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Ryszard BIELAWSKI

Morfologiczno-systematyczne opracowanie krajowych gatunków rodzaju *Rhyzobius* STEPHENS, 1831 (*Coleoptera*, *Coccinellidae*)

Морфолого-систематические исследования над польскими видами рода *Rhyzobius* STEPHENS, 1831 (*Coleoptera*, *Coccinellidae*)

Morphological and systematical studies on Polish species of the genus *Rhyzobius* STEPHENS, 1831 (*Coleoptera*, *Coccinellidae*)

[Pl. IV—VI and 31 text-figures]

INTRODUCTION

The subfamily *Coccinellinae*, the most numerous in the family *Coccinellidae*, includes, beside others, the remarkably distinct tribe *Coccidulini*. In Poland this tribe is represented by two genera: *Coccidula* GYLL., 1827, and *Rhyzobius* STEPH., 1831. The latter, comprising two Polish species, namely *Rh. litura* (F.) and *Rh. chrysomeloides* (HERBST), is the object of the present paper.

The purpose of my investigations was, first of all, a detailed morphological analysis of the mentioned species, based on modern methods of systematic research; another purpose was to find features apt to give, as far as possible, an exact idea of the distinguishing features in these species, which would



allow their precise determination; besides, I had in view to discuss the particular features as to their variability. This contribution is intended also to sum up previous investigations carried out in this country, as well as to illustrate the distribution in Poland of the species in question. Finally, its purpose is to ascertain their proper biotopes.

All Polish materials available have been taken into consideration. These are first of all the collections of the Institute of Zoology of the Polish Academy of Science in Warszawa and those of the Kraków Branch of the Institute. Material from the Upper Silesia Museum at Bytom and the Museum of the Zoological Institute, Wrocław University, has also been studied, as well as specimens collected by the author himself. The material amounts to 480 specimens¹.

The material for morphological study has been determined taking into consideration, among others, the characters of the genitalia. A number of microscopic slides have been made partly in Canadian balsam, most of them, however, in glycerine-gelatine, the latter method rendering easy free handling of the specimens at detailed examination. Some of the parts investigated, such as abdominal segments and the prosternum, which in certain specimens were strongly sclerotized, were subjected to discoloration by means of potassium chlorate with hydrochloric acid; this made clearly visible such barely discernible characters as the abdominal plates or prosternal carinae. Other parts being but slightly sclerotized and thus poorly visible, or whose outlines were obliterate, had to be stained either with a 1% pyrogallol solution or with saphranine diluted in alcohol.

The accompanying drawings of the male genitalia show their left side and dorsal views, while the genital segments are figured as seen from the ventral side. The variability of the coloration of the elytra is shown on their schematic outli-

¹ Investigations were carried out in the Coleopterological Laboratory of the Institute of Zoology of the Polish Academy of Science in Warszawa and was directed by Prof. Dr. T. JACZEWSKI and the late Eng. J. MAKÓLSKI, to whom are due my heartiest thanks. I feel also much obliged for valuable hints and remarks to all those who advised me during my work.

nes; in this case, however, merely more characteristic coloration varieties have been taken into consideration. In order to make the pattern better visible, the specimens had to be submerged in water when the drawing was made.

Among the characters peculiar to a given species, or any higher taxonomic unit, two kinds have been distinguished: the first-rank and the complex characters. A first-rank character is one that allows in practice to identify a species correctly and which is subjected to a minimum of individual variability. In the species here in question, such first-rank characters are the genitalia in both sexes. The remaining characters are complex features, which means, that a whole set or combination of features is required to characterize a species. In view of a wide range of individual variability, a single character fails to determine a species correctly. An example is the shape of the pronotum, as a feature so far believed to be a first-rank character. Certain specimens have the outline of the lateral pronotal margins intermediate between a sub-circular contour considered as characteristic of *Rh. chryso-meloides* (HERBST) [Pl. IV, fig. 5–8] and an entirely straight margin pretended to be distinctive for *Rh. litura* (F.) [Pl. IV, fig. 1–4]. Consequently, there may very often be observed in collections a number of specimens which are determined erroneously (about 50%). This is why it is legitimate to reduce such a character to the rank of a complex characteristic. The same regards another feature connected with the foregoing, namely the posterior angle of the pronotum; a series of measurements taken showed that extreme figures of its variability range are either common for both species, or are extremely close to each other; this character cannot thus be considered distinctive. The same concerns other feature such as, for instance, coloration, general body outline etc., the variability of which will be dealt with below in the description of the particular species.

The names of aberrations have been deliberately omitted, as it was assumed that single features, unconnected with other characters, have no sufficient taxonomic value whatever. Names of colour aberrations would merely augment confusion in nomenclature.

The genus *Rhyzobius* STEPH. was described in 1831 by STEPHENS and based on the species occurring in Europe. However, the majority of the species belonging to the genus in question are reported from Australia. Some Australian species were accidentally introduced into North America (California) and have acclimatized in that region, the same regarding North Africa and Europe. Some particular species have also been reported from a number of islands of the Malayan Archipelago (as, for instance: New Guinea and Borneo), and also from Madagascar and from South Africa (Natal). In Europe this genus is represented by the following species: *Rh. litura* (F.), *Rh. chrysomeloides* (HERBST), *Rh. oculatissimus* WOLL., *Rh. bipartitus* FUENTA and *Rh. bassus* NORMAND.

The first species belonging to the genus *Rhyzobius* STEPH., *Rh. litura* (F.), was described by FABRICIUS in 1787, the next one, reported by HERBST in 1792, was *Rh. chrysomeloides* (HERBST). Subsequent years brought a series of redescriptions pertaining to the two species mentioned. When describing *Rh. litura* (F.), FABRICIUS included it into the genus *Nitidula* F., and MARSHAM, 1802, in a description of probably the same species under the name *Dermestes coadunatus* MARSHAM, placed it in the family *Dermestidae*. *Rh. chrysomeloides* (HERBST), described as *Strongylus chrysomeloides* HERBSTS, was considered later a variety of *Rh. litura* (F.) (as, for instance, by WEISE, 1879). Even in 1940, KLEINE reported it in his paper under a varietal name, *Rh. litura* var. *chrysomeloides* (HERBST).

The position of the *Coccidulini* within the family *Coccinellidae* requires a closer study. KAPUR's paper (1950) dealing with the larvae roused some doubts in this connection as the structure of the hypopharynx and the antennae in the larvae of the *Coccidulini* (*Rhyzobius* STEPH. and *Coccidula* GYLL.) show differences in comparison with other tribes of the *Coccinellidae*. In the structure of the hypopharynx they resemble the *Epilachninae*, while the structure of the antennae is intermediate between the *Epilachninae* and the *Coccinellinae*. The restricted knowledge of the relations of forms has made it as yet impossible to solve this problem. For want of larval material, the matter has been omitted in the present contribution.

