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ERIOPHYID STUDIES XIV *

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The present installment contains the descriptions of ten new species of mites, including a pest of persimmon and a pest of cypress, and a group and generic revision of the family. I feel that the data now on hand discloses certain definite structural groupings by means of which the larger Eriophyid genera can be fairly adequately split into more homogeneous aggregations of species. It is also clear that the possession of anterior setae on the cephalothoracic shield, and of subdorsal abdominal setae, constitutes much more than specific differences from the species that lack these setae. We have, in reality, two different types of setal arrangement present in the Eriophyidae. Each setal group is further characterized by its own type of female genitalia and certain leg features. This is the basis for the following two new subfamilies.

SYNOPSIS OF ERIOPHYID SUBFAMILIES

- Three or four setiferous tubercles on shield, the rear pair of tubercles always bearing setae that point forward; anterior pair of subdorsal abdominal setae present or absent; foretibia usually with a lateral spur; hind patellar seta often laterally placed; female coverflap smooth; female genital glands elliptical or elongate, arising from ducts that project forward and then recurve laterally-----1.
- One pair of setiferous tubercles on the cephalothoracic shield, or these absent; no subdorsal abdominal setae; no lateral spur on foretibia; hind patellar seta always arising from above; female genital coverflap variously sculptured or smooth; female genital glands usually subcircular and on short lateral or diagonally posteriorly directed ducts originating from rear of genital opening-----2.
1. Shield with no anterior lobe over rostrum; abdomen wormlike with rings similar dorsoventrally-----**PHYTOPTINAE**, new subfamily
1. Shield with an anterior lobe over rostrum which is sometimes very short, abdomen divided laterally into broader tergites, and more numerous narrower sternites-----**SIERRAPHYTOPTINAE**, new subfamily
2. Shield never with lobe overhanging rostrum; abdomen wormlike, with rings similar above and below, at least anteriorly; when rostrum large, not set at right angles to body and with evenly curved chelicerae-----**ERIOPHYINAE**
2. Shield usually with anterior lobe over rostrum; abdomen most often divided laterally into broader tergites and narrower sternites; or with large tapering rostrum, set at right angles to body, and with large chelicerae abruptly downcurved in front of rostrum base-----**PHYLLOCOPTINAE**

PHYTOPTINAE

Phytoptus Dujardin 1851

Dujardin—Ann. Sci. Nat. Paris Zool. (3) Vol. 15, p. 106, 1851
Keifer—Bul. Cal. Dept. Agr. Vol. 27, p. 301, 1938, genotype *avellanae* Nal.

Phytoptus pini Nalepa

Plate 180

Keifer—Bul. Cal. Dept. Agr. Vol. 27, p. 181, June 1938.
The pine needle mite has been refigured from Torrey Pine, *Pinus torreyana* Parry, to show the type of female genitalia in relation to other species in *Phytoptus*. The long-stalked genital glands seem to be characteristic of coniferous infesting Phytoptinae.

* Eriophyid Studies XIII was published in the Bul. Cal. Dept. Agr. Vol. 32, No. 3, p. 212, Oct. 14, 1943. When describing *Eriophyes litchii*, p. 212, XIII, I neglected to note Oudemans' name for this mite: *Eriophyes cordai*, Crit.-Hist. Acar. III, p. 1325, 1937. O'Gara had neither described nor named the mite so the derivation of *chinensis* O'Gara, the original name for this species, is not immediately apparent. However, as my account of the species is the first description, *litchii* K. should stand.

A more thorough study of this mite on various hosts and in the several geographical areas it inhabits, is necessary. I have yet to see pine twig galls in North America similar to those in Europe ascribed to the activities of this mite.

Phytoptus cupressi Keifer, new species

Plate 181

Female 200-260 μ long, 40-50 thick, wormlike, whitish. Rostrum 30 μ long, somewhat downcurved. Shield 27 μ long, 40 μ wide, diagonal lines from rear margin to tubercles; frontal seta 11 μ long; a few lines along side of shield; dorsal tubercles 12 μ apart, well ahead of rear margin; dorsal setae 50 μ long, projecting forward. Forelegs 31 μ long, tibia 6 μ long, tarsus 7 μ long; claw 8 μ long, tapering, curved; featherclaw 7 rayed. Hindlegs 28 μ long, tibia 4.5 μ long, tarsus 7 μ long, claw 8 μ long. Anterior coxae separate. Abdomen with 60-70 rings, completely microtuberculate; microtubercles evenly curved, not pointed. Subdorsal seta 12 μ long, on ring 10. Lateral seta 30 μ long, on about ring 8; first ventral 20 μ long, on about ring 18; second ventral 20 μ long, on about ring 32; third ventral 33 μ long, on about ring 6 from rear; accessory seta present, 20 μ long. Female genitalia with long stalked glands; 21 μ wide, 12 μ long, coverflap smooth, seta 14 μ long.

Male 150 μ or more long, 40 μ thick.

Type locality: San Francisco, California. **Collected:** August 28, 1943, by the writer. **Host:** *Cupressus macrocarpa* Hartw., Monterey Cypress. **Relation to host:** The mites live in the leaf crevices around the twig tips and cause a centrally necrotic terminal enlargement of the green twigs, in which a colony may be found. **Type slide:** so designated, as above. **Paratype slides:** four in number, with the above data. There are also specimens of this same mite, or a very similar species, from *Juniperus chinensis procumbens* Endl. taken in Berkeley, California, October 1, 1941, by M. R. Bell of the State Nursery Service. The mite was killing the twig tips on this juniper. I am unable to identify *cupressi* with *Phytoptus quadrisetus* (Thom.) on the basis of Nalepa's figure of that species.

Setoptus Keifer, new genus

Body elongate, wormlike, somewhat clavate anteriorly. Rostrum large, chelicerae evenly curved. Cephalothoracic shield longer than wide, with broad, transverse front edge and narrower transverse rear edge; three setiferous tubercles, the central anterior set projecting up, the long paired lateral setae projecting forward from tubercles about equidistant from front and rear margins. Legs with all usual setae plus a lateral spur or seta on the foretibia; hind patellar seta somewhat lateral; featherclaw simple. Narrow abdominal rings completely microtuberculate, a shallow sub-lateral furrow; no subdorsal abdominal setae; the remaining setae in usual positions. Female genitalia with smooth coverflap and long-stalked genital glands.

Genotype: "*Platyphytoptus*" *jonesi* K.
Bul. Cal. Dept. Agr. Vol. 27, p. 189, 1938

The genotype is the largest Eriophyid yet described, being one-third of a millimeter long. It has a discontinuous distribution along the California coast. M. L. Jones collected the original specimens from Torrey Pines growing in their native stand on the bluffs above the San Diego County beaches. I have examined native Monterey Pines, *Pinus radiata* Don., both on the Monterey peninsula and at Año Nuevo Point (San Mateo County) without finding *Setoptus jonesi*. However, the mite reappears on Bishop pine, *Pinus muricata* Don., north of the above listed localities near Point Reyes at Inverness, California, a native stand of Bishop pine. *Setoptus* differs from *Phytoptus* in lacking subdorsal abdominal setae and in the sublateral furrow. The name is a contraction of *Seta* plus *Phytoptus*.

As I have not seen either *Phytoptus quadrisetus* (Thom.) or *Phytoptus abnormis* (Gar.), I am not including them in the following synopsis.

SYNOPSIS OF THE PHYTOPTINAE

- A sublateral longitudinal abdominal furrow; subdorsal abdominal setae missing; rostrum very large; shield with transverse rear edge; in needle sheaths of *Pinus torreyana* and *muricata*-----SETOPTUS JONESI K.
- Abdomen cylindrical in cross section; subdorsal abdominal setae present; rostrum moderate in size; shield curved posteriorly (PHYTOPTUS)-----1
1. Three cephalothoracic shield setae; female genital glands long-stalked; on conifers-----2
1. Four setiferous tubercles on shield; female genital glands short-stalked-----3
2. Anterior shield seta minute; subdorsal abdominal setae short; in pine needle sheaths-----PINI Nal.
2. Anterior shield seta and subdorsal setae of moderate length; in swollen tips on cypress-----CUPRESSI K.
3. Foretibia lacking a lateral spur; causing filbert "big-bud"-----AVELLANAE Nal.
3. Foretibia possessing a lateral spur;-----4
4. Shield smooth; in buds and among seeds on *Cornus* spp.-----CORNISEMINIS K.
4. Shield with a design of longitudinal ridges; in *Hedera* buds, causing twig stunting-----HEDERAE K.

SIERRAPHYTOPTINAE

Austracus Keifer, new genus

Body wormlike, cylindrical in cross-section, curved. Rostrum moderate in size. Shield subtriangular, scarcely overhanging rostrum anteriorly; four setiferous tubercles present, laterally placed in anterior and posterior pairs, the posterior tubercles somewhat ahead of the rear margin and directing the setae ahead and outward. Legs with all usual setae, plus a lateral spur on the foretibia and the hind patellar seta laterally placed. Abdomen with broad fairly smooth tergites; sternites much more numerous, microtuberculate; a pair of anterior subdorsal setae present; the other setae in the usual positions. Female genitalia with smooth coverflap; glands gradually enlarging from anteriorly projecting recurved ducts.

Genotype: *Austracus havrylenkonis*, new species

This genus is characterized by the shield and body shape, and by the subdorsal abdominal setae. The name is *Austral* plus *acus* for *Acarus*.

