

2. Corium bright yellow, clavus and apical part piceous black. Length, $3\frac{1}{2}$ mm. (Is. Grenada) *armatus* Uhler.
— Corium entirely nigro-piceous and shining throughout. Length 5 mm. (Panama, Colombia) *vittativentris* Stål.
3. Posterior lobe of pronotum rufo-testaceous, trimaculate with black. Corium fuscous with pale costal margin, inner field opaque. Length $5\frac{1}{2}$ mm. (Mex., Guat., Panama, Brazil) *trimacula* Stein.
— Posterior lobe of pronotum entirely nigro-piceous. Corium pale testaceous, apically infuscated, shining throughout. Length $3\frac{1}{2}$ mm. (Texas) *nigrolobus*, n. sp.

Oncerotrachelus pallidus, n. sp.

Color pale stramineous except outer marginal vein of membrane which is lightly infuscated and the apical portion of the venter which is slightly embrowned, as is the membrane.

Compared with *O. acuminatus* Say the body parts and appendages are less densely pilose, the antennae and legs being almost entirely devoid of the long hairs so distinctive of that species. The head is more prolonged before the eyes, these being relatively larger; the posterior lobe of head being slightly more globose dorsally and laterally.

Size larger measuring from $7-7\frac{1}{2}$ mm. long.

Described from four specimens. Type ♀ Sabinal, Tex. (collected by F. C. Pratt); Paratypes ♀ Zavalla Co., Tex. (coll. by Hunter and Pratt) and 2 ♀s from Victoria, Tex., Collection of the U. S. Nat. Museum (Cat. No. 25204).

Easily distinguished from *O. acuminatus* Say by differences in size, coloration and pilosity. Say's species is always of a flavo-testaceous color with distinct fuscous markings above and below. Judging from the artist's figures Pl. XI, figs. 8, 8^a, Biol. Cent. Amer., the specimens from Mexico and Central America referred to by Champion, p. 180, may in all probability be referred to *pallidus*.

THREE NEW SPECIES OF PECULIAR AND INJURIOUS SPIDER MITES.

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Of the large number of spider mites that recently have been sent to the writer for determination, three species are somewhat remarkable; one for the dimorphism shown by the male, another for its wonderful plumose and foliaceous coat of setae, and the third for its gall-making habit, its peculiar mouth-parts and its possession of but six legs in all instars. The latter

species, which is the second gall-making spider mite to be reported, has many morphological and biological affinities with the true gall mites, the Eriophyidae, and throws much light on the origin of the latter degenerate and highly specialized group. This gall-making species will be made the subject of a paper to be presented later on the phylogeny of the Eriophyids.

The first mentioned species belongs to the genus *Paratetranychus* Zacher, which genus is characterized by having one simple and one strongly deflexed divided tarsal claw.

The divided claw is split into 5 or 6 spurs, the inner one or two of which are usually somewhat stouter than the others. A formal description of the new species follows.

***Paratetranychus heteronychus*, new species.**

Female.—Distinctly larger and stouter than the male. Mandibular plate about three-fifths as broad as long and evenly rounded in front. Palpi moderate; thumb slightly exceeding claw, terminal digit about one and two-thirds times as long as broad at its base and pointed distally, two terminal digituli situated just above digit and each slightly surpassing the latter, sense seta fusiform, equal to digit in length; claw of palpus rather slender and strongly hooked toward tip; antepenultimate segment of palpus ring-like, about three times as broad as long. Abdomen with rather long simple setae arranged in the usual manner. Legs moderate, the anterior and posterior pairs being about equal and longer than the second and third pairs. Tarsal armature as follows: four tenent hairs in two groups as usual, outer hair shortest, inner next in length and two middle hairs longest and subequal; a single simple claw slightly over one-half as long as middle tenent hairs and a deflexed split claw of the six usual prongs the inner, or most strongly deflexed, ones being slightly stouter than the others. The deflexed claw is about two-thirds as long as the simple one, its inner spurs very slightly surpassing the somewhat tubercle-like base of claws. The simple claw is more strongly curved toward its tip and is rather slender throughout its length. Length, 0.38 mm.; width, 0.20 mm.

