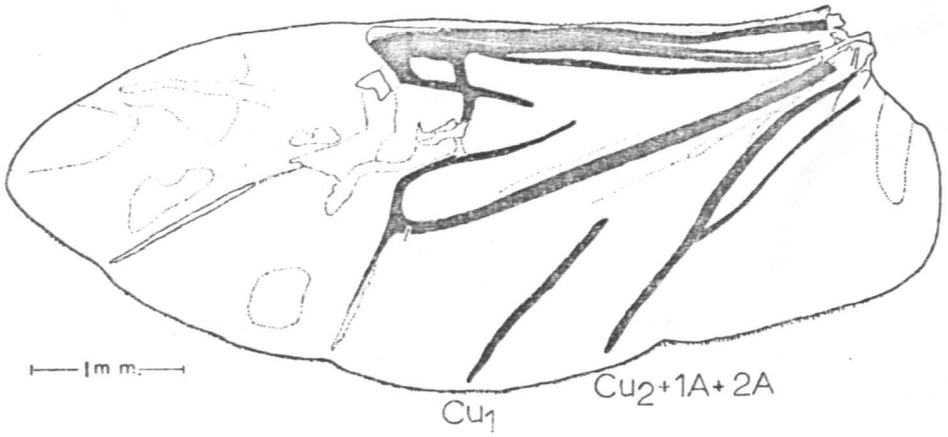


FIG. 16 Crioceris asparagi (L.)

FIG. 17 Lema melanopa (L.)

PLATE W6

CHRYSOMELINAE

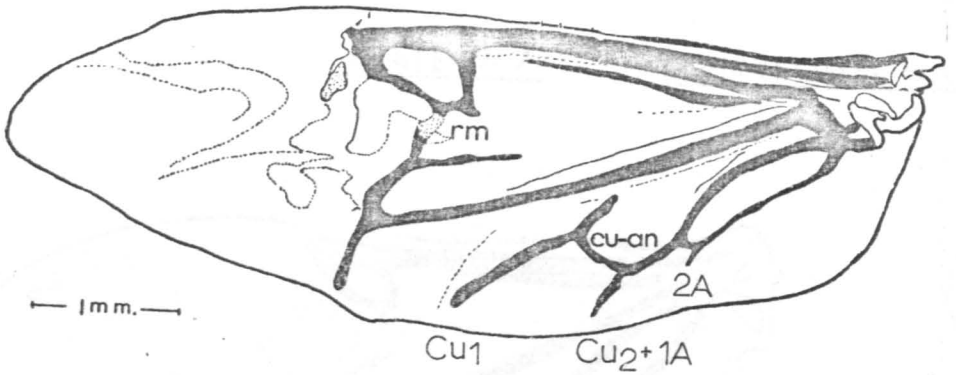


FIG. 18 Phytodecta olivacea (Forst.)

LAMPROSOMATINAE

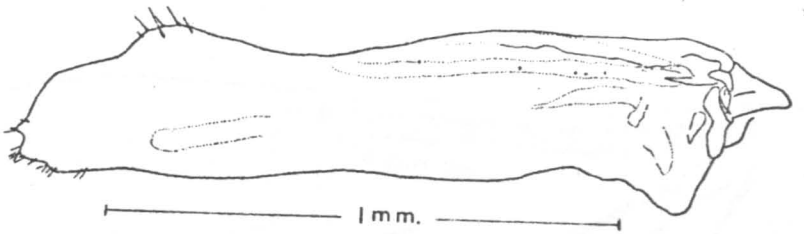


FIG. 19 Lamprosoma concolor (Stm.)

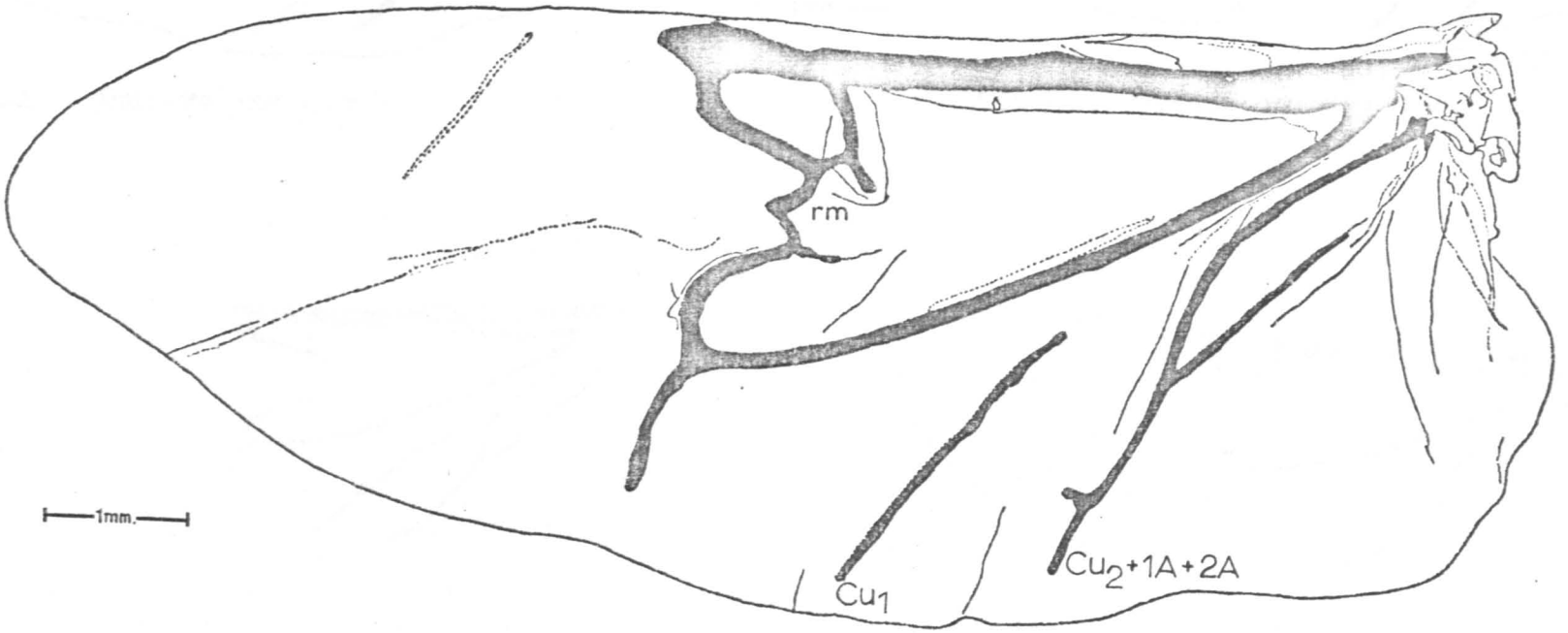


FIG. 20 Chrysolina hyperici (Forst.)

PLATE W7 CHRYSOMELINAE

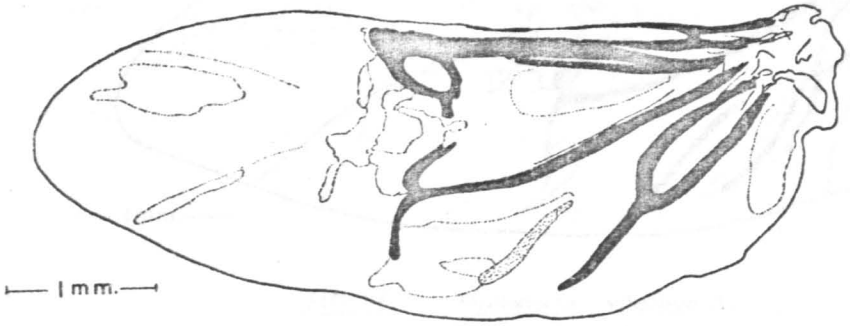


FIG. 21 Gastroidea viridula (De G.)

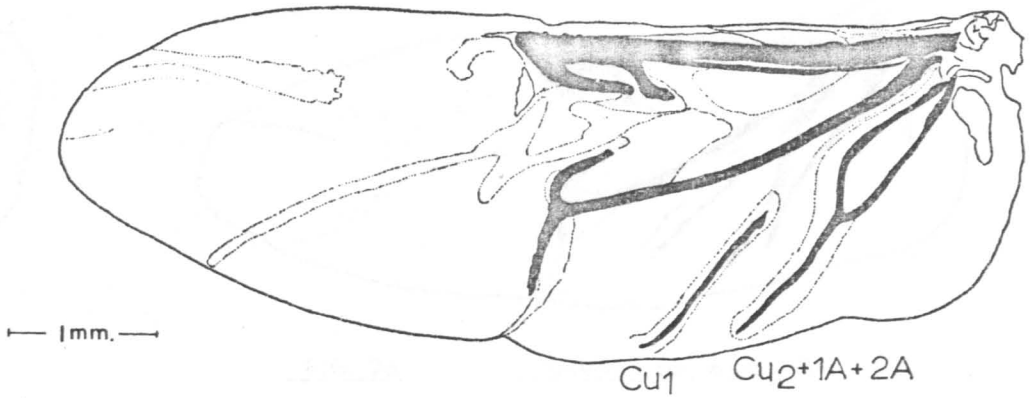


FIG. 22 Plagiodera versicolora (Laich.)

FIG. 23 Hydrothassa marginella (L.)

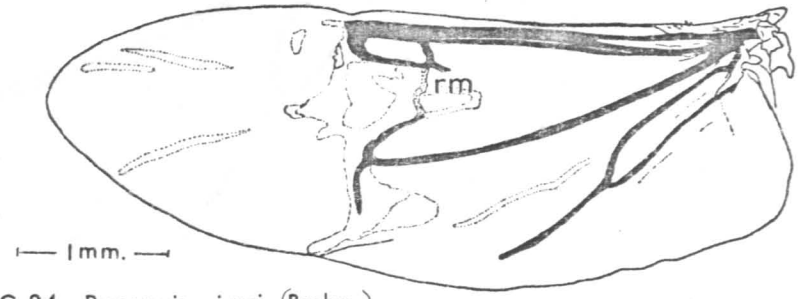


FIG. 24 Prasocuris junci (Brahm.)

PLATE W8 CHRYSOMELINAE

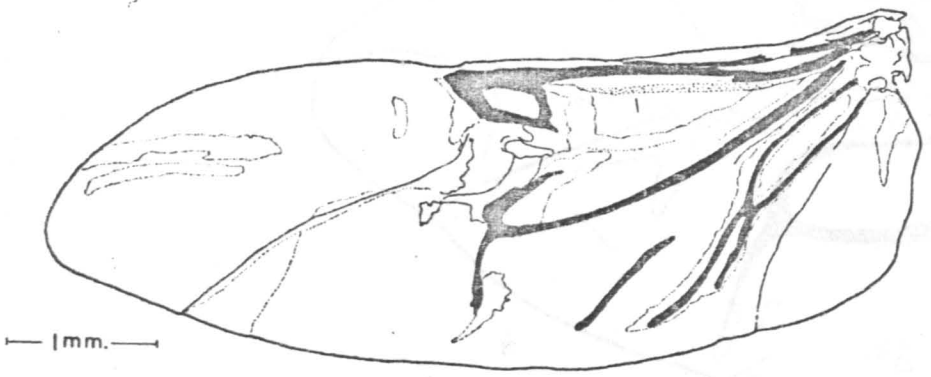


FIG. 25 Phyllodecta vitellinae (L.)

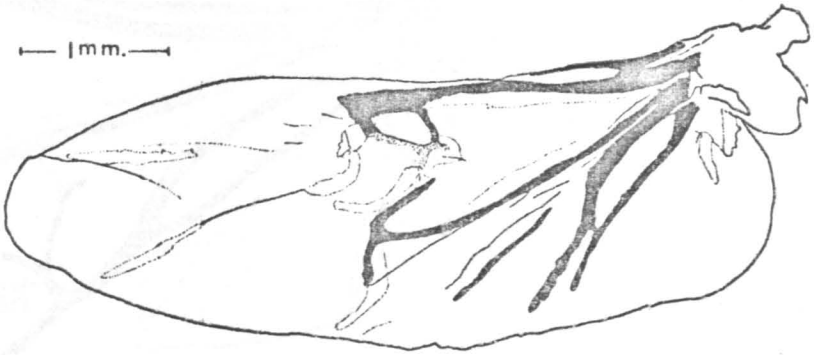


FIG. 26 Phaedon cochleariae (F.)

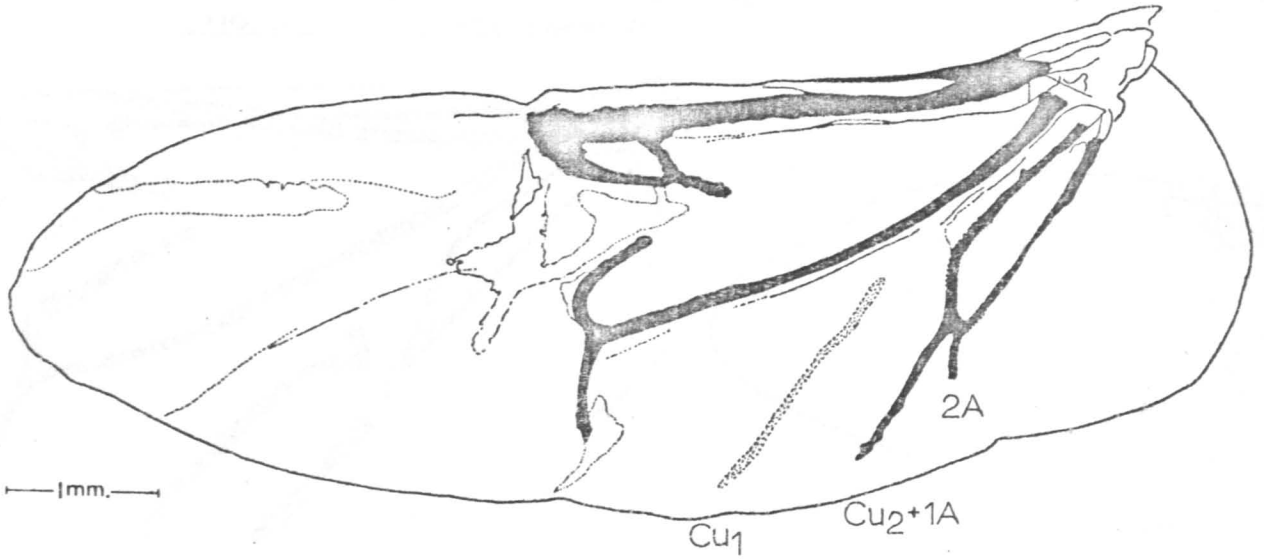


FIG. 27 Chrysomela aenea L.

PLATE W9 GALERUCINAE

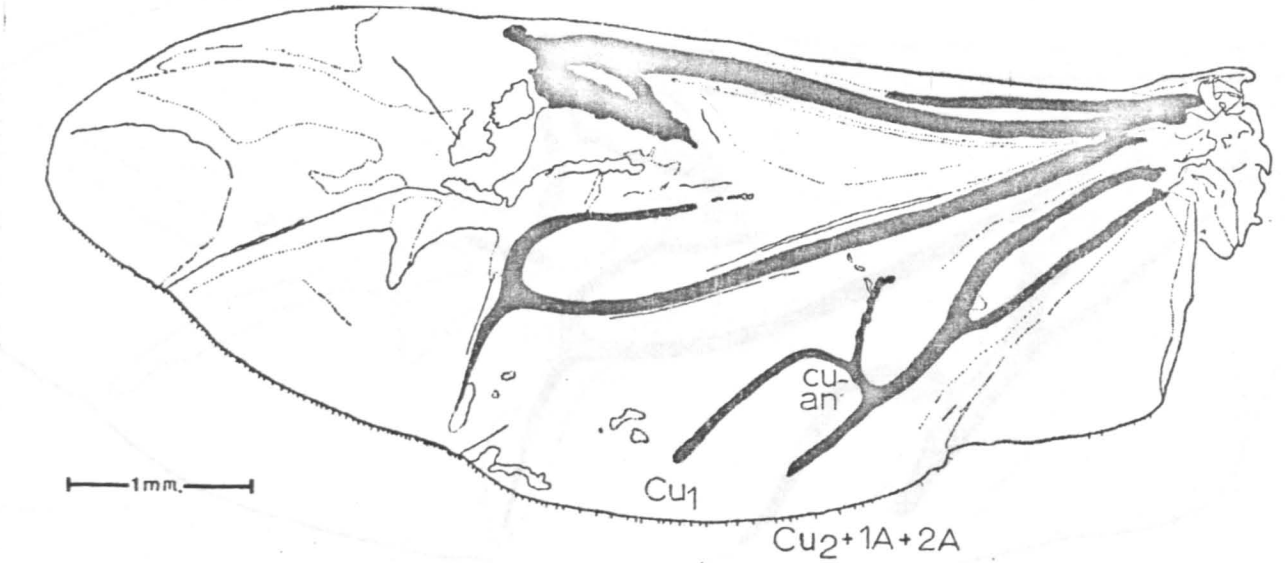


FIG. 28 Sermylla halensis (L.)

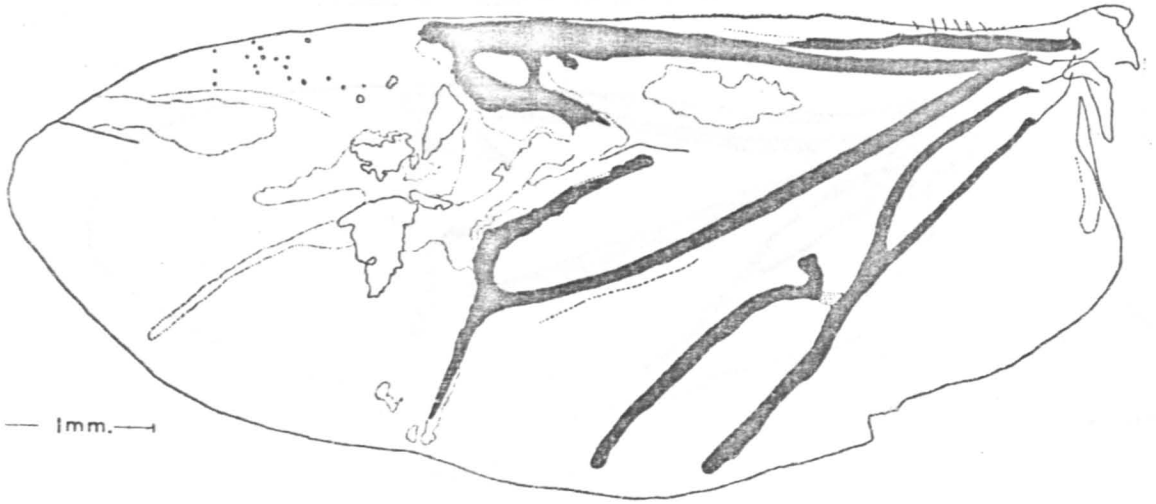


FIG. 29 Phyllobrotica quadrimaculata (L.)

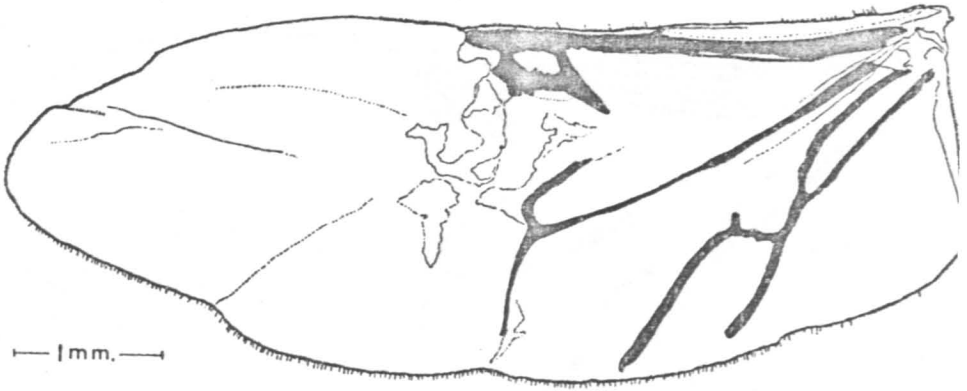


FIG. 30 Luperus longicornis F.

PLATE W 10 GALERUCINAE

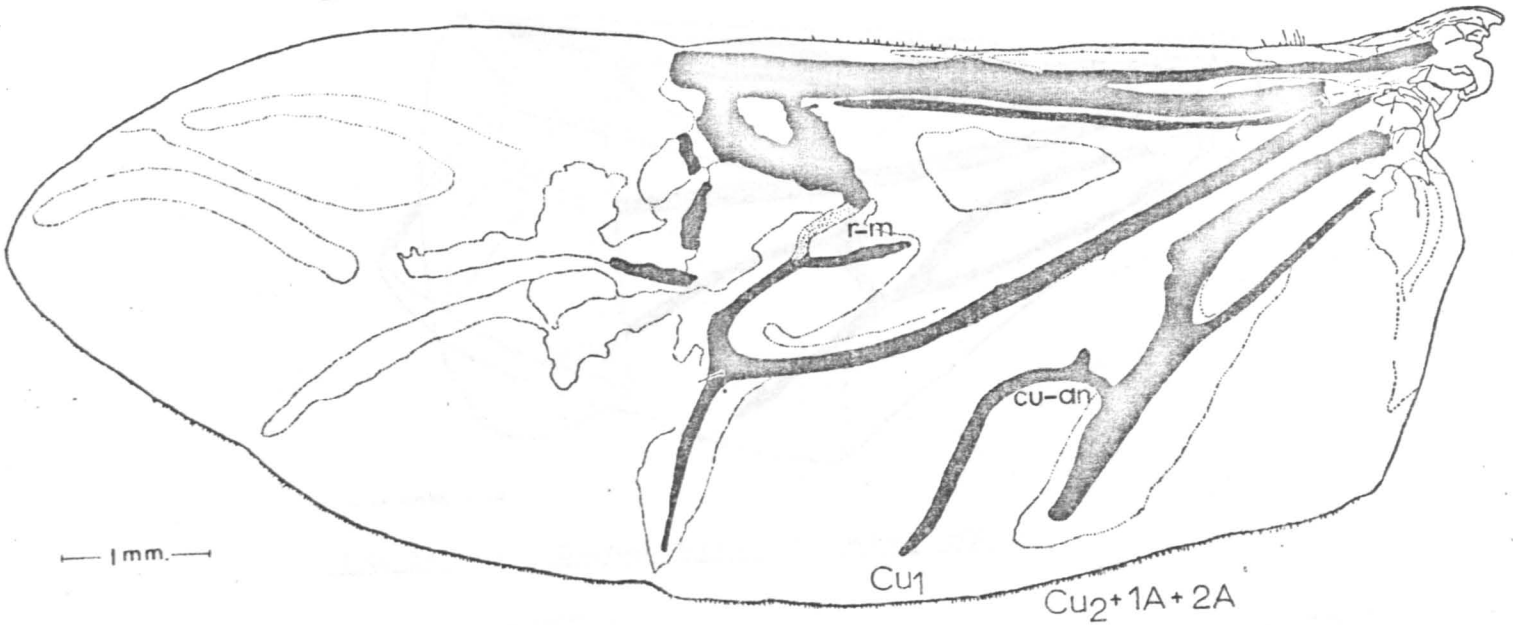


FIG. 31 Agelastica alni (L.)

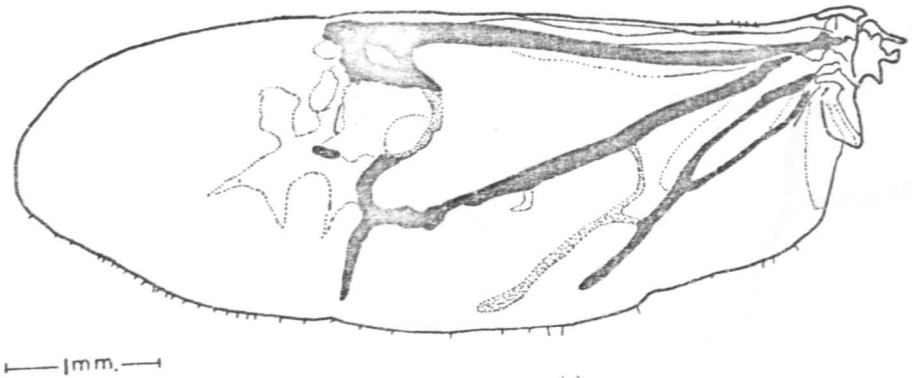


FIG. 32 Galerucella tenella (L.)

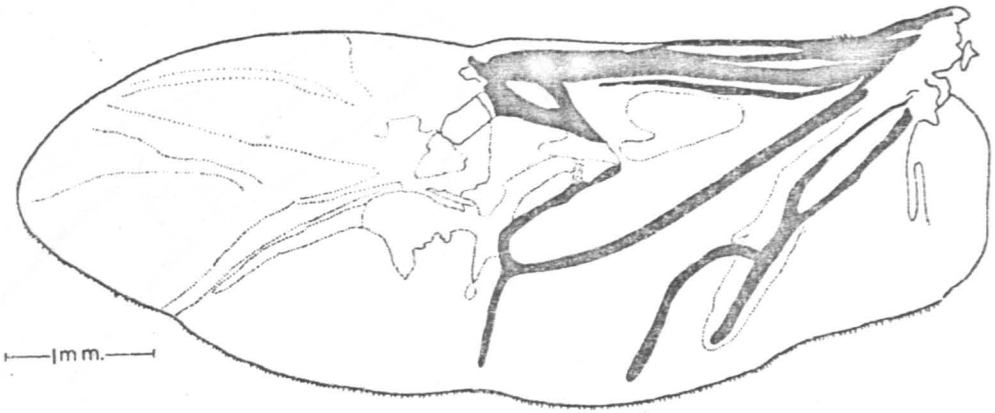


FIG. 33 Lochmaea crataegi (Forst.)

PLATE W11 GALERUCINAE

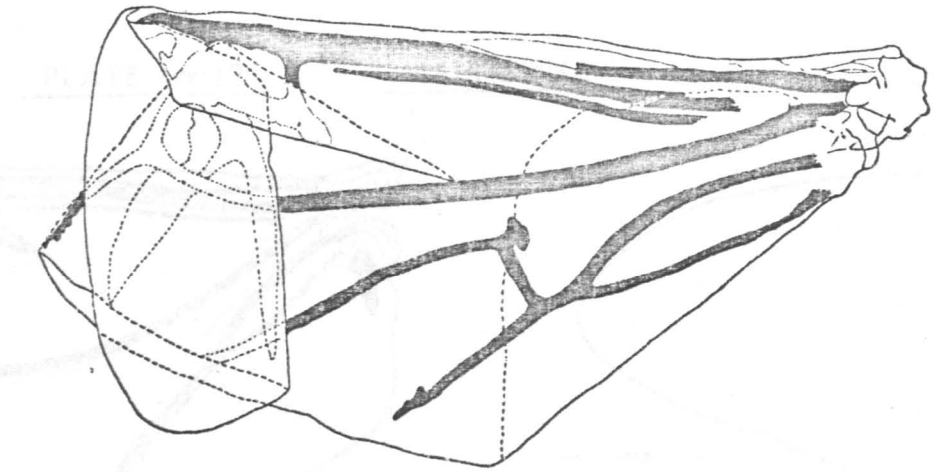


FIG. 34 Galeruca tanaceti (L.) WING FOLDED

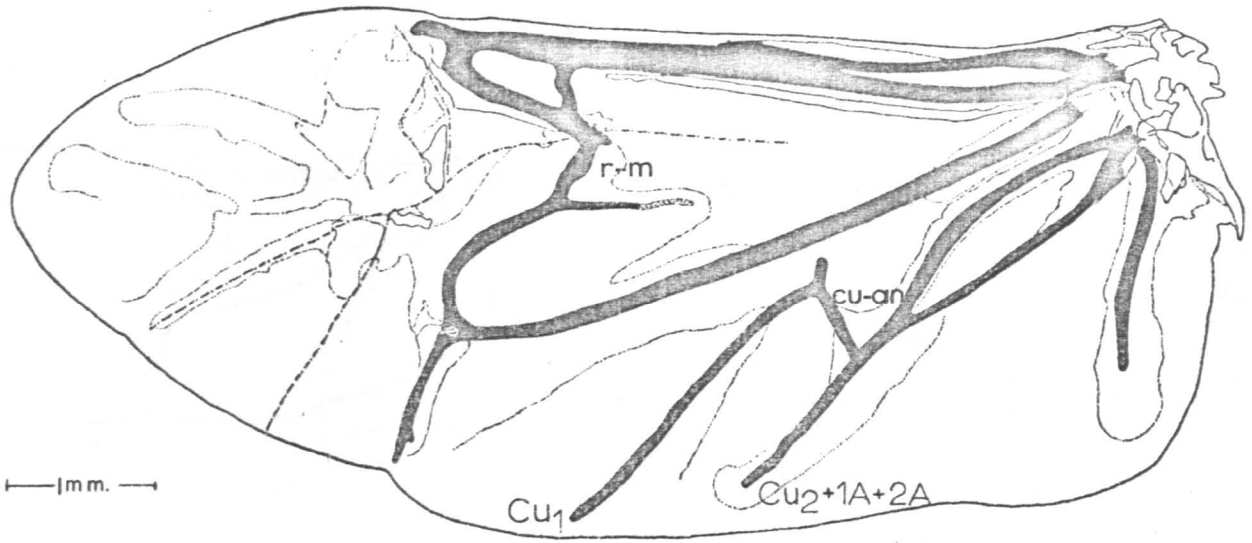


FIG. 35 WING UNFOLDED

PLATE W 12 HALTICINAE

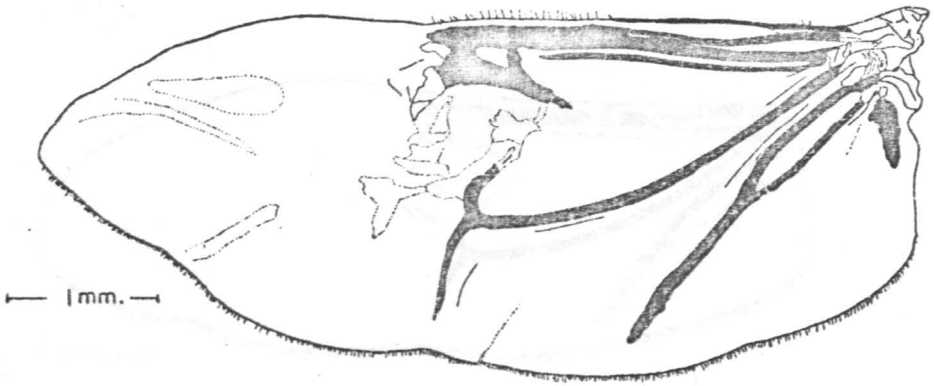


FIG. 36 Haltica lythri Aub.

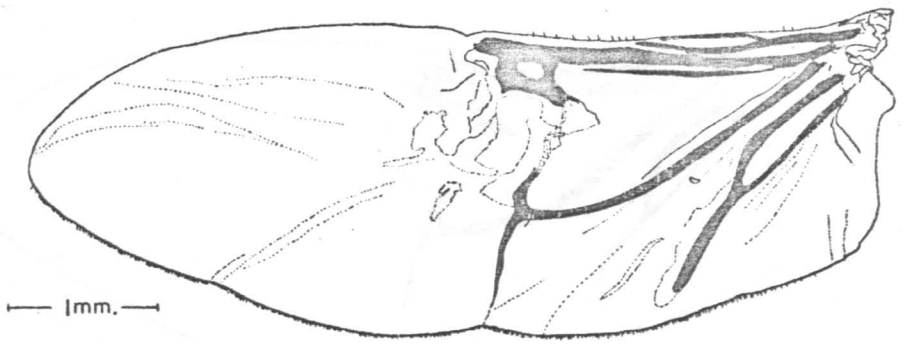


FIG. 37 Chalcoides aurea (Geof.)

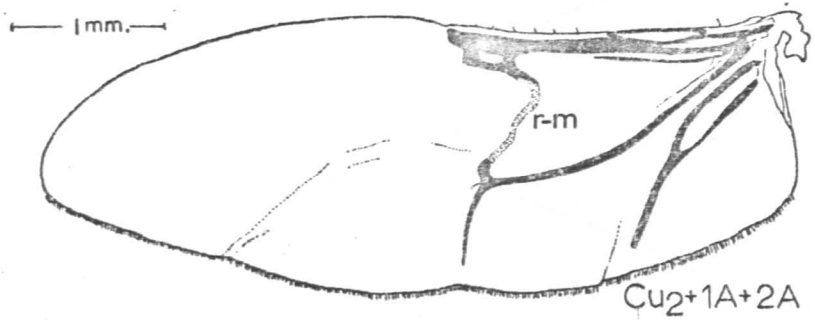


FIG. 38 Psylliodes marcida (Ill.)

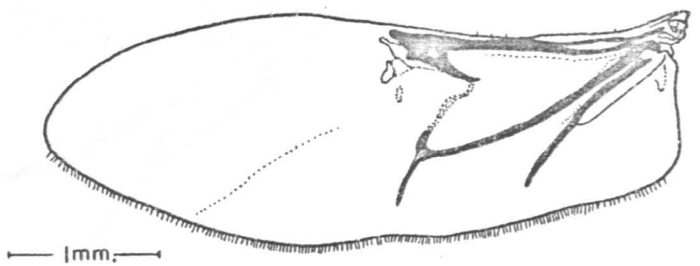


FIG. 39 Chaetocnema concinna (Marsh.)

PLATE W 13

HALTICINAE

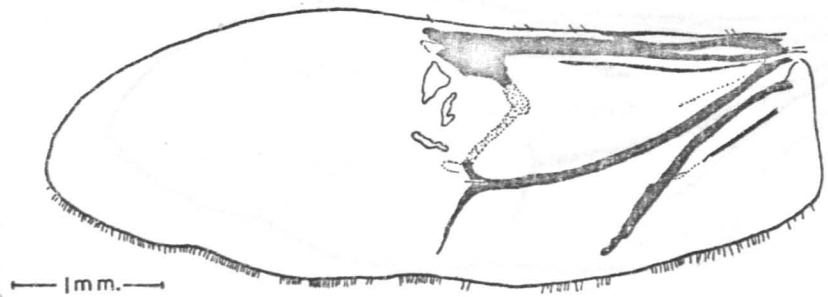


FIG. 40 Phyllotreta tetrastigma Com.

