Mitt. Münch. Ent. Ges.	77	103–135	München, 1. 12. 1987	ISSN 0340–4943

Morphological comparison of type (or model) genera of the subfamilies of Cleridae

(Coleoptera, Cleridae)

By Jiří KOLIBÁČ

Abstract.

Wings, labia, labra, metendosternites, male and female sterna VIII and pygidia, male copulatory organs and ovipositors are illustrated and described in the present paper. The body parts were studied in the type-species of the nominate genera of all clerid subfamilies, except for the Cleropiestinae, where the inaccessible type genus *Cleropiestus* FAIRMAIRE was replaced by the indoubtedly appurtenant model genus *Thanasimodes* MURRAY (*T. gigas* CAST.), and Dieropsinae where both species *D. quadriplagiata* GAHAN, *D. femina* WINKLER were used as a source of morphological information.

New terms are proposed for the reception of structures that have yet neither been studied nor defined.

Introduction

The morphology of the Cleridae has not yet been examined in a wider scale. The most frequently studied bodyparts have been the male copulatory organs, generally studied by DUFOUR (1825), BORDAS (1898), SHARP & MUIR (1912); in the framework of special papers, they were also described by some subsequent authors. Similarly female genitalia have been currently studied by DUFOUR (1825), STEIN (1847) and TANNER (1927) (See CORPORAAL 1950).

The wing venation has been studied by KEMPERS (1901, 1922, 1923, 1924). (See CORPORAAL 1950). Beside this, wings of some species are illustrated in later works, e. g. CROWSON (1955), EKIS (1977), WINKLER (1964, 1980), etc.

Sterna and terga VIII (pygidia) of some species, similarly as metendosternites and ovipositors are given by EKIS (1977) in *Perilypus* SPIN. and by SOLERVICENS (1986) in *Eurymetopum* BLANCH. Labra and labia are also treated in the latter mentioned papers.[1]

Material and methods

All the examined structures have been studied in the type-species of the type genera of all but one clerid subfamilies (see below):

Thaneroclerinae: *Thaneroclerus buquet* (LEF., 1835)
Phyllobaeninae: *Phyllobaenus humeralis* (SAY, 1823)
Tillinae: *T. elongatus* (LINNAEUS, 1758)
Cleropiestinae: *Thanasimodes gigas* (CASTELNAU, 1836)[2]

[1] In other Coleoptera (as my knowledge) labra and labia have been illustrated by HALSTEAD (1967, 1973) in the families Tenebrionidae and Silvanidae, and by MAJER (1986) in the Melyridae. From the latter paper I accept the greater part of the morphological terms.

[2] Regrettably I had the type species, *Cleropiestus oberthuri* FAIRMAIRE, 1889 not at disposal. This is why the genus *Thanasimodes* was used as a replacement model genus.

Clerinae:	*C. mutillarius* Fabricius, 1775
Dieropsinae:	*D. quadriplagiata* Gahan, 1908 (♂)
	D. femina Winkler, 1964 (♀)[3]
Epiphloeinae:	*E. duodecimmaculatus* (Klug, 1842)
Tarsosteninae:	*T. univittatus* (Rossi, 1792)
Enopliinae:	*E. serraticorne* (Olivier, 1790)
Korynetinae:	*K. coeruleus* (De Geer, 1775)

Examined heads and abdomina were boiled 2–3 min. in a 10% KOH solution, subsequently all body parts (labra, labia, copulatory organs, spicular forks, sterna VIII and terga) were separated under the stereoscopic microscope (magnifications 8–63 etc.).

Metendosternites were separated and afterwards boiled in a 10% KOH solution. Wings were also taken from relaxed specimens, rinsed in water acidized with acetic acid, and, finally, dry-medium preparations were carried out following Winkler (1974).

All the body parts (except ovipositors and wings) were studied and illustrated under the stereoscopical microscope immersed in a drop of glycerol.

For examination of wing venation the compound microscope was used to observe it with magnifications 50–200×. Ovipositors, labra and labia were studied in the same way (magnifications 50–450×).

All examined specimens were designated as secondary types (plesiotypes) and deposited in collections of J. R. Winkler or of author.

Used terms and their abbreviations

The terms given below follow the works of Crowson (1955) (marked as C); Ekis (1977) (E); Majer (1986) (M), and Halstead (1980) (H). The new proposed terms are marked „K".

ad	= phallobasic apodeme	E	ltp	= lateral tormal process	E
ame	= articulating membrane	M	md	= marginal denticles	E
at	= anterior tendons	C	mea	= mental appendage	M
ctp	= connecting tormal process	K	men	= mentum	–
cx	= coxite	E	mtp	= medial tormal process	E
cxd	= coxital depressions	K	obb	= oblique bacculus	E
cxs	= coxital stylus	E	par	= parameres	–
dl	= dorsal lamina	E	pbt	= phallobasic armature	K
ejd	= ejaculatory duct	E	pg	= proctiger	E
eps	= epipharyngeal sclerites	K	pgb	= proctigeral bacculus	E
fa	= furcal arms	C	pha	= phallobasic appendages	K
fl	= furcal plate	K	phb	= phallobase	E
hyb	= hypopharyngeal bar	M	phy	= pharynx	–
hyp	= hypopharynx	–	plt	= phallic plate	E
inl	= interspicular plate	E	pme	= phallic membrane	K
l	= lamina	C	ppl	= phallic plicae	E
lin	= laminal incisions	E	prd	= premental apodemes	M
lpa	= labial palps	–	prm	= prementum	–

[3] The females of *D. quadriplagiata* Gahan are scarce and I had not them on hand, this is the reason when the ovipositor, female sternum VIII and pygidium were adopted from *D. femina* Winkler.

prn	=	premental notch	M	su	=	suspensory sclerites	K
prs	=	primary setae	K	top	=	tormal process	M
s	=	stalk	C	ts	=	taste sensillae	M
sb	=	spicular lobes	K	tsa	=	taste sensillae of articulating membrane	K
scs	=	secondary setae	K	tse	=	taste sensillae of epipharynx	K
sl	=	spiculae	E	tgs	=	tegminal struts	H
ss	=	spicular sac	E	vb	=	ventral baculus	E
str	=	phallic struts	E	vl	=	ventral lamina	E

Descriptions

In the following text, generic names only are given. The descriptions refer merely to the structures being distinctive for each species.

Wings: the standard numbering (marking) of the veins is used here. Capital letters refer to the main veins, numeral indexes refer to a vein bifurcation. Index „x" substitues the numeral index in unknown (unnamed) veins. Letter W means merely the anal (wedge) cell developed between veins 2A and 3A.

Thaneroclerus (fig. 1):

humeral vein (h) present, radial cell (Rc) small and suppresed due to a heavy sclerotized area. An indication of two springing veins in radial sector. 2A split into 2A and $2A_2$; 1A not present. It cannot be exluded that the attachment of 1A to 2A is continuous and, in such a case, $2A_1$ = 1A and $2A_2$ = 2A.

Phyllobaenus (fig. 2):

Rc not entire, Rs completely reduced (except Rs_x), also M and Rx reduced. 1A absent; 2A coalescent with 3A (evident at basal portion), and separated at very termination.

Tillus (fig. 3):

vein h present, Rc strongly developed, Rs with an indication of two veins (as in *Thaneroclerus*). Anal veins completely developed; a connection between 4A and 3A illusory (a pigmented spot).

Thanasimodes (fig. 4):

anal veins strongly reduced, 1A abbreviate and not connected with 2A; 4A attached to arch of 3A and not continuing. Jugal veins clearly divided into J_1 and J_2.

Clerus (fig. 5):

all veins completely developed, similarly as in *Tillus*, but 4A still appended (even when weakly) to 5A.

Dieropsis (fig. 6):

wings similar to those in *Clerus* or *Tillus*, subcosta (Sc) growing into costa (C), humeral vein (h) therefore not developed. Distinct transverse vein present between 4A and 3A. Well perceptible projections present on 2A and 1A.

Epiphloeus (fig. 7):

1A markedly reduced, not appended to 2A, rest of transverse connection between them clearly preserved on 2A. 4A in a greater part approximated to 3A and divergent in distal third. 2A approximated to arch of 3A and thus forms anal cell W.

Tarsostenus (fig. 8):

in apical vein portion, continuation of medial vein M (?) is scarcely perceptible as well as its attachment to Rs_x by means of a transverse vein. 1A strongly prolonged, appended to base of 3A. 4A longly attached to 3A and divergent at very wing margin. Anal cell not developed.

Enoplium (fig. 9):

rudiments of two veins occur on each side of Rc bordering. Transverse vein lacks between 1A and 2A. 2A split at apex, attached at own base to 3A and forms anal cell. 4A attached to 3A and does not continue. Jugal veins strongly developed.

Korynetes (fig. 10):

anal veins very well developed. Two transverse veins situated between 1A and 2A, 4A and 3A split at their ends, transverse vein between 3A and 4A and anal cell W are developed. Similarly as in *Enoplium,* vein rudiments occur ate base of Rc bordering to which is distinctly attached Rs_x.

Labrum: The most significant specific characters are the tormal processes (top, mtp, ltp, ctp). This term was used at first by Ekis (1977) in the genus *Perilypus*. The processes probably serve to attach the labrum to the clypeus. Articulating membrane (ame) is most likely appended to the membranous epipharynx, it bears also hypopharynx and taste (?) sensillae (tsa). Epipharyngeal sclerite (eps) probably represents a sclerotized part of the epipharynx.

Thaneroclerus (fig. 11):

labral ciliation developed only at outer margin, epipharyngeal sclerite strongly developed. Tormal processes differentiated as medial (mtp) and lateral (ltp) ones. Projection of lateral tormal processes is not completely conjoined.

Phyllobaenus (fig. 12):

quite surprising structures are developed on inner (hypopharyngeal) side of the labrum. Taste sensillae of epipharynx (tse) have not been observed; an aggregation of sensillae (tsa) occurs on articulating membrane. Tormal processes (top) not differentiated; non-coalescent medial tormal process merely indicated.

Tillus (fig. 13):

labrum (if comparing with the beetle size) extraordinarily small, taste sensillae on epipharynx very long and stout, tormal processes differentiated into medial, lateral and connecting ones (mtp, ltp, ctp). Hypopharynx (hyp) located on articulating membrane which continues towards labium, as presented on fig. 13. Pharynx covered by hypopharynx.

Thanasimodes (fig. 14):

labrum of a clerine type, medial tormal processes absent but connecting ones are developed. Epipharyngeal sclerites present.

Clerus (fig. 15):

tormal processes similar to those in the preceding species, epipharyngeal sclerites absent.

Dieropsis (fig. 16):

labrum strongly ciliate, all three kinds of tormal processes present. Taste sensillae on articulating membrane strongly developed.

Epiphloeus (fig. 17):

labrum evenly vested with long hairs; taste sensillae of epipharynx strongly developed. Tormal processes differentiated into lateral and medial (?) ones.

Tarsostenus (fig. 18):

labrum sparsely ciliate (two setae on each side); taste sensillae of epipharynx cover its complete median portion. Both lateral and medial tormal processes developed.

Enoplium (fig. 19):

lateral tormal processes longly divergent from their middle, connecting one inconspicious, seemingly growing into labium beneath. As the structure is too obscure, it scarcely can be judged if they are the true tormal processes.

Korynetes (fig. 20):

tormal processes the same as in *Tarsostenus*.

Labium. The structure of the labium is very complex. Prementum (prm) and ligula (lig) are connected by hypopharyngeal bar (hyb) which is apparently a non-functional rudiment of the salivary glands (Majer 1986). From the prementum run premental apodemes (prd); mental appendages (mea) rise from the mentum (men). On the articulating membrane (ame) which runs from ligula, sclerotized formations are perceptible; these are named by me as „suspensory sclerites" (su). Articulating membrane then bears taste sensillae (tsa), hypopharynx (hyp), pharynx (phy) and it is attached to the labrum. Taste sensillae also occur on the labial palps (lpa) and on the ligula.

Thaneroclerus (fig. 21):

segment 3 of labial palps sparsely pubescent, hypopharyngeal bar extraordinarily strongly developed. Mentum big, ciliate at basal corners, mental appendages (which are connected by suspensory sclerites) run from it towards hypopharynx which is crescent-shaped.

Phyllobaenus (fig. 22):

hypopharyngeal bar developed, mentum very narrow, without mental appendages. Suspensory sclerites also present. Ligula only sparsely ciliate. Prementum with long premental apodemes.

Tillus (fig. 23):

segment 3 of labial palps and ligula densely ciliate, hypopharyngeal bar developed. Premental apodemes slender. Mentum ciliate, mental appendages reaching hypopharynx. Suspensory sclerites developed.

Thanasimodes (fig. 24):

taste sensillae on ligula reduced. Premental notch expressively developed, suspensory sclerites present.

Clerus (fig. 25):

premental notch (prn) not developed, hypopharyngeal bar evidently preserved, suspensory sclerites expressively developed.

Dieropsis (fig. 26):

labium densely ciliate throughout all surface, segment 3 of labial palps relatively small, hypopharyngeal bar strongly reduced. Prementum has deeply incised premental notch and short stout apodemes. Mentum densely ciliate, articulating membrane densely covered with taste sensillae. Hypopharynx possesses two appended sclerites. Location of pharynx as figured.

Epiphloeus (fig., 27):

hypopharyngeal bar reduced, suspensory sclerites fairly developed as well as mental appendages by means of which is big hypopharynx attached to mentum.

Tarsostenus (fig. 28):

hypopharyngeal bar and mentum reduced to a high degree; premental notch and taste sensillae of articulating membrane developed.

Enoplium (fig. 29):

segment 3 of labial palps only sparsely pubescent. Premental notch and forked mental appendages present. Prementum sparsely ciliate. Two kinds of taste sensillae present on articulating membrane. Hypopharynx small and narrow.

Korynetes (fig. 30):

segment 3 of labial palps only sparsely pubescent, premental notch deep. Mental appendages and suspensory sclerites present. Hypopharynx of a normal clerid shape.

Metendosternite: The metendosternite (furcasternum metathoracale) is an internal sclerite of metathorax to which the wing muscles are chiefly attached. Crowson (1955) has it differentiated into lamina (l), stalk (s) which is connected with metasternite, furcal arms (fa) and anterior tendons (at). All the metendosternites described below differ substantially each from other.

