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Descriptions of larva and pupa of *Rhysodes sulcatus* (F.) (Coleoptera, Rhysodidae) and notes on the bionomy of this species

[With 36 figures in the text]

The small family *Rhysodidae* comprises only about 130 species distributed in all zoogeographic regions, with three living in Europe. Only two known genera, *Clinidium* Kirby and *Rhysodes* DALMAN, are more prevalent in the tropics. The members of this family closely resemble the species of the family *Colydiidae*. Their relationships, however, were not all clear. The early authors placed this family in the suborder *Polyphaga*, either as a part of the *Cucujidae* or as a separate family between the *Colydiidae* and the *Cucujidae*. The *Rhysodidae* are separated from the *Cucujidae* on the ground of peculiar grooves on the thorax, from the *Colydiidae* by the cleft first visible abdominal sternite and the five-segmented tarsi, instead of four. The recent authors have included the *Rhysodidae* in the primitive members of the suborder *Adephaga*. BÖVING (1929) using larval characters, has proposed to separate the family *Rhysodidae* into a superfamily distinct from the *Caraboidea*. On the contrary, R. T. BELL and J. R. BELL (1962), basing exclusively on adult characters, placed this family in the *Carabidae* as a tribe *Rhysodini*, next to the *Scaritini*. CROWSON (1955) in his natural classification of *Coleoptera* has shown that this group has a distinct family rank, and he considers them to be the most primitive of living *Adephaga*.

Adults of species of *Rhysodidae* often are collected frequently, however, only three species are known in larval stage. The descriptions of pupae are lacking. The systematic position of the family *Rhysodidae* seems to be perfectly clear on account of its larval form, and they are placed at the beginning of the

suborder *Adephaga*. The larva of *Clinidium sculptile* NEWMAN is figured by BÖVING (1929: p. 69, pl. XV), but no detailed description is given. The larva of *Rhysodes philippensis* CHEVR. or *Rh. pilosus* GROUV.) has been briefly described and figured from Sumatra by PEYERIMHOFF (1903), has not, however, been identified through rearing, but was found together with adults. According to ARROW (1942) this larva belonged probably to *Rh. malaicus* ARR., which had been found in numbers in that locality. The morphology of larva of *Rh. (Omoglymmius) americanus* CAST. as *Rh. germari* GANGLB. has been studied in detail from Italy by GRANDI (1956).

The family *Rhysodidae* is represented in Poland by only one species, *Rhysodes (Rh.) sulcatus* (F.). In the available literature its larva and pupa have not been as yet described. The bionomical informations are scarce, and devoted chiefly to data on distribution and ecology of adults only. The present paper contains descriptions of the mature larva, pupa and their bionomy. The descriptions are based on the larvae collected in Poland and Roumania; some specimens were reared by the author in the laboratory until the pupa and the imago stage. The present study of the immature stages was undertaken to clarify the taxonomic status of the *Rhysodidae*. All material is kept in the collection of the Institute of Zoology of the Polish Academy of Sciences in Warszawa.