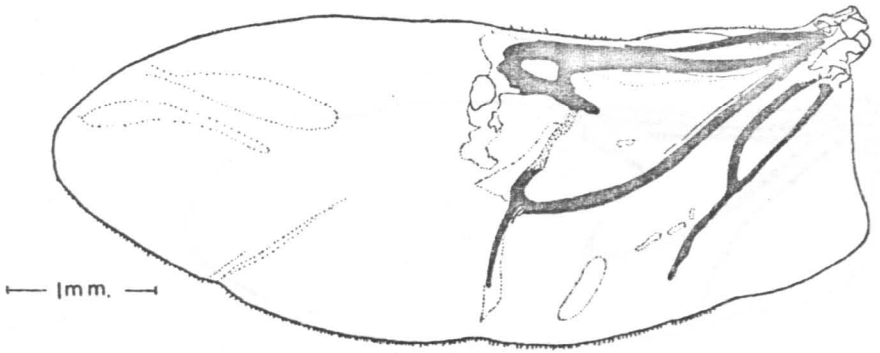


FIG. 41 Sphaeroderma testaceum (F.)

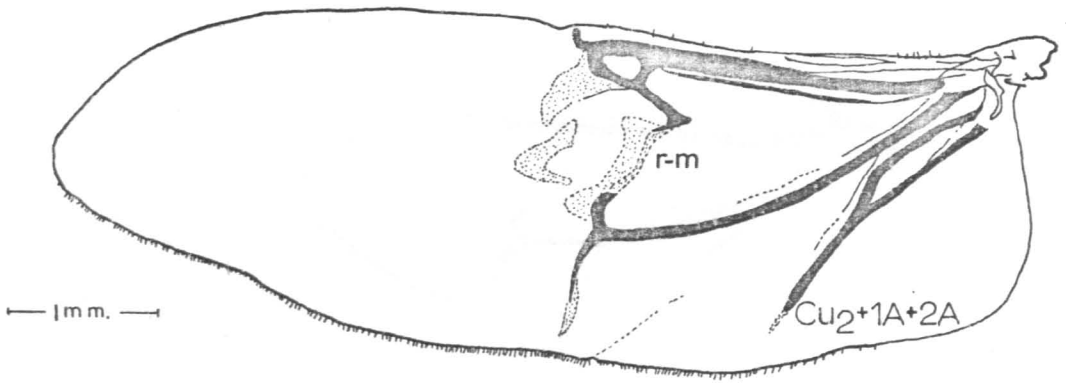


FIG. 42 Crepidodera ferruginea (Scop.)

PLATE W 14 HALTICINAE

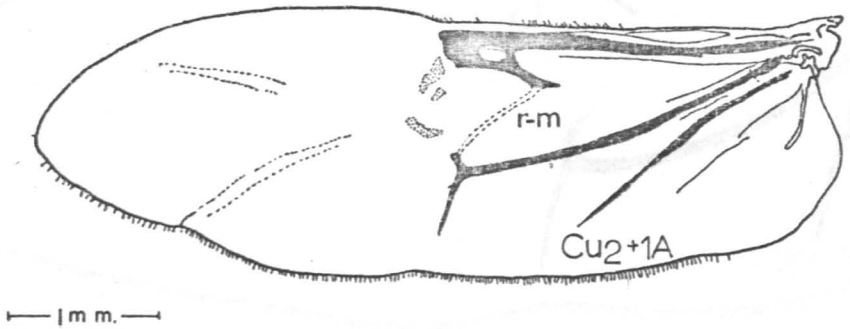


FIG. 43 Mantura rustica (L.)

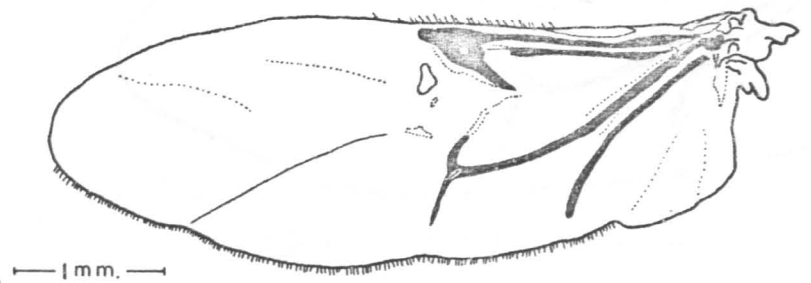


FIG. 44 Hippuriphila modeeri (L.)

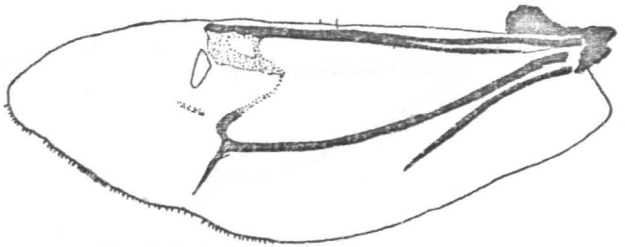


FIG. 45 Dibolia cynoglossi (Koch.)

PLATE W 15 HALTICINAE

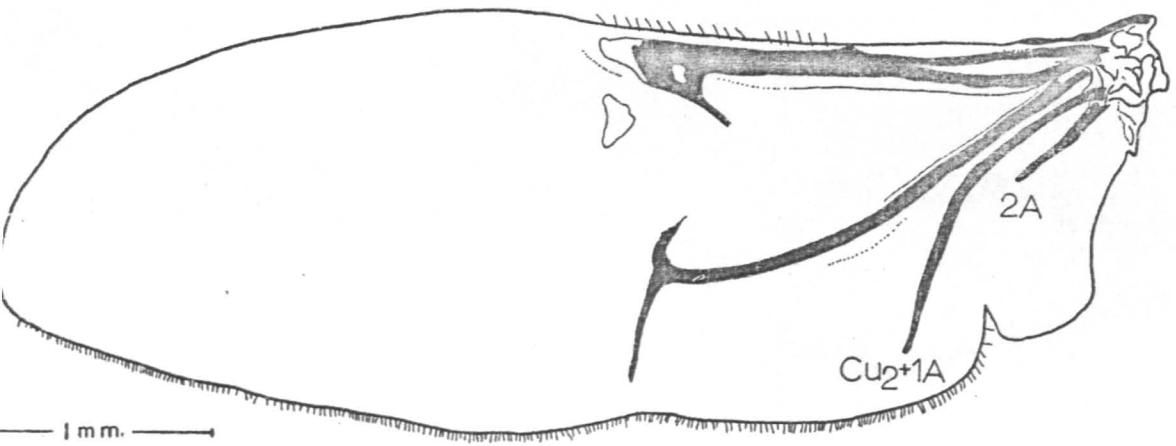


FIG. 46 Longitarsus jacobaeae Wat.

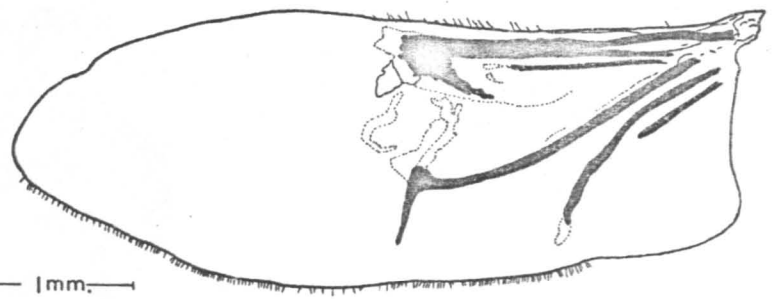


FIG. 47 Aphthona coerulea (Geof.)

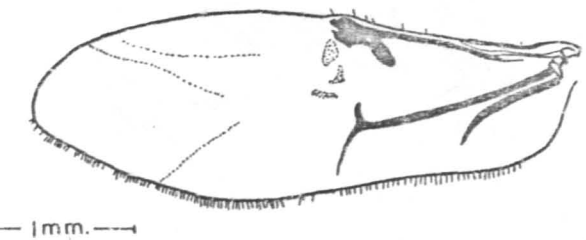


FIG. 48 Epitrix atropae Foud.

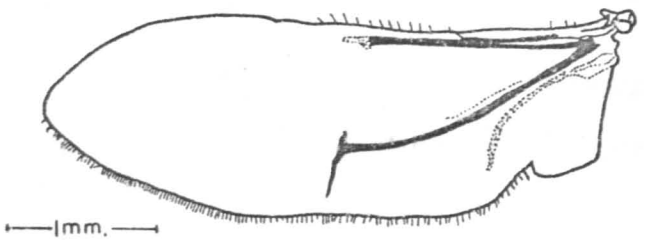


FIG. 49 Lythraria salicariae (Pk.)

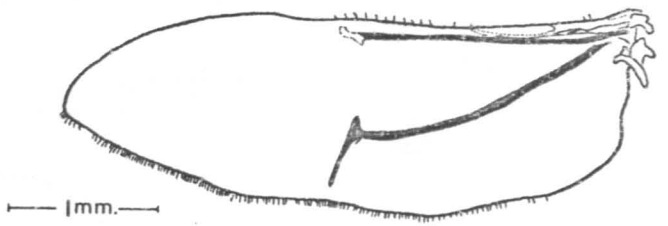


FIG. 50 Ochrosis ventralis (Ill.)

PLATE W16 BRACHYPTEROUS HALTICINAE

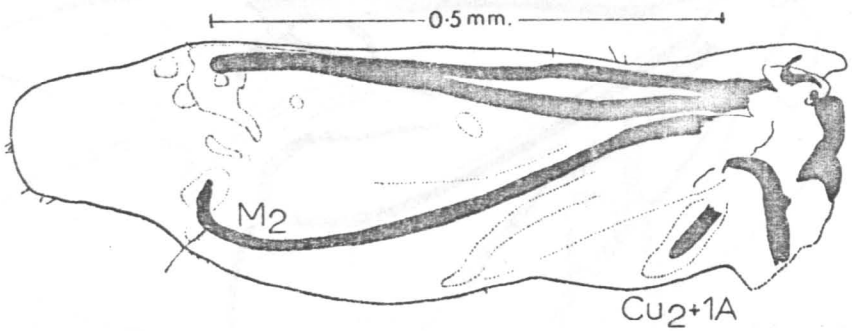


FIG. 51 Derocrepis rufipes (L.)

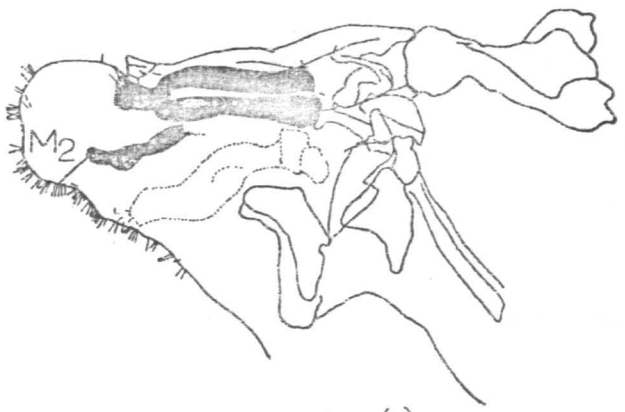


FIG. 52 Podagrica fuscipes (L.)

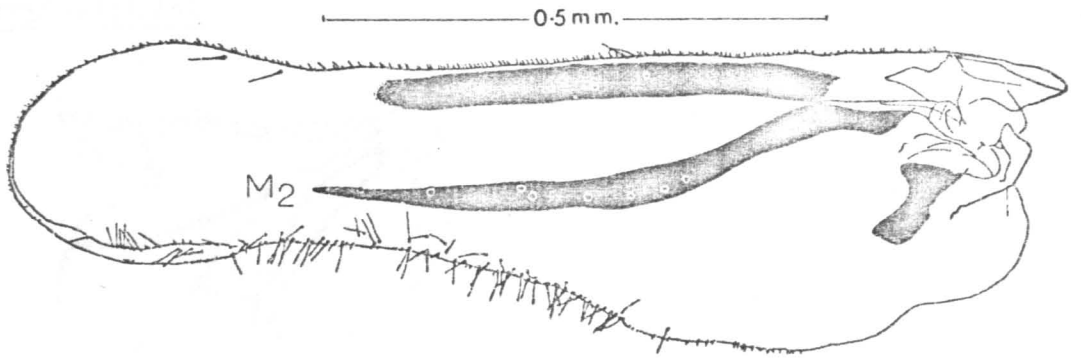


FIG. 53 Hermaeophaga mercurialis (F.)

PLATE W17 CASSIDINAE

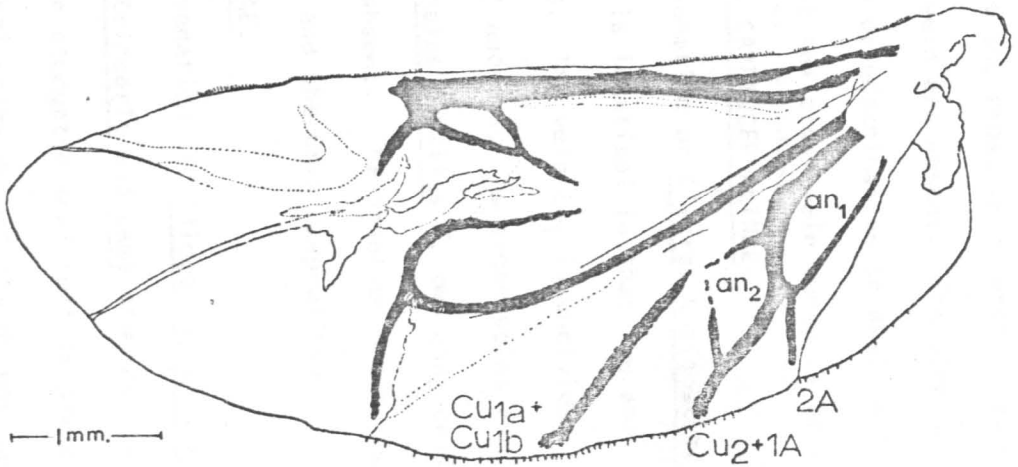


FIG. 54 Cassida rubiginosa Müll.

CHRYSOMELINAE

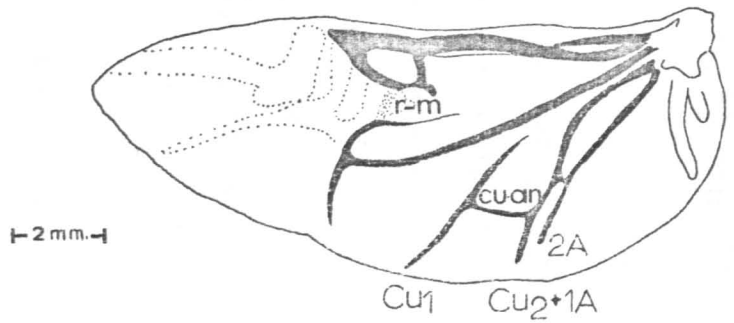


FIG. 55 Leptinotarsa decemlineata (Say.)

D. Relationships indicated by the wing venation.

DONACIINAE, ORSODACNINAE, & ZEUGOPHORINAE.

The wing venation of Orsodacne cerasi is the most primitive amongst the Chrysomelid species studied and approaches most closely to the generalised Phytophagan wing venation. An anal cell is present and the cross vein Cu-an links Cu_2 + 1A with the veins Cu_{1b} and Cu_{1a}. The wing venation of the Donaciinae is similar. An anal cell is present in Plateumaris and Donacia and although the veins Cu_2 + 1A and Cu_{1b} and Cu_{1a} are present the cross vein cu-an is absent. In Macroplea the anal cell and cross vein are absent. The wing venation in the Zeugophorinae is similar to Orsodacninae as an anal cell and the veins Cu_{1a} and Cu_{1b} are present but the cross vein cu-an is absent. Suzuki (1969) considered that Macroplea is the most specialised genus in the subfamily in having a simple Cu_{1a}. On this character Macroplea resembles the majority of the Criocerinae. The venation of the Donaciinae differentiates from a complex type to a simple one.

CLYTRINAE, CRYPTOCEPHALINAE.

The venation of Clytra, Labidostomis, Gynandrophthalma and Cryptocephalus aureolus, is identical in that two anal cells are formed from the cubito-anal veins. The vein Cu_1 is undivided and does not join the second anal cell (an_2) and also the cross veins r-m and cu-an are absent. In Cryptocephalus pusillus F. two anal cells are present but the veins Cu_{1a} and Cu_{1b} are absent. The venation shows the close relationship between the Clytrinae and the Cryptocephalinae.

CRIOCERINAE.

The venation of Lilioceris, Crioceris and Lema is very similar, possibly Crioceris and Lema showing the closest relationship. In all genera, an elongated anal cell is present. However in Crioceris and Lema the two anal veins do not divide whereas in Lilioceris they do. There are indications of the cross vein r-m in Crioceris asparagi, Lema cyanella and Lema puncticollis. Suzuki (1969) divided the 3 British genera into 3 wing venation types on the form of the post cubital vein (1st anal vein)

CHRYSOMELINAE.

The venation of the Criocerinae closely approaches that in the Chrysomelinae. The venation of Lema and Crioceris is similar to that of Gastroidea, Plagiodera, Hydrothassa and Prasocuris whereas that of

Lilioceris approaches that of Phyllodecta, Phaedon and Chrysomela. Within the Chrysomelinae, the genera Gastroidea, Plagiodera, Hydrothassa and Prasocuris are probably related as are the genera Phyllodecta, Phaedon and Chrysomela. Venation in Phytodecta and Chrysolina is comparable, the only difference is the presence of the cross vein cu-an. In Timarcha tenebricosa the wings are absent whereas Lamprosoma concolor is brachypterous

GALERUCINAE.

The wing venation in the Galerucinae approaches most closely that of Phytodecta in the Chrysomelinae. The cross vein r-m is present in the wings of Agelastica, Galeruca, Galerucella and Lochmaea which are related. In Lochmaea capreae and L. suturalis this vein is complete whereas it is incomplete in L. crataegi. In Sermyla, Phyllobrotica and Luperus r-m is absent. In Galerucella tenella and Sermyla halensis the vein Cu_1 is extended towards vein M_2.

HALTICINAE.

The wing venation of the Halticinae including Haltica, Psylliodes, Chalcoides, Chaetocnema, Phyllotreta, Sphaeroderma, Crepidodera is most similar to that of Hydrothassa aucta of the Chrysomelinae in which vein Cu_1 and the cross vein cu-an are absent. However, the cross vein r-m is absent in Hydrothassa aucta whereas it is present in the above genera of the Halticinae. In this respect the group resembles the genera Galeruca, Agelastica, Galerucella and Lochmaea of the Galerucinae.

In the genera Mantura, Hippuriphila and Dibolia the venation is similar. The anal cell is absent because the anal veins one and two are absent. The cross vein r-m is present but indistinct and the radial triangle is moderately well developed. In the genera Longitarsus and Aphthona the venation is similar as cross vein r-m and one anal vein are absent. The genera Epitrix, Lythraria and Ochrosis can be grouped on similar venation.

Brachypterous genera in the Halticinae include Derocrepis, Podagrica and Hermaeophaga and Aphthona whereas the apterous genera are Mniophila, Apteropeda and Batophila.

The Criocerinae, Chrysomelinae, Galerucinae and Halticinae were grouped on their venation and were all probably derived from the Sagrinae via the Orsodacninae (Chen, 1940; Jolivet, 1953). However, it is considered that two groups can be made on similarities of wing venation, the Criocerinae and Chrysomelinae group and the Galerucinae and Halticinae group.

CASSIDINAE.

The venation of the Cassidinae, genus Cassida most resembles that of the Clytrinae and Cryptocephalinae. The major difference is the presence of the cross vein r-m in the Cassidinae. It was considered that the Cassidinae were derived from the Clytrinae and Cryptocephalinae (Chen, 1940) whereas others thought they were derived directly from the Sagrinae (Jolivet, 1953).

E. The value of wing venation.

Wing venation is a very good character at the subfamily level and also good at the tribal level. However, as it is variable intraspecifically it is not a good character for separating species.

6. CLAW STRUCTURE. Plates AC 1 - AC 6.

A. Claw Types.

All the claws possessed by the adults are paired. Four types are shown, of which there are two major divisions. In connate claws the inner surfaces are perfectly contiguous in the basal half or more and appear convex if the claws are viewed dorsally. In free claws of which there are three types the inner surfaces are not contiguous. In the simple type the inner surfaces describe a more or less concave curve. Bifid claws possess an inner tooth, smaller but of similar shape to the outer one. Appendiculate claws possess an obtuse inner tooth with the anterior edge about 90° to the inner contiguous edge.

B. Species descriptions.

Subfamily Donaciinae

The genera, Donacia, Macroplea, Plateumaris possess claws of the free, simple type.

Subfamily Orsodacninae

The genus Orsodacne possess claws of the free, bifid type.

Subfamily Zeugophorinae

The genus Zeugophora possess claws of the free, appendiculate type.

Subfamily Criocerinae

The genus Lema has claws of the connate type whereas in Lilioceris and Crioceris they are free and simple.

Subfamily Clytrinae

In the genera Clytra, Labidostomis and Gynandrophthalma the claws are of the free simple type.

Subfamily Cryptocephalinae

The genus Cryptocephalus possesses claws of the free simple type.

Subfamily Lamprosomatinae

The genus Lamprosoma possesses claws of the free simple type.

Subfamily Chrysomelinae

Claws of the free simple type are possessed by the genera Prasocuris,

Hydrothassa, Phaedon, Gastroidea, Chrysomela, Plagiodera, Chrysolina and Timarcha whereas Phyllodecta and Phytodecta have the free, appendiculate type.

Subfamily Galerucinae

The first group including Galeruca, Galerucella and Lochmaea have free, bifid claws. The second comprising Phyllobrotica, Sermyla, Agelastica and Luperus have free, appendiculate claws.

Subfamily Halticinae

The claws are free simple or free appendiculate.

Subfamily Cassidinae

In the genus Cassida the claws are usually of the free, simple type. However, in C. viridis and C. hemisphaerica they are free, appendiculate.

C. Relationships indicated by claw structure.

Although claw structure is not a good character for indicating relationships at the subfamily level, it is sometimes useful in forming generic groups and rarely for species groups. It is of little use as a specific character because it is so constant intragenerically.

PLATE A C 1 — DONACIINAE — Figs. 1 - 21

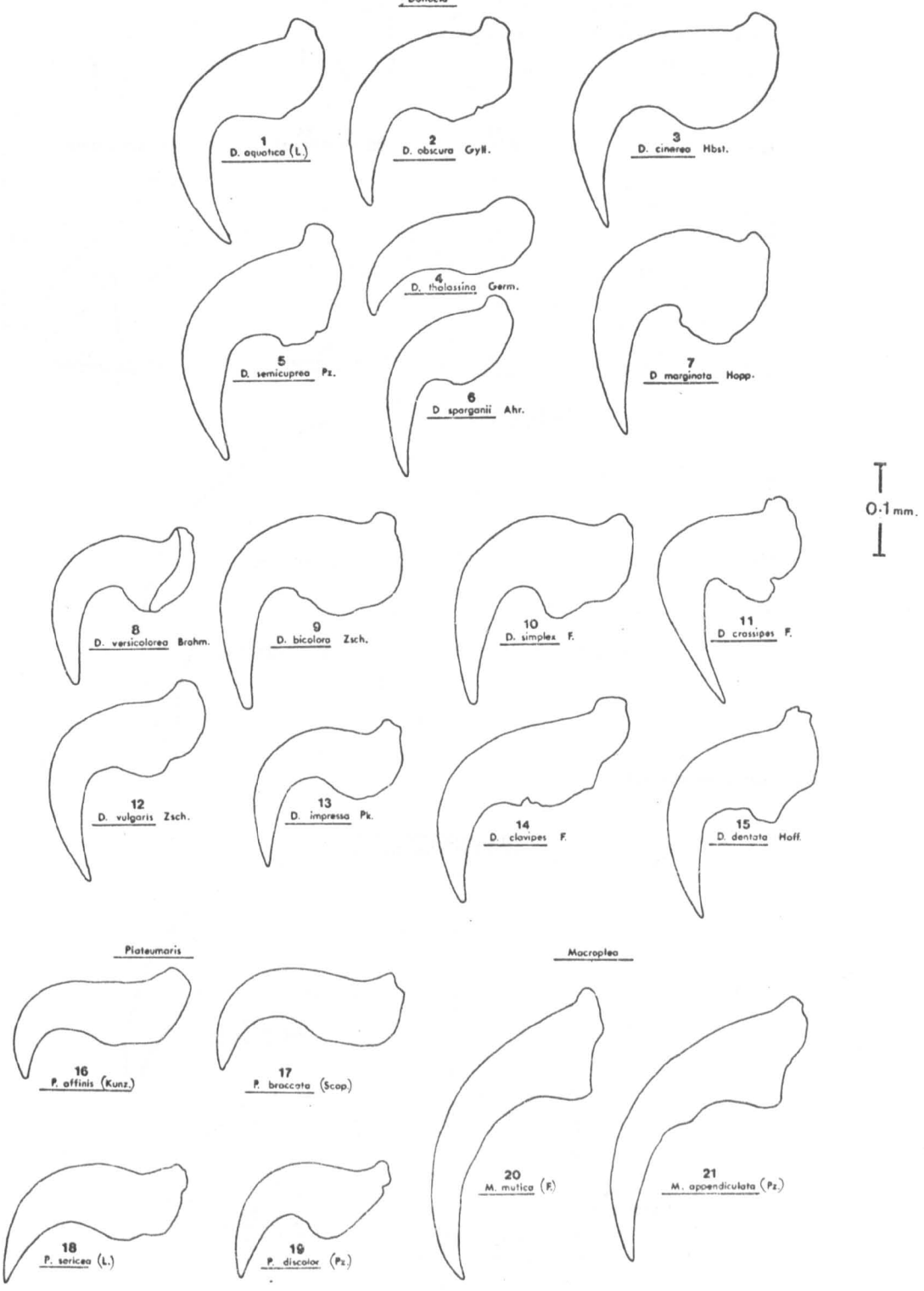


PLATE AC 2 Figs 22-48

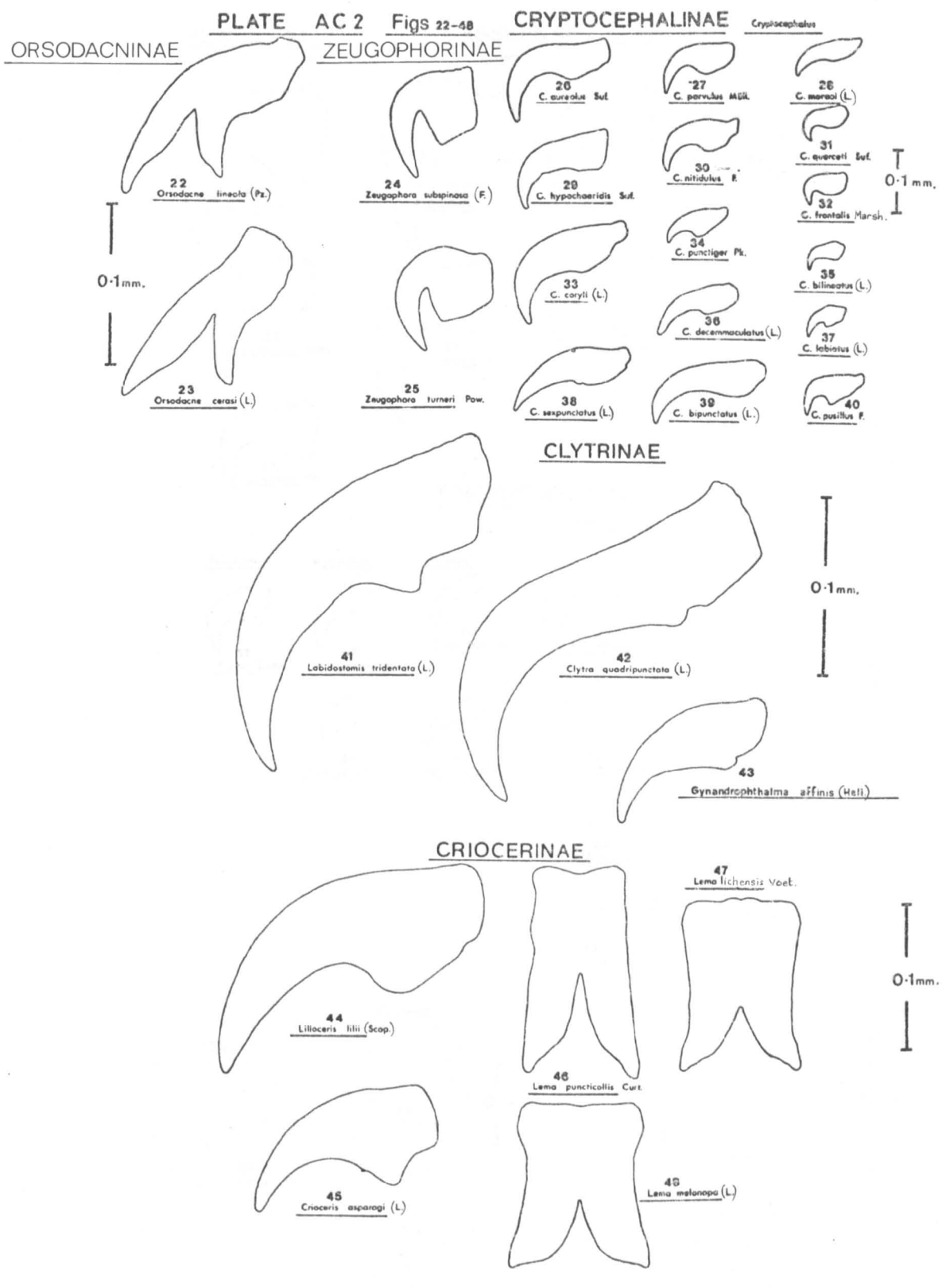
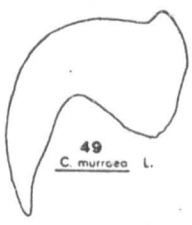


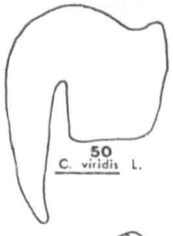
PLATE AC 3

CASSIDINAE Figs. 49 - 72

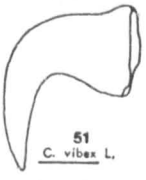
Cassida



49
C. murraea L.



50
C. viridis L.

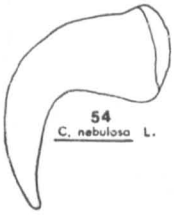


51
C. vibex L.

52
C. flaveola Thunb.

0·1 mm.

53
C. fastuosa Schal.



54
C. nebulosa L.

55
C. sanguinolenta Müll.

56
C. vittata Vill.

CHRYSOMELINAE

Phytodecta

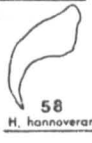
Prasocuris

Hydrothassa

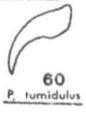
Phaedon

Phyllodecta

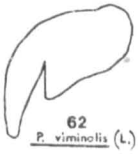
57
P. junci (Brahm.)



58
H. hannoverana (F.)



60
P. tumidulus (Germ.)



62
P. viminalis (L.)

0·1 mm.

59
H. aucta (F.)

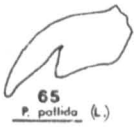
61
P. armoraciae (L.)

63
P. rufipes (De G.)

66
P. vulgatissima (L.)

64
P. alivacea (Forst.)

67
P. vitellinae (L.)



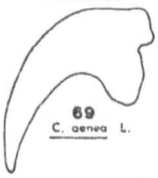
65
P. pallida (L.)

Chrysomela

Timarcha

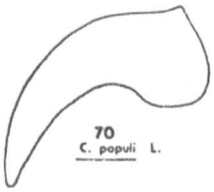
Gastroidea

68
G. viridula (De G.)

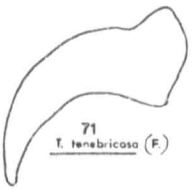


69
C. aenea L.

0·1 mm.

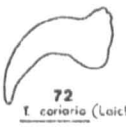


70
C. populi L.



71
T. tenebricosa (F.)

0·5 mm.