Thaneroclerus (fig. 31):

developed anterior tendons, which are mutually widely distant. Anterior tendons are developed also in *Tillus* (fig. 33), *Enoplium* (fig. 39) and *Epiphloeus* (fig. 37). In *Tillus*, laminae are moreover strongly shortened. A broad stalk is characteristical for *Korynetes* (fig. 40). The most different metendosternite occurs in *Epiphloeus* (fig. 37): laminae are inflexed backwards and coalescent. In *Tarsostenus* (fig. 38) and *Epiphloeus* (fig. 37), a formation arising from fused elongate furcal arms is moreover developed – furcal plate (fl) which covers stalk base.

Terga VIII and sterna VIII: Terga VIII (pygidia) (figs 41–50) and sterna VIII (figs 51–60) of males bear rather characters of lower taxa; the following vestiture may be observed: (a) primary setae (prs) – long, stout, growing from distinct shallow depressions, and (b) secondary ones (scs) – short, thin, superficially appended to the sclerite. No intercalary forms have been observed between the both types of setae. The primary setae are almost perfectly symmetrically arranged and perhaps bear specific characters.

Aedeagus: Tegminal struts (tgs) is not a term homologous to the phallobasic struts of Ekis (1977).

Thaneroclerus (fig. 61):

phallobase (phb) not closed dorsally; phallobasic apodeme (ad) not developed, only its rudiment perceptible on the place of the coalescence of tegminal struts.

Phyllobaenus (fig. 62):

aedeagus, regarding to body size of the beetle, is relatively long, occupying complete abdominal length till metanotum. Phallobase coalescent through a point at entrance opening. Tegminal struts not connected, as long as phallobasic apodeme. Phallobasic armature (pbt) split and both processes run throughout whole phallobase. Phallus robust, long, markedly reaching beyond tegminal length; more than a half of phallus formed by phallic struts (str). Phallic plate (plt) diverges at apex into two points which are, however, of a different nature than phallic appendages (pha) in *Dieropsis* (fig. 66).

Tillus (fig. 63):

tegminal struts coalescent, phallobasic apodeme present. Phallobasic armature runs into membranous portion of phallobase. Phallus robust, with strongly developed phallic phicae (ppl). The tegmen (i. e. phallobase pictured on fig. 62) rolled out. In the natural condition the phallus is encompassed by tegmen.

Thanasimodes (fig. 64):

a typical clerine tegmen. Phallobase coalescent with phallus encompassed. In the place of coalescence the tegminal struts are still perceptible. Phallus short, with marginal denticles (md).

Clerus (fig. 65):

phallobase coalescent, phallus long.

Dieropsis (fig. 66):

tegmen of a clerine type, phallus has two phallic appendages.

Epiphloeus (fig. 67):

phallobase fused with parameres (par). Parameres finely pubescent. Inverted tegmen: opening at parameres on ventral side, whereas opening at phallobasic apodeme situated dorsally. Phallic struts extraordinarily long and connected by phallic membrane (pme).

Tarsostenus (fig. 68):

aedeagus very similar to that in the preceding species. Tegmen inverted, phallus with long phallic struts and phallic membrane.

Enoplium (fig. 69):

tegmen resembles that of *Tillus* (fig. 63). Tegminal struts present. Phallobase membranous, not coalescent. Phallus stout, longer than tegmen.

Korynetes (fig. 70):
phallobase sclerotized, coalescent. Tegminal struts not present. Phallus similar to that in *Epiphloeus* (fig. 67) and *Tarsostenus* (fig. 68), but with shorter phallic membrane.

Spicular fork:

Thaneroclerus (fig. 71):
both spiculae (sl) coalescent in along basal half, spicular lobes (sb) reduced to inconspicuous tubercles.

Phyllobaenus (fig. 72):
spiculae free along complete length, formations at their apices very likely have arisen as a constriction of spiculae.

Tillus (fig. 73):
a tendency to diverge is apparent in spiculae; spicular lobes small, interspicular plate (inl) preserved.

Thanasimodes (fig. 74):
spiculae not coalescent, both spicular lobes and interspicular plate becoming obsolete.

Clerus (fig. 75):
spiculae coalescent along basal half, interspicular plate and spicular lobes inconspicuous.

Dieropsis (fig. 76):
spicular fork resembles that in *Clerus*.

Epiphloeus (fig. 77):
spiculae coalescent more than along basal half, interspicular plate and spicular lobes developed.

Tarsostenus (fig. 78):
spiculae coalescent along basal half, interspicular plate developed, spicular lobes as reduced as those in *Thaneroclerus* (fig. 71).

Enoplium (fig. 79):
spiculae form a narrow slot, spicular lobes and interspicular plate evident.

Korynetes (fig. 80):
spiculae coalescent along two basal thirds, both spicular lobes and interspicular plate expressive.

Terga VIII and sterna VIII of female: Female terga VIII (pygidia) (figs 81–90) and sterna VIII (figs 91–100) differ each from other as these in males. Similarly primary setae (prs) and secondary ones (scs) are distiguishable in females. Moreover, female sternum VIII bears spiculum ventrale (sv).

Ovipositor: The individual ovipositors mutually differ in the presence/absence of laminal incisions (lin) on both ventral and dorsal lamina (dl, vl) and in the coxital ciliation.

Thaneroclerus (fig. 101):
proctiger (pg) inconspicuous, coxital styli (cxs) located in coxital depressions (cxd). Laminae without incisions.

Phyllobaenus (fig. 102):
proctiger conspicuous, laminae finely fibriate.

Tillus (fig. 103):
proctiger absent, coxitae (cx) densely and finely ciliate (namely on ventral side). Laminae without incisions.

Thanasimodes (fig. 104):
proctiger well developed, coxitae finely pubescent, dorsal lamina with two incisions (lin).

Clerus (fig. 105):
proctiger present, coxitae densely pubescent, laminae without incisions.

Dieropsis (fig. 106):
proctiger (!) and coxites densely ciliate, laminae finely fibriate (fibriation is not equal to laminal incisions).

Epiphloeus (fig. 107):
proctiger not developed, both laminae with incisions.

Tarsostenus (fig. 108):
proctiger absent, laminae with incisions.

Enoplium (fig. 109):
proctiger absent, laminae present.

Korynetes (fig. 110):
proctiger as well developed as laminal incisions.

Discussion

Wings: The structure of the wing venation becomes continuously more simple in the course of the phylogeny of Coleoptera. In the studied Cleridae the reductions of the venation are manifested chiefly in the anal area. Namely transverse veins of anal area become reduced sometimes also vein 1A *(Phyllobaenus)* or vein 4A *(Phyllobaenus, Thanasimodes).*

In some cases, radial cell (Rc) has also been transformed. In *Thaneroclerus* Rc it is small, surrounded by a thick and heavily sclerotized rim; on the contrary, that is reduced in *Phyllobaenus* and Rc is therefore hard to see. A striking similarity of the wings is evident in *Tillus, Clerus, Dieropsis,* and on the other hand, in *Epiphloeus* and *Tarsostenus.*

Labrum: The most distinctive differences have appeared in the structures of the tormal processes. The incurved tormal processes in *Epiphloeus* appear to be evident modification of the medial tormal processes. The strongest reduction probably passed in *Phyllobaenus* where, in addition, unusual structures occur on ventral (epipharyngeal) side of the labrum.

Labium: The structures maximally influenced by evolution are the hypopharyngeal bar, prementum, mentum, and the pubescence of the terminal segment of the palps. The hypopharyngeal bar is very likely being diminished during evolution. It is developed in all the studied species, to a high degree in *Thaneroclerus;* it is the most reduced, strange to say, in *Epiphloeus* and *Tarsostenus.* The presence of such structures as premental notch and sparse ciliation on terminal segment of labial palps should most likely be considered plesiomorphic.

Metendosternite: The fundamental proportions are more or less preserved in all studied metendosternites, except for *Tillus* where an apparent reduction of laminae is coming, and *Epiphloeus* where the laminae are fused. In *Thaneroclerus, Tillus* and *Epiphloeus,* anterior tendons are preserved; in *Epiphloeus* and *Tarsostenus* the furcal plate is present.

Aedeagus: As an ancestral type of the clerid tegmen should be considered the cucujoid inverted one (Crowson 1955) which is recently present in the Korynetinae, Epiphloeinae, Tarsosteninae. In the course of evolution, various modifications became in this ancestral type. The parameres were probably reduced (similarly as it is indicated in the genus *Aplocnemus:* Melyridae) and the tillinae or enopliinae tegmen has arisen. This non-closed phallus merely encompasses the tegmen.

Spicular fork: With the respect to the evolution of the wings and tegmen, the ancestral structure of the spicular fork may be that resembling the recent Korynetinae, i. e. with spiculae coalescent in part, developed spicular lobes, interspicular plate present on the spicular sac. During a further evolution the spiculae may become divergent, with spicular lobes and interspicular plate vanished *(Thanasimodes)*.

Interspicular plate is apparently a rudiment of tergum IX; it is indicated by the structure of this body part in the family Acanthocnemidae, where sternum IX is preserved on ventral side, or, in the Phloiophilidae. Tergum IX is preserved on spicular fork also e. g. in the genus *Melyris* (Melyridae).

Ovipositor: The examined ovipositors differ by presence/absence of laminal incisions of the dorsal and ventral laminae, shape of the proctiger and ciliation of the coxites.

A shape of the ventral and proctigeral bacculi is perhaps less important.

Summary

The aim of this contribution is to give the initial point for subsequent more precised definitions of the subfamilies of Cleridae and for additional morphological examination of the genera of this family planned for the future.

Acknowledgements

I am indebted to Mr. Karel MAJER, Agricultural University, Brno, Czechoslovakia, and to Dr. Josef R. WINKLER, Prague, Czechoslovakia, for their valuable comments, advices and criticism, and for placing of some specimens as well as valuable literature at my disposal. I am very obliged also to Dr. Roland GERSTMEIER for his willing patience and excellent editorial care.

Zusammenfassung

In dieser Arbeit werden Flügel, Labium, Labrum, Metendosternite, Sternum VIII und Pygidium beider Geschlechter, männliche Kopulationsorgane und Ovipositor der Gattungstypen der Cleriden-Unterfamilien dargestellt und beschrieben. Damit soll in Zukunft eine einheitliche Terminologie erreicht werden.

Literature

For all literature before 1950 see the work of CORPORAAL cited below.

CORPORAAL, J. B. 1950: Cleridae – In: Coleopterorum Catalogus, Suppl. ed. a. W. D. Hincks, Pars 23 (Ed. sec.), s'Gravenhage, 373 pp.

CROWSON, R. A. 1955: The Natural Classification of the Families of Coleoptera. 187 pp., London.

EKIS, G. 1977: Classification, Phylogeny and Zoogeography of the Genus *Perilypus* (Coleoptera: Cleridae). – Smithsonian Contributions to Zoology **227**, IV + 138 pp., Washington.

HALSTEAD, D. G. H. 1967: A revision of the genus *Palorus* (sens. lat.) (Coleoptera: Tenebrionidae). – Bull. Brit. Mus. (nat. Hist.) Ent. **19** (2), 59–148, 56 figs.

–– 1973: A revision of the genus *Silvanus* Latreille (s. l.) (Coleoptera: Silvanidae). – Bull. Brit. Mus. (nat. Hist.) Ent. **29** (2), 37–112, 179 figs.

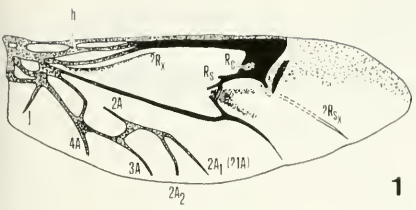
–– 1980: A revision of the genus *Oryzaephilus* GANGLBAUER, including descriptions of related genera (Coleoptera: Silvanidae). – Zoological Journal of the Linnean Society **69**, 271–374, 307 figs.

MAJER, K. 1986: Comparative morphology of the labrum and labium of some Melyridae (Coleoptera). – Acta ent. bohemoslov. **83**, 137–151

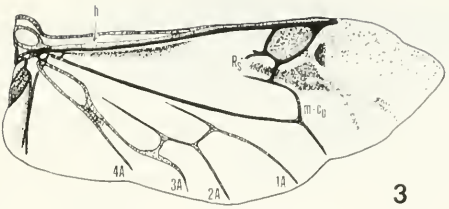
SOLERVICENS, J. 1986: Revision taxonomica del genero *Eurymetopum* BLANCHARD, 1844 (Coleoptera, Cleridae, Phyllobaeninae). – Acta Ent. Chilena **13**, 11–120.

WINKLER, J. R. 1964: A revision of the genus *Dieropsis* GAHAN, 1908, type of a new subfamily Dieropsinae n. subf. (Coleoptera: Cleridae). – Acta Univ. Carolinae – Biol., vol **1964**, No 3, 305–329.
–– 1974: Sbíráme hmyz a zakládáme entomologickou sbírku. 211 pp., Praha (in Czech).
–– 1980: A revision of the new subfamily Cleropiestinae subf. n. (Coleoptera: Cleridae). – Acta Univ. Carolinae-Biol. **1978**, 437–456.

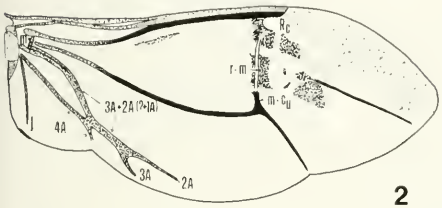
Address of Author:
Jiří KOLIBÁČ,
J. Skupy 1714,
708 00 Ostrava, Czechoslovakia.



