

Descriptions and notes on nymphal instars of four Tingidae (Heteroptera, Tingidae)

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This paper representing the author's further contribution to the knowledge of immature stages of Tingidae deals with the descriptions of all five nymphal instars of *Catoplatus horvathi* (Puton) development of which took place on *Seseli devenyense* Simk. There is described also the fifth instar nymph of *Catoplatus anticus* (Reuter), the third, fourth and fifth instars of *Tingis rotundipennis* Horváth and the fifth instar nymph of *Acalypta nigrinervis* Stål. The distinguishing characters in which the fifth instar nymphs of the species mentioned above differ from hitherto known nymphs of related species are given.

The author would like to thank to Dr. J. Carayon and Mr. R. Bénard for the loan of nymphs of *Catoplatus anticus* and *Acalypta nigrinervis* from the collections of the Muséum National d'Histoire Naturelle, Paris.

Catoplatus horvathi (Puton, 1879)

The host plant of this species is *Eryngium campestre* (L.) (for example: Horváth 1889, Dobšík 1947, Stichel 1960 etc.) but it develops also on *Seseli devenyense* Simk (= *S. glaucum* auct. non L.) where nymphs of all five instars as well as imagines were found. Investigations on bionomics and collecting of material of the species took place in South Moravia on the limestone hill "Kopeček" near the town Mikulov. Although on the locality both *Eryngium campestre* and *Seseli devenyense* occur, the developmental stages were found on the base of *Seseli devenyense*. Nymphs were collected as follows:

I. instar: June 27, 1962. II. instar: June 19, 1964. III. instar: June 27, 1962. IV. instar: June 27, 1962; June 19, 1964. V. instar: June 19, 1964.

The nymphal instars are described below.

First Instar

(Fig. 1)

Long oval, without any remarkable processes or tubercles. General colour light yellowish.

Head robust, wider than long. Eyes composed of five red facets. Dorsal side of head with unpaired common foundation of anterior frontal processes in shape of a low and wide tubercle. Median frontal process quite absent and also occipital processes

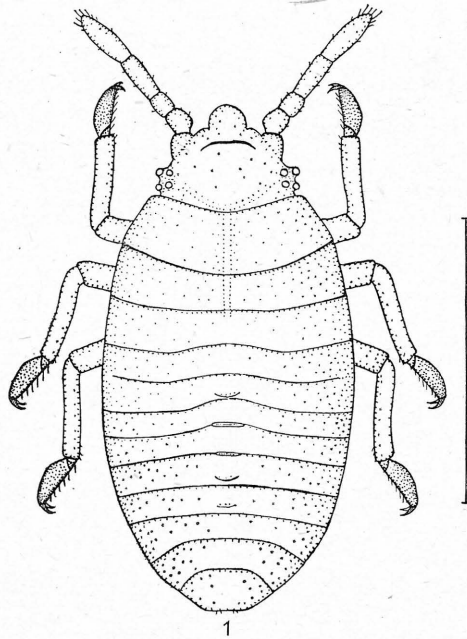


Fig. 1: *Catoplatus horvathi* (Put.). First instar nymph. (Scale = 0.5 mm.)

indistinct (absent). Antenniferous tubercles smaller than the first antennal joint, blunt and moderately rounded. All antennal joints pale, the fourth joint is the longest. Antennae sporadically covered with tiny hairs, only the apex of fourth joints with wider and longer hairs. Ventral side of head unicolorously pale. Rostrum reaching the anterior margin of middle coxae, it is as long as the antenna and as wide as the femur. Distal half of the fourth rostral joint brown. Relation of rostral joints: I : II : III : IV = 21 : 15 : 11 : 14 (= 0.10 mm. : 0.07 mm. : 0.05 mm. : 0.07 mm.).

Pronotum transverse and short, about three times wider than long in its median line (0.36 mm. : 0.12 mm.). Anterior pronotal margin arch-like concave, posterior margin arch-like convex. Mesonotum and metanotum similar to abdominal tergites in shape. All the ventral side unicolorously yellowish. Also legs yellowish except the tarsi which are brown.

There is per one unpaired, very low but rather wide tubercle near the posterior margin of tergites II, V and VI medially. The smallest tubercle is that of the sixth tergite. Apex of abdomen (ninth segment) broadly rounded, not excised.

Body surface without remarkable structure, only tiny club-shaped hairs growing out sparsely here and there can be found by observing the body surface by greater magnification. These hairs are about 0.004 mm. in length.

Measurements: Length of body 0.90 mm., maximal width of body 0.42 mm., width of head 0.25 mm., length of antenna 0.27 mm. (I : II : III : IV = 0.05 mm. : 0.04 mm. : 0.08 mm. : 0.10 mm.), length of posterior tibia 0.15 mm., length of posterior tarsus 0.11 mm.

Second Instar

Oval flat, light yellowish, only tarsi and apex of rostrum brown to dark brown. Similar to the first instar.

Head considerably large. Anterior frontal processes marked in form of two adjacently situated low and small tubercles. Median frontal process absent. Occipital processes very indistinct, in shape of two very low tubercles. Antenniferous tubercles smaller than first antennal joint, blunt and rounded. Antennae pale, the fourth joint longer than the third. Eyes composed of more than five red facets. Rostrum reaching the posterior margin of anterior coxae. Relation of rostral joints: I : II : III : IV = 18 : 9 : 6 : 8 (= 0.17 mm. : 0.09 mm. : 0.06 mm. : 0.08 mm.).

Dorsal and ventral sides of thorax yellowish. Pronotum quadrangular, about three times wider than long in its median line (0.45 mm. : 0.15 mm.), its anterior margin concave. Lateral margins of pronotum roundly convex. Mesonotum and metanotum similar to abdominal tergites.

