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Morpho-systematic studies on *Collembola*. Part 1. Materials to a revision of the genus *Lepidocyrtus* BOURLET, 1839 (*Entomobryidae* s. l.)

[Pp. 369—378, 4 text-figs.]

Badania morfologiczno-systematyczne nad *Collembola*. I. Materiały do rewizji rodzaju *Lepidocyrtus* BOURLET, 1839 (*Entomobryidae* s. l.)

Морфолого-систематические исследования над *Collembola*. 1. Материалы к пересмотру рода *Lepidocyrtus* BOURLET, 1839 (*Entomobryidae* s. l.)

Abstract. The present paper contains the characteristics of the armature of the labrum in *Lepidocyrtus curvicollis* BOURLET, *L. violaceus* LUBBOCK, *L. lignorum* (F.), *L. serbicus* DENIS and *L. paradoxus* UZEL. Moreover, the author gives a redescription of *L. ruber* SCHÖTT and a description of a new species *L. nigrescens* n. sp. belonging to the *paradoxus* group.

INTRODUCTION

Till recently, the taxonomy of the genus *Lepidocyrtus* BOURLET, 1839 was very poorly known. An identification of the members of this genus was based on very superficial characters as the coloration and the shape of the body and the shape of the empodium clav. Only in 1964 and 1965, GISIN in his outstanding papers on the *Collembola*, showed some new characters, which allow more accurate identification of the species of the genus in question. These are: the presence or absence of the scales on the basal segments of the antenna and on the legs, the arrangements of the macrochetae and the trichobotria on the dorsal side of the abdominal segments, the shape and the arrangements of the microchetae at the base of the anterior trichobotrium of the fourth abdominal segment, and chaetotaxy of the base of the labium. Recently, DA GAMA (1966) showed that the arrangement of the microchetae on the dorsal side of the second and the

third abdominal segments provide also with some important taxonomic features. However, the armature of the labrum, which is very important in the taxonomy of other genera of the family *Entomobryidae*, has not hitherto been studied by any author. I found that the character of the armature of the labrum allow to separate several species of the genus *Lepidocyrtus*. Moreover, that character is easy to detect even in badly worn or poorly preserved specimens, which are in an unsufficient condition for the observations of other characters of the chaetotaxy.

The descriptions and the figures given in the present paper are based, except *L. nigrescens* sp. n., on the material collected in Ojców, distr. Olkusz in the southern part of the Cracow-Wieluń Highland. The following species are here considered: *Lepidocyrtus curvicolis* BOURLET, 1839, s. GISIN 1964 b, *L. violaceus* LUBBOCK, 1873, s. GISIN 1964 a, b, *L. lignorum* (FABRICIUS, 1775), s. GISIN, 1964 b, *L. serbicus* DENIS, 1933, s. GISIN, 1965, *L. paradoxus* UZEL, 1890, s. GISIN, 1964, a, b, *L. ruber* SCHÖTT, 1902 and *L. nigrescens* sp. n. In addition, some material from the Wolin Island and Poznań area is also worked out. The major part of the material from Poznań area was received through the kindness of Dr. J. WIŚNIEWSKI of the Departament of the Forestry of the Academy of Agriculture in Poznań. I wish to express to him my cordial thanks for such a help in my study.

THE MORPHOLOGY OF THE LABRUM

The general armature of the labrum in the species of the genus *Lepidocyrtus* (Fig. 1, A) resembles that in other genera of the family *Entomobryidae*. The base of the labrum bears four praelabral setae (YOSH, 1963), which, in *L. curvicolis* BOURLET are smooth (Fig. 1, A) but distinctly ciliated in other studied species. The first and the second rows of the labral setae consist of five setae of equal length; the third row has four setae which are slightly thicker and shorter than the setae of the first and second rows (briefly: labral setae 5, 5, 4). The setae of the third row, in *L. violaceus* LUBBOCK and *L. lignorum* F. are distinctly trilobed with lobes pointed, (Figs. 1, C, D, E), being simple in other species. The lower margin of the labrum shows four transversally elongate papillae of various shape in the individual species. These papillae, in *L. curvicolis* BOURLET and *L. serbicus* DENIS, are smooth, ill-defined and almost confluent into one lamella (Figs. 1, A, B, F, G). In *L. ruber* SCHÖTT, the papillae are also smooth, but easier to detect and distinctly separated from each other, (Fig. 2, F—G); interior papilla in *L. nigrescens* sp. n. is provided with a single spine, and the exterior papillae of this species are smooth (Fig. 4, D, E). Both exterior and interior papillae in *L. paradoxus* UZEL, are armed with distinct, singular spines (Fig. 1, H, I). In *L. violaceus* LUBBOCK and *L. lignorum* F. each of the papillae shows some irregular spines; the small differences in the armature of those spines found in both species seem to have no taxonomical significance.

