

Jerzy PRÓSZYŃSKI and Marek ŻABKA

**Genus *Tomocyrra* (*Aranei*, *Salticidae*) — hypothetic survivor of the Amber fauna.
Systematic study with description of four new species**

[With 32 text-figs.]

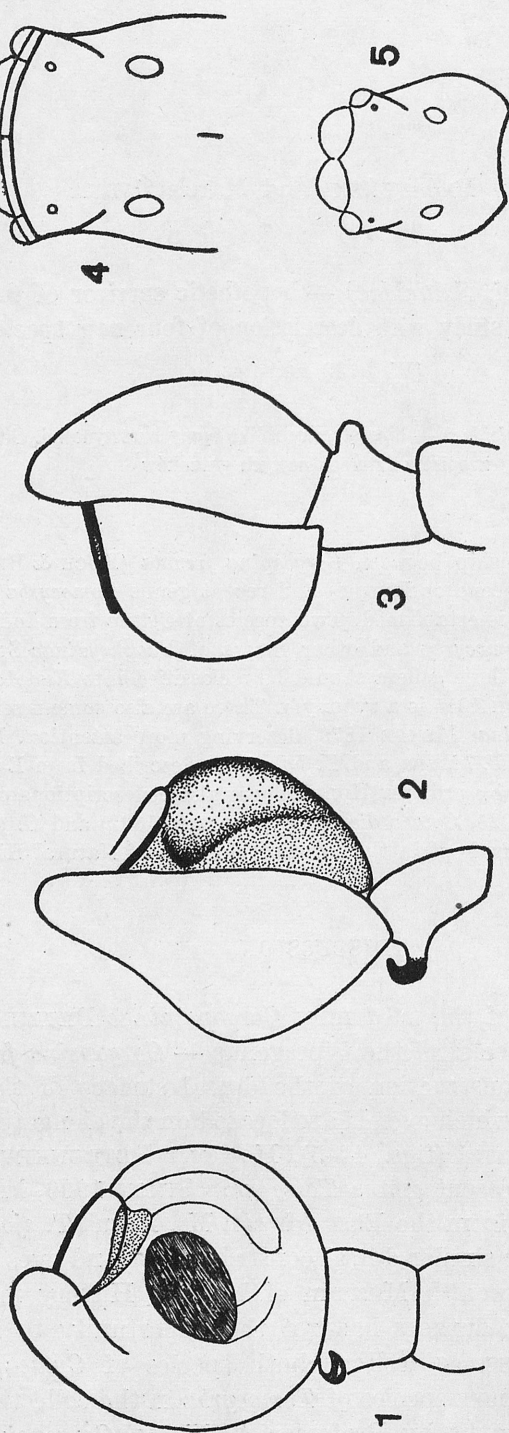
Rodzaj *Tomocyrra* (*Aranei*, *Salticidae*) — hipotetyczny relikw fauny bursztynowej. Studium systematyczne z opisem czterech nowych gatunków

Abstract. Close relationship between *Gorgopsina frenata* (KOCH & BERENT 1854) from Baltic Amber (possibly Oligocene or Eocene) and recent genus *Tomocyrra* SIMON 1900 from Madagascar and East Africa is established. Two species of *Cytaea* from Indonesia and Birma are intermediate between *Tomocyrra* and other genera of *Euophryinae* SIMON 1901 (sensu PRÓSZYŃSKI 1976) and both these genera should be reclassified into *Euophryinae*, of which *Gorgopsininae* PETRUNKEVITCH 1955 is a synonym. There are also some resemblances between *Tomocyrra* and *Dendryphantinae* MENGE 1879, deserving more attention. Four new species: *Tomocyrra masai*, *T. keinoi*, *T. kikuyu* and *T. holmi* are described from East African Mountains on specimens collected by prof. A. HOLM. There also redescrptions or remarks on *Tomocyrra sjoestedti* LESSERT 1925, *Cytaea dispalans* (THORELL 1892) and *C. guentheri* THORELL 1895, based on type specimens kept in the Swedish Museum of Natural History, Stockholm.

DISCUSSION

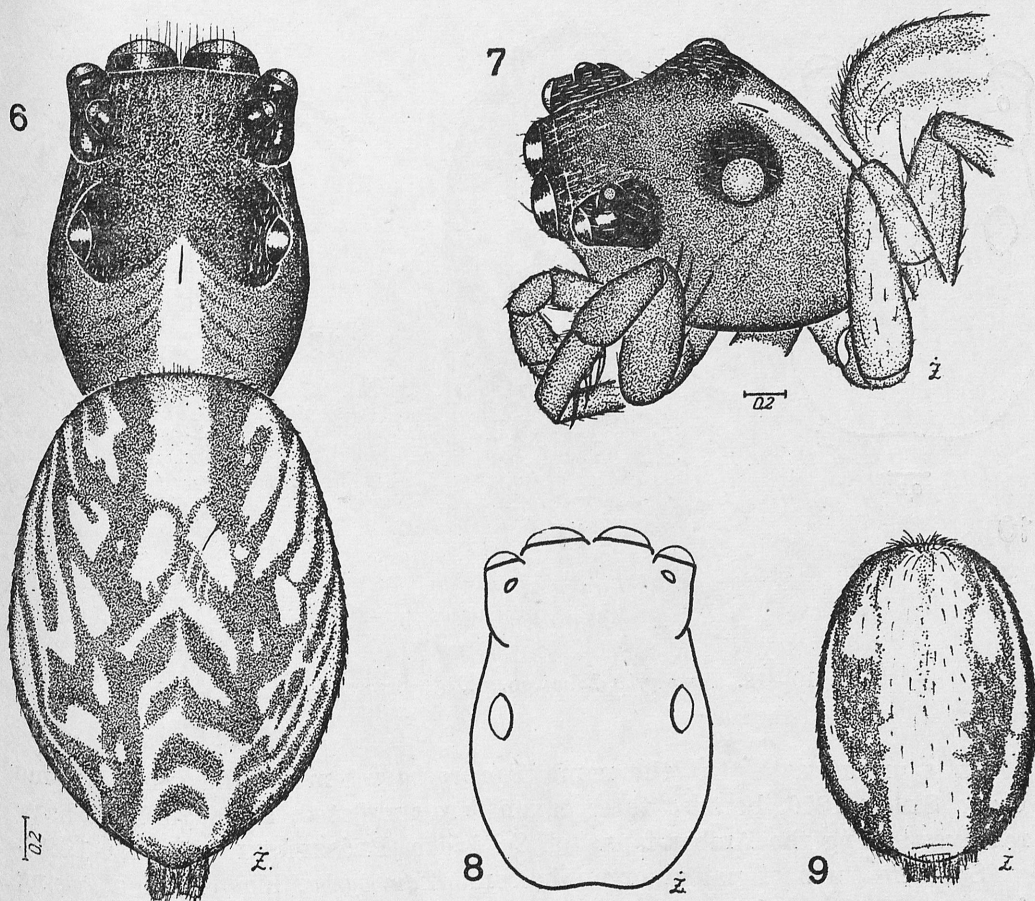
The main character of the subfamily *Gorgopsininae* PETRUNKEVITCH 1955, as well as of the type species of the type genus — *Gorgopsina frenata* (KOCH & BERENT 1854), is the construction of the dorsal surface of the head region, behind eyes II, owing to which eyes II are located on the elongated protuberance together with eyes I lateral (figs. 4—5). However PETRUNKEVITCH has overlooked existence of the recent genus *Tomocyrra* SIMON 1900, known from Madagascar (2 species) and from the East African Mt. Meru (*T. sjoestedti* LESSERT 1925), which has also got similar dorsal constriction behind eyes II (figs 6—11).

