

Papéis Avulsos de Zoologia

GENUS *PYROPHORUS*. 3. LIFE-HISTORY, LARVA AND PUPA OF *PYROPHORUS PUNCTATISSIMUS* BLANCHARD (COL., ELATERIDAE)

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INTRODUCTION

The bibliography on the biology of the Elateridae is very large, but little information is available on *Pyrophorus*. Dubois (1866), was the first to present a broad study of the biology of the genus, reviewing the literature and pointing out that all previous references to *Pyrophorus* larvae were the product of misidentifications. Since then the only work is that of Hislop (1917), who presented some data on the larva of *P. luminosus* Illiger, when characterizing the subfamily Pyrophorinae.

I have been able to follow in the laboratory parts of the cycle of two generations of *P. punctatissimus*, covering together the entire life span of the species. Six young larvae were reared to the adult stage, and these observations are here presented.

The drawings are of "pre-pupal" larvae, finished with help of the exuviae. The photographs were taken by Giro Pastore, some of them only with light from the specimen (pl. 3), using a 400 ASA Perutz film and one hour exposure.

LARVAL DEVELOPMENT

One male and one female adult *P. punctatissimus*, collected by L. Alonso at the vicinity of Cachoeira do Marimbondo, Minas Gerais, were received on October, 28, 1966. These specimens were placed in a glass container with pieces of wet rotting wood. They remained alive for a month, fed with a concentrated solution of sugar. Mating, oviposition or eggs were not observed at that time.

On December 28, 1966, I observed a few larvae at the bottom of the glass container. Eight larvae, then around 2-5 mm long, were placed in individual Petri dishes, with pieces of wet wood and fed with Collembola. It was not possible to count the moults because, in the initial stages, the larvae were very small, and the skins got lost in the refuse. As the larvae grew, the alimentation was changed; at first were given workers of Termitidae of the genera *Anoplotermes* and *Proconitermes* and later larvae of *Tenebrio molitor*.

On September 9, 1968, the larvae entered the "motionless" phase, which precedes pupation; thus the larval period required

about two years. The "pre-pupa" period took on the average 21 days; the pupal phase took on the average 24 days. The complete data are given in the following table:

larva nº sex	adults caged	first seen		"motionless"		pupa		adult	
		date	days	date	days	date	days	date	days
1 ♂	28.X.66	28.XII.66	60	9.IX.68	621	19.IX.68	10	14.X.68	25
2 ♂	28.X.66	28.XII.66	60	12.IX.68	624	24.IX.68	12	17.X.68	23
3 ♂	28.X.66	28.XII.66	60	12.IX.68	624	29.IX.68	17	24.X.68	26
4 ♀	28.X.66	28.XII.66	60	12.IX.68	624	8.X.68	26	1.XI.68	24
5 ♀	28.X.66	28.XII.66	60	12.IX.68	624	10.X.68	28	3.XI.68	24
6 ♀	28.X.66	28.XII.66	60	12.IX.68	624	16.X.68	34	6.XI.68	21
7 -	28.X.66	26.I.67	89	fixed in alcohol					
8 -	28.X.66	31.I.67	94	still in development					

In order to obtain eggs and the first larval stages, a new cycle was started with the adults reared. On November 3, 1968, three males and two females were placed in a large wooden box. During the day they usually remained hidden, beginning to move around only after 6 P.M. The females sometimes showed stronger luminescence than the males, but neither luminous signalling between them nor mating were observed. Fifteen days later two couples were separated in glass containers.

After about one month, only one of the females was alive; it began oviposition. It was not possible to observe its behavior during this phase, because the eggs were laid only at night. I tried to observe the female during this period under artificial light but it didn't lay. An average of 50 eggs were laid during 12 hours of observation, the majority early in the evening.