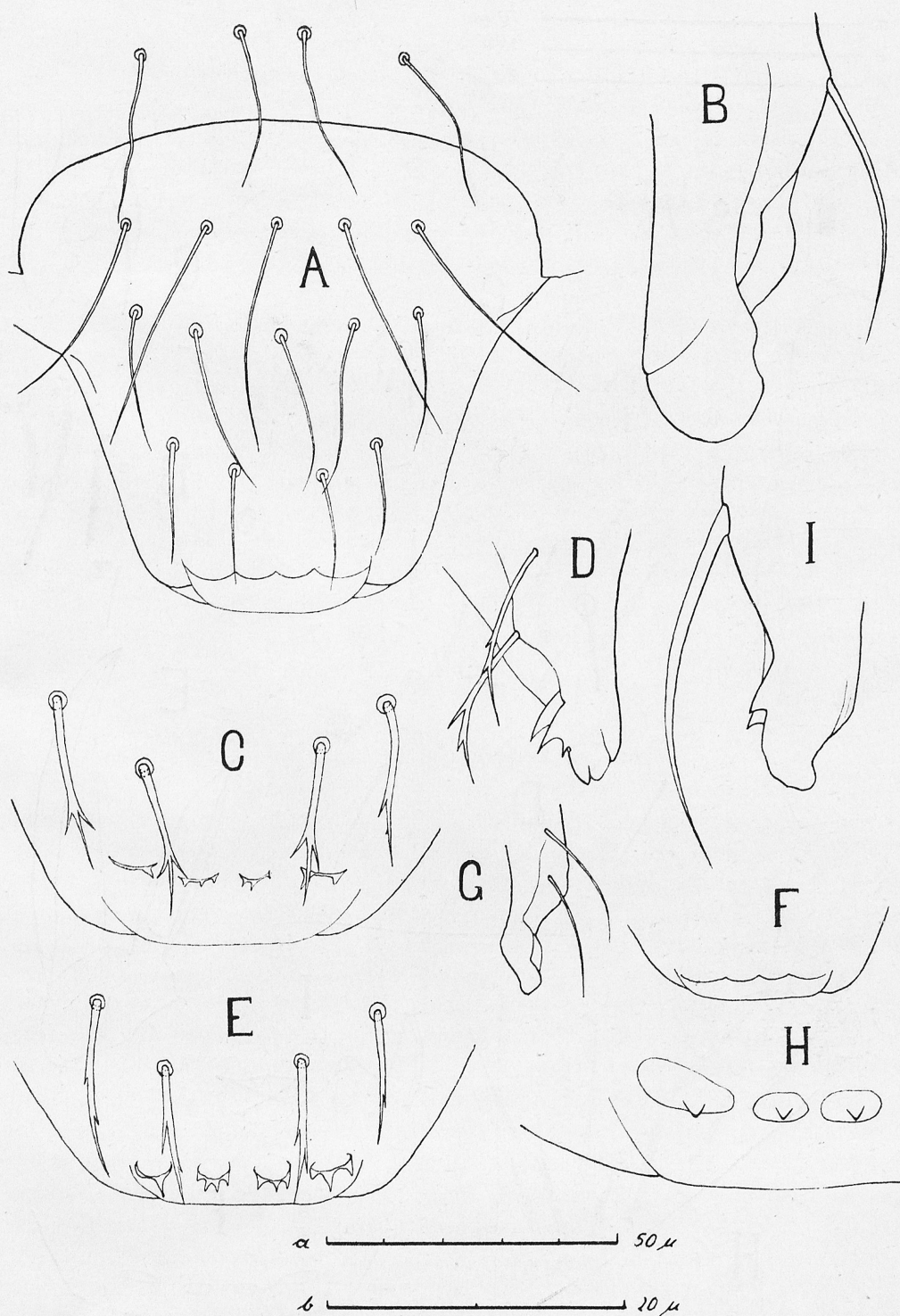


Fig. 1. Morphology of the labrum. A — *Lepidocyrtus curvicollis* BOURL., frontal view (magnification: a), B — *L. curvicollis*, lateral view (magnification: b), C, D — *L. violaceus* LUBB. (magnification: b), E — *L. lignorum* (F.), (magnification: b), F, G — *L. serbicus* DEN. (magnification: b), H, I — *L. paradoxus* UZ. (magnification: b).