Lateral margins of abdomen rounded, apex of abdomen (ninth segment) slightly arch-like concave (fig. 2). Low tubercles are situated on tergites II, V and VI medially, as in the first instar.

Body surface almost bald, only with sporadical tiny club-shaped hairs (0.004 mm.) (fig. 3) and with sparse and badly distinct "circle-shaped structure" (fig. 2).

Measurements: Length of body 1.19 mm., maximal width of body 0.58 mm., width of head 0.31 mm., length of antenna 0.34 mm. (I : II : III : IV = 0.06 mm. : 0.05 mm. : 0.10 mm. : 0.13 mm.), length of posterior tibia 0.19 mm., length of posterior tarsus 0.12 mm.

Third Instar

(Fig. 4)

Long oval, flat, yellowish coloured. Tarsi and tip of rostrum dark brown.

Dorsal side of head with two pairs of processes. Anterior frontal processes in form of two closely adjacent small, wide and blunt tubercles, hardly reaching the level of anterior margin of antenniferous tubercles with their apices. Occipital processes are small, low and narrow of tubercle-like shape. Antenniferous tubercles smaller than the first antennal joint, their anterior margin almost straight and their anterolateral angles a little sharply produced. Antennae wider than tibia, the fourth antennal joint longer than the third. Apex of the fourth joint with short bristle-like hairs. Rostrum hardly reaching the posterior margin of anterior coxae. Relation of rostral joints: I : II : III : IV = 16 : 11 : 8 : 9 (= 0.15 mm. : 0.11 mm. : 0.08 mm. : 0.09 mm.).

Pronotum approximately 2.8 times wider than long (0.62 mm. : 0.22 mm.), its anterior margin moderately arch-like concave. Posterior pronotal margin with small triangular corner apex of which does not nearly reach the middle of mesonotum. Lateral margins of pronotum convex. Posterior margin of mesonotum straight; the foundations of hemelytral lobes (as well as of alar lobes of metathorax) not yet developed. Ventral side of thorax and legs yellowish except the dark brown tarsi.

In the median line of abdominal tergites II, V and VI there is per one low, not too considerably marked tubercle near the posterior margin of each tergite. Lateral margins of abdomen rounded, only the posterolateral angles of the seventh and

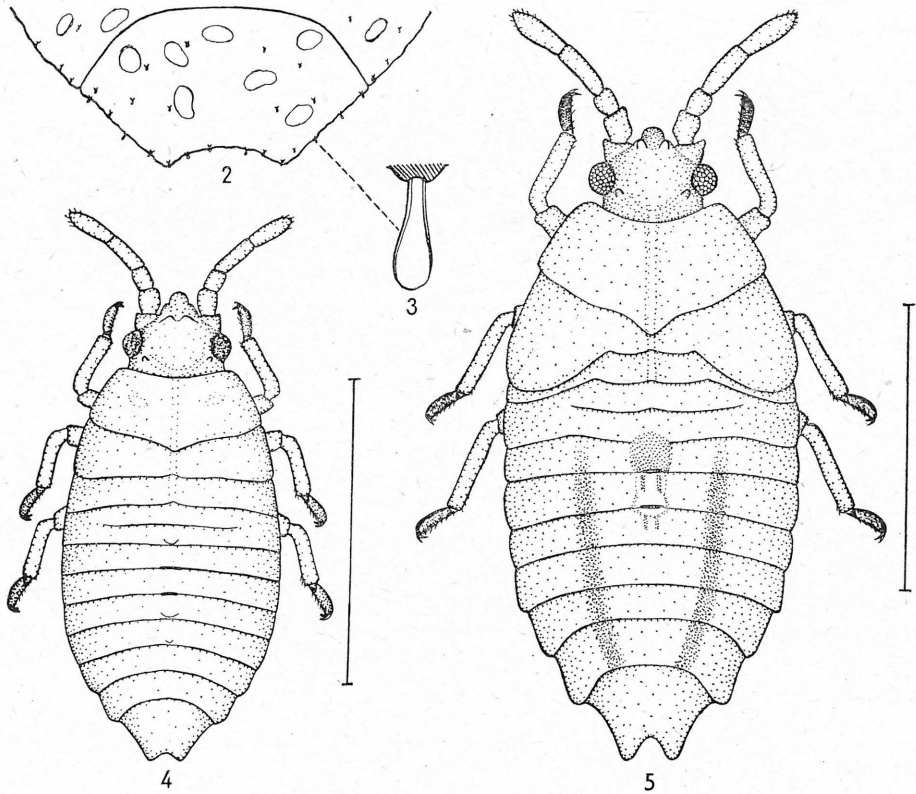


Fig. 2: *Catoplatus horvathi* (Put.). The end of body of the second instar nymph with the „circle-shaped structure” of the body surface. 3: Tiny club-shaped glandular hair of the second instar nymph of *Catoplatus horvathi* (Put.). 4: *Catoplatus horvathi* (Put.). Third instar nymph. (Scale = = 1 mm.) 5: *Catoplatus horvathi* (Put.). Fourth instar nymph. (Scale = 1 mm.)

eighth segments moderately prominent sideways. End of body (apex of the ninth segment) poorly and broadly excised.

Body surface bald except the apices of tibiae, tarsi and fourth antennal joints where there are bristle-like hairs. Tiny club-shaped hairs can be observed here and there as in the preceding instars. “Circle shaped structure” poorly distinct as in the second instar.

Measurements: Length of body 1.48 mm. to 1.67 mm., maximal width of body 0.71 mm. to 0.80 mm., width of head 0.36 mm. to 0.40 mm., length of antenna 0.46 mm. to 0.50 mm. (I : II : III : IV = 0.08 mm. to 0.09 mm. : 0.07 mm. to 0.08 mm. : 0.14 mm. to 0.15 mm. : 0.17 mm. to 0.18 mm.), length of posterior tibia 0.26 mm. to 0.28 mm., length of posterior tarsus 0.14 mm. to 0.15 mm.