Austracus havrylenkonis Keifer, new species

Plate 182

Female 200-275 μ long, 50-70 μ thick, robust, wormlike. Rostrum 23 μ long, somewhat downcurved; apical seta 4.5 μ long. Shield 30 μ long, 43 μ wide, without apparent design; no anterior lobe, dorsal tubercles 18 μ apart, ahead of rear margin; dorsal setae 11 μ long, pointing forward; anterior tubercles 20 μ apart; anterior setae 7 μ long, pointing diagonally outward. Forelegs 38 μ long, tibia 8 μ long, with a lateral spur, tarsus 8 μ long, claw 8.5 μ long, somewhat curved; featherclaw 4 rayed. Hindlegs 35 μ long, patellar seta lateral, tibia 6.5 μ long, tarsus 7.5 μ long, claw 9 μ long. Coxae with strong sternal line. Abdomen with subdorsal seta on second tergite, about 40 μ long; tergites non-tuberculate, ridged at rear margin; sternites set with oval micro-tubercles; 16-18 tergites; about 50 sternites, lateral setae 9 μ long, on about sternite 7; first ventral 14 μ long, on about sternite 19; second ventral 11.5 μ long, on about sternite 28, third ventral 25 μ long, on about sternite 4 from rear; accessory seta present. Female genitalia 23 μ wide, 16 μ long, coverflap with none of the usual furrows, but a basal and apical division, seta 8 μ long.

Male: 200-230 μ long, 50-60 μ thick.

Type locality: Isla Victoria, Nahuel Huapi National Park, Argentina. **Collected:** April, 1943, by D. Havrylenko. **Host:** *Nothofagus dombeyi* of the Fagaceae. **Relation to host:** Causing a gall in the fruit. **Type slide:** with the above data. **Paratype slides:** four in number as above. I take pleasure in naming this unusual Eriophyid for the collector. The fact that *Austracus havrylenkonis* and *Sierraphytoptus alnivagrans* have subdorsal abdominal setae greatly influenced the erection of the two new subfamilies at the beginning of this paper. No mite with these setae and broad tergites has been found outside the western hemisphere. The very short shield lobe over the rostrum may be degeneration due to the gall-forming habit.

Nalepella Keifer, new genus

Body spindleform. Rostrum moderate in size. Shield subtriangular, anterior lobe over rostrum; three setiferous tubercles; one on anterior lobe; paired rear tubercles well ahead of rear margin and directing long setae ahead. Legs presumably with all usual setae, hind patellar seta apparently placed laterally, featherclaw simple. Abdomen with non-tuberculate tergites less numerous than the microtuberculate sternites; subdorsal abdominal setae absent, the other setae in usual locations. Female genitalia not described.

Genotype: *Phyllocoptes tricerus* Börner

Börner—Abr. Biol. Abt. Land-Forster, Kaiserl. Gesundt Berlin Vol. 5, p. 140, 1906

Nalepa—Marcellia Vol. 25, p. 70, 1929

While I have not seen anything like this species, the original description bears a creditable lateral diagram by Börner. The position and direction of the large paired shield setae harmonize with other mites bearing extra setae. The figure is evasive about the exact location of the anterior shield setae and aside from the lateral hind patellar seta leaves the legs and female genitalia to be investigated. But it is necessary to designate a new genus for *tricerus* to fit it into the present classification scheme. The mite is said to be a vagrant on the needles of *Pinus veitchi* Lindl. The generic name, *Nalepella* is for the well-known Austrian Eriophydologist.

SYNOPSIS OF SIERRAPHYOPTINE GENERA

- Subdorsal abdominal setae present-----1
 Subdorsal abdominal setae absent-----2
1. Shield with an anterior lobe over rostrum; body broad, flattened-----SIERRAPHYOPTUS K.
 -----SIERRAPHYOPTUS K.
1. Shield hardly overhanging rostrum; body more wormlike-----AUSTRACUS K.
2. Two anterior shield setae present; body elongate with longitudinal lines on broad tergites -----MACKIELLA K.
2. One anterior shield seta; body spindleform, the tergites narrower and lacking lines -----NALEPELLA K.

ERIOPHYINAE

Eriophyes von Siebold 1851

The type of this genus as set by me in 1938 is *Eriophyes vitis* Pgst. (Bul. Cal. Dept. Agr. Vol. 27, p. 301). This mite, as well as possessing the usual Eriophyine features, is characterized by paired setiferous shield tubercles a little ahead of the rear shield margin which direct the setae ahead and centrad; female genitalia somewhat appressed to the coxae which are spread more than usual; female coverflap longitudinally furrowed, the furrows tending to be two-ranked; female anterior genital apodeme much shortened in ventral view. I here propose to divide the mass of species referred to *Eriophyes* (*Phytoptus*—old use) into three groups, mainly on the presence and position of the dorsal tubercles, or their absence. Thus *Eriophyes* will hereafter be used for mites with dorsal tubercles more or less ahead of the rear shield margin, that are so inclined as to direct the setae ahead or centrad. All of the species I have studied with such a character, aside from the genotype, have female genitalia a normal distance behind the coxae, the coverflap furrows when present are in one line, and the apodeme is of normal length. Thus the genotype is at once unharmonious with the bulk of species herein referred to *Eriophyes* and may have to be separated. The interspecific variation of the dorsal tubercle position suggests further heterogeneity. The other two groups which are apparently quite homogeneous will be discussed in turn.

Eriophyes vitis Pgst.

Plate 183

Pagenstecher—Verh. nat.—med. Ver. Heidelberg, Vol. 1, p. 46-53, 1857-59
 Landois—Zeitsch. Wiss. Zool. Vol. 14, p. 353, 1864
 Parrott, Hodgkiss, Schoene—N. Y. Agr. Exp. Sta. Bul. 283, p. 289, 1906
 Banks—Proc. U.S.N.M., Vol. 32, p. 621, 1907
 Nalepa—Marcellia, Vol. 25, p. 125, 1929.

Female 160-200 μ long, 40 μ thick, wormlike, pale yellowish. Rostrum 21 μ long, curved down. Shield 27 μ long, 32 μ wide, blunt, triangular, numerous longitudinal lines, an ocellus-like lateral spot; dorsal tubercles 15 μ apart, ahead of rear margin; dorsal setae 18 μ long, projecting ahead and centrad. Forelegs 30 μ long, tibia 7 μ long, tarsus 8 μ long, claw 8 μ long, tapering; featherclaw 5 rayed. Hindlegs 26 μ

long, tibia 4 μ long, tarsus 7 μ long, claw 10.5 μ long. Coxae with setae I ahead of junction of anterior coxae; setae II ahead of line through setae III. Abdomen with 65-70 rings, completely microtuberculate, the microtubercles slightly pointed. Lateral seta 19 μ long, on about ring 7; first ventral 38 μ long, on about ring 22; second ventral 42 μ long, on about ring 40; third ventral 15.5 μ long, on about ring 4 from rear; accessory seta missing. Female genitalia somewhat appressed to hind coxae, the anterior apodeme shortened in ventral view; 20 μ wide, 10 μ long, coverflap with 16 or more furrows, interrupted across center; seta 14 μ long.

Male 140-160 μ long, 35 μ thick.

Locality: Fresno district, California. **Collected:** June 1943 by Dr. E. M. Stafford. **Host:** *Vitis vinifera* L., grape, Vitaceae. **Relation to host:** The mites cause extensive undersurface white erineum on the leaves. They overwinter in the buds and may do early spring damage to young shoots. *Eriophyes vitis* is generally distributed in the California grape-growing sections, but the erineum cannot be found everywhere. Further study of hosts and economic importance of this mite is needed. *Eriophyes vitis* is generally distributed in Europe and elsewhere.

Eriophyes caricis Keifer, new species

Plate 184

Female 150-180 μ long, 40 μ thick, somewhat clavate anteriorly, flattened, whitish. Rostrum 26 μ long, curved down, apical seta rather short. Shield 40 μ long, 38 μ wide; a pattern of lines centrally, the sides quite granular; dorsal tubercles 17.5 μ apart, well ahead of rear margin. Dorsal setae 10 μ long, directed up and caudad. Forelegs 34 μ long, tibia 7.5 μ long, tarsus 7 μ long; claw 8 μ long, curved, tapering; featherclaw 6 rayed. Hindlegs 30 μ long, tibia 6 μ long, tarsus 6.5 μ long, claw 9.5 μ long. Anterior coxae not clearly touching, nor any sternal line present. Abdomen with 80-90 rings, the rings microtuberculate and some dorsal reduction in ring number. Lateral seta 38 μ long, on about ring 10; first ventral 50 μ long, on about ring 27; second ventral 14 μ long, on about ring 48; third ventral 26 μ long, on about ring 7 from rear; accessory seta present. Female genitalia 23 μ wide, 17 μ long, coverflap with about 12 furrows, seta 12 μ long.

Male 140 μ long; 40 μ thick.

Type locality: Sacramento, California. **Collected:** September 19 and 30, 1943 by the writer. **Host:** *Carex barbarae* Dew., sedge, Cyperaceae. **Relation to host:** The mites are found down in the plant toward the base of the leaves where the tissue is turning from yellow to green. No damage was noted. **Type slide:** so designated, with the above data and dated September 19. **Paratype slides:** five in number as above. The position of the dorsal tubercles is not similar to *Eriophyes vitis*, though ahead of the rear margin.

I intend to publish a list of species in the next installment, showing which are assigned to *Eriophyes*, and which to the other genera, here proposed. The pear leaf blister mite, *pyri* Pgst., goes into *Eriophyes*, but the citrus bud mite, *sheldoni* Ewing, is associated with the following genus.