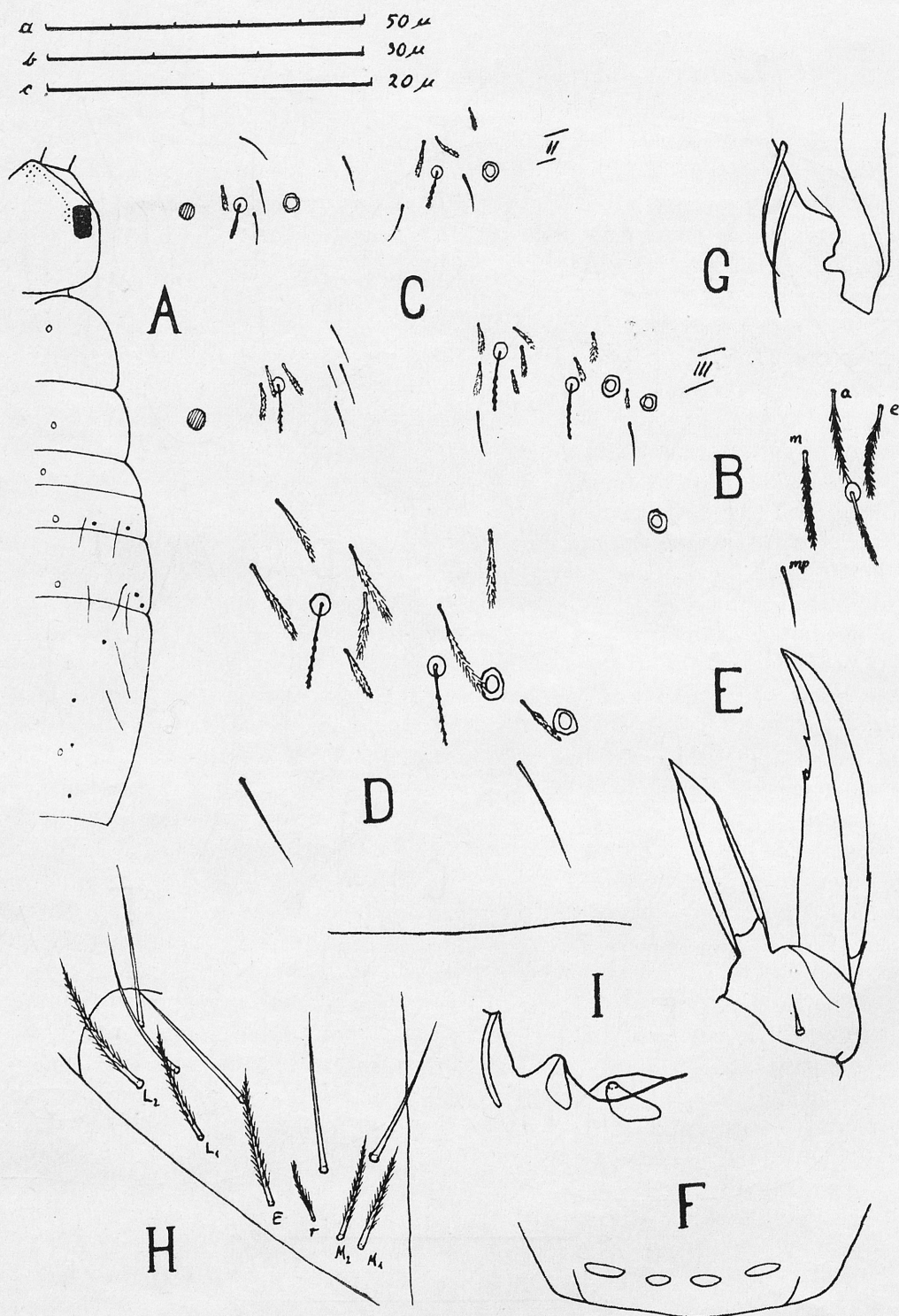


Fig. 2. *Lepidocyrtus ruber* SCH. A — Dorsal chaetotaxy (scheme), B — Base of anterior trichobotrium of the fourth abdominal segment (magnification: a), C — Chaetotaxy of the second and the third abdominal tergites (scheme), D — Chaetotaxy of the lateral part of the third abdominal tergite (magnification: a), E — Claw and empodium (magnification: b) F, G — Lower margin of the labrum (magnification: c), H — Chaetotaxy of the base of labium (magnification: a), I — Sensory organ of the third antennal segment (magnification: c).

REDESCRIPTION OF *LEPIDOCYRTUS RUBER* SCHÖTT, 1902

Lepidocyrtus ruber SCHÖTT was separated from its allies on the basis of different coloration of the body. Only in 1920, STACH considered the shape of the empodial appendage, which is very characteristic in this species. However, the morphology of *L. ruber* SCHÖTT is still poorly known and a redescription of this species seems to be important. The redescription is based on the specimens collected in Ojców, and in the vicinity of Poznań.

The body length (measuring from the posterior margin of the sixth abdominal segment to anterior margin of the mesothorax) 0.9—1.2 mm., the colour of the body very variable, yellowish-white to dirty purple or black-violet. General habitus as in *L. lignorum* (F.). The ratio of the length of the head (measuring from the posterior margin to the base of the antenna) to the length of the antenna is 1:1.9. The ratio of the length of the antennal segments is I:II:III:IV is 1:2.6:2.5:3.9.

