Boll. Zool. agr. Bachic.
Ser. II, 23 (2), 1991: 133-142

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A new aphid species from *Quercus frainetto* in Italy, *Tuberculatus (Tuberculoides) etruscus* sp. n. (Homoptera Aphididae)

Abstract - A new aphid species, *Tuberculatus (Tuberculoides) etruscus* sp.n., is described. Notes are given on morphology of viviparous morphs, distribution and ecology of the new taxon. Host plant is *Quercus frainetto* Ten. Taxonomical notes include a key to the alate viviparae of five species in the subgenus *Tuberculoides* v.d.G.

Riassunto - Tuberculatus (Tuberculoides) etruscus *sp. n., nuovo afide vivente su Farnetto in Italia.*

Viene descritta una nuova specie di afide Myzocallidino, *Tuberculatus (Tuberculoides) etruscus* sp. n., rinvenuta in diverse località della penisola italiana su Farnetto, *Quercus frainetto* Tenore. Sono illustrate le forme virginopare dell'afide (alata vivipara, ninfa di 4ª età ed embrione) e viene fornita una chiave analitica per la discriminazione di alcune specie affini del sottogenere *Tuberculoides* v.d.G.

Key words: Homoptera Aphididae, *Tuberculatus (Tuberculoides) etruscus* sp. n., *Quercus frainetto*, Italy.

A new species of *Tuberculatus* Mordv., subgenus *Tuberculoides* v.d.G., living on the Italian Oak, *Quercus frainetto* Tenore, has been discovered in a joint collection of oak aphids made by the writers in lower Tuscany (Central Italy). Further collections of the same aphid followed in other Italian biotopes where this magnificent and uncommon oak occurs. The material available at present consists of a few viviparous morphs including nymphs, which are described below.

Tuberculatus (Tuberculoides) etruscus sp. n.

Alate vivipara. Rather medium-sized aphid, with body length 1.48-2.84 mm. Colour yellowish green. Head and thorax slightly brownish, abdomen unpigmented. Antennae mostly pale, with brownish first two joints, distal parts of III-VI and sensillar area of VI segment. Legs very slightly pigmented, rather yellowish, with infuscated tarsi. Siphunculi pale at base and progressively darker toward the apex. Cauda and subanal plate unpigmented or slightly infuscated.

Head with very low median frontal prominence and median ocellus visible from above. Frontal hairs rather acute and usually shorter (0.60-1.10) than the basal articular diameter of the III antennal joint; anterior discals from acute to distinctly blunt at apex, 15-25 μ long, both pairs inserted on small conical prominences; posterior discals even shorter (11-24 μ) and without basal cone-shaped elevations. Antennal flagellum of nearly the same length (0.90-1.20) as body; III joint with 2-7 (most frequently 3-4) secondary rhinaria, in a row confined to the 0.23-0.48 basal part; VI joint with a very long (2.10-2.80 times the basal part) and thin processus terminalis. Antennal hairs blunt and very short, including those on the first two segments, which are at most 0.60-1.20 of the basal articular diameter of III joint; hairs on the latter segment not longer than 1/2 that diameter. Rostrum reaching the mesosternum, with hairy (12-15 supplementary hairs) and rather long last rostral segment, 1.20-1.35 times length of hind tarsomer II.