Aceria Keifer, new genus

Body wormlike, circular in cross section or nearly so. Rostrum various in size, usually small, when large with the chelicerae evenly curved. Shield usually subtriangular, dorsal setiferous paired tubercles, in subdorsal positions on rear shield margin and directing the setae caudad. Legs with all usual setae and simple featherclaw. Abdominal rings the same above and below, usually more numerous dorsally, nearly always microtuberculate. Female genitalia a moderate distance behind coxae; coverflap furrowed or smooth, usually with a single row of longitudinal scoring; anterior female apodeme of normal length in ventral view.

Genotype: *Eriophyes tulipae* Keifer
Bul. Cal. Dept. Agr. Vol. 27, p. 185, 1938.

Aceria is separated from *Eriophyes* by the dorsal setiferous tubercles being on the rear shield margin and directing the setae caudad. This is the largest genus in the family, possessing many series of closely related species. It appears to be homogeneous. The walnut mites with smooth

coverflap and triradiate featherclaws are the most unharmonious species known and they are connected via the oak mites. The peculiar mites referable to *Paraphytoptus*, that have an abdomen which is Eriophyine anteriorly and "Phyllocoptine" posteriorly are definitely connected here. The intergrades between *Aceria* and *Paraphytoptus* may make an arbitrary division point necessary. The name, *Aceria*, is composed of the first two letters of *Acarus*, plus the first part of *Eriophyes*.

Aceria diospyri Keifer, new species

Plate 185

Female 140-170 μ long, 30 μ thick, wormlike, light yellowish white. Rostrum 20 μ long, somewhat downcurved, apical seta short. Shield 24 μ long, 26 μ wide, design a series of longitudinal dotted lines, sides granular; dorsal tubercles 17.5 μ apart, on rear margin; dorsal setae 16 μ long, projecting backwards. Forelegs 20 μ long, tibia 4 μ long, tarsus 4 μ long, claw 6 μ long, somewhat tapering, featherclaw 5 rayed. Hindlegs 20 μ long, tibia 4 μ long, tarsus 4 μ long, claw 7 μ long. Coxae microtuberculate, no definite sternal line. Abdomen with about 70 rings, rings showing ventrad reduction in number, the microtubercles not pointed. Lateral seta 12 μ long, on about ring 7; first ventral 40 μ long, on about ring 22; second ventral minute, on about ring 40; third ventral 13 μ long, on about ring 6 from rear; accessory seta present. Female genitalia 17.5 μ wide, 11.5 μ long, coverflap with 12-14 furrows, seta 8 μ long.

Male not studied.

Type locality: Garden Grove, Orange County, California. **Collected:** October 13, 1943 by E. A. Dudley. **Host:** *Diospyros kaki* Linn., persimmon, of the Ebenaceae. **Relation to host:** The mites develop under the bud scales and under the fruit buttons. In the latter location they blacken the stem end of the fruit and aid premature dropping. **Type slide:** so designated, with the above data. **Paratype slides:** five in number, all from Orange County; one as above, two from Santa Ana, September 20, E. C. Knight; two from San Juan Capistrano, October 8, R. J. Bumgardner. This mite is much like *Aceria sheldoni* (Ewing), the citrus budmite, in both appearance and habit. But *diospyri* has a differently and more clearly designed shield, and shorter setae; the second ventral seta on *diospyri* is minute, whereas it is of appreciable length in *sheldoni*.

Aceria escalloniae Keifer, new species

Plate 186

Female 160-190 μ long, 50 μ thick, wormlike but rather stout. Rostrum 18 μ long, downcurved, apical seta 8 μ long. Shield 32 μ long, 38 μ wide, three central longitudinal lines, granular laterally; dorsal tubercles 30 μ apart, on rear margin; dorsal setae 35 μ long, projecting caudad. Forelegs 32 μ long, tibia 7.5 μ long, claw 8 μ long, curved, slightly knobbed; featherclaw 4 rayed. Hindlegs 31 μ long, tibia 6 μ long, tarsus 7 μ long, claw 8.5 μ long. Anterior coxae touching; tubercles of setae I well ahead of a line through tubercles of setae II. Abdomen with about 60-65 rings, some ventrad reduction in ring number; rings entirely microtuberculate, the tubercles somewhat pointed. Lateral seta 30 μ long, on about ring 10; first ventral 32 μ long, on about ring 23; second ventral 11.5 μ long, on about ring 38; third ventral 24 μ long, on about ring 5 from rear; accessory seta present. Female genitalia 20 μ wide, 14 μ long, coverflap with about 8 longitudinal furrows, seta 14 μ long.

Male 160 μ long, 50 μ thick.

Type locality: Isla Victoria, Nahuel Haupi National Park, Argentina. **Collected:** April, 1943 by D. Haveylenko. **Host:** *Escallonia rubra* Pers., Saxifragaceae. **Relation to host:** The mites deform the fruits, living within the gall. **Type slide:** so designated, with the above data. **Paratype slides:** five in number as above. The four-rayed featherclaw and the two central longitudinal shield lines characterize this mite.

Cecidophyes Nalepa 1889

Nalepa—Sitzb. Akad. Wiss. math-natur. Wien. Vol. 98, p. 31, 1889
 Nalepa—Denkr. Akad. Wiss. math-natur. Wien. Vol. 59, p. 539, 1892
 Keifer—Bul. Cal. Dept. Agr. Vol. 27, p. 302, 1938 genotype *galii* Karp.

The genotype which I designated for this in 1938 is *galii* Karp. I have not seen this species but Nalepa's figure suggests it has all of the following characters which are taken from other species that also lack dorsal tubercles. As well as having the usual Eriophyine features, the mites of this genus lack setiferous tubercles on the cephalothoracic shield; all other setae as usual; female genitalia appressed to the spread rear coxae; female coverflap longitudinally furrowed, the furrows tending to be two-ranked; anterior female apodeme much shortened in ventral view. Nalepa utilized this name for a few years, attempting to group chunky spindleform species under it. He disregarded the setal characters. As I here define *Cecidophyes*, it is a homogeneous group of a few species. If mites are subsequently found lacking dorsal tubercles but possessing female genitalia as described for *Aceria*, they will not be properly referred to *Cecidophyes*. I do not know of any species of this genus native to the Western Hemisphere.

Cecidophyes vermiformis (Nal.)

Plate 187

Nalepa—Sitzb. Akad. Wiss. math-natur. Wien. Vol. 98, p. 18, 1890

Nalepa—Marcellia Vol. 25, p. 81, 1929

Female up to 230 μ long, 40 μ thick, light yellowish, elongate-wormlike. The measurements of the 230 μ size are: Rostrum 21 μ long, somewhat downcurved, apical seta 4 μ long. Shield 35 μ long, 35 μ wide, design of numerous longitudinal lines and microtubercles, granulate laterally; dorsal tubercles and setae missing. Forelegs 29 μ long, tibia 6 μ long, tarsus 6.5 μ long, claw 5 μ long, curved; featherclaw 5 rayed. Hindlegs 25 μ long, tibia 5 μ long, tarsus 5 μ long, claw 7 μ long. Coxae somewhat ornamented with curved lines, a thin sternal line present. Abdomen with about 80 rings, some ventrad reduction in ring number; microtubercles pointed. Lateral seta 11 μ long, on about ring 4; first ventral 40 μ long, on about ring 21; second ventral 8 μ long, on about ring 36; third ventral 19 μ long, on about ring 6 from rear; accessory seta absent. Female genitalia with apodeme shortened in ventral view; 23 μ wide, 10 μ long, coverflap with 14-16 furrows and transverse basal lines; seta 10 μ long.

Male not seen.

Locality: Springfield, Oregon. **Collected:** March 21, 1941 by B. G. Thompson. **Host:** *Corylus avellana* L., filbert, *Deviana* variety, Corylaceae. **Relation to host:** The mites are inquilins in the terminal big buds caused by *Phytoptus avellanae* Nal. This is the first record of *vermiformis* from North America. It is widely distributed in Europe, both on filbert and birch. Students will note that *vermiformis* was described in the same paper as *Cecidophyes*, but was placed in *Phytoptus* (old use).

KEY TO ERIOPHYINE GENERA

- Abdomen with a median dorsal longitudinal furrow, (dorsal tubercles ahead of rear margin) ----- MONOCHETUS Nal.
 Abdomen with several dorsal longitudinal furrows ----- PHYTOPTOCHETUS Nal.
 Abdomen subcircular in cross section ----- 1.
1. Abdominal microtubercles bearing one or two recumbent hairs ----- TRICHOSTIGMA Gerber
1. Microtubercles often spine-like but not bearing hair-like structures ----- 2.
 2. Dorsal setiferous shield tubercles and setae missing; female genitalia appressed to coxae, furrows tending to be in two ranks, apodeme shortened ----- 2.
 2. Dorsal setiferous tubercles present ----- 3.
 3. Dorsal tubercles more or less ahead of rear shield margin and directing setae ahead or centrad; female genitalia usually a moderate distance from coxae, coverflap smooth or furrows in one row, female genital apodeme of moderate length; female genitalia rarely as in *Cecidophyes* ----- ERIOPHYES Von S.
3. Dorsal tubercles on rear shield margin and directing setae caudad; female genitalia a moderate distance from coxae, coverflap with furrows in one row, or curved, or coverflap smooth; anterior female genital apodeme of normal length ----- 4.
4. Abdominal rings similar dorsoventrally for entire abdominal length or but little broadened and reduced in number on posterior dorsum ----- ACERIA K.
 4. Abdominal rings narrow anteriorly but at some point before the distal third becoming increasingly broader dorsally and reduced in number compared to sternites ----- PARAPHYOPTUS Nal.