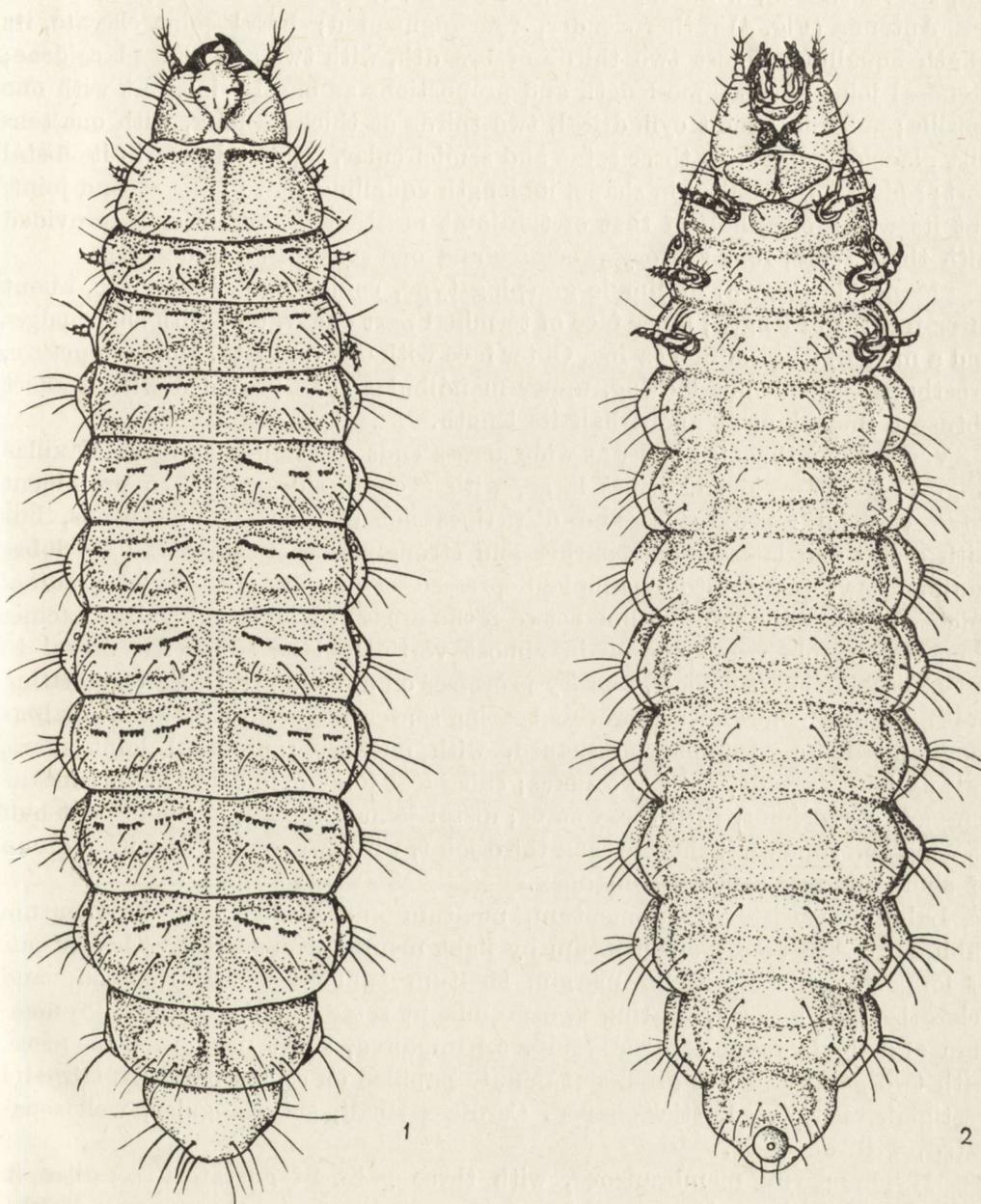
Description of the mature larva

General: The larva (Fig. 1 and 2) fleshy, well characterised by its vestigial labial palpi, labrum fused with frons, mandible without a mola and hairfringes, the structure of the 1-7 abdominal tergites and little differentiated sterna.

Body shape: elongate, subcylindrical, slightly flattened and gradually tapering anteriorly and posteriorly. Ninth abdominal segment rounded, without urogomphi. **Colouring:** dorsal side whitish with somewhat yellowish tinge; feebly sclerotized except head, legs, spines and setae, which are yellow and moderately sclerotized. **Dimensions:** full-grown, distended larva measures up to 9.0 mm in length, and 1.5 mm in greatest width, head width about 1.0 mm.

Head (Figs. 1,2) subquadrangular, laterally convex, slightly broader than long, narrower than prothorax, its maximum width in proportion to the maximum width of prothorax being 2 : 3.

Frons (Fig. 3) indistinctly limited in living larva, well defined in its exuvium, slender than long, with width to length as 2 : 3, on each side with an arcuate, shallow groove and elevated anterior margin. Frontal suture with anterior and posterior parts slightly concave, middle part slightly convex, and posterior angle acuminate. Anterior part of each side of frons with one long seta, lateral margin with two short and one long seta, posterior part with one short seta and one pore. Epicranial suture indistinct. Epicranium with 3 pairs of long dorsal setae and 4 additional pairs of short lateral setae. Ventral surface of



Figs. 1, 2. *Rhysodes sulcatus* (F.), mature larva: 1 — dorsal view; 2 — ventral view.

epicranium with four setae on each side. Labrum fused with frons, subtrapezoidal, shovel-shaped, with length to width as 1 : 2. Eye-spots lacking.

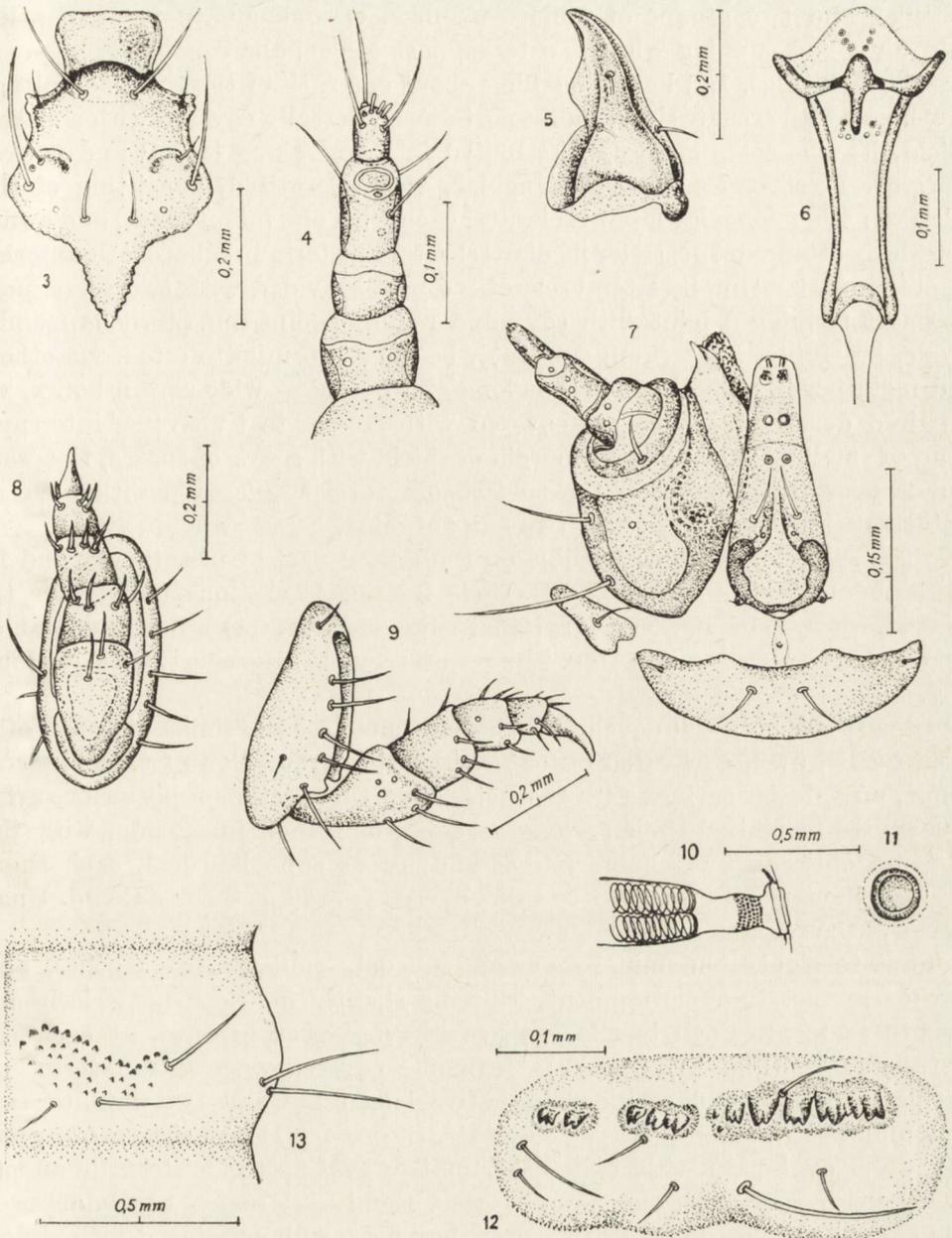
Antenna (Fig. 4) rather slender, four-segmented; basal joint clavate, its length equalling almost two thirds of breadth, with two sensillae placoideae; prebasal joint about same length and proportions as basal joint, but with one sensilla; subapical joint cylindrical, two thirds as thick as long, with one sensilla placoidea and with three setae and semicircular, sensorial area in its distal part; apical joint conical in shape, its length equalling that of the second joint, but its width only half of that of the joint mentioned and its apex provided with three setae, four sensory processes and one sensilla placoidea.