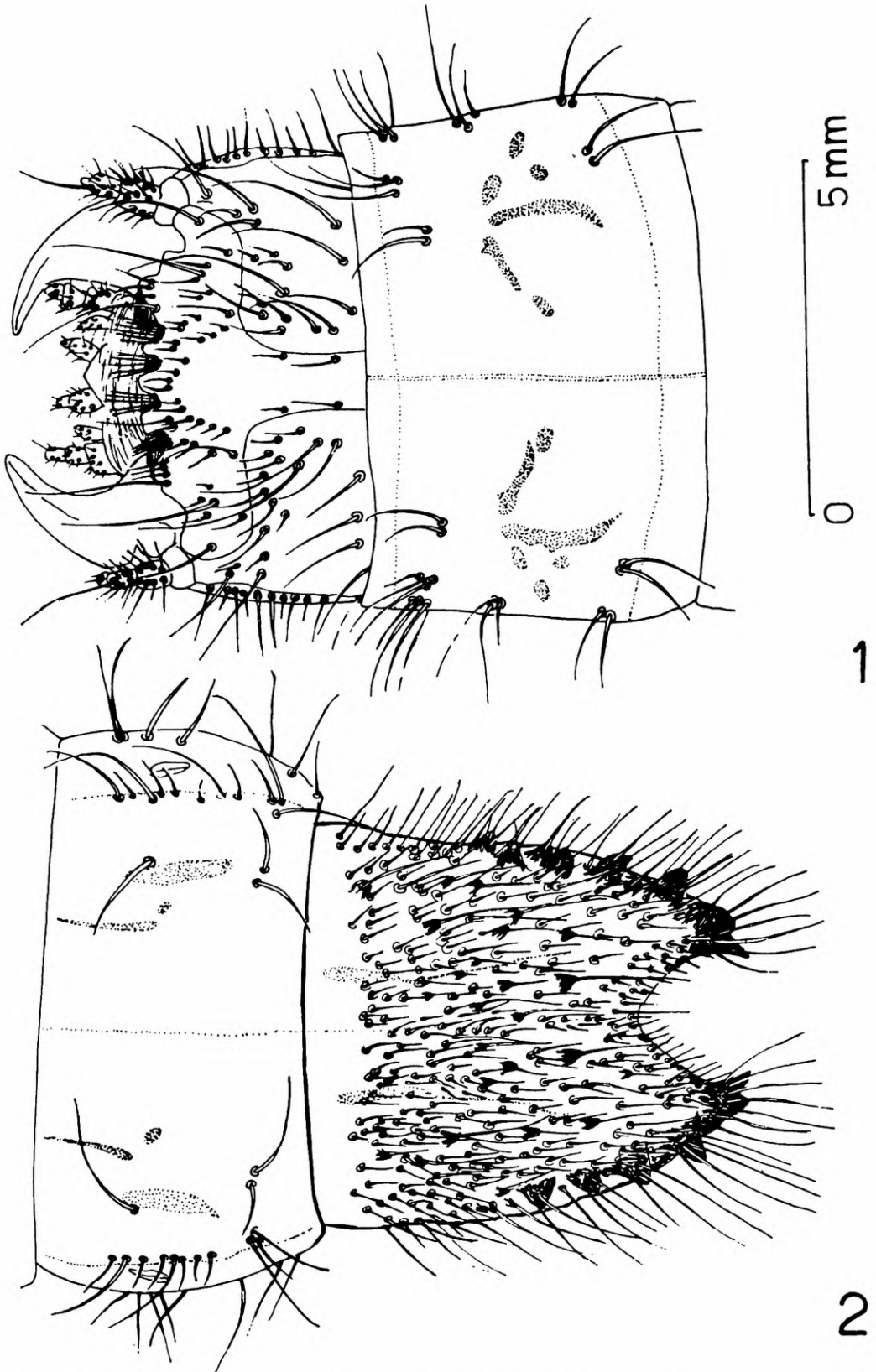
The eggs (pl. 1) were laid, individually or in groups, on the substratum. They are very small (the largest have a diameter of about 0.5 mm), white, and have microscopical papillae in the whole surface, permitting the adhesion of small particles.