Fourth Instar

(Fig. 5)

Light yellowish with brown colouring in shape of two longitudinal stripes on the abdomen, as in the fifth instar. Tip of rostrum and tarsi dark brown, median subcoxal plates of sterna brown.

Head dorsally with two pairs of processes: The pair of anterior frontal processes is short with rounded tips not nearly reaching the anterior margin of head. Occipital processes reaching the level of posterior margin of eyes with their apices. The processes of head are very small and equal in size, they are only a little smaller than the first tarsal joint. Anterolateral angles of antenniferous tubercles sharply produced. Eyes reddish in colour. Antennae light yellow, usually the apex of the fourth joint a little darkened. Third and fourth antennal joints almost equal in length. Rostrum hardly reaching the posterior margin of anterior coxae. Relation of rostral joints: I : II : III : IV = 18 : 11 : 8 : 9 (= 0.23 mm. : 0.14 mm. : 0.10 mm. : 0.12 mm.).

Pronotum 1.8 to 2.1 times wider than long in its median line (average 0.86 mm. : 0.43 mm. = 2). Anterior pronotal margin moderately arch-like concave, posterior pronotal corner reaching the middle of mesonotum. Lateral margins of pronotum convex. Hemelytral lobes reaching almost to the posterior margin of the first tergite, alar lobes of metanotum just reaching the anterior margin of the second tergite.

Lateral margins of abdomen moderately cogged (step-like), as the posterolateral angles of segments are projected prominently sideways, especially the angles of the fifth to eighth segment. End of body deeply excised. One low and wide tubercle is situated in the middle of posterior margins of tergites II, V and VI.

Hairs and "circle-shaped structure" as in the fifth instar.

Measurements: Length of body 2.13 mm. to 2.30 mm., maximal width of body 1.02 mm. to 1.12 mm., width of head 0.46 mm. to 0.53 mm., length of antenna 0.63 mm. to 0.69 mm. (I : II : III : IV = 0.12 mm. to 0.13 mm. : 0.09 mm. to 0.10 mm. : 0.20 mm. to 0.23 mm. : 0.22 mm. to 0.23 mm.), length of posterior tibia 0.36 mm. to 0.39 mm., length of posterior tarsus 0.16 mm. to 0.18 mm.

Fifth Instar

(Fig. 6)

Flat, prolonged, about twice longer than wide. General colour light yellowish with dark brown colouring. Dorsal and ventral side of head yellowish, sometimes a little brownish at its base. Eyes reddish. On the dorsal side of head there are two pairs of small processes of yellowish colour pressed to the head. The anterior frontal processes, situated near each other, reaching about the level of base of first antennal joint with their apices, i. e. they do not nearly reach the apex of anteclypeus. The processes are only as long as the first tarsal joint. Median frontal process quite absent. Occipital processes reach a little beyond the level of posterior margin of eyes. Antenniferous tubercles reaching almost the level of anterior margin of anteclypeus by their pointed, produced anterolateral angles. Antennae light yellow except the apices of fourth joints which blend into brownish. The third antennal joint longer than the fourth. Rostrum also yellow, only its tip dark brown and

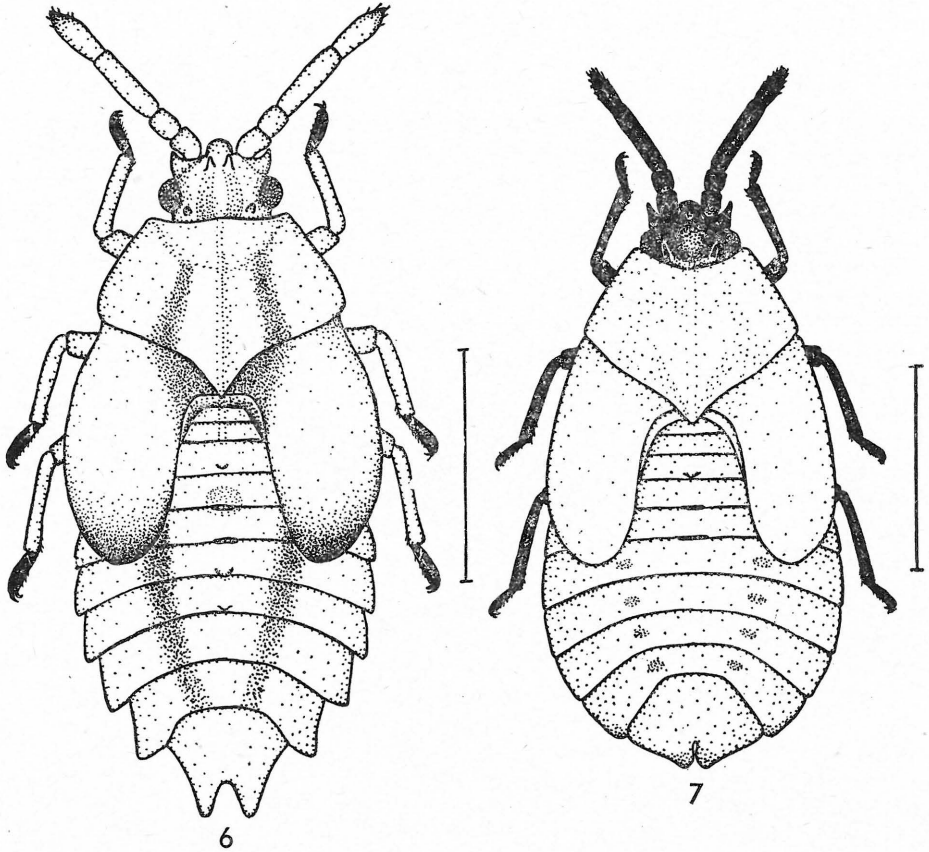


Fig. 6: *Catoplatus horvathi* (Put.). Fifth instar nymph. (Scale = 1 mm.) 7: *Catoplatus anticus* (Reut.). Fifth instar nymph. (Scale = 1 mm.)

reaching between anterior coxae. Relation of rostral joints: I : II : III : IV = 18 : 14.5 : 8.5 : 9 (= 0.23 mm. : 0.18 mm. : 0.11 mm. : 0.12 mm.).