Male.—Smaller and more slender than the female, especially in the abdominal region. Palpal spur conspicuous, slightly recurved and situated on a prominent internally and dorsally situated tubercle. When the palpus is viewed from the inside this spur-bearing tubercle is seen to extend forward and upward for over half the length of the antepenultimate segment; antepenultimate segment longer, relatively in the male than in the female. Penis of the *telarius* type; inner lobe slightly longer than the shaft; basilar lobe apparently absent; shaft broad and stout, being fully one-half as broad at its base as it is long; hook short, recurved beyond 90° and with flattened barb. Legs relatively more slender than in the female; tarsi of first pair with two simple claws! One of these claws slightly shorter and deflexed. It evidently represents the barbed claw of the female. The deflexed claw of the second pair of legs is not simple yet differs from the corresponding claw of the female in that it is split into barbs for only a part of its length. Length of male, 0.31 mm.; width, 0.15 mm.

Type locality.—Coachella Valley, California.

Type slide.—Cat. No. 24720, U. S. N. M.

Description based upon specimens on two slides, one of them the type slide and the other a slide of cotypes. All specimens collected July 22, 1921, in Coachella Valley, California, and submitted by A. D. Borden with the label "date mite." The females of this species are similar to those of *P. viridis* (Banks) but differ from *viridis* individuals in having the finger of palpal thumb about one and two-thirds times as long as broad at the base instead of being almost as broad as long as in *viridis*. In the dimorphism of the male, as reflected in the tarsal claws, this species differs apparently from all other species of the genus.

***Eupalopsis pavoniformis*, new species.**

Species of *Eupalopsis* are characterized especially by having the tarsal claws provided with pectines and by having the abdomen divided by one or more transverse sutures. The species here to be described is clothed with foliaceous and plumose setae. At the caudal end of the abdomen is a whorl of the latter, enormous in size. When this whorl is thrown forward the plumose setae arrange themselves into a fan, like the feathers of a peacock's tail when the peacock is strutting, hence the name *pavoniformis*. As a common name for this mite that of "The Peacock Spider Mite" is suggested.

Female.—Skin coarsely and somewhat irregularly reticulate; body clothed with large foliaceous setae and at the tip of abdomen with enormous, finely pectinate plumes; setae on legs foliaceous, pectinate setiform and simple setiform. Beak very long, slightly surpassing the palpi and deeply grooved above for the reception of the chelicerae. Palpi rather large; claw large, stout and strongly hooked; thumb slender, not swollen, tipped with two unequal setae, and not quite reaching the tip of claw. Dorsally the cephalothorax bears six foliaceous setae arranged into two longitudinal rows of three each. Abdomen apparently two-segmented, the dividing suture passing entirely around the body and just in front of the posterior coxae. Foliaceous setae on the dorsum of abdomen arranged as follows: A transverse row of eight setae just behind cephalothoracic groove; a similar transverse row, but of only six setae, just behind the abdominal groove; a row of eight setae, the posterior one being much reduced, along each lateral margin of abdomen; a circle of eight setae around middle part of postabdomen and a single seta in the middle of circle. The tail plumes are in a single whorl and number an even dozen. They are fully equal in length to the total length of the body, are wavy and flagelliform toward their tips, the flagelliform part of each seta being exceedingly minutely pectinate. Legs short and stout; first pair longer than the others which are sub-equal. Length, 0.44 mm.; width, 0.19 mm.

Male.—Unknown.

Type locality.—Hawaii.

Type.—Cat. No. 24721, U. S. N. M.

Description based exclusively on the type specimen. A paratype is in the writer's private collection, and a slide containing two distorted but well stained specimens is in the United States National Museum. All material taken on *Hibiscus*, from Hawaii, by L. A. Whitney at the port of San Francisco. This splendid and beautiful species differs not only from all other species of its genus, but from all mite species known to the writer, in the possession of its erectile whirl of long tail plumes.

PHYTOPTIPALPIDAE, new family.