PHYLLOCOPTINAE

KEY TO THE PHYLLOCOPTINE TRIBES

- Rostrum variable in size, usually small, when large not set at right angles to body and with chelicerae evenly curved; dorsal setiferous shield tubercles usually present and variable in location, less often directing setae ahead.....PHYLLOCOPTINI
- Rostrum large, tapering, set at right angles to body; chelicerae large, projecting directly ahead in front of rostrum base, then abruptly downcurved to the attenuate rostrum apex; dorsal setiferous shield tubercles present or absent, when present located near rear of shield margin and so inclined as to direct the setae forward.....DIPTILOMIOPINI

PHYLLOCOPTINI

Phyllocoptes Nalepa, 1889

Nalepa—Sitz. Akad. Wiss. math-natur. Wien, Vol. 98, p. 148, 1889

Keifer—Bul. Cal. Dept. Agr. Vol. 27, p. 191, 1938, *carpini* Nal. set as genotype

Phyllocoptes carpini has the dorsal setiferous tubercles placed well ahead of the rear shield margin; abdominal tergites broader and fewer than the sternites; female genitalia a moderate distance from the coxae, smooth coverflap. The anterior female genital apodeme is presumably of the normal length. Thus *carpini* associates the name *Phyllocoptes* with Phyllocoptine species having dorsal tubercles ahead of the rear shield margin. This is comparable to the restriction of similarly tuberculate Eriophyines to *Eriophyes*.

Phyllocoptes calisalicis Keifer, new species

Plate 188

Female 130-170 μ long, 40-45 μ thick, robust, spindleform, reddish. Rostrum 35 μ long, large, tapering, curved down, apical seta 5 μ long. Shield 40 μ long, 35 μ wide, rounded anteriorly and with a narrow sagittate lobe over rostrum; design in center obscurely lined, lateral granulations; dorsal tubercles 19 μ apart, set a little ahead of rear margin and inclined forward; dorsal setae 26 μ long, projecting forward and centrad. Forelegs 32 μ long, tibia 8 μ long, tarsus 7.5 μ long; claw 7 μ long, curved, slightly knobbed; featherclaw 3 rayed. Hindlegs 30 μ long, tibia 6 μ long, tarsus 7.5 μ long, claw 8 μ long. Coxae granular, a moderately long sternal line at junction of forecoxae. Abdomen Eriophyiform, with about 55 microtuberculate rings; ventrad reduction in ring number; microtubercles rounded. Lateral seta 24 μ long, on about sternite 4; first ventral seta 35 μ long, on about sternite 18; second ventral 10.5 μ long, on about sternite 32; third ventral 23 μ long, on sternite 5 from rear; accessory seta present. Female genitalia rather broad, transverse lines and granulations at base of coverflap, the genitalia 20 μ wide, 11 μ long, coverflap with about 16 longitudinal furrows, seta 15 μ long.

Male 130-160 μ long, about 40 μ thick.

Type locality: Sacramento, Cal. **Collected:** Oct. 22, 25, 28, and Nov. 2, 1943, by the writer. **Host:** *Salix* spp. including *S. babylonica* L., weeping willow. **Relation to host:** The mites live behind the lateral buds and at the petiole bases, causing some shriveling to the tissue on which they feed. **Type slide:** so designated, with the above data, host *S. babylonica*, and dated Nov. 2, 1943. **Paratype slides:** five in number, with the above data. If it were not for the peculiar narrow anterior lobe over the rostrum, this mite would fit in *Eriophyes*. But since the immature stages of *Phyllocoptes* are Eriophyiform, and since this new species has degenerated to the *Eriophyes* habit of living concealed on its host, it can be presumed that the abdomen has ceased to develop as far as the normal *Phyllocoptes* species.

Vasates Shimer, 1869

Shimer—Tr. Amer. Ent. Soc. Vol. 2, p. 319, 1869

Hodgkiss—N. Y. Agr. Exp. Sta. Tech. Bul. 163, p. 16, 1930

Vasates quadripedes Shimer is the genotype. According to the description of this species and the figure in the above reference by Hodgkiss, *quadripedes* is a typical Phyllocoptine with an anterior shield lobe over the rostrum, and with smooth tergites about half as numerous as the microtuberculate sternites. The dorsal shield tubercles are on the rear shield margin, directing the setae caudad; the female genitalia are a moderate distance behind the coxae, the coverflap is smooth. Hodgkiss' figure

seems to show the anterior female genital apodeme as of moderate length. The species group then typed by *quadripedes* is similar to *Aceria* in regard to the dorsal tubercles. The majority of species here referred to *Vasates* have the female coverflap scored in one transverse row.

Vasates quadripedes Shimer is a gallmite, forming so-called bladder galls on sugar maple leaves and on one or two other species of maple. Most of the generically associated species are silver mites or leaf vagrants. From the data presented by Hodgkiss it seems probable that *quadripedes* is deuterozygous.

Vasates mckenziei Keifer, new species

Plate 189

Female 170-210 μ long, 40-50 μ thick, wormlike, white; in life covered with white powdery wax. Rostrum 35 μ long, large, downcurved, apical seta 12 μ long. Shield 46 μ long, 40 μ wide, the anterior lobe narrow and pointed; design of longitudinal lines curved to the rear; granules to the rear and sides. Dorsal tubercles 25 μ apart, on rear shield margin; dorsal setae 43 μ long, projecting caudad. Forelegs 36 μ long, tibia 9 μ long, tarsus 10 μ long; claw 11 μ long, curved, tapering; featherclaw 7-rayed. Hindlegs 33 μ long, tibia 6 μ long, tarsus 8.5 μ long, claw 12 μ long. Anterior coxae broadly contiguous; setae 1 opposite anterior point of junction. Abdomen completely microtuberculate and Eriophyiform, with the sternites slightly more numerous; microtubercles acuminate; sternites about 65 in number. Lateral seta 30 μ long, on about sternite 9; first ventral 52 μ long, on about sternite 23; second ventral 26 μ long, on about sternite 39; third ventral about 25 μ long, on about sternite 5 from rear; accessory seta present. Female genitalia 23 μ wide, 17.5 μ long, coverflap with about 12 long furrows, seta 25 μ long.

Male 150-170 μ long, 35-40 μ thick.

Type locality: Sacramento, Cal. **Collected:** Oct. 3 and 18, 1943, by H. L. McKenzie and the writer. **Host:** *Elymus triticoides* Buckl., wild rye, family Gramineae. **Relation to host:** The mites live in the longitudinal leaf furrows on the upper leaf surface. They apparently cause some leaf browning. **Type slide:** so designated and dated Oct. 18. **Paratype slides:** five in number as above. I take pleasure in naming this mite for Howard L. McKenzie, who took part in collecting specimens. This is another species of Phyllocoptine mite with an Eriophyiform abdomen.

Coptophylla Keifer, new genus

Body generally spindleform, circular in cross section. Rostrum moderate in size. Cephalothoracic shield subtriangular, with anterior lobe over rostrum; dorsal setiferous tubercles and setae missing. Legs with usual setae, featherclaw simple. Abdomen variable: either with broad smooth tergites and more numerous microtuberculate sternites, or with Eriophyiform abdomen. Female genitalia somewhat appressed to the coxae which are separated posteriorly more than usual; coverflap with longitudinal furrows tending to be two-ranked; anterior female genital apodeme much shortened in ventral view.

Genotype: *Phyllocoptes lamimani* Keifer

Bul. Cal. Dept. Agr. Vol. 28, p. 419, 1939

Coptophylla is segregated from both *Phyllocoptes* and *Vasates* by the lack of dorsal tubercles and setae, and by the appressed female genitalia with shortened apodeme. This genus corresponds to *Cecidophyes* and completes the curious parallel between the *Eriophyes-Aceria-Cecidophyes* group and the *Phyllocoptes-Vasates-Coptophylla* group respectively. If this is parallelism, Eriophyid taxonomy is correct. If this is true relationship, this taxonomy is based on the wrong characters. *Coptophylla* is *Phyllocoptes* reversed.

Coptophylla caliquerici Keifer, new species

Plate 190

Female 150-160 μ long, 45-50 μ thick, spindleform, robust, light purple in color. Rostrum 24 μ long, projecting obliquely down, apical seta 8.5 μ long. Shield 38 μ long, 43 μ wide, the anterior lobe broad and short; design a network of dotted lines. Dorsal tubercles and setae absent. Forelegs 34 μ long, tibia 8.5 μ long, tarsus 8.5 μ long;

claw $7\ \mu$ long, curved, with small knob; featherclaw 5-rayed. Hindlegs $32\ \mu$ long, tibia $6.5\ \mu$ long, tarsus $8\ \mu$ long, claw $8\ \mu$ long. Anterior coxae narrowly contiguous; hind coxae rather widely separated. Abdomen Eriophyiform, completely microtuberculate, the microtubercles pointed; about 48 to 55 rings, the sternites slightly more numerous. Lateral seta $14\ \mu$ long, on about sternite 5; first ventral $50\ \mu$ long, on about sternite 18; second ventral $11\ \mu$ long, on about sternite 30; third ventral $25\ \mu$ long, on about sternite 6 from rear; accessory seta absent. Female genitalia $24\ \mu$ wide, $12\ \mu$ long, coverflap with 15-20 irregular double-ranked furrows; seta $12\ \mu$ long.