Pronotum approximately 1.3 times wider than long in its median line (1.07 mm. : 0.82 mm.), yellow with two longitudinal bands of dark brown colour. Mesonotum with large dark brown spot in the middle. Hemelytral lobes reaching the fifth tergite, their distal ends dark brown. Alar lobes of metanotum hardly reaching the fifth tergite. Ventral portions of thorax also light yellow except the median subcoxal plates which are dark brown. Coxae, trochantera, femora as well as tibiae light yellow, tarsi brown black.

Abdomen light yellowish, dorsally with two longitudinal dark brown bands extending from the anterior margin of the fourth to the end of the eighth tergite. Lateral margins of abdomen strongly cogged (step-like) as the posterior margins are always wider than the anterior margins of the abdominal segments, so that posterolateral

angles of the segments are prominent sideways. Apex of the ninth segment deeply excised. There are low and small tubercles on the II, V and VI tergites as in the preceding instars. The largest of them is that of the fifth tergite. Dorsal abdominal glands distinct, first of them (in the third segment) orange coloured.

Body surface bald, only tiny hairs moderately club-shaped, are present sporadically here and there, especially in the posterolateral angles of body segments, at the apex of the ninth abdominal segment. These hairs are about 0.005 mm. long. Similar tiny hairs are more abundant on the antennae and legs. Apices of tibiae and fourth antennal joints with short bristle-like hairs (hardly 0.03 mm. in length). "Circle-shaped structure" is visible by observing the surface in transmitted light.

Measurements: Length of body 2.89 mm. to 3.06 mm., maximal width of body 1.34 mm. to 1.44 mm., width of head 0.56 mm., length of antenna 0.95 mm. to 0.99 mm. (I : II : III : IV = 0.15 mm. to 0.17 mm. : 0.14 mm. to 0.15 mm. : 0.35 mm. to 0.36 mm. : 0.31 mm.), length of posterior tibia 0.49 mm. to 0.51 mm., length of posterior tarsus 0.19 mm.

The fifth instar nymph of *Catoplatus horvathi* (Put.) can be distinguished from nymphs of *Catoplatus*-species hitherto known as follows.

It differs considerably from *C. carthusianus* (Goeze), *C. nigriceps* Horv. and *C. anticus* (Reut.) by having the head, antennae and legs (except tarsi) yellowish and not blackish, and by having the lateral margins of abdomen cogged (i. e. with sideways prominent posterolateral angles of abdominal segments) and not straight and rounded. It is similar to *C. fabricii* (Stål) in having light head, antennae and legs, and cogged lateral margins of abdomen but it differs very considerably for example in the fact that the anterior frontal processes of head are short, tubercle-like and not reaching the level of anterior margin of anteclypeus, and that the median frontal process is quite absent in *C. horvathi*. In the nymph of *C. fabricii* the anterior frontal processes are rather long, projecting beyond the level of anterior margin of anteclypeus by half the length of one process and a small median frontal process is developed in this nymph (Štusák 1962).

Catoplatus anticus (Reuter, 1880)

Fifth instar

(Fig. 7)

Body widely oval and without any processes or tubercles (except the head). Head, antennae, legs and sternal subcoxal plates blackish brown, thorax and abdomen light yellow to yellowish-white.

Head blackish brown, dorsally armed with two pairs of tubercle-like processes. The pair of anterior frontal processes is black, the processes being situated close to each other, thin and pointed at their apices. They hardly reach the level of the anterior margin of the head (anteclypeus). Median frontal process quite absent. Occipital processes a little smaller and thinner than the anterior frontal processes, directed obliquely sideways and reaching almost to the level of the middle of the eyes. Antenniferous tubercles very pointed at their outer angles, they are a little longer than the first antennal joint and they reach the level of the anterior margin of anteclypeus. Antennae black except the places of their insertions. Ventral portion

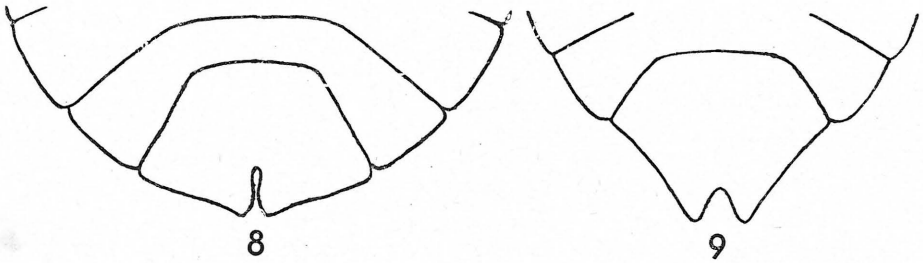


Fig. 8: The end of body of the fifth instar nymph of *Catoplatus anticus* (Reut.). 9: The end of body of the fifth instar nymph of *Catoplatus carthusianus* (Goeze).

of head is blackish too except the bucculae and the rostral channel which are light yellowish. Rostrum light brown, reaching just between the anterior coxae.

Pronotum about 1.44 times as wide as long in its median line (1.12 mm. : 0.78 mm.), anterior margin of pronotum deeply arch-like concave. Triangular corner of the posterior pronotal margin reaches to the posterior margin of metanotum. Lateral pronotal margins convex. Hemelytral lobes of mesonotum reaching the middle of the fifth abdominal tergite.