Mandible (Fig. 5) of simple grasping type, conical and acuminate, about three-fourths of length; inner face of terminal part excavated, with sharp edges and a median longitudinal carina. Outer face with one fine seta. Molar structure, prosthema or penicillus lacking, upper mandibular edge provided with a short obtuse retinaculum at about half its length.

Ventral mouthparts almost as wide across ends of stipites as long. Maxillae (Fig. 7) well developed. Stipes large, with arcuate sides and two prominent setae ventrally; proxistipes and dististipes not distinct, membranous, but with distal and lateral edges darker and strongly sclerotized. Maxillary lobes rudimentary, fused into a simple depressed structure, with a longitudinal sulcus, which is the limiting line between the areas of lacinia and galea. Lacinia elongate, membranous, borne in almost vertical plane somewhat dorsal to galea, bearing short conical, sensory processes on apical part. Galea terminating in protrusible membranous process bearing sensory structure. Maxillary palpus four-jointed. Basal joint ring-shaped, with one seta; prebasal joint short, half as long as wide, with two pores; subapical joint cylindrical, two times as long as second joint, with three pores; distal joint conical in shape, about half as wide and somewhat shorter than third joint, with two pores and with a group of short sensory processes on apex.

Labium consists of submentum, mentum and prementum. Submentum sublunate, separated from mentum by light membranous skin, with one pair of long setae near anterior margin. Mentum subtrapezoidal, rounded, and sclerotized posteriorly, bearing two prominent setae and four pores. Prementum and ligula fused anteriorly into an unpaired, short membranous piece, with two pores and two groups of minute papillae on apical part. Labial palpi vestigial, one-jointed, stick-shaped. Cardines small, subtriangular, well separated, with one seta.

Hypopharynx membranous, with three pairs of gustatory sensillae in form of round plates. Transverse hypopharyngeal sclerome (Fig. 6) well developed, provided with a medial short process anteriorly and a longer one posteriorly. A prolonged posterior part of hypopharyngeal sclerome passing along of pharynx. Pharynx large, tube-shaped, its anterior part provided with two



Figs. 3-13. *Rhysodes sulcatus* (F.). 3-12 - mature larva: 3 - frontoclypeal region, dorsal view; 4 - left antenna, ventral view; 5 - right mandible, dorsal view; 6 - hypopharyngeal region; 7 - ventral mouthparts, ventral view; 8 - left leg, ventral view; 9 - left leg, anterior view; 10, 11 - abdominal spiracle; 12 - protuberance and spinules in left mediotergite of fourth abdominal segment. 13 - larva of earlier stage, right mediotergite of fourth abdominal segment.

sensillae and two groups of minute papillae. Oesophagus in form of a long, thin pipe, and running within posterior part of cephalic capsule.

Thorax (Figs. 1,2) length equalling about one fifth of the total body length. Prothorax with arcuate sides, widest posteriorly, dorsally covered with a glabrous shield, its fine setae sparsely distributed in a row along lateral and posterior margins. Presternal plate subtriangular, well sclerotized, consisting of three sclerites: two triangular lateral sclerites, each with one minute seta, and a small, anteriorly attenuate, posterior median sclerite. Episternum subarcuate, anteriorly reaching presternum, its lateral sclerotized part provided with two setae, posterior part forming a joint with coxa and reduced epimeron. Sternella membranous, indefinite. Eusternum subovate, bearing two minute setae. Mesothorax and metathorax each about half as long and nearly as wide as prothorax, with a paired dorsal protuberances covered with a sinuate transverse interrupted band of small spinules; lateral margin of shield with a row of sparse, fine setae, and two or three setae on the surface of protuberances. Mesothoracic and metathoracic sternal areas with two pairs of setae.

The spiracles are easily visible on the lateral part of mesothorax and first eight abdominal segments. The thoracic spiracle is one quarter greater than that of other segments. The functional spiracles (Fig. 11) are all annular and surrounded by a sclerotized ring. The respiratory air tube short, slightly sinuate (Fig. 10).

Legs (Figs. 8,9) well developed, six-segmented, short, similar to each other. Coxa sessile, oval, excavated on outer surface for reception of trochanter and femur, on anterior surface with five setae, and three setae on posterior surface. Trochanter more than half as long as coxa, longer on inner side, with three setae on outer surface. Femur, tibia and tarsus subcylindrical, each shorter than trochanter, with four or five spine-like setae around the distal end. Ungula narrow, curved and acuminate.

First to eighth abdominal segments subequal, similar to each other, about as wide as metathoracic segment, tapering slightly in width posteriorly from seventh segment. Each tergite with a subovate protuberance, at each side; protuberances (Fig. 12) of I-VII segments covered with a transverse band of small spinules, and provided with five long setae and two minute setae. Abdominal sterna feebly sclerotized, pale. Sterna I-VIII consisting of anterior transverse oval part with two setae, of two oval posterior sternella and two lateral ones, each with one or two setae. Epipleural region of abdomen possibly swollen and protuberant, each bearing four long setae. Ninth abdominal segment conical, without urogomphi, provided with eight setae on each side. Anal segment with four short setae.

Larvae of earlier stages

The only one younger larva, which I found, in general similar to that of mature larva described above. The fully distended larva measured 2.2 mm

in length of body and 0.3 mm in breadth of head. Colouring of body is paler than that of larvae of later age. Mandible without retinaculum. Protuberances (Fig. 13) on terga with a transverse band of larger spinules anteriorly and of minute ones on almost whole surface of the protuberance.