LUMINESCENCE

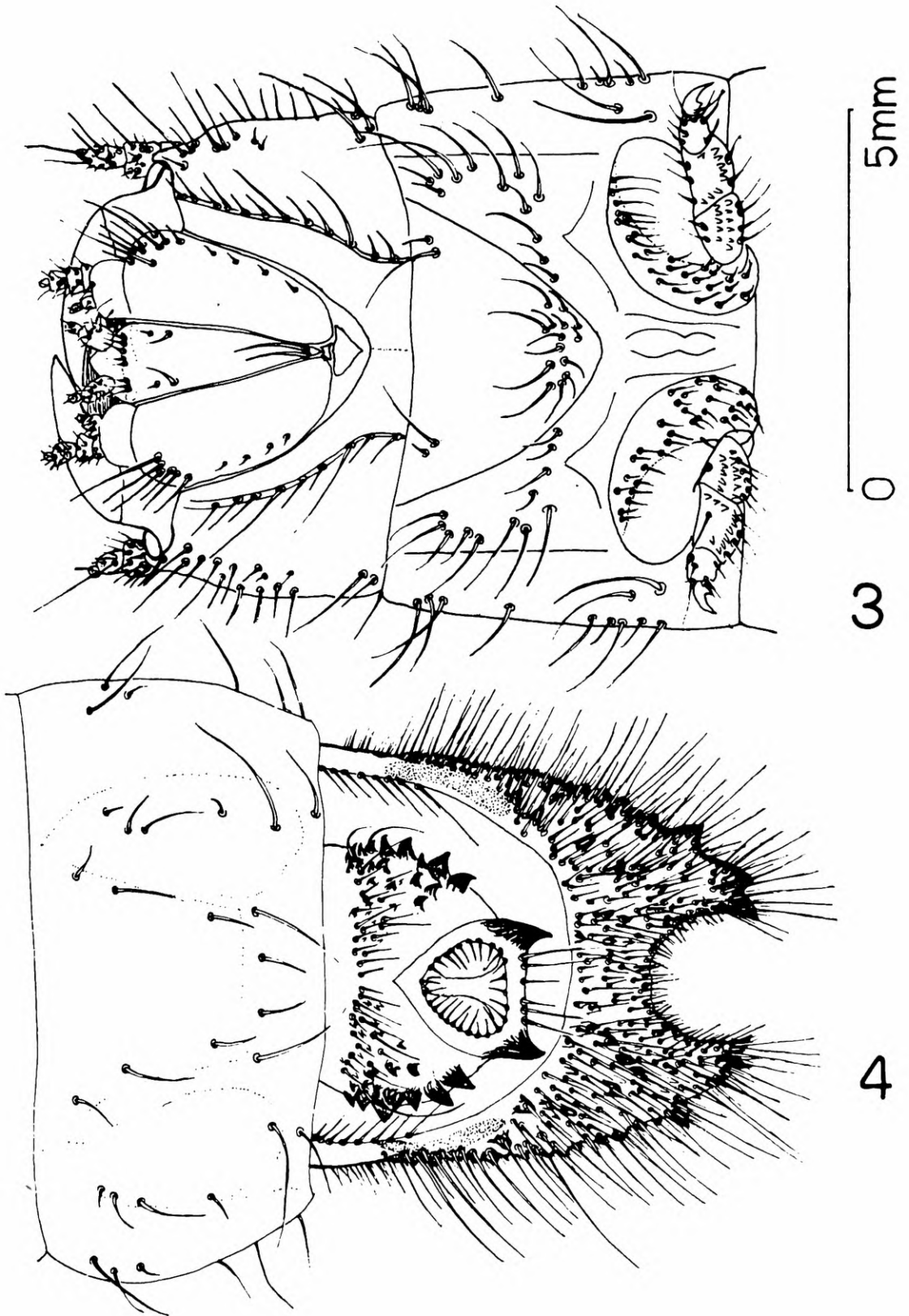
Neither the eggs nor the young larvae showed luminescence. One of the larvae, 2 cm long (one year old), when disturbed, showed luminescence on the thoracic and abdominal segments, round spots laterally and transversal zones dorso-ventrally (pl. 3). It was later seen that this luminescence appears only shortly before and after ecdyses; during the intermediate phases no light emission was observed, but the larvae, when disturbed, eliminated through the mouth a brown liquid.