72
T. coriaria (Laich.)

PLATE AC 4 CHRYSOMELINAE Figs. 73 – 86

Chrysolina

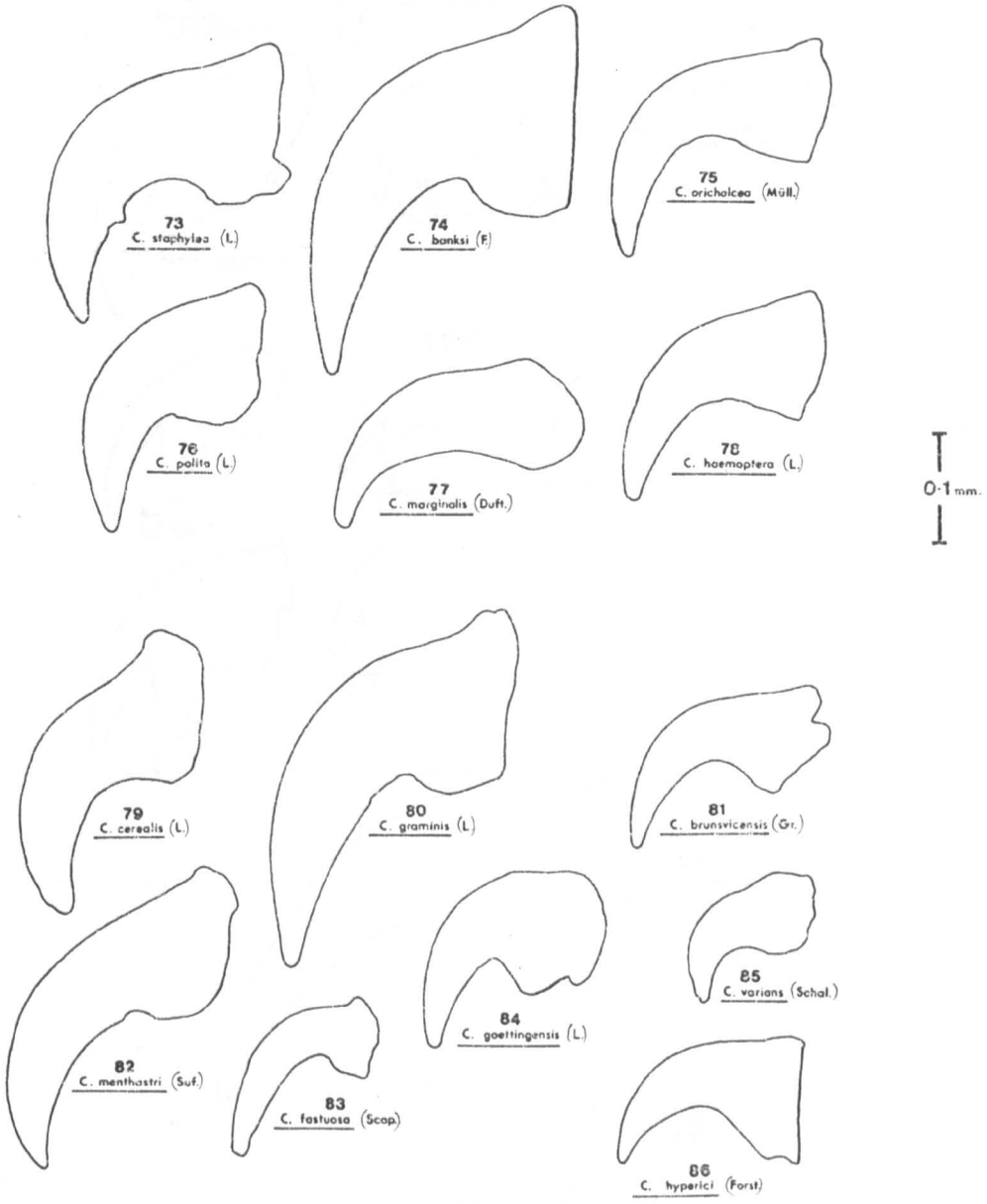


PLATE AC 5

GALERUCINAE

Figs 87 - 100

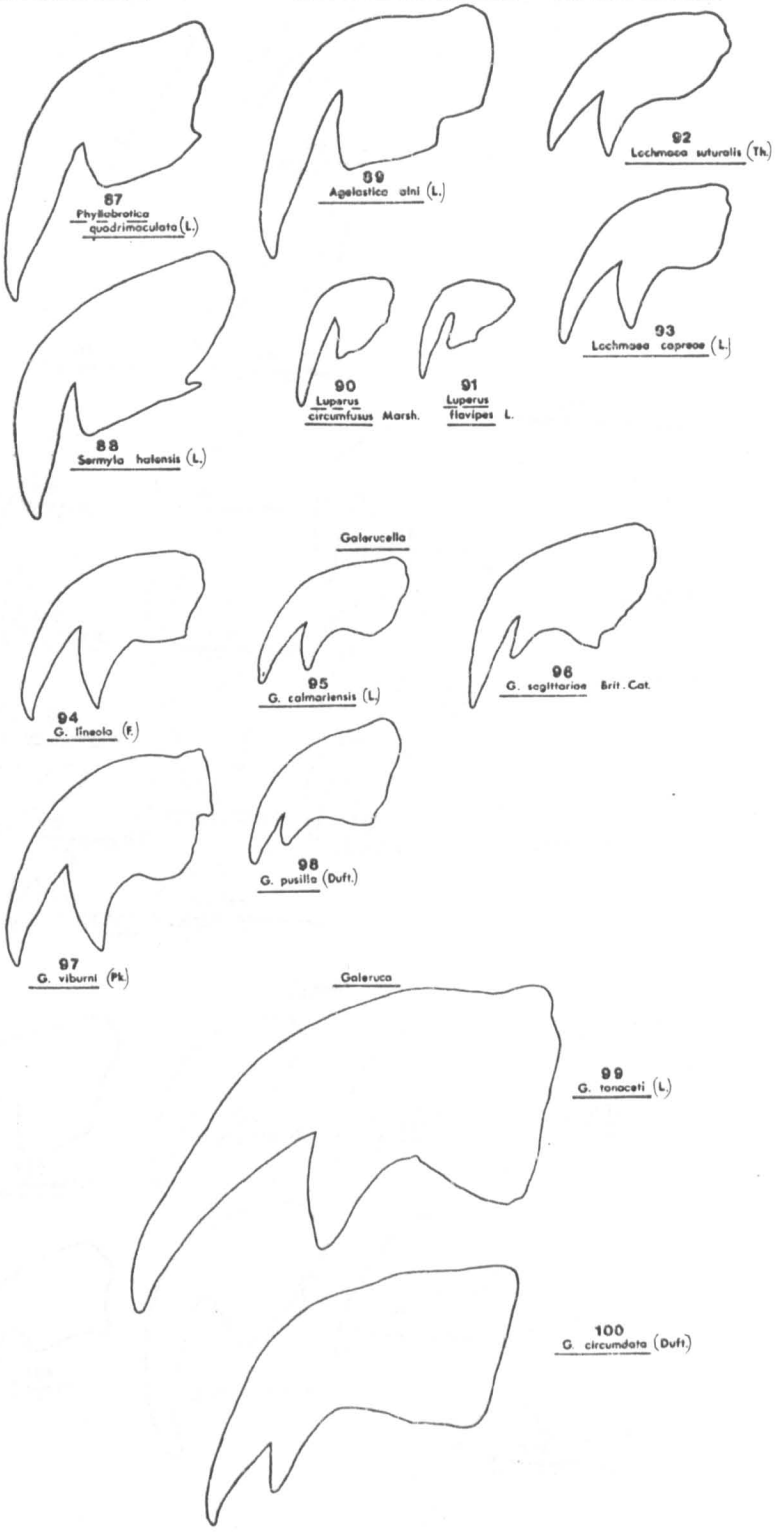
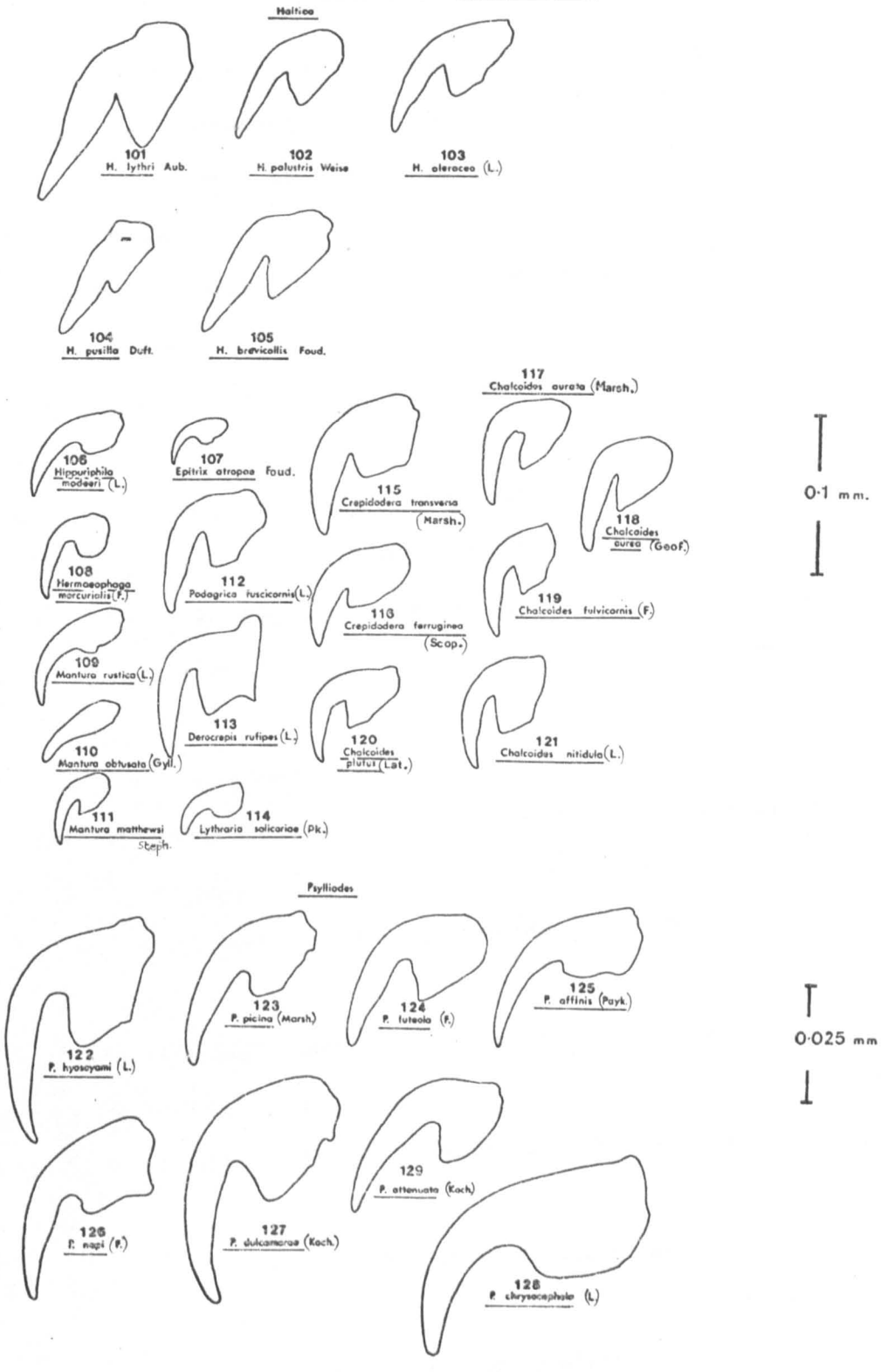


PLATE AC6 HALTICINAE Figs. 101 - 129



7. ADULT KEYS.

A. A key to the adults of the subfamilies.

The species occurring in Britain can be divided into eleven subfamilies: Donaciinae, Orsodacninae, Zeugophorinae, Criocerinae, Cryptocephalinae, Clytrinae, Lamprosomatinae, Cassidinae, Chrysomelinae, Galerucinae, Halticinae.

1a. Head covered by explanate anterior edge of the prothorax; elytra broad with explanate margins.
Head with vertex projecting forward with mouth posterio-ventral and often partly hidden by the prosternum.
Outline of body broadly elliptical (Fig. 1a) Cassidinae p101

b. Head visible from above, frons usually facing forwards and upwards
Vertex not projecting and mouth directed forward and downward.
Pronotum and elytra without broad marginal expansions, head never covered.
Outline of body not broadly elliptical ..... 2a.

2a. Hind femora much more distended than the mid-femora and containing the endoskeletal jumping organ. (Figs. 1b, 2a, b,c,d). Halticinae p97

b. Hind and mid femora both slender, the endoskeletal jumping organ absent (Fig. 1c) 3a

3a First ventral abdominal segment as long as or longer than the remainder combined (Fig. 3g) Donaciinae p91

b. First ventral segment of abdomen shorter than the remainder combined 4a

4a. Antennae closely inserted on front of head, not separated by frons or vertex Galerucinae p96

b. Antennae not closely inserted, separated by width of frons or vertex (Fig. 4c) 5a

5a. Tarsal claws simple, not toothed, prothorax never toothed laterally. (Fig. 4c) Criocerinae p.92

b. Tarsal claws generally bifid, or toothed internally, prothorax usually with lateral prominence (Fig. 1e) 6a

6a. Side of prothorax with a prominent swelling anterior to constricted base. Prosternum very short (Fig.1e) Zeugophorinae p.92

b. Side of prothorax plain, evenly rounded (Fig.1d) 7a

7a. Prosternum long. Middle 3 abdominal sternites not constricted centrally. Body rather flat and narrow. Orsodacninae p.91

b. Middle 3 abdominal sternites contricted centrally. Form of body subcylindrical 8a

8a. Antennae long and filiform, not serrate; fore coxae widely separated (Fig. 1f) Cryptocephalinae p.93

b. Antennae relatively short and serrate 9a

9a. Prothoracic pleuron without antennal groove, fore coxae very close, body surface smooth (Fig. 4b) Clytrinae p.93

b. Prothorax as broad as elytra basally, its side grooved for the reception of antenna 10a

10a. Abdomen grooved for reception of hind legs; clypeus not divided into 2 parts. Antennae short, segs 7, 9, 10, 11 thickened. Lamprosomatinae p.95

b. Abdomen not grooved for reception of hind legs; clypeus divided into 2 parts. Antennae relatively long, usually slightly thickened towards apex. Chrysomelinae p.93

B. Keys to the adults of the genera.

i. Donaciinae

1a. Tarsus broad, pubescent ventrally, segment 3 bilobed, segment 5 at most twice as long as 3. Elytral apices without a tooth (Figs. 3e,f.) 2

b. Tarsus slender without segment 3 small, unlobed, segment 5 longer than 1-4 combined.
Elytra with rows of punctures united in pairs and with black longitudinal stripes.
Elytra truncate apically, often toothed (Fig. 3a,b) Macroplea p.104

2a. Legs slender, tibiae slender to apices; fore tibiae weakly toothed ectoapically.
Body somewhat flat above, mandible short.
Abdominal segment 1 longer than the following 4 combined (Figs. 3f,g;4a;5b,d). Donacia p.104

b. Legs stout, at least fore tibiae thickened and toothed apically.
Elytra vaulted, apices truncate, mandible protruding.
Abdominal segment 1 as long as following 4 combined.
Tarsal segment 3 no longer than broad (Figs. 3c,d,e; 5a,c.).
Plateumaris p.107

ii. Orsodacninae.

Protonum heart shaped, suture only edged anteriorly. Fore-coxae throughout length narrowly separated from the prosternum. Head not constricted behind the eyes. Ligula of labium deeply bilobed. Prosternum long. Third segment of tarsi with apical margin deeply emarginate. Claws bifid. Orsodacne p.108

iii. Zeugophorinae.

Prothorax laterally with a distinct prominence, suture edged up to the scutellum. Body glabrous. Front coxae adjacent. Head distinctly constricted behind the eyes. Ligula of labium with anterior margins slightly emarginate and not bilobed. Prosternum very short. Third segment of tarsi with apical margin only slightly emarginate. Claws appendiculate. Zeugophora p.108

iv. Criocerinae (Figs. 6,7,8)

1a. Tarsal claws fused together for basal 1/4 to basal 1/2 (connate) Prothorax generally broader than long or as broad as long, sides strongly constricted at or behind the middle. Prothorax often broadest anteriorly. Head and prothorax combined, often as long as elytron. Meso and metasternum not produced nor greatly swollen. Elytron rarely much more than 3x as long as broad. Eyes deeply notched. Occiput (upper interocular area) not abbreviated, not wider than long, with sides forming an anterior angle of less than 90°. Elytra black, blue or blue green. (Figs 7a,b) Lema p.108

b. Tarsal claws free, not fused at bases (Figs. 7a,b) 2a

2a. Head as broad as long. Head without a transverse depression across top at constriction and without any deep grooves extending forwards from constriction along sides of central portion of occiput. Pronotum cordiform or parallel, not constricted, its disc regularly convex. Elytra blue and yellow. (Figs. 8a,b) Crioceris p.109

b. Head constricted posteriorly forming a neck, notched laterally, vertex with 2 distinct elevations. Pronotum constricted laterally and transversely depressed on disc. Elytra yellow or orange, legs black (Figs. 6a,b) Lilioceris p.109

v. Clytrinae. Figs. 9, 10, 11, 12, 13, 14, 15, 16.

1a. Elytra uniformly yellow brown. Head and prothorax, antennae and legs metallic green or blue. Posterior angles of prothorax nearly straight. 1st segment of hind tarsus elongate. Front legs of males longer than those of the female. Body large, length 6-8mm. (Figs. 9 & 13.) Labidostomis p.109

b. Elytra not uniformly yellow brown 2a

2a. Elytra yellow with 2 black marks on each. Head, prothorax, antennae except segments 2-3 and legs black. Segment one of hind tarsus quadrate to transverse. Front coxae throughout length narrowly separated from the prosternum. Prothorax glabrous, brilliantly polished. Antennae from 4th segment saw edged (pectinate) (Figs. 10, 14). Body large, Length 7-11mm. Clytra p.109

b. Elytra blue or green. Thorax blue, sides yellow, antennae black, base yellow, legs yellow. Anterior corners of the head shield not pointed but rounded at the tip. Front legs of the male not longer than those of the female.
Body small, length 3.5-4mm. (Figs. 12, 15) Gynandrophthalma p.109

vi. Cryptocephalinae.

Prothoracic shield evident, eyes not strongly convex. Prothorax rounded dorsally, strongly narrowed anteriorly. Prothorax base not edged with densely arranged teeth. Antennae filiform. Anterior coxae separated by a wide prosternal process.
(Figs. 11, 16) Cryptocephalus p.109

vii. Chrysomelinae.

1a. Prothorax margined basally, usually broadened anteriorly, very broad. Metasternum very short, no longer than the prosternum, placing the hind and middle coxae near to one another (Fig. 19a). Legs long, the femurs projecting beyond the sides of the body. Apterous. Elytra

rounded with fused joints. Elytral epipleurae broad, flat, applied vertically against the body. (Figs.19 a,b,c.) Timarcha p.115

b. Posterior coxae set apart from the front and middle coxae. Legs short, only in the largish species do the front and middle legs overhang the sides of the body (Fig. 20) 2a

2a. Internal border of the lateral margin of elytra fringed with short, fine setae near the apex. Maxillary palpi thickened and flattened. Elytra with small forward pointing shoulders often punctate as antennae. Body usually short and dome like, sometimes long and dome-like, rarely long and flat. Sides of prothorax not thickened. Metasternum always shorter than the 1st abdominal segment. (Figs. 21a,b,c,d) Chrysolina p.116

b. Internal border of the lateral margin of the elytra without setae even at the apex. 3a

3a. Elytra confusedly punctured. Hollow joint of front coxae open behind, the front coxae attaching directly to the mesosternum. 4a

b. Elytra with lines of punctures. Prothorax sides never humped. 6a

4a. Prothorax much narrower than the elytral bases. Elytral epipleurae flat not narrower turned in. Distinct prosternal projections between the front coxae. Pronotum with lateral callus separated by a punctured depression. 3rd tarsal segment deeply emarginate. Metosternum unmargined anteriorly (Fig. 22a-f) Chrysomela p.122

b. Elytra never twice as broad as the pronotum. Elytra never uniformly red. 5a

5a. Elytral epipleuron up to the apex broad and distinct. Body egg shaped, of one colour, blue or dark green, only the antennal bases and tarsi or in addition the tibial apices, red. Elytral epipleuron along the edge to the apex turned under (concave) with sharp side edges. Prosternum constricted behind the front coxae.

Elytral apices rounded, humerus distinct. Body moderately vaulted dorsally. (Figs.24a-c) Plagiodera p.122

b. Elytral epipleuron bowed over elytra from 1st abdominal segment disappearing anterior to the apex. Body long, completely metallic green to blue or with legs, prothorax and antennal bases, red. Prothorax bases rounded, broad longish oval. Tibial apices with a tooth like process (Figs. 23a,b) Gastroidea p.120

6a. The final segment of the maxillary palps thick and shortened (Figs.17a-e, 28a,b) Phytodecta p.119

b. The final segment of the maxillary palps, small and pointed 7a

7a. Prothorax twice as broad as long, basally with a well defined narrow constriction. Body broad, oval, vaulted. 3rd tarsal segment clearly bilobed. Prosternum between the front coxae only moderately broad. Front coxae a little further apart than the middle coxae. Depression internal to humerus. Prothorax narrower than elytral base with hind angle a right angle (Figs25a,b.) ..... Phaedon p.122

b. Prothorax almost 1.5 times as broad as long, anteriorly only moderately constricted. Body elongate and flattened. 8a

8a. Claws at the base with a sharp tooth. (appendiculate). Elytra flat (Figs. 27a,b) Phyllodecta p.120

b. Claws simple. 9a

9a. Basal margin of pronotum without a fine elevated line. Body short to elongated. Hydrothassa p.121

b. Prothorax base edged. Body long, antennae long. Body narrow and parallel-sided, slightly elevated above, pronotum narrower than elytra (Figs. 26a,b) Prasocuris p.121

viii. Lamprosomatinae

Epipleurae with grooves into which the extremity of the femora fit. Prosternum covered wholly by the mesosternum. Antennae short, bluntly toothed. Body oval, short, very convex, glabrous, brilliant bronze or black. Length 2.5 - 2.8mm. (Figs. 18a,b) Lamprosoma p.115

ix. Galerucinae

1a. Elytra rugose and without a boundary with the epipleurae. Claws toothed at the base(appendiculate). Prothorax and elytra yellow, each elytron with 2 large black patches or only one spot at the tip. Phyllobrotica p.126

b. Elytral epipleuron extends to the apex and is distinctly edged throughout. Claws at the base toothed (appendiculate) or split (bifid). Front coxae adjacent to one another 2a

2a. Prothorax edged anteriorly with prominent front angles. Body broad. 3a

b. Prothorax anteriorly without prominent front angles. Body small. 4a

3a. Prothorax bases edged. The penultimate segment of maxillary palps heavily depressed. Scutellum with sharp points. Agelastica p.126

b. Prothorax bases not edged. The penultimate segment of maxillary palps weakly depressed. Scutellum with rounded points. Coxal cavities closed behind. ..... Sermyla p.124

4a. Claws appendiculate ..... Luperus p.126

b. Claws bifid. 5a

5a. Dorsally punctured throughout, or more or less setate. Posterior tibiae coarsely punctured, shiny with clear erect setae. Claws bifid. Coxal cavities closed behind. Galeruca p.123

b. Hind tibiae finely punctate , finely but densely pubescent..... 6a

6a. Dorsally glabrous or with only single setae. Elytra broadened posteriorly. Lochmaea p.123

b. Dorsally densely and finely setate. Elytra almost parallel. Third antennal segment longer than the 4th. Galerucella p.124

x. Halticinae Plates AK 16, 17, 18

1a. Antennae 10 segmented (Fig. 31b); posterior tarsi inserted pre-apically on the posterior edge of the tibia (Fig. 31a); first tarsal segment 1/2 the tibial length, pronotum without furrow on each side at base and without transverse impression. (Fig.55)

Psylliodes Ol. p.136

b. Antennae 11 segmented; posterior tarsi inserted apically on the tibiae, first tarsal segment much less than 1/2 the tibial length (except Longitarsus). 2a

2a. Pronotum with a longitudunal furrow basally on each side and often a transverse impression between the furrows. 3a

b. Pronotum without lateral striae at the base, elytra always glabrous 11a

3a. Longitudinal furrows of pronotum united by a basal transverse impression. 4a

b. Prohotum with lateral furrows at the base, without transverse impression between these; elytra glabrous 10a

4a. Elytra with regular and equal punctured striae (except some Crepidodera) 5a

b. Elytra with punctuation fin and confused, basal transverse striae of pronotum curved behind, lost in the margin. Dorsally blue black, antennae and legs almost entirely black (Figs. 37a,b) On Mercurialis. (Fig.51) Hermaeophaga Foud. p.130

5a. Elytral interstices with small close setae directed posteriorly. (Figs.43,40,a,b.) Small, rounded, with black elytra, often yellow spotted. Epitrix Foud. p.129

b. Elytra glabrous 6a

6a. Dorsally entirely red or red brown, rarely dark brown 7a

b. Elytra at least partly of dark colour, often metallic 8a

7a. Lateral furrows of pronotum reaching about I/3 its length, basal transverse striae deep. (Fig. 48) ..... Crepidodera Chevr. p. I27

b. Lateral folds of pronotum very short, almost reaching I/6 its length, basal transverse striae weak, interrupted in the middle. (Fig.44) ..... Ochrosis Foudr. p. I27

8a Dorsally dark metallic; elytra spotted with red posteriorly; basal transeverse impression of pronotum very flat. Abdomen and metathorax laterally with whitish pubescence. (Figs. 39 a&b,46) Length 2.25 mm. On Equisetum. ..... Hippuriphila Foud. p. I28

b. Elytra unicolorous; sides of abdomen and metathorax without whitish pubescence. 9a

9a Head and pronotum red, elytra blue, bronze green or metallic black. (Figs.42 &52) ..... Derocrepis Weise p.I38

b. Head and pronotum dark or metallic .(figs.38a,b, &45).. Chalcoides Foud. p.I28
(Pronotum with a very fine lateral border, frontal hump small, narrow, triangular, separated from the forehead by a distinct furrow.Colour metallic, blue or light green,gold or coppery).

IOa Large, body length 3-4 mm. Head and pronotum red, elytra blue, green or metallic, irregularly punctured or im almost regular lines. (Figs. 4Ia,b,&49) On Malvaceae ..... Podagrica Foud. p. I30

b Small, body length I.6-2.8mm; long cylindrical; head and pronotum always dark; elytra with regularly punctured striae; antennae markedly thickened in the last 5 segments. (Fig. 50).... Mantura Steph. p.I30

IIa Pronotum with a trans verse impression anterior to the base. (Transverse impression of pronotum terminated by a slight dimple; elytra confusedly punctured, green or blue). (Fig. 47)... Haltica F.

b Pronotum without transverse impression I2a

I2a Elytra with regularly punctured striae I3a

b Elytra confusedly punctured or with lines of punctures more or less distinct, but never very regular. I7a

I3a Form oval or ovoid, never nearly hemispherical I4a

b Body nearly hemispherical; colour dark, often metallic I6a

I4a Intermediate and posterior tibiae with a wide tooth connected to a notch on the dorsal edge(Figs. 34a,b,c,&53). Chaetocnema Steph. p I3

b Intermediate and posterior tibiae without tooth nor notched after the middle on the dorsal edge. I5a

I5a Humeral callus distinct; colour brownish yellow (Fig.54)... Lythraria Red. p. I28

b Humeral callus absent; colour black with indistinct metallic reflection (Fig.56) ..... Batophila Foud. p. I28

I6a Last 5 segments of antennae progressively thickened; Length 2.2-3mm. (Figs. 29a,b,c,d,30b,58) ..... Apteropeda Chevr. p.I35

b Only last 3 segments of antennae strongly thickened; Length I-I.5mm. (Figs 32a,b;59) ..... Mniophila Steph. p. I30

I7a Terminal spur of posterior tibiae large and wide, forked at the extremity; head with the eyes which are large and flat, sunken into the prothorax so it is hardly visible; black, dark green or bronze. (Figs. 32c,63) ..... Dibolia Latr. p. I35

b Terminal spur of posterior tibiae simple, often very small, head clearly visible from above I8a

I8a Elongate, slightly convex I9a

b Very convex, hemispherical or nearly spherical..... 22a

I9a Intermediate and posterior tibiae with a wide tooth, connected to a setate notch on the dorsal edge; colour dark, often metallic, punctuation of elytra confused only on the disc.. Chaetocnema Steph.

b Tibia without tooth nor notch, punctuation of elytra only regular on the disc, confused laterally 20a

20a First tarsal segment of posterior legs as long as or longer than I/2 the tibial length, frontal humps usually indistinct. (Figs. 35a,b,6I) ..... Longitarsus Latr.

b First tarsal segment of posterior legs not exceeding I/3 tibial length. 2Ia

2Ia Frontal humps flat and indistinct; elytra completely black, metallic blue or green, or black with yellow spots often in longitudinal bands . (Fig. 60) ..... Phyllotreta Foud. p.I32

b Frontal humps distinct, bounded by a deep furrow, elytra completely yellow or with the suture black or elytra entirely blue, green or metallic black. (Fig. 62) ..... Aphthona Chev. p.I40

22a Large, entirely red brown, hemispherical (Fig. 57) Length 2,5-3.5mm. ..... Sphaeroderma Steph. p. I40

b Very small, black, weakly metallic, nearly spherical (Fig. 59) Length I-I.5mm. ..... Mniophila Steph. p.I30

C. Keys to the species.

Cassida L. 1758.

1a. Elytra with punctuation close and confused or in irregular lines, without unwrinkled sides. 2a

b. Elytra with slightly regular lines of punctures, 2nd interstice anteriorly, often also the 4th and others more or less hull-like or at least more raised than the others 8a

2a. Pronotum much narrower than the elytra, the explanate margin of these not bounded by a line of large points; dorsally, green; ventrally black with the abdomen broadly yellow margined. Length 7-9mm. On Labiatae. viridis L.

b. Pronotum not or only slightly narrower than the elytron; smaller species, more rounded and more convex. 3a

3a. Elytra green, legs yellow; punctuation of elytra irregular; explanate margin of elytra bounded by a line of strong punctures; yellowish green, shiny; abdomen entirely yellow or black, margined with yellow. Length 4.5-5.2mm. On Cucubalus baccifer L. hemisphaerica Hbst.

b. Elytra red, legs black. fastuosa Schall. Pronotum shiny with sides strongly raised, black spotted; disc of elytra with black longitudinal spots, suture black; elytra sometimes black with some red spots, or red with only some small black spots. Length 4.5-6mm.

4a. Elytra regularly punctured or if almost confused with one or several costiform intervals. 5a

b. Elytra with very regular punctured striae and 2nd interstice slightly wider than the others, elytra with a golden silvery longitudinal band; border of elytra not flattened; dorsally yellow or pale green; ventrally black with the abdomen usually lighter bordered. 11a

5a. Elytra with 2 regular lines of punctures between 2nd and 4th interstices 6a

b. Elytra with 2 lines of punctures between the interstices 2 & 4, and some smaller punctures on a rudimentary striae between the 2, or entirely confusedly punctured in this interval. 8a

6a. Ventrally entirely black, including the legs; elytra with some small black spots near the suture on the disc; pronotum without spots; sometimes elytra mostly black, or without spots or greenish. Length 8mm. On Inula dysenterica. murraea L.

b. Legs at least partly pale. 7a

7a. Marginal rim of elytra extremely narrow and regular; pronotum much narrower than the elytra, the posterior angles broadly rounded; interstices of elytral striae not broader than these, the 2nd only slightly more raised, dorsally dull, punctuation indistinct, brownish yellow or light yellow, disc of elytra sometimes blackish brown with light spots; ventrally mostly black. Length 4.5-6mm. On Stellaria. flaveola Thunb.

b. Marginal rim of elytra thickened anteriorly, very narrow posteriorly; base of elytra notched on each side, so that the humeral angles are prominent anteriorly; posterior angles of pronotum broadly rounded; ferruginous red or green, elytra with numerous punctiform spots; ventrally black, abdomen margined with yellow. Length 5-7.5mm. On Chenopodium. nebulosa L.

8a. Black ventrally, legs yellow, basal 1/2 of femora black, base of elytra with or without dark triangular spot. 9a

b. Legs entirely yellow. 10a

9a. Body almost orbicular; posterior pronotal angles pointed; green or greenish yellow; elytra unicolorous or with a small dark triangular spot around the scutellum, also usually a small dark spot near the suture. Length 6-8mm.

On Carduus, Cirsium, Centaurea. rubiginosa Müll.

b. Body short oval; posterior pronotal angles obtuse; green or yellowish green, base of pronotum sometimes with 2 small dark spots; elytra with a triangular scutellar spot, spots also on the suture, elytral disc usually with a small black point near the sides; pronotal spots sometimes more extensive. Length 6-8mm. On Cirsium. vibex L.

10a. Lateral part of mesothorax black, green, periphery of escutcheon pale blood red, rarely concolorous; femurs yellow. Length 6-7mm. On Tanacetum vulgare. sanguinosa Suffr.

b. Lateral part of mesothorax yellow or black with an oblique yellow spot; green or greenish yellow, usually with 1 or 2 reddish spots at the base. Length 5-6mm. On Achillea millefolium. sanguinelenta Müll.

11a. Posterior angles of pronotum broadly rounded; antennal apices and basal half of femora black; body short oval; elytra sometimes with a longitudinal rose red band covering all the disc or with the suture and some discal spots blackish. Length 3.5-5.5mm. On Spergula arvensis. nobilis L.

b. Posterior angles of pronotum obtuse; antennae and legs yellow; body elongate oval. Length 5-6.5mm. On Beta. vittata Vill.

Macroplea Curtis 1819

(= Haemonia Latr. 1821)

1a. 1st segment of posterior tarsi much shorter than the second and terminal spine of elytra long and slender *appendiculata* (Panz.)
On *Potamageton* and *Myriophyllum spicatum*.

b. 1st segment of posterior tarsi approximately as long as the 2nd and terminal spine of elytra shorter and broader at base, nearly triangular (Fig. 68) *mutica* (F.)
On *Zostera maritima*

Donacia F. 1775

1a. Covered by silvery grey pubescence *cinerea* Hbst.
Hind femora without tooth, apex of elytra rounded, Length 7-11mm. (Fig. 71) On *Sparganium*, *Typha* and *Phragmites*.

b. Without pubescence, nearly glabrous 2a

2a. Elytra without strong transverse wrinkles, pronotum indistinctly punctured, shagreened nearly smooth, posterior femurs with one or two teeth, purple or green. Length 9-13mm. (Figs. 70a,b.). On *Nymphaea alba* and other Nympheaceae *crassipes* F.

b. Elytra distinctly transversely wrinkled, pronotum ounctuated and generally wrinkled ∨ 3a

3a. Elytral apices rounded. Pronotal punctuation fine and scattered, posterior femora toothless, legs reddish brown, body green to coppery. Length 7-12mm. (Fig. 69) On *Phragmites communis* and Phalaris arundinacea ..... *clavipes* F.

b. Elytral apices truncate. 4a

4a. Pronotum transverse and wrinkled transversely, posterior femora toothed 5a

b. Pronotum longer than wide, strongly punctured, not wrinkled transversely 7a

5a. Pronotum with indistinct punctuation and confusedly, finely and closely wrinkled, elytra with 2 dorsal impressions, posterior femora not reaching the elytral apices. Coppery. Length 7-9mm. Figs.79,84a,b.) On *Sparganium simplex* and *Butomus umbellatus* *sparganii* Ahr.

b. Protonum distinctly punctured, wrinkled transversely, elytra without impressions, posterior femora reaching the elytral apices 6a

6a. Pronotum strongly and closely punctured. Length 7-11mm. (Figs.80,83a,b.) On *Sagittarria sagitti folia* *dentata* Hoppe

b. Pronotal disc finely and sparsely punctured. Length 5.5-10mm. Figs. 74a,b.). On *Potamogeton natans* *versicolorea* Brahm.

