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Nymphs and host plants of Monosteira lobulifera Reuter and Tingis ragusana (Fieber) (Heteroptera, Tingidae)

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Monosteira lobulifera Reuter, 1888

This pontomediterranean species has been recorded on Salix sp. (Salicaceae) in Egypt (Priesner et Alfieri 1953), Hoberlandt (1955) found the species living on Quercus coccifera L. and Quercus ilex L. (Fagaceae), Linnavuori (1961) on Pyrus sp. (Malvaceae) in Israel.

Material: Iran, Teheran, August 15, 1956, 2 fifth instar nymphs together with imagines, leg. Safavi (det. Dr. L. Hoberlandt).

Fifth Instar

(Figs. 1, 2, 4—7, 9)

Body armed with short processes and tubercles, general colour light ochreous brown, some body portions dark brown.

Head darker brown, dorsally armed with five following processes: Paired anterior frontal processes approximately reach the level of anterior margin of anteclypeus. Median frontal process a little longer than anterior frontal processes and moderately reaching beyond the bases of these. Occipital processes moderately longer, about as long as first antennal segment and scarcely reaching the level of anterior margin of eyes in dorsal view. The processes of head are piceous and densely covered with tiny, sharply teeth-like tubercles. Their apices with hemispherical tubercle and with a robust glandular hair of pestle- or trumpet-like shape growing out of the apical tubercle (Fig. 5). Eyes reddish. First to third antennal segments yellowish, fourth segment dark brown blending to black to its apex. Antennae covered with very long setaceous hairs which are longer than third antennal segment is wide. Rostrum scarcely reaching anterior margin of middle coxae. Relation of rostral segments: I : II : III : IV = 0.22 mm : 0.17 mm : 0.09 mm : 0.13 mm.

Pronotum approximately 1.5 times wider than its median length. Anterior pronotal margin moderately concave, lateral margins almost straight (inconspicuously concave), posterior margins sinuate. Posterior corner of pronotum reaching the anterior margin of first tergite. Lateral pronotal margins armed with several small, irregularly situated tubercles each bearing one robust glandular hair. The tubercles are smaller than tarsal claw and some of them are piceous. Two pairs of small light tubercles with glandular hairs, almost equal in size to the tubercles of lateral pronotal margin, situated in the median line of pronotum. First pair of them near the anterior

pronotal margin, second pair in the middle of pronotal disc (Fig. 7). (In these places two pairs of large and piceous tubercles covered with tiny teeth are situated in the nymph of *Monosteira unicostata* /Muls. et Rey/). One pair of short piceous processes

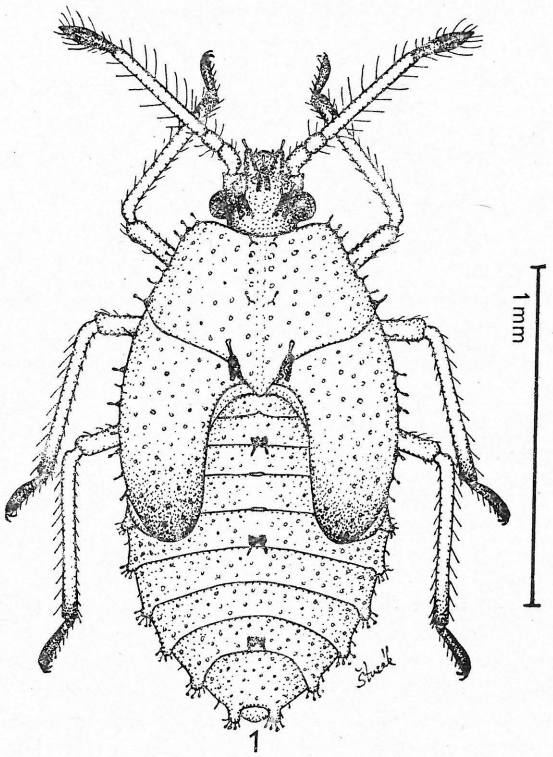


Fig. 1. *Monosteira lobulifera* Reut., fifth instar nymph.