Description of pupa

The pupa of *Rhysodes* sp. was mentioned briefly by PEYERIMHOFF (1903), but it was not formally described. He maintains that the pupa is completely glabrous, while I have found a chaetotaxy on the body of *Rh. sulcatus* (F.).

Body (Figs. 14,15) longitudinally oval with abdomen tapering posteriorly, about 6.5 mm long, greatest width about 2.2 mm. In form it was more thicker than the adult. Body whitish with somewhat yellowish tinge, covered with sparse setae.

Head subglobular and strongly bent beneath prothorax so that the vertex for the greater part is concealed from above. Front of head with three pairs of short setae. Eyes feebly convex; ventral margin of eye bearing two fine setae, outer margin with four setae. Antennae rather thick, moniliform, moderately long, fitting between elytra and fore and mid legs, extending beyond mid tibiae. Labrum triangular without setae. Mandibles stout, visible at each lateral side of labrum. Maxillae situated beyond mandibles, with conspicuous palpus. Labium long, bilobed at apex.

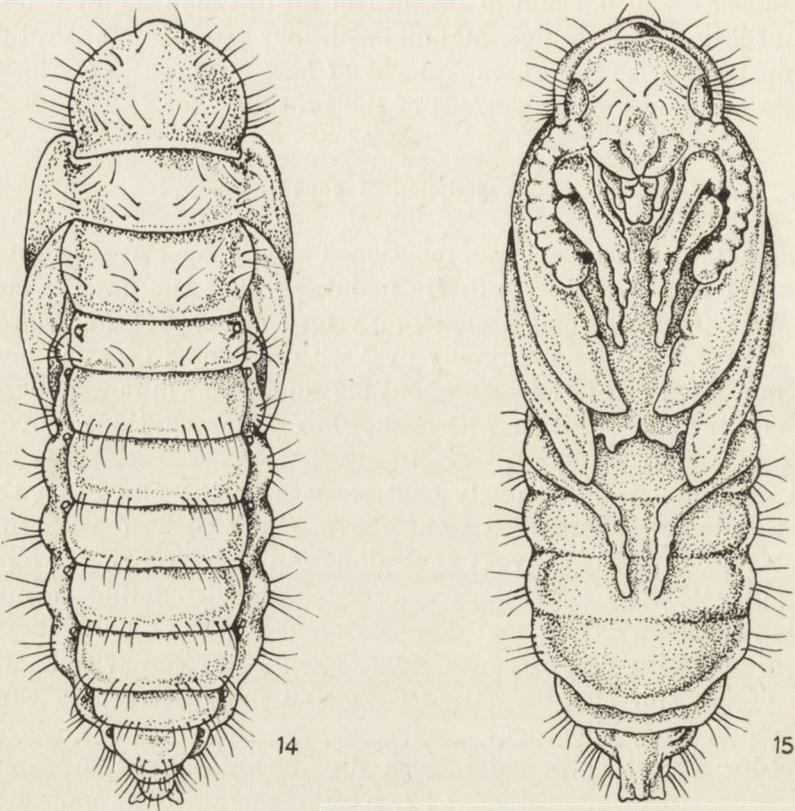
Pronotum almost trapezoidal, with disc feebly convex, narrowed anteriorly, its width to length ratio 2.7 : 2, lateral margin of pronotum reaching ocular area when viewed from the ventral side. Setae at each side of pronotum 18 in number: 3 setae in anterior part, 4 setae in posterior one and 11 on its anterior and lateral margin. Mesonotum almost rectangular, with one seta in anterior part, three setae in posterior one on each side, and four setae along lateral margin of mesonotum. Metanotum a little longer than mesonotum, otherwise similar in shape and chaetotaxy.

Anterior wings fitting obliquely at both sides of body and passing to the underside; wings apex reaching posterior margin of metasternum. Posterior wings partly visible, their apex reaching near the third abdominal sternum.

Legs clinging to the underside of body. Tibiae directed obliquely toward mid-line. Tarsi turned backward almost parallel to body axis and widely separated. Distal parts of anterior and median tarsi reaching the middle of metasternum; apices of posterior tarsi reaching beyond the posterior edge of the fourth abdominal sternum.

Spiracles annular, situated anterolaterad at conical areas of each abdominal segment from the first to the eight, and on mesothorax.

Pleura each strongly protuberant, bearing three to four long, slender setae. Abdomen convex dorsally, composed of 9 segments, anal cone and gonopoda. Abdominal terga I-VI almost equal in width, subsequent terga gradually



Figs. 14, 15. *Rhyssodes sulcatus* (F.), pupa: 14 – dorsal view; 15 – ventral view.

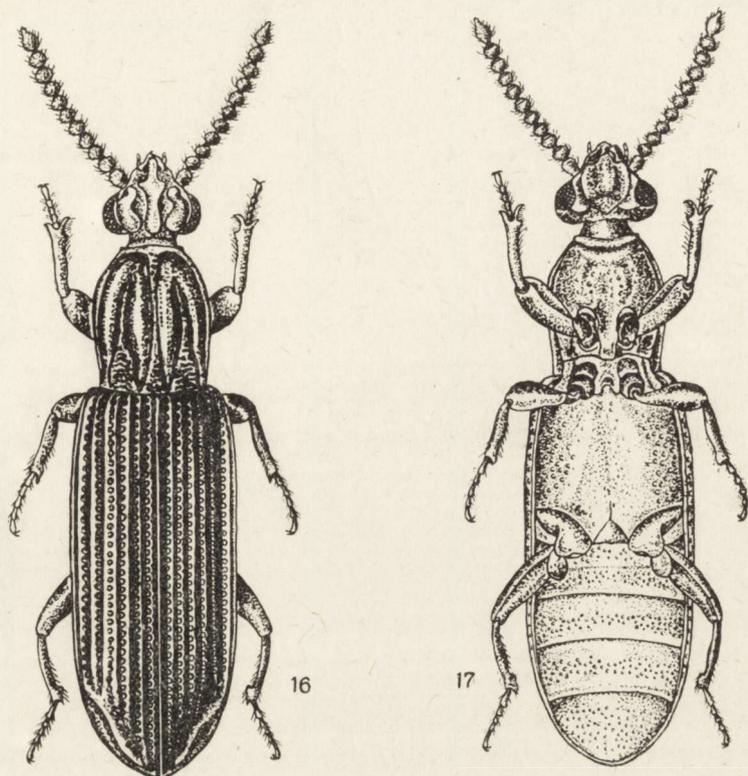
tapering toward apex. Ist–VIIth abdominal terga bearing 4–5 setae at each side, VIIIth, IXth and anal cone with four setae at each side. Anal cone situated between IXth abdominal tergum and gonotheca.