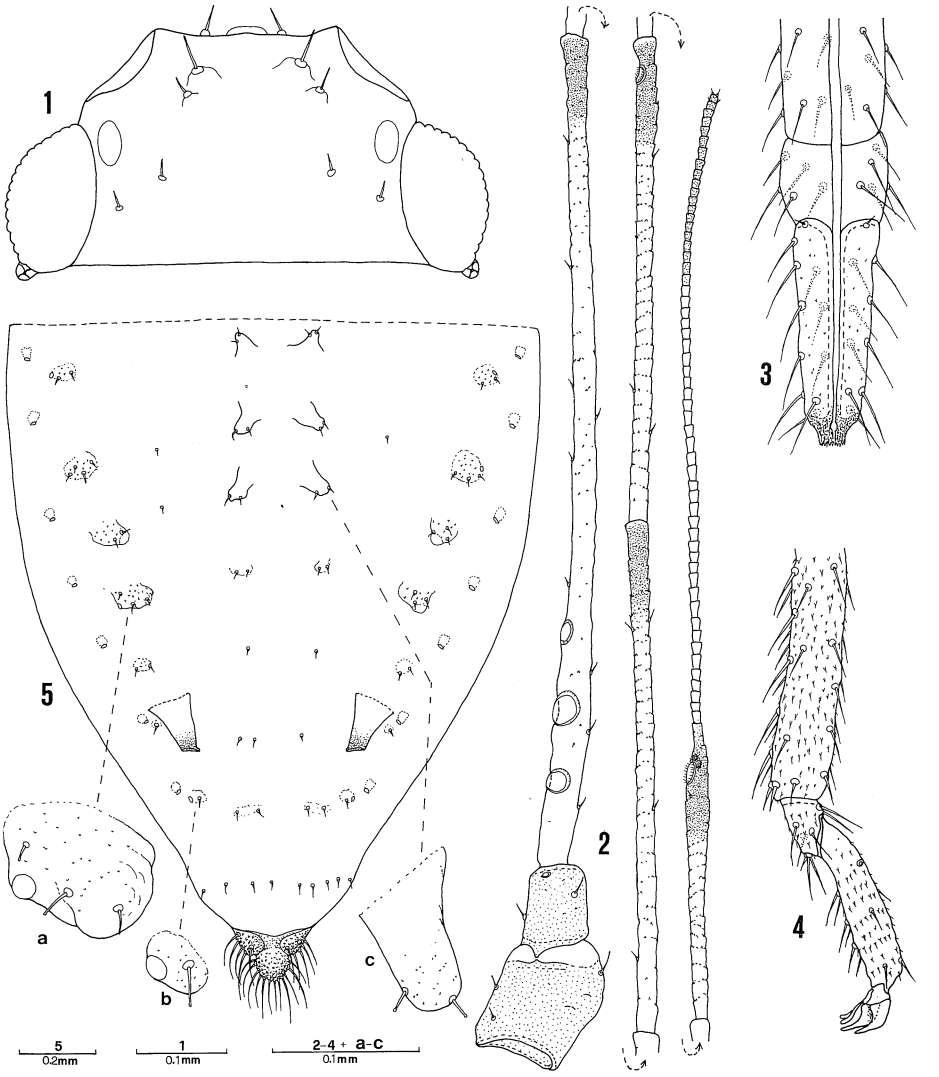
Pronotum with the anterior marginal lobes adorned with few, small spinules; posterior marginal lobes with two setae and 1-2 small papillae on each side; spinal setae as usual in the subgenus and pleural setae not present. Lobes of mesonotum smooth, each with 5-9 blunt or subcapitate setae, 16-28 μ long. Legs with slightly enlarged fore coxae; femora and tibiae rather uniformly pigmented along their length. Femoral hairs blunt and short; those on dorsal side of hind femur about 1/3-2/3 of the diameter of the trochantro-femoral suture. Tibial hairs blunt or subcapitate on the proximal part and progressively pointed toward the apex of the same tibiae; apical inner setae just longer than the outer ones and about as long (0.90-1.10) as the median tibial width.

Rastral organ composed of 4 very stout hairs on the front tibiae; much less evident in the other two pairs of legs. Cuticular spinulation on tibiae and tarsi as usual in the group. First tarsomer chaetotaxy composed of two dorsal and six ventral setae, of which the median distal ventral one is a very short sense-peg. Empodial hairs flabellate and sigmoid in shape.

Wings hyaline, with venation and pigmentation as usual in the subgenus; Rs vein complete, although weaker than the other veins.