7a. Legs reddish yellow. Golden green, first 5 elytral interstices generally coppery. Length 5-9mm. (Fig . 72) On *Glyceria* *semicuprea* Panz.

b. Legs and antennae dark 8a

8a. Posterior femora reaching the elytral apices. Golden green, elytral terstices 2-6 or 7 red or purple. Hind femur with a tooth about 1/3 from apex (Fig. 73) On *Carex*, *Glyceria* and *Sparganium*. *aquatica* (L.)

b. Posterior femora not reaching the elytral apices 9a

9a. Epipleurae only half as wide as the interstice which borders them 10a

b. Epipleurae at least partly as wide as the nearest interstice.... 13a

10a. Posterior femora with a small often indistinct tooth; pronotum strongly and closely punctured and the anterior angles only slightly prominent 11a

b. Posterior femora with a large pointed tooth 12a

11a First elytral interstice nearest the suture very finely transversely wrinkled. Each elytron with 4 or 5 distinct impressions. Bronze or green, usually with sides of elytra and a mark at the base of elytral interstices 3-5 red or blue. Length 8-11mm. (Fig. 81) On *Sparganium* and *Carex*. *marginata* Hoppe

b. First elytral interstice with extremely fine, oblique and longitudinal wrinkles usually forming a longitudinal line in the middle. Bronze or coppery red. Length 6-10mm. Elytral impressions distinct. On Carex and Scirpus (Fig.76) impressa Payk.

12a. Elytra with 4 or 5 well marked impressions, 2 oblique near the suture and 2 elongated, often fused near the borders. Ventrally and femora bearing golden yellow pubescence. Light golden yellow or bronze, rarely coppery or bluish with a dull silky reflection. Head and pronotum sometimes blue. Length 8.5-11mm. (Fig. 82) On Sagittaria, Glyceria, Carex, and Sparganium. bicolora Zsch.

b. Elytra without 2 impressions on the disc near the suture. Dull deep bronze. Pronotum strongly and closely punctured, slightly wrinkled, anterior angles prominent externally. Base of elytra with sparse punctuation, striae 1-6 broken up at base so somewhat confusedly punctuated, interstices with punctuation very finely wrinkled, nearly shagreened. Length 8.5-12mm. On Scirpus and Carex. obscura Gyll.

13a. Posterior femora with a stronger and sharper more pointed tooth. Elytra with 2 or 3 slight impressions near the suture. Golden green, green, or brassy, rarely purple red. Striae 1-6 of elytra quite regular to base. Length 7-9mm. (Fig. 78). On Scirpus and Carex. thalassina Germ.

b. Posterior femora without tooth 14a

14a. Elytra truncated and indented flatly at the apex. Golden green, coppery red er blue green, interstices 2-5 with a deep metallic blue or red band. Length 6-9mm. (Fig.75) On Sparganium. vulgaris Zsch.

b. Elytra truncated at apex but apical margin slightly convex. Epipleurae a lot narrower than the external interval. Dull and coppery, metallic green, rarely blue. Length 7-9mm. (Fig.77) On Glyceria and Carex. simplex F.

Genus Plateumaris Thoms. 1866

1a. Elytra with 2 impressions on each near suture, one about 1/3 from base, the other 1/3 from apex. Hind femora with a strong triangular tooth in both sexes. Pronotum glabrous, lateral swelling nearer the border than the disc. 2a

b. Elytra without impressions. Hind femora in male without strong angular tooth, in female tooth present. Pronotum very finely pubescent, lateral swellings nearer the disc. 3a

2a. Antennae stouter, 3rd and 4th segments a little longer than the 2nd. Disc of pronotum with punctuation distinctly stronger in the median line and obliquely wrinkled. Metallic green, blue, violet or gold, rarely black. Length 6.5-9,0mm. (Fig.66). On Eriophorum and Carex. discolor (Panz.)

b. Antennae less stout, 3rd segment more than 1/2, 4th segment 2 times as long as 2nd segment. Disc of pronotum with punctuation equal and fine. Metallic, blue or violet, reddish blue, bronze, nearly black. (Fig.67). Length 7-10.5mm. sericea (L.)

3a. Pronotum a little contracted, somewhat rounded anteriorly, more strongly posteriorly, with a tuberosity at each side just behind the front angle. Elytral intervals strongly cross strigose, punctuation of pronotum fine, sparse in the male, quite close in the female. Black with a green or violet reflection, pronotum often greenish or bluish. Abdomen, antennae and legs, red. (Fig.65). Length 9-12mm. On Phragmites communis braccata (Scop.)

b. Pronotum square, not contracted in front where it has the greatest width, without a tuberosity, borders nearly parallel, distinctly sinuate before the posterior angles which are prominent. Elytral interstices finely reticulate. Male black with a purple or violet reflection. Female coppery. Abdomen and legs reddish yellow. (Fig. 64) Length 5-9mm. On Carex. affinis (Kunz.)

Orsodacne Latr. 1802

1a. Upper surface almost glabrous, more diffusely punctured. Length 4.5 - 8 mm. ..... cerasi (L.)

b. Upper surface finely and closely pubescent, finely and densely punctured. Length 4 - 7mm. lineola (Pz.)

Zeugophora Kunze 1818

1a. Entirely yellow. On Aspen turneri Pow.

b. Elytra and segments 5-11 of antennae black 2a

2a. Head entirely yellow. Lateral spine of pronotum obtuse. On Aspen subspinosa (F.)

b. Head between middle of eyes black. Lateral spine of pronotum sharp. On Black Poplar. flavicollis (Marsh.)

Lema F. 1798

1a. Body entirely green or blue 2a

b. Thorax, femora and tibia reddish yellow. Body rarely entirely black. Length 4 - 4.8mm. On Gramineae melanopa (L.)

2a. Pronotum constricted at about the middle, strongly and closely punctured with a median smooth line. Blue or green. Length 3.5 - 5.0mm. On Cirsium sp. puncticollis Curt.1830 (= cyanella (L.) 1758)

b. Pronotum contracted close to base, very diffusely punctured..... 3a

3a. Elytra more elongate. Basal transverse impression of pronotum very closely and finely punctured, nearly mat, its lateral punctuation spreading largely on the impression. Green, blue or very deep blue. Length 3.8 - 4.5mm. erichsoni Suffr.

b. Elytra less elongate, as puncticollis. Basal impression of pronotum smooth or only with some large punctures, brilliant. Blue, rarely green, sometimes black. On Gramineae. lichensis Voet.

Lilioceris Reitter 1912

Legs entirely black. Body completely black except the pronotum and elytra which are yellow orange; Length 6-8mm.

On Lilium sp. lilii (Scop.)

Crioceris Geoff. 1769

Elytral length three times greater than width. Blue black, often with a green reflection; pronotum red, often with a large spot on the disc dark; elytra yellow, with a wide sutural band and 3 fascies blue black. Length 5-6.5mm. asparagi (L.)

On Asparagus officinalis

Labidostomis Redtenbacher 1845

Elytra without humeral spot, scutellar lobe of pronotum moderately projecting behind than the posterior angles. Length 6-8.5mm.

On Betula. tridentata (L.)

Clytra Laicharting 1781

Pronotum black; legs black; elytra punctured, lateral guttering broad and rugose, dorsal elytral spot usually punctiform, sometimes absent; pronotum slightly convex; vertex deeply furrowed, with a red spot behind the eyes. Length 7-11mm. On Salix. quadripunctata (L.)

Gynandrophthalma Lacordaire 1848

Pronotum black or blue- black, broadly margined with red brown on the sides; elytra blue, finely and moderately densely punctured; vertex with fine erect pubescence; palpi reddish. Length 3.5-4mm.

On Corylus. affinis (Hell.)

Cryptocephalus Geoff. 1762

Scutellum clearly visible; eyes flattened reniform; base of pronotum not edged, bisinuate; anterior femora equal in size to others.

Key to groups.

1a. Dorsally metallic green or blue at least partly, or even black with a metallic blue or green reflection. 2a

b. Dorsally without metallic colour, entirely yellow or black or a combination of these 2 colours 3a

2a. Elytral punctuation irregular, presenting at the very most some trace of series ..... 1st Group

b. Elytral punctuation regularly seried ..... 2nd Group

3a. Elytra without regular punctured striae or with indistinct striae, their disc always punctured without order 4a

b. Elytra with regular punctured striae, their lateral edges usually not entirely visible together from above 7a

4a Lateral margins of elytra elevated, so that the 2 are visible from above since the humeral callus extends as far as the apex 5a

b. Lateral margins of elytra narrow, not flattened, the 2 margins not entirely visible from above 6a

5a. Elytra dark red or yellow ..... 3rd Group

b. Fundamental colour of elytra red-yellow with the spots or the longitudinal bands black ..... 4th Group

6a. Head entirely black including the genae and labrum ..... 5th Group

b. Genae and often also vertex and labrum yellow or reddish 8a

8a. Pronotum distinctly punctured or striolated ..... 6th Group

b. Pronotum with punctuation indistinct, smooth and shiny 9a

9a. Pronotum and elytra black, unicolorous, the pronotum at the very most narrowly bordered by yellow anteriorly ..... 7th Group

b. Pronotum yellow or reddish brown, at the very most blackish at the base, escutcheon often yellow ..... 8th Group

1st Group.

1a. Legs black 2a

b. Legs partly yellow 3

2a. Pygidium with a very fine hull on its lower half; last ventral segment of male with a large impression. Length 4.5-5mm. On Hieraceum ..cristula Duf.

b. Pygidium without hull on its lower half, impression on last ventral segment in male shallow. Length 6-7.5mm. On Hieraceum aureolus Suffr.

3. Anterior legs and intermediate and posterior tibiae yellow. Green or blue, elytra strongly punctured, pronotum sometimes spotted with yellow at the posterior and anterior angles. Length 3.5-5mm. On Betula nitidulus F.

2nd Group.

1a. Anterior margin of pronotum and often also the lateral edge narrowly yellow. Pronotum finely punctured, elytra narrow with very regular punctured striae. Legs at least partly yellow, posterior legs dark. Base of antennae yellow. Body blue black or black with blue reflection on the elytra. Length 2.5-3.5mm. On Betula and Salix capreae punctiger Payk.

b. Pronotum without yellow anterior margin. Base of antennae, epistomium and trochanters yellow-brown. Length 3.5-4.5mm. On Betula parvulus Müll.

3rd Group.

1a. Elytra red, usually immaculate (not spotted) coryli (L.) Sexes dissimilar, pronotum black male, red female, vertex with a small red spot against the eyes, epipleurae red usually without black spots, intermediate tibiae straight. Length 6-7mm. On Corylus (Fig. 87).

b. Elytra with black spots. (Figs. 92,93) sexpunctatus (L.)

Sexes alike, vertex without spot against the eyes, pronotum bicolorous, epipleurae at least partly black. Elytra pale red, with a slightly elongated humeral spot situated just on the callus and with large black spots (2,1), the posterior sometimes divided or dilated so as to form a fascie; elytron sometimes black with a red spot on the disc. Pronotum with the sides entirely bordered with red and a red shortened median band behind, sometimes yellow, with the base and 2 large black spots. Length 4.5-6.5mm.

4th Group.

1. Head and escutcheon entirely black; elytra red or reddish brown each with 5 usually small oblique black spots (2,2,1), sometimes larger and more or less united or partly absent, these partly black with a slight leaden reflection, pronotum glabrous, elytron with punctuation not seried (close). Length 4.5-7.0mm. primarius Har. 1872 (Fig.86)
= decemmaculatus Fourc. 1785
= imperialis F. 1798

5th Group

1a. Elytra black, with a red brown transverse spot very near the apex; antennae and legs black, the antennae yellow brown at the base. Length 4.5-6mm. On Erica tetralix (Fig.85) biguttatus Scop.

b. Elytra red or red brown, with 2 black spots or with a wide dorsal band; pronotum smooth; suture and marginal edge narrowly black, external interval with an obtuse fold and some points anteriorly, behind the humeral callus. Elytra bright red, with 2 black spots, one on the callus, the other behind the middle; these usually larger and a little transverse, this and the humeral spot sometimes absent. Length 4-6mm. (Figs.88,89,90) bipunctatus (L.)

6th Group

1a. Pronotum with punctuation simple 3a

b. Punctuation of pronotum longitudinally finely strigose 2a

2a. Final marginal edge of pronotum entirely visible from above. Black, legs reddish brown, except the posterior femora, antennae red brown at the base; vertex red brown as well as the anterior margin of the pronotum, an enlarged median line spotted behind and often also a narrow lateral border; elytra, yellow, striae strongly punctured, suture and external edge and 5 large spots (2.2.1) on each, black; pronotum sometimes red brown with 2-4 black spots, elytral spots partly absent or more or less transversely united, or elytra black with some small yellow spots or black above, with the pronotum not having the narrow anterior border and the median line yellow, pronotum and elytra sometimes entirely black. Length 3.5-4.5mm (Figs.94,95) decemmaculatus (L.)

b. Final marginal edge of pronotum not visible from above 3a

3a. Pronotum smooth or very finely punctured moraei (L.)
Without transverse impressions laterally, with the posterior angles yellow spotted; black, shiny, head of male with a yellow X; anterior margin of pronotum and 2 large marginal spots on each of elytra, the anterior subhumeral, the posterior apical, yellow; anterior legs more or less yellow; spots on elytra sometimes united into transverse fascies by the black suture or else the posterior one remains only, or the anterior. Length 3-5mm.
On Hypericum (Figs.97, 98,99)

b. Pronotum longitudinally finely strigose 4a

4a. Pronotum shiny with punctuation formed by short elongated close dashes exiguus Schn.
Black, base of antennae and legs yellow, pronotum dark, head of male yellow with the median line black, in the female black with the epistomium, the eyes and the labrum yellow brown, elytra with

strongly punctured striae. Length 2-2.5mm.

b. Pronotum almost dull, with punctuation formed by short, close elongated dashes bilineatus (L.)

Black, base of antennae and legs yellow; pronotum narrowly margined with yellow anteriorly and laterally; elytra yellow with the suture and a longitudinal band, shortened behind, on the disc, black, the yellow part between the suture and this band sometimes interrupted, sometimes elytra black with the base and the marginal edges yellow; the pronotum often with 2 yellow spots near the middle of the base. Length 2-3mm.(Fig.91)

7th Group.

1a. Pronotum and escutcheon entirely black; legs entirely yellow or with only the posterior femora dark 2a

b. Pronotum with a very narrow yellow anterior border, sometimes interrupted in the middle; escutcheon yellow or yellow spotted; epipleurae usually yellow; black, base of antennae and legs yellow, with the posterior femora black, the anterior ones slightly darkened posteriorly; elytra with strong striae, nearly reaching the apex, epipleurae and marginal edge yellow; head of male yellow, that of female with a yellow cordiform spot in the middle, vertex black. Length 2-3mm. (Fig.100) frontalis Marsh

2a. Legs entirely yellow, posterior femora slightly darkened, elytral striae fine; vertex rarely with 2 very small oblique and ferruginous spots between the eyes. Length 3mm. querceti Suffr.

b. Posterior legs black, the others yellow,the posterior edge of the femora darkened; elytra with strongly punctured striae; antennal margin of eyes sometimes reddish bordered. Length 2-2.8mm. On Betula labiatus (L.)

8th Group.

1a. Elytral striae much less marked at apex; antennae with segments 6-10 more elongate. On Betula, Salix (Figs. 101, 102) pusillus F.
Reddish brown, black ventrally, except the prosternum; elytra pale reddish brown, except the suture, a humeral spot generally elongated, a transverse spot behind the middle not reaching the sides but often touching the suture, black; posterior spot sometimes absent or else elytra black, with the marginal edge and the tip more or less yellow. Length 2.5-3.0mm.

b. Elytral striae not obliterated apically; antennae with segments 6-10 less elongate (Fig. 103) fulvus Goeze
Head brownish red with 2 yellow spots on the vertex and 2 smaller ones at the internal border of the eyes; pronotum reddish yellow, elytra yellow with the humeral callus and the suture narrowly darkened, sometimes unicolorous. Length 2-3mm.

Lamprosoma Kirby 1818. (= Oomorphus Curtis 1831)

Bronze, black, very shiny, glabrous dorsally; antennae black, with 1st segment red brown, segments 7-11 strongly dilated; pronotum finely punctured; elytra with lines of fine and regular punctures, elytral interstices with 2 lines of very fine punctures. Length 2.5-3.5mm.

concolor (Stm.)

Timarcha Dej. 1821

1a. Pronotum subcordiform, very broad anteriorly; onychium ventrally with a layer of black setae; border of pygidium indistinct; dorsally very finely punctured, dull, blue black. Length 11-18mm.
On Gallium tenebricosa (F.)

b. Pronotum weakly curved laterally, not broadened anteriorly; onychium dorsally with erect black setae ; border of pygidium distinct. Bluish black, violet coppery sometimes black. Length 8-13mm.
On Gallium goettingensis (L.)
(= coriaria (Laich.))

Chrysolina Motschulsky 1886
(= Chrysomela L. 1758)

1a. Elytra dark, with lateral border red, as are the epipleurae.... 2a

b. Elytra without red border or entirely red 4a

2a. Disc of elytra without distinctlypunctured striae 3a

b. Disc of elytra with striae distinctly punctured. Blackish green with bronze reflection, pronotum finely punctured, elytra elongate with close paired punctured striae; marginal border reaching the 2nd lateral striae; elytra sometimes brown with a bronze reflection or black with metallic reflection and yellow bordered. Length 5-7mm. marginata (L.)

3a. Marginal band of elytra red, passing anterior to the humeral callus and prominent on the base. Black dorsally, blue black ventrally; pronotum very finely punctured, elytra strongly and densely punctured. Length 7-9mm. sanguinolenta (L.)

b. Marginal band terminating on the humeral callus, not passing anteriorly; blue black, pronotum very finely punctured, elytra slightly less strongly and more densely than sanguinolenta. Length 6-8.5mm. marginalis (Duft.)

4a. Pronotum smooth, impunctate, with an entire distinct lateral rim, Elytral striae, interstices impunctate orichalcia (Müll.)
Base of pronotum polished, trapezoidal with anterior and posterior angles sharp, antennae reddish at the base; shiny bronze, somtetimes green with a bronze reflection or greenish with the elytra blue. Length 6.5-8.5. On Anthriscus sylvestris

b- Pronotum strongly punctured, at least near the lateral line.... 5a

5a. Elytra with close punctuated striae in pairs, striae strongly punctured, elytral interstices very finely punctured, rarely smooth 6a

b. Elytra with or without punctured striae, but if present they are equi-distant 7a

6a. Striae with punctures isolated *hyperici* (Först.)
Punctures little regularly disposed, surrounded by a dark circle or simply dark at the base. Pronotal disc almost smooth, green metallic or bronze, blue black or black. Length 5-7mm. On *Hypericum*

b. Striae with punctures close, not further from one another by more than their own width. Elytral striae progressively weaker towards the apex; pronotal disc with distinct fine punctuation; shiny, red coppery with a brassy reflection, or golden green; base of antennae red brown. Length 6mm. On *Hypericum* *brunsvicensis* (Grav.)

7a. Dorsally red brown without metallic colour 8a

b. Dorsally black or metallic, rarely red brown with a strong bronze reflection 9a

8a. Dorsally red brown, often with a weak metallic reflection, quite finely punctured; elytra without lines of punctures, pronotum laterally nearly straight and lateral rim distinct. Length 6-9mm. On *Ranunculus* *staphylea* (L.)

b. Bronze, pronotum almost smooth, punctured only near the lateral rim, pointed anteriorly, laterally almost straight; elytra with quite regular strong close punctuation. Length 7-11mm. *banksi* (F.)
On *Foeniculum vulgare*

9a. Elytra concolorous, dark, usually metallic green or blue, rarely black. 10a

b. Body blue, green or bronze, elytra brownish red, elongated, form oblong. Length 6.5-8.5mm. On *Mentha* *polita* (L.)

10a Pronotum straight at sides, narrowed, cone like anteriorly. Pronotum with punctuation fine and regular; elytral striae little regular, the suture deep near the apex; blue black; antennal base red brown *haemoptera* (L.)

b. Pronotum rounded laterally, usually more strongly narrowed anteriorly or nearly parallel, never narrowed into a cone with the sides straight 11a

11a Elytra without transverse lateral depression behind the base and without trace of a prominent humeral callus; disc of pronotum with fine punctuation, elytra with close irregular punctuation more distinct laterally although more finely but without smooth band. Green blue, golden red, rarely black; blue, violet or coppery red with bronze reflection. Length 5mm. On Hypericum varians (Schall.)

b. Elytra with a lateral transverse impression behind the base delimiting an indistinct humeral callus 12a

12a. Pronotum with a lateral rim at least posteriorly; tarsi and antennal bases blue or green, the latter sometimes red brown with a metallic reflection; metallic fiery red; head, 3 pronotal bands, the elytral suture, lateral margins and 3 bands on the disc violet, or sometimes pronotum with 3 green bands, the suture and the lateral margin of the elytra and a band posterior to the shoulder coppery green. Length 6-11mm. on Thymus cerealis (L.)

b. Pronotum without rim but lateral margin with large punctures, dorsally green or blue sometimes with fiery red elytral bands 13a

13a. Onychium angularly enlarged on each side at the extremity; shiny golden green; suture, elytra with lateral margin and a band on disc blue; sometimes head and thorax golden green or fiery red, elytra fiery red very shiny with the suture, sides and discal band green with a violet reflection. Length 5-7mm. On Galeopsis tetrahit fastuosa (Scop.)

b. Onychium simple, without angular enlargement at the extremity 14a

14a. Sides of pronotum evenly curved, nearly straight and parallel, often slightly narrowed near the base, with a slight lateral rim, pronotum with punctuation double, elytra wrinkled between punctures; elongated, golden green; pronotum suture and an indistinct band on the elytral disc, green, sometimes coppery and golden or golden fiery red, the suture and the discal band green. On Tanacetum vulgare graminis (L.)

b. Pronotum more strongly narrowed anteriorly, without rim; disc with punctuation fine and simple, elytra with punctuation simple, not wrinkled. Metallic green or green with a golden purple reflection or golden red or deep blue. Length 11mm.
On Mentha sp. menthastri (Suffr.)

Phytodecta Kirby 1837

1a Striae formed by small close points, interstices broad with punctuation fine and dense; anterior tibiae with a sharp tooth exteriorly before the extremity 2a

b. Striae formed by large points, the shoulders confused in the middle; interstices narrow, smooth or with a single line of separate small punctures 3a

2a. Legs red rufipes (De G.)
Anterior border of pronotum, mandibles red, black ventrally except abdominal borders; dorsally red, head, a double basilar spot on the pronotum and 3-5 spots on each,elytron black. Length 5.5-7.5mm.
On Populus

b. Legs entirely black viminalis (L.)
Vertex and mandibles black, border of the abdomen and near the apex; pronotum and elytra red, pronotum with 2 points or a fascie at the base black, sometimes entirely red or entirely black, with the elytra red; elytra often with numerous black spots which may be united, sometimes black with the base and the sides red or completely black. Length 5.5-7mm. On Populus, Salix capreae

3a. Anterior tibiae with a tooth exteriorly before the extremity olivacea (Först.)
Oval, red; head and pronotum dark red; elytral suture and body ventrally black, sometimes entirely yellow ventrally or the ventral parts, the suture and a discal band on the elytron are black, the elytra may be completely black. Length 3.5-55mm. On Sarothamnus scoparius

b. Anterior tibiae without tooth ..... pallida (L.)
Unicolorous red or with the sternum, some spots on the elytra black or with the pronotum black spotted and the elytral spots confluent, or ventrally and elytra black, or entirely black with a part of the head, the antennal base, femoral apices and tarsi red. Length 5-7mm. On Corylus, Salix, Sorbus.

Phyllodecta Kirby I837 (Key modified from) Morris (I970)

Ia Antennal segments 2 and 3 nearly equal in length, vetral surface of segments 4-6 with tufts of erect setae; elytral humeral prominences strong; metallic blue, blackish or greenish. On Salix. ....vulgatissima (L.)

b Antennal segment 2 distinctly shorter than 3, ventral surface of segments 4-6 without tufts of erect setae; elytral humeral prominences weaker. 2a

2a Frons with a wide, deep longitudinal impression up to the middle of the vertex; metallic blue. On Populus .....laticollis Suffr. (=cavifrons Thoms.)

b Frons only with an impression between the base of the antennae, level between the eyes; shining bronze or black bronze. 3a

3a More elongate, less parallel- sided and more oval with the shoulders less marked; pronotum strongly arched; shining bronze- bronze black. Montane species. .....polaris Sohn.

b Less elongate, more parallel-sided and square, with the shoulders more marked; pronotum less strongly arched; always shining bronze. Lowland species. On Salix and Populus. .....vitellinae (L.)

Gastrophysa Chevr. I837 (= Gastroidea Hope I840)

Ia Unicolorous golden green or metallic green or blue; last 6 antennal segments black. Length 4-6mm. On Rumex, ...viridula (DeG.)

b Black, head and elytra blue or violet, rarely green, base of antennae, apex of abdomen and pronotum red. Length 4-5mm. On Polygonum aviculare. .....polygoni (L.)

Hydrothassa Thomson 1866

1a. Body elongate, pronotum much narrower than the base of the elytra, bordered with yellow laterally; elytra with humeral callus distinct, prolonged in the female onto the base of the interstice, forming a short hull; pronotum sparsely punctured. 2a

b. Body shorter, pronotum not or slightly narrower than the elytral bases, without yellow lateral border; elytra without humeral callus and without hull on the 7th interstice; 9th striae formed by some small isolated punctures; elytra with a red lateral border spreading up to the 8th striae, or without border; pronotum densely punctured. Length 3-4mm. aucta (F.)

2a. Elytra almost parallel, elongate, with fine striae, without yellow discal band, but bordered laterally with yellow; 5th interstice simple and flat in the 2 sexes. Length 3.5-4.5mm. marginella (L.)

b. Elytra oval, weakly rounded laterally, with lines of strong punctures; elytra laterally bordered with yellow, with an entire longitudinal reddish brown band on the 3rd interstice curved anteriorly towards the 5th; dorsal band sometimes almost interrupted, represented only by yellow spots or absent . Length 4-5mm. On Caltha palustris. hannoverana (F.)

Prasocuris Latreille 1802

1a. Pronotum and elytra bordered with red brown laterally; body dark metallic green, shiny, temples short, parallel; 7th antennal segment slightly angularly enlarged at the apex exteriorly; elytra with strongly punctured striae, with a yellow longitudinal band on the 3rd and 4th interstices, this is sometimes interrupted or absent . Length 5-6mm. On Oenanthe aquaticum phellandrii (L.)

b. Unicolorous metallic green or blue; temples very short, narrow posteriorly, 7th antennal segment simple, elytra with fine striae. Length 4-5mm. On Veronica beccabunga junci (Brahm.)

Phaedon Latreille 1829

1a. Anterior edge of pronotum enlarged centrally, angular behind the eyes,disc almost impunctate. Length 4mm. tumidulus (Germ.)
On Umbelliferae, Heracleum sphondylium

b. Anterior edge of pronotum very narrow throughout, disc distinctly punctured 2a

2a. Antennal segments 1 and 2 with red brown spot, even ventrally... 3a

b. Antennal segments 1 and 2 red brown in part, at least ventrally; elytra without humeral callus, with strongly punctured striae, abdomen smooth, anal sternite very narrowly bordered with red brown at the extremity; blue or greenish rarely black. Length 3-4mm. On Cruciferae. cochleariae (F.)

3a. Elytra with distinct humeral callus bounded on the inside by an impression; form ovoid, steely blue or blackish, and sternite bordered with red brown. Length 3-4mm. On Nasturtium. armoriaciae (L.)

b. Elytra without humeral callus; form rounded, especially posteriorly, bluish green or golden. Length 3-4mm. concinnus Steph.

Plagiodera Redt. 1845

Oval, blue or green dorsally, black or greenish black ventrally, sometimes coppery; base of antennae red; punctuation very fine on head and thorax, strong and close on the elytra, a line of punctures near the margin. Length 2.5-4.5mm. On Salix versicolora (Laich.)

Chrysomela L. 1758
Melasoma Stephens 1834
(= Lina Redt. 1849)

1a. Pronotum without lateral rim; metasternum with a sharp border anteriorly; metallic green or blue, sometimes coppery golden red; antennal segments 2-4 at least partly and lateral borders of last 2 abdominal sternites reddish; punctuation fine and close; elytra enlarged posteriorly, humeral callus smooth and prominent,bounded exteriorly by an impression. Length 6.5-8.5mm. On Alnus. aenea L.

b. Pronotum with a very distinct lateral rim, punctuation stronger and closer; metasternum not bordered anteriorly, elytra red. 2a

2a. Sides of elytra with a single line of points; apical angle black. Length 10-12mm. On Salix and Populus populi L.

b. Sides of elytra with 2 lines of points; apical angle concolorous. Length 6-9mm. On Populus. tremulae F.

Galeruca Müller 1764

1a. Lateral gutter of elytra terminating on the shoulder 2a

b. Lateral gutter of elytra passing round the shoulder and terminating towards the middle of the base. Pronotum densely and strongly punctuated, anterior angles not prominent. Elytra with broad gutter, densely and strongly punctuated, rarely with traces of sides, the interstices finely wrinkled, slightly raised on the sloped part and forming wrinkles on the disc. Body black. Length 6-12mm. tanaceti (L.)

2a. Black, borders of pronotum lighter, elytra testaceous or brown with the sides shiny black, interrupted, lateral borders of pronotum strongly convergent anteriorly and without gutter, anterior angles rounded obtuse. Length 6-8.5mm. circumdata Duft. (= interrupta Ill.)

Lochmaea Weise 1883

1a. Pronotum with lateral borders rounded, not angular, epipleurae pubescent, female dorsally and legs red; male, head, prothorax and elytra spotted with black, legs almost completely black. Length 4-5mm. On Crataegus crataegi (Först.)

b. Pronotum with lateral borders angular near the middle, head black, epipleurae glabrous. 2a

2a. Forehead dull, densely and rugosely punctured, surantennal callus depressed and indistinct posteriorly, inter-antennal furrow reaching the vertex. Black with the first 4 antennal segments, pronotum, elytra, and tibiae testaceous yellow. Pronotum sometimes brown spotted, escutcheon brown or black. Length 4-6mm. On Salix atrocinerea. capreae (L.)

b. Forehead shiny, strongly and sparsely punctured, surantennal callus distinctly limited posteriorly, interantennal furrow not reaching the vertex, a yellow spot quite broad ventral to each eye and internal border of the suture black. Length 5-6mm. On Calluna and Erica.

suturalis (Thoms.)

Sermylassa Reitter 1912
(= Sermyla Chapuis 1875)

Light yellow brown, antennae and tarsi blackish, a spot on the forehead and elytra metallic green or blue, rarely coppery, antennae elongate, punctuation of elytra fine and close. Length 5-7mm. On Gallium mollugo

halensis (L.)

Galerucella Crotch. 1873

1a. Head almost as broad as the pronotum, pronotum impunctate except laterally; dull and shagreened, covered by dense silky pubescence, dark yellow brown, antennae black, basally yellow, spot on vertex, three indistinct longitudinal lines on pronotum and humeral callus black. Length 4.5-6.5mm. On Viburnum lantana and V. opulus. viburni (Payk.)

b. Head distinctly narrower than pronotum, pronotum distinctly punctured, usually shiny; pubescence not silky. 2a

2a. Middle of pronotum glabrous and shiny, with strong sparse punctuation 3a

b. Middle of pronotum almost dull, sparsely punctured, very finely pubescent, anterior margin glabrous and shiny, rarely the sides. 5a

3a. Apex of each elytron rounded; surface convex; elytra with 1 or 2 raised lines more or less distinct but not depressed; antennal segments 5-10 more elongate, each 2x longer than broad. Length 4-5mm.

grisescens (Joan.)

b. Apical angle of elytra prolonged posteriorly in the form of a beak, antennal segments proportionately shorter

4a. Pronotum reddish testaceous, usually spotted with black- elytra black

or brown with the margin testaceous, surface depressed with 2 raised longitudinal lines often lighter under fawn brown. Length 6-8mm. nymphaeae (L.)

b. Smaller, body length 4-5mm. Apical angle of elytra straight or prolonged into a short obtuse point; pronotum with 3 black spots; elytra dark or testaceous with the margin paler. On Polygonum sagittariae (Brit.Cat.) (Gyll.)

5a. Elytral epipleurae subhorizontal reaching the apex,; antennae unicolorous or black with the first segments testaceous 6a

b. Epipleurae stopping before the elytral apices which are thinner and pointed near the apex; antennal segments more or less ringed with reddish basally; lateral borders not sinuate after the middle, dorsally testaceous or brownish, a spot on the vertex, one on the middle of pronotum, escutcheon and humeral callus of elytra, black. Length 5-6mm. On Alnus, Corylus lineola (F.)

6a. Antennae black with basal segments testaceous or reddish, only anterior borders of pronotum glabrous; escutcheon notched apically; elytron level dorsally 7a

b. Antennae reddish, slightly darkened near the apex; pronotum glabrous anteriorly and laterally; escutcheon rounded apically, elytra usually convex, not depressed dorsally. Length 3-4mm. On Filipendula ulmaria, Potentilla, Geum. tenella (L.)