(Fig. 6) in median line of mesonotum; posterior corner of pronotum reaches between them. Hemelytral lobes as well as metathoracic lobes reaching the middle of 5th tergite. Distal portions of hemelytral lobes dark brown. Lateral margins of hemelytral lobes with several small tubercles bearing robust glandular hairs; some of the tubercles are piceous (Fig. 9).

Lateral margins of abdomen with odd, similar, small tubercles. Posterolateral angles of segments II—IX prominent, with wide and short excrescences which are densely covered with small hemispherical tubercles bearing glandular hairs of pestle- or trumpet-like shape (Fig. 4). Smallest are the excrescences in posterolateral angles of 2nd, largest in angles of 9th segment. One large, low and wide bilobic excrescence (tubercle-like process) of piceous colour with two robust glandular hairs is situated on each of 2nd, 5th and 8th tergite in median line.

Femora and tibiae yellowish ochreous, apices of tibiae and tarsi dark brown. Legs, especially tibiae, with long setaceous hairs.

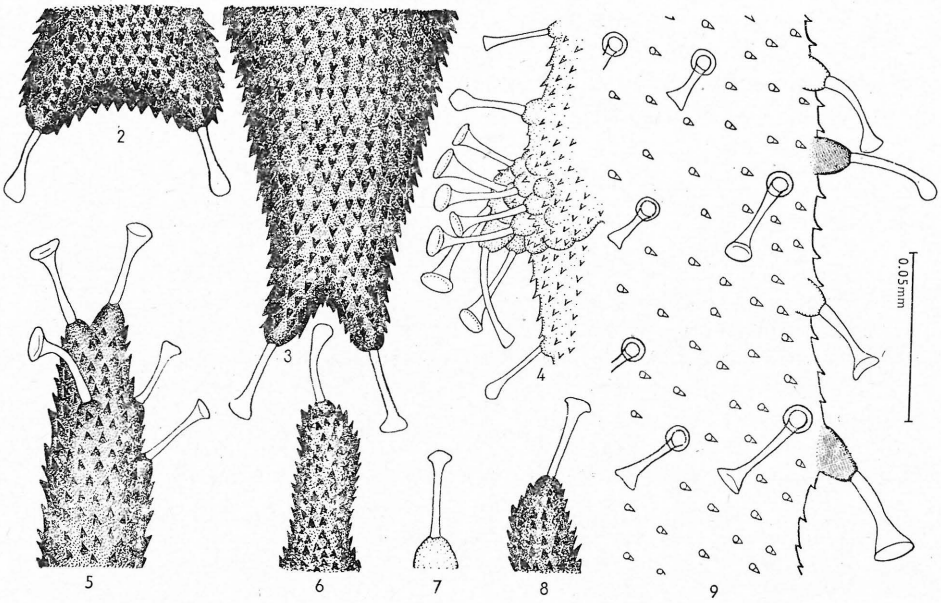


Fig. 2. *Monosteira lobulifera* Reut., process of 2nd tergite. Fig. 3. *Monosteira unicostata* (Muls. et Rey), process of 2nd tergite. Fig. 4. *Monosteira lobulifera* Reut., portion of left abdominal margin with posterolateral angle of 7th abdominal segment. Fig. 5. *Monosteira lobulifera* Reut., occipital process. Fig. 6. *Monosteira lobulifera* Reut., process of mesonotum. Fig. 7. *Monosteira lobulifera* Reut., tubercle-like process from the middle of pronotal disc. Fig. 8. *Monosteira unicostata* (Muls. et Rey), process from the middle of pronotal disc. Fig. 9. *Monosteira lobulifera* Reut., portion of right hemelytral lobe with outer lateral margin showing chetotaxy and microstructure in transmitted light.

Dorsal surface of body, especially of thorax and abdomen covered with small hemispherical tubercles bearing glandular hairs, and with tiny sharply teeth-like excrescences. These tubercles and excrescences look like "circle-shaped structure" by dorsal aspect in transmitted light (Fig. 9).