While visiting the Swedish Museum of Natural History in Stockholm in 1976 one of the present authors has got the opportunity to study types of *Tomocyrra sjoestedti* LESS. as well as both species of *Cytaea*, we have also found subsequently four new species of *Tomocyrra* in the collection of *Salticidae* from East Africa sent to us by Professor Å. HOLM. *Gorgopsina frenata* (figs 1—3) and five species of *Tomocyrra* studied by us have embolus twisted into



Figs. 1—5. *Gorgopsina frenata* (KOCH & BERENT 1854) from Baltic Amber and its characters (from PETRUNKEVITCH 1942). 1—3 palpal organ, ventral and lateral views, note coiled thin embolus and semirescent receptaculum canal (anteriorly stippled, posteriorly white); 4—5 shape of the cephalothorax with the most important character — constriction behind eyes II

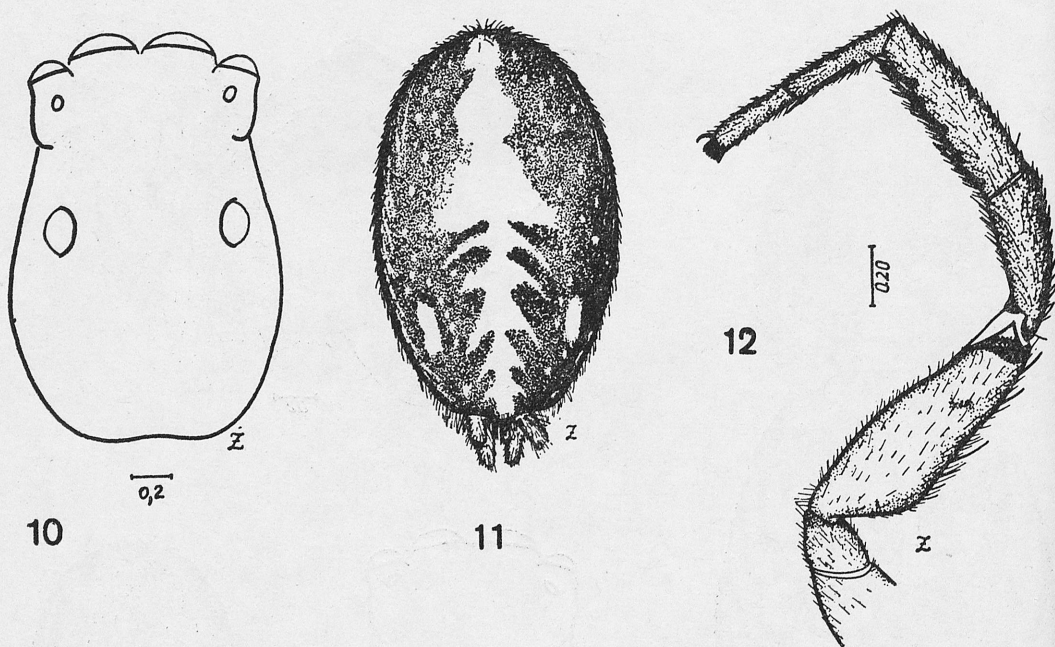
tighter or broader coil, which is typical for the recent subfamily *Euophryinae* SIMON 1901 (sensu PRÓSZYŃSKI 1976). The differences between *Gorgopsina frenata* and *Tomocyrra* are of the magnitude found between various species of *Tomocyrra*, or various common European *Euophrys* species. As far as could be judged from PETRUNKEVITCH'S drawing (fig. 1) and from Amber embedded specimen (!) the seminal receptacle canal in *Gorgopsina frenata* resembles these structures in *Tomocyrra* and does not agree with typical receptacle canal in



Figs. 6—9. General view of *Tomocyrra masai* sp. n., ♀ (6, 7) and ♂ (8, 9); note dorsal constriction behind eyes II

Euophryinae which is meandering. However, two species of *Cytaca* described below (figs 16—17) have somewhat intermediate receptacle canals, not yet meandering but slightly bent (or bulged) in the middle of their course. This leads to the assumption that the meandering canals could develop from the straight ones (increase in internal capacity of the seminal receptacle). The conditions found in *Gorgopsina/Tomocyrra* would be therefore ancestral, while widespread among *Euophryinae* meandering canal would be the derived condition.

On the strength of the above arguments we assume that forms described as *Gorgopsina* and *Tomocyrra* are very closely related and presumably congeneric. We abstain from synonymizing their generic names as to avoid confusion in paleontological and zoological literature. All these forms should be considered members of the *Euophryinae* SIMON 1901 (sensu PRÓSZYŃSKI 1976), of which name *Gorgopsininae* PETRUNKEVITCH 1955 is a junior synonym.