The pupae, when disturbed, always produced intense light (pl. 3). It was possible, after 10 to 14 days of the pupal phase to perceive the lineaments of the adult luminescent spots.

The new-born adult shows luminescence at the prothoracic spots, the anterior margin of the prothorax, the organ between



Mature larva, dorsal aspect: 1, head and first thoracic segment; 2, 8th and 9th tergites.



Mature larva, ventral aspect: 3, head and first thoracic segment; 4, 8th and 9th sternites and 10th segment.

the metathorax and the first abdominal segments, and all over the urotergites and urosternites, in the shape of transversal zones which correspond to the insertions between them; on the urosternites those zones are narrower. As the adult becomes more sclerotized the anterior margin of the prothorax and the abdominal segments lose their luminescence. In the senile phase, the adult gradually loses the capacity of light emission; one day or two before death, luminescence is completely lost. I think that in nature this fact does not occur because in the senile phase the adult also loses its tarsi and becomes torpid, becoming an easy prey.

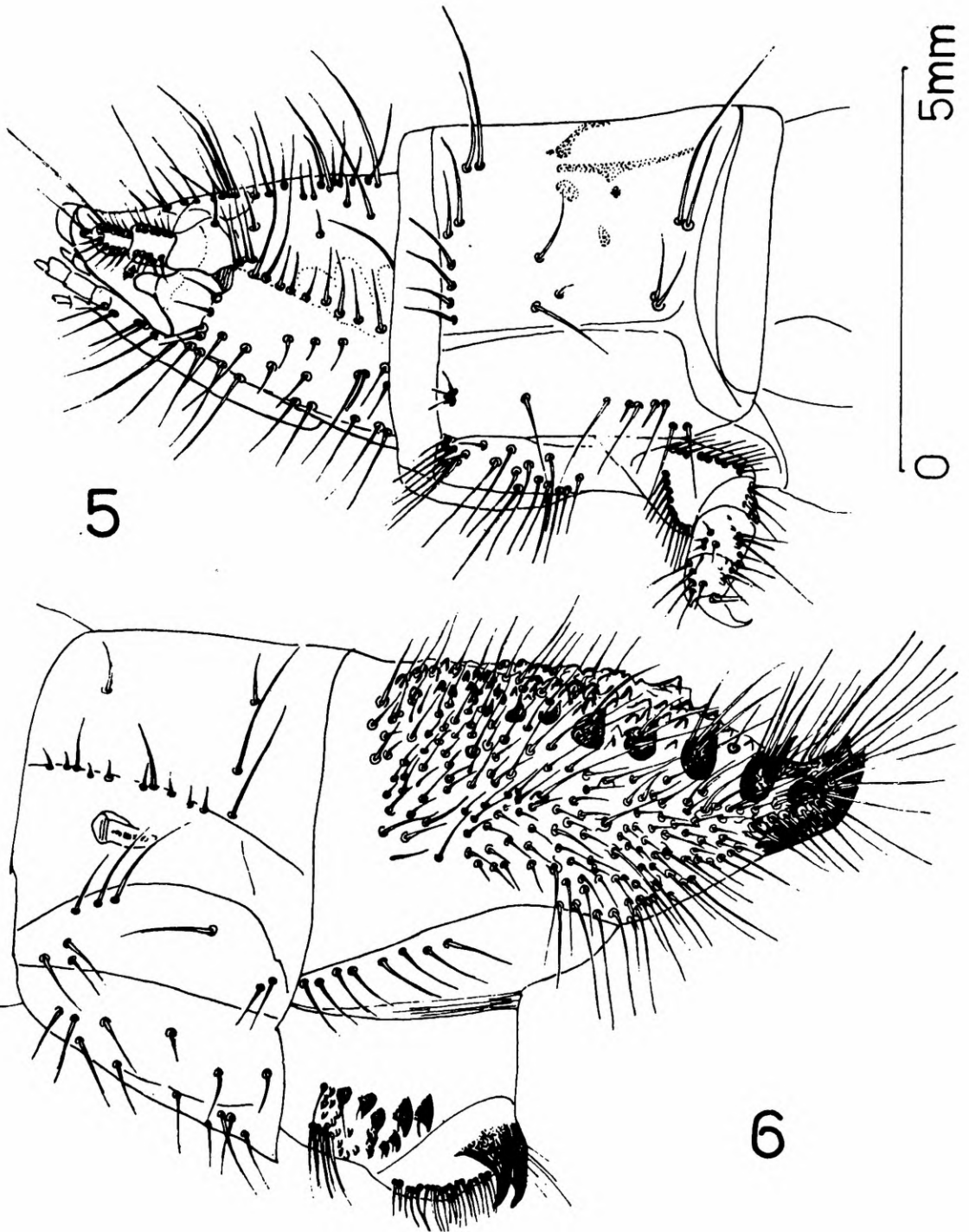
MATURE LARVA

Body surface yellowish; head, pronotum and prosternum darker. Head and body dorso-ventrally compressed. Surface of the ninth abdominal segment with small hairy tubercles; at least four of them bigger than the others, laterally placed; the apical pair bifurcate (pl. 2).