The chaetotaxy of the dorsal side of the head and the abdomen (Fig. 2, A) similar as in *L. lignorum* (F.): one macrochaeta submedially, one macrochaeta sublaterally and one trichobotrium, on the second abdominal segment; one submedian trichobotrium, two sublateral macrochaetae and two sublateral trichobotria on the third abdominal segment; three dorsal macrochaetae posteriorly on the fourth abdominal segment. Three ciliated microchaetae (a, e and m after GISIN, 1964) and one smooth microchaeta (mp) at the base of the anterior trichobotrium on the fourth abdominal segment (Fig. 2, B). The arrangement of the microchaetae on the second and the third abdominal tergites is shown in Fig. 2, C, D. The basal segments of the antennae, the legs and the ventral side of the manubrium are clothed with scales. The arrangement of the pseudopori on the dorsal side of the body and on the ventral side of the manubrium similar to *L. lignorum* (F). The arrangement of the setae on the ventral side of the manubrium similar to *L. lignorum* (F)., but very variable (see GISIN, 1964 a, Fig. 2).

The claw as shown in Fig. 2, E. Basal teeth above the middle of the inner margin, the inner tooth very close to basal ones. Exterior margin with two poorly visible teeth. The appendage flatly truncate apically, with two elongate lamellas, the outer one of which is broad and the inner one is narrower. The tibiotarsal bristle slightly shorter than the inner margin of the claw; with a distinct head.

The praelabral setae 2+2, distinctly ciliated. Labral setae 5,5,4, smooth. Lower margin of the labrum with four transversally elongate, smooth papillae (Fig. 2, F, G).

The chaetotaxy of the base of the labium similar to that in *L. lignorum* F. (Fig. 2, H); the seta M_1 in many instances smaller than M_2 , the seta r slightly reduced. All the setae in the second row (M_1 , M_2 , r, E, L_1 , L_2) distinctly ciliated.