Abdomen is very wide, broadly rounded at the apical end. The apex of the abdominal segment very narrowly excised and blending to slightly brownish (fig. 8). Dorsal abdominal glands orange. In the median line of the second tergite near the posterior margin there is one very tiny tubercle which is almost indistinct.

Surface of body smooth with poorly distinct structure of small circles, similar to related species.

Measurements: Length of body 2.78 mm., maximal width of body 1.55 mm., width of head 0.53 mm., length of first antennal joint 0.15 mm., length of second antennal joint 0.13 mm. (third and fourth joints lacking), length of posterior tibia 0.54 mm., length of posterior tarsus 0.17 mm.

The nymph of *Catoplatus anticus* (Reut.) can be easily distinguished from nymphs of *Catoplatus*-species hitherto known as follows. It differs from *C. fabricii* (Stål), for example, in colour, in the fact that the median frontal process is absent etc. and from *C. horvathi* (Puton) in having blackish head, legs and antennae. It can be distinguished from *C. nigriceps* Horváth by blackish sternal subcoxal plates and by having the ninth abdominal segment excised at the apex. The nymph of *C. anticus* (Reut.) is most similar to that of *C. carthusianus* (Goeze) but it differs in wider body shape (abdomen) and especially in the ninth abdominal segment which is quite different in shape (fig. 8, 9).

Material: One fifth instar nymph (female) taken together with imagines. Corfu Isl., Paganetti (coll. Mus. Nat. Hist. Nat. Paris).

Tingis rotundipennis Horváth, 1911

While collecting in Gizah near Cairo (Egypt) a rather rich population of this species was found feeding on *Echinops spisosissimus* Turza (= *E. spinosus* L.) on

border of the desert. *Tingis rotundipennis* described by Horváth (1911) and cited from *Echinops spinosa* by Priesner et Alfieri (1953) is hitherto known to us only from Egypt. It occurred on the host plant there on April 8, 1966 as the nymphs of the third, fourth and fifth instars as well as imagines newly hatched together with fifth instar nymphs of *Galeatus scrophicus* Saunders. As our knowledge and records on *Tingis rotundipennis* have been rather poor, the third, fourth and fifth instar nymphs are described below.

Third Instar

(Fig. 10)

Body armed with short spiniform processes; general colour ochreous, the majority of spiniform processes, the fourth antennal joints, tip of rostrum and tarsi dark brown.

Head robust, armed with five spiniform processes dorsally. The anterior frontal processes about as long as the first antennal joint not nearly reaching the level of anterior margin of anteclypeus. The median frontal process a little shorter than the anterior frontal processes, wider, growing out at the level of the middle of eyes and reaching to the base of anterior frontal processes with its apex. Occipital processes only moderately longer than the anterior frontal ones, divergent and surpassing the level of the middle of eyes but they do not reach the level of anterior margin of eyes with their apices. Eyes composed of red rather large facets. Antenniferous tubercles smaller than the first antennal joint and rounded at their apices. Rostrum reaching moderately beyond the posterior coxae. Relation of rostral joints: I : II : III : IV = 20 : 14 : 10 : 12 = 0.26 mm. : 0.18 mm. : 0.13 mm. : 0.15 mm.

Pronotum approximately 1.6 to 1.8 times wider than long (average 0.59 mm. : 0.35 mm. = 1.69), its anterior margin straight or a little arch-like concave, posterior pronotal margin moderately convex. Lateral margins straight and each of them armed with several (mostly two-three) small tubercles and with one short process situated in the posterolateral angles of pronotum. Mesonotum with its posterior margin moderately convex and with foundation of hemelytral lobes which are, however, very small and indistinct. Lateral margins of mesonotum with one small tubercle in the middle and with one short and dark, process situated in posterolateral angles of mesonotum. In the median line of pronotum there are two pairs of processes. The first pair of processes (which are smaller than processes of head) is situated near the anterior pronotal margin, the second pair about in the middle of pronotum. These processes are tubercle-like and about half the length of anterior processes of pronotum. In the median line of mesonotum, metanotum and of the first tergite there is per one pair of processes situated near each other. The biggest ones are the processes of mesonotum (as the processes of head in size).

Posterolateral angles of metanotum and of the second to ninth abdominal segments armed with one blunt process in each angle (these are smaller than the processes of head). In the median line of abdominal tergites II, V, VI and VIII there is per one unpaired (but mostly slightly bilobed at its apex) process on each tergite. These processes are the longest and most robust ones of all body processes.

Dorsal body side covered with tiny hemispherical tubercles; a trumpet-shaped glandular hair growing out of each of them. An impression of sparse "circle-shaped structure" arises by observing these tubercles in transmitted light.

Outer margins of tibiae covered with several (four to six) tiny tubercles with long moderately club-shaped glandular hairs, the hairs being, however, shorter than the width of tibia. Bristle-like hairs of usual shape growing out on the distal portion of the fourth antennal joints, tarsi etc.

Measurements:*) Length of body 1.23 mm. to 1.32 mm., maximal width of body 0.64 mm. to 0.68 mm., width of head 0.36 mm. to 0.40 mm., length of antenna 0.35 mm. to 0.41 mm. (I : II : III : IV = 0.07 mm. to 0.10 mm. : 0.06 mm. : 0.12 mm. to 0.13 mm. : 0.10 mm. to 0.12 mm.), length of posterior tibia 0.21 mm. to 0.25 mm., length of posterior tarsus 0.10 mm. to 0.11 mm.

Fourth instar

(Fig. 11)

General colour light ochreous brown, majority of spiniform processes, fourth antennal joints, tarsi and tip of rostrum dark brown. Eyes red.