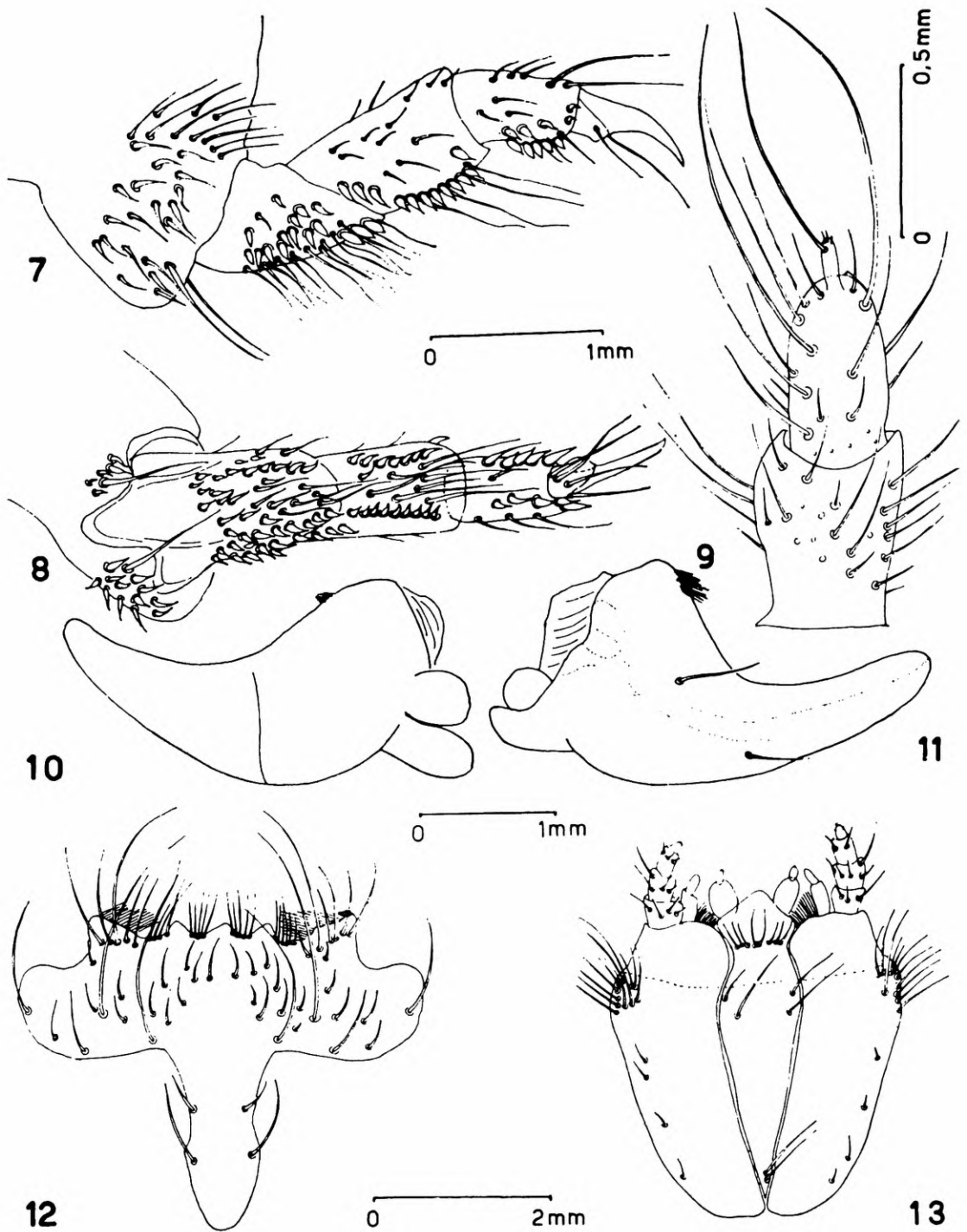
Head (figs. 1 and 3) broader than long. Cranial sutures widely separated in front, converging behind. Epicranial plates with setae, some of which longer than the others. Ocelli hyaline, triangular, laterally placed between the insertion of the mandibles and the basis of the antennae. Antennae (fig. 9) 3-segmented; first segment with one lateral pair of setae longer than the others; second segment with many short and a few longer setae, with one pair of long hair-like setae; third segment, the smallest, with one long hair-like seta apically. Nasale (fig. 12) tridentate, with tufts of five setae between adjacent teeth; ventrally three other small round teeth behind the anterior margin. Mandibles (figs. 10 and 11) arcuate and stout; the penicillus formed by a tuft of short and thin hairs. Insertion condyle well developed. Maxila (fig. 13) with elongate stipes, very close at the base, with a tuft of setae on the latero-anterior margin and four small setae on the outer margin; ventrally an antero-lateral tuft. Maxillary palpi with four segments, decreasing in length; the second segment with several setae around the distal part. Galea bi-segmented, lacinia little developed. Labium (fig. 13) with bi-articulate palpi and small rounded ligula. A transverse row of hairs, on the middle of the pre-mentum; anterior margin of the mentum with two pairs of setae; posterior margin with one pair. Inner region of the palpifer and of the pre-mentum densely clothed with long hairs, from the anterior margin to the hypopharynx. Hypopharynx with a rectangular, strongly sclerotized bar and a weaker anterior portion, densely clothed with long pubescence arranged in two layers. Inner region of the hypostome densely pubescent.