The pupa described above is a female as indicated by the two apices of styli and by the apex of ovipositor, when viewed ventrally (Fig. 15).

Imago (Figs. 16, 17)

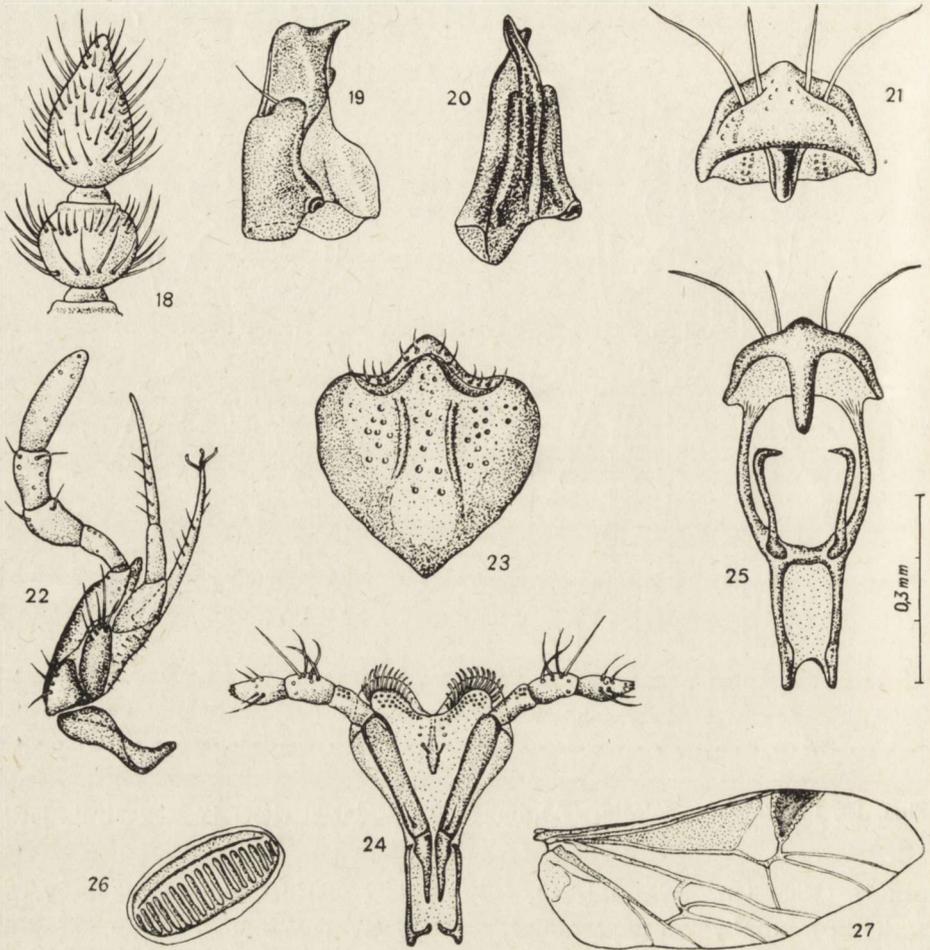
Shape cylindrical, elongate, well sclerotized; dark rufous, immaculate, shining; size 6.5–8.0 mm; sparsely and coarsely punctured; vestiture absent except for sparse, moderate hairs on antennae, appendages of mouth-parts, legs and last segments of abdomen.

Head strongly constricted posteriorly into a neck, and with two deep grooves above; the median lobe arrow-shaped, reaching the neck; arcuate lateral lobes broadly expanded posteriorly. Antennae thick, moniliform, composed of nearly equal globular joints, the first longer, but also rounded, apical joint acutely



Figs. 16, 17. *Rhysodes sulcatus* (F.), imago: 16 — dorsal view; 17 — ventral view.