7a. Elytra with one broad black band extending from the humeral callus posteriorly for 1/4 of the elytral length, strongly punctured; Pronotum black spotted centrally; abdomen black with the final segment only testaceous; male aedeagus elongate, straight or slightly flexuous, apex rounded obtuse; female, apex of abdomen furrowed with an almost triangular impression, also quite distinct in the male. Length 4-5mm. On Lythrum salicariae calmariensis (L.)

b. Elytra entirely testaceous, sometimes slightly darkened centrally, usually a black point on the humeral callus, punctuation quite strong; abdomen black with the last 2 segments testaceous; male aedeagus strongly

curved, apex elongate cone shaped; female, apex of abdomen very slightly sinuate. Length 3.5-4.5mm. pusilla (Duft.)

Agelastica Chevrolet 1837

Blue black violet, rarely purple or bronze, densely and finely punctuated, glabrous, pronotum narrower than the elytra, very short; elytra broadened posteriorly with sutural angle obtuse. Length 6-7mm. On Alnus alni (L.)

Phyllobrotica Chevrolet 1837

Brilliant yellow, head posteriorly, a round spot sometimes absent at elytral base and a transverse anti-apical spot, black, elytral punctuation very fine; antennae elongate. Length 5-7mm. On Scutellaria galericulata' quadrimaculata (L.)

Luperus Müller 1764

1a. 2nd antennal segment much shorter than the 3rd, elytra glabrous sometimes withsome black setae near the apex. 2a

b. 2nd and 3rd antennal segments equal in length; pronotum not margined anteriorly, elytra with sparse setae in the posterior half. Black; pronotum and elytra ochre yellow or brilliant pale yellow; pronotum basally with a broad black band expanding laterally and forming a double point centrally; elytra bordered broadly with black; legs black, tibiae sometimes testaceous. Length 3-4mm. On Genista circumfusus Marsh.

2a. Pronotum black ..... longicornis F.

Black, head broader than the pronotum, elytral punctuation very fine; legs yellow with the base of the femurs black; male, anterior tibiae and tarsi generally smoky; female, broader than the male, tibiae and tarsi clear. Length 3.5-5mm. On Salix, Betula.

b. Pronotum red or yellow *flavipes* L.

Antennae mostly testaceous yellow, intermediate and posterior tibiae usually darkened apically, base of femora black; elytra with a mixture of large and fine punctures. Length 3.8-5mm.

On *Salix*, *Betula*, *Quercus*.

Halticinae

Crepidodera Chevrolet 1837

1a. Punctures of elytral striae irregular, often doubled 2a

b. Punctures of elytral striae strong, usually regularly arranged, rarely the internal striae sinuate or doubled; pronotum with lateral border narrow, the sides rounded or very weakly angular near the setigerous pore; body stout, pronotum broad, not sinuate laterally anterior to the posterior angles, transverse impression flat and shallow, elytral striae usually regular, humeral callus very weak. Length 3-4mm. On Gramineae *ferruginea* (Scop.)

2a. TRansverse pronotal impression wide, flat and shallow, pronotal punctuation quite strong; elytral striae strong; sides of pronotum obtusely angular behind the anterior setigerous pore; coloration sometimes dark, head pitchy brown, pronotum black, elytra dark and brown with a large darker scutellar spot. Length 4-5mm.

On Compositae *Carduus* *transversa* (Marsh.)

b. Transverse pronotal impression narrow, deep, disc of pronotum smooth or very finely punctured, sides sharply angular behind the anterior setigerous pore; elytral striae quite fine. Length 4-4.5mm.

On *Statice limonium* *impressa* (F.)

Ochrosis Foudras 1859

Ovoid, moderately convex, brownish yellow, pronotum and elytra sometimes finely darkly bordered, rarely fore-body dorsally or completely darkened; antennae and legs brownish yellow. Length 1.9-2.4mm. *ventralis* (Ill.)

Lythraria Bodel 1889 - 1901

Pronotal impression absent . Smaller and more convex than O. ventralis, brownish yellow, fore body rarely darkened, pronotum distinctly punctured. Length 1.8-2.3mm. On Lythrum salicariae salicariae (Payk.)

Batophila Foudr. 1859

1a. Dorsally deep black, rarely with a slight metallic reflection; legs red brown, body ovoid, pronotum broad, weakly narrowed anteriorly and posteriorly, weakly rounded laterally. Length 1.5-2mm. On Rubiaceae rubi (Payk.)

b. Dark bronze-green dorsally, body elongate, legs red-brown, pronotum more narrowed posteriorly than anteriorly, quite strongly rounded laterally. Length 1-1.8mm. On Rubiaceae aerata (Marsh.)

Hippuriphila Foudras 1859

Broadly oval and convex, narrowed posteriorly, black with a brown reflection or slightly greenish bronze with the elytral apices brown yellow; legs red-brown except the posterior femora and basal half of the antennae. Length 2 - 2·5mm. On Equisetum arvense modeeri (L.)

Chalcoides Foudras 1859

1a. Unicolorous dorsally 2a

b. Bicolorous, pronotum golden green or coppery red, elytron dark violet, blue, green or metallic brown. 4a

2a. Antennae red brown, sometimes progressively darker near the apex 3a

b. Antennae with first 4 segments red brown, others black. Narrow, subparallel, slightly convex, posterior femora black, unicolorous coppery green pronotum sometimes more golden or coppery or blue or bluish green. Length 2.5-3.2mm. On Salix. plutus (Latr.)

3a. Small, narrow species, pronotal punctuation strong and deep, the sides sinuously narrowed so that the posterior angles are prominent, legs red brown, posterior femora more or less darkened posteriorly near

the apex; dorsally light brilliant green, bordered with blue, or golden green or coppery brown, sometimes pronotum blue or bluish green or with the elytra blue. Length 2-2.5mm. On Salix and Populus. fulvicornis (F.)

b. A larger and broader species; punctuation of pronotum usually strong but shallow and sparse, posterior angles more obtuse; antennae red brown, apical segments slightly partly darkened, posterior femora more or less dark; golden green to coppery red, sometimes green or blue. Length 2.5-3.5mm. On Populus. aurea (Geof.)

4a. Elytral striae entirely regular, interstices without punctures, dorsally very shiny, pronotal punctuation strong, very unequal; apical 4-5 antennal segments darkened; elytra not sinuate near the apex, often dark green or metallic brown. Length 2.5-3.3mm. On Salix and Populus. aurata (Marsh.)

b. Elytral striae slightly confused near the suture, interstices with incomplete lines of punctures often equal in size to these of the striae, dorsally moderately shiny; pronotal punctuation equally close throughout; elytra usually blue or bluish green, slightly sinuate apically. Length 3-4mm. nitidula (L.)

Epitrix Foud. 1859

1a. Elytra completely black, striae near the suture 1/2 the elytral length. pubescens (Koch.)
Transverse impression of pronotum distinct. Length 1.2-1.8mm. On Solanum dulcomara, S. nigrum, Hyoscyamus niger

b. Elytra with apex yellow also usually yellow at the shoulders; striae obliterated in the posterior quarter; basal impression of pronotum indistinct. Length 1.2-1.5mm. On Atropa belladona and Hyoscyamus niger. atropae Foud.

Mniophila Stephens 1831

Body convex, rounded; pronotum without lateral impressions, 3 apical antennal segments strongly thickened, elytra with partial striae, punctured irregularly; black, slightly metallic; antennae and legs red brown, pronotum slightly shaqreened or with punctuation obliterated. Length 1-1.5mm. muscorum (Koch.)

Hermaeophaga Foudras 1859

Short, oval, broad, Crepidodera like; elytra strongly convex, without humeral callus; dark blue, antennae and legs pitchy black, with the tarsi, antennal base ferruginous brown. Length 2.3-4mm. On Mercurialis perennis mercurialis (F.)

Podagrica Foudras 1836

1a. Legs black; pronotal punctuation fine, sometimes absent , elytral punctuation strong, in quite regular striae; elytra blue or bluish green, sometimes bronze. Length 3.5-4mm. On Malvaceae fuscipes (F.)

b. Legs red brown, pronotal punctuation fine, sometimes absent , elytral punctuation more or less fine, quite close, irregular; elytra blue or bluish green, rarely slightly metallic. Length 3-5mm. On Malvaceae fuscicornis (L.)

Mantura Steph. 1831

1a. External onterstice of elytra without line of supplementary punctures; pronotum not projecting over the head; elytra more oval 2a

b. External interstice of elytra with a short irregular line of punctures anteriorly, pronotum strongly narrowed anteriorly and partly covering the head; blue, metallic bronze green, or coppery; sometimes bicolorous, pronotum blue or blackish with elytra green, bronze or coppery or pronotum green or metallic with the elytra blue. Length 1.8-2.4mm. On Helianthemum matthewsi Steph.

2a. Elytra with apex yellow 3a

b. Elytra unicolorous obtusata (Gyll.)

Black with a dark greenish or bluish reflection, elongate and pointed; Length 1.8-2.6mm. On Rumex acetosa

3a. Dark brown, with metallic reflection more or less distinct, sometimes red brown, slightly metallic. Length 1.8-2.5mm. On Rumex acetosella. chrysanthemi (Koch.)

b. Head and thorax metallic green or bluish; elytra dark blue, rarely greenish, apical half red brown, elytra sometimes completely red brown except the suture. Length 2-2.8mm. On Rumex obtusifolius. rustica (L.)

Chaetocnema Stephens 1831

1a. Vertex without hull between the antennae and eyes; elytral striae usually confused or sinuous internally, rarely regular; pronotum without basal striae 3a

b. Vertex with a hull between the antennae, elytra with regular punctured striae; body ovoid, slightly convex; 2a

2a. Hull between eyes narrow, with sharp edge; elytra metallic (Fig. 53) concinna (Marsh.)

Vertex with 3-6 strong punctures near each eye; pronotum not narrowed behind, greenish bronze brown, blackish, anterior femora black. Length 1.5-2.3mm. On Polygonaceae

b. Hull between eyes broad and flat, elytra testaceous red brown, bordered with black laterally and at the suture, head and thorax bronze or coppery (Fig. 125) conducta Mots.

Humeral callus prominent, black as the external border. Length 1.7mm.

3a. Dorsally black with a greenish metallic reflection or bronze brown 4a

b. Dorsally dark blue, rarely greenish (Fig. 120) subcoerulea Kuts.

Elytra only slightly broader than pronotum, elytral humeral callus absent or indistinct, striae quite regular; tibiae darker. Length 1.8-2.2mm.

4a. Bronze brown, often with a greenish reflection, never blue or blackish with a leaden reflection 5a

b. Black with a leaden greenish reflection, sometimes bluish, never brownish bronze; broad with elytra shortly ovoid, humeral callus distinct, smooth; striae strong, regular externally; middle and posterior femora blackish; tibiae and tarsi red brown. Length 2-2.5mm. On Juncus. (Fig. 126) confusa Boh.

5a. Head and thorax finely punctured 6a

b. Head and thorax strongly punctured 7a

6a. Elongate oval, elytral punctures quite small and close internally, confused; humeral callus distinct; antennal base dark ferruginous red, 1st segment mostly blackish. Length 2-2.5mm. aridula (Gyll.)

b. Smaller, short oval; tibiae, tarsi and first antennal segment red brown, sometimes dark; humeral callus small. Length 1.5-2mm. On Juncus and Carex (Fig. 124) arida Foud.

7a. Dorsally blue; femora black; tibiae, tarsi and first antennal segments ferruginous red, more or less darkened generally; elytral striae partly irregular, sometimes blue black or violet. Length 1.8-2.3mm. (Fig. 122) sahlbergi Gyll.

b. Dorsally brown bronze or coppery, sometimes slightly metallic greenish. Elytra moderately broad at the shoulders, not very shiny, striae quite regular except on the median dorsal part; anterior and middle femora reddish brown; tibiae, tarsi and basal half of antennae red brown, rarely darkened; coppery bronze or metallic green. Length 1.6-2.3mm. (Fig. 123) hortensis (Geoff.) = aridella Payk.

Phyllotreta Steph. 1836

1a. Elytra black, chequered with yellow or with longitudinal bands sometimes interrupted 2a

b. Elytra black, blue, green or bronze without yellow spots or bands. 9a

2a. Yellow band deeply notched externally in the middle, enlarged behind the humeral callus 3a

b. Yellow band not or slightly marginate externally, dilation posterior to humeral callus forming a small angle, head and pronotum usually with metallic reflection 7a

3a. Anterior legs entirely yellow, basal half of antennae darkened, 5th segment very elongate and slightly thickened in males; yellow band enlarged and posterior to the callus, sometimes black border very reduced, nearly parallel. Length 2-2.5mm. (Fig. 107) ochripes Curt.

b. Legs with black setae, with articulations clean; yellow band less dilated posterior to the shoulders 4a

4a. Humeral callus indistinct; short, rounded, oval, very convex; each elytron with 2 yellow triangular, irregularly rounded spots, rarely united; male 5th antennal segment very elongate and enlarged near the apex. Length 1.5-1.8mm. On Nasturtium (Fig. 110) exclamationis (Thunb.)

b. Humeral callus distinct, body larger 5a

5a. Black sutural band very broad, very slightly narrowed anteriorly and posteriorly, almost parallel throughout; yellow band rarely divided into 2. Length 2-2.5mm. (Fig. 112) sinuata Steph. (= flexuosa (Ill.))

b. Black sutural band distinctly narrowed anteriorly and posteriorly 6a

6a. Body large 2.6-3mm; elytra convex, rounded laterally; sutural band widest centrally, yellow band usually separated into 2 spots. On Nasturtium and Cardamine amara. (Fig. 109) tetrastigma Com.

b. Body small 1.8-2mm; elytra slightly convex, subparallel laterally; sutural band enlarged posterior to the base, then parallel and narrowed near the rounded apex; longitudinal band usually entire. On Rorippa. vittata (F.)

7a. Tibiae and tarsi usually entirely red brown; yellow band slightly broader, almost straight; first 3 antennal segments yellow, male 4th and 5th moderately enlarged; pronotum usually with bluish or greenish metallic reflection. Length 2.5-3mm. (Fig. 104) nemorum (L.)

b. Body smaller 1.5-2.5mm; tibiae and tarsi brown, paler near the articulation 8a

8a. Sutural band subparallel centrally, narrowed gradually anteriorly; pronotum black, sometimes slightly metallic; yellow bands sometimes very narrow, almost parallel, slightly curved at the base near the suture. Length 2.2-3mm. (Fig. 105) undulata Kuts.

b. Sutural band parallel throughout; pronotum generally with a green metallic reflection. Length 1.5-1.8mm. (Fig. 106) vittula Redt.

9a. Head punctuation more or less fine, but distinct even centrally, on Cruciferae 10a

b. Head impunctate centrally, body elongate narrow, subparallel, depressed, bronze green. On Resedaceae (Fig. 113) nodicornis (Marsh.)
Antennae with base reddish or brownish; pronotum square; in male, 3rd and 4th antennal segments strongly dilated; elytral punctuation very close and confused. Length 2.2-2.8mm.

10a. Most of antennal 2 and 3 reddish 11a

b. Antennae entirely black, head punctuation very fine, elytral punctuation fine very close and confused, form quite depressed 14a

11a. Bluish green or green, usually strongly metallic; punctuation usually very strong, more or less regular on the elytral disc. Length 1.8-2.4mm. (Fig. 117) cruciferae (Goeze)

b. Black or with an indistinct metallic reflection 12a

12a. Head quite strongly punctured, at least between the eyes; pronotum and elytra strongly punctured 13a

b. Forehead very finely punctured, vertex without punctuation, pronotum and elytra finely and closely confusedly punctured; black with distinct bronze reflection. Length 1.6-2mm (Fig. 118) aerea All.

13a. Head strongly punctured throughout; dorsal elytral punctuation indistinctly regular. Body length 1.9-2.5mm. (Fig. 119) atra (F.)

b. Head strongly punctured only in a transverse band between the eyes, impunctate elsewhere; elytral punctuation regular or irregular. Length 1.5-2.3mm. On Rorippa sylvestris (Fig. 116) diademata Foud.

14a. Head punctuation close, black with a slight bluish reflection, punctuation slightly stronger, foundation shiny, not alutaceous. Length 1.8-2.3mm. (Fig. 115) consobrina Curt.

b. Head punctuation extremely fine, indistinct, body more depressed; greenish blue or metallic green, foundation alutaceous, dull silky; pronotum and elytra with very fine and quite close punctuation. Length 2-2.6mm. (Fig. 114) nigripes (F.)

Apteropeda Steph. 1836

1a. Antennal segments 4 and 5 equal in length; metallic green, blue or violet, brown bronze to coppery; anterior angles of pronotum prolonged into pronounced lobes. Length 2.2-2.6mm. On Plantago lanceolata orbiculata (Marsh.)

b. 5th antennal segment longer than the 4th, body black with a slight greenish or bluish reflection, anterior angles of pronotum obtuse, broadly rounded at the extremity. Length 2.5-3mm. globosa (Ill.)

Dibolia Latreille 1829

Body broad, oval, convex obtusely rounded posteriorly; pronotal punctuation fine, anterior and middle tibiae red, the posterior reddish; antennae blackish near the apex. Length 2.5-3mm. On Cynoglossum officinale, Stachys, Marrubium vulgare cynoglossi (Koch.)

Psylliodes Latreille 1825

1a Posterior tibiae narrow, slightly curved, slightly sickle shaped at the apex, the border of this excavation with close fine setae; frontal humps indistinct, limited by deep lines in the form of an X in P. attenuata 1st Group

b. Posterior tibiae, unequal sparse setae, upper frontal lines usually very distinct 2nd Group

1st Group

1a. Frontal lines distinct and deep, united between the eyes to form an X; metallic green, with the elytral apices usually red; narrow; front finely shagreened impunctate ; pronotum weakly transverse, strongly punctured; elytral striae strong; elytra sometimes entirely metallic green. Length 1.8-2.6mm. attenuata (Koch.)

b. Frontal lines very indistinct or absent 2a

2a. Sides of pronotum not or very weakly directed towards the outside in their anterior quarter, then narrowed up to the anterior angles in a smooth curve; head red anteriorly; anterior legs red, sometimes darkened; greenish blue, or blackish green on the pronotum with the elytra yellow brown, or entirely yellow brown. Length 3-4.6mm. chrysocephala (L.)

b. Sides of pronotum directed angularly in front at their anterior quarter, then in a straight line in front.

3a. Dark dorsally at least on the elytra 4a

b. Above, at least on the elytra red, then sometimes with the suture dark 6a

4a. Dorsally blue or greenish blue, blue or bronze 5a

b. Head and pronotum red, pronotum partly red; elytra blue or metallic green; legs and antennae darker than in chrysocephala; pronotum sometimes entirely black. Length 2.8-3.6mm. On Sisymbrium sophia cyanoptera (Ill.)

5a. Elytra distinctly less elongate and more rounded at sides. Dorsally usually blue ; anterior tibiae often slightly darkened; pronotum and elytra quite strongly convex; anterior legs usually entirely red; base of pronotum with a small dimple more or less distinct at the basal striae; blue, pronotum often greenish. Length 2-3.3mm. napi (F.)

b. Elytra more elongate, and less rounded at sides. Dorsally coppery or bronze, rarely with a green reflection, sometimes metallic black, rarely blue. cuprea (Koch)

Groove near the eyes entire up to the base of the antennae, coppery or bronze rarely green bronze or blue green; front punctured, pronotum slightly convex, finely shagreened, as all the dorsal surface; elytral striae of fine punctures, very close. Length 2.5-3.2mm. On Sisymbrium officinale

Elytra

6a. Entirely red, suture concolorous; head and thorax strongly and closely punctured, slightly wrinkled and generally with slight metallic green reflection, elytral striae strong, interstices clearly punctured; posterior tibiae very narrow, with a sharp tooth on the internal border, near the tarsal insertion, their apex broad elongate sickle shaped; posterior femora red, slightly darkened brownish on the outside. Length 2.8-3.6mm. On Cakile maritima. marcida (Ill.)

b. Elytra not entirely red , suture darkened; head impunctate. Length 2.0-2.8 m.m. affinis (Payk.)

Pronotum quite strongly punctured, red, suture pitchy black enlarged posteriorly, but not covering the apex entirely; head usually pitchy brown , pronotum always brown, an indistinct X-shaped frontal impression; elytral striae strong. On Solanum dulcamara.

2nd Group.

1a. Small elongate oval, weakly convex, colour varying from dirty to clear brown to red; pronotum with shallow punctuation, with a dimple at the base of the lateral fold 2a

b. Large short oval, convex, blue or blackish green or shiny metallic; pronotal punctuation fine, mixed with larger punctures 3a

2a. Read, frons with some punctures; frontal lines often partly absent effacees. Length 2-2.8mm. luteola (Müll.)

b. Chestnut brown, more or less clear, shiny; anterior part of head, base of antennae and anterior legs reddish, frons usually impunctate, frontal lines distinct, sometimes ferruginous red entirely or with the pronotum red and elytra black brown picina (Marsh)

3a. Frontal lines forming a furrow equal and deep; tibiae and tarsi red, pronotum quite regularly curved laterally or narrowed in line nearly straight anteriorly on the anterior quarter. 4a

b. Frontal lines usually slight, often dissected by the punctures; femora, tibiae and tarsi black; pronotum slightly narrowed in its anterior 1/3 or it is angular; elytral striae moderately strong; usually blue black. Length 3-4mm. On Solanum dulcamara. dulcamarae (Koch.)

4a. Green with a metallic or brown bronze reflection, sometimes coppery or blue green. Length 2.8-3mm. On Hyoscyamus niger hyoscyami (L.)

b. Greenish blue, sometimes bronze; anterior femora mostly brown; pronotum short, strongly narrowed anteriorly, slightly rounded laterally, very inclined anteriorly. Length 2.8-3.8mm. On Carduus. chalcomera (Ill.)

Derocrepis Weise 1881-93

Head and thorax, antennae and legs red or ferruginous red; elytra blue green to blackish green, often weakly metallic. Length 2.8-3.8mm. On Leguminosae - Vicia, Ulex rufipes (L.)

Aphthona Chevrolet 1842

1a. Pronotum and elytra red brown 2a

b. Dorsally unicolorous black, blue or metallic green 3a

2a. Head red brown or ferruginous; suture finely darkened on its apical half as are the femoral extremities; quite narrow, subparallel, with distinct humeral callus; elytral punctuation very close, quite fine, regular. Length 2.2-2.5mm. On Lythrum salicaria (Fig. 128) lutescens (Gyll.)

b. Head and abdomen black; elytral sutural band enlarged in the middle Body length 1.5mm. (Fig. 127) nigriceps Redt.

3a. Species winged, humeral callus distinct 4a

b. Species wingless, humeral callus absent , not exceeding 2mm. .. 7a

4a. Anterior and intermediate femora entirely yellow 5a

b. Legs red brown or pitchy black, posterior femora entirely dark, anterior and mid femora dark at least in their basal half. Anterior and intermediate femora dark at the base only venustula Kuts. Dark blue, humeral callus strong, elytra subparallel, legs light reddish yellow, anterior femora black in their basal half, posterior femora black; pronotum almost smooth, elytra very weakly punctured, unequal, absent laterally and posteriorly. Length 1.8-2.3mm. On Euphorbia cyparissias (Fig. 129)

5a. Length 2.5-3.0mm. nonstriata Har. (= coerulea (Geoff.))

Elytra closely moderately strongly punctured, mixed with smaller punctures; blue rarely metallic green; posterior femora yellow on their basal half. On Iris pseudacorus. (Fig. 62)

b. Length not exceeding 2.2mm. of dark colour, blue black, violet, blackish green or bronze. 6a

6a. Frontal humps small, prominent, bounded by a deep line; head and thorax deep shiny black; pronotal punctuation usually absent , weak on the elytra cyanella Redt.

Elytra black with violet reflection, with punctuation moderately strong, unequal, usually slightly regular; posterior femora slightly darkened. Length 1.6-2.0mm. On Euphorbia cyparissias (Fig. 130)

b. Frontal humps indistinct dorsally; colour uniform, usually dark blackish green to bronze; posterior femora metallic or pitchy black. (Fig. 133) euphorbiae (Schr.)

Black with a dark green metallic reflection, sometimes bluish; humeral callus strong; elytra subparallel, quite depressed; pronotal punctuation fine, slightly longitudinally wrinkled; anterior and middle femora light yellow. Length 1.5-2.0mm. On Euphorbia cyparissias

7a. Legs yellow, posterior femora only slightly darkened, pronotum only very slightly transverse; body slender; light metallic green, rarely bluish; distinct, deep frontal lines, above the prominent humps; pronotal punctuation more or less wrinkled; elytral punctuation moderately strong and close, wrinkled. Length 1.5-2mm. (Fig.132) On Helianthemum vulgare herbigrada (Curt.)

b. Legs red or brownish red, posterior femora black; pronotum moderately transverse; elytra with apices rounded; pronotum with very fine punctuation often absent , or wrinkled; elytral punctuation moderately strong; antennal segments short; black, very slightly bluish, greenish or metallic. Length 1.5-1.8mm. (Fig. 131) atrovirens Först.

Sphaeroderma Steph. 1831

1a. Oval; pronotum strongly punctured, moderately short, less strongly narrowed anteriorly, anterior angles prolonged into lobes; elytra strongly punctured; less reddish than rubidum. Length 2·5-3·6 mm. On Carduus, Cirsium.

testaceum (F.)

b More rounded; pronotal punctuation very fine or absent, pronotum very short, very strongly narrowed anteriorly, anterior angles not prolonged into lobes; elytra finely punctured, light ferruginous red. Length 2·3-3 mm. On Centaurea.

rubidum Graëlls.

PLATE AK 1

FIG. 1

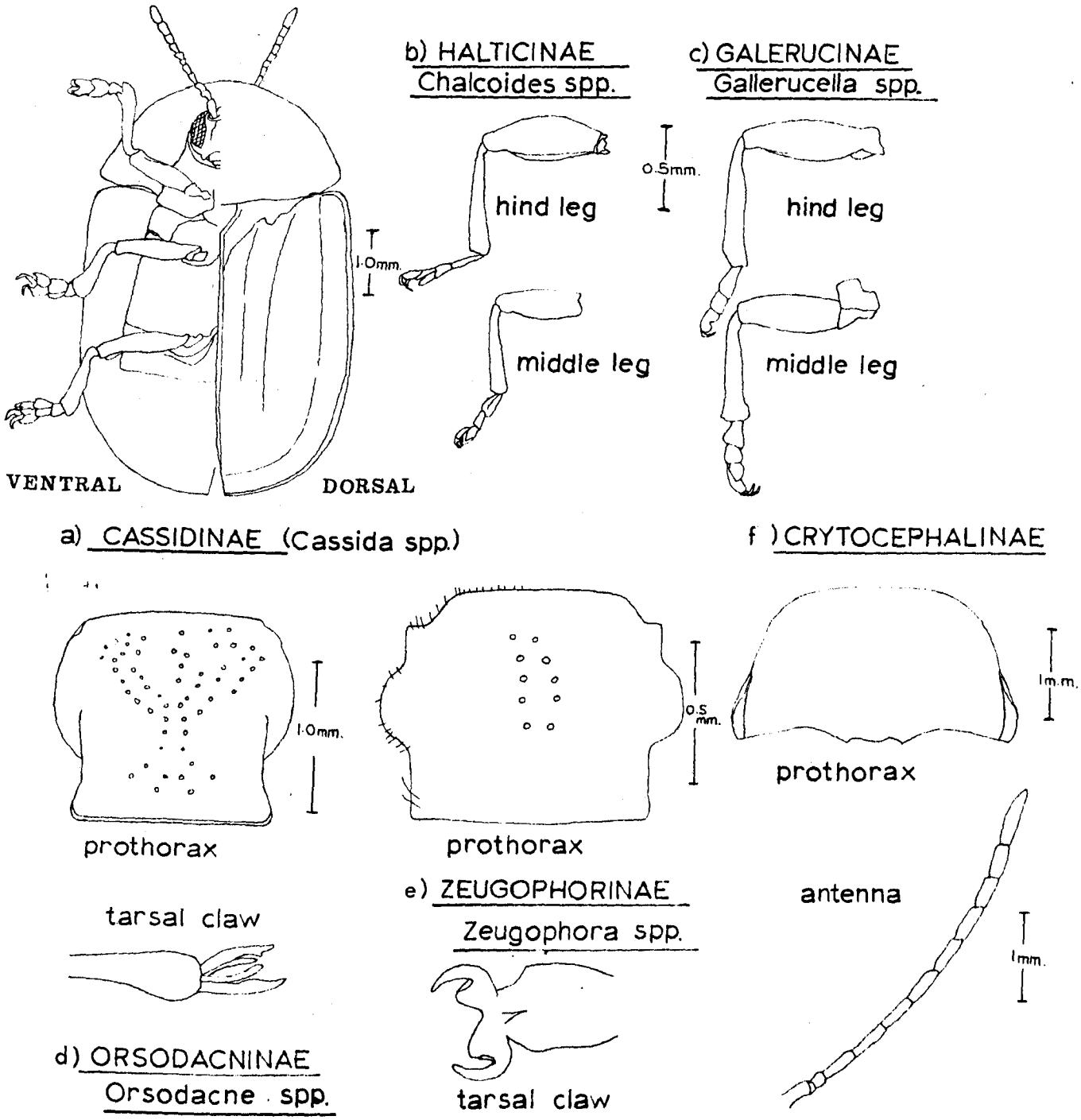
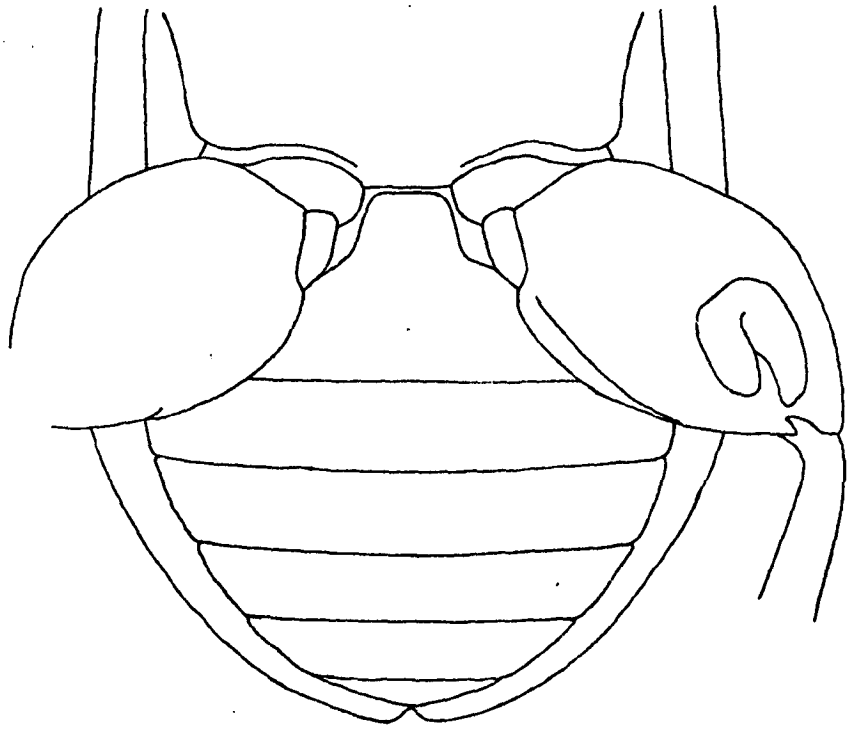
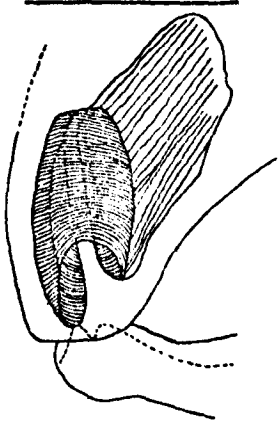


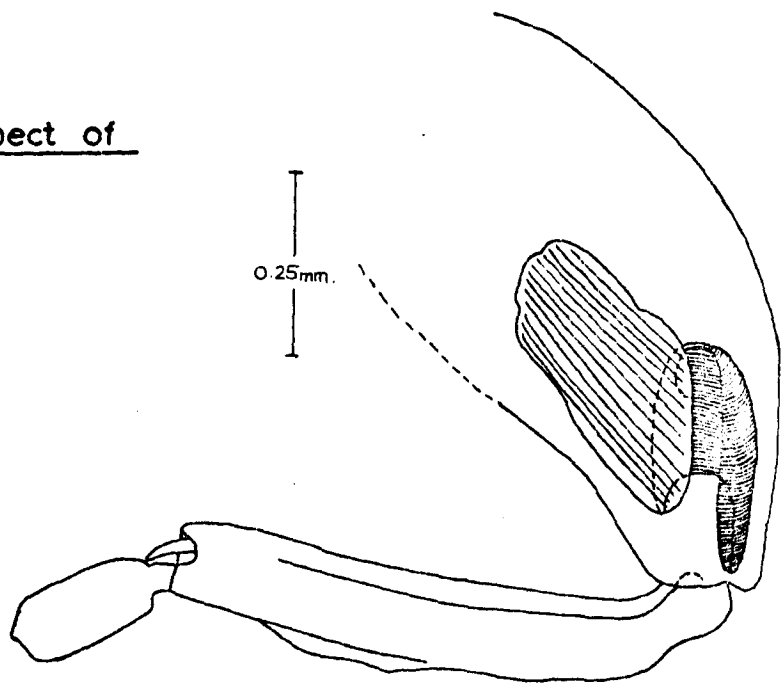
PLATE AK 2 FIG. 2
SUBFAMILY HALTICINAE

a) The underside of a Halticinid showing the inflated femur with endoskeletal organ in situ