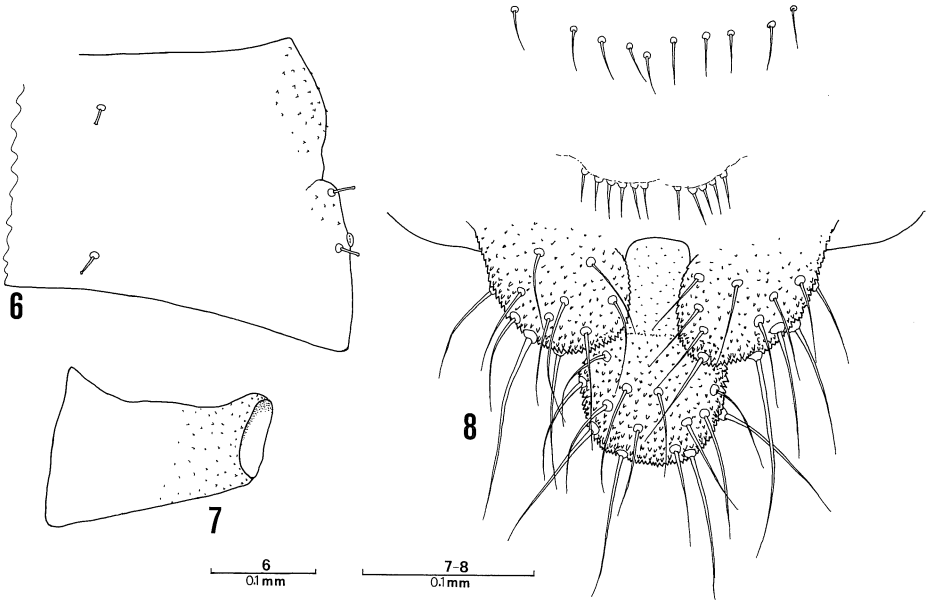
Abdomen without pigmented patches and with three pairs of pale spinal

tubercles, placed on the first three tergites, each one bearing two setae. These tubercles increase slightly in size from the first to the third pair, their length being respectively: 30-65 μ on 1st; 35-80 μ on 2nd and 60-110 μ on 3rd tergite.



Figs. 1-5 - *Tuberculatus (Tuberculoides) etruscus* sp. n., alate vivipara: 1. Head; 2. Antenna; 3. Distal part of rostrum; 4. Distal part of hind tibia and tarsus; 5. Abdomen with details of some features.

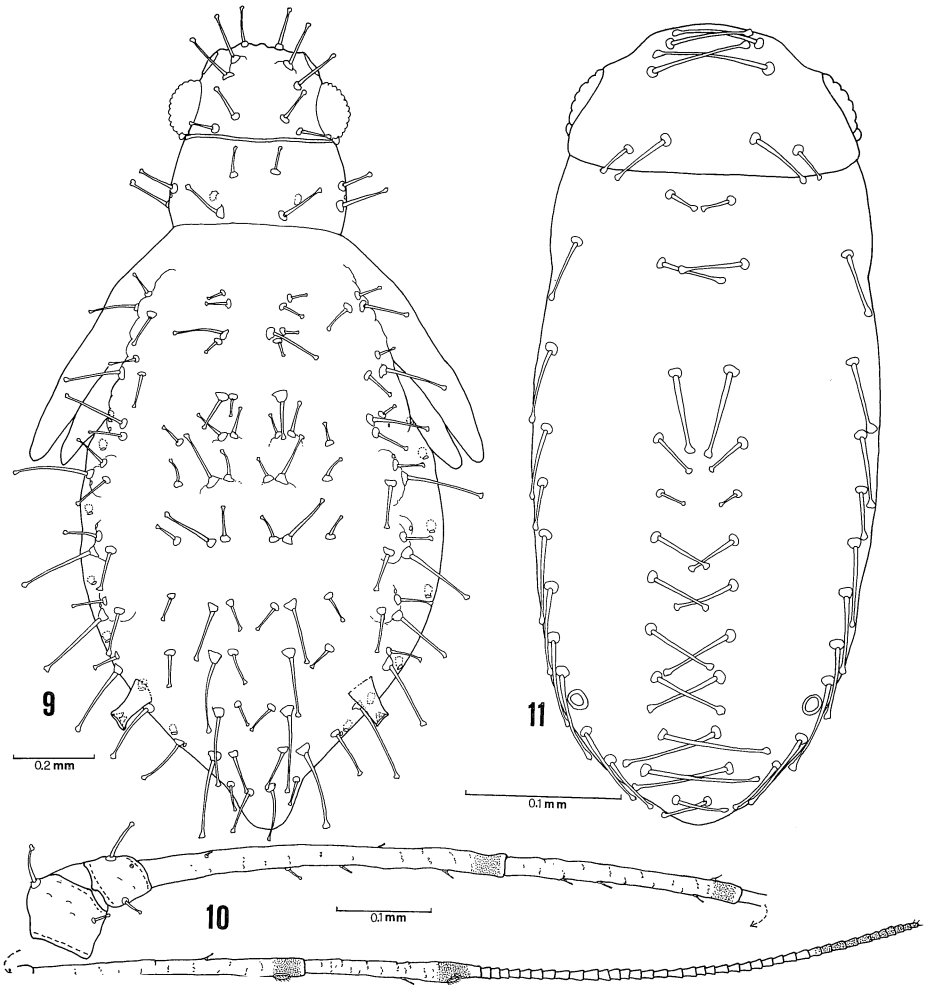
Sometimes a trace of a fourth pair of spinal tubercles is visible. Marginal cone-shaped elevations are present on 3rd and 4th (sometimes, but much smaller, also visible on 2nd and 5th) tergites. Spinal setae normally in pairs for each row, from 1st to 7th tergites; very rarely they are single on a few tergites. Marginal small setae in clusters of 2-3 (4) on each of the first five tergites, and single one on 6th and 7th. A very small marginal papilla is present on some tergites, close to the marginal setae. Eighth tergite with a transverse row of 6-9 setae. Pleural hairs usually present on some tergites. Spinal hair length maxima: 9-24 μ on 3rd (up to the tubercles); 7-18 μ on 5th; 18-47 μ on 8th. Siphunculi obliquely truncate, slightly spinulose on the distal part, 1.50-2.12 times length of knobbed part of cauda. The latter with apical knobbed part shorter (0.75-0.90) than wide and bearing 13-18 setae. Anal plate deeply indented, with 10-15 setae on each lobe. Gonochaetae in two groups of 4-8 small setae each.