Figs. 10—12. *Tomocyrra holmi* sp. n., ♂, general view and leg I

It is unfortunate that the name *Tomocyrra* resembles the generic name *Cyrra* SIMON 1876, because these taxons are unrelated, although both have relatives among the Amber fauna of *Salticidae* (PRÓSZYŃSKI & ŻABKA 1980).

Some features of palpal organ in some *Tomocyrra*, like embolus arising from a conical protuberance which gives it a somewhat "doubled" appearance best visible in *T. keinoi* (figs 20—21), location of embolus on a softer "pad" and closeness of both parts of anterior loop of the seminal receptacle canal in some specimens (figs 20—21, even more in some not drawn specimens) do resemble to certain extent structures found in palpal organ of *Dendryphantès* C. L. KOCH 1837 and in some related genera. Remembering the assumed ancestral character of *Tomocyrra* one may wonder whether there are no closer relationships between subfamilies *Euophryinae* and *Dendryphantinae* MENGE 1879.

The distribution of *Tomocyrra* in Africa, as far as it is known, displays rather striking pattern of geographical radiation with each of five species oc-

curing on other, separate mountain, usually between 2000 and 3000 altitude, which corresponds presumably with mountain tropical rain forest environments. It is interesting whether future field research will not shown more complicated pattern of distribution of this species and whether there is no *Tomocyrrba* on other mountains in East Africa.

SYSTEMATIC PART

Genus *Tomocyrrba* SIMON, 1900

Diagnosis. Small *Euophryinae* with dorsal constriction behind eyes II, colouration resembling common European *Euophrys* species. Male palpal organ with coiled embolus, which may be twisted around conical protuberance, embolus arise from the apical separate, softer part of the bulbus. Seminal receptacle canal not meandering. Posterior lateral edge of cymbium slightly expanded and bent, there is no prominent tibial apophysis. Female's epigyne externally simple, sometimes with two small "pockets" posteriorly and medially, internally more complex but showings common general layout, as shown on enclosed drawings.

Genus closely related to and most probably congeneric with *Gorgopsina frenata* (KOCH & BERENT, 1854), as redescribed by PETRUNKEVITCH 1942, 1955, 1958 from Baltic Amber. Type species of *Tomocyrrba* — *T. decollata* SIMON, 1900, from Madagascar, has not yet been seen by the present authors. The distribution of the genus *Tomocyrrba* agrees with some other taxa being considered relicts of the Amber Fauna, notably spider family *Archaeidae*.

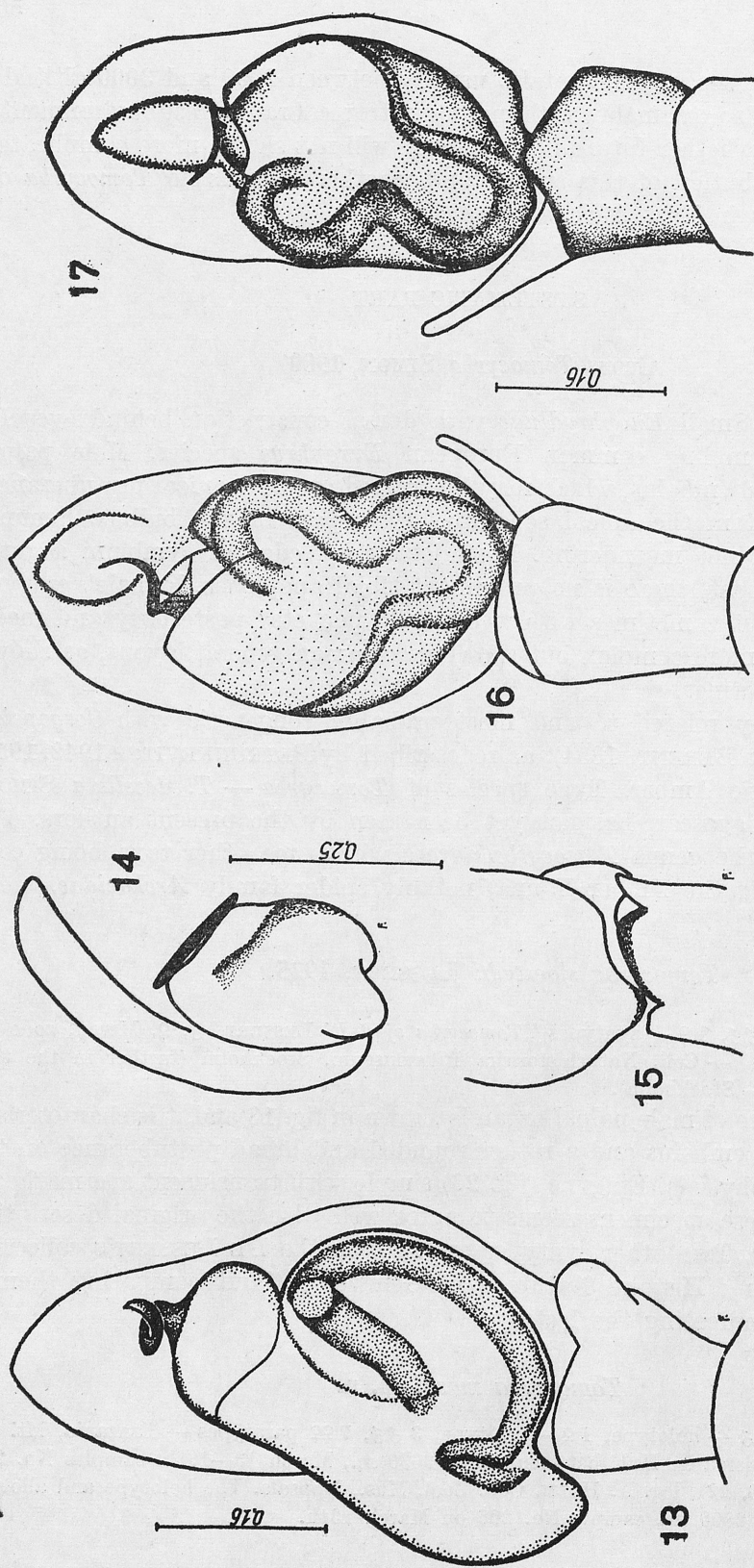
Tomocyrrba sjoestedti LESSERT, 1925

Material: 2 ♂♂, 1 ♀ — syntypes „*Tomocyrrba sjoestedti* LESSERT, ♂, ♀. Merou, zone forestiere des pluies" — Coll. Naturhistoriska Riksmuseum, Stockholm (further in the text quoted as NRM — Stockholm).