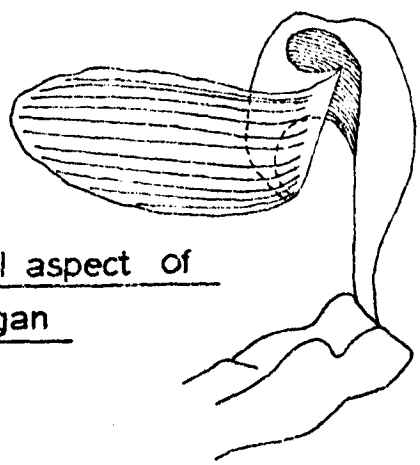


b) The convex aspect of the organ



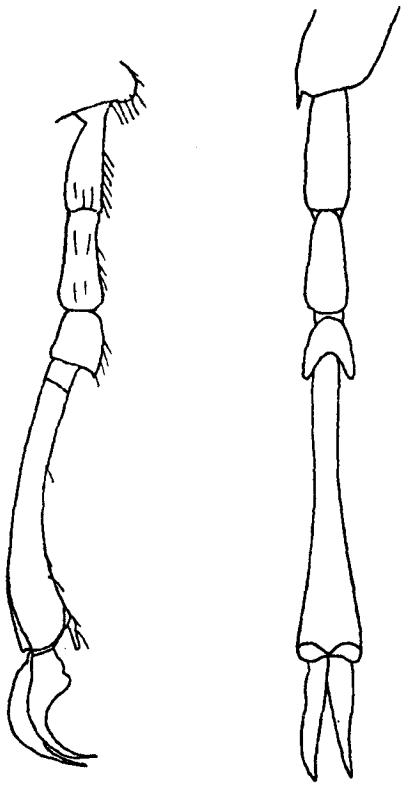


c.) The concave aspect of the organ



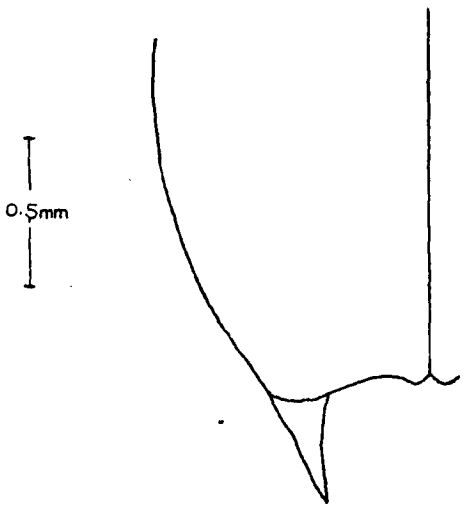
d.) The lateral aspect of the organ

PLATE AK 3 FIG 3
SUBFAMILY DONACIINAE



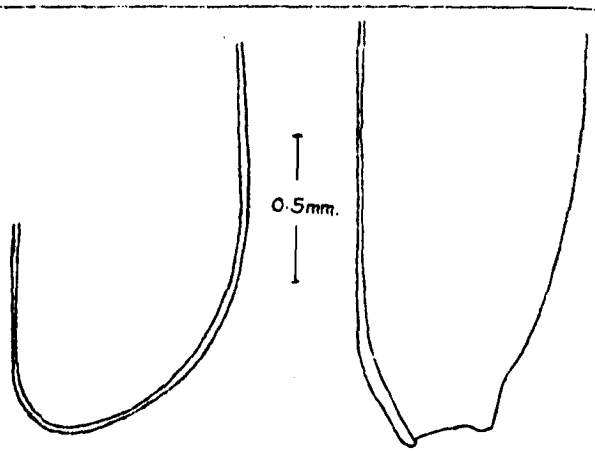
a) Tarsus of Macroplea appendiculata Panz.

b) Apex of left elytron of M appendiculata Panz

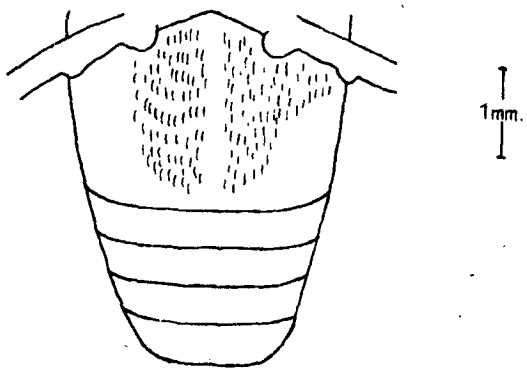


e) Apex of right elytron of P affinis Kunz ♀

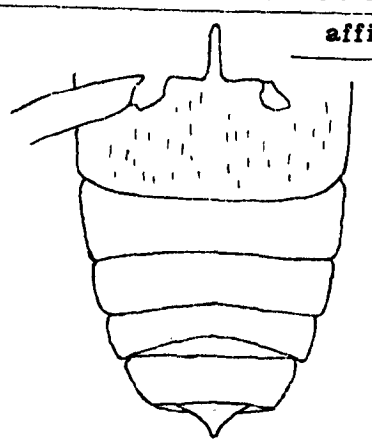
f) Apex of right elytron of D dentipes F

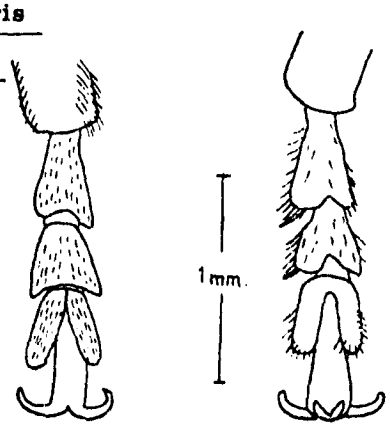


g) Ventral view of abdomen of Donacia dentipes F



c) Ventral view of abdomen of Plateumaris affinis Kunz ♀

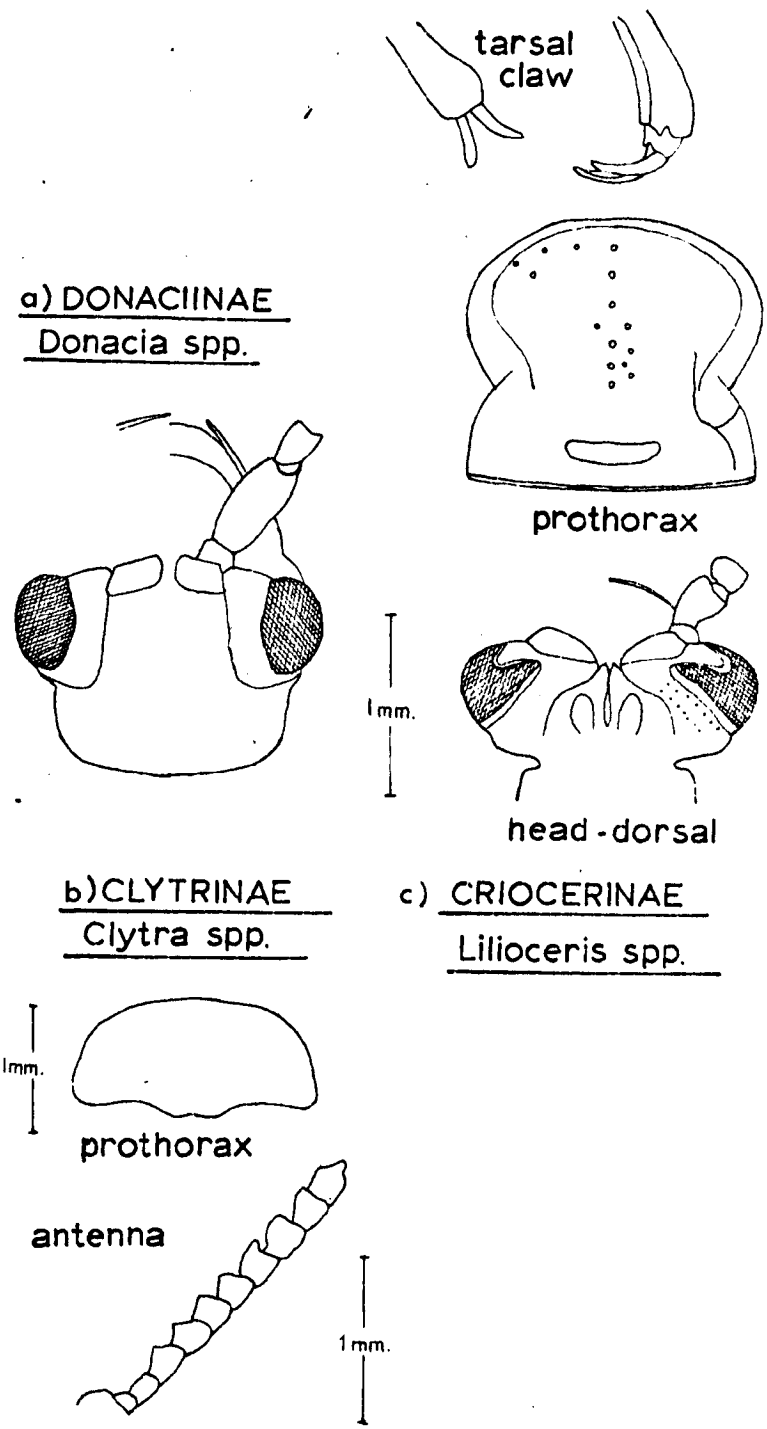




Ventral Dorsal

d) Hind Tarsus of Plateumaris affinis Kunz ♀

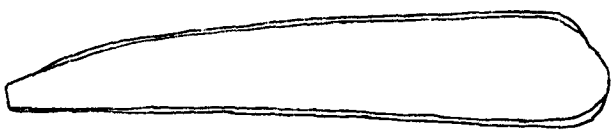
PLATE AK4 FIG.4

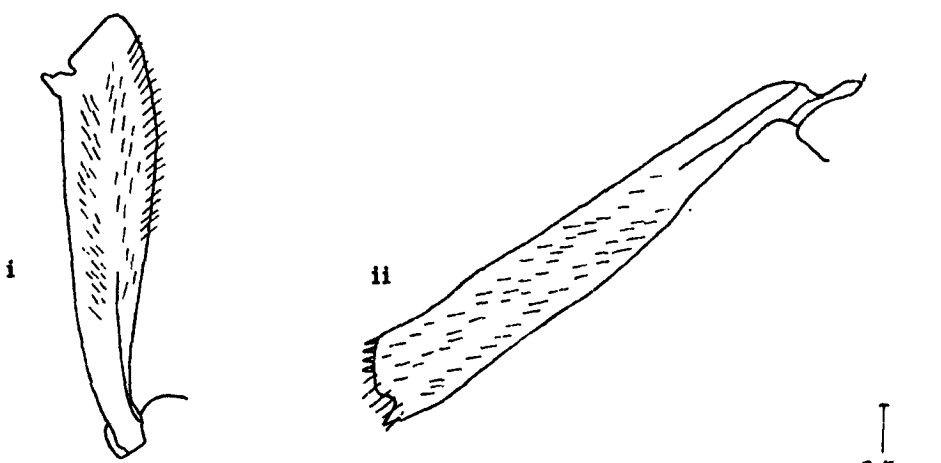


a. Lateral view of elytron of P. affinis Kunz. ♀

1mm.

b. Lateral view of elytron of D. dentipes F.





c.

i) Front tibia & ii) Hind tibia of P. discolor

d.

Hind tibia of Donacia versicolorea Brahm.

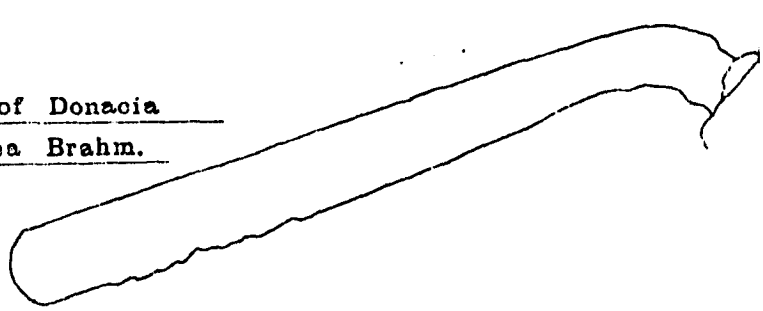
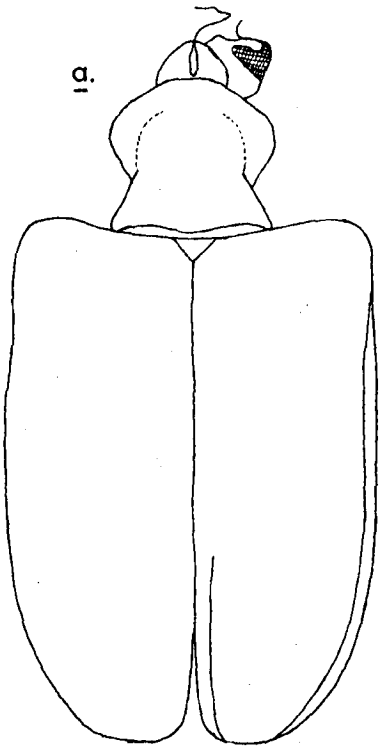


PLATE AK 6
SUB FAMILY CRIOCERINAE 12·8 = 1·0mm.(a)

FIG. 6
GENUS LILIOCERIS (L. lilii (Scop))



a. Dorsal view of head pronotum & elytra

b. Lateral view of pronotum & elytron

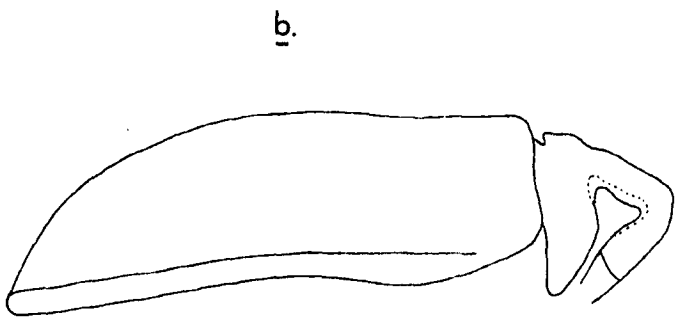
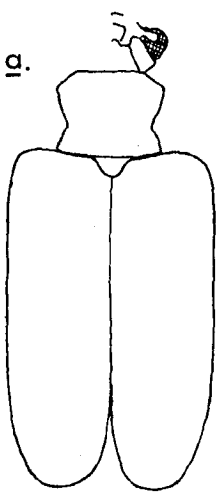
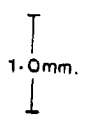
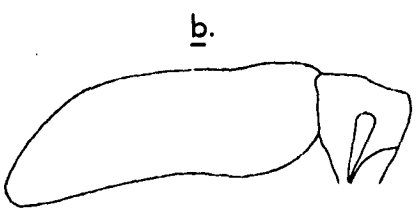


FIG. 7
GENUS LEMA (L.puncticollis Curt.)







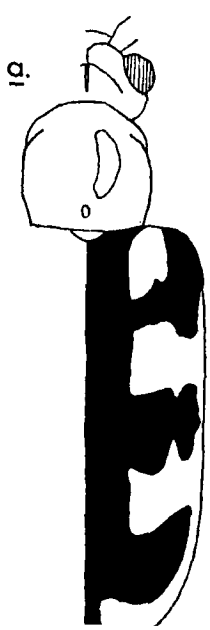


FIG. 8
GENUS CRIOCERIS (C.asparagi (L.))

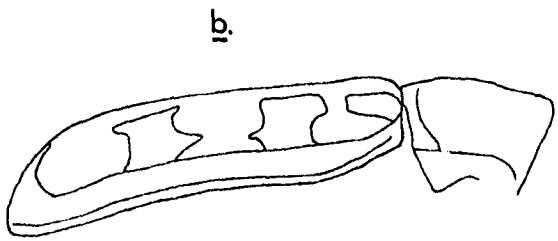


PLATE AK 7
SUBFAMILY CLYTRINAE

LATERAL VIEW OF ELYTRON AND THORAX

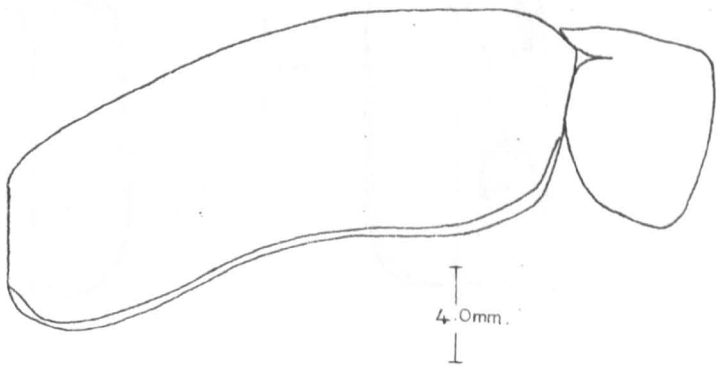


FIG. 9
GENUS LABIDOSTOMIS
(L,tridentata(L.))

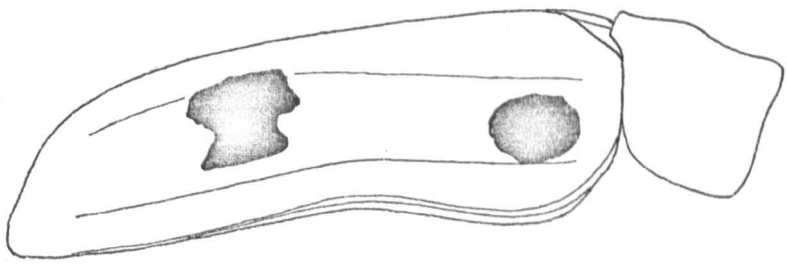


FIG. 10
GENUS CLYTRA
(C. laeviuscula Ratz.)

SUBFAMILY CRYPTOCEPHALINAE

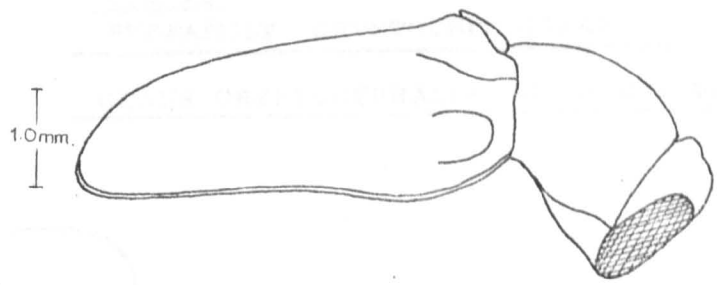


FIG. 11
GENUS CRYPTOCEPHALUS
(C. aureolus Suf.)

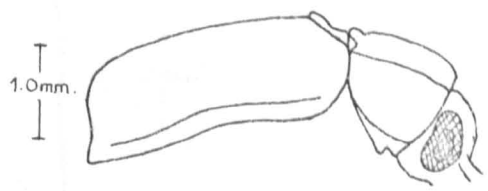


FIG. 12
GENUS GYNANDROPHTHALMA
(G. affinis (Hell.))

PLATE AK 8

SUB FAMILY CLYTRINAE

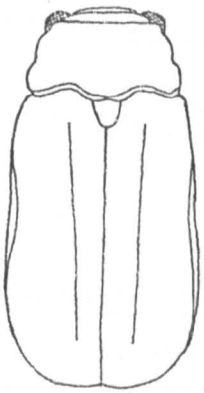
i 6·4 = 1·0mm.(♀)

ii 12·8 = 1·0mm.(♀)

FIG. 13

GENUS LABIDOSTOMIS

L. tridentata (L.)

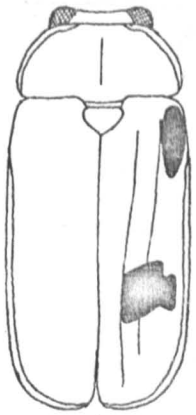


i

FIG. 14

GENUS CLYTRA

C. laeviuscula Ratz.

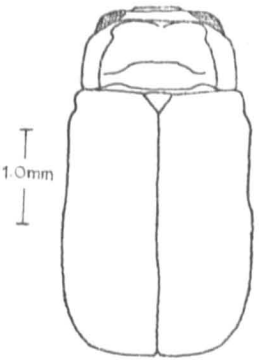


i

FIG. 15

GENUS GYNANDROPHTHALMA

G. affinis (Hell.)

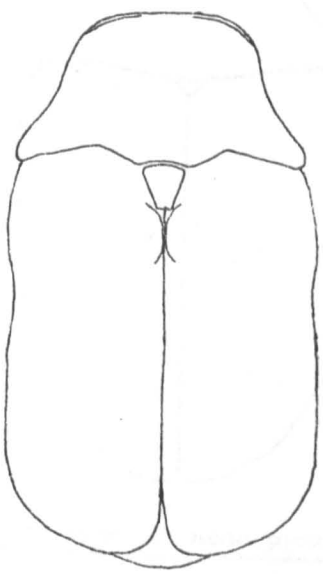


ii

FIG. 16

SUBFAMILY CRYPTOCEPHALINAE

GENUS CRYPTOCEPHALUS C. aureolus Suf.



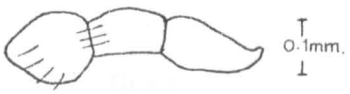
ii

PLATE AK 9 SUB FAMILY CHRYSOMELINAE

FIG. 17 GENUS PHYTODECTA P. rufipes (De G.)

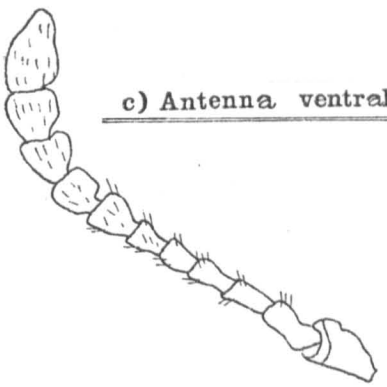
68·6 = 1 mm(R) a
34·3 = 1 mm(R) b, c, d
12·8 = 1 mm(R) e

a.) maxillary palp

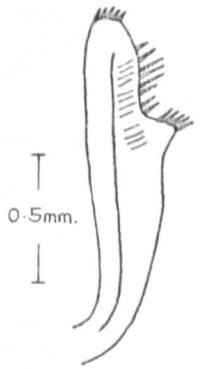


b) Front tarsus ventral

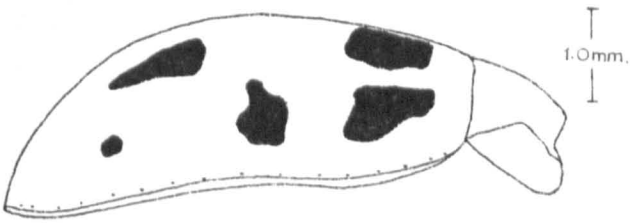
c) Antenna ventral



d) Front tibia ventral

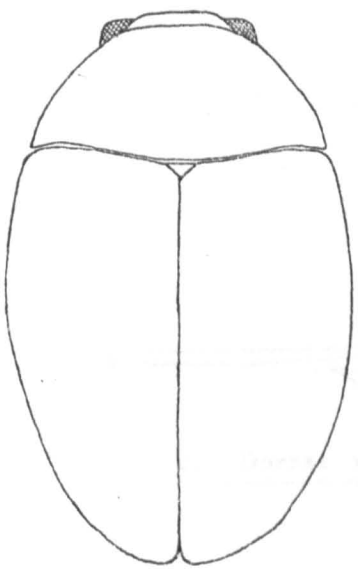


e) Lateral view of pronotum & elytron

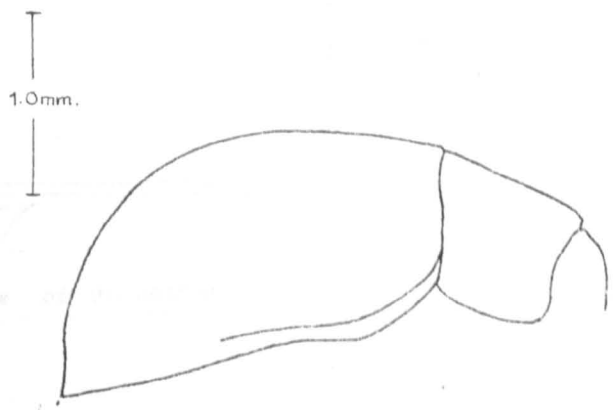


SUB FAMILY LAMPROSOMATINAE

FIG. 18 GENUS LAMPROSOMA L. concolor (Stm.) 25·6 = 1mm



a.) Dorsal view of head, pronotum & elytra



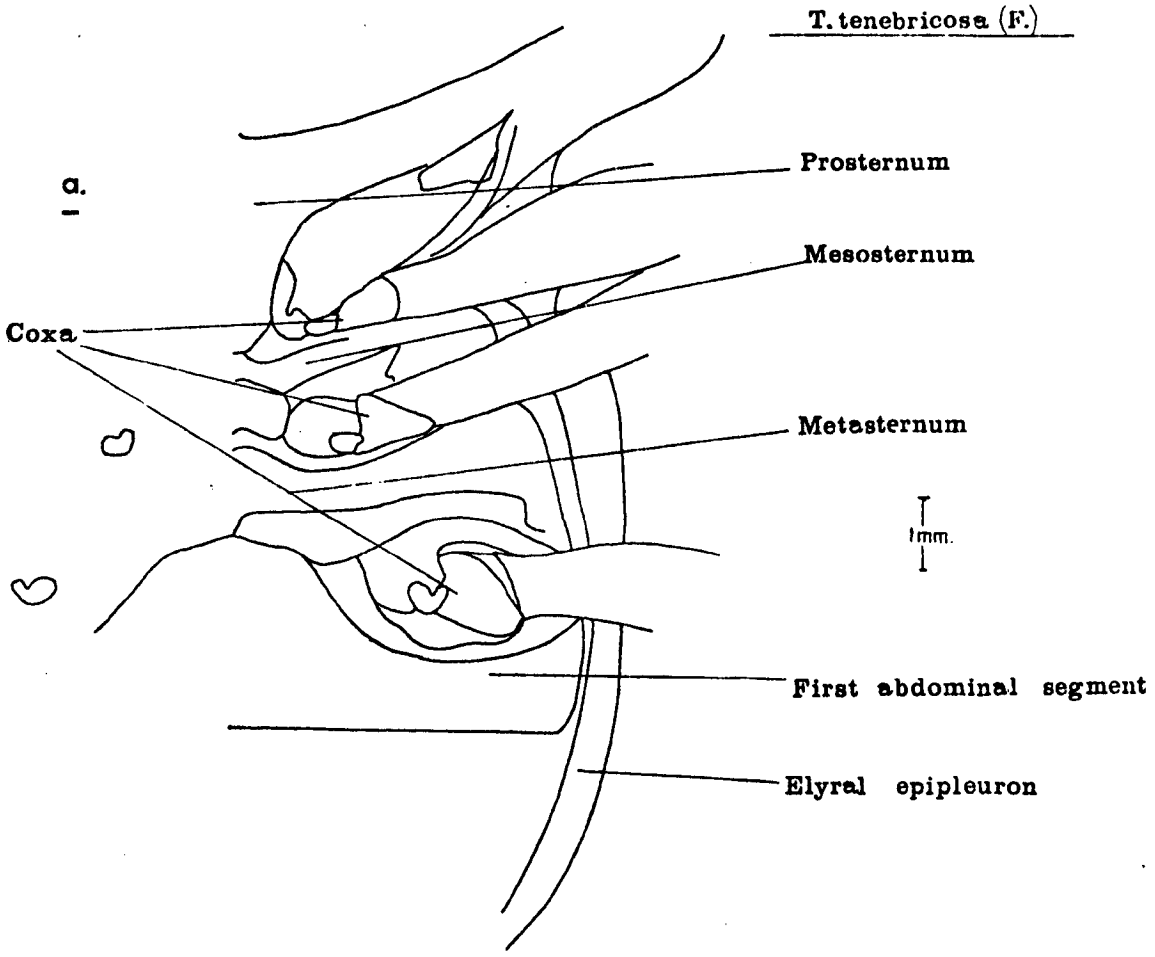
b.) Lateral view of pronotum & elytron

PLATE AK 10 FIG. 19

SUBFAMILY CHRYSOMELINAE GENUS TIMARCHA

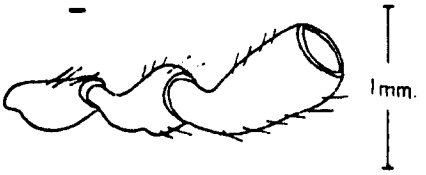
T. tenebricosa (F.)

a.

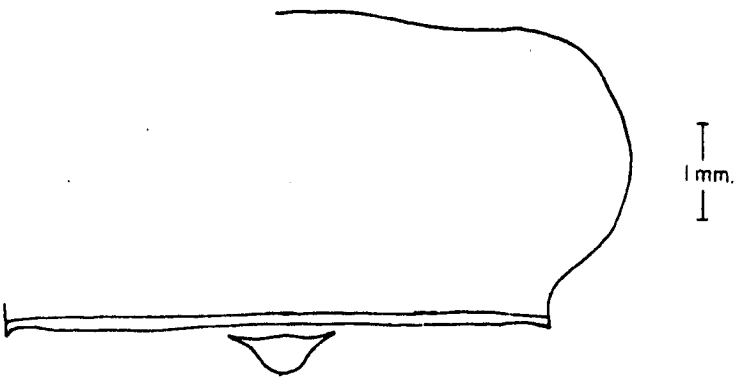


Ventral view

b.



Maxillary palp



c. Dorsal view of pronotum

PLATE AK II

FIG. 20

SUBFAMILY CHRYSOMELINAE

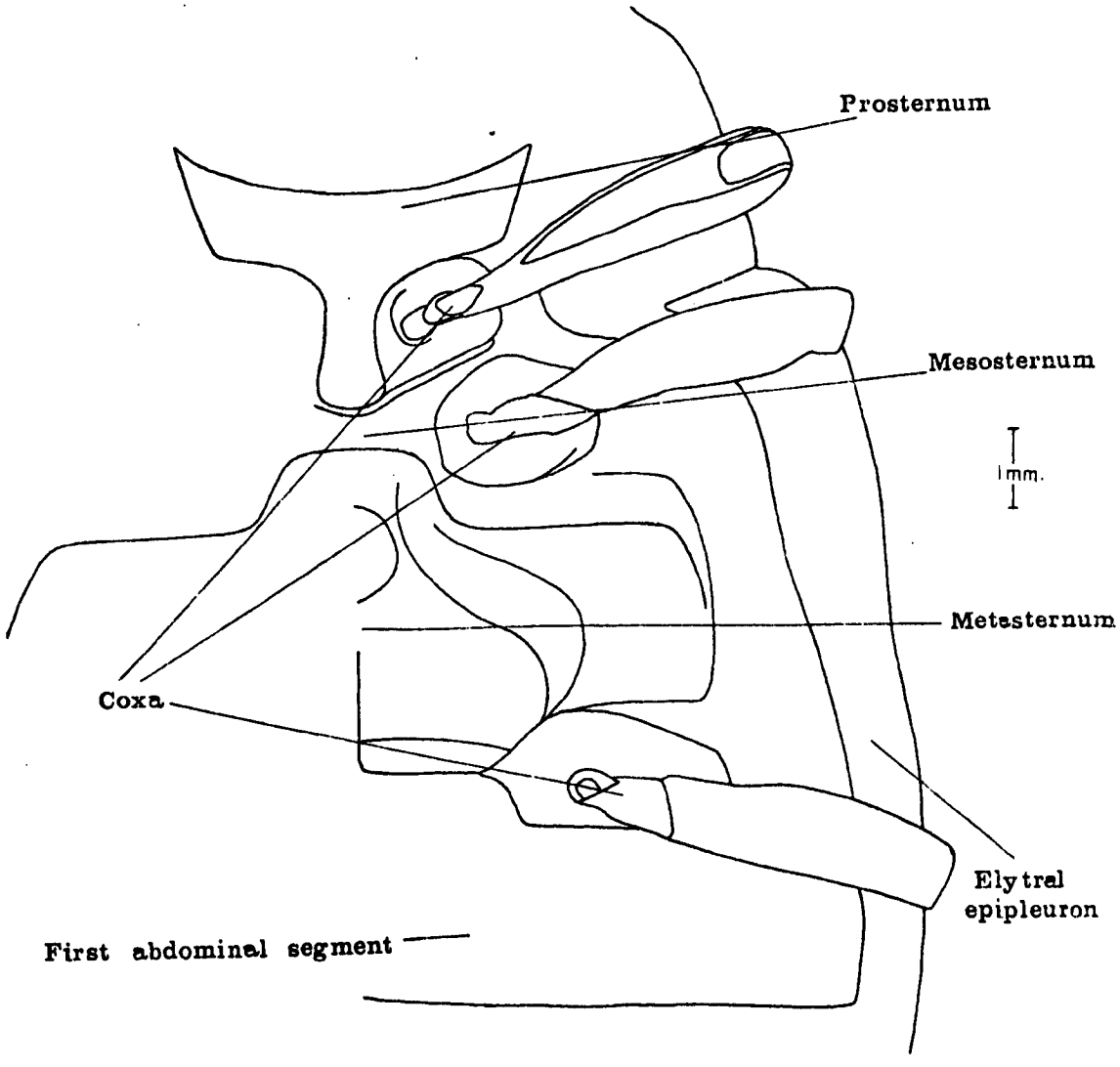


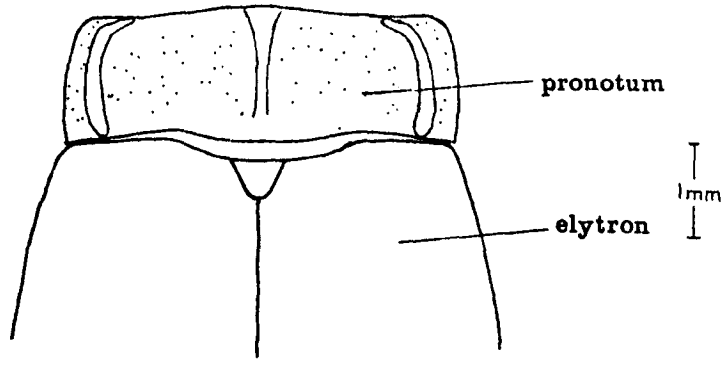
PLATE AK 12

FIG. 21

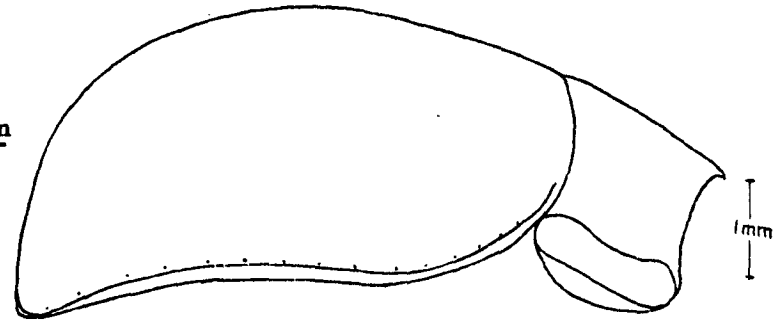
SUBFAMILY CHRYSOMELINAE GENUS CHRYSOLINA

C. staphylea (L.)

a.
Dorsal view

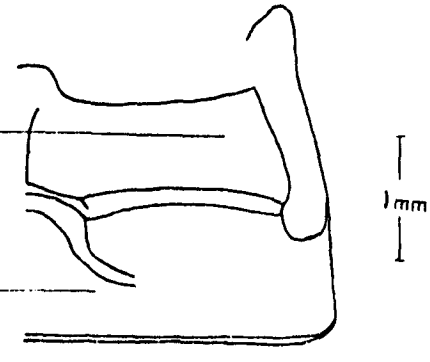


b.
Lateral view of
pronotum & elytron



c. Metasternum

First abdominal segment



d. Prothorax

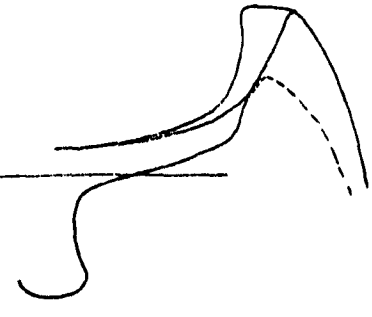


PLATE AK 13

SUBFAMILY CHRYSOMELINAE GENUS CHRYSOMELA

FIG. 22 C populi L.