Figs. 6-8 - *Tuberculatus (Tuberculoides) etruscus* sp. n., alate vivipara: 6. Pronotum (half side); 7. Siphunculus; 8. Complex cauda-genital plate (ventral view).

Alatoid nymph. Body 1.45-2.13 mm, pale green without dorsal brown spots. Antennae pale, with apical parts of III-V and sensillar area of VI joint brown. Legs mostly pale, with tibiae toward apex and tarsi rather infuscated. Siphunculi pale. Dorsal body hairs rather pale, all thick, smooth and well knobbed apically. Head with convex front and normal chaetotaxy; frontal setae

a little shorter (82-98 μ) than the anterior and posterior discals, which vary in length from 90 to 130 μ. Pronotum with two marginal setae on each side and four spinal setae altogether; no pleural setae present on it. Other thoracic and abdominal tergites with a pattern of two spinal setae for each row (sometimes reduced to only one on one side of the 5th and 6th tergites). Marginal setae in clusters of 2-3 elements on each segment from mesothorax to fifth abdominal



Figs. 9-11 - *Tuberculatus (Tuberculoides) etruscus* sp. n.: 9. Fourth instar nymph (antennae and legs are omitted); 10. Antenna of the same; 11. Embryo.

tergite; only one marginal seta on the 6th and 7th tergites. Eighth tergite with 4-6 setae in a row. Single pleural setae, smaller than spinal and marginal ones, are usually present on the first five abdominal tergites. Length maxima of spinal setae: 110-140 μ on mesothorax; 55-116 μ on 1st tergite; 110-135 μ on 3rd; 128-165 μ on 5th; 133-180 μ on 7th tergite. One very small marginal papilla, much smaller than the setae articular base, is usually present on prothorax and most abdominal tergites. Antennal flagellum 0.82-1.10 of the body length; inner (anterad) seta on each of the first two segments much thicker and longer than others; that on the II joint is 40-62 μ, or 1.30-2.75 times the basal articular diameter of III joint; hairs on flagellar segments much shorter, blunt or subcapitate, and those on III joint at most 0.40-0.60 of the basal diameter of