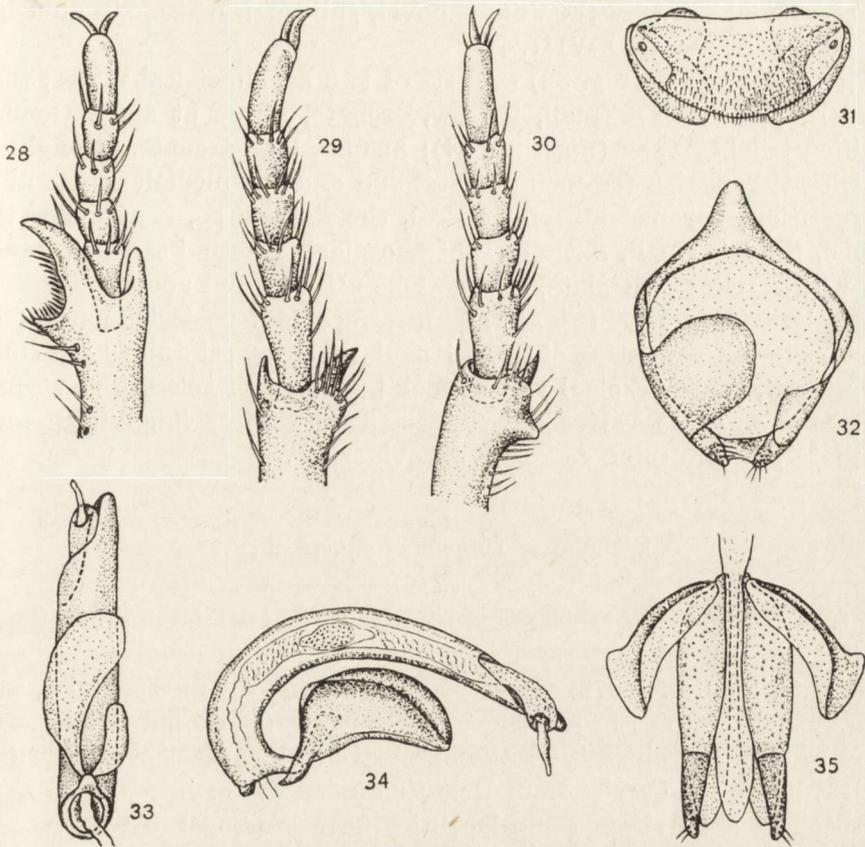
acuminate (Fig. 18). Eyes lateral, subcircular, distinctly granulated. Labrum (Figs. 21,25) small, subpentagonal, with four conspicuous setae. Mandibles (Figs. 19,20) stout, with small retinaculum and simple acuminate apex, and provided with a protuberance and one seta on the upper surface. Appendages of ventral mouthparts (Figs. 22,24) fragile and minute, partly drawn into head capsule. Cardo (Fig. 22) elongate, articulated with two-jointed stipes; basistipes short, with two setae laterally; mediostipes long, with five setae on anterior part. Lacinia long and narrow, covered with a few setae, and produced into three sensory filaments on apex. Galea two-jointed; basigalea subcylindrical, about a half as long as second joint, with one pore; distigalea narrower than basal segment, with some fine setae. Maxillary palpifer large, with one seta on antero-lateral corner. Maxillary palpi four-jointed; first three joints subequal in length, apical joint as long as both two preceding ones. Mentum (Fig. 23) very large and broad, heart-shaped, with two shallow sulci, bisinuate anteriorly, covering almost entirely the mouth beneath, setose on anterior edge. Gula enormously developed. Palpifer (Fig. 24) long, bearing three-segmented palpi; basal joint apically with a few sensory pores, second joint with four



Figs. 18-27. *Rhysodes sulcatus* (F.), imago: 18 - two last joints of antenna; 19 - left mandible, dorsal view; 20 - right mandible, medial view; 21 - labrum, dorsal view; 22 - right maxilla, ventral view; 23 - mentum, ventral view; 24 - hypopharynx and labial palpi; 25 - hypopharyngeal sclerome and labrum, ventral view; 26 - abdominal spiracle; 27 - right wing.

setae and pores, apical joint subconical, with four setae, provided with a few minute sensory processes at apex. Ligula membranous, with a pair of paraglossae. Hypopharynx (Fig. 24) covered with numerous filaments and pores at anterior edge. Hypopharyngeal sclerome (Fig. 25) attached - ventrally to posterior end of hypopharynx, obliquely dorsally to posterior part of labrum, and posteriorly to anterior end of oesophagus.

Pronotum about four-fifth as wide as long, with three grooves and two fine lateral lines; median sulcus entire, subfoveately enlarged at base and apex, lateral sulci not reaching the apex, and foveately enlarged at base. Elytra only



Figs. 28–35. *Rhysodes sulcatus* (F.), imago. 28–34 — male. 28–30 — apical part of right tibia and tarsus: 28 — anterior leg, 29 — middle leg, 30 — posterior leg; 31 — eighth abdominal segment; 32 — ninth abdominal segment, ventral view; 33 — aedeagus, ventral view; 34 — aedeagus, lateral view. 35 — female, ninth abdominal segment and ovipositor.

slightly wider than pronotum, with humeri rounded laterally, and with eight coarsely punctate sulci; intervals subequal and broader than punctate sulci; intervals V and VII fused posteriorly and forming a convex costa. Scutellum narrow, invisible, covered by elytra. Legs short, with five-segmented tarsi (Figs. 28–30); anterior tibiae dilated, terminated by two hooks, and armed above the tip with a spine. Male metatibiae (Fig. 30) each with a large apical inwardly extending elongate process. Female metatibiae unmodified. Wings (Fig. 27) with oblong area absent, the medio-cubital cross-vein straight.

Abdomen (Fig. 17) with seven visible segments: segments VIII–IX invisible from without, concealed in VIIth. Sternites I–II fused into a unit, divided by metacoxae into three parts, their middle part broadly separates the metacoxae; sternites III–IV also fused, with a rudimentary suture. Tergites feebly sclerotized, only tergite VIII (Fig. 31) well sclerotized and setose at posterior

edge. Abdominal spiracles (Fig. 26) suboval, subequal in size, situated in anterior part of segments I–VIII.

Male. Sternite IX (Fig. 32) consists of two asymmetrical plates, the right one is large; tergite IX small, narrow, arcuate, setose at apex. Genitalia of a modified trilobed type (Figs. 33, 34); median lobe arcuate, strongly sclerotized, with the median foramen at basal end and the median orifice at dorso-distal position; parameres asymmetrical, the right large, bent under the median lobe, the left small, flat and subtrapezoidal. Internal sac well developed, armed with a sclerotized plate, a large lobe arising from apex.

Female. Segment IX (Fig. 35) transformed into posterior part of genital organ. Tergite IX consisting of two triangular sclerites; sternite IX is composed of two narrow, subtrapezoidal valves, each bearing well sclerotized stylus with two fine setae. These valves are connected with three linguliform membranous plates, and forming as whole an ovipositor.

Bionomy of *Rhysodes sulcatus* (F.)

This very rare forest species is known from the lowland and highland areas of central and eastern parts of Europe, and from Caucasus and Asia Minor. According to HORION (1972) the species is a primeval forests relict, and has become entirely extinct in Sweden and Germany (GDR and FRG), and probably in France. In Poland it has been reported from a few localities. TENENBAUM (1913) noted the species from Roztocze (near Zwierzyniec, distr. Zamość); it has been recorded from some localities near Przemyśl by TRELLA (1926, 1939). Its occurrence in Upper Silesia (Mureki, distr. Tychy) has been noted for the first time by NOWOTNY (1922), later this locality were repeated several times by others authors. Also it has been reported more than 130 years ago, under the name *Rh. exaratus* and *Rh. europaeus*, from the vicinity of Warszawa by MOTSCHOUJSKY (1837) and WAGA (1841). They found the species in forests overgrowing the bank of Vistula river. However, this species has not been found in that locality since then.

