

THE CITRUS MITE NAMED AND DESCRIBED FOR THE FIRST TIME.

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The discovery which forms the text of this paper was the outcome of a study of types in the red spider collection of the Bureau of Entomology. Out of respect for previous workers in the acarid group the author wishes to state here that the anatomical studies, on which the present paper is based, were conducted with the aid of an oil-immersion lens and a camera lucida attachment. It has developed, through the studies of Mr. H. E. Ewing and the present writer, that the microscopic structures which constitute the taxonomic characters in the red spider group must be examined more critically than has been the practice with earlier workers if satisfactory specific demarcation is to be secured.

In 1885 Riley published* the original description of a mite under the name *Penthalodes mytilaspidis*, stating that "it possesses three claws, and that it is certainly predatory upon scale insects" on citrus trees. In 1900 Banks† re-named the species *Tetranychus mytilaspidis* stating that "This species is a true *Tetranychus* and not a *Penthalodes* * * * On careful observation I cannot discern any division to the lower (tarsal) claw in the many specimens examined (including Riley's types). It * * * probably feeds, like the other species of the genus, on plant juices." In his figure Banks shows only two divisions to the tarsal claw.

The writer's studies of Banks' red spider types included the slide which he says is probably the original type slide of Riley's *Penthalodes mytilaspidis*. In connection with this study the author went carefully through all of Hubbard's and Riley's acarid material in the National Museum and in the Bureau collection in an effort to locate material antedating that of the slide which Banks considers to be the valid type of *Penthalodes mytilaspidis*. Nothing was found that cast a shadow of a doubt

*Hubbard, Orange Insects, p. 216.

†"The Red Spiders of the United States, Div. of Ent., Tech. Ser. No. 8, p. 71.

on the validity of the Hubbard slide, and we may safely accept the material as representing the type specimens of the above species.

A study of the structure of specimens on Riley's type slide (see plate XIII) confirms his diagnosis of their identity. Riley states it "is one of the 'harvest-mites' belonging to the section Eupodidæ and comes nearer *Penthalodes* Murray than to any other defined genus, having 6-jointed legs (see plate XIII, fig. 2), of about equal length, * * * 'head' distinctly separated, narrow, elongate, conical. Mandibles scissor-like, projecting. Palpi * * * 4-jointed (fig. 1) * * *. Cephalothorax * * * merging posteriorly into the abdomen, so as to have no distinct division * * *. Surrounded by rather long and stout bristles * * *. Legs about equal in length * * *. Claws 3, much curved at tip * * *. (See plate XIII, figs. 3 and 4).

Considering the limitations of the microscopic equipment in use by workers of Riley's time, the above description tallies very well with the structures as shown in plate XIII. Some of the finer details do not conform to the original description, which is quite excusable. For example, Riley overlooked certain characters of the palpi (see plate 1, fig. XIII), and the plumose appendages of the tarsus (see plate XIV, figs. 3 and 4), which are invisible with magnifications weaker than the oil-immersion lens.

Finally, the notes on field observations, published at the time of the original description, prove that *P. mytilaspidis* is quite distinct from the citrus mite. Hubbard stated that "the eggs are sherry-brown in color, quite large and globular, and are usually deposited singly upon the leaf among scales, or strung like amber beads upon strands of spiders web * * *." Regarding the citrus mite, it has long been known that the egg is bright red in color, and is not globular, but lenticular with a slender stalk projecting from the center of the top side. Hubbard further states that "This mite is also very rapid in its movement." In this respect it agrees perfectly with the travel of predaceous mites—which Riley and Hubbard claimed the species to be. On the other hand it is entirely at variance with the rule in the group for red spiders to be very rapid of movement, and the citrus mite is no exception.

Banks concluded that the citrus mite is identical with Riley's *Penthalodes mytilaspidis* which is clearly not the case.

As a result the citrus red spider has never been technically named or described. It therefore becomes necessary to name and describe it.

***Tetranychus citri* sp. nov.**

ORIGINAL DESCRIPTION.