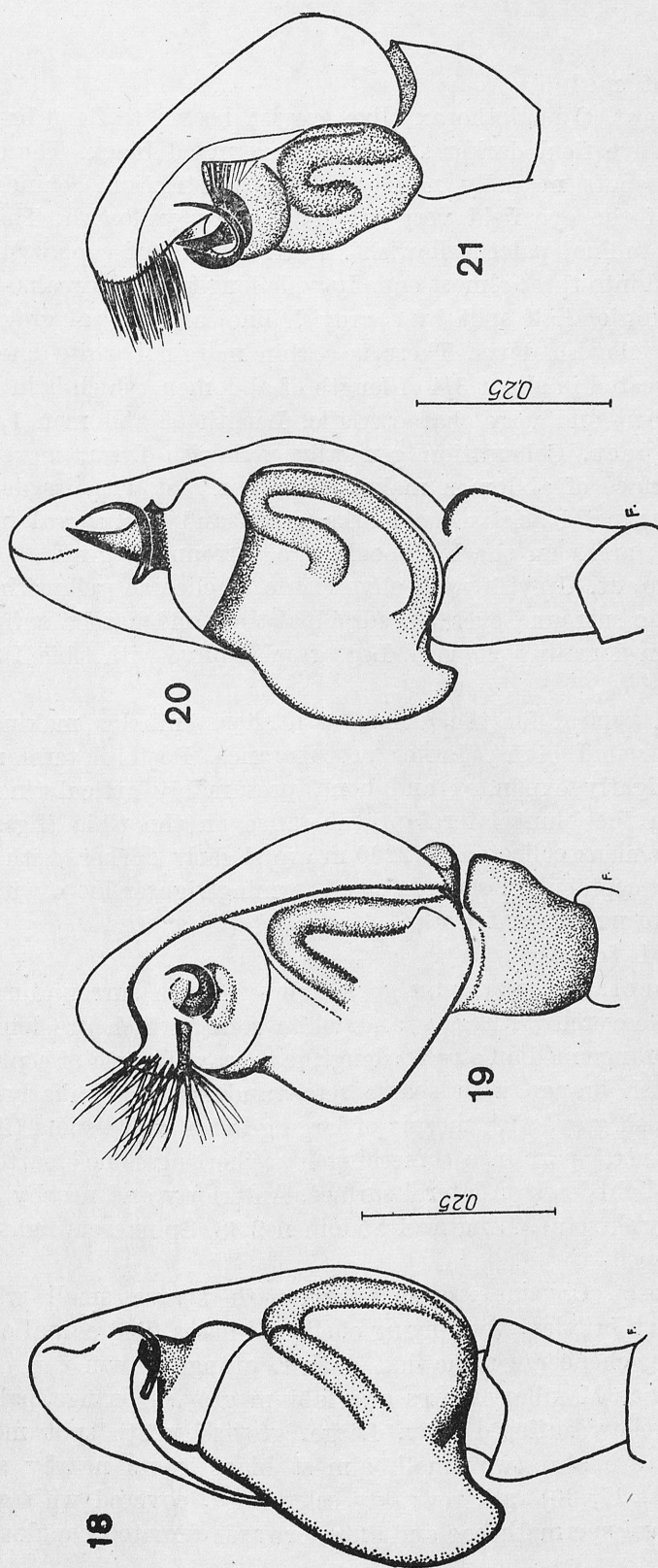
The structure of male palpal organ is shown in fig. 13 and it is characterised by small coiled embolus and a rather rounded and broad protuberance on the tibia (is it apophysis?). Epigyne (fig. 26) simple with translucent spermathecae and canals. These specimens seems to agree well with the original description of DE LESSERT. Two other syntypes are kept in the DE LESSERT's collection in the Museum d'Histoire Naturelle in Geneve, without comparing them I abstain from indicating the lectotype.

Tomocyrrba masai sp. n.

Material: 1 ♂ — holotype, 1 ♀ — allotype, 3 ♂♂, 7 ♀♀ paratypes — Tanzania, Mt. Kilimanjaro, near Bismarck Hut, between 2200—3030 m., March 13—16th, samples No. 206, 209, 214, 216, 220, 221, leg. Å. HOLM. Coll. Zool. Mus., Uppsala. The holotype and allotype were collected at 2800 m., sample No. 206 on March 13th.



Figs. 13—17. Systematic position of *Tomocyrba* species: 13 — *T. sjoestedtii* LESSERT 1925, ♂ syntype, palpal organ; 14—15 — *T. kikuju* sp. n., lateral view of palpal organ and dorsal view on tibia (note short apophysis); 16—17 — Asian relatives belonging to the genus *Cytaea*: *C. guentheri* (THORELL 1895), syntype, and *C. dispalans* (THORELL 1892), holotype — note coiled, small ambolus and slightly meandering seminal receptacle canal



Figs. 18—21. Palpal organs, ventral and oblique antero-lateral views: 18, 19 — *Tomocyrba masai* sp. n.; 20, 21 — *T. keinoi* sp. n.

Description of male

Dorsal aspect. Cephalothorax olive greyish brown to light brown, with anterior part of eye field darker and eyes surrounded black. There are two rounded darker spots medially nearby dorsal constriction behind eyes II. Posterior part of the eye field very distinctly paler yellowish. Thorax with contrasting longitudinal paler yellowish streak. Length of cephalothorax 1,6. Abdomen divided into three almost equally wide longitudinal streaks — median whitish (with anterior half split by a greyish line) and lateral greyish black, with indistinct yellowish dots. There is a thin marginal white line reaching the white spot located in about 3/4 of length of abdomen, which is in remaining species independent and very characteristic. Length of abdomen 1,5.

Ventral aspect. Colouration generally yellowish fawn, however, very light ventral surface of abdomen makes sharp contrast with its dark lateral surfaces. Two distinct black wedge marks, small and transversal in front of spinnerets. Light areas on the lung-books are surrounded grey.