Pronotum as long as the meso and the metanotum together, with three groups of setae (fig. 1) anterior, median and posterior; medially to the anterior group there are two other groups, and at the side of the posterior group, only one. On the meso and the metanotum the median group is missing.

Pubescence of the abdominal tergites as in fig. 2; a lateral row of long and short setae, a pair of setae on the median region and two pairs posteriorly.



Mature larva, lateral aspect: 5, head and first thoracic segment; 6, 8th, 9th and 10th abdominal segments.



Mature larva, posterior leg: 7, lateral view; 8, ventral view; 9, antenna; 10 and 11, mandibles; 12, frons and nasales; 13, hypostoma.

Legs (figs. 3, 7 and 8). Coxae separated. Trochanter with several stout setae on the inner lateral margin; the middle region with long hairs. Lateral margin of the femora with a row of stout setae; on the inner side this row has 9 setae; on the outer side the number of setae varies, but always less than in the inner group; middle region of the femora with long hairs. Prosternum (fig. 3) triangular with two anterior pairs of setae and one group of posterior ones. Ventral aspect of abdominal segments as in fig. 4.

Ninth abdominal tergite (fig. 2) slightly convex, with at least four pairs of lateral tubercles, which diminish in length from the tip to the base; the apical tubercle is bifurcate; all of them have several hairy points; surface of tergite almost covered with numerous little hairy tubercles.