In 1905 Trägårdh described from an *Acacia* species, in Egypt, a very peculiar gall-making spider mite. He created for its reception the genus *Phytoptipalpus*, which he placed in the subfamily Tetranychinae. Not only was this species peculiar in its gall making habits, but, according to Trägårdh, even more peculiar in its transformations. Because of the structure of the mouth-parts being of the same type as in *Eriophyes* (formerly *Phytoptus*), Trägårdh suggested the name *Phytoptipalpus* for his new genus.

Quite recently there has been sent to me through Nathan Banks a collection of gall-making *Phytoptipalpi*, sent by C. S. Misra from India. The specimens were collected from the jujube tree (*Zizyphus jujuba*), the galls being cut off and inclosed with specimens in vials. Mr. Misra also sent, sealed in a glass tube, a fine specimen of a galled twig of the jujube preserved in spirit. The mite species makes blister-like galls by feeding under the bark, and specimens are found in all stages of development in a single gall, which during its earlier growth has no opening to the exterior.

A study of this species from the jujube shows it to be closely related to the one described by Trägårdh. I am convinced, however, that it has no such remarkable transformations as he describes for his *paradoxus*, also that the genus *Phytoptipalpus* has important morphological homologies with the Tetranychidae on the one hand and the Eriophyidae on the other, that were not observed by Trägårdh. In fact a morphological study of the species from the jujube, convinces the writer that in the genus *Phytoptipalpus* we not only have a group of family importance but a group that probably included species which were the direct ancestors of the gall mites, or Eriophyidae.

Description of Family.—The following characters are given for the new family, *Phytoptipalpidae*: Prostigmatic mites which are hexapod in all stages; palpi greatly reduced and completely fused with the maxillary base to form a guttered beak for holding the needle-like chelicerae. Chelicerae elbowed at

the base as in Tetranychidae and situated in a greatly reduced mandibular plate which is completely concealed from above. Legs stout, six-segmented; tarsi in immature individuals with tenent hairs and in all instars with pecten-bearing claws. Vulva situated ventro-posteriorly; anus and penis terminal.

Phytoptipalpus transitans, new species.

Female.—In general appearances similar to *Tenuipalpus* species, cephalothoracic-abdominal groove marked and abdomen long and swollen in egg-bearing individuals. Cephalothorax with much of its anterior margin formed into a collar-like projection above the retractile mandibular plate. Eyes four, subequal, and with well developed corneas; posterior eye situated less than its diameter behind the anterior eye. Mandibular plate completely concealed from above; it is greatly reduced in size, being much narrowed and shortened in front, while posteriorly it is bilobed as usual. Chelicerae very slender, except near their bases where they are elbowed and enlarged; they lie in an almost capillary gutter on the upper side of the beak and are thrust from the beak at its tip and not through the opening on the lower side as stated to be the case with *paradoxus*. Palpi so completely fused with the beak that only the vestige of a single segment remains more-or-less marked off and bearing a single small seta. Beak as a whole rather stout and conspicuous and extending to tips of femora. Abdomen sparsely clothed with moderate, curved, obsoletely pectinate, setiform setae. Anus a subterminal and almost vertical, irregular slit. Vulva large, with more or less evenly folded, or crumpled, integument around its rim, situated as in Tetranychidae, *i. e.* ventrally, just in front of the anus. Legs stout and nearly subequal; posterior pair falling far short of tip of abdomen. Tarsi armed with a pair of inner, subequal claws and an outer pecten-bearing pair; pecten composed of several short subequal elements each of which is knobbed at its tip. Length, 0.33 mm.; width, 0.18 mm.

Male.—Considerably smaller than female and more slender. Abdomen frequently somewhat drawn out and always bilobed behind, each lobe bearing a distal and two inner setae. Penis very large and stout, composed of two elements that fit together making a strongly chitinized spike-like structure that is frequently observed extending beyond the abdominal lobes. Length, 0.20 mm.; width, 0.10 mm.

Type locality.—Pusa, India.

Type slide.—Cat. No. 24722, U. S. N. M.

Described from hundreds of specimens many of which were dissected or given special treatment. Some of the cotypes are on the type slide, some in a vial of material retained for the United States National Museum, some on slides for my private collection and some in a vial to be returned to Mr. Misra. All specimens were taken from galls on *Zizyphus jujuba* and were sent in by Mr. Misra from Pusa, India.

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