Most of the published data on the genus *Rhyzobius* STEPH. consist merely of a number of descriptions of various kinds, inserted in general papers or works dealing with beetles, often with keys for the determination of species as, for instance, the works of REDTENBACHER (1858), BACH (1856), SEIDLITZ (1875), GANGLBAUER (1899), REITTER (1911), KUHNT (1913). All these descriptions are more or less alike, bringing no new features useful to characterize a species more exactly, being often simple repetitions of earlier descriptions. However, the description by CHAPUIS (1876), based on fairly precise characters, is worth mentioning. Such characters as the genitalia, which have proved to offer first-rank features, have not been taken into consideration, except for NORMAND (1938) who, when describing a new species, *Rh. bassus* NORM., took into account the male genitalia. However, he described merely parts of the male genitalia (parameres, penis) in his study of the following species: *Rh. litura* (F.), *Rh. chrysomeloides* (HERBST) and *Rh. bassus* NORM. Female genitalia in the genus *Rhyzobius* STEPH. have not been examined heretofore, being considered as having no taxonomic value. Biological data are extremely scanty and fragmentary; moreover, the characteristic biotopes have not been taken into account. All contributions dealing with species of the genus in question lack drawings representing the described parts; inadequate attention has also been paid to the variability of the particular characters. Attention was paid only to the variability of the coloration of the elytra, which has resulted in an unnecessary description of colour aberrations.

SYSTEMATICAL PART

Rhyzobius STEPH.¹

Antennae with the first joint long, remarkably thickened; the second joint by a half shorter than the preceding one; the third thin and exceeding in length the next joints taken

¹ The original spelling of this name is used here. The emendation by AGASSIS (1846) is invalid, since no special opinion was rendered in this case by the International Commission on Zoological Nomenclature.

together; the three last ones form a club with a sort of dentation on the inner side [fig. 1]. Mandibulae with two teeth, one of which at the top, the other in the posterior half [fig. 3]. Structure of the maxillae and lower labium as shown on fig. 2 and 4. Base of pronotum bordered. Surface of elytra with two sorts of punctures, the larger ones scattered without order

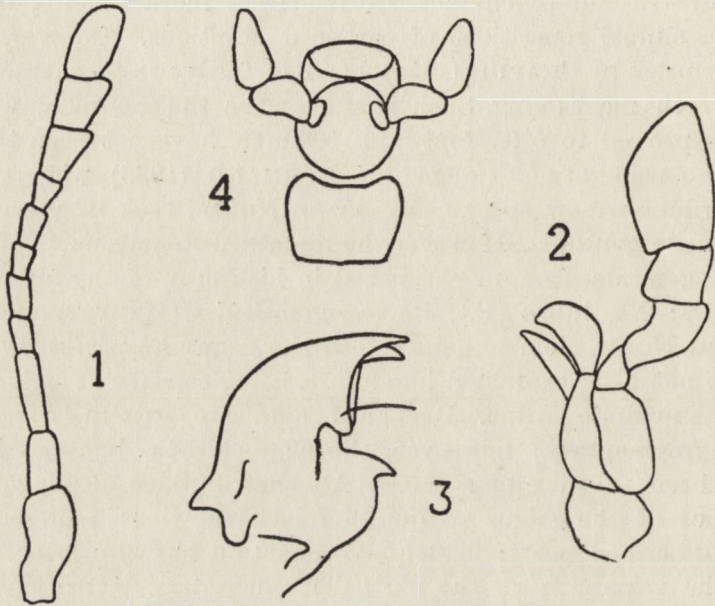


Fig. 1—4. *Rhyzobius chrysomeloides* (HERBST). Fig. 1. left antenna from above, $\times 90$; fig. 2. left maxilla from above, $\times 100$; fig. 3. left mandibula from above, $\times 130$; fig. 4. labium from the underside, $\times 130$.

and not arranged in rows. Epipleurae flat, narrow, extending along two-thirds of the length of the elytra. Process of prosternum expanding distally, its apex truncate, with rounded angles. Abdominal plate single, regularly arcuate, not reaching the next segment [fig. 29]. Spiculum gastrale long, expanded at both its extremities [Pl. V, fig. 5, Pl. VI, fig. 5]. Syphon semicircularly rounded at the apex [Pl. VI, fig. 4], with distinctly separate syphonal capsula. Trabes very long. Para-

meres narrow, long and hairy at the extremities. Penis symmetrical [Pl. V, fig. 3, Pl. VI, fig. 3]. Ninth tergite with lateral processes well developed [Pl. V, fig. 5, Pl. VI, fig. 5]. Genital plates hairy with sex tubercles, partly covered by the ninth urotergites [Pl. V, fig. 6, Pl. VI, fig. 6].

Rhyzobius litura (F.)

Body strongly convex; its general shape obovate, lateral parts of the body nearly perpendicular to the body underside. Dorsal surface with fine, rusty-red pubescence. Head, as well as mouth parts and antennae, brownish-yellow.

Pronotum [Pl. IV, fig. 1—4] narrowing cephalad. In typical specimens lateral borders almost straight, but they may present also various degree of arcuate curving; posterior angle of pronotum varies from 98° to 104° . Maximal width of pronotum at the base. Pronotum coloration in most cases uniformly brownish, sometimes slightly darkened in the middle at the base, in form of two obliterate spots.

Distal parts of the elytra punctured more densely. In the median portion of the elytra a pubescence distinctly pointing towards the suture. The appearance of the colour pattern on the elytra runs as follows: at first there appear the preapical spots [fig. 6], next the lateral ones [fig. 7—8], finally come out the subhumeral spots [fig. 10]. Specimens may be found having spots non-confluent, and also such ones in which these spots fuse to a various degree. When the preapical spots fuse with the lateral ones, the subhumeral spot is absent [fig. 9]. The presence of a band is due to these spots fusing together: at first the subhumeral with the lateral one [fig. 11], and next both these spots getting connected with the preapical one [fig. 12]; this results in the formation of an arcuate band. Sometimes, the latter may widen so as to form upon the elytra a single black spot covering almost two thirds of their surface. I have had no opportunity myself to examine such specimens in this country, but ŁOMNICKI (1913) reports them from Silesia, and TRELLA (1923) from the neighbourhood of Przemyśl. Specimens most frequently found are those having two or three separate spots.

Hind wings tend to reduction and are seldom fully developed. When reduced, they are in the shape of narrow, membranous and very feebly sclerotized appendages. Their exterior margin is in the middle of its length sharply broken. Venation present merely in the basal portion, while the distal part is narrower and membranous. Short, very dense bristles cover the entire surface of the wing, becoming longer along the inner margin. Particularly rare are specimens with normally developed wings which are then usually folded under the elytra. Legs totally brownish and hairy.