Distinctly velvety-red in color. In size larger and more obese than the majority of red spider species. Female: length, .305 mm., width, .230 mm. A single eye cornea on each side, twice as far behind the subfrontal bristle as the latter's distance from the frontal bristle. Dorsal bristles long, stout, arising from prominent tubercles (see Plate XIV, Fig. 3); subfrontal bristles barely 3 times as long as frontals (see Plate XIV, Fig. 2); bristles sparsely pilose. Legs paler than body color, bristles 26, arranged chiefly in four longitudinal rows (see Plate XIV, Fig. 8). Mandibular plate abruptly narrowed anteriorly, tip rounded with an almost imperceptible emargination. Palpus is provided (see Plate XIV, Fig. 9), with a comparatively short "thumb," bearing a terminal, slightly clavate "finger" whose base is less than half the width of tip of "thumb"; with two pseudo-fingers arising on either side of the upper distal corner, which are not greatly thicker than hairs; on upper side hardly midway to base with a small "finger" between which and base are two, short, stout hairs; near the lower center of the outer side of the "thumb" with a hair which reaches to the tip of the terminal "finger"; with the claw on the penultimate joint stout and reaching to the dorsal "finger"; a strong hair arising laterally from the center of the penultimate joint, another arising from the center of the dorsal face of this joint which equals the claw, and a short, weak hair with its origin on the inner base of claw; and with a very strongly tubercled spur arising distally from the top of the antepenultimate joint of the male (see Plate XIV, Fig. 7). The legs (see Plate XIV, Fig. 1), are relatively short; femur somewhat more than twice as long as wide, barely equalling tarsus; tibia a little longer than patella which is one-third again as long as trochanter. Tip of tarsus (see Plate XIV, Fig. 6), bears a claw which is rather straight for two-thirds its length and then bent sharply downward; at a point one-third the length of the claw from its base arise six slightly curved spurs whose tips surpass that of the main claw; the four usual capitate hairs arise two on either side of the base of the claw.

The male is considerably smaller than the female (length .216 mm., width .146 mm.), abruptly narrowed posteriorly. The legs appear longer in proportion to the body than in the case of female, and are salmon pink. The distribution of dorsal bristles (see Plate XIV, Fig. 8), is similar to that of female. Penis (see Plate XIV, Fig. 4), comparatively short; inner lobe long, rod-like, about 3 times as long as the shaft; shaft very stout and short, becoming abruptly smaller distally, and bent upward at an angle of 120 degrees to form the attenuate hook which is considerably longer than the shaft; basilar lobe present on upper side of shaft as a strong, conical projection; hook possessing no barb, being spine-like terminally.

The egg is bright red in color, spherio-lenticular, with a vertical stalk arising from the center of the top side which in length is about twice the diameter of the egg. Several guy fibrils radiate downward from the apex of the stalk to the leaf surface, thus giving additional attachment to the egg.

Type No. 20362, U. S. Nat. Mus.

The type material is from Orlando, Florida, March 7, 1916, from the leaves of lemon, collected by W. W. Yothers. The species is in the group containing *T. yothersi* McG. and a species soon to be described by the author, of the United States, and *Paratetranychus* (*Tetranychus*) *pilosus* Zacher (Can. & Fanz.) and *P. ununguis* Zacher (Jac.) of Europe.

NOTES

Mr. Yothers, who for years has been engaged in studying the entomology of citrus trees in Florida, writes as follows. "*Tetranychus mytilaspidis* is most abundant during the spring of the year. I would say its period of maximum occurrence is from the first or middle of December until the first of May. It occurs most abundantly on lemon and sour orange, and it appears in great numbers in nurseries where these species are grown for stock upon which to bud. I have seen it so abundant on sour stock as to cause the stems of the young trees to turn blue for a distance of two feet from the top downward. Its next most favorable food plant is the grapefruit. I rather doubt that it is of any great economic importance on this fruit. It also can be found on sweet orange, but it is of little or no importance on this fruit."

The citrus mite was introduced into California from Florida on nursery stock about 1890. While the species does not seem to be as injurious in Florida as the so-called 6-spotted mite, its work in California, as early as 1900, was such as to demand urgent action. It is an interesting problem to account for the fact that the citrus red spider is severest as a pest of sweet orange in California, whereas in Florida it all but forsakes the sweet orange and is only severe upon lemon, sour orange, and grapefruit.

The citrus red spider on orange in California produces a silvering, dwarfing, and dropping of the fruit, and also causes discoloration and dropping of the foliage. It gives trouble in packing houses since it readily attacks the picked fruit. This species is doubtless the most injurious of those found on citrus trees on the Pacific Coast.

EXPLANATION OF PLATES.

PLATE XIII.

Penthalodes mytilaspidis Riley.

- Fig. 1. A nearly lateral view of palpus.
- Fig. 2. Dorsal view of adult showing distribution of bristles, and right foreleg.
- Fig. 3. Tip of tarsus, showing appendages (lateral view).
- Fig. 4. Same (ventral view).

PLATE XIV.

Tetranychus citri sp. nov.

- Fig. 1. Right foreleg (dorsal).
- Fig. 2. Frontal and subfrontal bristles.
- Fig. 3. Attachment of dorsal bristles to tubercle.
- Fig. 4. Penis.
- Fig. 5. Profile view of female (only proximal portion of legs shown). X 166.
- Fig. 6. Tip of tarsus with appendages.
- Fig. 7. Section of palpus of male showing tubercled spur.
- Fig. 8. Dorsal outline of male showing distribution of dorsal bristles. X 436.
- Fig. 9. Left palpus of female (outer view) showing "thumb," claw, and other appendages.