Frontal aspect. Greyish with olive shade, chelicerae yellowish. Distinct sparse white setae surround eyes I. Pedipalpal tibia and patella suffused olive greyish, cymbium dorsally yellowish. Legs greyish olive with tibia I somewhat darker.

Palpal organ typical for the genus, with short embolus making a small and tight coil around blunt, darker protuberance. Posterolateral margin of the cymbium slightly expanded and bent, presumably articulating, or supporting itself on the blunt lateral protuberance on the tibia (figs. 18—19).

Two ♂♂ specimens collected at 2200 m are slightly darker, with legs dark brown and the receptaculum seminis canal forming tighter loop, with internal walls almost contiguous anteriorly.

Description of female

Dorsal aspect. Cephalothorax greyish brown with surroundings of eyes black, eye field covered with grey and white setae, which are longer above eyes I. Greyish orange median streak along the thorax. Length of cephalothorax 1,70. Legs greyish orange with sparse setae and spines, similarly coloured. Abdomen brownish grey, with mosaic of large greyish white spots (figs. 6—7), arranged in a central part in a something like "herring bone" pattern. There are also oblique light lines on lateral surface. Anteriorly and nearby spinnerets sparse small greyish setae. Length of abdomen 2,38. Spinnerets light brownish grey, lighter tipped.

Frontal aspect. Clypeus greyish brown with sparse small white setae and greyish brown bristles overhanging cheliceral bases. Pedipalpal colouration like that of legs, chelicerae somewhat darker, orange brown.

Ventral aspect. Maxillary plates and labium greyish orange, paler tipped, sternum dark yellow suffused grey. Large, greyish white spot medially on abdomen, there are also two small, almost black spots nearby spinnerets.

Epigyne (figs. 27, 30) rather weakly sclerotized, covered with grey setae. There are two oval spermathecae and anteriorwards directed copulatory canals

visible through semitransparent wall. Internal structures consist of two simple copulatory canals coming from each opening, one of which runs directly to spermatheca, the second fuses with canal leading to the accessory gland and only then joins spermatheca. This is the first instance of the double copulatory canals known to us, the preparation itself is not entirely unambiguous, and so we are not able to give comments upon that structure. The spermathecae are simple.

Tomocyrba keinoi sp. n.

Material: Kenya, Mt. Elgon, E. side: 1 ♂ — holotype, 1 juv. — 2650 m., Feb. 22nd, 1948; 1 ♀ — allotype — Kaptega, 1950 m., March 25th, 1969, No. 233; 1 juv. — 2290 m., Feb. 9th, 1939, No. 92. Leg. Å. HOLM. Coll. Zool. Mus., Uppsala.

Description of male

Dorsal aspect. Cephalothorax light brown with anterior part of the eye field darker, eyes surrounded black, eyes lateral I—II on mutual protuberance. Thorax with paler median streak. Length of cephalothorax 1,5. Abdomen with broad light irregular streak of about 1/3 of width of the dorsal surface, followed laterally by brownish grey streaks, the latter divided in 1/3 of their length by a thin white line. There is also marginal white line along the anterior half of the abdomen, followed by a white marginal spot in about 3/4 of length of the abdomen. Spinnerets greyish fawn. Length of abdomen 1,5.

Ventral aspect. Generally yellowish fawn, abdomen very light contrasting with darker lateral surfaces. Two little black wedge shaped transversal spots in front of spinnerets.

Frontal aspect. Generally greyish brown, with paler tips of chelicerae, eyes I lateral surrounded black. All eyes I surrounded also by white setae. Pedipalps distinctly paler, yellowish fawn, legs yellowish fawn.

The palpal organ is shown on figs 20—21 and is characterised by small and short embolus coiled around sharp and pointed, striking conical protuberance.

Description of female

Dorsal aspect. Cephalothorax resembling that in *T. masai*, somewhat lighter, its length 1,76. Legs orange, lighter than in *T. masai*, with dark orange setae and spines. The colouration of abdomen is partly faded now, the remaining traces resemble *T. masai*, covered with greyish brown short setae, anteriorly longer. Length of abdomen 1,80.

Frontal aspect. Clypeus, chelicerae and pedipalps lighter than in *T. masai*, orange. Clypeus with yellow and greyish yellow setae. There are two brown bristles beneath eyes I median.

Ventral aspect. Maxillae and labium orange, sternum yellow — all these structures lighter than in *T. masai*. Abdomen greyish orange suffused dark with indistinct rows of spots.

Epigyne (figs. 28, 31) weakly sclerotized, covered with greyish brown setae, with barely visible, shallow, expanded depressions. Copulatory canals, as visible through semitransparent wall are "S" shaped. Internal structures consist of strongly sclerotized canals which begins from indistinct grooves and ridges on the surface of epigyne. There are two long canals leading to the accessory glands and branching off from the above canals. The spermathecae are spherical and heavily sclerotized. There are two superficial pockets or openings of unknown function in front of the posterior edge of epigyne.

Tomocyrra kikuyu sp. n.

Material: 1 ♂ — holotype, 1 juv. — Kenya, Kikuyu Escarpment, 2030 m., March 3rd, 1970, No. 240. Leg. Å. HOLM. Coll. Zool. Mus. Uppsala.

Description of male

Dorsal aspect. Cephalothorax light brown with slightly greyish shade, other characters as in *T. keinoi*. Length of cephalothorax 1,3. Abdomen dark grey, with rather thin median light streak, extending along $3/4$ of length of abdomen. The marginal white line is lacking, but there is light marginal spot at $3/4$ of length of abdomen. Length of abdomen 1,3. Legs yellowish fawn with distinct olive greyish shade.

Ventral aspect. Resembles darker specimens of the next species, but is even darker.