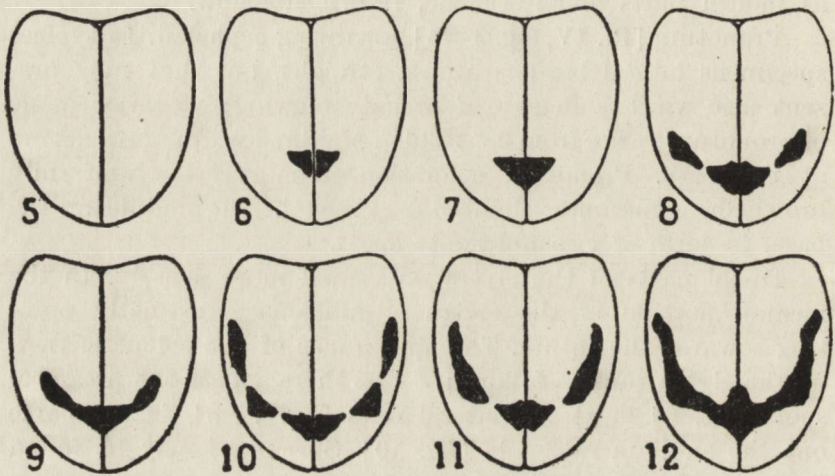


Fig. 5—12. *Rhyzobius litura* (F.). Variability of the pattern of the elytra.

Prosternum always brownish-yellow, meso- and metasternum black. Coloration of the abdominal sternites may be of various intensity. The first sternites are most frequently black. The last one, forming the pygidium, is always brownish-yellow. The two preceding sternites often brown, dark-brown or even black. The flexure of the abdominal plate protrudes beyond the middle of the first visible abdominal sternite, reaching over two thirds of its length.

Prosternal carinae are well defined along their whole length [Pl. IV, fig. 11—12]. They converge frontally forming an acute

angle at their contact point; they are either confluent totally at that point, or may be just connected only, and occasionally they do not meet at all [Pl. IV, fig. 12].

Length of penis [Pl. V, fig. 1—2] smaller than or equal to that of the parameres; penis provided with an additional appendice, the distal extremity of which expands into a tiny club. Penis, rounded at the tip, narrows frontally [Pl. V, fig. 3]. Parameres oval, thickened at the extremity, beset with bristles not exceeding half the length of the parameres [Pl. V, fig. 2]. Basal part of parameres large [Pl. V, fig. 1—2], equalling almost half of the length of the aedeagus, elongated towards the trabes. Trabes [Pl. V, fig. 1] broad, its width exceeding or equalling the length of the parameres and of the basal part taken together; towards the apex the trabes expands gradually to become rounded at its extremity; exterior margin more sclerotized. Proximal end of spiculum gastrale [Pl. V, fig. 5] embodied in the ninth urotergite and provided with narrow processes.

Female genitalia [Pl. V, fig. 6] broad, slightly elongate. Genital plates wide and short. Ratio of length of the genital plates to their maximal width about 3,5.

Length of body 2,5 — 3 mm.

Rh. litura (F.) belongs probably to European zoogeographical elements. It is known from Europe, and is likely that its eastern limit of distribution runs across Polish territory, yet for want of material, no detailed data are available at this time.

Distribution records regarding the occurrence of this species in Poland have but a fragmentary character. The particular places of its occurrence are grouped around Szczecin, Wrocław and Warszawa. On the accompanying map [fig. 30] have been indicated finds both already published and those not yet reported, in both instances, however, only such ones as have been verified during my investigations. The remaining published data, requiring revision, have not been taken into account.

Rh. litura (F.) has been recorded so far from the following localities in Poland:

Distr. Legnica: Dobrzejów (GERHARD, 1898); distr. Kozuchów: Nowa Sól (GERHARD, 1906); distr. Legnica: Państw Legnicki (GERHARD, 1910); distr. Koszalin: Koszalin (LÜLLWITZ, 1915).

Not yet published places of occurrence in Poland are:¹

Distr. Nowogard, Goleniów, 3 specimens, leg. LÜDERWALDT; Szczecin, 4 specimens; distr. Głogów, Polkowice, coll. W. KOLBE (Institute of Zoology, Wrocław University); distr. Świdnica, Strzegom, 16 VI 1943, 15 IX 1943, 2 specimens, coll. A. LANZKE; distr. Oława, Bystrzyca, 1 specimen, coll. W. KOLBE (Institute of Zoology, Wrocław University); Łęczyca, 31 III 1935, 1 specimen, 6 IX 1936, 6 specimens, coll. A. BARTOSZYŃSKI; Grodzisk Mazowiecki, 7 IV 1926, 1 specimen, coll. Sz. TENENBAUM: [this specimen was published by TENENBAUM, 1931 as *Rh. chrysomeloides* (HERBST)]; distr. Piaseczno, Chyliec, 18 VI 1918, 1 specimen, coll. Sz. TENENBAUM; distr. Piaseczno, Skolimów, 27 VII 1952, 1 specimen, leg. B. BURAKOWSKI; distr. Pruszków, Żbików, 22 IX 1952, 4 specimens, 5 X 1952, 1 specimen, 2 XI 1952, 1 specimen, 3 V 1953, 1 specimen, leg. R. BIELAWSKI.

Rhyzobius chrysomeloides (HERBST)

Body convex, general shape elliptic, lateral parts of the body not perpendicular to the body underside, but slightly diverging. Upper side of body punctate, with bristly, rusty-red pubescence. Head, as well as mouth parts and antennae, brownish-yellow.

Pronotum [Pl. IV, fig. 5–8] in two thirds of its length narrows cephalad. Lateral margins more or less arcuate; posterior angle varies from 104° to 120°. Maximal width of pronotum before its base. Pronotum coloration uniformly brown, or marked in the middle, above the scutellum, by a dark spot of various form and size. Occasionally, the spot covers the entire surface of the pronotum. Most frequently, however, the pronotum is but slightly darkened. Half way through the length of the elytra, the pubescence distinctly points towards the apex, and but seldom slightly towards the suture. Coloration of elytra [fig. 13–28] remarkably varying from uniformly brown (such a specimen having not been found so far in Poland by the author himself) to a pattern formed by four spots blending into one extending over two thirds of the

¹ The names of the institutions preserving the particular collections are given in brackets; lack of name of institution means that the material belongs to the collection of the Institute of Zoology of the Polish Academy of Science in Warszawa.

surface of the elytra. Specimens may be observed coloured as follows: those having lateral spots differently elongated, or specimens with lateral and subhumeral spots. Both these kinds of spots are liable to meet on each elytrum so as to



Fig. 13 - 28. *Rhyzobius chrysomeloides* (HERBST). Variability of the pattern of the elytra.

merge together into straight, black bands [fig. 15]. Besides, there are specimens which have, in addition to both of the above mentioned spots, the preapical [fig. 17] and the central ones [fig. 20]. Preapical spots apt to fuse and extend along the suture [fig. 21]. All these spots may be connected in dif-

ferent ways: the subhumeral with the central spot [fig. 18], or the lateral spot with the subhumeral and the central ones [fig. 23]. The appearance of coloration on each elytrum is probably due to a fusion of the lateral and the subhumeral spots subsequently merging with the central and preapical ones. The preapical spot blends with the confluent lateral and subhumeral ones either through the central spot [fig. 24], or directly [fig. 25—26]. This is the way in which the arcuate band is formed. Through the fusion of the preapical spot with the central one, and next with the lateral and subhumeral ones, an extensive spot is formed covering two thirds of the surface of the elytrum [fig. 27—28]. Most frequently are specimens marked with three or four spots fusing to a various degree.