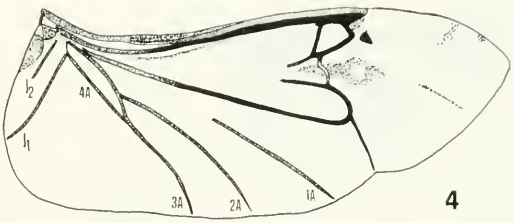
1



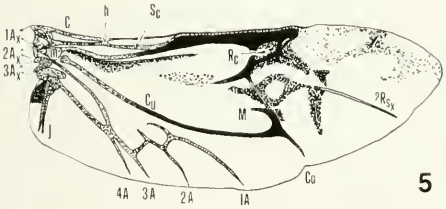
3



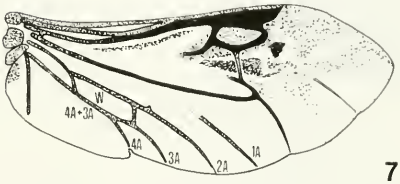
2



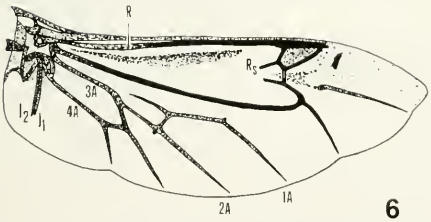
4



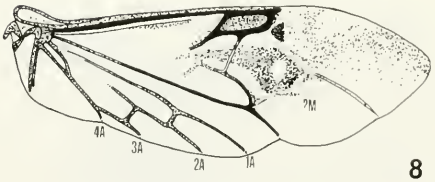
5



7

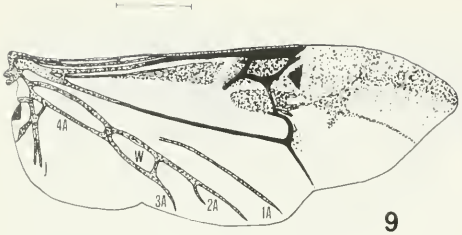


6

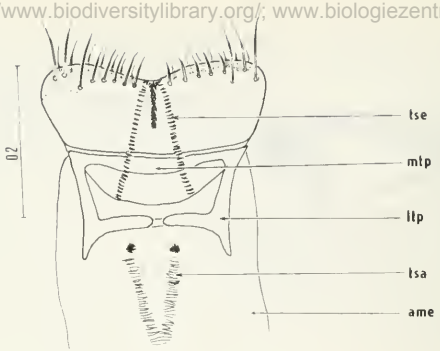


8

Figs 1–8: Wings: 1 *Thaneroclerus*, 2 *Phyllobaenus*. Scale 1 mm; 3 *Tillus*, 4 *Thanasimodes*. Scale 1 mm; 5 *Clerus*, 6 *Dieropsis*. Scale 1 mm; 7 *Epiphloeus*, 8 *Tarsostenus*. Scale 1 mm.

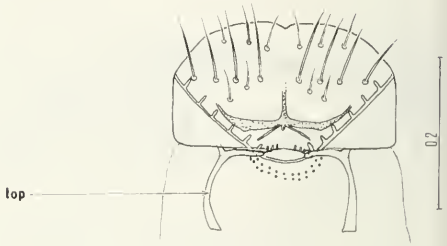


9

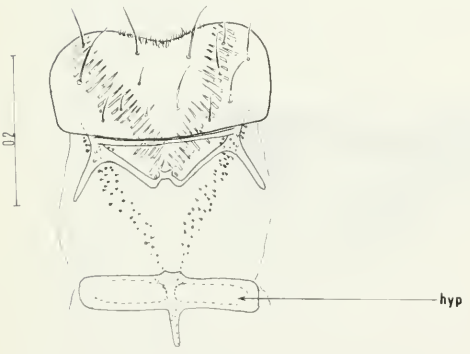


11

10

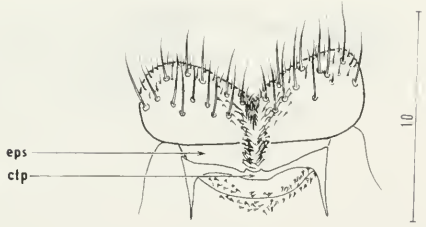


12

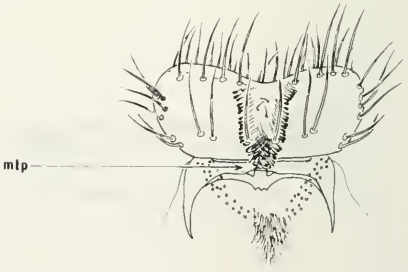


13

15

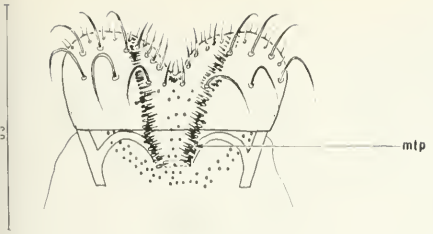


14

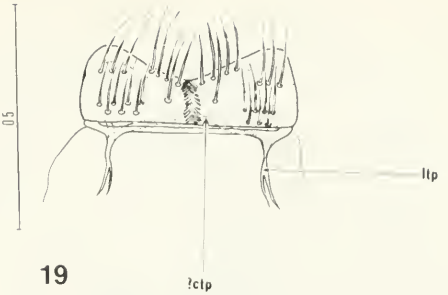


16

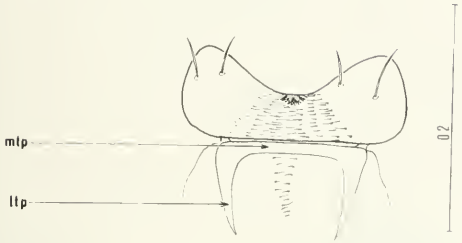
Figs 9–16: Wings: 9 *Enoplium*, 10 *Korynetes*. Scale 1 mm; Labra: 11 *Thaneroclerus*, 12 *Phyllobaenus;* 13 *Tillus*, 14 *Thanasimodes;* 15 *Clerus*, 16 *Dieropsis*.



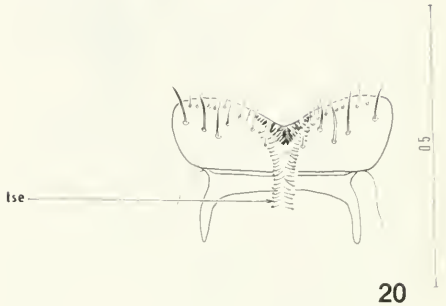
17



19

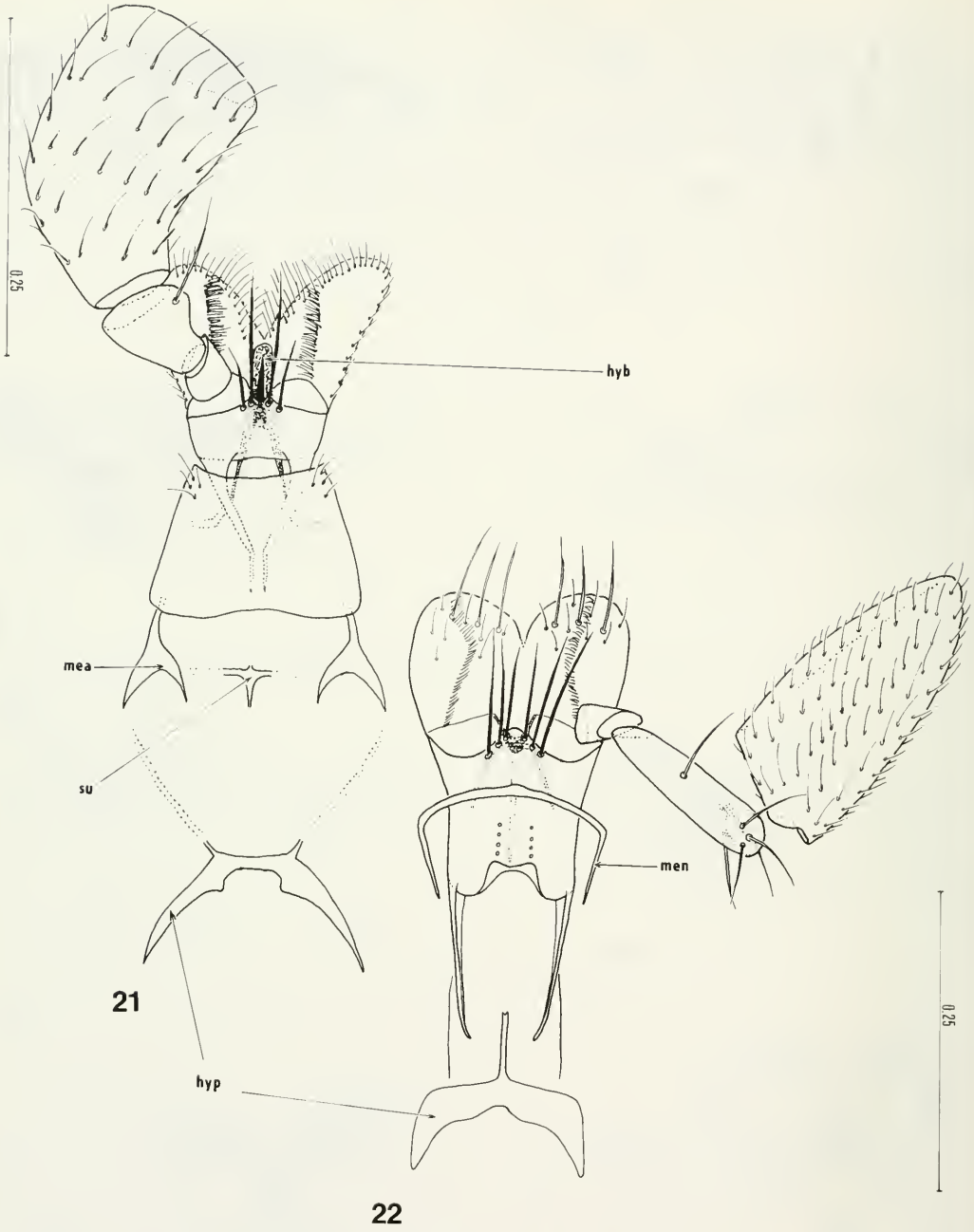


18

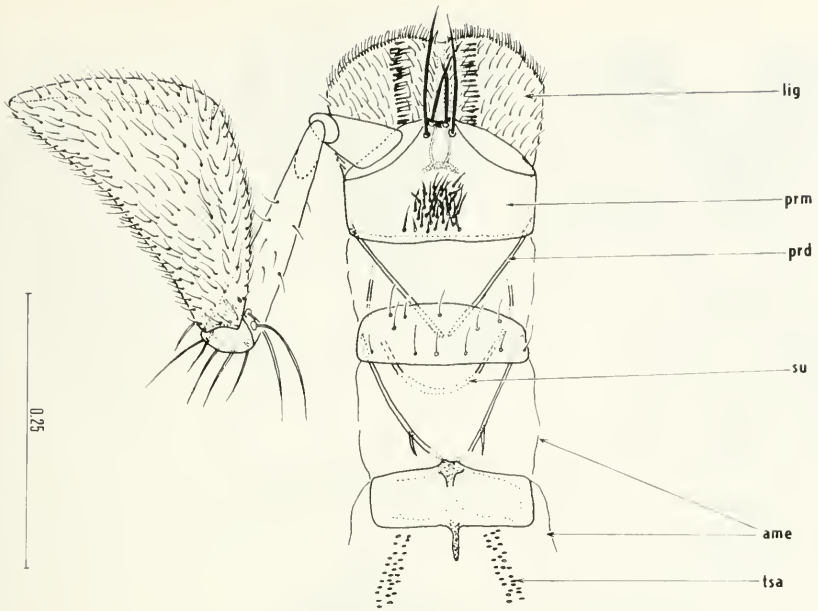


20

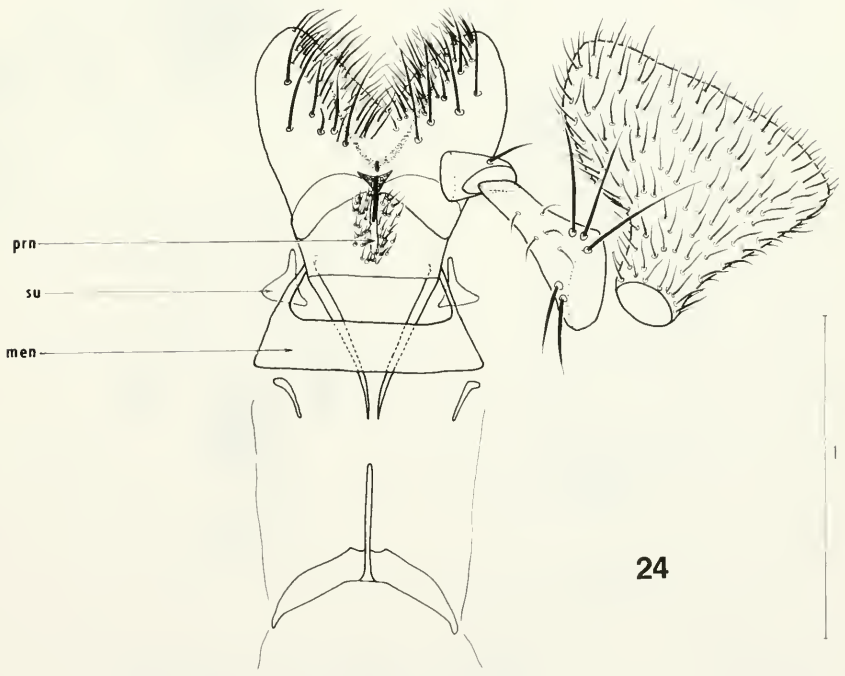
Figs 17–20: Labra: 17 *Epipbloeus*, 18 *Tarsostenus;* 19 *Enoplium*, 20 *Korynetes.*



Figs 21–22: Labia: 21 *Thaneroclerus*, 22 *Phyllobaenus*.