Measurements in mm (two specimens measured): Length of body 1.50—1.70, maximal width of body 0.80—0.81, width of head 0.26—0.31, length of antenna 0.75—0.77 (I : II : III : IV = 0.10 : 0.09 : 0.38—0.40 : 0.18), length of pronotum 0.40—0.47, width of pronotum 0.60—0.73, length of posterior tibia 0.57—0.58, length of posterior tarsus 0.17.

Distinguishing notes. The nymph of *Monosteira lobulifera* Reut. is very similar to the nymph of *Monosteira unicostata* (Muls. et Rey) bionomics and developmental stages of which were studied by Bremond (1938), Vidal (1939) and Gomez-Menor (1950, 1955). It is similar in size, general shape, colouring, placing of tubercles or processes, chetotaxy and microstructure. The nymph of *M. lobulifera* differs, however, from *M. unicostata*, judging according to figures of the authors cited above as well as according to material of nymphs of *M. unicostata* which were at my disposal (Algeria, G. Kabylia, Tizi-Ouzou, June 15, 1971, leg. Dr. A. Hoffer et J. Horák) in having the processes of head and also the other body processes relatively shorter

than they are in *M. unicostata* (Figs. 2, 3). Especially the two pairs of processes on the pronotal disc are very small, in shape of small, light and smooth tubercles while these processes are much larger, piceous and covered with tiny teeth-like excrescences in the nymph of *M. unicostata* (Figs. 7, 8).

Tingis (Lasiotropis) ragusana (Fieber, 1861)

(Figs. 10, 11)

This species of mediterranean origin extending also into Central Europe, was recorded on Stachys sp. (Stichel 1926, Josifov 1964), Stachys italica Mill. (Horváth 1906) and Stachys salviaefolia (Labiatae) (Novak et Wagner 1951). Stichel (1960) cited Stachys italica and also Verbascum phlomoides L. (Scrophulariaceae) which seems to be inprobable as a host plant. The population of Tingis ragusana developing on Stachys germanica L. (det. Dr. V. Zelený) has been observed in eastern Bulgaria. Stachys germanica is newly recorded as a host plant for the species.

Material: S. E. Bulgaria, Burgas, July 20, 1971, fifth instar (1 specimen); 9 km N. of Primorsko (Rovadinivo), July 26, 1971, third instar (8 spec., 1 exuv.); Achtopol, July 26, 1971, third instar (2 spec., 2 exuv.), fourth instar (15 spec., 5 exuv.), fifth instar (31 spec.), many imagines; all on Stachys germanica, leg. J. M. Štusák.

Third Instar

Longish oval, body with not too considerably long spiniform processes. General colour light ochreous, fourth antennal segment, tip of rostrum and apices of tarsi dark brown.

Anterior frontal processes about as long as second antennal segment, not reaching the level of anterior margin of anteclypeus. Median frontal process subequal in length, moderately bilobed at its apex. Occipital processes moderately longer, slightly bilobed. Eyes red. Rostrum reaching considerably beyond posterior coxae. Relation of rostral segments: I : II : III : IV = 0.19 mm : 0.18 mm : 0.13 mm : 0.22 mm.

Pronotum 2.6—2.8 times wider than its median length. Anterior pronotal margin moderately concave, posterior margin convex without a typical posterior pronotal corner. Mesonotum only moderately enlarged laterally, metanotum quite similar in shape to abdominal tergites. Lateral margins of thoracic segments with small tubercles bearing robust trumpet-shaped glandular hairs. Two pairs of processes on pronotal disc in median line, one pair of processes each on mesonotum and metanotum.

Posterolateral angles of abdominal segments II—IX armed with processes; smallest tubercle-like process in posterolateral angles of second segment; the processes enlarge gradually in caudal direction so that longest are in the angles of 8th to 9th segments. First tergite with a pair of processes, tergites II, V, VI and VIII with unpaired, long and bilobed processes in median line.

Chetotaxy and glandular hairs as in the fifth instar but less dense.

Measurements in mm (6 specimens measured): Length of body 1.09—1.26, maximal width of body 0.61—0.66, width of head 0.33—0.36, length of antenna 0.37—0.41 (I : II : III : IV = 0.07—0.08 : 0.05—0.06 : 0.12—0.13 : 0.13—0.14), length of

pronotum 0.18—0.19, width of pronotum 0.49—0.51, length of posterior tibia 0.27—0.31, length of posterior tarsus 0.13—0.14.