The sensory organ on the antennal segment consists of two smooth sensory rods, which are partly covered by a fold of the integument (Fig. 2, J).

L. ruber SCHÖTT, comes very near *L. lignorum* (F.) and *L. violaceus* LUBBOCK as the above description shows. It is separable decidedly from the two allies by the armature of the empodial appendage, the shape of the setae of the third row on the labrum, as well as by the armature of the lower margin of the labrum.

***Lepidocyrtus nigrescens* sp. n.**

Diagnosis: Habitus and chaetotaxy of the body similar to *L. paradoxus* UZEL. Body yellow, white. Median papillae of the lower margin of the labrum with a rather small spine; lateral papillae smooth.

Description: Length of the body 1.15—1.85 mm. Body light yellow, legs, head and antennae slightly darker than the body; the bases of the legs and the

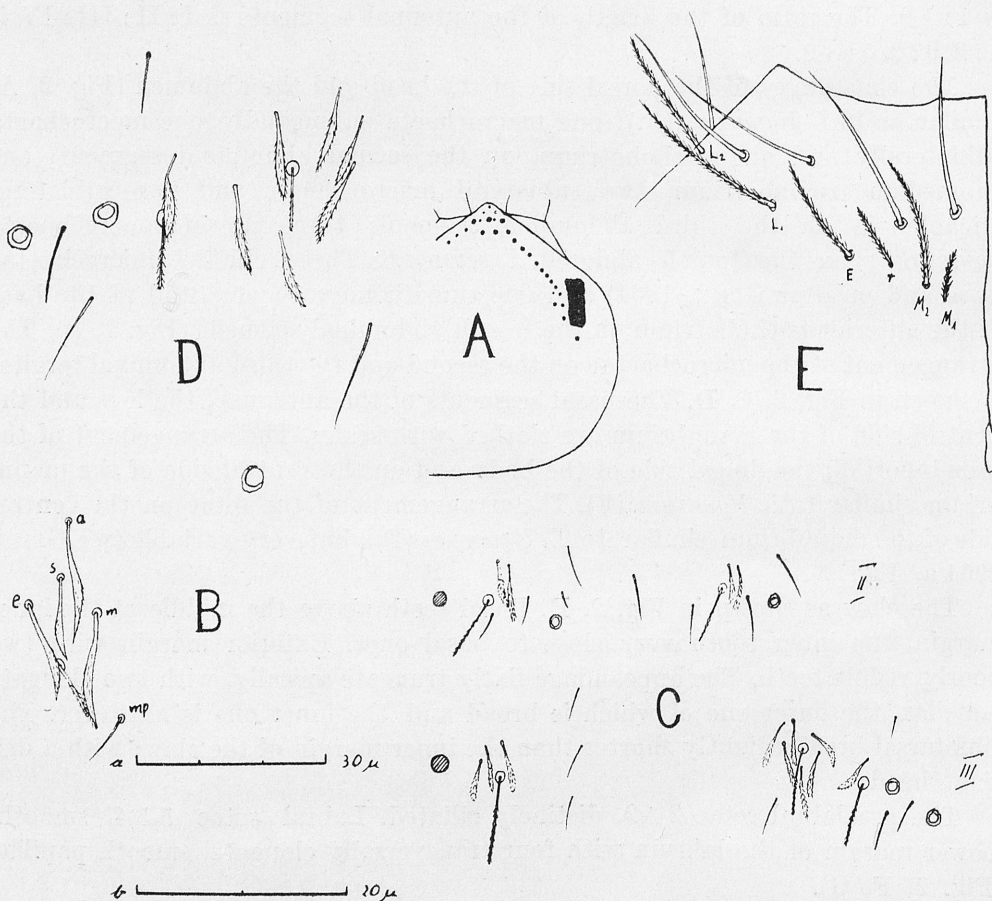


Fig. 3. *Lepidocyrtus nigrescens* sp. n. A — Chaetotaxy of the head (scheme), B — Base of the anterior trichobotrium of the fourth abdominal segment (magnification: b), C — Chaetotaxy of the second and the third abdominal tergite (scheme), D — Chaetotaxy of the lateral part of the third abdominal tergite, (magnification: b), E — Chaetotaxy of the base of the labium, (magnification: a).

posterior margins of the abdominal lobes very dark violet-blue (Fig. 4, A). Dorsum clothed with black scales. The ratio of the length of the head to the length of the antennae is 1:2.3; the ratio of the length of the antennal segments I:II:III:IV is 1:1.7:1.9:2.5. Habitus as shown in Fig. 4, A.