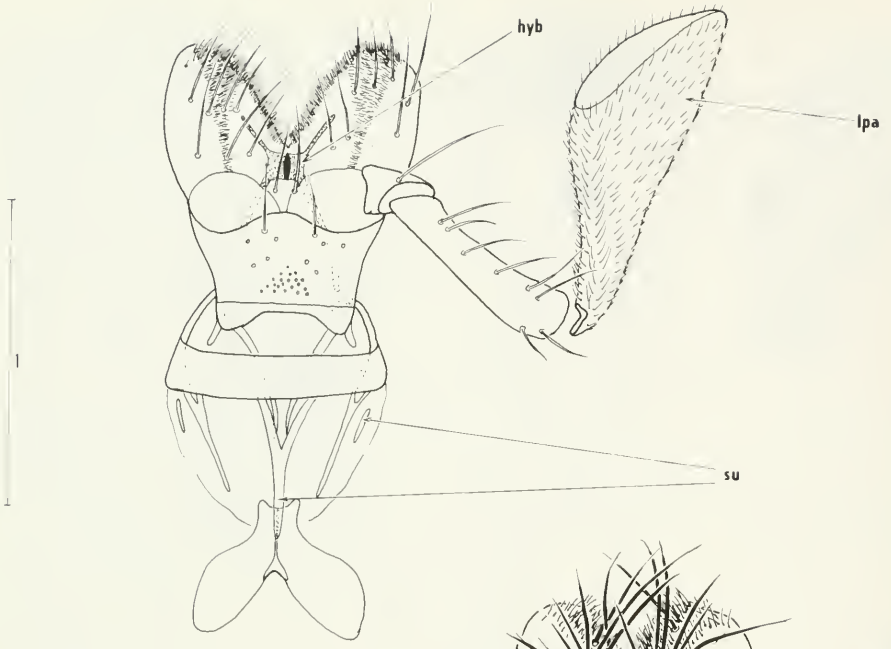


23

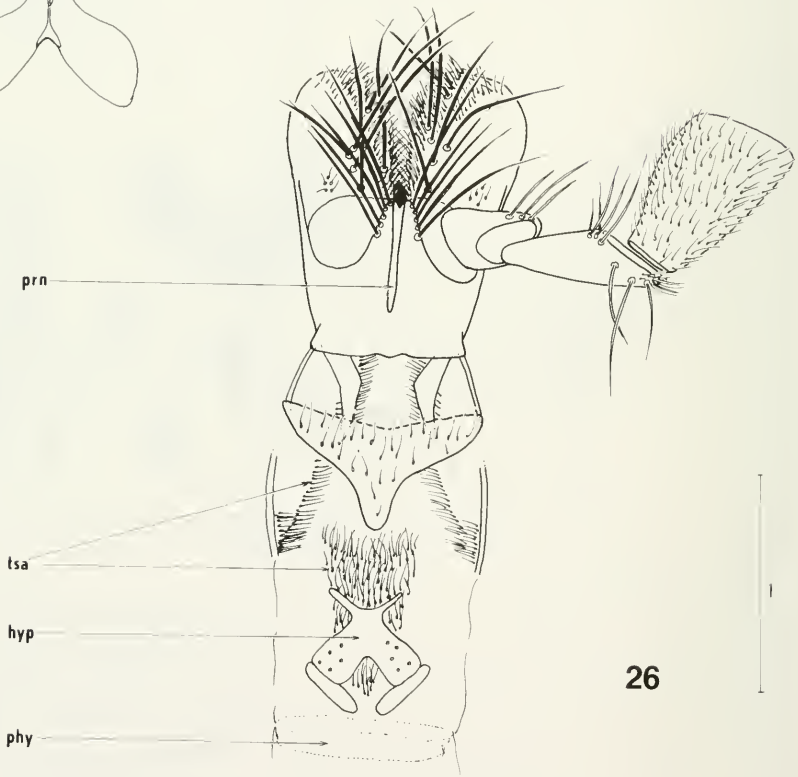


24

Figs 23–24: Labia: 23 *Tillus*, 24 *Thanasimodes*.

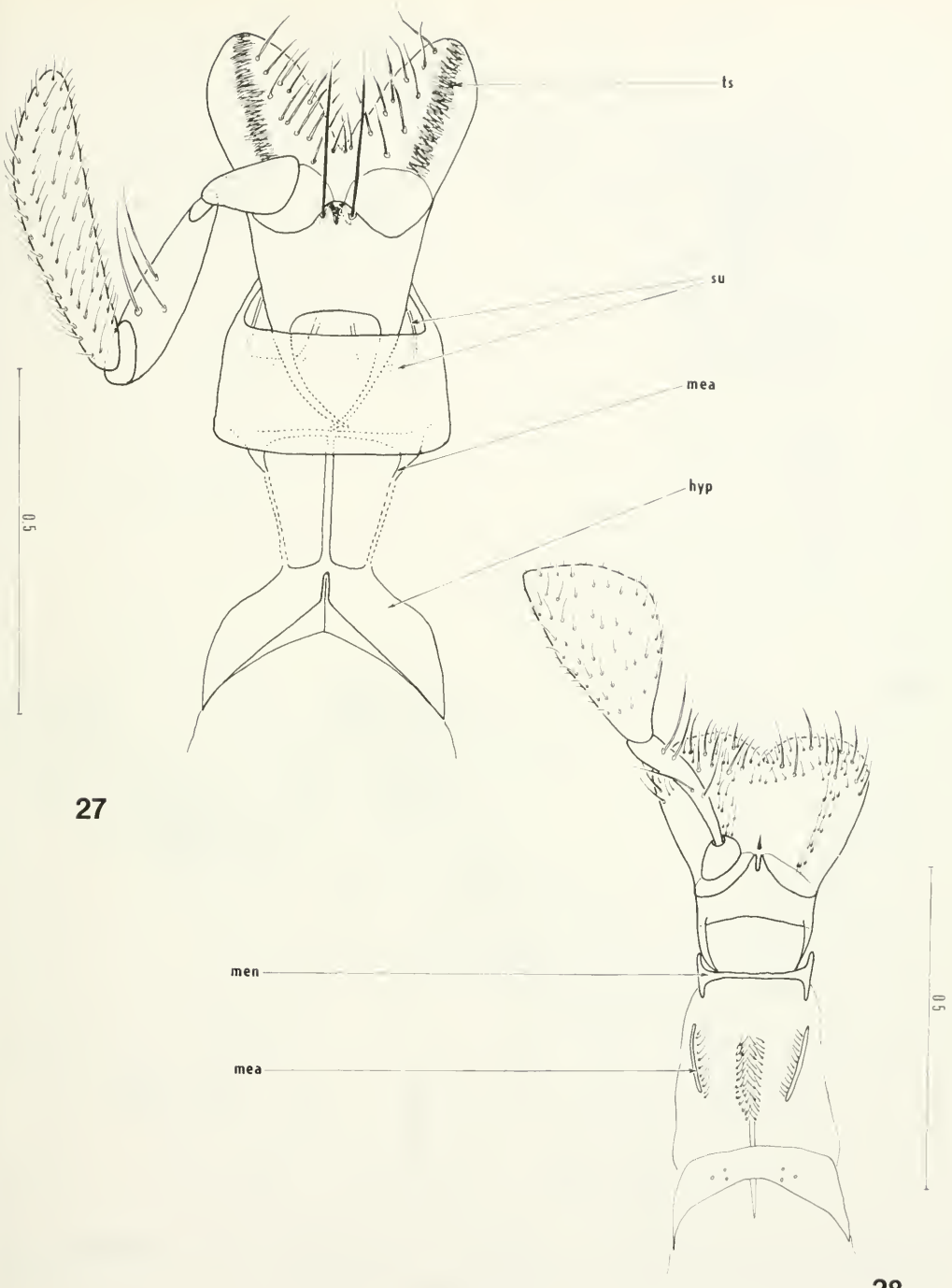


25

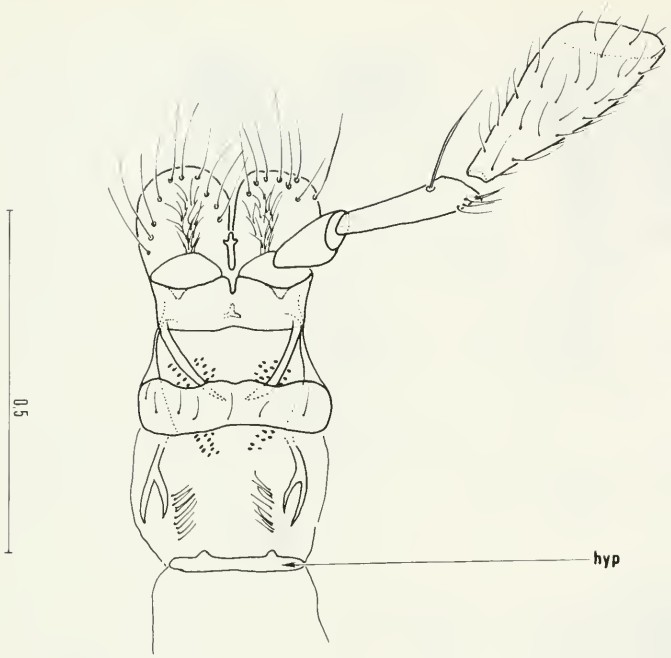


26

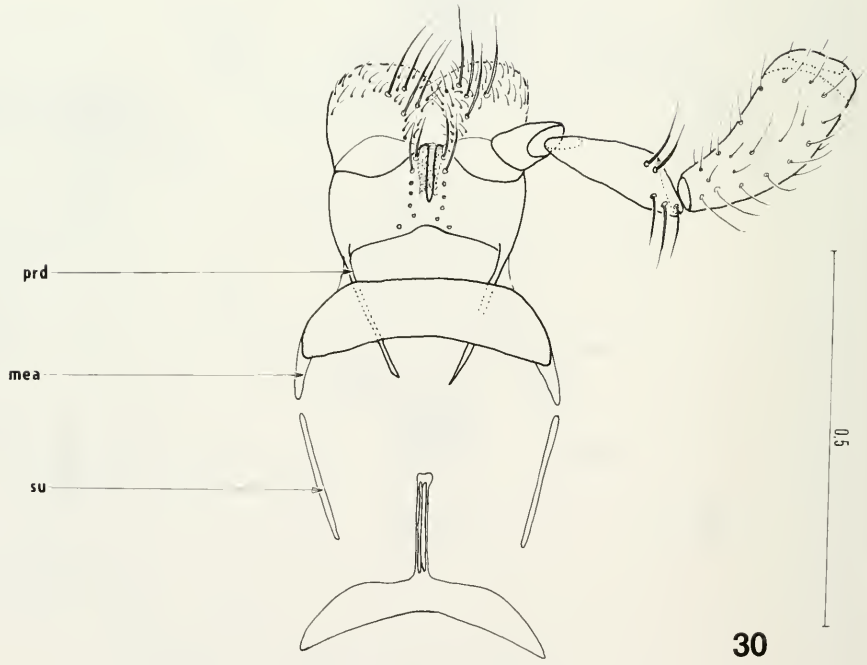
Figs 25–26: Labia: 25 *Clerus*, 26 *Dieropsis*.



Figs 27–28: Labia: 27 *Epiphloeus*, 28 *Tarsostenus*.