Male $140\ \mu$ long, $40\ \mu$ thick.

Type locality: Sacramento, Cal. **Collected:** Sept. 9, 1943 by the writer. **Host:** *Quercus lobata* Nee, Valley white oak, Fagaceae. **Relation to host:** The mites are upper surface vagrants, appearing in late summer. **Type slide:** so designated, with the above data. **Paratype slides:** four in number as above. This mite is very similar to *Coptophylla arbuti* (K), but has a different type of shield ornamentation.

Thamnacus Keifer, new genus

Body somewhat spindleform. Rostrum of moderate size. Shield more nearly semicircular in dorsal view, the lobe over the rostrum rather broad and blunt; dorsal tubercles on rear margin, setae directed caudad. Legs with setae as usual, featherclaw simple. Abdomen with broad smooth tergites and fine microtuberculate sternites; tergites formed into lateral longitudinal troughs on either side of broad evenly arched dorsal elevation; abdominal setae as usual. Female genitalia a moderate distance from coxae, the coverflap with one row of furrows; apodeme of normal length.

Genotype: *Phyllocoptes rhamnicola* K.

Bul. Cal. Dept. of Agr. Vol. 27, p. 307, 1938

This mite would be referred to *Vasates* but the broad dorsal ridge, flanked by furrows, does not fit. *Tegonotus* has a central longitudinal ridge which is acute and therefore not similar to *Thamnacus*. The genotype deforms the leaves of *Rhamnus californicus* at about 3000-5000 feet elevations in the Sierra Nevada Mountains. The name is *Thamnus* plus a contraction of *Acarus*.

Tetra Keifer, new genus

Body spindleform, somewhat dorsoventrally flattened. Rostrum rather small. Shield subtriangular, a small lobe over rostrum; dorsal tubercles on rear margin and directing the long setae caudad. Legs with all usual setae, featherclaw simple. Abdomen with broad non-tuberculate tergites, and narrow microtuberculate sternites; tergites irregular in height and forming a broad dorsal longitudinal trough with a lateral ridge on each side; all setae as usual. Female genitalia a moderate distance from coxae, coverflap with one row of longitudinal scoring; apodeme of normal length in ventral view.

Genotype: "*Phyllocoptruta*" *concava* K.

Bul. Cal. Dept. of Agr. Vol. 28, p. 489, 1939

This new genus removes *concava* from association with *Phyllocoptruta oleivorus* (Ashm.), the citrus rust mite, with which it does not belong. *Tetra* has the setiferous shield tubercles on the rear margin, directing the long setae backwards, whereas *Phyllocoptruta* has these tubercles well ahead of the rear shield margin and directing the setae up and inward.

Calepitrimerus andropogonis Keifer, new species

Plate 191

Female $160-170\ \mu$ long, $50\ \mu$ wide, $45\ \mu$ thick, flattened spindleform, yellow-orange in color; in life with three tufted rows of yellow wax on the shield and abdominal dorsum. Rostrum $23\ \mu$ long, projecting down, apical seta $11\ \mu$ long. Shield $55\ \mu$ long, $50\ \mu$ wide, triangular, anterior lobe acute; a central longitudinal series of wax-bearing lines, a transverse ridge above forelegs; lateral curved lines; dorsal tubercles $24\ \mu$ apart, well ahead of rear margin; dorsal setae $4\ \mu$ long, projecting up. Legs with femoral seta absent. Forelegs $35\ \mu$ long, tibia $7\ \mu$ long, tarsus $7.5\ \mu$ long; claw $8\ \mu$ long, curved, tapering; featherclaw 8-rayed. Hindlegs $35\ \mu$ long, tibia $6.5\ \mu$ long, tarsus $8\ \mu$ long, claw $9\ \mu$ long. Coxae strongly lined, the anterior coxae hardly

touching; setae I near apex of forecoxae. Abdomen with three dorsal wax-bearing ridges, flanked on each side by longitudinal troughs, the central ridge ending before the lateral ridges; sternites bearing minute micro-tubercles; sternites and tergites about equal in number and 65-70 each. Lateral seta $30\ \mu$ long, on about sternite 10; first ventral $50\ \mu$ long, on about sternite 22; second ventral $46\ \mu$ long, on about sternite 42; third ventral $25\ \mu$ long, on about sternite 6 from rear; accessory seta present. Female genitalia $17.5\ \mu$ wide, $14.5\ \mu$ long, coverflap with 16-18 longitudinal furrows, in two ranks, seta $20.5\ \mu$ long.

Male not studied.

Type locality: Wyandotte, Oroville district, California. **Collected:** November 6, 1942, by the writer. **Host:** *Andropogon* sp., a marsh grass. **Relation to host:** The mites are vagrants on the leaves. **Type slide:** so designated, with the above data. **Paratype slides:** Three in number as above. This mite is distinguished by the long body setae, the lack of femoral setae, the orange-yellow body color, and the yellow rows of tufted wax.

Abacarus Keifer, new genus

Body more or less elongate. Rostrum moderate in size. Cephalothoracic shield sub-triangular, with anterior acuminate lobe over rostrum; dorsal tubercles on rear margin, directing setae caudad. Legs with all usual setae, featherclaw simple. Abdominal tergites nearly as numerous as the microtuberculate sternites, the micro-tubercles suppressed or absent dorsally; tergites formed into three dorsal longitudinal wax-bearing ridges, the central ridge shorter than the lateral ridges and ending in the dorsal trough; all abdominal setae present. Female genitalia a moderate distance behind coxae, the coverflap with one row of longitudinal furrows, the apodeme of normal length.

Genotype: *Calepitrimerus acalyptus* K.
Bul. Cal. Dept. Agr. Vol. 28, p. 490, 1939

Abacarus differs from *Calepitrimerus* by having the dorsal setiferous shield tubercles on the rear margin and so inclined as to direct the setae caudad. These tubercles in *Calepitrimerus* are ahead of the rear shield margin. *Abacarus* not only receives *acalyptus* but also *Callyntrotus hystrix* Nal. This latter species is unharmonious in *Callyntrotus*, as that genus has lines of wax-bearing tubercles, whereas the *Calepitrimerus* complex has wax-bearing bands, as possessed by *hystrix*. The genus name is *Ab* plus *Acarus*.

Abacarus hystrix (Nal.)

Plate 192

Nalepa—Denks, Akad. Wiss. math-natur. Wien. Vol. 77, p. 141, 1904

Nalepa—Marcellia Vol. 25, p. 72, 1929

Pepper—Jr. Ec. Ent. Vol. 35, p. 201, 1942

Female 180-200 μ long, 35-40 μ wide, 45 μ thick, whitish; in life with a central longitudinal stripe of wax, enclosed by a lateral band on each side. Rostrum 30 μ long, antapical seta 8.5 μ long. Shield 50 μ long, 35 μ wide; anterior lobe narrowed above, a spine below; shield with a central ridge, laterally granulate; dorsal tubercles 23.5 μ apart, on rear margin; dorsal setae 20 μ long, projecting caudad. Forelegs 36 μ long, tibia 8.5 μ long, tarsus 8 μ long; claw 9 μ long, curved, tapering; featherclaw 8 rayed. Hindlegs 35 μ long, tibia 7 μ long, tarsus 7 μ long, claw 7.5 μ long. Coxae with strong sternal line. Abdomen with sternites microtuberculate, the microtubercles suppressed or absent on tergites; the central longitudinal wax-bearing ridge ending in the dorsal trough on about the 46th tergite; supralateral wax-bearing ridges extending farther caudad; tergites about as numerous as sternites; sternites 60-65. Lateral seta 35 μ long, on about sternite 6; first ventral 36 μ long, on about sternite 21; second ventral 23 μ long, on about sternite 38; third ventral 27 μ long, on about 4 from rear; accessory seta present. Female genitalia deep basin-shaped externally, 21 μ wide, 16 μ long, coverflap with about 12 furrows, set 40 μ long.

Male 170-190 μ long, 40 μ wide, 35-40 μ thick.

Locality: Sacramento, California. **Collected:** during September and October 1943 by the writer. **Host:** *Elymus triticoides* Buckl., wild rye. **Relation to host:** The mites live in the upper surface furrows of the leaves. This mite has a wide distribution on perennial grasses throughout the northern hemisphere. It is of economic importance in

New Jersey. A common name for the species might be "cereal rust mite". For references previous to this article look under *Callyntrotus* and *Epitrimerus*.

Acamina Keifer, new genus

Body spindleform, somewhat flattened. Rostrum large, the chelicerae evenly curved. Shield sub-triangular, the anterior lobe over rostrum very broad and blunt; dorsal tubercles ahead of rear margin, turned so as to direct the setae ahead and centrad. Legs lacking femoral setae, featherclaw simple. Abdominal tergites nearly as numerous as the microtuberculate sternites; dorsum with three longitudinal wax-bearing ridges, the central ridge ending in the central shallow trough and not as long as the lateral ridges; ventral setae I and II absent. Female genitalia the normal distance behind coxae, coverflap with longitudinal furrows in two ranks; apodeme of normal length.

Genotype: *Calepitrimerus nolinae* K.

Bul. Cal. Dept. Agr. Vol. 28, p. 151, 1939

The broad anterior shield lobe, the lack of femoral setae and abdominal setae I and II, separate *nolinae* from species properly referred to *Calepitrimerus*. The genus name is a contraction of *Acarus* plus *minus*.