Hind wings definitely tending to reduction. They are developed in the shape of membranous appendages gradually narrowed distally and truncate at the end. Tiny bristles, scattered upon the entire surface, are along the internal margin longer. Basal half of the hind wings with brown spots. Median vein distinct. External margin of the wing runs straight or is slightly arcuate in the middle. Extremely scarce are specimens having normally developed hind wings.

Legs totally brown, hairy.

The colour of the underside of the pro-, meso- and metasternum varies from light to dark-brown and very seldom to almost black. Abdominal sternites mostly brown, occasionally the first one as well as the central part of the remaining ones, except for the pygidium, are intensely dark-brown. Such a colour, however, can spread upon the total surface of the two first segments and on the remaining ones this colour is located in form of a triangle pointing towards the pygidium. Abdominal plates reach half the length of the segment, sometimes exceeding it [fig. 29].

Prosternal carinae variously developed; they can be well marked along their entire length [Pl. IV, fig. 9], or posteriorly reduced in varying degrees, yet always distinct at their contiguity point [Pl. IV, fig. 10]. They are contiguous along an arcuate line and their course is parallel in the front part, while half way through their length they become divergent.

Length of penis exceeds that of the parameres [Pl. VI, fig. 1—2]. Penis narrow, expanding in the middle, with distal extremity slightly rounded and somewhat elongate, bending towards the parameres [Pl. VI, fig. 1 and 3]; its lower margin, in lateral view, curves in the middle. Parameres narrow, long, circular in cross section, bent at one third of their length from base. Sides, as well as extremity, beset with bristles. Length of the bristles equals one third of the length of the parameres. Basal part [Pl. VI, fig. 1—2] small, occupying one third of the entire length of the aedeagus. Towards the trapes its walls

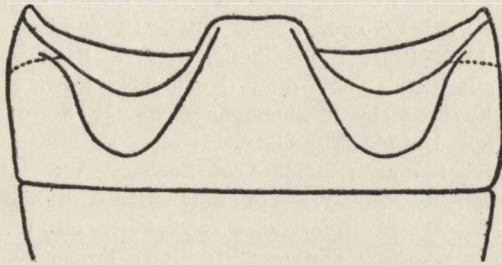


Fig. 29. *Rhyzobius chrysomeloides* (HERBST). First two abdominal sternites developed normally; prosternal carinae visible on the first sternite, $\times 45$.

are elongate and lobular. Trabes [Pl. VI, fig. 1] as long as penis and basal part taken together, with external margin stronger sclerotized. Lateral margin bends commencing at its one third, whence it either faintly expands distally, or runs parallel to the exterior margin. Spiculum gastrale [Pl. VI, fig. 5] without additional processes.

Female genitalia [Pl. VI, fig. 6] remarkably elongate, Genital plates long and narrow, six times longer than broad.

Length of the body 3—3,3 mm.

Material concerning the distribution of *Rh. chrysomeloides* (HERBST) in Poland is more abundant than for the preceding species, but nearly all specimens in the collections have been erroneously identified as *Rh. litura* (F.). All collections revised proved to contain more specimens of *Rh. chrysomeloides* (HERBST) than of *Rh. litura* (F.) and it should be deduced

that the former species is more frequently met with in Poland than the latter. The distribution of *Rh. chrysomeloides* (HERBST) is similar to that of *Rh. litura* (F.), and comprises Europe, representing probably an European zoogeographical element. Following are the published data concerning the distribution in Poland:

Distr. Kraków: Łapanów (TENENBAUM, 1931); distr. Puławy (TENENBAUM, 1931); distr. Radzymin: Urle (TENENBAUM, 1931); distr. Piaseczno: Piaseczno (TENENBAUM, 1931).

Not yet published places of occurrence in Poland are:

Szczecin, 1 specimen; Międzychód, 25 V 1951, 1 specimen, leg. R. BIELAWSKI; distr. Rzepiń, Słubice, 4 specimens, coll. W. EICHLER; distr. Poznań, Puszczykowo, 23 X 1950, 12 specimens, 24 V 1951, 17 specimens, 11 X 1951, 7 specimens, leg. R. BIELAWSKI; Wolsztyn, 26 V 1951, leg. R. BIELAWSKI; distr. Koźuchów, Nowa Sól, 1 specimen; distr. Lubañ, Karczowska, 2 specimens, coll. R. SCHOLZ (Institute of Zoology, Wrocław University); distr. Legnica, Państw Legnicki, 4 specimens, coll. W. KOLBE (Institute of Zoology, Wrocław University); Legnica, 3 specimens, coll. W. KOLBE (Institute of Zoology, Wrocław University); distr. Jawor, Brachów, 4 specimens, coll. W. KOLBE (Institute of Zoology, Wrocław University); distr. Trzebnica, Kotowice, 26 XII 1929, 4 specimens, 15 III 1931, 4 specimens, coll. G. POLENTZ (Institute of Zoology, Wrocław University); distr. Wałbrzych, Sońnica, 16 specimens, coll. W. KOLBE (Institute of Zoology, Wrocław University); distr. Oława, Bystrzyca, 3 specimens, coll. W. KOLBE (Institute of Zoology, Wrocław University); Oława, XI 1941, 2 specimens, coll. G. POLENTZ (Institute of Zoology, Wrocław University); distr. Ząbkowice Śląskie, Ziębice, 2 specimens, coll. R. SCHOLZ (Institute of Zoology, Wrocław University); Kraków, Panińskie Skały, 10 specimens, coll. E. MAZUR; Kraków, Las Wolski, 17 XI 1935, 1 specimen, coll. POPEK (Institute of Zoology of the Polish Academy of Science, Branch in Kraków); distr. Kraków, Wola Justowska, 5 specimens, coll. S. A. STOBIECKI (Institute of Zoology of the Polish Academy of Science, Branch in Kraków); Kraków, Bielany, 1 specimen, coll. S. A. STOBIECKI (Institute of Zoology of the Polish Academy of Science, Branch in Kraków); distr. Kraków, Przegorzały, 2 specimens, coll. E. MAZUR; distr. Kraków, Swoszowice, 9 IV 1914, 1 specimen, coll. E. MAZUR; distr. Bochnia, Klaj, 9 specimens, coll. M. RYBIŃSKI, 2 specimens, coll. S. A. STOBIECKI (Institute of Zoology of the Polish Academy of Science, Branch in Kraków); distr. Bochnia, Niepołomice, 2 specimens, coll. E. MAZUR; Bochnia, 1 specimen, coll. E. MAZUR; distr. Bochnia, Wiśniach Stary, 8 specimens, coll. S. A. STOBIECKI (Institute of Zoology of the Polish Academy of Science, Branch in Kraków); distr. Nowy Sącz, Naściszowa, 25 III 1892, coll. S. A. STOBIECKI (Institute of Zoology of the Polish Academy of Science, Branch in Kraków); distr. Mińsk Mazowiecki, Siennica, 20. XI 1933, 1 specimen,