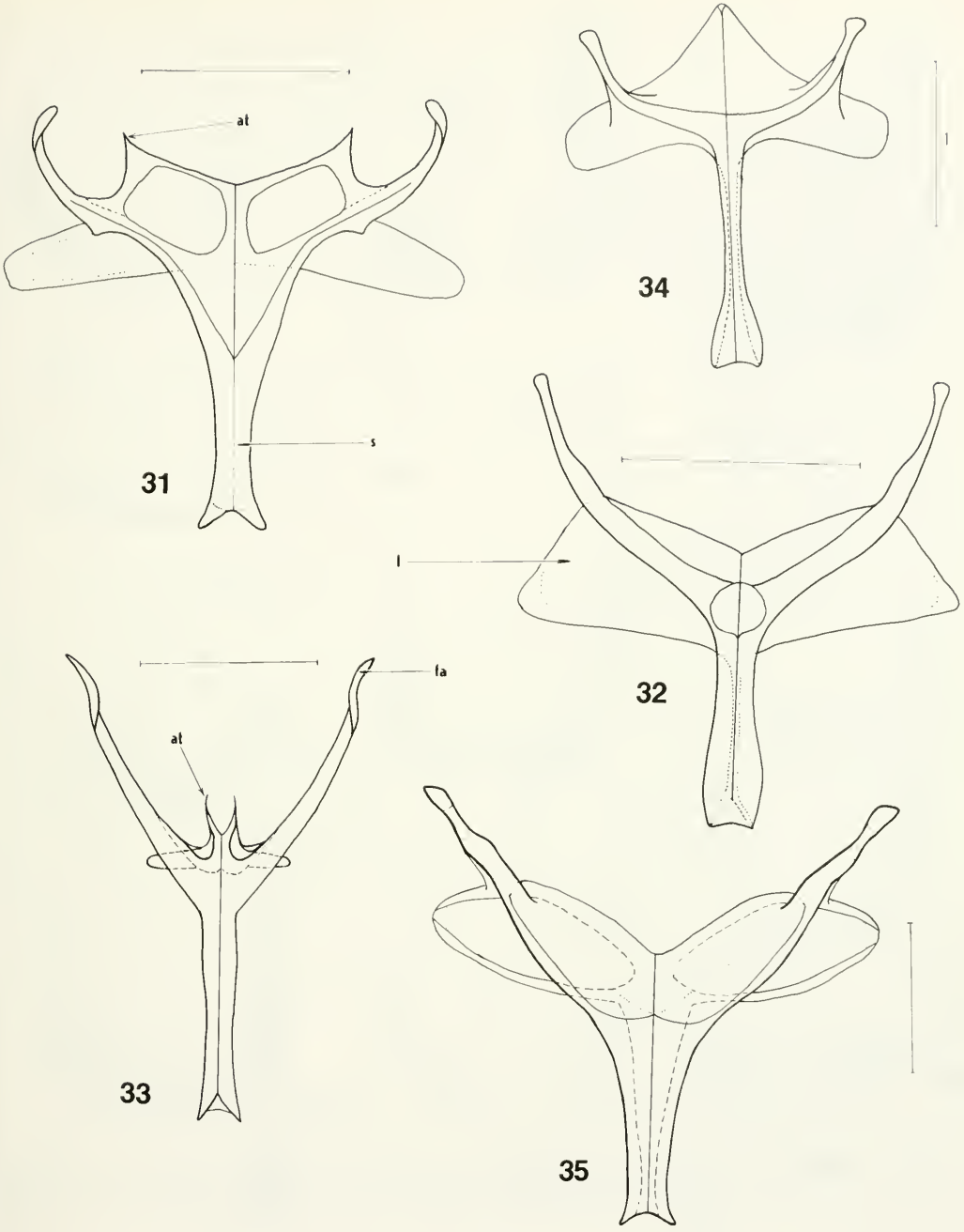


29

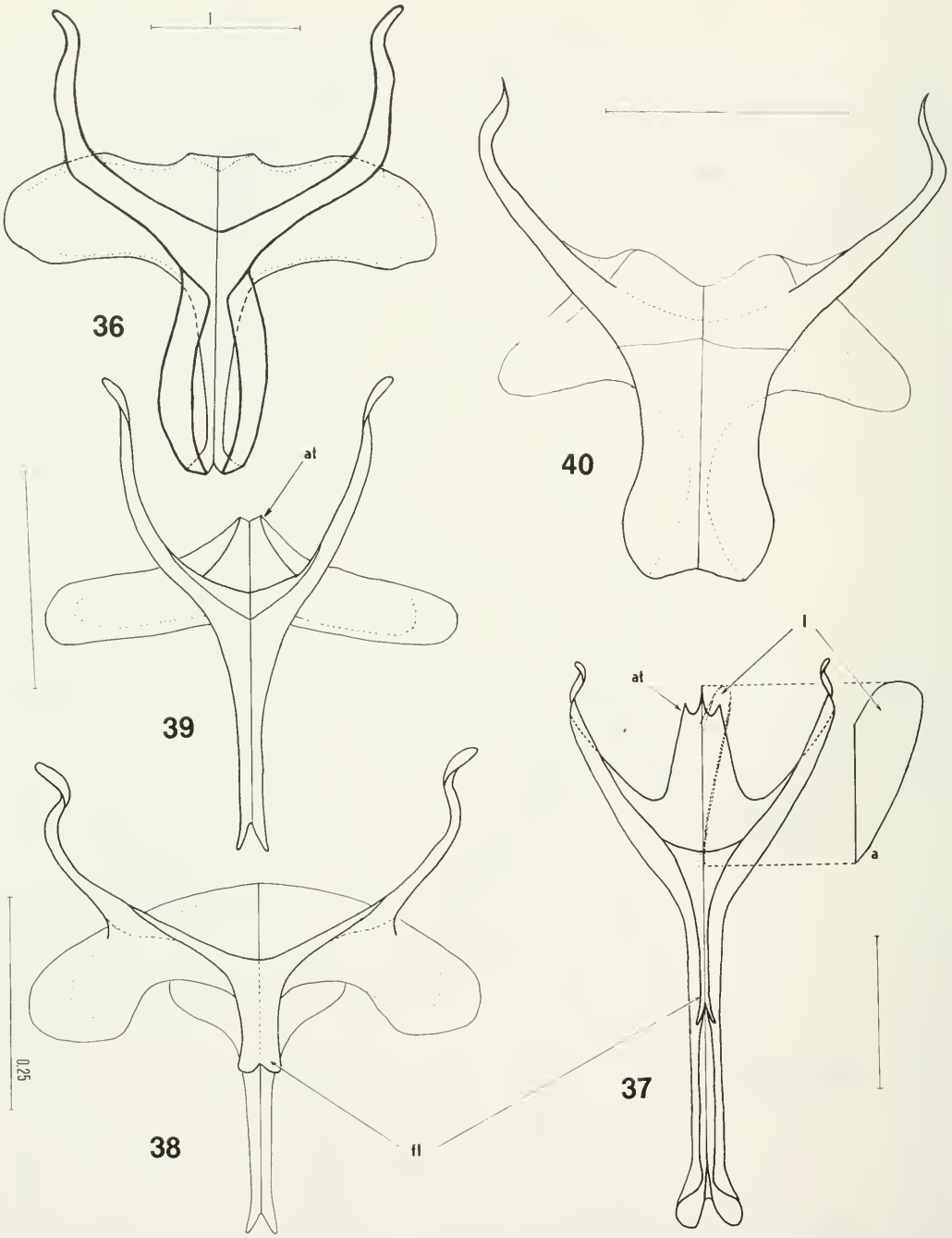


30

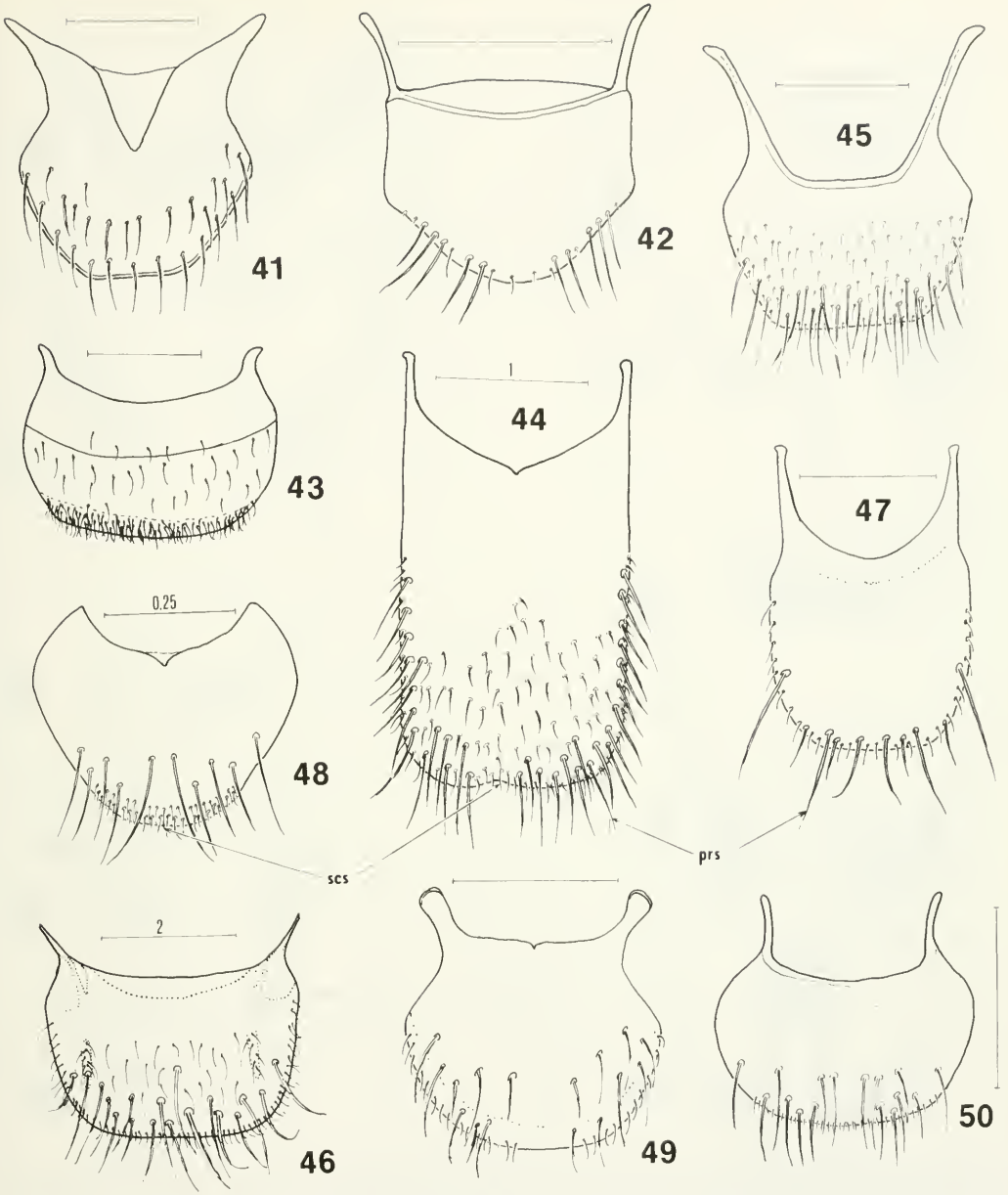
Figs 29–30: Labia: 29 *Enoplium*, 30 *Korynetes*.



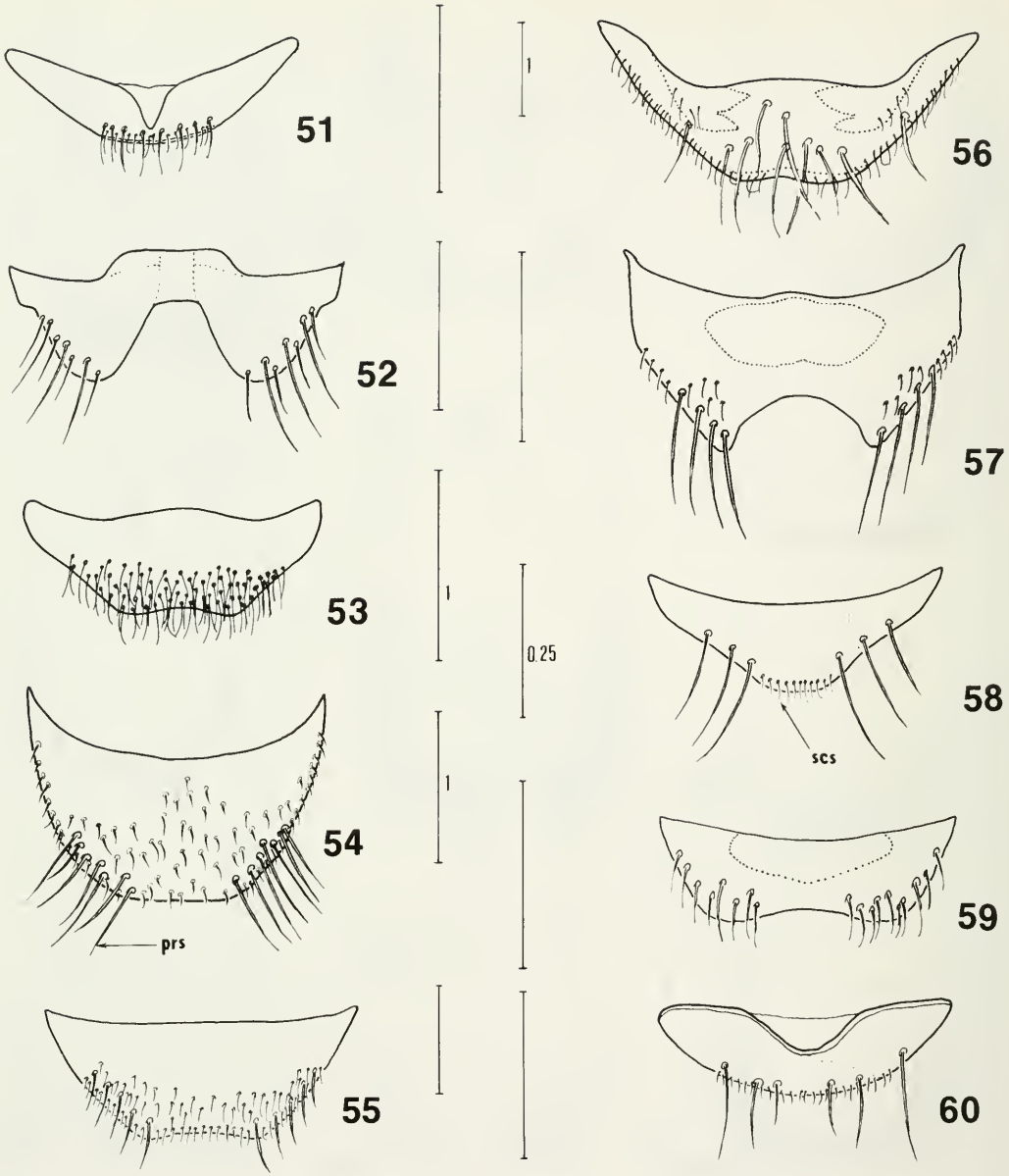
Figs 31–35: Metendosternites: 31 *Thaneroclerus*, 32 *Phyllobaenus*, 33 *Tillus*, 34 *Thanasimodes*, 35 *Clerus*. Scale 0,5 mm.



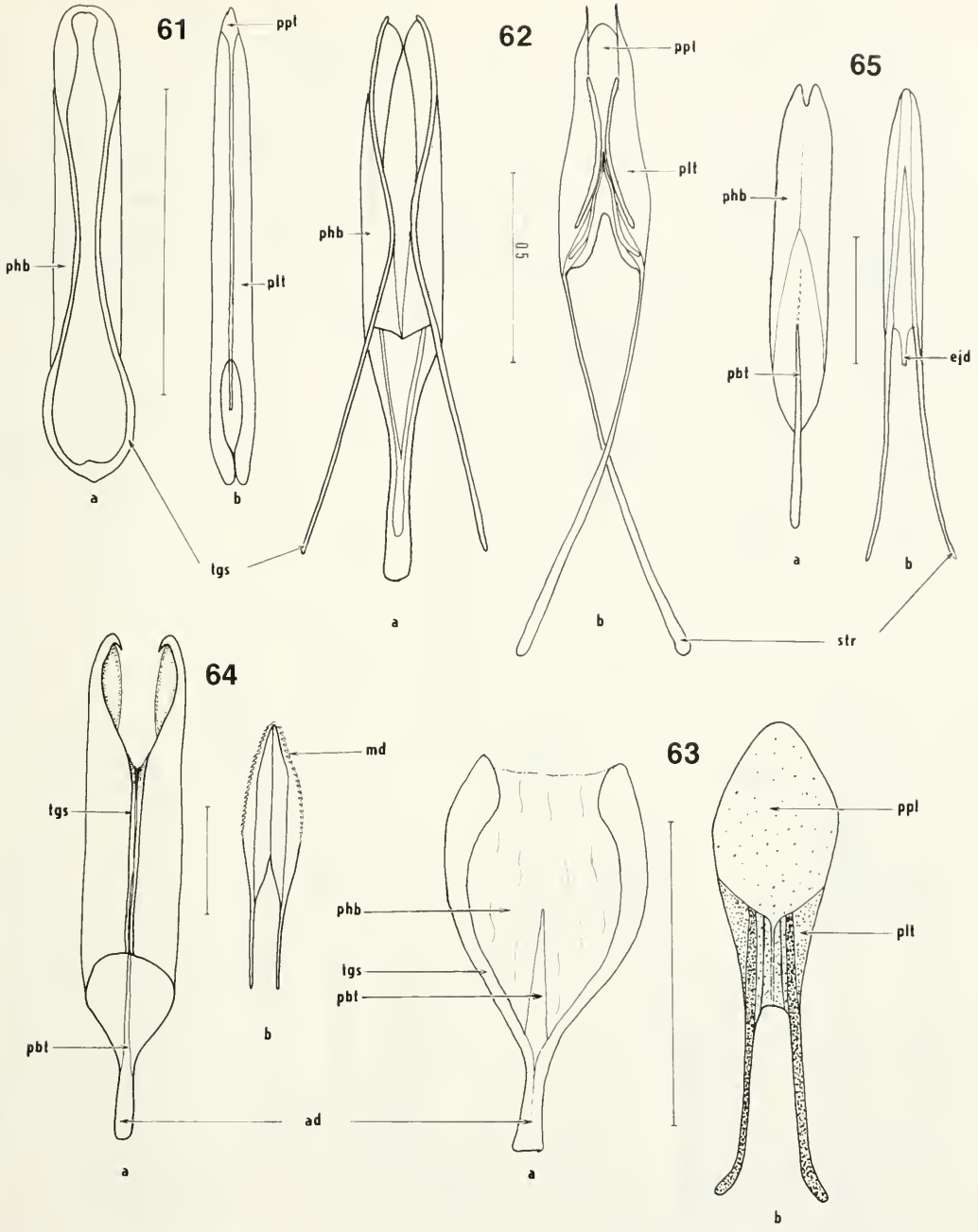
Figs 36–40: Metendosternites: 36 *Dieropsis*, 37 *Epiphloeus*, 38 *Tarsostenus*, 39 *Enoplium*, 40 *Korynetes*. Scale 0,5 mm.