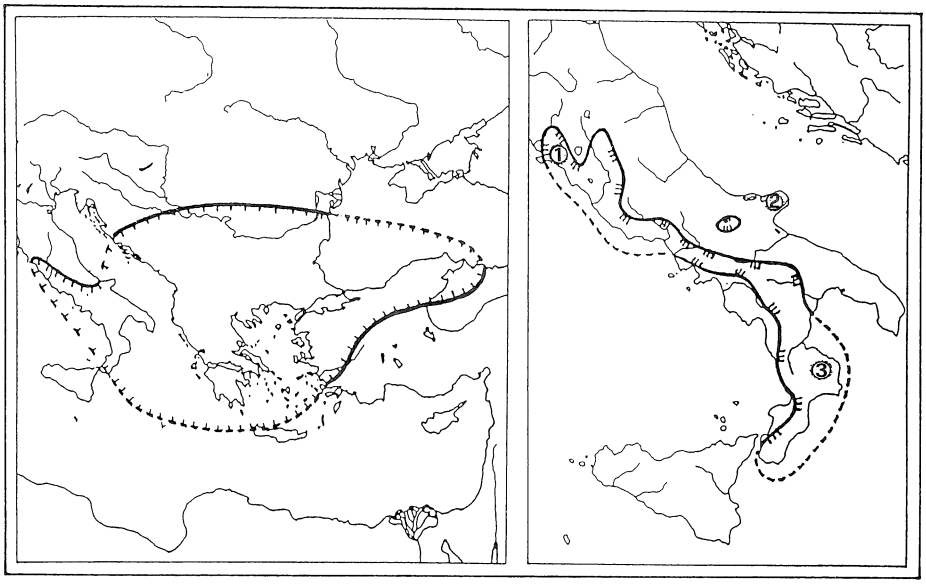


Fig. 12 - Geonemy of *Quercus frainetto* (left) and its distribution in Italy (right) (after Fenaroli & Gambi, 1976, modif.). Collecting localities of *T. (T.) etruscus*: 1. Manciano (GR), 2. Ischitella (FG), 3. Campana and Savelli (CS).

the same segment. Ultimate antennal joint with a long processus terminalis, which is usually longer than V joint and from 1.85 (? fundatrix) to 2.85 (on average 2.5) times the basal part of VI. Rostrum reaching the mesocoxae, with its last segment 1.20-1.35 times longer than the II hind tarsomer and bearing 12-15 supplementary hairs. Tibiae with outer hairs distinctly knobbed on the basal part, becoming gradually acute or even finely produced apically ones toward the distal part; the longest setae, on posterior legs, are 1.6-2.0 times the

diameter of the same tibiae at their median length. First tarsomer with six ventral setae. Siphunculi truncate, with slightly enlarged distal part, subequal in length to the second hind tarsomer.

Embryo. Protopattern composed of thick and distinctly knobbed dorsal body hairs. All dorsal body setae very long, except those on 1st abdominal tergite, both the marginals and particularly the spinals, the latter being comparatively very much smaller than the former. Seventh spinal setae slightly shifted laterally. The length of spinal setae is as follows: 16-32 μ on 1st; 52-66 μ on 2nd; 53-75 μ on 4th; 85-97 μ on 6th tergite. Siphuncular pore 20-25 μ in diameter (inner ring).

TYPES. *Holotype*: alate vivipara (n° 1 in tab. 1) from *Quercus frainetto* Ten., collected at Campana (Cosenza province), Italy, 20.VI.90 (S.B.); deposited in the collection of the Institute of Entomology, University of Catania, Italy (S. Barbagallo). *Paratypes*: 2 alate viviparae and 9 alatoid nymphs, Manciano (Grosseto province, Italy), 12.VI.90 (S.B. & A.B.); 3 alatoid nymphs, data as for holotype; 2 alate viviparae and 4 alatoid nymphs, Savelli (Cosenza province, Italy), 3.VI.91 (S.B.); 2 alatoid nymphs, Campana (Cosenza), 3.VI.91 (S.B.); 1 alate vivipara, Ischitella (Foggia province, Italy), 7.VI.91 (S.B.). All paratypes are from *Q. frainetto*, too. They are deposited in the Authors' collections and in the collections of The Natural History Museum - London (England) and of Dr. F.W. Quednau - Laurentian Forestry Centre, Saint Foy, Quebec (Canada).