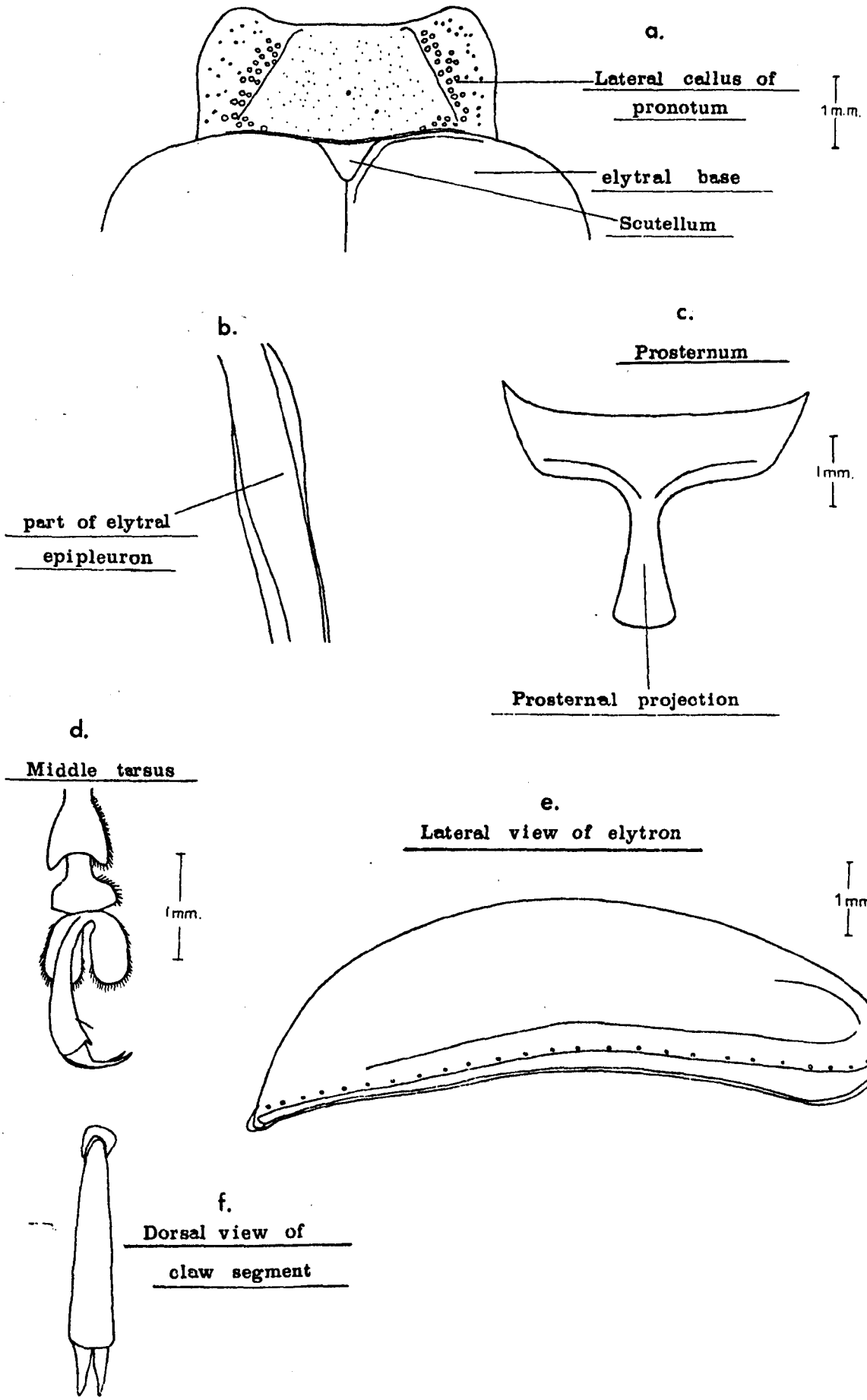
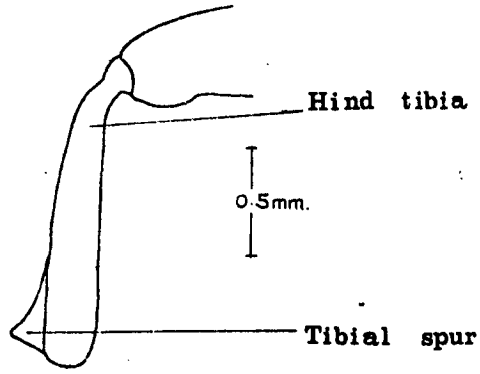


PLATE AK 14

SUBFAMILY CHRYSOMELINAE

FIG.23 GENUS GASTROIDEA G viridula (De.G)

a.



b. Lateral view of pronotum & elytron

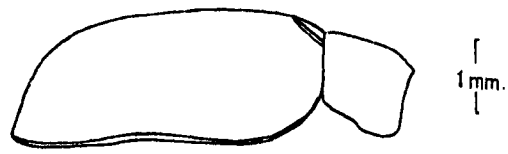
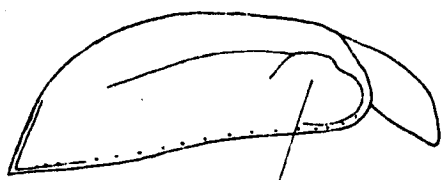
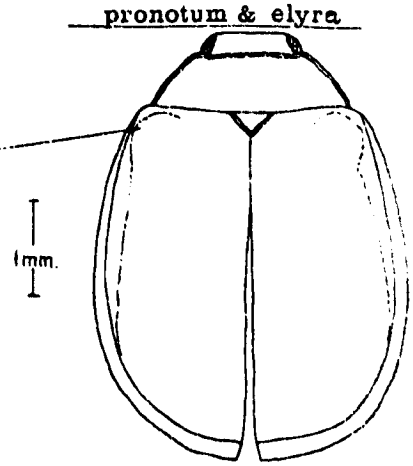


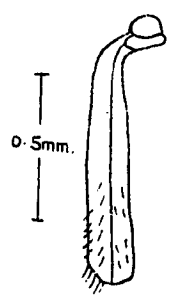
FIG. 24 GENUS PLAGIODERA P. versicolora (Laich.)

a. Lateral view of pronotum & elytron



b. Dorsal view of head pronotum & elyra





c.

Hind tibia

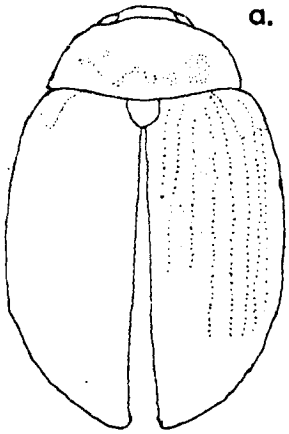
PLATE AK 15

SUBFAMILY CHRYSOMELINAE 12·8 = 1mm.(R)

a. DORSAL VIEW

b. LATERAL VIEW OF ELYTRON AND THORAX

a.



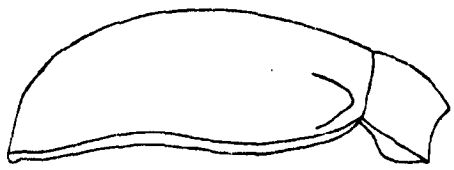
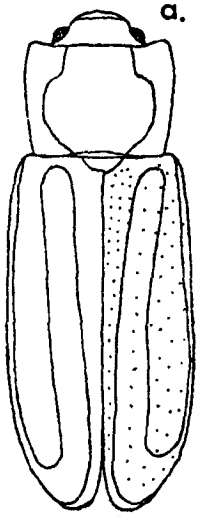


FIG. 25
GENUS PHAEDON
(P. armoraciae (L.))

a.



b.

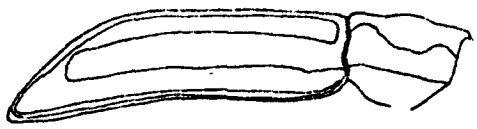


FIG. 26
GENUS PRASOCURIS
(P. phellandrii (L.))

1.0mm.

b.

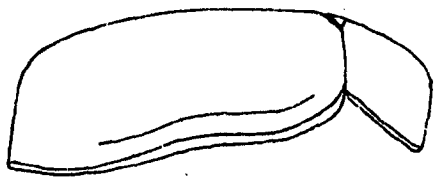
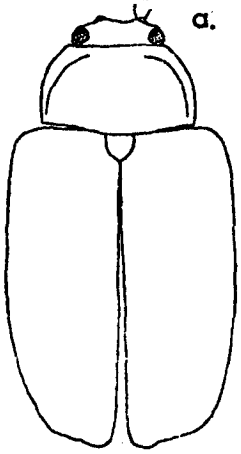


FIG. 27
GENUS PHYLLODECTA
(P. vitellinae (L.))

a.



b.

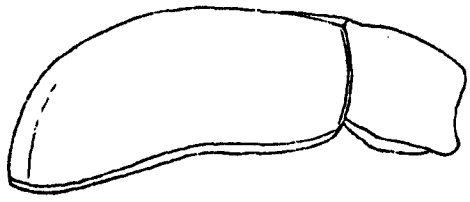


FIG. 28
GENUS PHYTODECTA
(P. pallida (L.))

a.

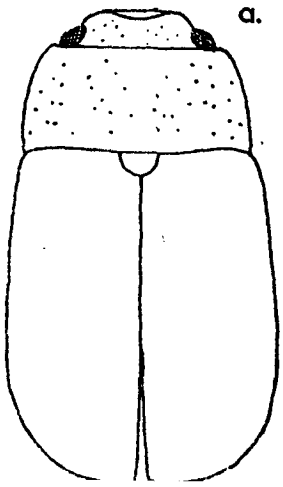


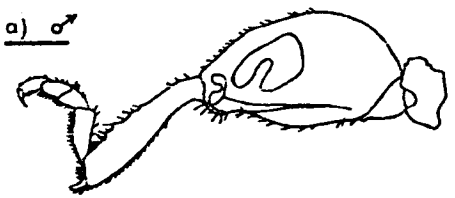
PLATE AK 16

HALTICINAE

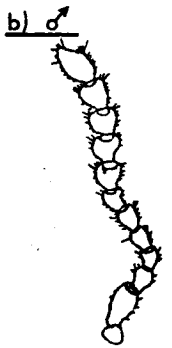
Apteropeda

FIG. 29 A. orbiculata (Marsh.)

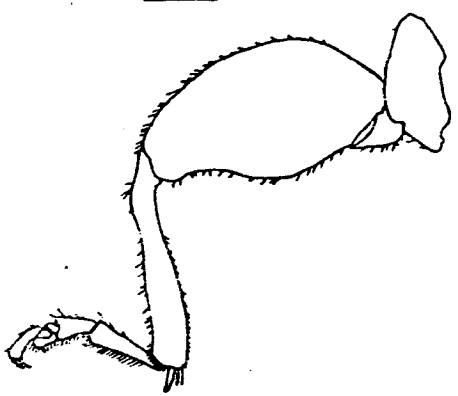
a) ♂



b) ♂



c) ♀

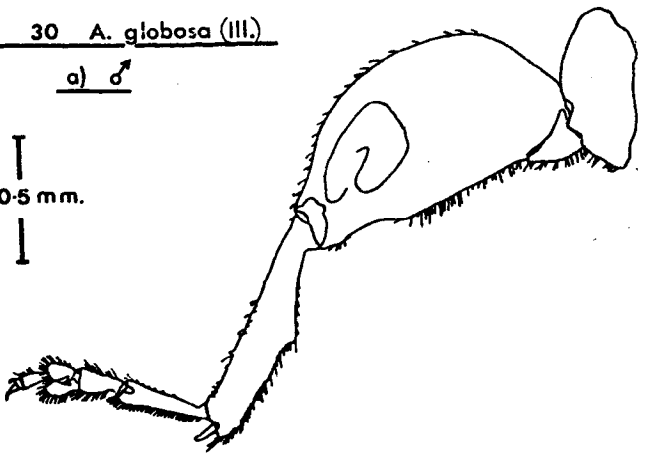


d) ♀

FIG. 30 A. globosa (Ill.)

a) ♂

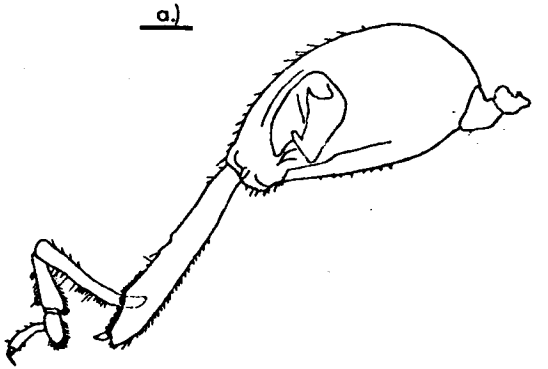
0·5 mm.



b) ♂

FIG. 31 Psylliodes napi (F.) ♀

a.)



b.

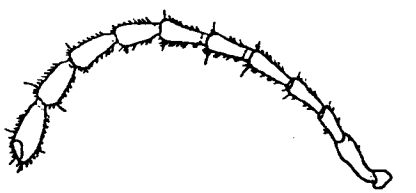
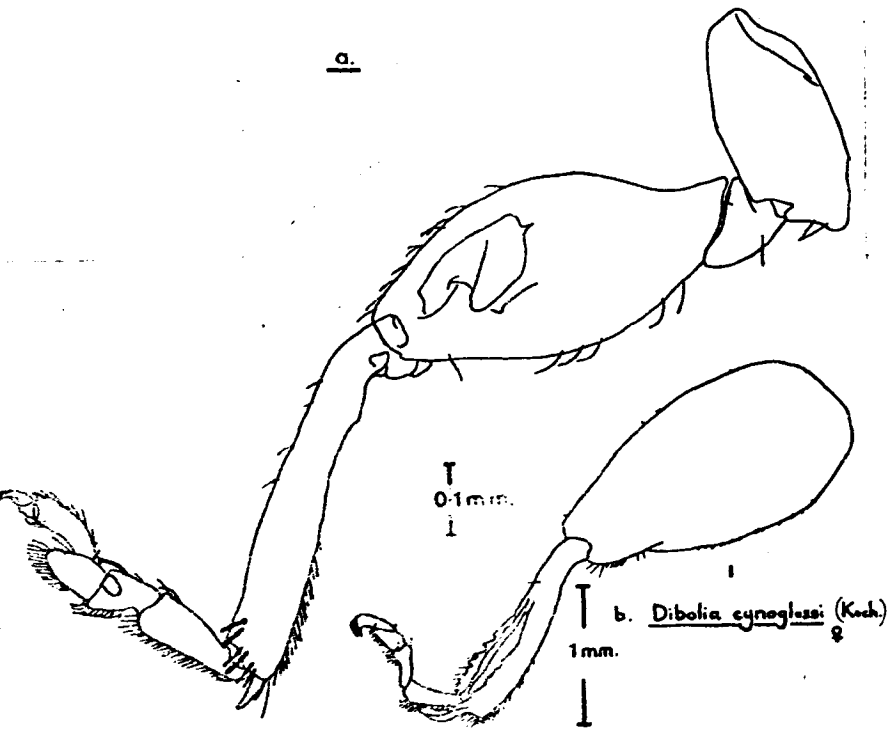


PLATE AK 17

HALTICINAE

FIG. 32 Mniophila muscorum (Koch.) ♂



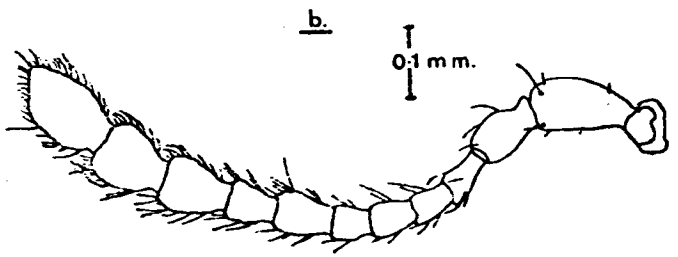


FIG. 33 Phyllotreta undulata Kuts. ♀

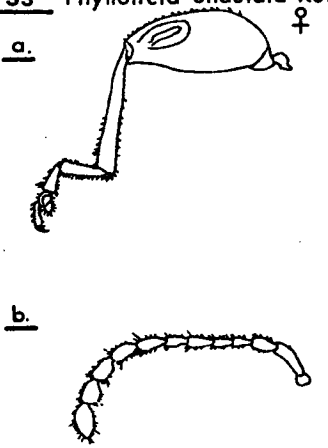


FIG. 34 Chaetocnema concinna (Marsh.) ♂

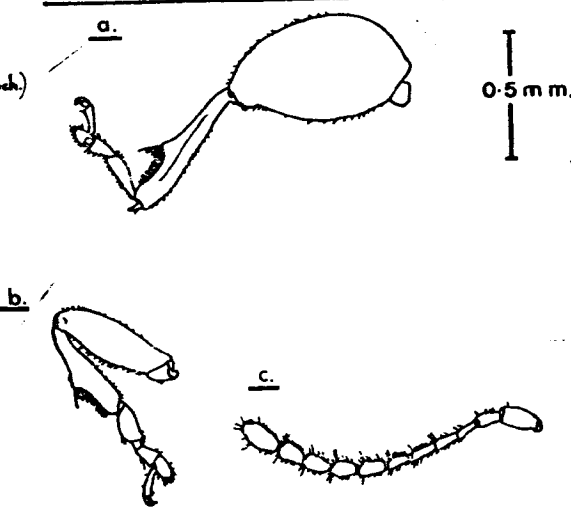


FIG. 35 Longitarsus jacobaeae Wat. ♂

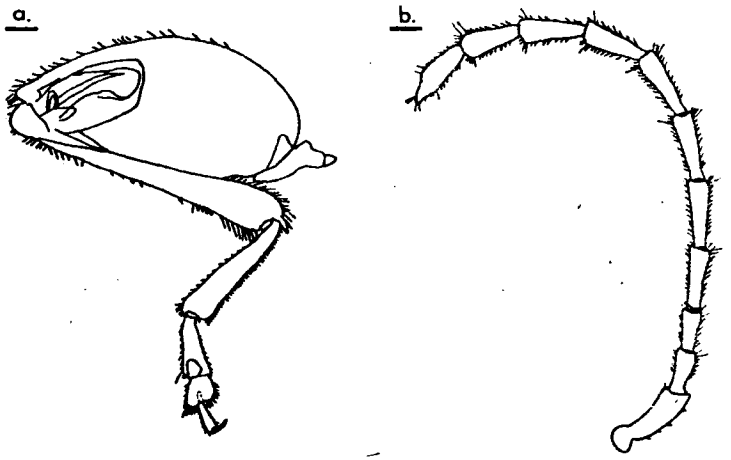


FIG. 36 Aphthona coerulea (Geof.) ♂

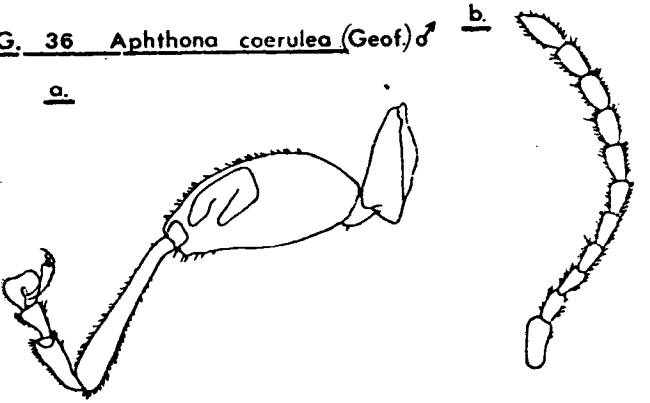


PLATE AK 18

HALTICINAE

FIG. 37 Hermaeophaga mercurialis (F.) ♂

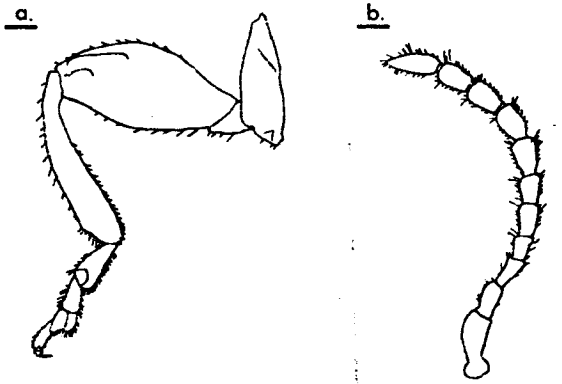


FIG. 38 Chalcoides fulvicornis (F.) ♀

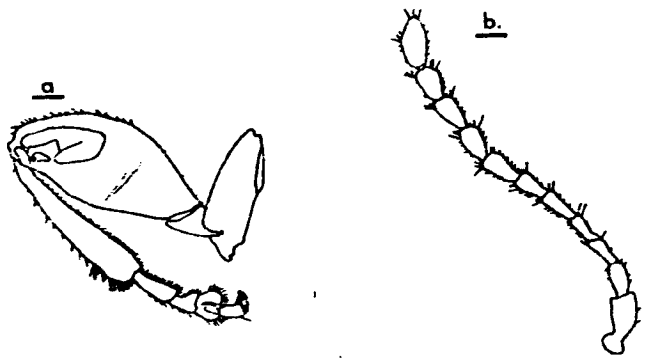


FIG. 39 Hippuriphila modeeri (L.) ♂

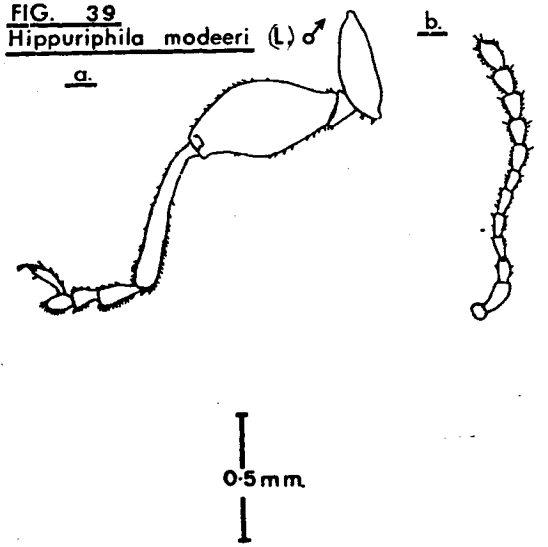


FIG. 40 Epitrix atropae Foud. ♀

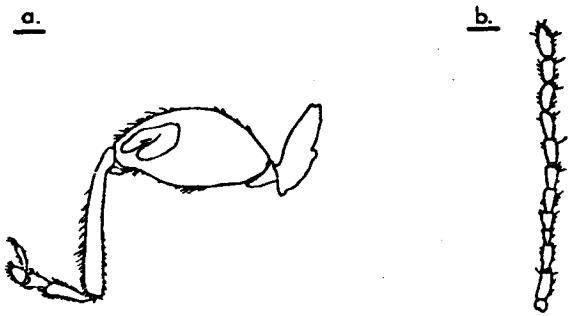


FIG. 41 Podagrica fuscipes (F.) ♂

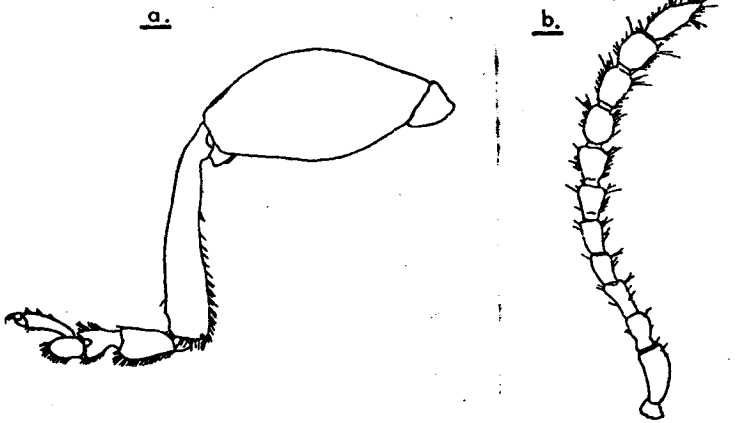


FIG. 42 Derocrepis rufipes (L.) ♂

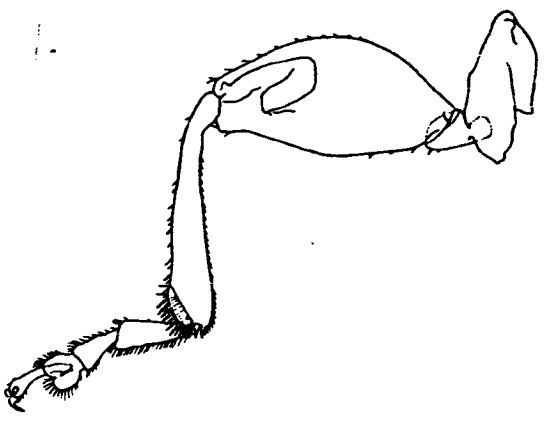


PLATE AK 19 HALTICINAE

Fig.43 Epitrix

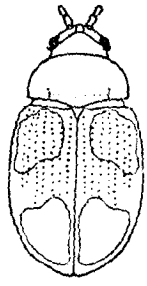


Fig.44 Ochrosis

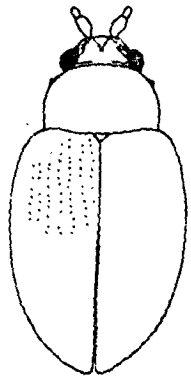


Fig.45 Chalcoides

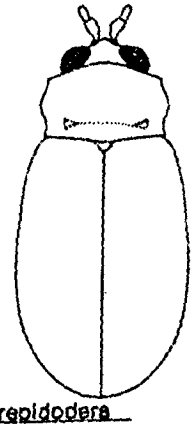


Fig.46 Hippuriphila

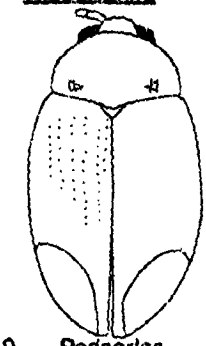


Fig.47 Haltica

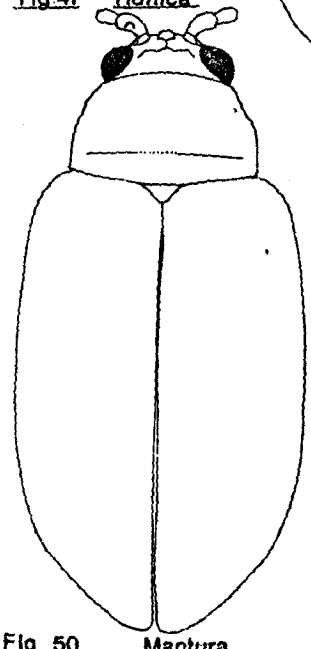


Fig.48 Crepidodera

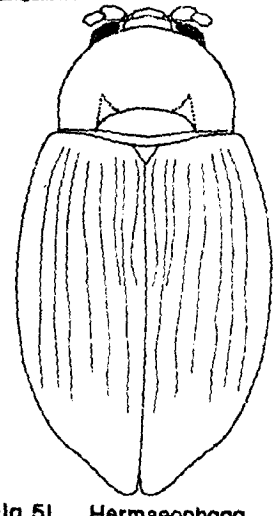


Fig.49 Podagrica

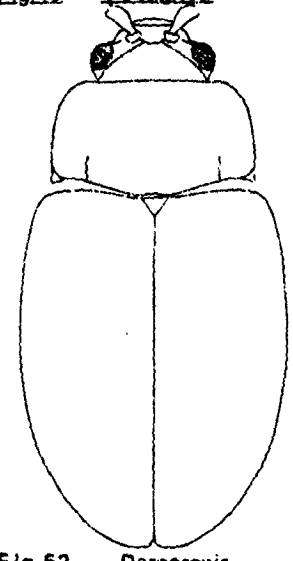


Fig.50 Mantura

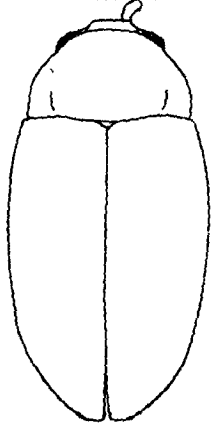


Fig.51 Hermaeophaga

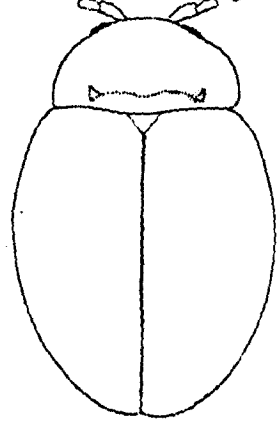


Fig.52 Derocrepis

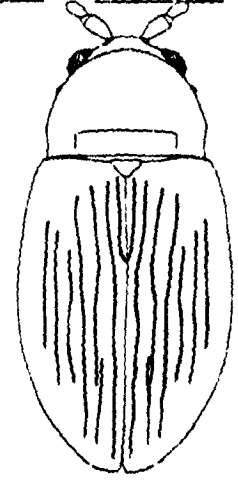


PLATE AK 20

HALTICINAE

Fig. 53
Chaetocnema

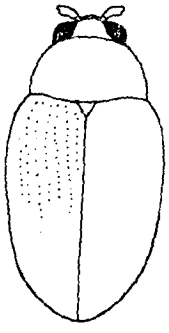


Fig. 54
Lythraria

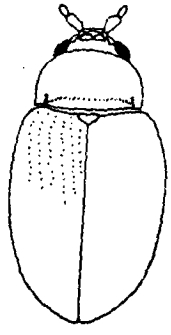


Fig. 55
Psylliodes

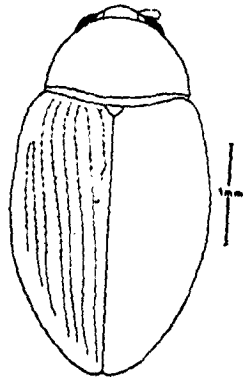


Fig. 56
Batophila

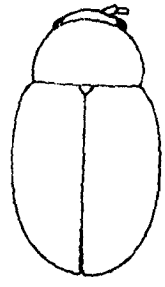


Fig. 57 Sphaeroderma

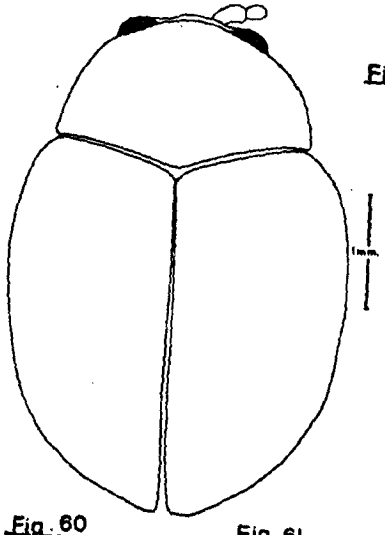


Fig. 58 Apteropeda

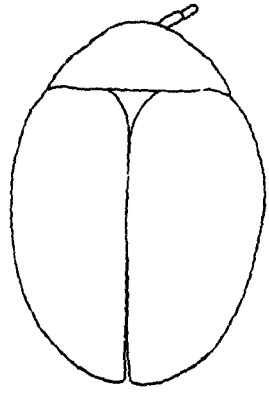


Fig. 59
Mniophila

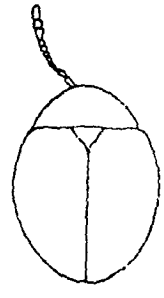


Fig. 60
Phyllotreta

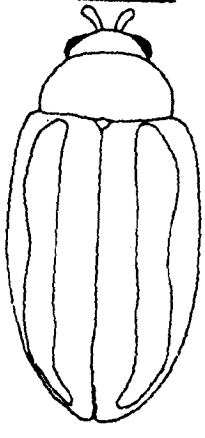


Fig. 61
Longitarsus

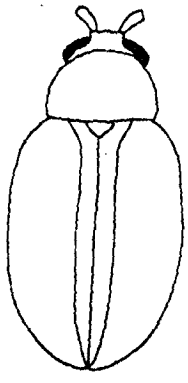


Fig. 62
Aphthona

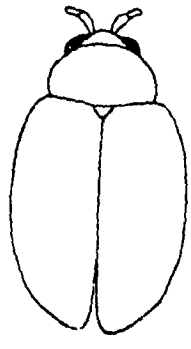


Fig. 63
Diboila

PLATE AK 21

PLATEUMARIS

MACROPLEA

FIG. 64 P. affinis Kunze ♀

FIG. 65 P. braccata Scop.