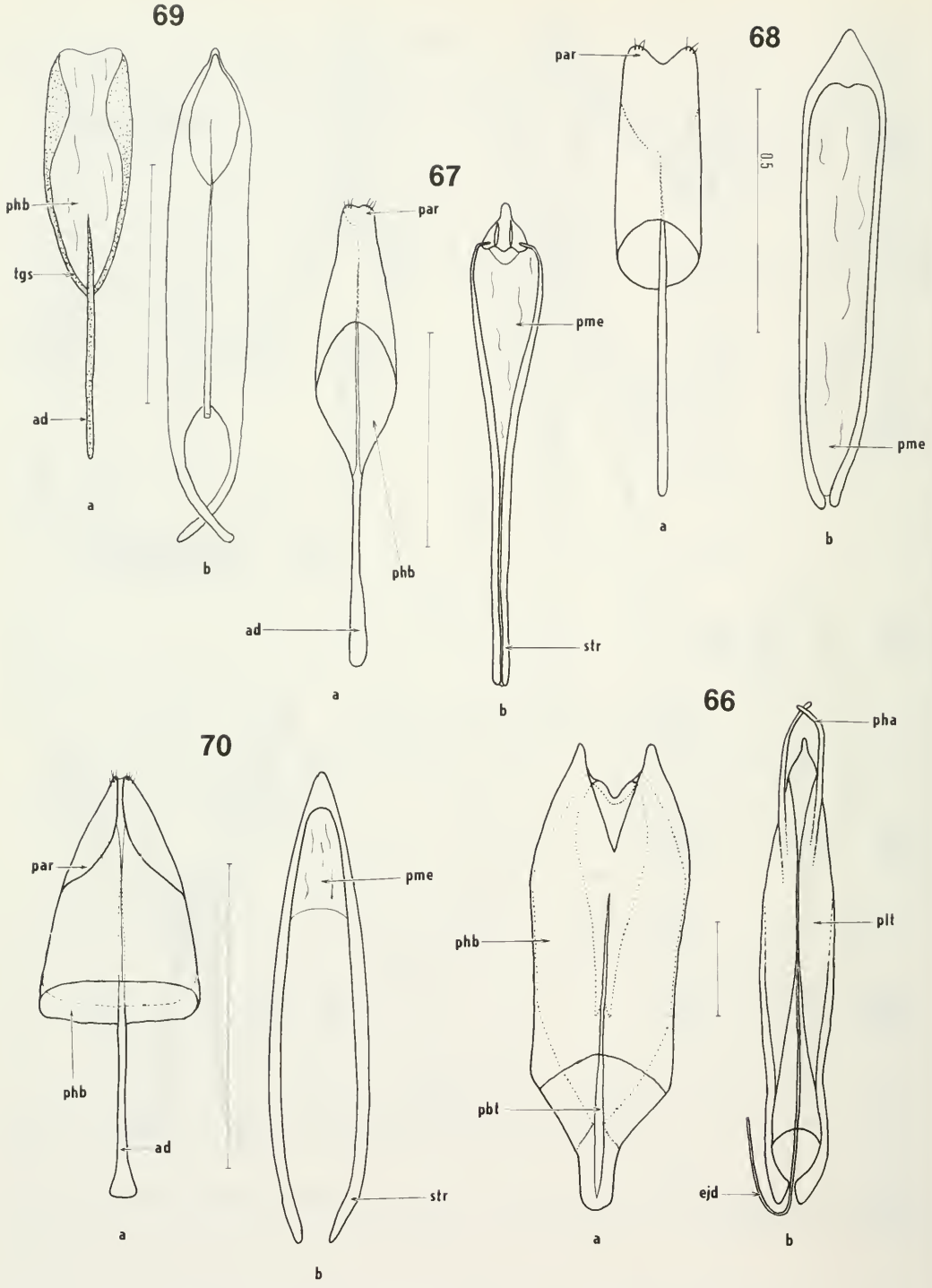
Figs 41–50: Male terga VIII (pygidia): 41 *Thaneroclerus*, 42 *Phyllobaenus*, 43 *Tillus*, 44 *Thanasimodes*, 45 *Clerus*, 46 *Dieropsis*, 47 *Epiphloeus*, 48 *Tarsostenus*, 49 *Enoplium*, 50 *Korynetes*. Scale 0,5 mm.



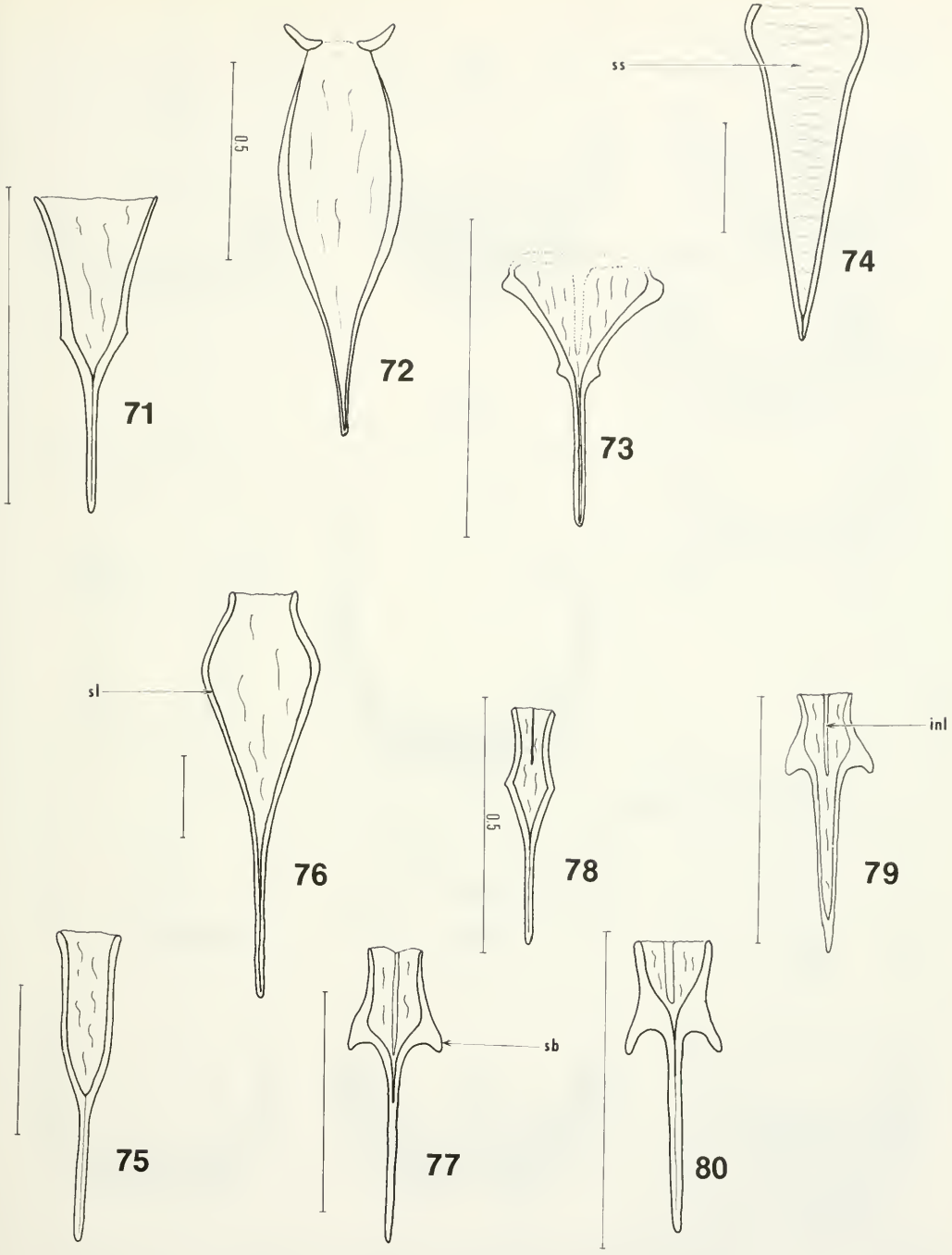
Figs 51–60: Male sterna VIII: 51 *Thaneroclerus*, 52 *Phyllobaenus*, 53 *Tillus*, 54 *Thanasimodes*, 55 *Clerus*, 56 *Dieropsis*, 57 *Epiphloeus*, 58 *Tarsostenus*, 59 *Enoplium*, 60 *Korynetes*. Scale 0,5 mm.



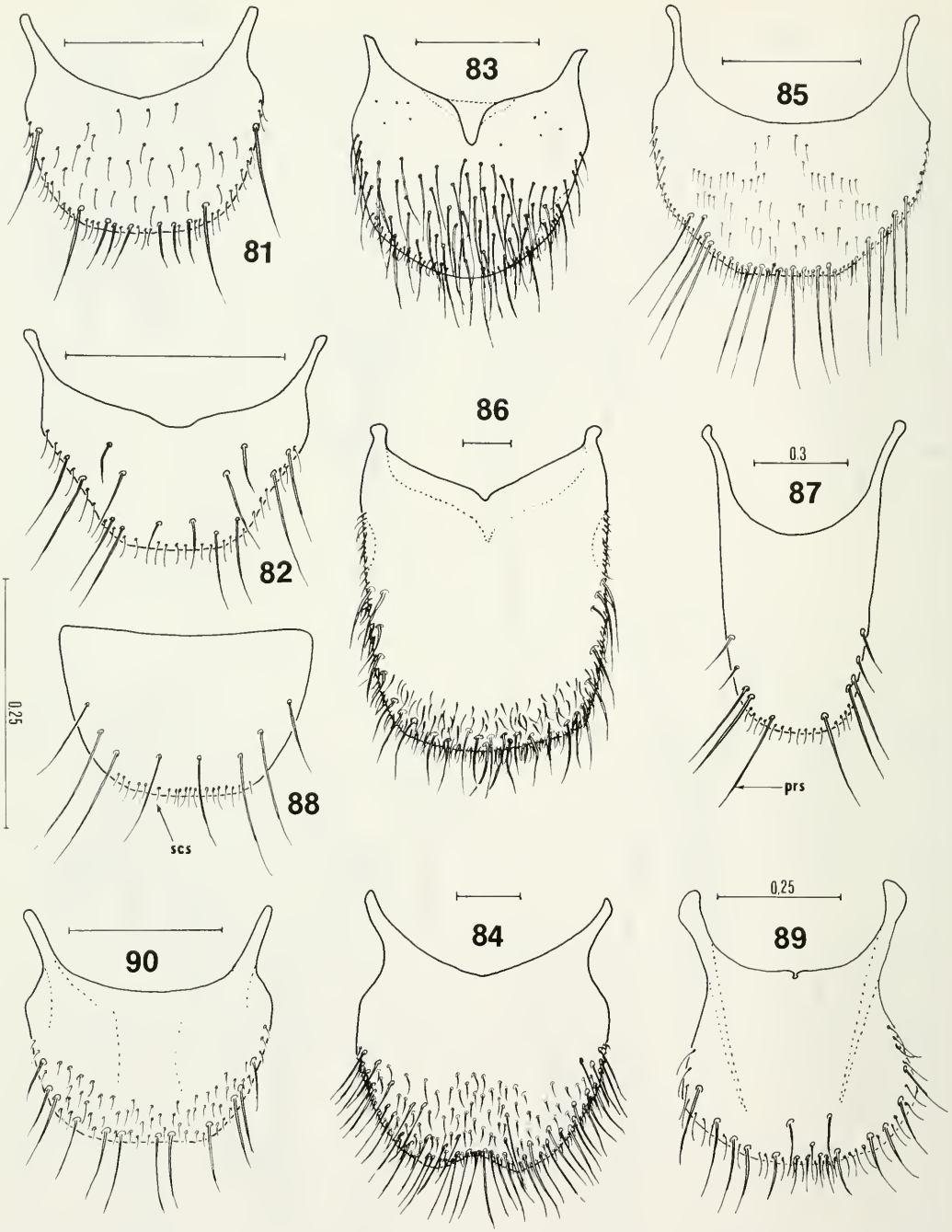
Figs 61–65: Aedeagus dorsally: a tegmen, b phallus: 61 *Thaneroclerus*, 62 *Phyllobaenus*, 63 *Tillus*, 64 *Thanasimodes*, 65 *Clerus*. Scale 1 mm.