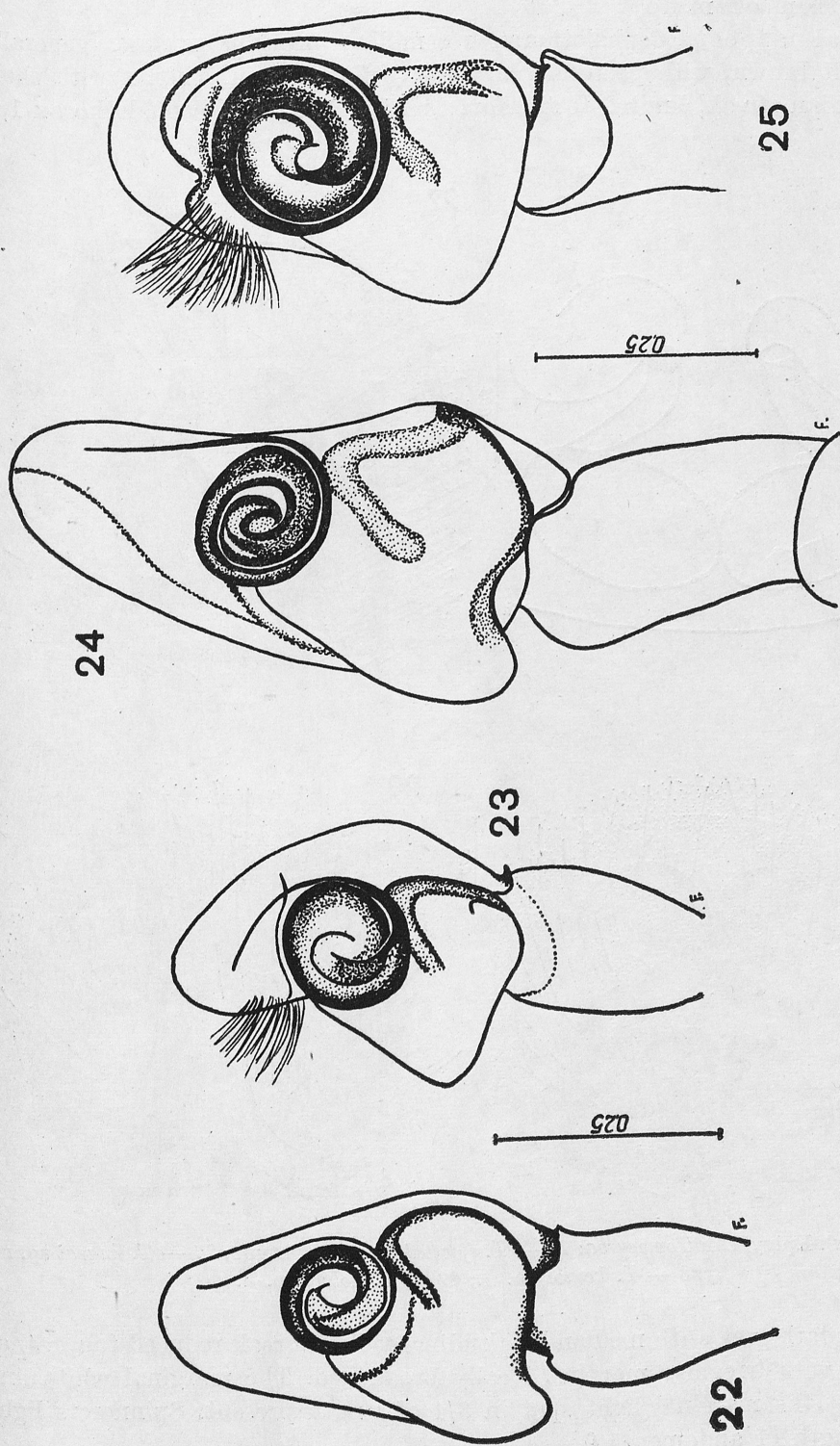
Frontal aspect. Generally brown, darker than in previous species, chelicerae brown with wedge shaped depression in the apical part of the frontal surface, separated by the sclerotized brown, oblique ridge, running from the mid-length of inner margin of chelicerae. This character, common also to *T. holmi*, seems to be an important and easy mark of these species. White setae between eyes I median, above and beneath. There are also white setae on the ventral edge of clypeus, however, thinner, shorter and less striking than in the next species. Pedipalps whitish yellow, contrasting.

Palpal organ shown on figs 22—23 is characterized by longer embolus making much broader coil than in three previous species. Legs olive greyish brown.

Tomocyrra holmi sp. n.

Material: 1 ♂ — holotype, 1 ♀ — allotype, 5 ♂♂ — paratypes, 3 juv. — Kenya, Aberdare [Mts.], Kabage Forest Station, 2250—2300 m., March 2—4th, 1969, samples No 190, 192, 193, 202 (holotype and allotype in sample No 192); 1 ♂, 3 juv. Kenya, Mt. Kenya, Ragati Forest Station, 2000 m., Feb. 23—25th, 1969. All specimens leg. Å. HOLM. Coll. Zool. Mus., Uppsala.