Chaetotaxy and arrangement of the pseudopori similar to *L. paradoxus* UZEL (see: GISIN, 1964 a, Fig. 1). Chaetotaxy of the head shown in Fig. 3, A. Four ciliated microchaetae (a, e, m, s) and one smooth microchaeta (mp) at

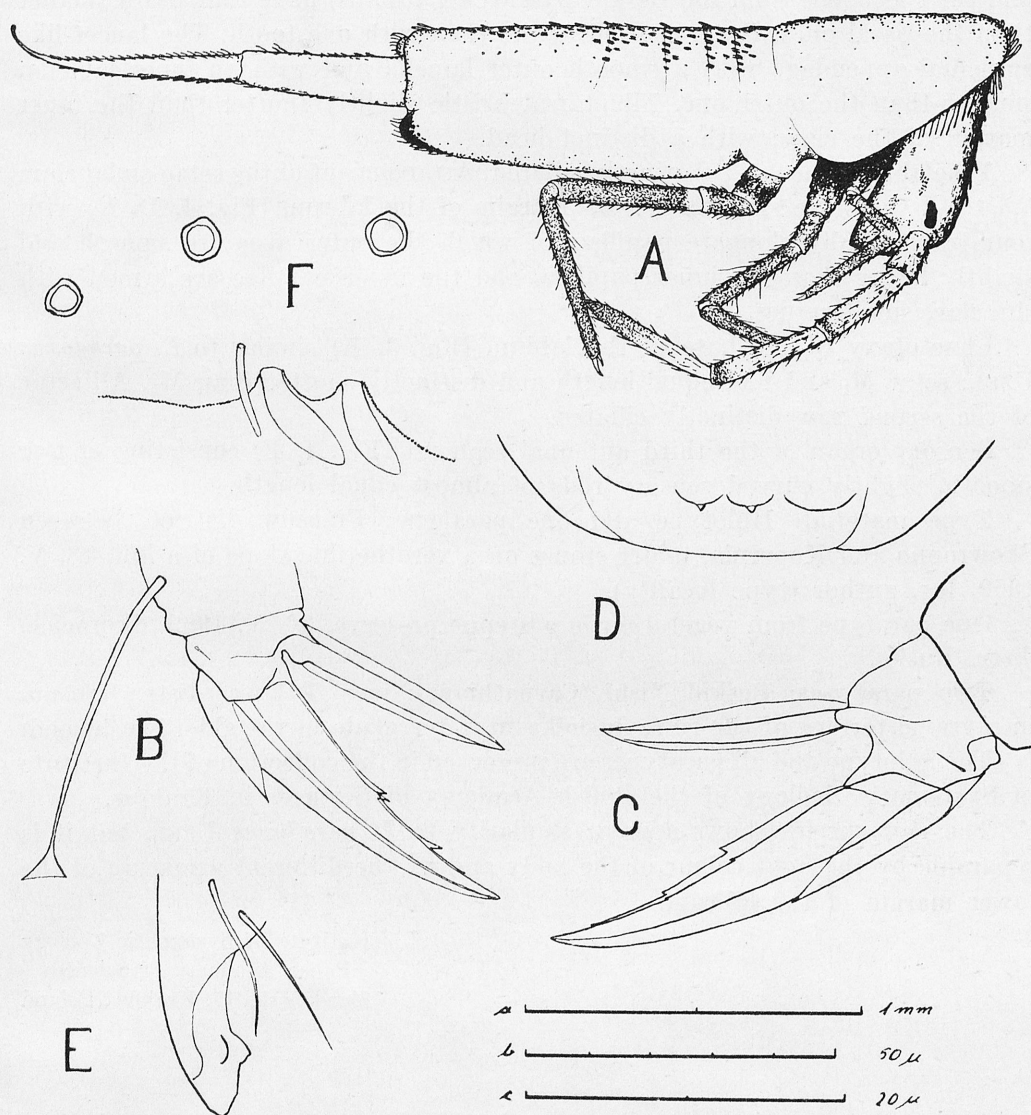


Fig. 4. *Lepidocyrtus nigrescens* sp. n. A — Habitus (magnification: a), B — Claw of the third leg. from specimen from the Pińczów district (magnification: b), C — ditto, from a specimen from the Beskid Niski (magnification: b), D, E — Lower margin of labrum (magnification: c), F — Sensory organ of the third antennal segment (magnification: c).

the base of the anterior trichobotrium of the fourth abdominal segment (Fig. 3, B). Microchaetae of the second and the third abdominal tergites shown in Fig. 3, C, D. Legs, basal segments of the antennae and the ventral side of the manubrium clothed with scales.

Claw (Fig. 4, B, C) with a pair basal teeth above middle of the inner margin, and two irregularly situated ones above the basal teeth. The specimens from the Pińczów district show the lower tooth distinctly larger than the basal teeth, and the specimens from the Beskid Niski (Carpathians) have that tooth smaller than the basal ones. Outer margin of the claw with one tooth. The lancet-like empodial appendage with a smooth outer lamella and with an inner lamella, smaller than the outer one. Tibiotarsal bristle slightly shorter than the inner margin of the claw; with a distinct head.

Praelabral setae 2+2, distinctly ciliated. Arrangement of the setae on labrium 5,5,4; all the setae smooth. Lower margin of the labrum (Fig. 4, D, E) with four transversally elongate papillae, of which the outer ones are smooth and slightly larger than the inner papillae, and the inner papillae are armed with singular, small spines.

Chaetotaxy of the base of the labium (Fig. 3, E) similar to *L. paradoxus* UZEL: setae M_1 and r of equal length and distinctly shorter than M_2 . All setae of the second row distinctly ciliated.