Spiniform processes of head about as long as the first antennal joint (or a little longer), the anterior frontal ones do not reach beyond the anterior margins of anteclypeus, median frontal process surpasses the base of anterior frontal ones, and occipital processes reach just the level of anterior margin of the eyes with their apices. Rostrum reaching anterior margin of posterior coxae. Relation of rostral joints I : II : III : IV = 23 : 18 : 11 : 15 = 0.30 mm. : 0.23 mm. : 0.14 mm. : 0.19 mm.

Pronotum 1.78 to 2.2 times wider than long in its median line (average 0.78 mm. : 0.38 mm. = 2.05). Anterior margin of pronotum concave, posterior pronotal margin with posterior corner not nearly attaining the posterior margin of mesonotum. Each of lateral pronotal margins with about three small processes, the biggest being situated in the posterolateral angle of pronotum. Two pairs of processes in the median line of the pronotum, similar to the fifth instar. Hemelytral lobes reaching the first tergite, their lateral margins armed with about three to four processes on each margin. Median line of mesonotum armed with one pair of strong dark closely adjacent processes. Median line of metanotum as well as of the first abdominal tergite with one pair of smaller usually pale processes. Posterolateral angles of metanotum slightly produced into foundation of alar lobes and armed there with one small, usually pale process. In the posterolateral angles of the second to ninth abdominal segments there is one process in each angle, the processes being subequal to the processes of head in size. In the median line of the tergites II, V, VI and VIII there is one unpaired dark, robust process on each tergite, the processes being the biggest of the all body processes.

Dorsal body side including the processes, antennae and legs with tubercles with trumpet-shaped glandular hairs, and structures, as in the fifth instar.

Measurements*: Length of body (without spiniform processes) 1.62 mm. to 2.00 mm., maximal width of body (without spiniform processes) 0.85 mm. to 0.94 mm., width of head 0.44 mm. to 0.49 mm., length of antenna 0.50 mm. to 0.59 mm. (I : II : III : IV = 0.10 mm. to 0.12 mm. : 0.08 mm. to 0.09 mm. : 0.18 mm. to 0.21 mm. : 0.14 mm. to 0.17 mm.), length of posterior tibia 0.35 mm. to 0.37 mm., length of posterior tarsus 0.13 mm. to 0.15 mm.

*) Twenty individuals measured in each instar.

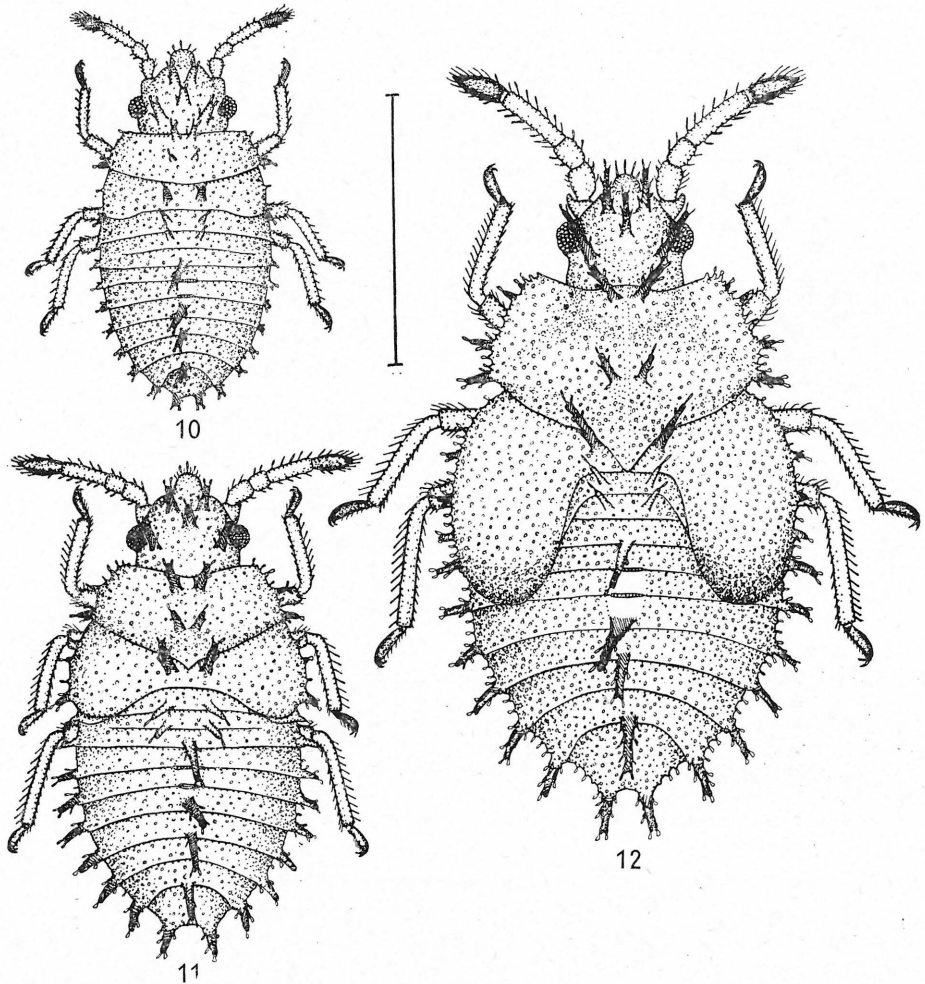


Fig. 10: *Tingis rotundipennis* Horv. Third instar nymph. (Scale = 1 mm.) Fig. 11: *Tingis rotundipennis* Horv. Fourth instar nymph. (Scale = 1 mm.) Fig. 12: *Tingis rotundipennis* Horv. Fifth instar nymph. (Scale = 1 mm.)