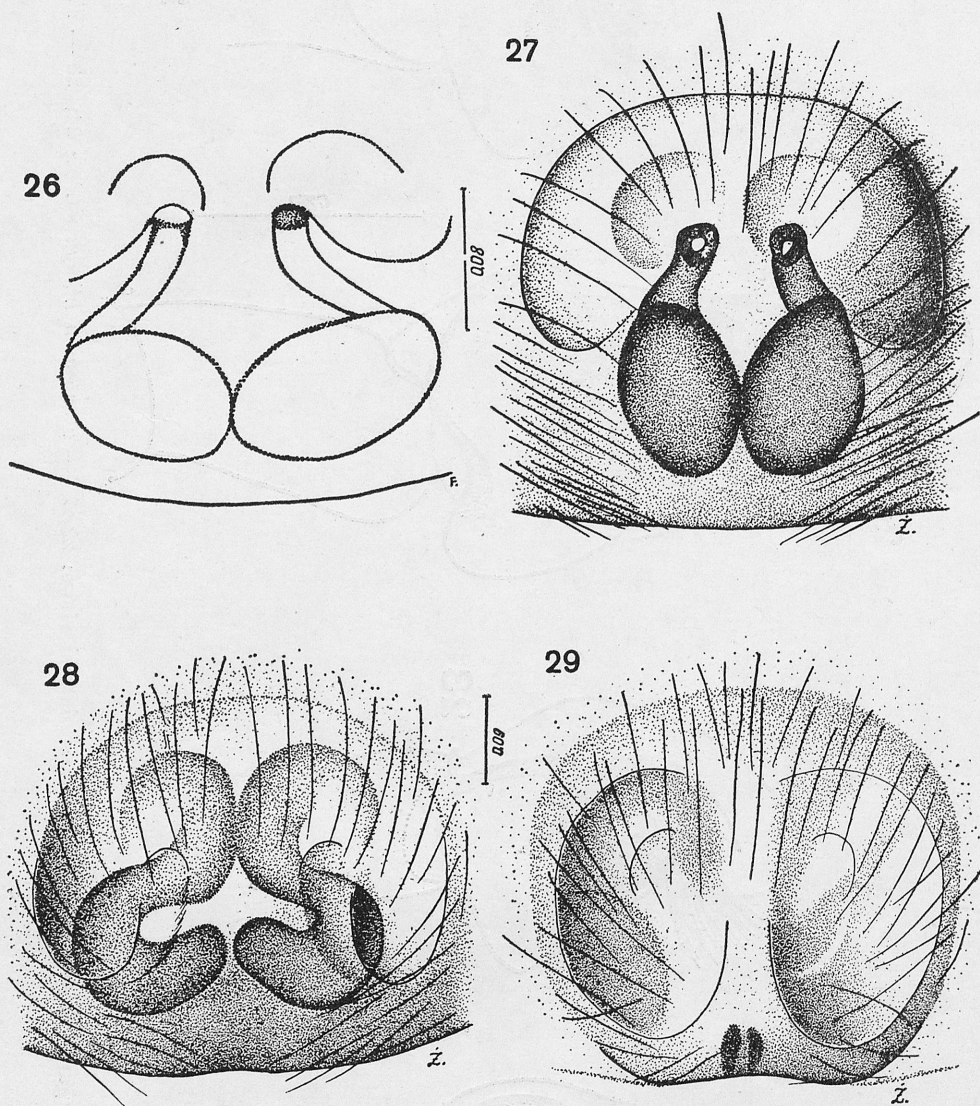
The species is named in honour of Åke HOLM, Professor Emeritus of the Uppsala University, to whom we are greatly indebted in many ways, beginning from our learning of arachnology from his monograph of *Lycosidae* in „Svenska Spindelfauna“, through his important papers on Arctic and other spiders, and recently for sending us his large collection of Salticidae collected in East Africa from 1937 till 1970.



Figs. 22—25. Palpal organs, ventral and oblique antero-lateral views: 22, 23 — *Tomocorybba kikuyu* sp. n.; 24, 25 — *T. holmi* sp. n.

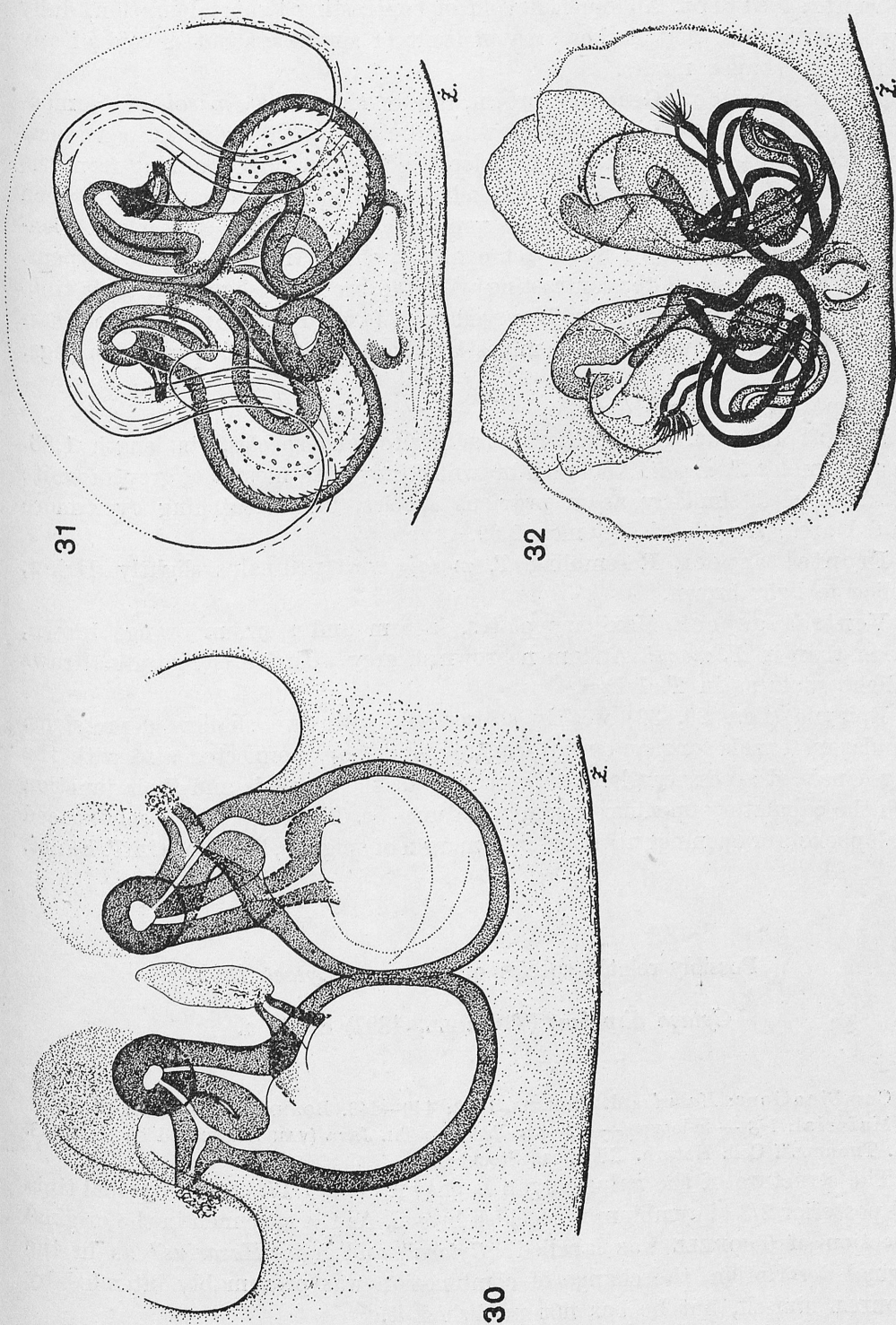
Description of male

Dorsal aspect. Cephalothorax resembling previous species, generally more light brown, with posterior part of eye field brown. Thorax with short paler median streak, limited to the fovea region. Length of cephalothorax 1,9.