When using the following key, care must be taken not to attempt to properly assign deutogynes. This key is only good for the primary forms. Deutogynes develop on deciduous shrubs and trees, but may be found wandering on other types of plants. They are usually distinguished by the suppression or lack of microtubercles, and in this key will run to the *Phyllocoptes-Vasates* complex. Some are properly assigned to that complex, but many actually belong to the Epitrimeri.

KEY TO GENERA OF THE PHYLLOCOPTINI

- Abdomen circular in cross-section or nearly so, lacking long longitudinal furrows or ridges1.
- Abdomen flattened, furrowed, ridged, or with lateral projections.....4.
1. Caudal abdominal section, especially the tergites, distinct from anterior sectionANTHOCOPTES Nal.
1. Abdominal tergites gradually narrowing to rear.....2.
2. Tergites with numerous small lobes, (dorsal setae projecting caudad; female apodeme shortened)GAMMAPHYTOPTUS K.
2. Tergites evenly arched.....3.
3. No dorsal tubercles or setae; female genitalia appressed to coxae, the apodeme shortenedCOPTOPHYLLA K.
3. Dorsal tubercles on rear shield margin, directing setae caudad; female genitalia in normal position with apodeme of usual length.....VASATES Sh.
3. Dorsal tubercles ahead of rear shield margin, directing setae up or ahead; female genital apodeme of normal length in ventral view.....PHYLLOCOPTES Nal.
4. Either a broad central longitudinal abdominal trough or a broad central ridge...5.
4. Middorsal furrows or ridges narrow or acuminate, or dorsum flat, or flattened species with dorsum slightly transversely arched.....7.
5. A broad central longitudinal dorsal abdominal ridge.....THAMNACUS K.
5. A broad dorsal trough.....6.
6. Dorsal tubercles well ahead of rear shield margin, setae directed up and centradPHYLLOCOPTRUTA K.
6. Dorsal tubercles on rear shield margin, directing setae caudad.....TETRA K.
7. Caudal section of abdomen projecting abruptly down on dorsal side; an accessory flap over rostrum (CALIPHYTOPTI).....8.
7. Caudal section of abdomen more or less evenly downcurved, no accessory flap over rostrum (EPITRIMERI).....9.
8. Abdominal dorsum flat, dorsal tubercles near rear shield margin but directing setae aheadCAROLOPTES K.
8. Abdominal dorsum forming low arch, with three longitudinal furrows, dorsal tubercles well ahead of rear shield margin, directing setae ahead and centradACARELLIPTUS K.
8. Abdominal dorsum with a central ridge, followed by transverse depression; dorsal tubercles ahead of rear margin, directing setae centrad.CALIPHYTOPTUS K.

9. Flattened species with abdominal dorsum evenly or nearly evenly arched, a sub-lateral furrow present.....PLATYPHYTOPTUS K.
9. Abdominal dorsum ridged or furrowed; or mite with lateral projections or swellings; no sublateral furrow.....10.
10. Abdominal tergites smooth, broad, much less numerous than sternites.....11.
10. Tergites more nearly equal to sternites in number, often microtuberculate.....13.
11. Flattened species with abdomen swollen laterally just behind shield (featherclaws bifurcate).....TUMESCOPTES K.
11. Lateral abdominal projections more or less acute, formed by individual tergites; central ridge present or absent.....OXYPLEURITES Nal.
11. A central abdominal ridge but no lateral projections.....12.
12. Featherclaws simple, rear patellar seta present.....TEGONOTUS Nal.
12. Featherclaws bifurcate, rear patellar seta absent.....ACAPHYLLA K.
13. Dorsal longitudinal lines of wax-bearing microtubercles with spines.....CALLYNTROTUS Nal.
13. Either lacking wax-bearing organs or with wax-bearing ridges.....14.
14. A narrow central longitudinal abdominal trough.....CUPACARUS K.
14. Abdomen with a central ridge.....15.
15. Central longitudinal dorsal abdominal ridge as long as lateral ridges.....16.
15. Central ridge distinctly shorter than lateral ridges.....17.
16. Dorsal setae present.....EPITRIMERUS Nal.
16. Dorsal setae absent.....CALACARUS K.
17. Featherclaw bifurcate.....ACARICALUS K.
17. Featherclaw simple.....18.
18. Anterior shield lobe broad and blunt; abdominal setae 1 and 2 missing.....ACAMINA K.
18. Anterior shield lobe acute; all abdominal setae present.....19.
19. Dorsal tubercles ahead of rear margin, directing setae central or ahead.....CALEPITRIMERUS, K.
19. Dorsal tubercles on rear margin, directing setae caudad.....ABACARUS K.

DIPTILOMIOPINI

Rhyncaphytoptus ulmivagrans K

Keifer—Bul. Cal. Dept. Agr. Vol. 28, p. 420, 1939 (*Rhyncaphytoptus ulmivagrans*)
Keifer—Bul. Cal. Dept. Agr. Vol. 28, p. 491, 1939 (*Abacoptes platynus*)

Rearing experiments have now proved *Abacoptes platynus* is in reality the deutogyne of *ulmivagrans*. The lack of sternal microtubercles on "Abacoptes" harmonizes with other Diptilomiopine deutogynes. However, the flat back is remarkable, and not to be expected on the basis of other hibernating forms. The host in this case is *Ulmus* spp. I have seen specimens of an exceedingly similar deutogyne from the leaves of eastern *Fagus*.

Quadracus Keifer, new genus

Body wormlike, curved. Rostrum large, tapering, with characters of tribe. Shield subtriangular, with anterior lobe over rostrum; dorsal tubercles near rear margin but so inclined as to direct setae up and ahead. Legs with all usual setae, featherclaw simple. Abdomen with broad non-tuberculate tergites, and fine microtuberculate sternites; tergites forming a broad central ridge, and a lateral ridge on each side, the central ridge unevenly serrate in lateral view; all abdominal setae present. Female genitalia with longitudinal scoring on coverflap.

Genotype: *Quadracus urticae*, new species.

This genus is distinguished by the tergal ridges. The name is *Quadra*, plus a contraction of *Acarus*.

Quadracus urticae Keifer, new species

Plate 193

Female about 200 μ long, 45-50 μ wide, 45 μ thick, light yellowish amber, spindle-form, curved. Rostrum 42 μ long, set at right angles to body. Shield 32 μ long, 40 μ wide, anterior lobe short, broad, blunt; disc slightly raised and enclosed by curved lines; dorsal tubercles 17.5 μ apart, on rear margin, dorsal setae 25 μ long, projecting forward and out. Forelegs 35 μ long, tibia 6.5 μ long, tarsus 10 μ long; claw 8.5 μ long,

tapering slightly curved, knobbed; featherclaw 5 rayed, palmate. Hindlegs 32μ long, tibia 6μ long, tarsus 8.5μ long, claw 10.5μ long. Anterior coxae broadly contiguous behind a submental ridge; setae I much further apart than setae II. Abdomen with broad tergites, forming uneven serrations in lateral view; lateral ridge composed of 2-3 times the number of tergites forming the dorsal ridge; sternites microtuberculate; dorsal tergites about 25 in number; lateral tergites about 45; sternites about 80. Lateral seta 11.5μ long, on about sternite 7; first ventral 55μ long, on about sternite 24; second ventral 14μ long, on about sternite 38; third ventral 23μ long, on about sternite 7 from rear; accessory seta absent. Female genitalia 24μ wide, 22μ long, coverflap about 8 furrows, seta 12.5μ long.

Male about 180μ long, 45μ thick, 45μ wide.

Type locality: Sacramento, California. **Collected:** August 8, 22, and September 2, 1943, by the writer. **Host:** *Urtica gracilis holosericea* Jepson, nettle, Urticaceae. **Relation to host:** The mites occur in the thick hair on the underside of the leaves. No damage was noted. **Type slide:** so designated, bearing the above data and collected September 2. **Paratype slides:** six in number as above.

KEY TO DIPTILOMIOPINE GENERA

- Tergites more numerous than sternites.....PHYLLOCOPYCHES Nal.
 Abdomen Eriophyiform or tergites less numerous than sternites.....1.
 1. Sternites lacking microtubercles, dorsum arched or flattened; on deciduous shrubs or treesDeutogynes
 1. Sternites microtuberculate.....2.
 2. Featherclaws divided; femoral setae absent; a sternal ridge between forecoxaeDIPTILOMIOPUS Nal.
 2. Featherclaws simple; femoral setae present; forecoxae connate.....3.
 3. Tergites fairly evenly arched, at most rather faint subdorsal depressions.....RHYNCAPHYTOPTUS K.
 3. Tergites forming a rough central ridge, flanked by a lateral ridge on each side.....QUADRACUS K.