Fifth Instar

(Fig. 12)

Head, thorax as well as abdomen armed with rather long spiniform processes. General colour light ochreous brown, spiniform processes, the fourth antennal joints, tarsi and tip of rostrum blackish. Distal ends of hemelytral lobes blending to dark brown.

Dorsal side of head armed with five long spiniform processes. The anterior frontal processes longer than first antennal joint and a little surpassing the anterior margin

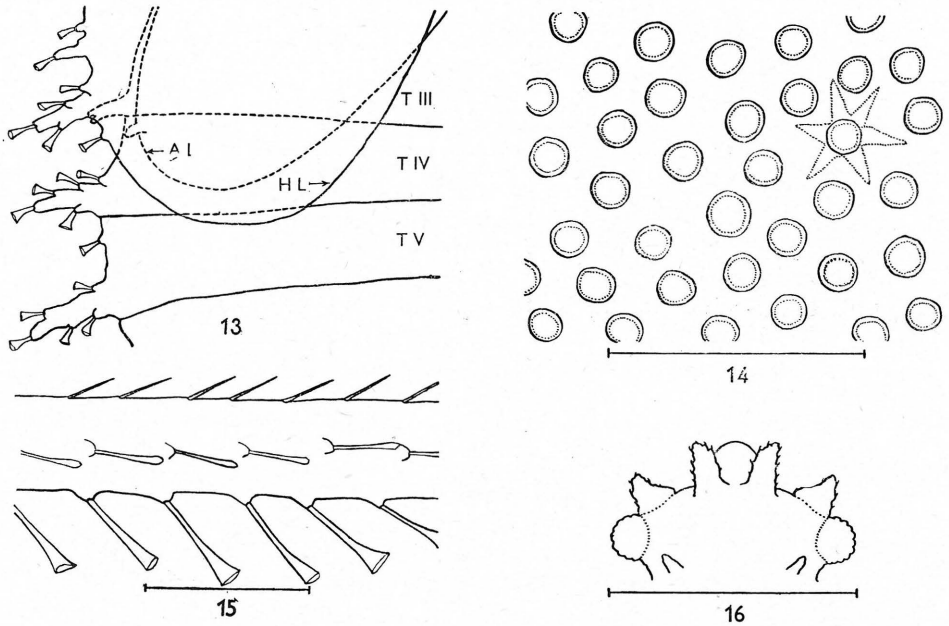


Fig. 13: *Tingis rotundipennis* Horv. Portion of the left dorsal body side of the fifth instar nymph. T III–T V = tergites III–V; HL = left hemelytral lobe; AL = left alar lobe of metanotum. 14: "Circle-shaped structure" of the body surface of the fifth instar nymph of *Tingis rotundipennis* Horv. (Scale = 0.1 mm.). 15: Portion of left posterior tibia of the fifth instar nymph of *Tingis rotundipennis* Horv. (Scale = 0.1 mm.). 16: *Acalypta nigrinervis* Stål. Head of the fifth instar nymph. (Scale = 0.5 mm.).

of anteclypeus. Median frontal process does not reach beyond the level of anteclypeus. Occipital processes are the longest ones, directed obliquely sideways over the eyes. Anterolateral angles of antenniferous tubercles prominent, the tubercles being about as large as the second antennal joint. Fourth antennal joint blackish except its base which is pale. Rostrum reaching the posterior margin of middle coxae. Relation of rostral joints: I : II : III : IV = 30 : 20 : 16 : 18 = 0.39 mm. : 0.26 mm. : 0.21 mm. : 0.23 mm.

Pronotum 1.4 to 1.6 times wider than long in its median line (average 1.04 mm. : 0.70 mm. = 1.54 mm.). Anterior pronotal margin moderately concave but its middle convex (foundation of vesicula). Lateral margins of pronotum moderately convex and armed with spiniform processes. The smallest tubercle-like processes are situated near the anterior portion of the lateral pronotal margin, the largest processes in the posterolateral angles of the pronotum. These are, however, always shorter than the processes of head. There are, as a rule, two larger and one to two smaller processes on each of lateral pronotal margins. Posterior corner of pronotum just reaching the posterior margin of mesonotum. Near the middle of anterior pronotal margin there is situated a convex foundation of vesicula and one pair of long spiniform processes, similar in shape and size to anterior frontal processes of head, growing out of it.

These processes situated near each other are directed divergently forward. Approximately in the middle of pronotal disc there is one pair of processes which are about half the length of the anterior pronotal processes. Hemelytral lobes reach the fifth tergite, their lateral margins armed with spiniform processes variable in size and number. There are, as a rule, four to five processes on each of hemelytral lobes, the longest ones are situated distally. Alar lobes of metathorax reaching almost the fifth tergite also, they are, however, narrower than the hemelytral lobes. There is one rudimentary blackish process close to the apices of alar lobes (fig. 13).

In the posterolateral angles of abdominal segments IV to IX there is per one long blackish spiniform process in each angle. Also posterolateral angles of the third abdominal segment usually with shorter process (fig. 13). In the median line of mesonotum, metanotum and of the first tergite there is one pair of closely adjacent processes. The processes of mesonotum are the longest ones, processes of metanotum and first tergite hardly half the length of mesonotal ones. In the median line of abdominal tergites II, V, VI and VIII there is one unpaired long spiniform process. These processes are the longest ones of all body processes.

Dorsal surface of body including spiniform processes, densely covered with tiny tubercles with trumpet-shaped glandular hairs secreting wax. A "circle-like structure" arises by observing these tiny excrescences in transmitted light (fig. 14). Glandular hairs of similar shape are situated also on the antennal joints (except the fourth where the bristle-like hairs are present), on the outer margins of tibiae and on distal ends of femora. Inner margins of tibiae with shorter bristle-like hairs (fig. 15).