Fourth Instar

Similar to the fifth instar in general shape, colouring, character and placing of processes and chetotaxy.

Anterior frontal processes not reaching the level of anterior margin of anteclypeus. Median frontal process subequal in length, occipital processes only a little longer not reaching the level of anterior margins of eyes. Rostrum reaching beyond posterior coxae. Relation of rostral segments: I : II : III : IV = 0.24 mm : 0.24 mm : 0.13 mm : 0.23 mm.

Pronotum 2.0—2.2 times wider than its median length. Anterior pronotal margin moderately concave. Posterolateral angles of pronotum armed with one larger process, lateral margins with several (3—4) small tubercles bearing glandular hairs. Hemelytral lobes reaching anterior margin of 2nd tergite, their lateral margins usually with one longer and with 1—2 smaller processes except several small tubercles. Posterolateral angles of metanotum with a small, tubercle-like rudimentary process. Posterolateral angles of abdominal segments, median line of thoracic nota and of abdominal tergites with processes as in the fifth instar.

Measurements in mm (10 specimens measured): Length of body 1.49—2.21, maximal width of body 0.87—0.92, width of head 0.39—0.45, length of antenna 0.53—0.58 (I : II : III : IV = 0.09—0.10 : 0.07—0.08 : 0.19—0.21 : 0.18—0.19), length of pronotum 0.31—0.36, width of pronotum 0.66—0.73, length of posterior tibia 0.41—0.42, length of posterior tarsus 0.16—0.18.

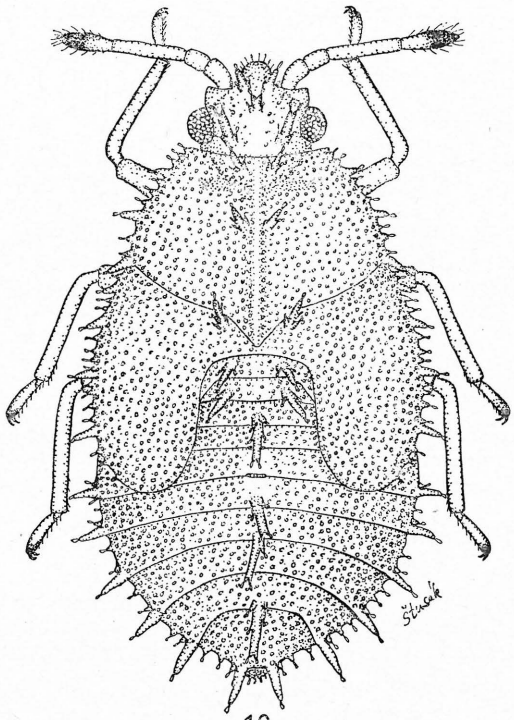
Fifth Instar

(Figs. 10, 11)

General colour light ochreous, body armed with spiniform processes.

Head with five processes dorsally: Anterior frontal processes rather short (about as long as second antennal segment) not reaching the level of anterior margin of anteclypeus with their apices. Median frontal process equal in length reaching bases of anterior processes with its apex. Occipital processes moderately longer (about as long as first antennal segment), approximately reaching the level of anterior margins of eyes. Eyes reddish brown. Antennae light ochreous, only distal 1/2—2/3 of fourth segment piceous (base of it always light). Rostrum light, only apex of fourth segment piceous reaching posterior margin or a little beyond posterior coxae. Relation of rostral segments: I : II : III : IV = 0.33 mm : 0.30 mm : 0.20 mm : 0.32 mm.