DESIGNATIONS ON PLATES

- API—Internal female genitalia, including apodeme and glands
 D—Dorsal view of mite
 DA—Dorsal view of anterior section
 ES—Detail of side skin
 F—Featherclaw
 GF1—Female genitalia and coxae from below
 L—Left legs
 S—Side view of mite
 SA—Side view of anterior part of mite

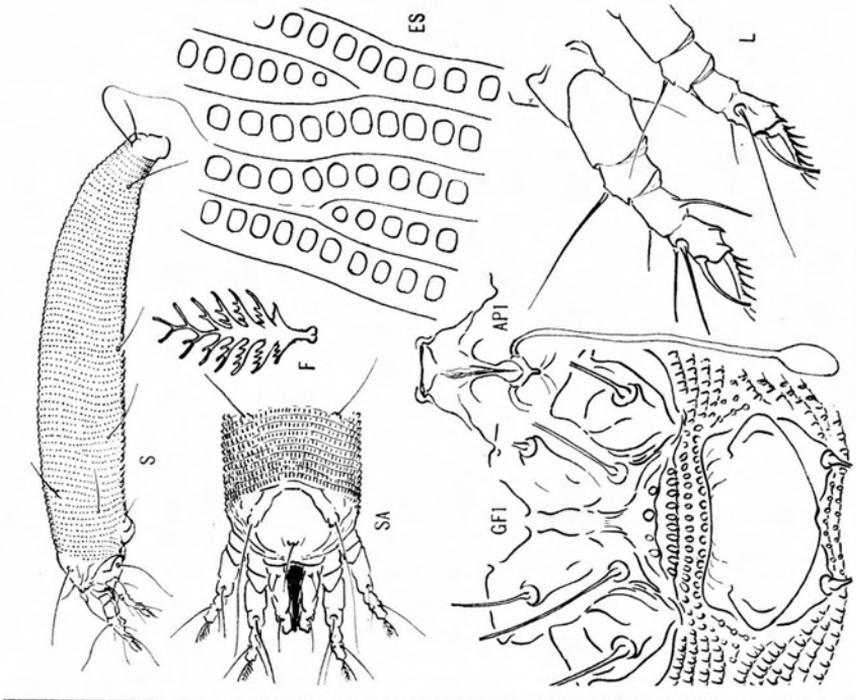


PLATE 180. *Phytoptus pini*, Nal.

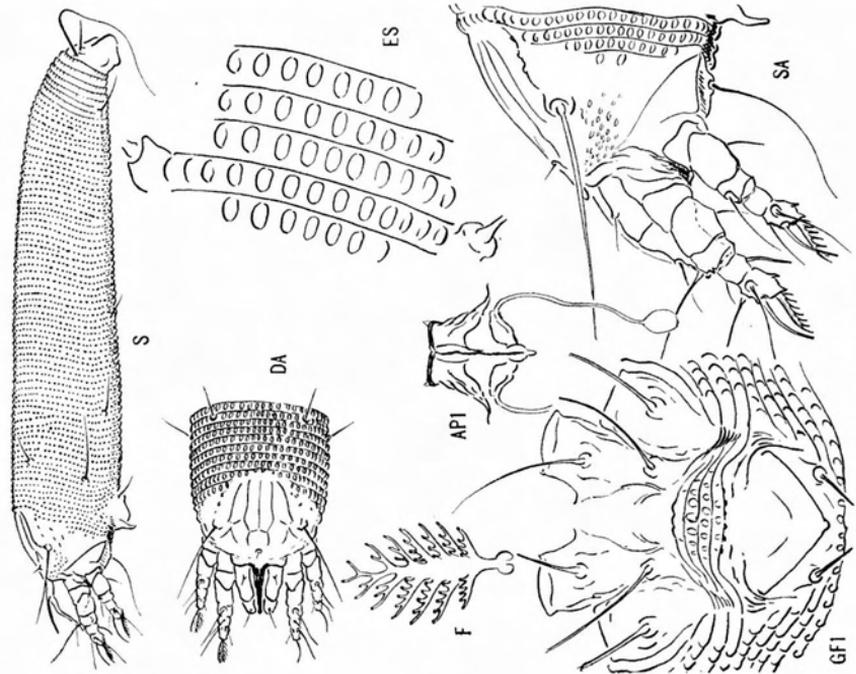


PLATE 181. *Phytoptus cupressi*, n. sp.

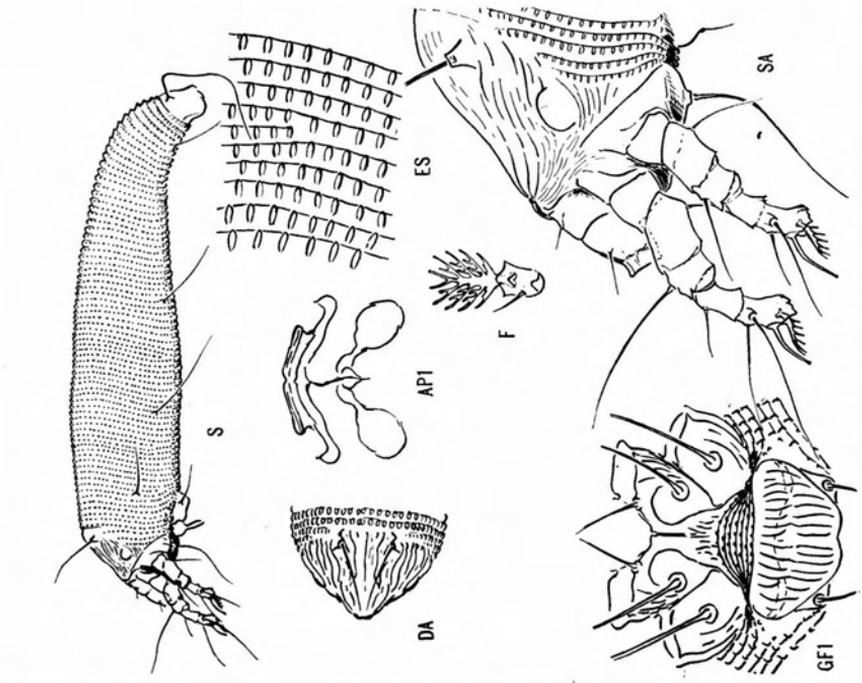


PLATE 183. *Eriophyes vitis*, Fgst.

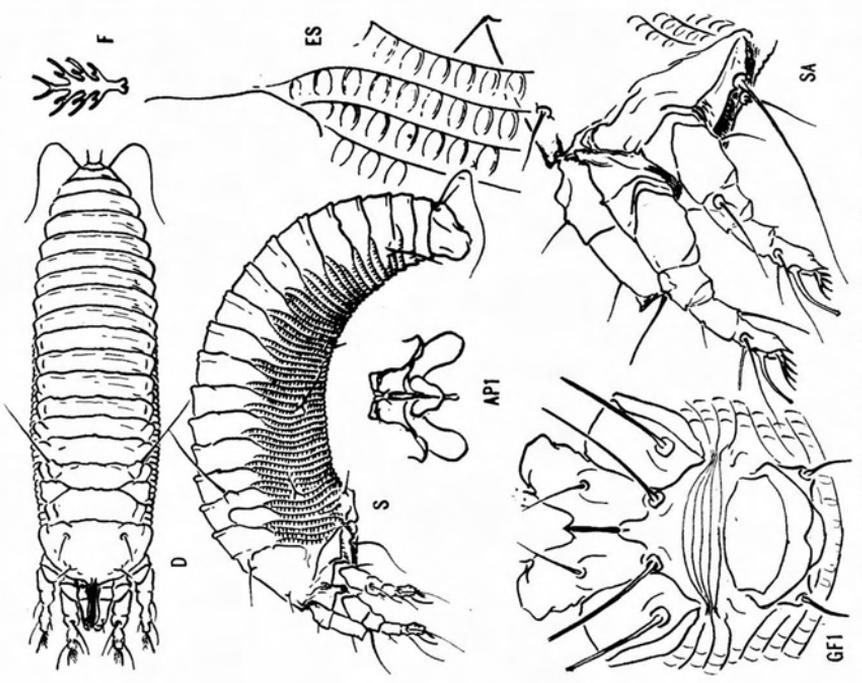


PLATE 182. *Austracus havrylenkonis*, n. sp.

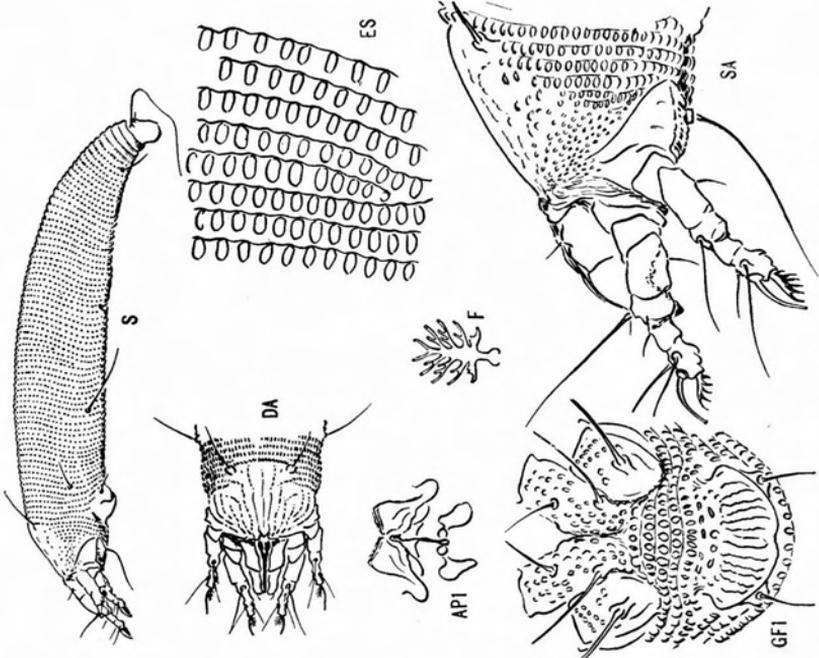


PLATE 185. *Acertia diospyri*, n. sp.