Measurements: Length of body (without spiniform processes) 2.17 mm. to 2.38 mm., maximal width of body (without spiniform processes) 1.15 mm. to 1.28 mm., width of head 0.47 mm. to 0.51 mm., length of antenna 0.79 mm. to 0.82 mm. (I : II : III : IV = 0.14 mm. : 0.13 mm. : 0.31 mm. to 0.33 mm. : 0.21 mm. to 0.22 mm.), length of posterior tibia 0.47 mm. to 0.51 mm., length of posterior tarsus 0.17 mm. to 0.21 mm.

The fifth instar nymph of *Tingis rotundipennis* Horv. differs from those of *Tingis ampliata* (H.-S.), *T. cardui* (L.) and *T. grisea* Germ. by having the lateral margins of pronotum, hemelytral lobes and abdomen armed with long spiniform processes. It is similar to nymphs of *T. reticulata* (H.-S.) and *T. stachydis* (Fieb.) in its general shape. The spiniform processes are, however blackish brown and covered with less tubercles in *T. rotundipennis*. It differs from *T. reticulata*, for example, by smaller size and from *T. stachydis* by structure of the body surface as there are no villi-like tiny excrescences in *T. rotundipennis*.

Acalypta nigrinervis Stål, 1874

Fifth instar

(Fig. 17)

Widely oval, body (except head) without any processes or tubercles. General colour light ochreous brown. Very similar to nymphs of the other *Acalypta*-species.

Head wider than long with two pairs of processes dorsally. The pair of anterior frontal processes is rather robust and moderately divergent. These processes, bluntly

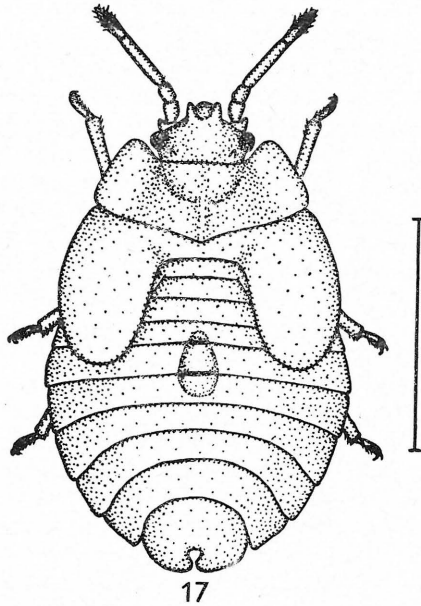


Fig. 17: *Acalypta nigrinervis* Stål. Fifth instar nymph. (Scale = 1 mm.)

rounded at their apices, just reaching the level of anterior margin of anteclypeus in dorsal view (fig. 16). Their length is equal to the first antennal joint. The occipital processes are pressed to the surface of head, more than twice smaller than the anterior frontal processes reaching the level of posterior margin of eyes with their apices. Eyes rather small, red coloured. Antenniferous tubercles smaller than the first antennal joint. The fourth antennal joint becoming blackish in its distal half and covered with longer setiform hairs. Rostrum moderately surpassing posterior coxae, its apex blends to blackish colour. Relation of rostral joints: I : II : III : IV = 19 : 15 : 12 : 18 (= 0.24 mm. : 0.19 mm. : 0.15 mm. : 0.23 mm.).

Pronotum about 2.5 times wider than long in its median line (0.98 mm. : 0.39 mm.). Anterior margin of pronotum concave, almost straight in the middle. Posterior pronotal margin with only moderately marked triangular corner which does not reach to the posterior margin of metanotum. A foundation of vesicula near the anterior pronotal margin and a longitudinal carina is indistinctly visible in the median line of the pronotal disc. Hemelytral lobes reaching the middle of fourth tergite with their apices.

Abdomen very wide, maximal body width in region of the fourth abdominal segment. Posterolateral angles of the eight abdominal segment free, prominent, they do not adjoin to the ninth segment. End of body (apex of the ninth segment) deeply excised.

Surface of body (especially dorsal side) covered with star-shaped structure of the same type as in the other nymphs of *Acalypta*-species.

Measurements: Length of body 2.04 mm., maximal width of body 1.34 mm., width of head 0.46 mm., length of antenna 0.82 mm. (I : II : III : IV = 0.11 mm. : 0.09 mm. : 0.36 mm. : 0.26 mm.), length of posterior tibia 0.38 mm., length of posterior tarsus 0.14 mm.

Material. Here is described the fifth instar nymph (male) ex coll. Noualhier (1898) (Mus. Nat. Hist. Nat. Paris), collected together with imagines (det. Horváth).

As already mentioned the nymphs of *Acalypta*-species are rather similar in shape, colour and structures to one another, so that there exist some difficulties in distinguishing them. That is why the distinguishing characters in which *A. nigrinervis* differs from the hitherto known nymphs of *Acalypta*, are given below.

It differs from *A. gracilis* (Fieb.) by having no unpaired tubercle-like processes in the median line of abdominal tergites and from *A. pulchra* Štusák by the presence of occipital processes of the head. It can be distinguished from *A. musci* (Schrnk.), *A. platycheila* (Fieb.) and *A. carinata* (Panz.) (in which the anterior frontal processes surpass the level of anteclypeus by half the length of these processes) by shorter anterior frontal processes which reach just the level of anteclypeus. Nymph of *A. nigrinervis* is similar to *A. parvula* (Fall.), *A. marginata* (Wolff) and *A. nigrina* (Fall.) by fact that in these species anterior frontal processes do not surpass the level of anteclypeus. It differs, however, considerably from *A. parvula* (Fall.) in its larger size and proportions, in not having the base of the third antennal joint enlarged and in longer anterior frontal processes. It can be distinguished from *A. nigrina* (Fall.), *A. marginata* (Wolff) as well as from *A. parvula* (Fall.) by its having wider pronotum and having only one median carina (not too considerably marked) in the median-line of pronotal disc.

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