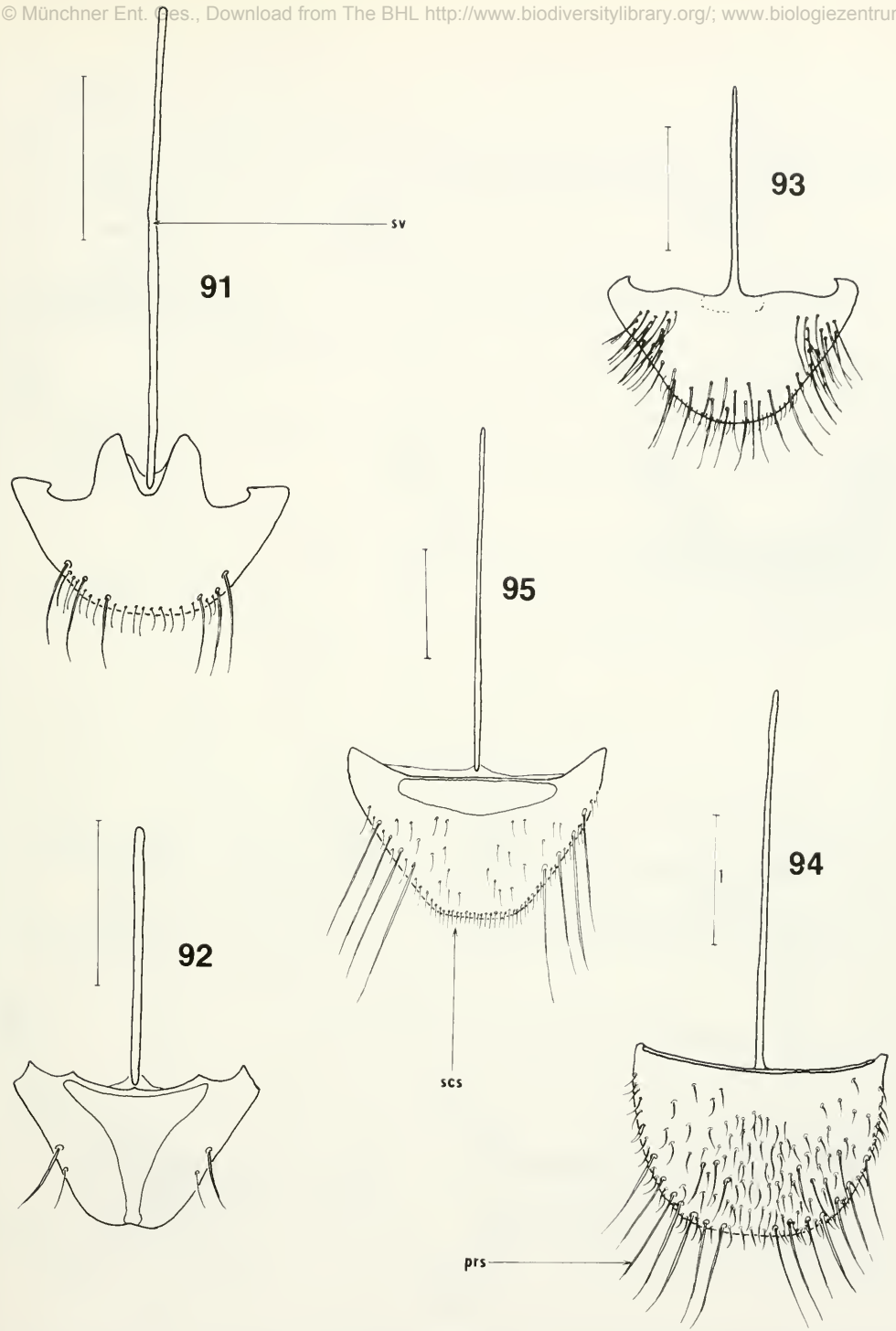
Figs 66–70: Aedeagus dorsally: a tegmen, b phallus: 66 *Dieropsis*, 67 *Epiphloeus*, 68 *Tarsostenus*, 69 *Enoplium*, 70 *Korynetes*. Scale 1 mm.



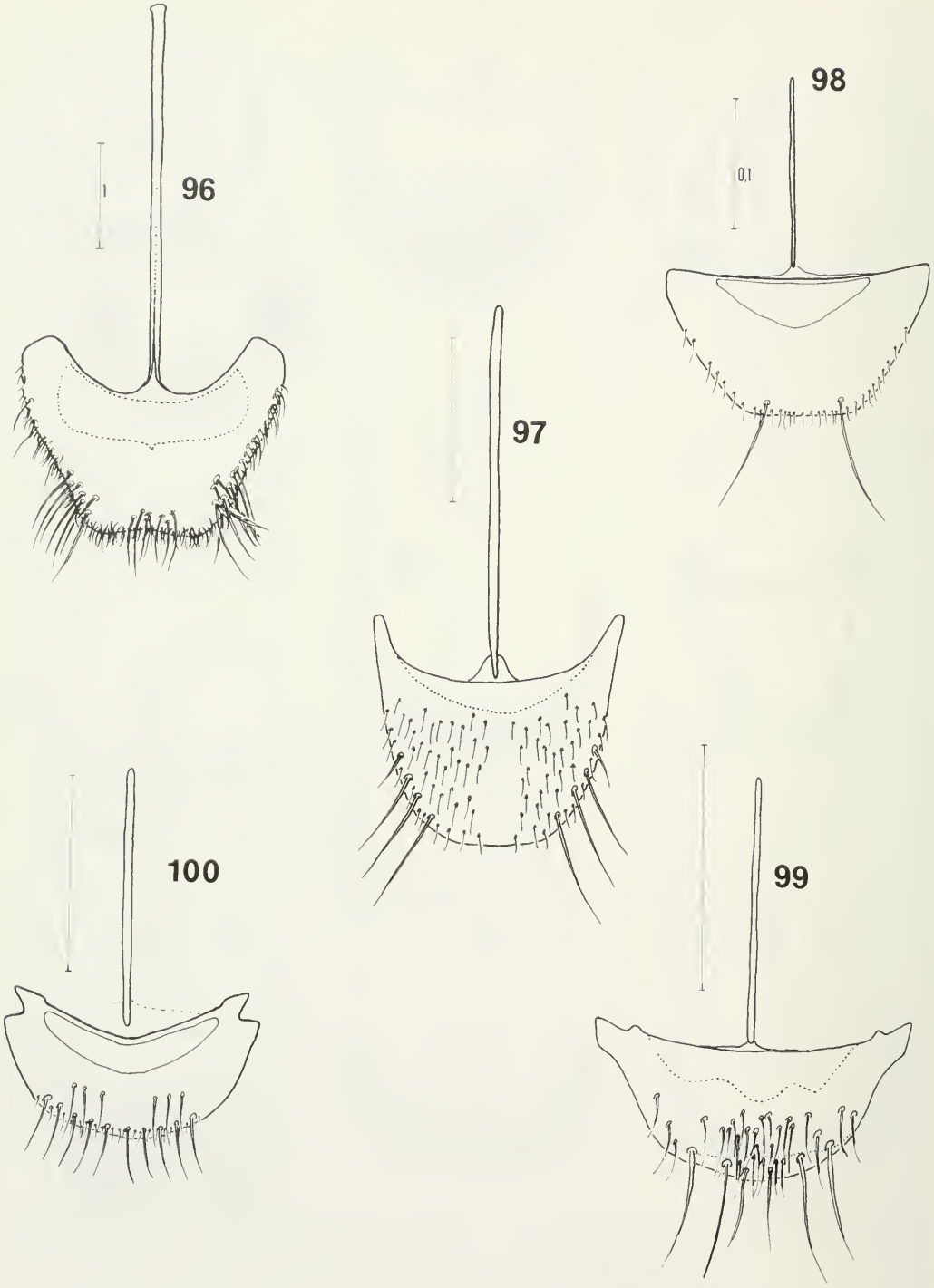
Figs 71–80: Spicular forks: 71 *Thaneroclerus*, 72 *Phyllobaenus*, 73 *Tillus*, 74 *Thanasimodes*, 75 *Clerus*, 76 *Dieropsis*, 77 *Epiphloeus*, 78 *Tarsostenus*, 79 *Enoplium*, 80 *Korynetes*. Scale 1 mm.



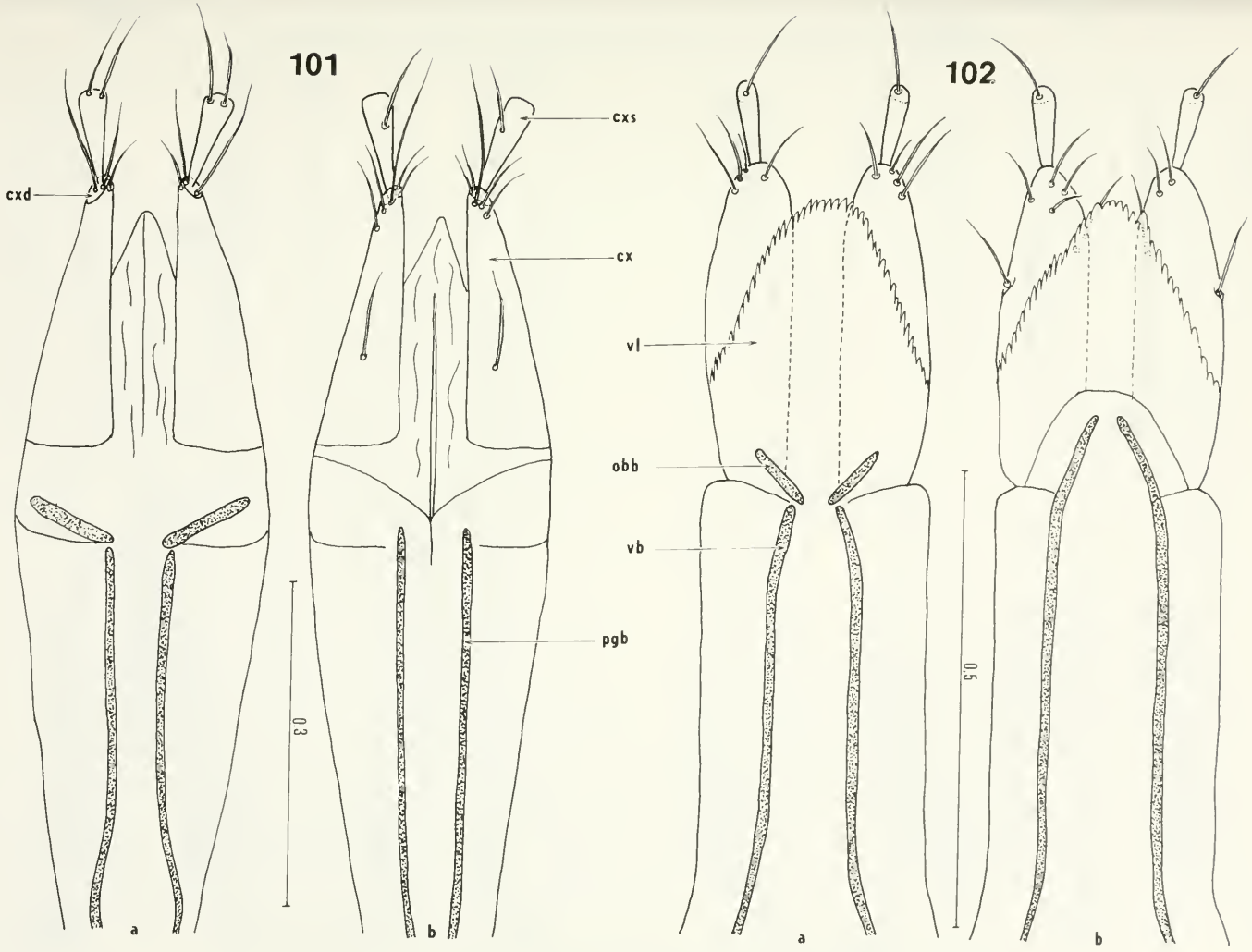
Figs 81–90: Female terga VIII pygidia: 81 *Thaneroclerus*, 82 *Phyllobaenus*, 83 *Tillus*, 84 *Thanasimodes*, 85 *Clerus*, 86 *Dieropsis*, 87 *Epiphloeus*, 88 *Tarsostenus*, 89 *Enoplium*, 90 *Korynetes*. Scale 0,5 mm.



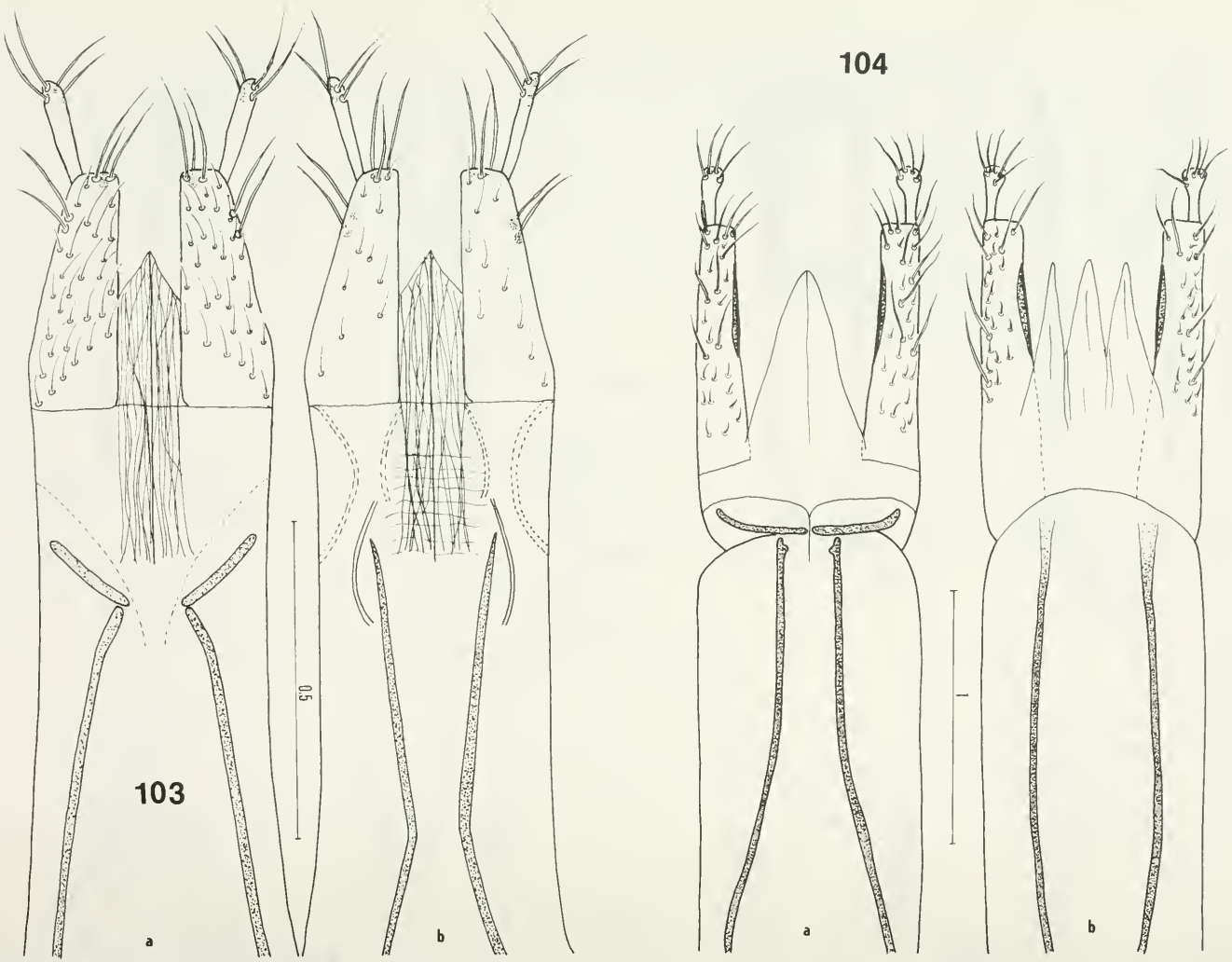
Figs 91–95: Female sterna VIII: 91 *Thaneroclerus*, 92 *Phyllobaenus*, 93 *Tillus*, 94 *Thanasimodes*, 95 *Clerus*. Scale 0,5 mm.