TAXONOMY. The subgenus *Tuberculoides* v.d.G., *sensu* Hille Ris Lambers (1974), is characterized, in the alate viviparae, by the presence of a number (usually 3 or 4 pairs) of spinal tubercles on the first three or four abdominal tergites, the lack of such tubercles on thoracic nota, the first tarsomer with 6 ventral hairs, the tibiae uniformly pigmented along their length and without basal spot, the frontal and antennal hairs usually very short (as a rule less than the basal articular diameter of the III antennal segment).

A total of eleven species is at present known in this subgenus, with a western Palaearctic and Middle Eastern distribution. Among these, a group of five species has embryos and first instar nymphs with very long, knobbed and inwardly crossed spinal hairs from the second abdominal tergite onward.

Alate viviparae of these species may be separated as follows:

1 (2) Ratio processus terminalis/base of last antennal segment 1.4 or more. Abdomen with three pairs of spinal tubercles 3

2 (1) Ratio processus terminalis/base of the last antennal segment usually 0.9-1.2; but, if exceeding 1.4, than abdomen with four pairs of spinal tubercles (*T. remaudierei*) 5

3 (4) Ratio last rostral segment/II hind tarsomer 0.9-1.0. Last rostral segment with 7-8 supplementary hairs. Sixth antennal joint with processus terminalis 1.4-1.8 times its basal part. Third pair of spinal abdominal tubercles distinctly pigmented, at least on its distal half. On *Quercus pubescens*. Sicily (probably widespread in the Mediterranean area) ..... *T. inferus* Barb.

4 (3) Ratio last rostral segment/II hind tarsomer 1.20-1.35. Last rostral segment more hairy (12-15 supplementary hairs). Sixth antennal joint with processus terminalis 2.1-2.8 times its basal part. Spinal abdominal tubercles all depigmented. On *Quercus frainetto*. Italy ..... *T. etruscus* sp. n.

5 (6) Three pairs (seldom only 2, the first pair not being developed) of abdominal spinal tubercles present. Fore wings with veins ending in small dark triangular spots (better visible with a pocket lens). Knobbed part of cauda and subanal plate distinctly infuscated. On *Quercus* spp. (*persica, macranthera* and probably others). Middle East (Iran, Turkey). ..... *T. maximus* H.R.L.

6 (5) Four pairs of abdominal spinal tubercles present. Pigmentation of wings and cauda, as above indicated, less pronounced 7

7 (8) Ratio last rostral segment/II hind tarsomer 0.9-1.1. Last rostral segment with 8-10 supplementary hairs. Ratio processus terminalis/base of VI antennal segment 0.9-1.3. On *Quercus* spp. (mostly of *pubescens* group, but also on other Mediterranean non-evergreen oaks). Widespread in Southern Europe and Mediterranean countries ..... *T. eggleri* (Börn.)(1)

8 (7) Ratio last rostral segment/II hind tarsomer 1.1-1.4. Last rostral segment with 9-12 supplementary hairs. Ratio processus terminalis/base of VI antennal segment 1.1-1.5. On *Quercus pyrenaica*. Spain (Pyrenean Region) .... *T. remaudierei* Nieto Nafria

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(1) Very similar is *T. (T.) africanus* H.R.L. (known from Algeria on *Q. canariensis*), whose alates and 4th instar nymphs virtually cannot be separated from those of *T. (T.) eggleri*, unless embryos are available. The latter have, in *africanus*, spinal setae on 2nd-3rd tergites variable in length from about 10 to 40 μ and not more than half the length of the marginal ones of the same tergites (see Hille Ris Lambers, 1974, for further accounts); these spinal setae in *eggleri* are 50-78 μ and about as long as (0.80-1.10) the marginal setae on the same tergites.