coll. A. BARTOSZYŃSKI; distr. Warszawa, Świder, 6. IV 1952, 97 specimens, leg. B. BURAKOWSKI; distr. Pruszków, Podkowa Leśna, 23 IV 1934, 1 specimen, coll. Sz. TENENBAUM; Warszawa, 10 X, 4 specimens, 3 V, 1 specimen, coll. W. MĄCZYŃSKI (Upper Silesia Museum, Bytom); distr. Warszawa, Babice, 5 I 1937, 1 specimen, coll. Sz. TENENBAUM; Warszawa, Młociny, 13 I 1952, 3 specimens, leg. B. BURAKOWSKI; Warszawa, Buraków, 14 II 1952, 2 specimens, leg. R. BIELAWSKI; distr. Pultusk, Zegrze, 19 III 1951, 1 specimen, leg. R. BIELAWSKI; distr. Grójec, Pawłowice-Kopana, 26 II 1953, 15 specimens, leg. R. BIELAWSKI; Warszawa, Bielany, 23 II 1953, 3 specimens, leg. R. BIELAWSKI.

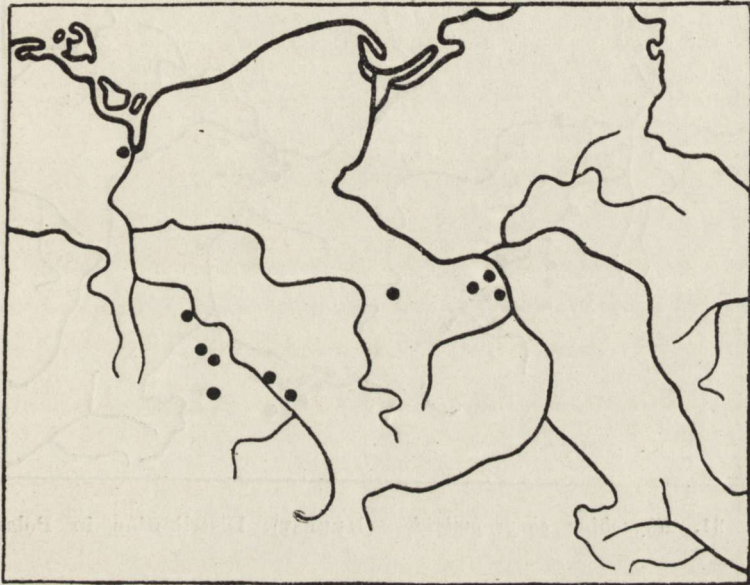


Fig. 30. *Rhyzobius litura* (F.). Distribution in Poland.

On the accompanying map [fig. 31] are indicated the finds either already published or not yet reported, in both instances, however, only such as have been verified by the author during his investigations.

Below, is given a tabular comparison of the main characters of the two species in question:

<i>Rh. litura</i> (F.)	<i>Rh. chrysomeloides</i> (HERBST)
Penis as long as the parameres or shorter.	Penis longer than the parameres.

Penis provided with additional process [Pl. V, fig. 1,2]

Genital plates in the female broad and short [Pl. V, fig. 6].

Prosternal carinae meeting at an acute angle [Pl. IV, fig. 11].

Penis without additional process [Pl. VI, fig. 1, 2].

Genital plates in the female long and narrow [Pl. VI, fig. 6].

Prosternal carinae meeting in an arch [Pl. IV, fig. 9].

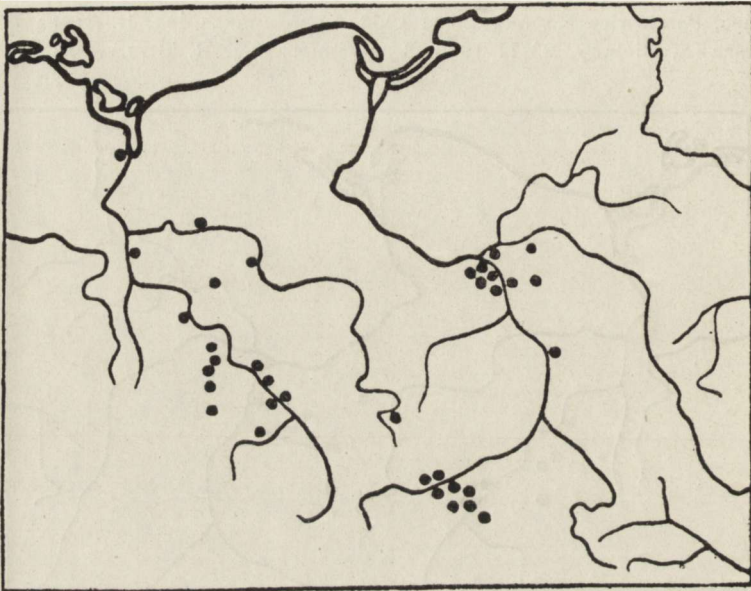


Fig. 31. *Rhyzobius chrysomeloides* (HERBST). Distribution in Poland.

BIOLOGY

The following biological data regarding the above two species of the genus *Rhyzobius* STEPH. are based both on the available published information and on the author's own observations. The relevant literature gives just fragmentary, sometimes even a one-word information concerning the plant where a given specimen has been found, without any details as to its biotope. Closer information, bearing a vague character, is recorded by BUDDENBERG (1885); he mentioned that the plants on which have been collected his specimens of the genus *Rhyzobius* STEPH. were growing in a garden or orchard. It may be stated, in general, that both the above discussed

species live on trees, especially on coniferous ones, or if on deciduous trees, preferably on fruit trees [GANGLBAUER (1899), REITTER (1911), SCHAFUSS (1916)]; they also live on climbers (GERHARDT, 1910), on *Carlina* sp. (MÜLLER, 1901), The larvae, as well as the imagines feed on *Aphidina* and *Acarina* (SCHILDER, 1928). The imagines of *Rhyzobius* STEPH. species occur in Poland all the year round. Since mid-June till the end of July the beetles in question may be observed but occasionally. In this time the old previous-year generation is dying out, while the new one has not yet attained its imago-stage.