Pronotum 1.4—1.5 times wider than its median length. Anterior pronotal margin moderately concave or almost straight, lateral margins moderately convex and armed usually with 3 short more robust processes except several large tubercles. Processes as well as tubercles bearing robust trumpet-shaped glandular hairs. Largest is the process of posterolateral pronotal angles. Posterior corner of pronotum reaching end of mesonotum. Two pairs of processes as long as the processes of head in median line of pronotum. First of them is situated near the anterior pronotal margin on



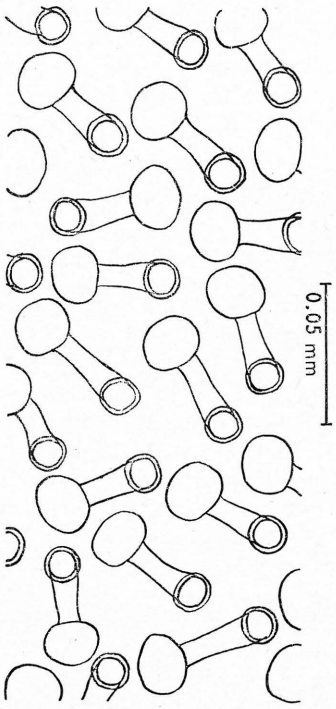


Fig. 10. *Tingis ragusana* (Fieb.), fifth instar nymph.

Fig. 11. *Tingis ragusana* (Fieb.), chetotaxy and microstructure of dorsal body surface of fifth instar nymph in transmitted light.

a moderately convex foundation of vesicula, second pair in the middle of pronotal disc. Hemelytral lobes reaching 5th tergite, each of their lateral margins armed with 3—4 more robust and short processes except several small tubercles bearing trumpet--shaped glandular hairs. One pair of processes, situated near each other, in the median line of mesonotum, metanotum and of first tergite.

Each of posterolateral angles of abdominal segments IV—IX armed with longer robust process. Tergites II, V, VI and VIII with one unpaired and long process which is bilobed at its apex.

Spiniform processes, margins of thorax, hemelytral lobes and of abdomen with trumpet-shaped hairs growing out of small conical tubercles. Dorsal surface of body (especially of thorax and abdomen) densely covered with very characteristic glandular hairs of conspicuously pestle-like shape (Fig. 11). Basal segments of antennae and femora with shorter moderately pestle-shaped hairs; tibiae, tarsi and 4th antennal segments with setaceous hairs. Ventral side of body with odd, very slightly pestle-like hairs.

Measurements in mm (10 specimens measured): Length of body 2.07—2.38, maximal width of body (without processes) 1.11—1.28, width of head 0.44—0.51,

length of antenna 0.73—0.80 (I : II : III : IV = 0.11—0.12 : 0.10 : 0.28—0.32 : : 0.24—0.26), length of pronotum 0.60—0.69, width of pronotum 0.87—0.98, length of posterior tibia 0.57—0.62, length of posterior tarsus 0.19—0.21.

Distinguishing notes. The nymph of *Tingis ragusana* (Fieb.) is similar to nymphs of *Tingis (Lasiotropis) reticulata* (H.—S.), *T. (Lasiotropis) rotundipennis* Horv., *T. (Tropidocheila) stachydis* (Fieb.) and *T. (Tropidocheila) sideritis* Štusák (nymphs described by Štusák 1959 b, 1968, 1973, 1977) in arranging of spiniform processes of body. It can be easily distinguished from the nymph of *T. reticulata* by smaller size. The nymph of *T. ragusana* differs considerably from nymphs of *T. rotundipennis, T. stachydis* and *T. sideritis* in shape of glandular hairs of the dorsal body surface which are strongly pestle-shaped (Fig. 11); they are stick-like or villi-like in the nymphs of the other species. It differs also from *T. rotundipennis* in having the body processes of the same colour as the body while the processes are piceous in nymph of *T. rotundipennis*. It differs from *T. stachydis* and *T. sideritis* except the chetotaxy which is the most important character, in having longer rostrum reaching mostly beyond the posterior coxae while the rostrum reaches only to the anterior margin of the posterior coxae in *T. stachydis* and *T. sideritis*. The nymphs of *T. stachydis* and especially of *T. sideritis* are dark brown, their 4th antennal segments and tarsi are piceous while the nymph of *T. ragusana* is light ochreous, only 1/2 (2/3) of the 4th antennal segments and only extreme apices of tarsi are piceous.

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