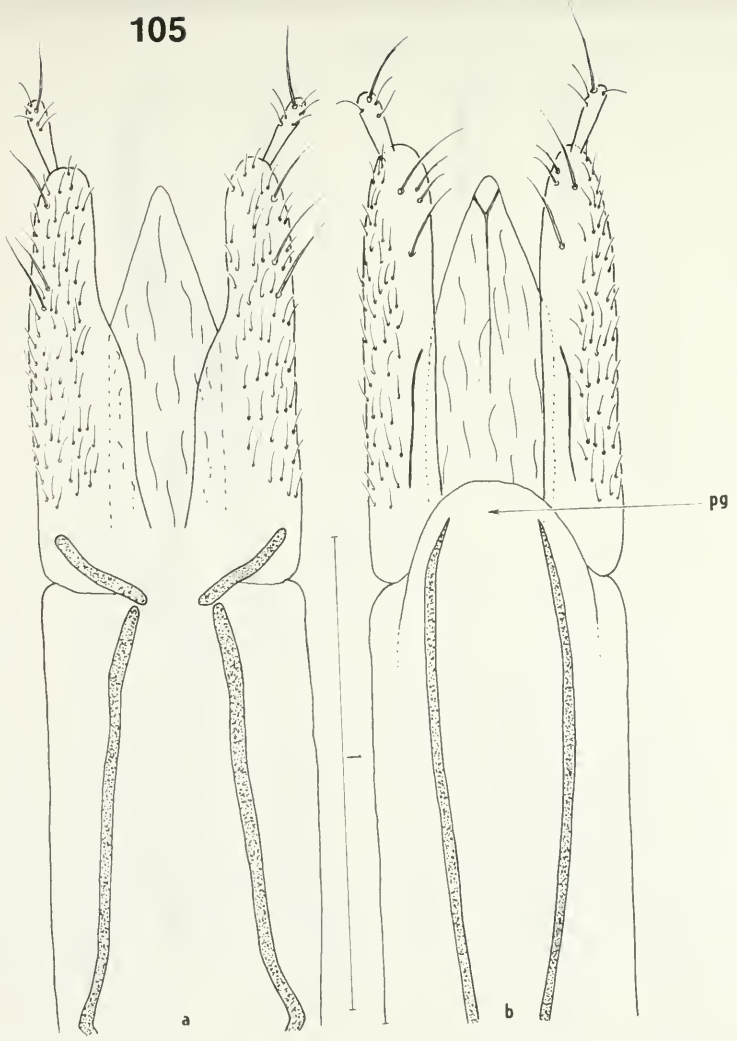
Figs 96–100: Female sterna VIII: 96 *Dieropsis*, 97 *Epiphloeus*, 98 *Tarsostenus*, 99 *Enoplium*, 100 *Korynetes*. Scale 0,5 mm.

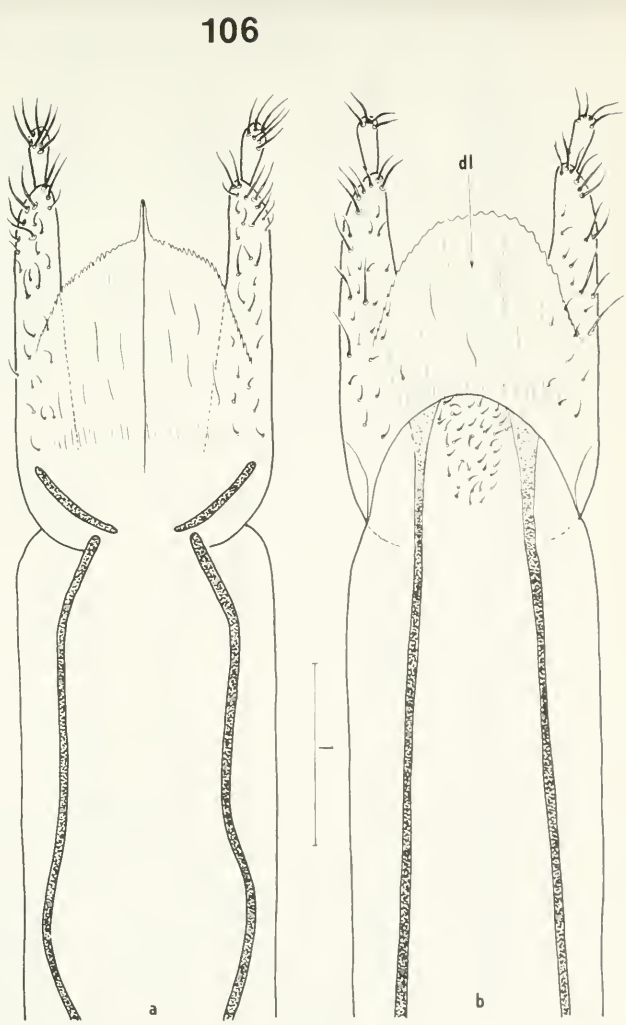


Figs 101–102: Ovipositors: a ventral view, b dorsal view: 101 *Thaneroclerus*, 102 *Phyllobaenus*.

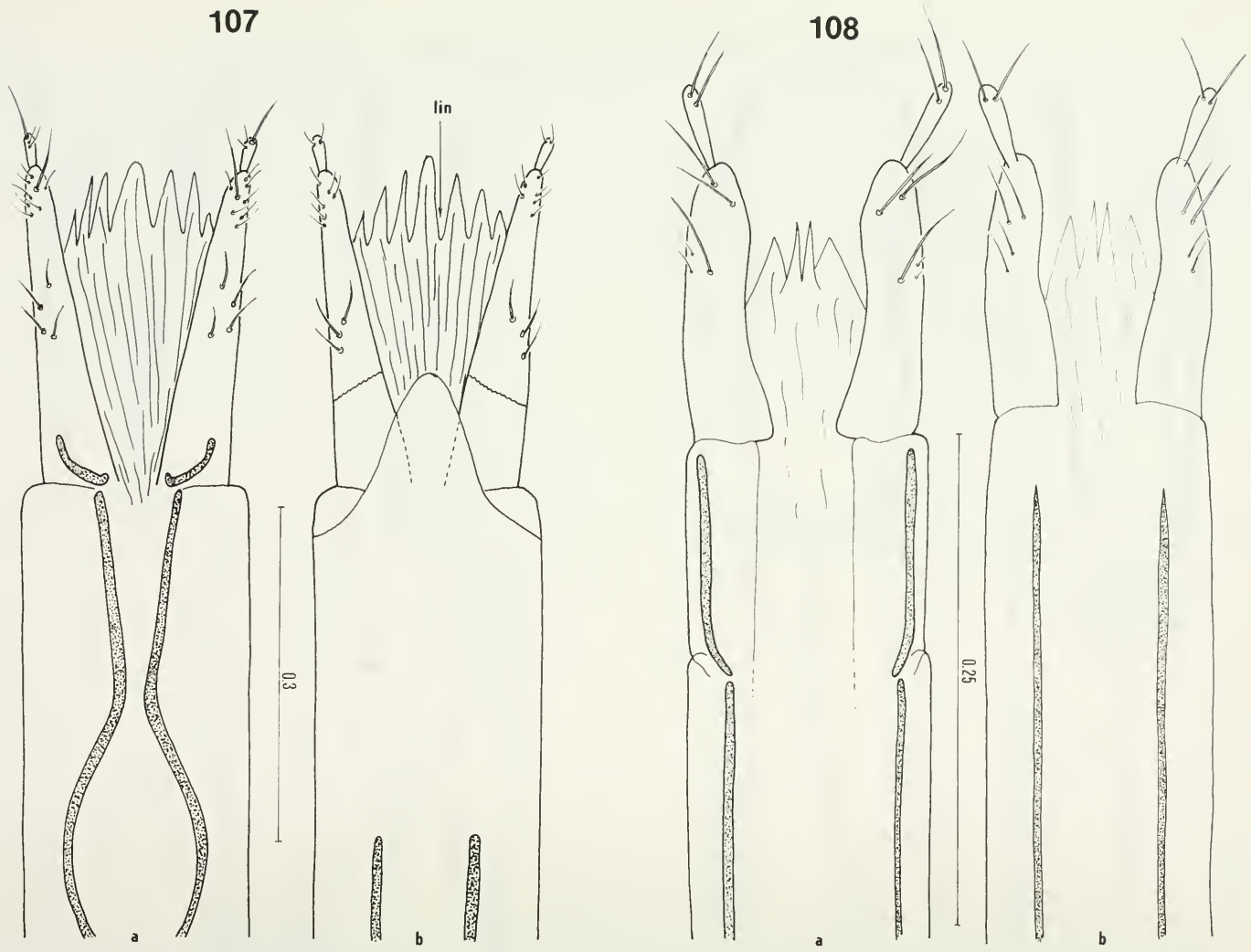


Figs 103–104: Ovipositors: a ventral view, b dorsal view: 103 *Tillus*, 104 *Thanasimodes*.

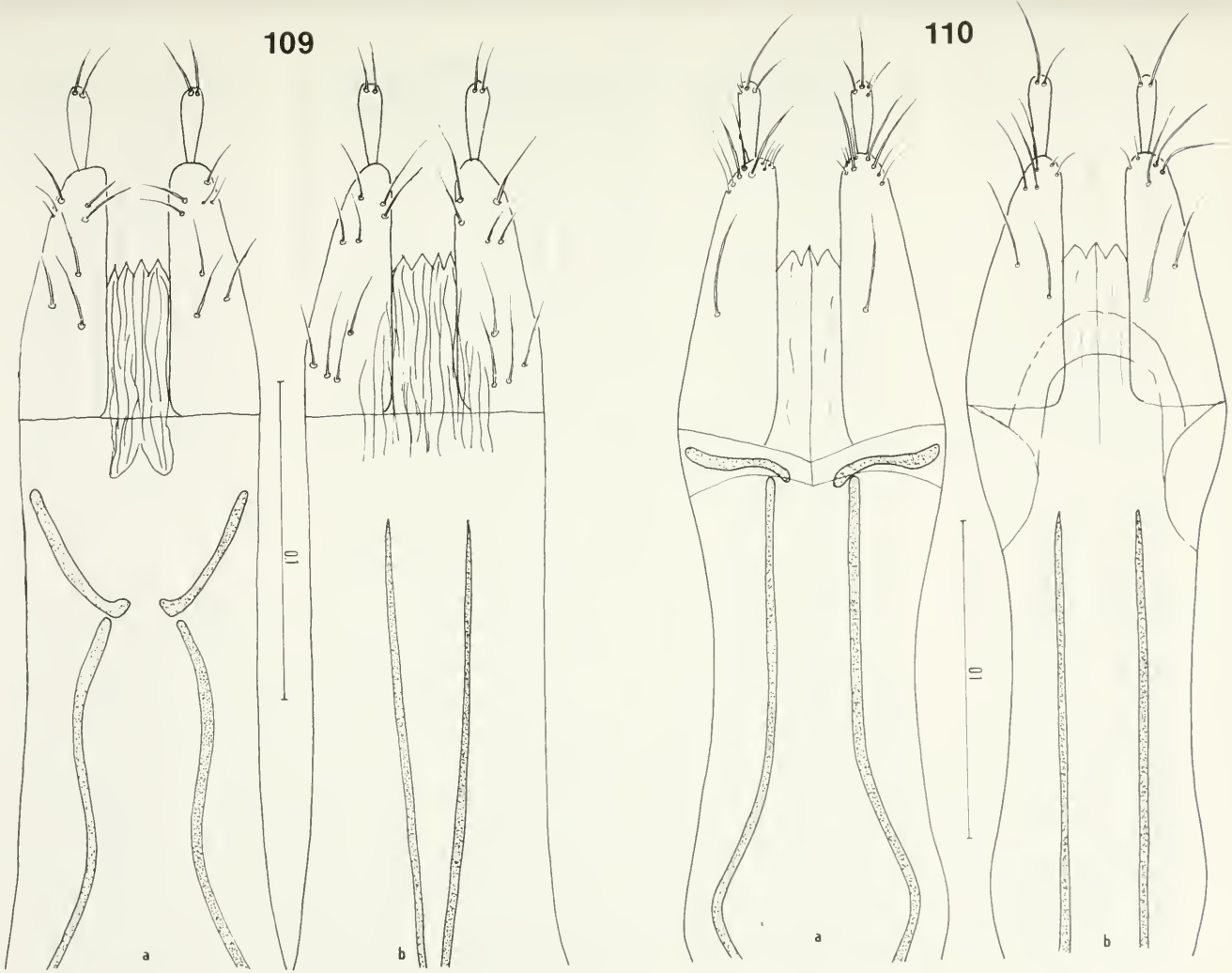




Figs 105–106: Ovipositors: a ventral view, b dorsal view: 105 *Clerus*, 106 *Dieropsis*.



Figs 107–108: Ovipositors: a ventral view, b dorsal view: 107 *Epipbloeus*, 108 *Tarsostenus*.



Figs 109–110: Ovipositors: a ventral view, b dorsal view: 109 *Enoplium*, 110 *Korynetes*.