The beetles then hibernate under the tree-bark and among dried up grass, where they sometimes gather in masses. In winter *Rh. chrysomeloides* (HERBST) was collected under pine-bark, and in summer it was found on pine branches exclusively. It was usually found on pines growing at notched forest borders, mostly on sandy, slightly elevated spots. These were usually places protected against winds from three sides, being open southwards and situated near water. In the day-time such a biotope is apt to keep a temperature remarkably higher than that of the surroundings (intensive sun operation from the south, protection from winds); also such places have proved damper owing to the water vicinity, which circumstance helped the maintainance of higher temperature throughout the night. Specimens of *Rh. chrysomeloides* (HERBST) after being shaken off on a piece of canvas, move about with clearly less agility than other *Coccinellidae* as, for instance, species of the genus *Scymnus* KUGELLAN. For a long time they lay motionless and do not fly off, as it is the case with many species of the *Coccinellidae*. This is due to the remarkable reduction of the hind wings in most specimens of this species. The area inhabited by one population is very small, being evidently restricted by the conditions of the biotope. A typical example of it is the habitat at Puszczykowo near Poznań (National Park), where the occurrence of *Rh. chrysomeloides* (HERBST) is limited to the southern bank of the Warta river semi-circle, in the middle of which these beetles may be found most frequently. The development of *Rh. chrysomeloides* (HERBST) has not been studied as yet.

Rh. litura (F.) is found in entirely different biotopes than the preceding species, among grass and herbs, as, for instance, in orchards, in the proximity of gardens or in road ditches along the fields. Such spots, shielded from winds, constitute a biotope characterized by its high temperature. No detailed comparison of the last discussed species with the former one is possible, as but a few finding places of *Rh. litura* (F.) have been discovered so far.

Further, detailed investigations with the view to find out new habitats of this species, will probably bring to light biological differences constituting one of the characters distinguishing *Rh. litura* (F.) and *Rh. chrysomeloides* (HERBST).

Experimental research with regard to both of the discussed species, intended in the time to come, will be based on breeding as well as on field observations.

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EXPLANATION OF PLATES

Plate IV

- Fig. 1—4. *Rhyzobius litura* (F.). Variability of the shape of the pronotum.
- Fig. 5—8. *Rhyzobius chrysomeloides* (HERBST). Variability of the shape of the pronotum.
- Fig. 9. *Rhyzobius chrysomeloides* (HERBST). Prosternum with prosternal carinae well developed in their whole length; $\times 110$.
- Fig. 10. *Rhyzobius chrysomeloides* (HERBST). Prosternum with prosternal carinae distinct only at their connection; $\times 110$.
- Fig. 11. *Rhyzobius litura* (F.) Prosternum with prosternal carinae fused; $\times 110$.
- Fig. 12. *Rhyzobius litura* (F.). Prosternum with prosternal carinae not fused; $\times 110$.

Plate V

- Fig. 1. *Rhyzobius litura* (F.). Male genitalia without syphon, in lateral view; $\times 135$.
- Fig. 2. *Rhyzobius litura* (F.). Male genitalia without syphon and trabes, from above; $\times 135$.

- Fig. 3. *Rhyzobius litura* (F.). Penis with additional process removed, from above; $\times 135$.
 Fig. 4. *Rhyzobius litura* (F.). Apical flexure of syphon; $\times 80$.
 Fig. 5. *Rhyzobius litura* (F.). Male urosegments; $\times 80$.
 Fig. 6. *Rhyzobius litura* (F.). Female genitalia; $\times 110$.

Plate VI

- Fig. 1. *Rhyzobius chrysoloides* (HERBST). Male genitalia without syphon, in lateral view; $\times 110$.
 Fig. 2. *Rhyzobius chrysoloides* (HERBST). Male genitalia without syphon and trabes, from above; $\times 110$.
 Fig. 3. *Rhyzobius chrysoloides* (HERBST). Penis from above; $\times 110$.
 Fig. 4. *Rhyzobius chrysoloides* (HERBST). Syphonal capsula; $\times 65$.
 Fig. 5. *Rhyzobius chrysoloides* (HERBST). Male urosegments; $\times 80$.
 Fig. 6. *Rhyzobius chrysoloides* (HERBST). Female genitalia; $\times 110$.

STRESZCZENIE

W pracy niniejszej podane są morfologiczno-taksonomiczne oraz biologiczne uwagi dotyczące krajowych gatunków z rodzaju *Rhyzobius* STEPH., a mianowicie: *Rh. litura* (F.) i *Rh. chrysoloides* (HERBST). Dotychczasowe kryteria morfologiczne, na podstawie których rozróżniano gatunki, okazały się nie wystarczające z powodu znacznej zmienności indywidualnej w poszczególnych cechach (boczny brzeg przedplecza, ubarwienie pokryw itp.). Za cechę pierwszorzędną autor uważa aparat genitalny zarówno samca, jak i samicy. Po omówieniu piśmiennictwa i dotychczasowego ujmowania powyższych gatunków [*Rh. chrysoloides* (HERBST) był uważany niekiedy za odmianę *Rh. litura* (F.)] autor podaje charakterystykę rodzaju a następnie opisy obu gatunków wraz z rozmieszczeniem ich na obszarze Polski. W opisach autor zwraca szczególną uwagę na zmienność poszczególnych cech. Można podać następującą tabelę do oznaczania obu krajowych gatunków z rodzaju *Rhyzobius* STEPH.:

***Rh. litura* (F.)**

Długość penisa mniejsza lub równa długości paramer.

Penis zaopatrzony od strony paramer w wyrostek dodatkowy [Tab. V, fig. 1, 2].

***Rh. chrysoloides* (HERBST)**

Długość penisa większa od długości paramer.

Penis bez wyrostka dodatkowego, jego dolna krawędź, przy oglądaniu z boku, w środku wygięta [Tab. VI, fig. 1, 2].

Płytki genitalne samicy szerokie i krótkie [Tab. V, fig. 6].

Żeberka na prosternum łączą się pod kątem ostrym [Tab. IV, fig. 11].

Płytki genitalne samicy wąskie i długie [Tab. VI, fig. 6].

Żeberka na prosternum łączą się łukowato [Tab. IV, fig. 9].

W końcu autor omawia dane biologiczne. Stwierdza, że *Rh. chrysomeloides* (HERBST) przebywa na sosnach na terenach o silnym nasłonecznieniu i w pobliżu wody. *Rh. litura* (F.) znajdowany był wśród traw i roślin zielnych.

РЕЗЮМЕ

В настоящей работе даются морфолого-таксономические и биологические заметки касающиеся видов рода *Rhyzobius* СТЕПЕН., встречающихся в Польше, а именно: *Rh. litura* (F.) и *Rh. chrysomeloides* (HERBST). Признаки, по которым различались эти виды до сих пор, оказались недостаточными в виду их большой индивидуальной изменчивости (боковой край переднеспинки, окраска надкрыльев и т. д.). Первостепенными признаками автор считает генитальный аппарат как самца, так и самки. После обсуждения литературы и разнообразного понимания рассматриваемых видов [*Rh. chrysomeloides* (HERBST). считали иногда аберрацией *Rh. litura* (F.)] автор дает диагноз рода и описания этих двух видов указывая их места обитания на территории Польши. В описаниях автор особенно обращает внимание на изменчивость отдельных признаков. Автор дает при этом следующую табличку для определения видов рода *Rhyzobius* СТЕПЕН.:

Rh. litura (F.)