Tenth abdominal segment (figs. 4 and 6) of moderate size, tubular, with two stout spines on the lateral margin of the anal region and several little spiny tubercles on the sides; inferiorly with several long hairs.

Dimensions: total length 7 cm; median width 1 cm; head width 6 mm; 9th tergite width 6 mm.

PUPA

Sides of pronotum with two pairs of cuticular prolongations, one on the anterior margin and the other on the posterior angles. Last abdominal segment with one pair of urogomphi; these in the males show fewer small ramifications than in the females.

Lateral margins of the abdominal segments with "gin-traps" (Hinton, 1946). Between the 4th and 5th, and the 5th and 6th segments those "gin-traps" are better developed, with stronger and darker cuticle, slightly rough and denticulated (pl. 2).

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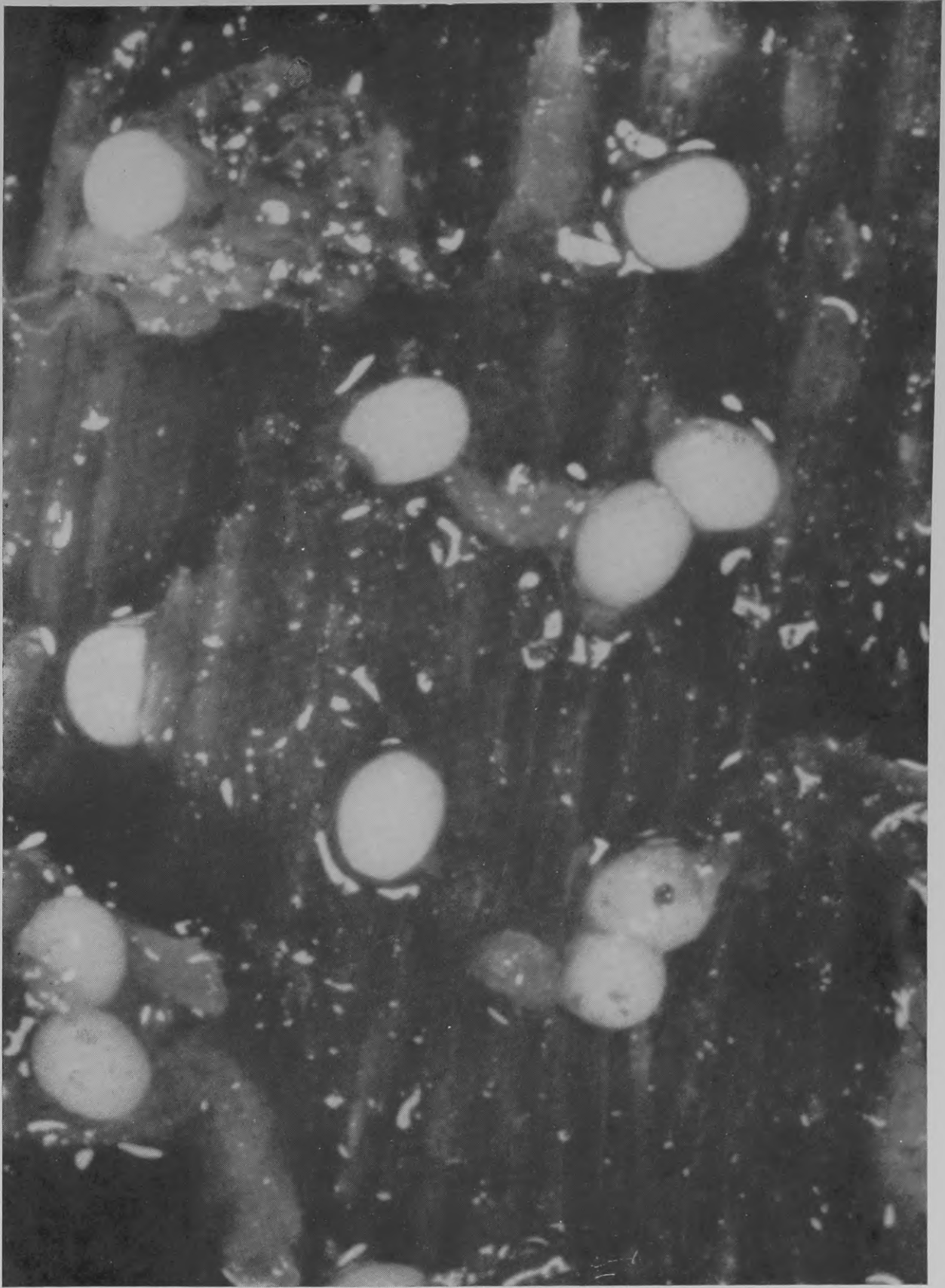