FIG. 66 P. discolor Panz.

FIG. 67 P. sericea L.

FIG. 68 M. mutica F.

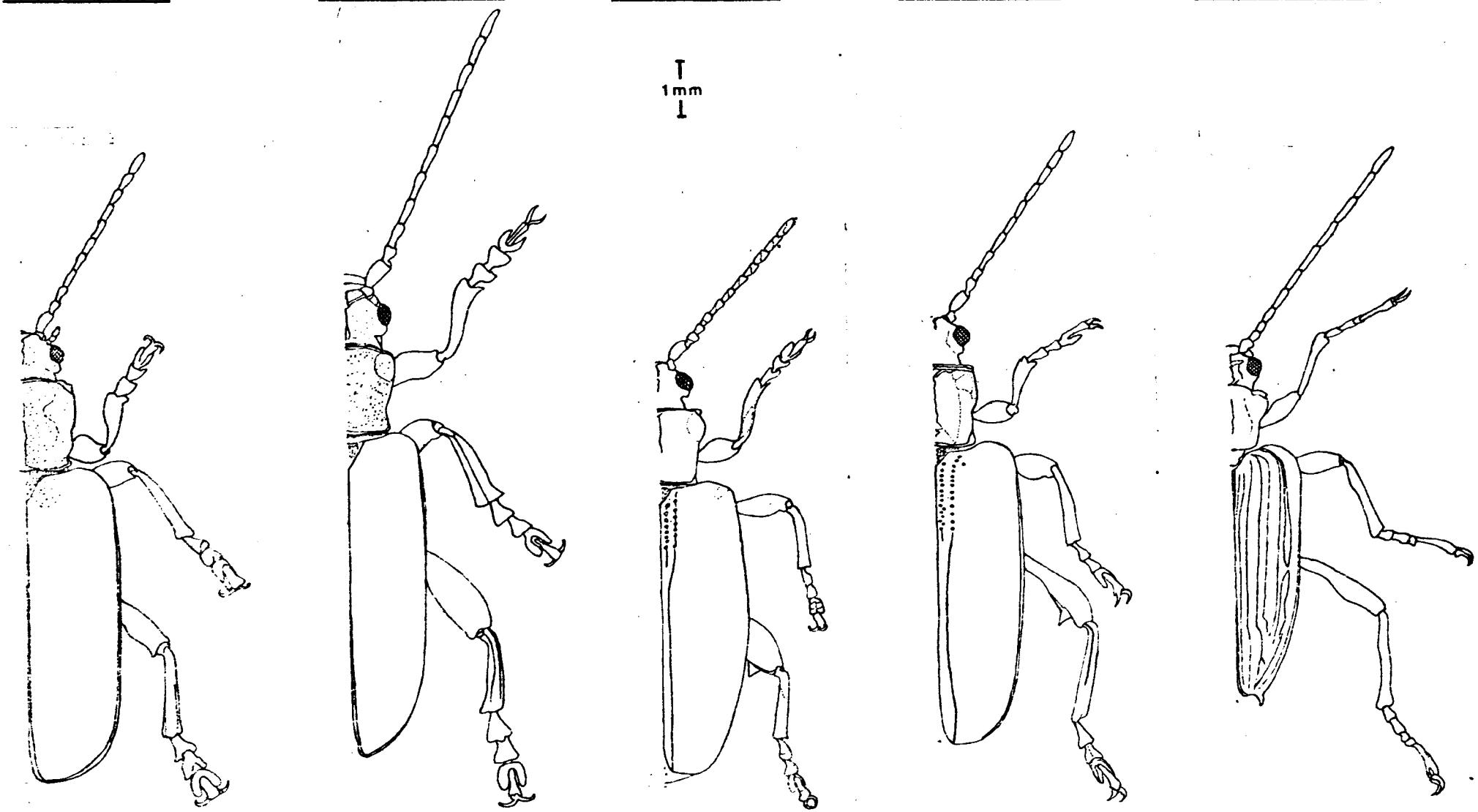


PLATE AK 22

DONACIA

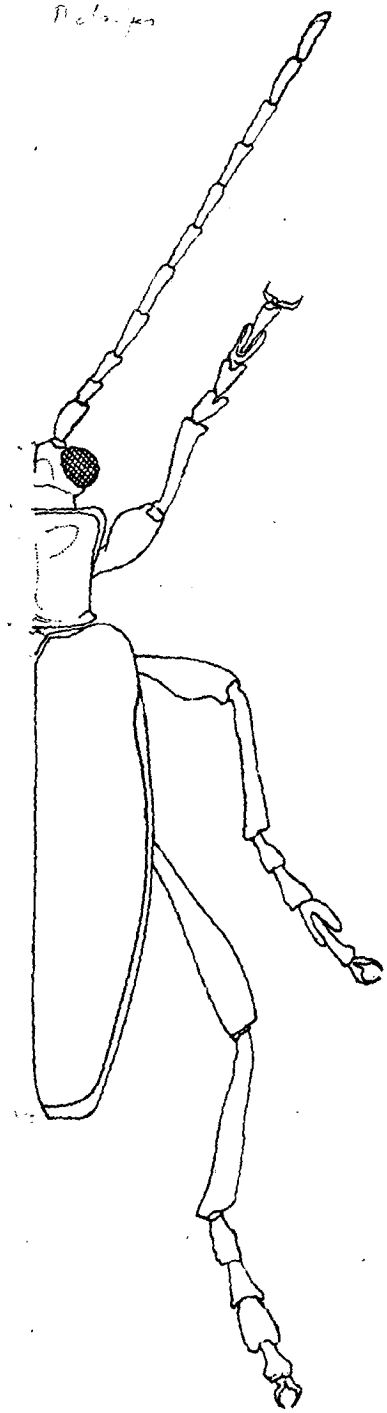


FIG. 69 D. clavipes F.

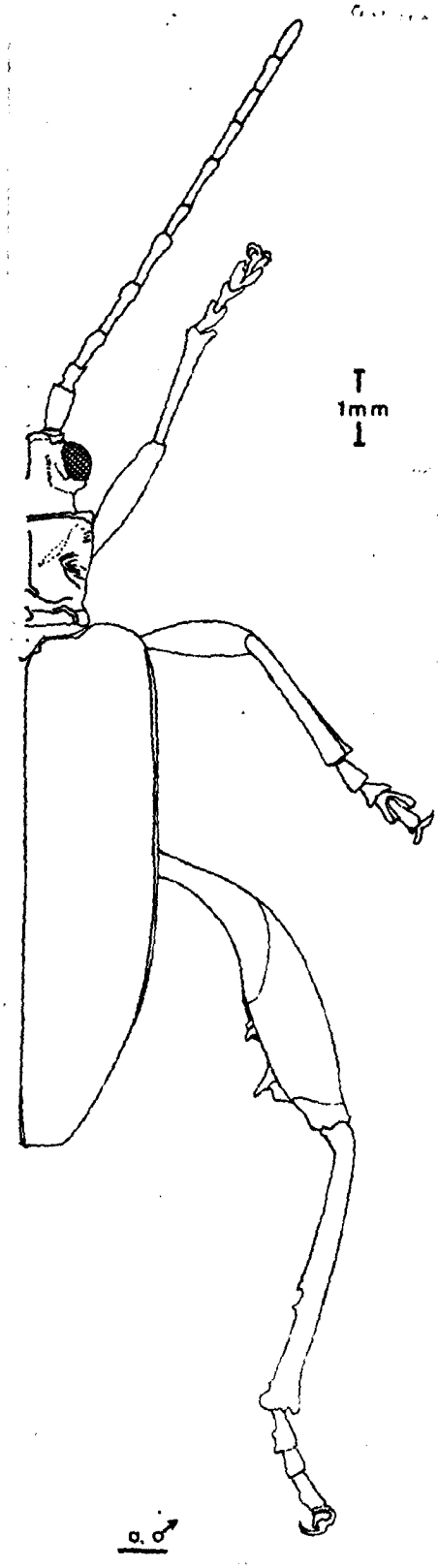


FIG. 70 D. crassipes F.

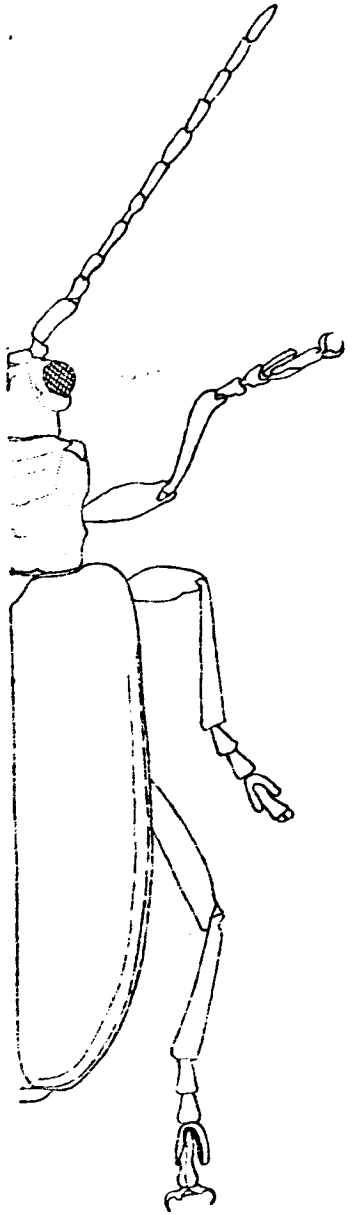


FIG. 71 D. cinerea Hbst.

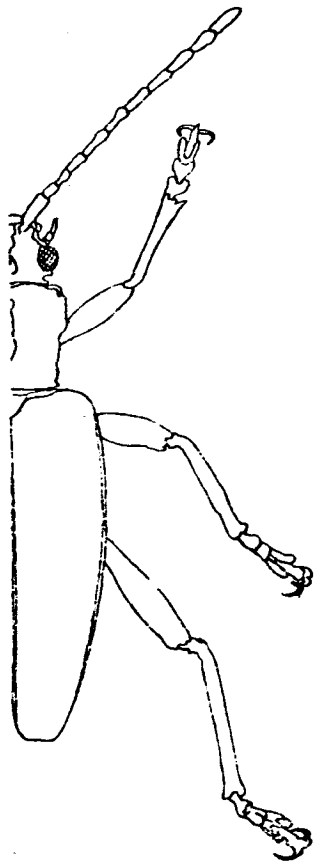
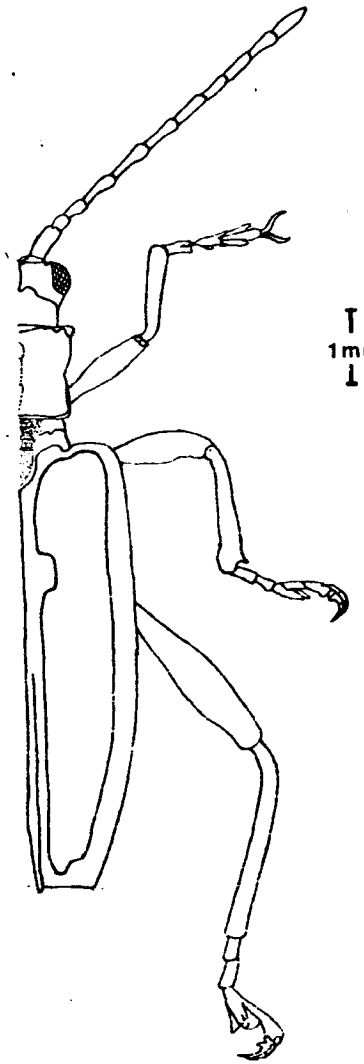
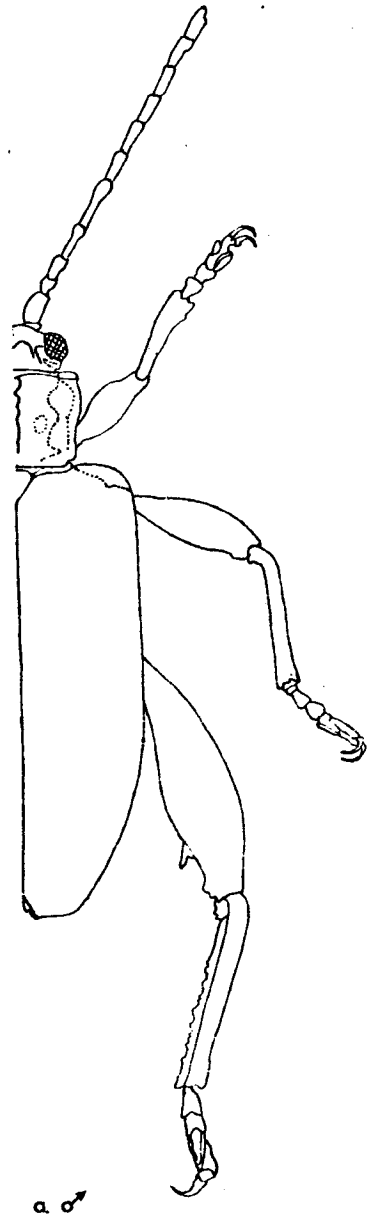


FIG. 72 D. semicuprea Panz.

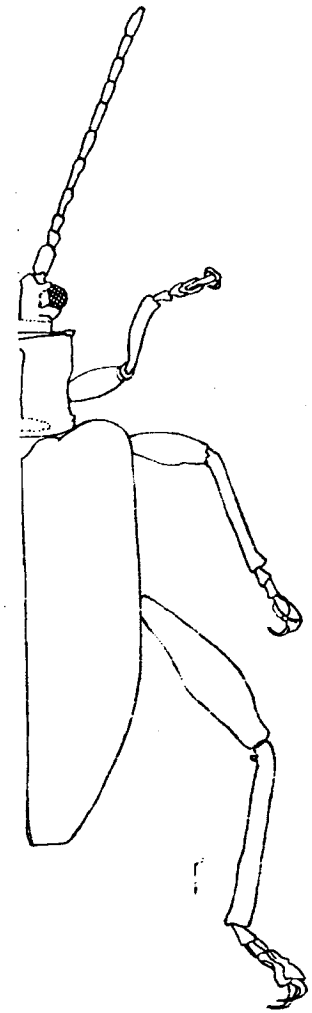


1mm.

FIG. 73 D. aquatica (L.)



a. ♂



b. ♀

FIG. 74 D. versicolora Brahm.

PLATE AK 24

DONACIA

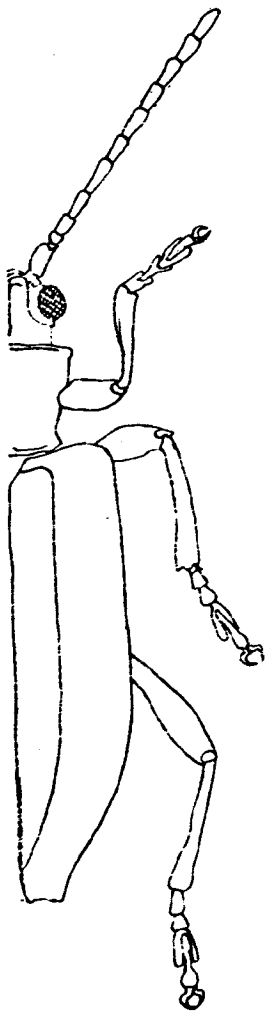


FIG.75 D. vulgaris Zsch.

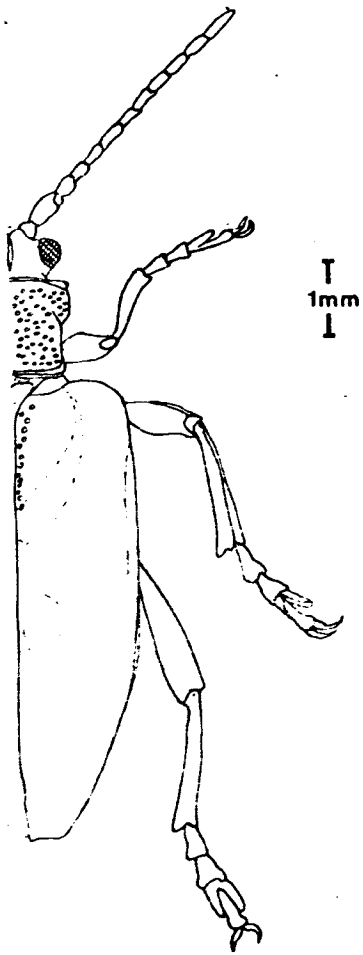


FIG.76 D. impressa Payk.

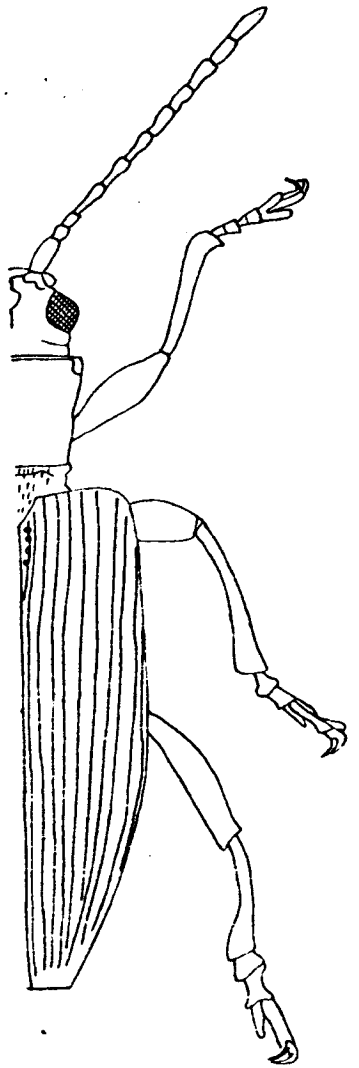


FIG. 77 D. simplex F.

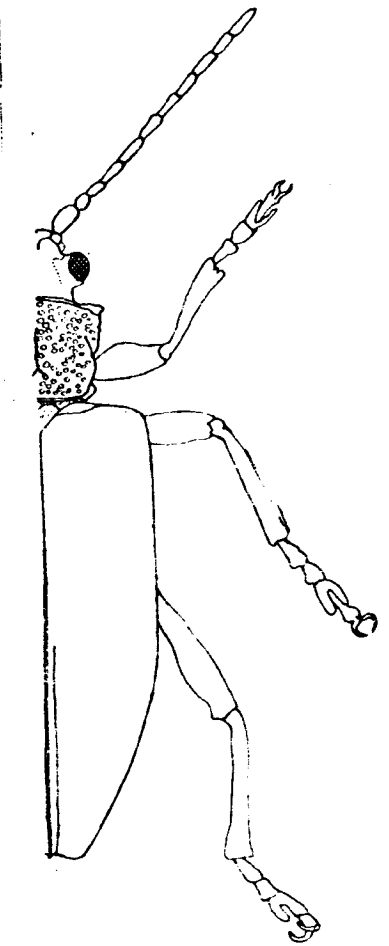


FIG. 78 D. thalassina Germ.

PLATE AK 25 DONACIA

FIG. 79 D sparganii Ahr.

1mm

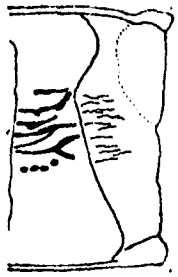


FIG. 80 D. dentata Hoppe.

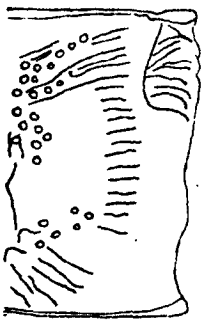


FIG. 81 D. marginata Hoppe.

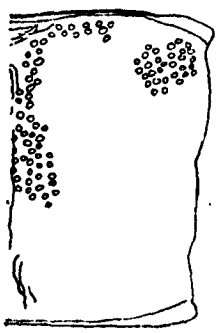


FIG. 82 D. bicolor Zsch.

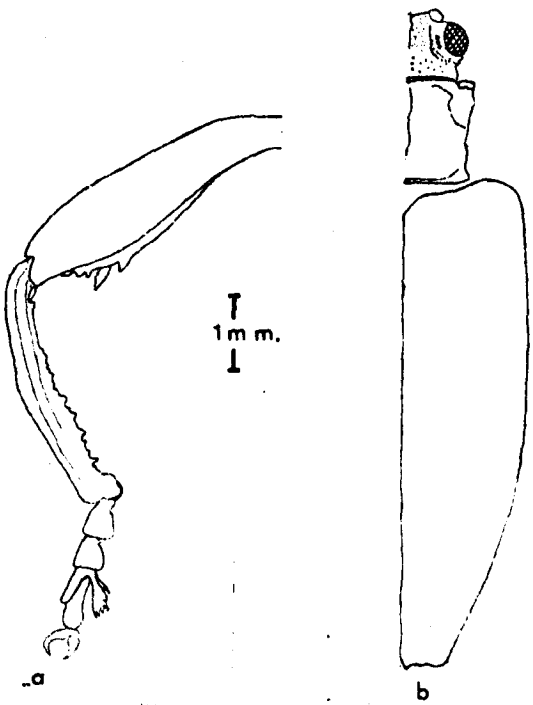


FIG. 83 D. dentata Hoppe.

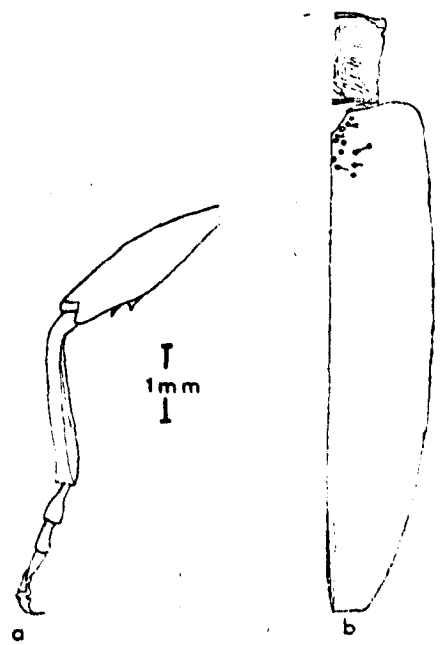


FIG. 84 D. sparganii Ahr.

FIGS. 79 - 82 DORSAL VIEW OF PRONOTUM
FIGS 83a & 84a LEFT HIND LEG

PLATE AK 26

CRYPTOCEPHALUS

DORSAL PRONOTUM & ELYTRA FIGS. 85-103. ANTERIOR HEAD FIGS. 91a, 94a, 97a, 99a, 100 ANTENNA FIGS. 101a, 103a.

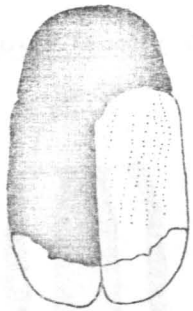


FIG. 85 C. biguttatus Scop.

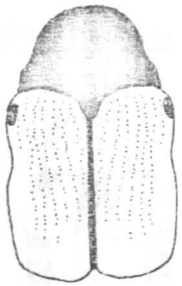


FIG. 88 C. bipunctatus (L.)

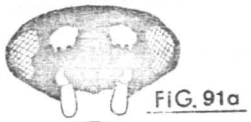


FIG. 91a

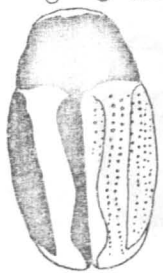


FIG. 91b C. bilineatus (L.)

FIG. 94a

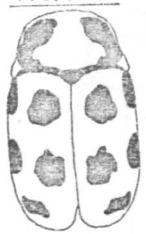


FIG. 94b C. decemmaculatus (L.)

FIG. 97a

FIG. 97b C. moraei (L.)

FIG. 100 C. frontalis Marsh.

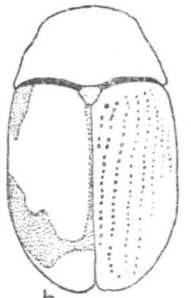


FIG. 101b C. pusillus F.

FIG. 101a

FIG. 86 C. primarius Har.

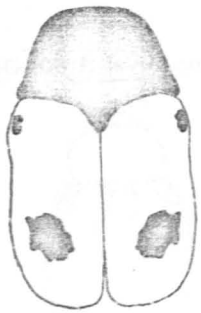


FIG. 89 C. bipunctatus (L.)

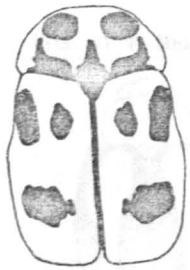


FIG. 92 C sexpunctatus (L.)

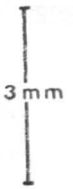


FIG. 95 C. decemmaculatus (L.)

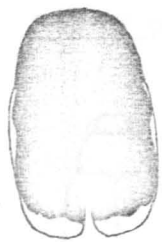


FIG. 98 C. moraei (L.)

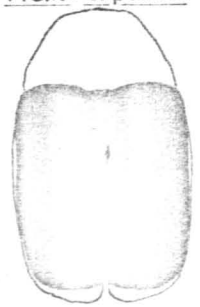


FIG. 102 C. pusillus F.

FIG. 87 C. coryli (L.) ♂

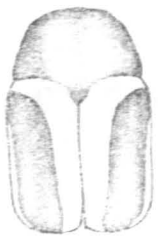


FIG. 90 C. bipunctatus var. sanguinolentus Scop.

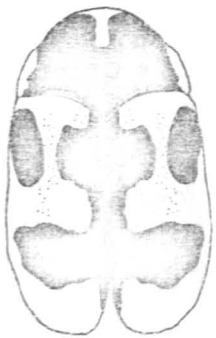


FIG. 93 C. sexpunctatus (L.)

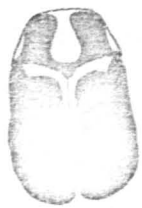


FIG. 96 C. decemmaculatus (L.)

FIG. 99a

FIG. 99b C. moraei (L.)

FIG. 103b C. fulvus Goez.

FIG. 103a

PLATE AK 27

PHYLLOTRETA

FIG.104 P. nemorum (L.)

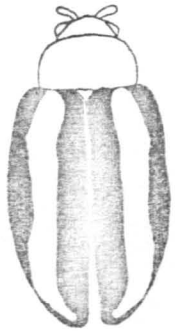


FIG.107 P. ochripes Curt.

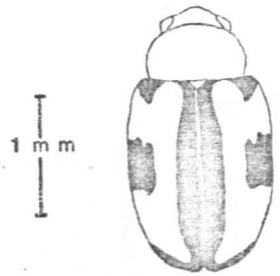


FIG.110 P. exclamationis (Th.)

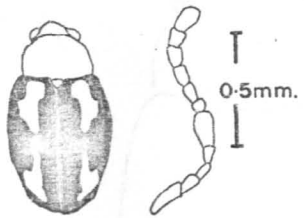


FIG.113 P. nodicornis (Marsh.)

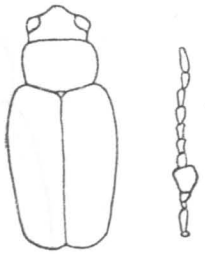


FIG.116 P. diademata Foud.

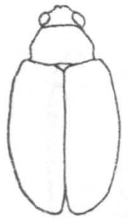


FIG.105 P. undulata Kuts.

FIG.108 P. tetrastigma Com.

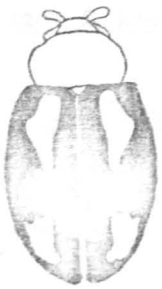


FIG.111 P. flexuosa (Ill.)

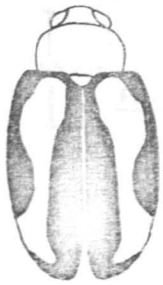


FIG.114 P. nigripes (F.)

FIG.117 P. cruciferae (Goez.)

FIG.106 P. vittula Redt.

FIG.109 P. tetrastigma Com.

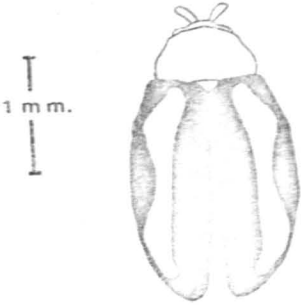


FIG.112 P. sinuata Redt.

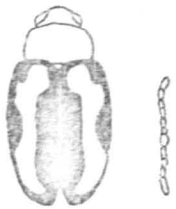


FIG.115 P. consobrina Curt.

FIG.118 P. aerea All.

FIG.119 P. atra (F.)

PLATE AK 28

CHAETOCNEMA

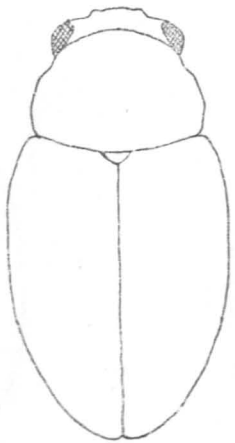
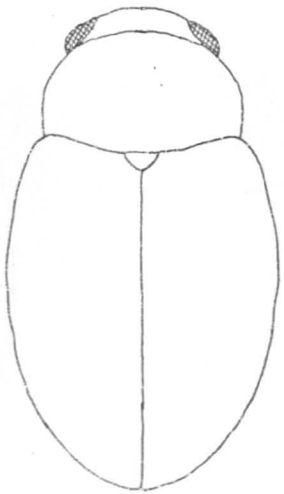


FIG. 120 C. subcoerulea Kuts.



0·5 mm.

FIG. 123 C. hortensis (Geof.)

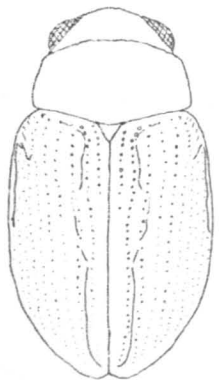


FIG. 125 C. conducta Mats.

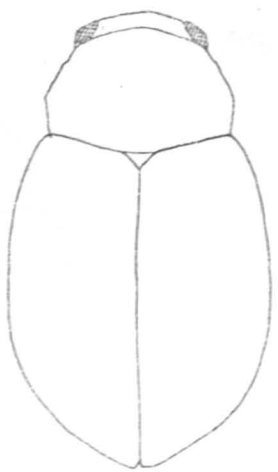


FIG. 122 C. sahlbergi (Gyll.)

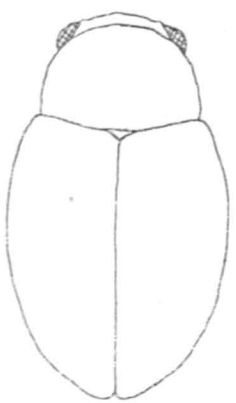


FIG. 124 C. arida Foud.

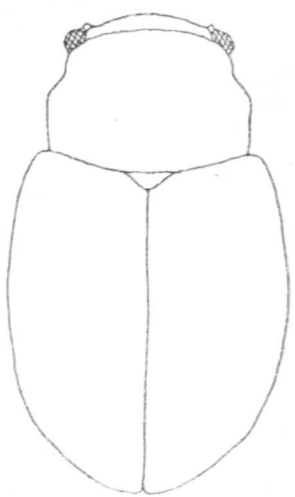


FIG. 126 C. confusa Boh.

PLATE AK 29

APHTHONA

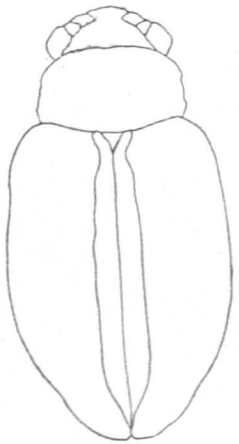


FIG. 127 A. nigriceps Redt.

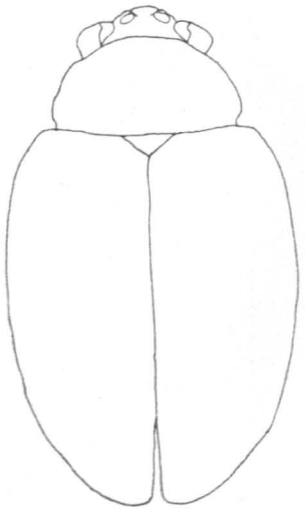


FIG. 129 A. venustula Kuts.

0·5 m m

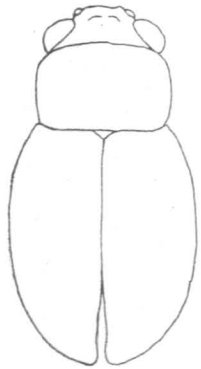


FIG. 132 A. herbigrada (Curt.)

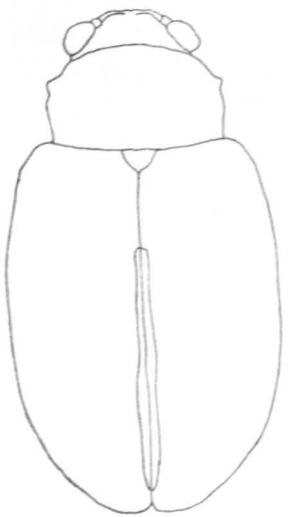


FIG. 128 A. lutescens (Gyll.)

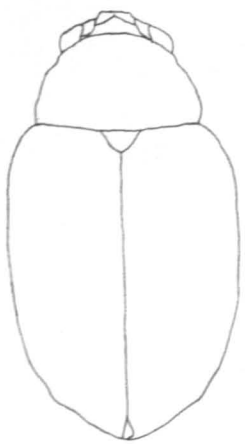


FIG. 130 A. cyanella Redt.

FIG. 131 A. atratula All.

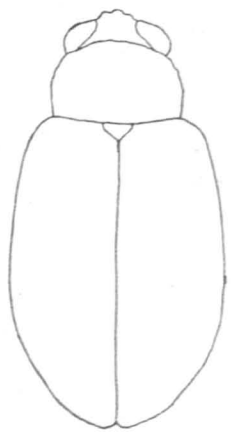


FIG. 133 A. euphorbiae (Schr.)