Длина пениса меньше или равна длине параметра.

Пенис снабжен добавочным отростком со стороны параметра [Tab. V, fig. 1,2].

Генитальные пластинки самки короткие и широкие [Tab. V, fig. 6].

Rh. chrysomeloides (HERBST)

Длина пениса больше длины параметра.

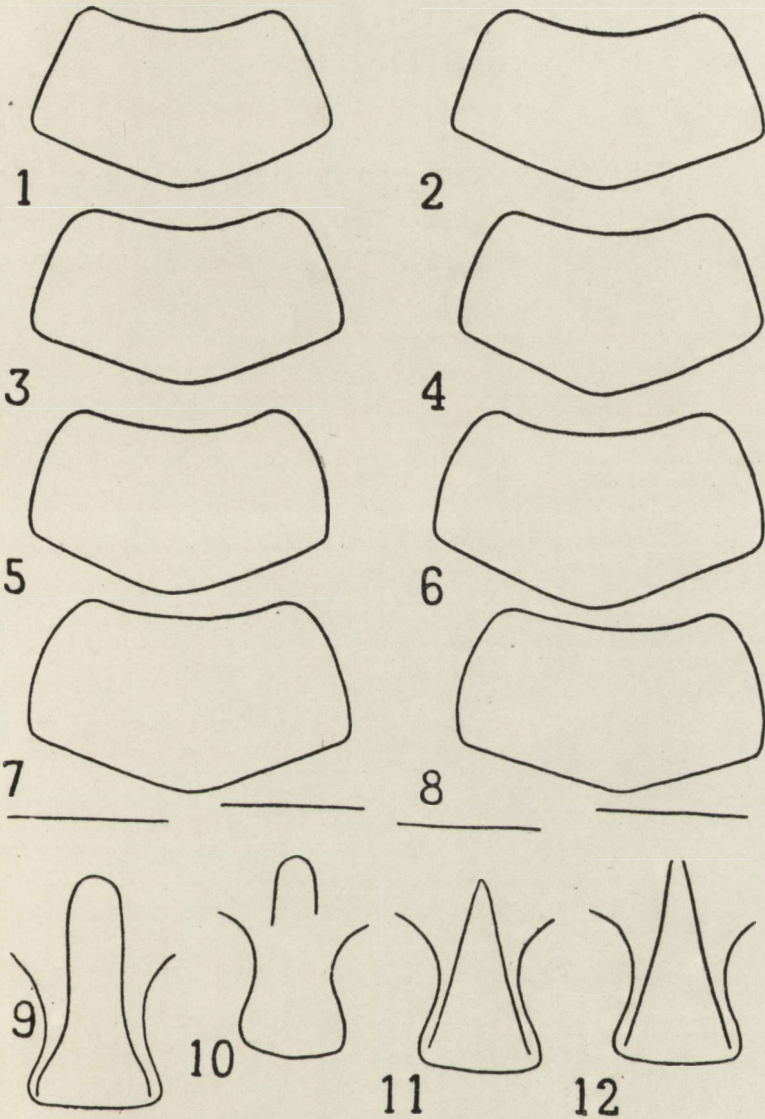
Пенис без добавочного отростка, его нижний край, смотря с боку, в середине выгнутый [Tab. VI, fig. 1,2].

Генитальные пластинки самки узкие и длинные [Tab. VI, fig. 6].

Килевидные линии на простернум соединяются под острым углом [Таб. IV, фиг. 11].

Килевидные линии соединяются на простернум дугообразно [Таб. IV, фиг. 9].

Наконец автор обсуждает биологические данные. По его наблюдениям *Rh. chrysomeloides* (НЕРВСТ) живет на соснах в местах сильно нагретых солнцем и вблизи воды. *Rh. litura* (F.) встречается среди трав и многолетних травянистых растений.



Auctor del.
R. Bielawski

ERRATUM

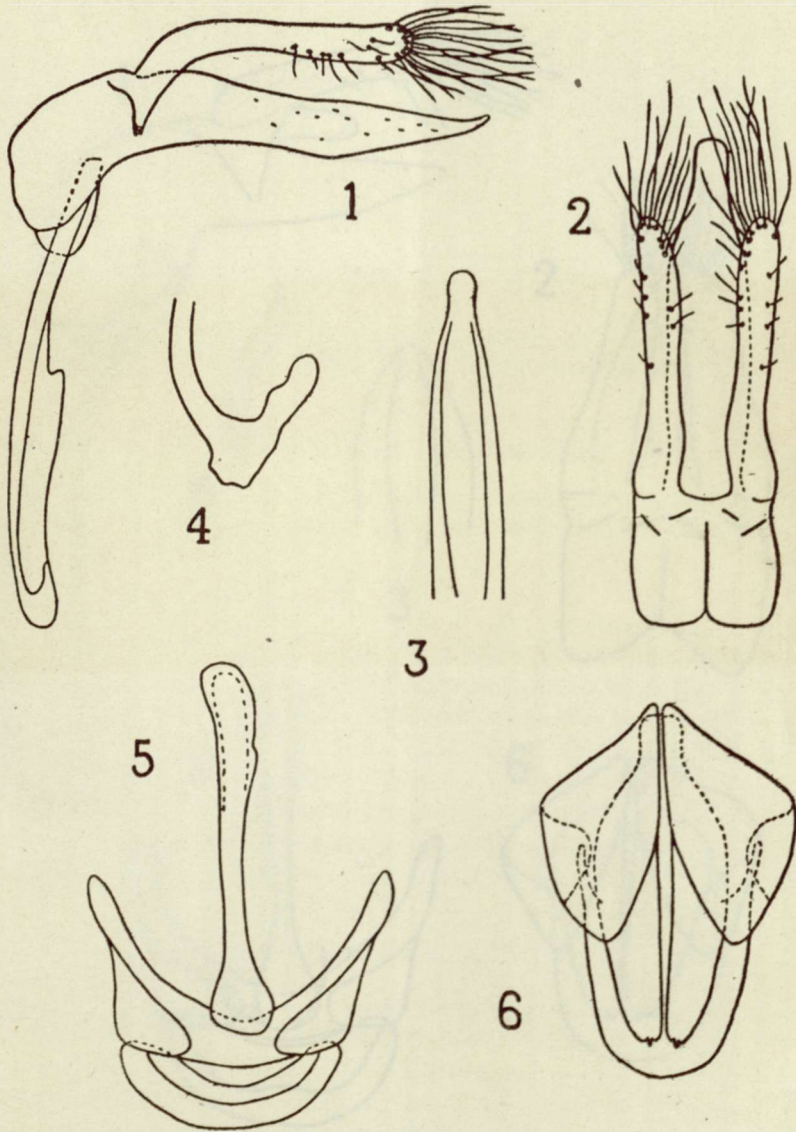
do *Annales Zoologici*, t. XVI, nr 4.