Rhysodes sulcatus (F.) seems to be everywhere fairly rare and very local, and has been collected only sporadically. In many European countries it has perished entirely as a result of cutting down older, primeval forests. I found it in Poland in the following localities: Bukowa mountain near Zwierzyniec, distr. Zamość; Białowieża Primeval Forest, distr. Hajnówka. The species was confined to areas covered by deposits of century-old trees.

On the bionomy of the species very little has been published. According to literature data the adults in Europe were found under the loose bark or in decayed wood of dead *Abies alba* MILL., *Fagus sylvatica* L., and sometimes *Picea excelsa* (LAW.) LK. The beetles have been collected in abundance by WAGA (1841) in roots of an older trunk of white and black poplar; they were found

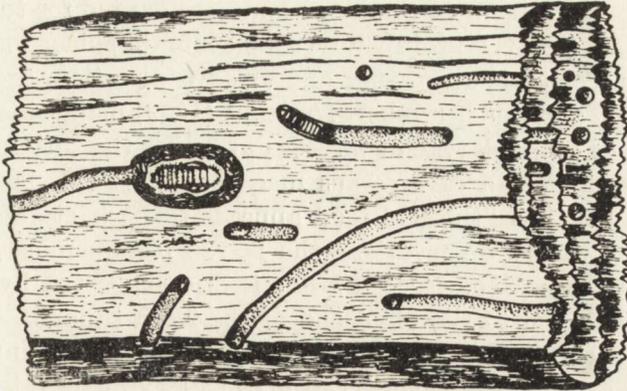


Fig. 36. *Rhysodes sulcatus* (F.), larval galleries and pupal cell in decaying sapwood of *Populus tremula* L.

under surface of ground, but according to my opinion it is not the natural habitat of the species. NOWOTNY (1922) found the species under moist bark and in crevices of whitish-decaying wood of *Fagus sylvatica* L. Hibernating adults have been taken in numbers in January by TRELLA (1926, 1939) from galleries of larvae of *Ceruchus chrysomelinus* HOCHW. (Col., *Lucanidae*), in a rotten trunk of *Abies alba* MILL.

Copulation of this beetle was observed by NOWOTNY (1922) on the beginning of May in the field, and from May to September in the laboratory. The sex act persisted sometimes up to two hours. This author bred the adults from May to Dezember, however, eggs and larvae have not been observed. TRELLA (1939), on the other hand, has found small larvae (3–4 mm in length) in April. Larvae have been taken from complicated galleries in moist rotten trunk of *Abies alba* L. Unfortunately, the breeding, of both larvae and adults carried out TRELLA, has not been successful. I succeeded in finding the larvae in the field, and in rearing them in laboratory until the pupal and the imaginal stage. The breeding was carried out in stoppered glas tubes filled with decayed, moist sapwood of aspen-tree (*Populus tremula* L.) containing the larvae of this species. Larvae sometimes make the pupal chamber near the glas sides and the process of pupation and emergence of imago can be easily observed.

This species apparently requires two years to be mature, as I have taken larvae of different sizes in the same trunk in summer. The larvae inhabit well decayed wood of felled stumps in stands of well-grown trees, apparently preferring very moist situations. They are certainly able to bore into wood, and seem to use their sharp mandibles, the shovel-shaped labrum and short legs, during the process. The larval tunnels (Fig. 36) are tightly packed with fine powdery particles of wood, extend into wood longitudinally and irregularly, but are sometimes more inclined to be relatively straight. They are nearly round in cross-section, and diameter of galery of old larvae is 1.5–2.0 mm. The

elongate and depressed form of the larva body is adapted for tunneling in sapwood. It is obvious that the protuberances and minute spines on upper surface of body, by virtue of their divergence and upward direction, are useful in travelling in the wood and under the bark. TRELLA (1939) maintains that the larva feeds on excreta of others larvae of insects devouring the rotten wood. EMDEN (1955) has at first assumed carnivorous mode of life of this beetles, but later (1960) he maintains that "the real food appears to be bacteria-rich, decaying wood". According to my observations the larvae fed on moist, rotting wood of dead, felled trees. A wood-feeding habit is also suggested by found larvae, with their head directed to the blind end of the fresh tunnel.

The rearing records indicate that pupation occurs in the summer. Pupation usually takes place in the sapwood. The mature larva excavates an elongate-oval cell, usually parallel to the grain of the wood. The pupal chamber measuring from 12–15 mm by 4–5 mm, is spread with a layer of wooden shavings. The fibrous shavings rather loosely-packed have up to 5 mm in length and to up 0.3 mm in wide. The adults are fully formed within one to two weeks after pupation. They are slow moving beetles similar to *Colydiidae* in appearance. The adult hibernates in the pupal cell or the emerged specimen overwinters under loose bark or in crevices of wood and in galleries of other insects in or near dead trees.

Collecting and rearing data

Poland: Roztocze, Bukowa mountain near Zwierzyniec, distr. Zamość, June 8, 1955, mixed-forest stands, in shady situation, under the loose bark of old felled stump of *Abies alba* L., three adults. Białowieża Primeval Forest, section 193, July 31, 1955, one adult in moist wood of a trunk of *Populus tremula* L. laying on ground. Same locality and place, April 2, 1966, habitat as above, two adults. Same locality, section 192, July 2, 1968, Circaeo-Alnetum, in shady and moist situation, a fallen, old, big, and well decaying stump of *Populus tremula* L., at a depth from one to four centimetres in the yellowish-rotting, damp sapwood, in galleries, seven larvae, three of them preserved in alcohol were used for this study, and four of them reared in laboratory, then transferred individually onto damp, decayed sapwood in glass tubes; two pupae taken out July 14, two pupae — July 18–20, 1968, three of them preserved, one imago emerged on July 21, 1968.