Figs. 26—29. Epigyne in *Tomocyrba*: 26 — *T. sjoestedti* LESS., syntype; 27 — *T. masai* sp. n.; 28 — *T. keinoi* sp. n.; 29 — *T. holmi* sp. n.

Abdomen dark grey with median longitudinal yellow streak reduced to a rather thin line, with irregular margins, locally broadened. The marginal white line absent but the marginal light spot in 3/4 of length present. Spinnerets light fawn. Length of abdomen 1,9.



Figs. 30—32. Internal structure of epigyne in *Tomocoryba*: 30 — *T. masai* sp. n.; 31 — *T. keinoi* sp. n.; 32 — *T. holmi* sp. n.

Ventral aspect. Abdomen devoid of contrasting light colouration, dully greyish with somewhat darker area in front of spinnerets but devoid of any definitively shaped marks.

Frontal aspect. Generally brown, darker than in *T. masai* and comparable with *T. kikuyu*. Chelicerae brown, anteriorly with wedge shaped apical depression, separated by an oblique sclerotized brown ridge, running from the mid-length of the inner margin of chelicerae. Light setae dorsally between eyes I median are thickened, their ventral opposites thin and white. Conspicuous concentration of white setae along ventral margin of the clypeus. Pedipalps yellowish white, contrasting with the brown background, their tibia longer than in previous species. Legs yellowish fawn. Palpal organ bigger than in previous species, which it resembles by the long and coiled embolus (figs. 24—25).

Description of female

Dorsal aspect. Cephalothorax as in previous species, its length 1,88. Legs resembles *T. masai*. Abdomen brownish grey with mosaic of greyish white spots arranged similarly as in previous species, but stretching over more limited area. Length of abdomen 2,69.

Frontal aspect. Resembling *T. masai*, with pedipalps slightly darker, chelicerae light brown.

Ventral aspect. Maxillary plates, labium and sternum orange brown, darker than in *T. masai*. Abdomen brownish grey with four longitudinal rows of light spots as in *T. keinoi*.

Epigyne (figs. 29, 32) weakly sclerotized, with two shallow depressions. Copulatory canals long and narrowing, joining loops connected also with the long canals of accessory glands. The course of these canals and their junction with the copulatory openings is somewhat unclear. There are two closely spaced small pockets or openings near posterior margin of epigyne, like those in *T. keinoi*.

Possibly related species of the genus *Cytaea* 1882

Cytaea dispalans (THORELL, 1892) comb. n.

Combinations: *Hasarius* d. THORELL 1892: 440—443, BONNET 1955—1959: 2120.

Material: 1 ♂ — holotype — „*Cytaea dispalans* TH. Java (VAN HASSELT det.) No. 1808. Coll. THORELL". Coll. Naturh. Riksmus., Stockholm.

The structure of the palpal organ is shown on fig. 17. The pedipalpal tibia and posterior 2/3 of cymbium is blackish brown. As the specimen in the original collection of THORELL was labelled "*Cytaea*" and not "*Hasarius*" as in the original description, the change of combination was presumably intended by THORELL himself, but he has not published it.

Cytaea guentheri THORELL, 1895

Material: 1 ♂ — syntype — „*Cytaea guentheri* TH. Birma: Tharrawady (OATES) No. 1809. coll. THORELL”. Coll. Naturh. Riksmus., Stockholm.

The structure of the palpal organ is shown on fig. 16, the species is generally paler than the previous one, with pedipalpal tibia and cymbium fawnish yellow.

A few other species of *Cytaea* we known have typical for *Euophryinae* palpal organ structure, although more complicated. Unfortunately we have not seen type species of the genus, so we cannot comment yet on validity of *Cytaeinae* SIMON, 1903.

ACKNOWLEDGMENTS

The authors wish to express their deep gratitude to Professor Å. HOLM and Dr. T. KRONESTEDT for the specimens studied in this paper as well as for very friendly attitude and assistance.

Zakład Zoologii I. B. S.
Wyższa Szkoła Rolniczo-Pedagogiczna
ul. Prusa 12, 08-100 Siedlce, Poland

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Praca ustala bliskie pokrewieństwo między *Gorgopsina frenata* (KOCH & BERENT 1854), znanym z bursztynu bałtyckiego (Oligocen lub Eocen), a współczesnym rodzajem *Tomocyrra* SIMON 1900 (*Aranei, Salticidae*) z Madagaskaru i Afryki Wschodniej. Obydwa rodzaje należy zaliczyć do podrodziny *Euophrydinae* SIMON 1901 (sensu PRÓSZYŃSKI 1976), za której synonim należy uznać nazwę *Gorgopsininae* PETRUNKEVITCH 1955. Wobec ustalenia tego pokrewieństwa cechy specjalne tych rodzajów można uznać za prymitywne właściwości podrodziny *Euophrydinae*. Zbliżone cechy, przejściowe do normalnych w tej podrodzinie, wykazują współczesne gatunki *Cytaea dispalans* (THORELL 1892) z Jawy i *C. guentheri* THORELL 1895 z Birmy. Należy również zwrócić uwagę na pewne podobieństwa między rodzajem *Tomocyrra* a podrodziną *Dendryphantinae* MENGE 1879.

Autorzy dają opisy i rysunki czterech nowych gatunków *Tomocyrra* z Afryki Wschodniej oraz uwagi o *T. sjoestedti* LESSERT 1925 i dwóch wspomnianych wyżej gatunkach z rodzaju *Cytaea*.

Redaktor pracy: prof. dr J. Pawłowski

ERRATA

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	9 from top	(Fig. 17)	(Fig. 13)
Table III	11 from top	<i>Stenostomum</i>	<i>Stenostomum anatirostrum</i>
349	10 from below	in press.	28: 305—310.
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	7 from below	in press.	28: 349—352.
	5 from below	in press.	28: 611—616.
	3 from below	in press.	28: 617—623.
351	20 from top	in press.	64: 801—810.

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J. Kolasa