Numery tablic V i VI należy przestawić.

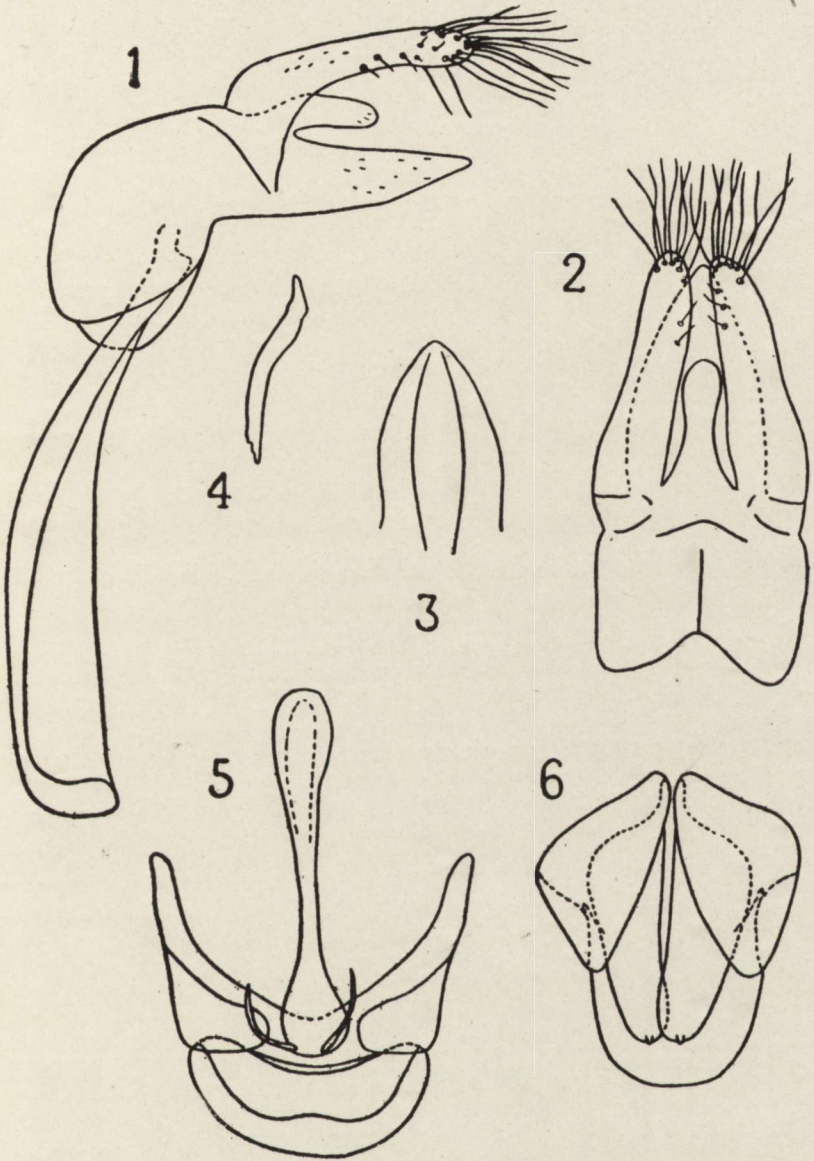
Номера таблиц V и VI следует переставить.

Numbers of plates V and VI should be interchanged.

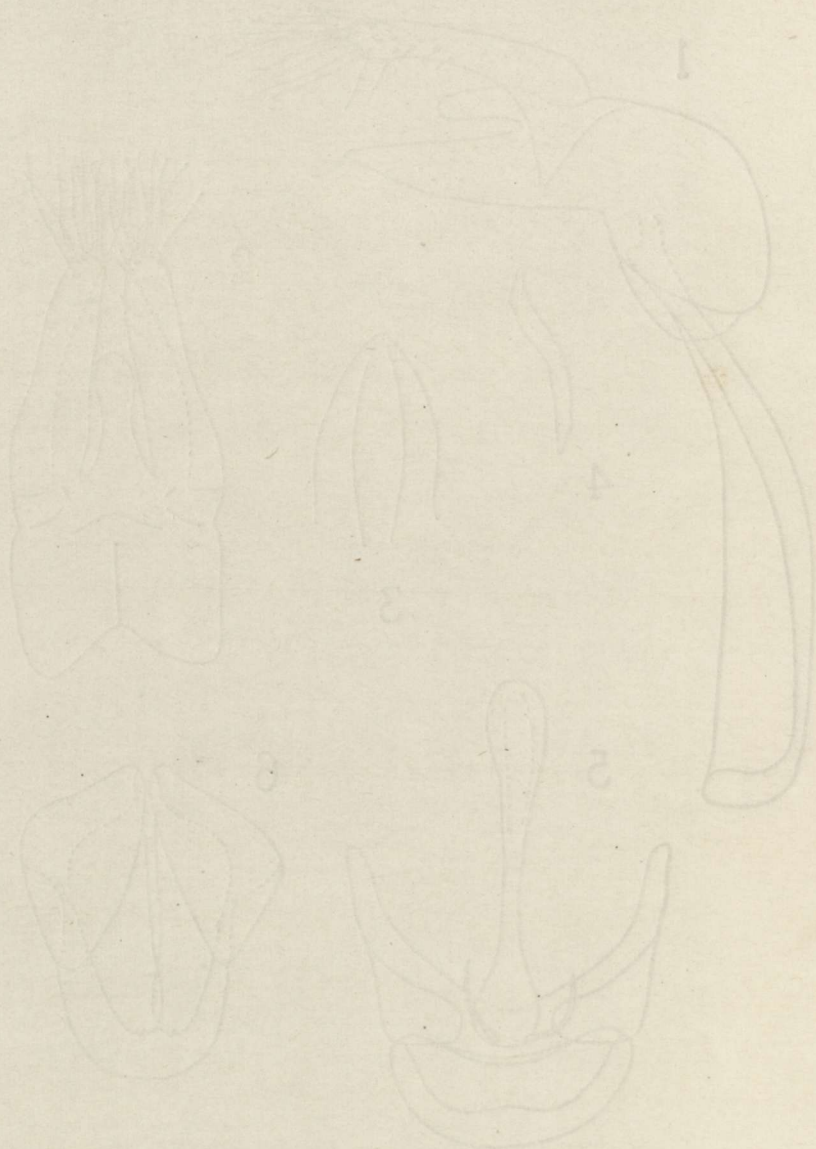
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Auctor .del.
R. Bielawski



Auctor del.
R. Bielawski



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