Sensory organ of the third antennal segment (Fig. 4, F) consisting of two smooth, slightly curved sensory rods of almost equal length.

Type material: Holotype and one paratype: Pińczów district, between Skowronno and Kopernia, under stones on a xerothermic slope of a hill, 28. V. 1962, leg. author (type locality).

One paratype from vegetation in a steppe preserve, 26, V. 1962, Skorocice, distr. Busko.

Two paratypes: Beskid Niski (Carpathians): near Tylawa, distr. Krosno, in a gravel terrace of the river Jasiołka in a dry glade in the alder brushwood.

The holotype and all paratypes are preserved in the collection of the Institute of Systematic Zoology of the Polish Academy of Sciences in Kraków.

The new species shows a great similarity to *L. paradoxus* UZEL, but it is separable by the light colour of the body and by the different armature of the lower margin of the labrum.

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STRESZCZENIE

Autor opisuje budowę labrum u kilku krajowych przedstawicieli rodzaju *Lepidocyrtus* BOURLET. Cecha ta, nie uwzględniana w dotychczasowych badaniach, wydaje się być bardzo ważna w taksonomii omawianego rodzaju. Poza tym autor daje redeskrypcję *L. ruber* SCHÖTT, gatunku o słabo poznanej morfologii oraz opis nowego dla wiedzy *L. nigrescens* sp. n., znalezionej w Niece Nidziańskiej i w Beskidzie Niskim.

РЕЗЮМЕ

Автор описывает строение верхней губы у нескольких отечественных представителей рода *Lepidocyrtus* BOURLET. Признак этот, не учитываемый до сих пор в исследованиях, кажется очень важным в систематическом отношении выше упомянутого рода. Кроме этого автор описывает: вид *L. ruber* SCHÖTT, морфология которого была слабо изучена, и новый для науки вид *L. nigrescens* sp. n., найденный в Ниданской котловине и в Низком Бескиде.

Redaktor zeszytu: doc. dr W. Szymczakowski

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