Roumania: Pădurea Jălărău near Baile Herculane, November 8, 1964; in shady situation, a fallen big trunk of *Fagus silvatica* L., partly barkless, with larvae of *Dorcus parallelipedus* (L.), *Helops rossi* GERM. and *Prostomis mandibularis* F., at a depth from four to ten centimetres in the yellowish-de-

cayed wood, three imagines and one mature larva; the larva brought to Warszawa on November 22, 1964 and put onto moist sapwood same day; I have not, unfortunately, succeeded in rearing, and this larva died on January 20, 1965.

All material was collected and reared by the author.

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STRESZCZENIE

[Tytuł: Opisy larwy i poczwarki *Rhysodes sulcatus* (F.) (Coleoptera, Rhysodidae) i notatki o bionomii tego gatunku]

Praca zawiera omówienie wyników badań nad morfologią młodszych postaci rozwojowych oraz bionomią *Rhysodes sulcatus* (F.), rzadko spotykanego chrząszcza w lasach pierwotnych. Większość materiałów do pracy została zebrana przez autora w Polsce, część materiału larw pochodzi z Rumunii.

Pracę poprzedza krótki przegląd piśmiennictwa odnoszącego się do poznania niższych postaci rozwojowych oraz do stanowiska i rangi *Rhysodidae* w układzie systematycznym.

Podano dokładne opisy dotychczas nie znanej larwy i poczwarki *Rhysodes sulcatus* (F.). Nadto, uwzględniając dymorfizm płciowy, omówiono zewnętrzną morfologię postaci dojrzałej oraz aparaty genitalne. Wymienione opisy zilustrowano oryginalnymi rysunkami. W części bionomicznej pracy przedstawiono cykl rozwojowy oraz ekologię zbadanego gatunku. Z larw zebranych w terenie zostały wyhodowane poczwarki i postacie dojrzałe, co pozwoliło na bezbłędną ich identyfikację. W końcowej części pracy przedstawiono krótko metodę hodowli oraz wykaz zebranego materiału, przechowywanego w Instytucie Zoologii PAN w Warszawie.

РЕЗЮМЕ

[Заглавие: Описание личинки и куколки *Rhysodes sulcatus* (F.) (Coleoptera, Rhysodidae) и заметки о бионии этого вида]

Работа содержит обсуждение результатов исследований над морфологией ювенальных стадий развития, а также бионией *Rhysodes sulcatus* (F.), редко встречаемого жука первичных лесов. Большинство материалов к работе было собрано автором в Польше, часть материала личинок происходит из Румынии.

Работу предшествует пересмотр литературы относящейся к ювенальным стадиям развития, а также места и ранга *Rhysodidae* в систематическом укладе. На основании сходства только некоторых морфологических признаков у имагинес это семейство засчитывалось прежде к подотряду *Polyphaga* соединяя его с семейством *Cucujidae* или как самостоятельное семейство помещая его между *Colydiidae* и *Cucujidae*. Представители семейства *Rhysodidae* отличаются от *Colydiidae* 5-сегментными лапками, а от *Cucujidae* своеобразными бороздками на переднеспинке. Теперь повсеместно считается, что *Rhysodidae* принадлежат к подотряду *Adephaga* и в его пределах к надсемейству *Caraboidea*, среди которого составляют наиболее примитивную группу. Ошибочной кажется точка зрения некоторых авторов засчитыва-

ющих это семейство как трибу к семейству *Carabidae*. Приведены автором в настоящей работе морфологические признаки всех стадии развития рассматриваемого вида обосновывают мнение Кровсона (CROWSON 1955) о обособленности *Rhysodidae* как семейства в пределах *Caraboidea*.

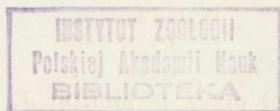
Автор дает точные описания неизвестной до сих пор личинки и куколки *Rhysodes sulcatus* (F.). Взрослая личинка длины около 9 мм характеризуется главным образом следующими морфологическими признаками: тело мясистое, беловое, слабо склеротизированное; верхняя губа лопаточная сросшаяся с лобной пластинкой; мандибулы без молы и кисточки волосков, галей, лациния и нижнегубные щупики сильно редуцированы. Сегменты брюшка без четких склеритов, тергиты I–VII сегмента брюшка с двумя вздутиями покрытыми поперечной полосой коротких темно пигментированных зубцов. IX-тый сегмент в апикальной части закруженный и без урогомф. Куколка длины около 6,5 мм отличается четковидными усиками и отчетливым ошетинением тела указанным на рис. 14 и 15.

Учитывая половой диморфизм, автор рассматривает внешнюю морфологию имаго и генитальные аппараты. Приведенные описания всех стадий развития иллюстрированы оригинальными рисунками, относительно личинки — на рис. 1–13, куколки — на рис. 14 и 15 и взрослой особи — на рис. 18–35.

Биономическая часть работы содержит экологическую характеристику вида и обсуждение цикла его развития. Личинки питаются на внешнем слое очень влажной мертвой древесины. Они выдалбливают ходы (рис. 36) наполняя их целиком мелкими опилками и экскрементами. Заселяют пни деревьев или стволы долго лежащие на земле в местах влажных и затененных. В Польше личинки были найдены в деревьях видов *Populus tremula* L. и *Abies alba* MILL.; в Румынии в *Fagus sylvatica* L. В литературе кроме того имаго отмечено с *Picea excelsa* (LAM.) LK., *Populus alba* L. и *P. nigra* L. Период полного развития вида не менее двухгодний. Личинка строит летом кукольную камеру выстланную тонкими стружками. Стадия куколки длится около двух недель. Взрослые особи обычно зимуют под отставшей корой деревьев, в щелях древесины и в ходах иных насекомых.

В концевой части работы представлен короткий метод выращивания старших личинок, из которых получено куколки и взрослые особи, что позволило на безошибочную их идентификацию.

Собранный материал хранится в Институте Зоологии ПАН в Варшаве.



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Państwowe Wydawnictwo Naukowe — Warszawa 1975
Nakład 1095+90 egz. Ark. wyd. 1,25 druk. 1½. Papier druk. sat. kl. III 80 g. B1. Cena zł 10,-
Nr zam. 699/74 — Wrocławska Drukarnia Naukowa

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