Table 1 - Tuberculatus (Tuberculoides) etruscus *sp. n.* - *Alate viviparous female. Measurements in mm of the available specimens.*

N.	Body length	Ant. flag.	Antennal segments				Rhin. on III	Last rostral segment	II hind tars.	Siph.	Cauda (knob part)
			III	IV	V	VI					
1	1.88	1.73	0.50	0.33	0.29	0.16+0.45	3/3	0.12	0.09	0.09	0.05
2	1.58	1.38	0.40	0.31	0.26	0.12+0.29	3/4	0.13	0.10	0.08	0.05
3	1.48	1.76	0.53	0.32	0.31	0.17+0.43	2/3	0.12	0.10	0.11	0.05
4	2.67	2.73	0.90	0.57	0.52	0.24+0.50	7/6	0.15	0.12	0.12	0.07
5	2.84	2.69	0.98	0.54	0.46	0.23+0.48	4/4	0.16	0.12	0.14	0.07
6	2.26	2.20	0.67	0.40	0.40	0.20+0.53	4/4	0.14	0.11	0.09	0.06

All from *Quercus frainetto*: no. 1, Campana (CS), 20.VI.90; ns. 2-3, Manciano (GR), 12.VI.90; ns. 4-5, Savelli (CS), 3.VI.91; no. 6, Ischitella (FG), 7.VI.91. No. 1 is the holotype, the others are paratypes.

Table 2 - Tuberculatus (Tuberculoides) etruscus *sp. n.* - *Alatoid nymph (4th instar)* - *Measurements in mm of some specimens.*

N.	Body length	Ant. flag.	Antennal segments				Last rostral segment	II hind tars.	Siph.
			III	IV	V	VI			
1	1.58	1.50	0.38	0.24	0.27	0.16+0.45	0.14	0.11	0.11
2	1.55	1.52	0.39	0.27	0.26	0.16+0.44	0.14	0.11	0.11
3	1.72	1.49	0.37	0.24	0.26	0.16+0.46	0.13	0.11	0.11
4	2.13	1.99	0.58	0.36	0.42	0.22+0.41	0.17	0.13	0.13
5	1.96	1.59	0.43	0.27	0.32	0.17+0.40	0.16	0.12	0.11
6	2.04	1.95	0.53	0.39	0.38	0.19+0.46	0.15	0.12	0.12

All specimens are paratypes from *Quercus frainetto*: ns. 1-3, Manciano (GR), 12.VI.90; ns. 4-5, Savelli (CS), 3.VI.91; no. 6, Campana (CS), 3.VI.91.

Typical features of the new species, *T. etruscus*, are the unusual very long processus terminalis and the long and hairy last rostral segment, the length of the former exceeding the limits hitherto known in other species of the group, i.e. *T. inferus* and *T. remaudierei*; in fact, both these species have a ratio (processus terminalis/base of VI a.s.) not exceeding 1.8 and 1.5, respectively, against more than 2.1 in *T. etruscus*. Moreover, *T. inferus* has a much shorter last rostral segment and a well pigmented third pair of abdominal tubercles (Barbagallo, 1990). *T. remaudierei* shares with the new species the quite long and hairy last rostral segment, but differs in having four pairs of abdominal spinal tubercles, besides the shorter antennal processus terminalis (Nieto Nafria & Mier Durante, 1978).

DISTRIBUTION AND ECOLOGY. *T. (T.) etruscus* is at present known only from Italy, spread wherever its host plant is present there. In fact, as far as we know, the aphid appears to be monophagous on the Italian Oak, *Quercus frainetto* Tenore, whose distribution in the Italian peninsula is rather restricted to small areas of central and southern lands (Pignatti, 1982). The Italian Oak geonemy includes the Balkans, the Aegean and part of the Anatolian regions too (fig. 12), where probably the aphid may also be present. The life cycle is not yet known, our samples being composed only of viviparous morphs; nevertheless two (see n° 4 & 5 in tab. 1) of the six available specimens appear to be fundatrices or at least viviparae of the 2nd generation, which suggest the development of a normal holocycle. The aphid lives scattered on the underside of leaves, similarly to other species of the same group; it has been found, sometimes, associated with specimens of the very much commoner *T. (T.) eggleri* (Börn.), which is an oligophagous species, living on several deciduous hairy-leaved oaks in the Mediterranean region.

ACKNOWLEDGMENTS

The authors express their best thanks to Dr. Henry L.G. Stroyan, Harpenden (Herts.) - England, for his most appreciated help in the revision of the manuscript.

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Ricevuto il 16 novembre 1991; pubblicato il 31 dicembre 1991.