Plate 1, eggs.

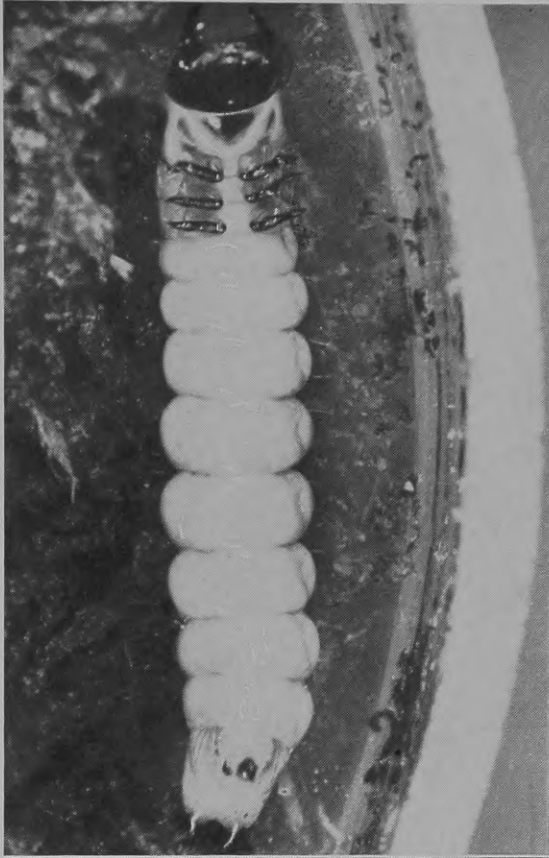


Plate 2, pre-pupa and pupa.

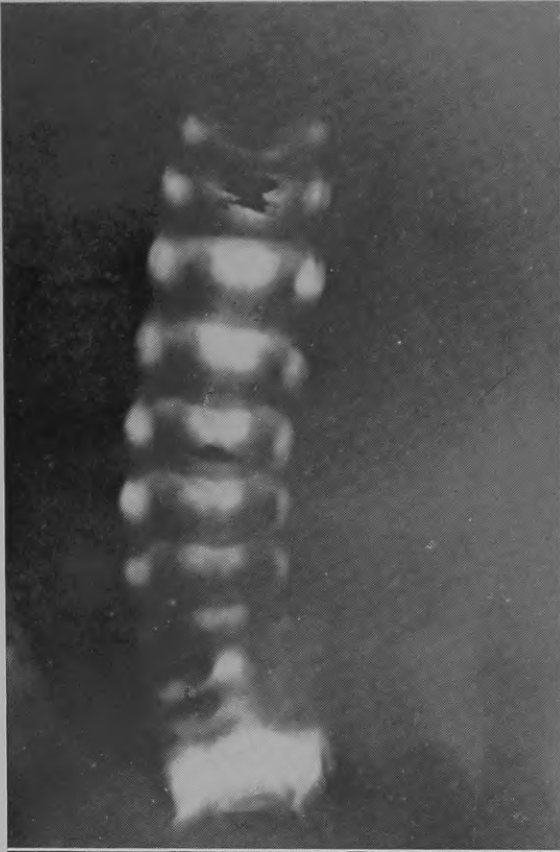


Plate 3, pre-pupa and pupa.