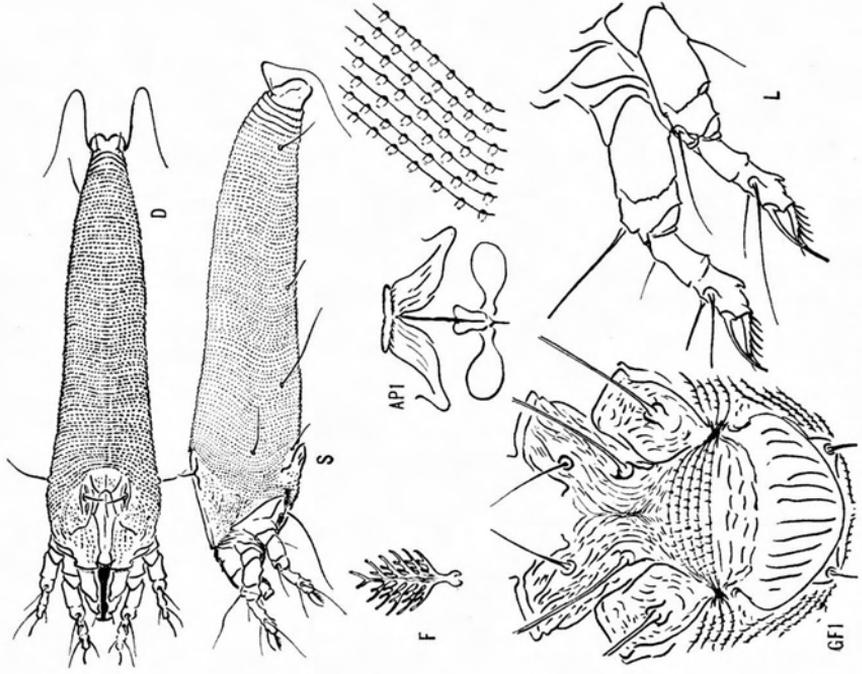


PLATE 184. *Eriophyes caricis*, n. sp.

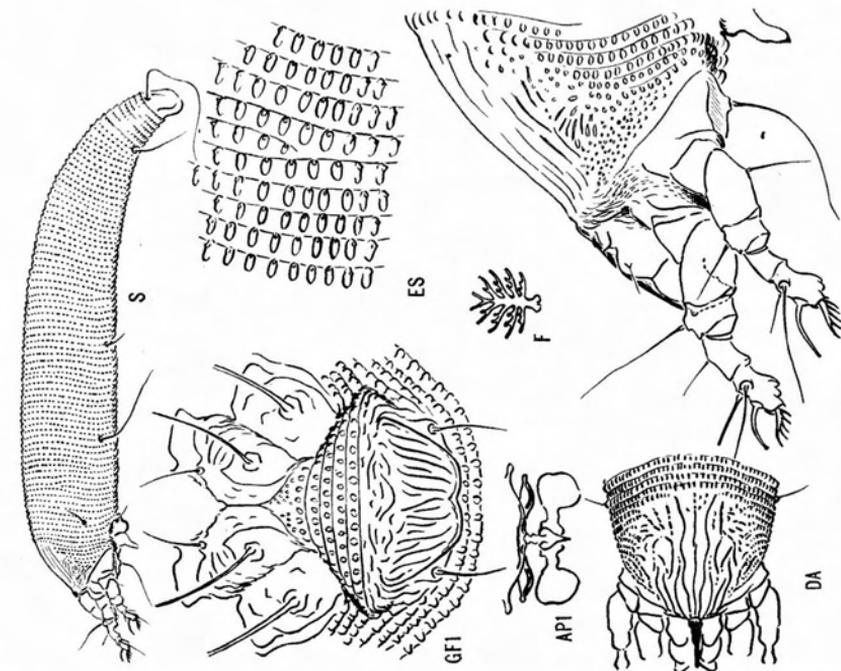


PLATE 187. *Cecidomyces vermiformis* (Nal.)

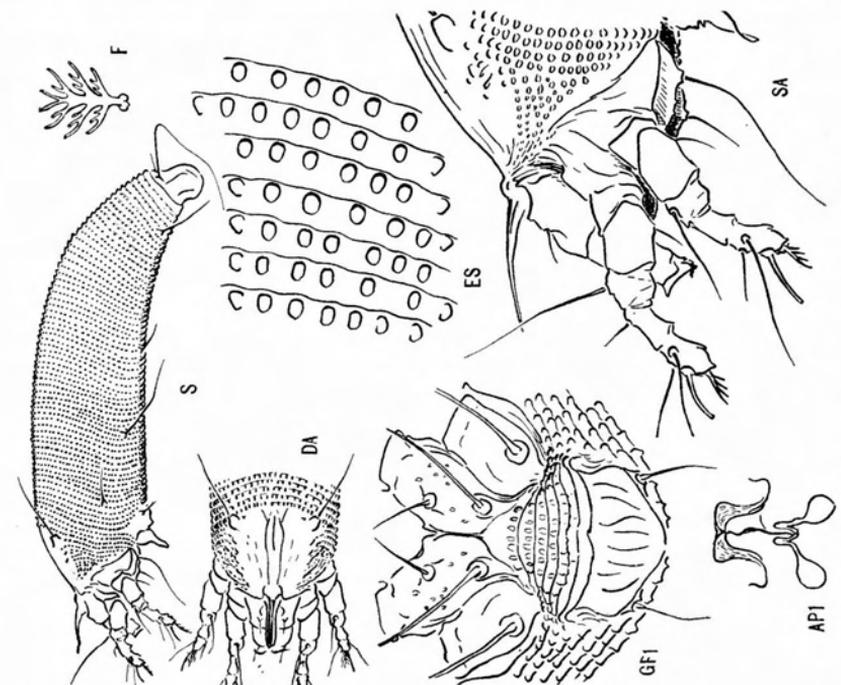


PLATE 186. *Aceria escailloniae*, n. sp.

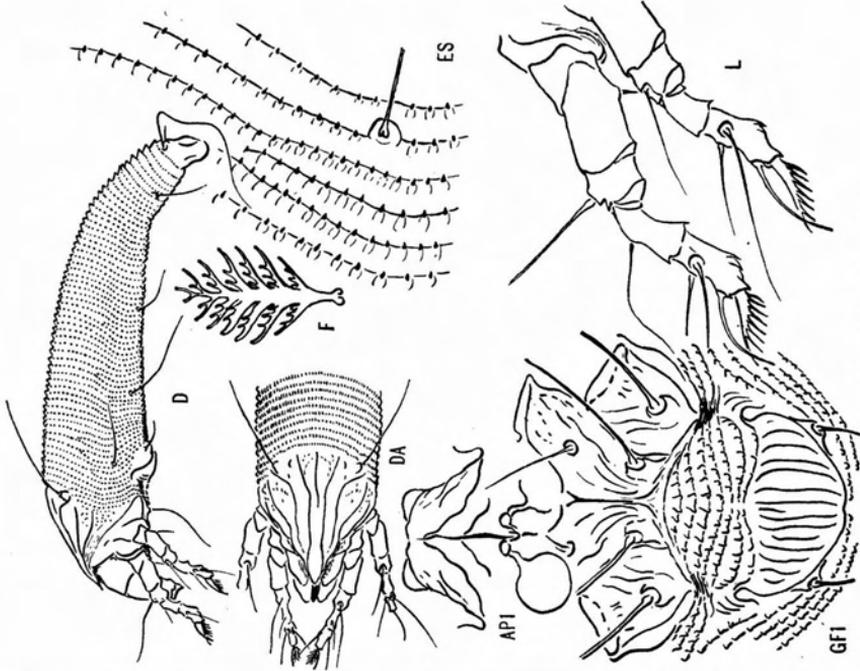


PLATE 189. *Vasates mckenziei*, n. sp.

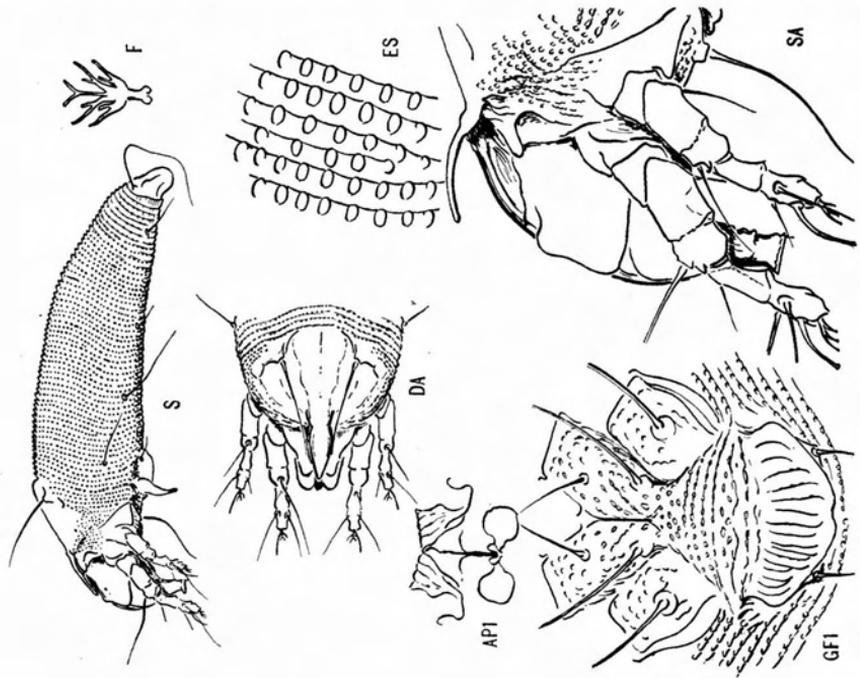


PLATE 188. *Phyllocoptes calisaltis*, n. sp.

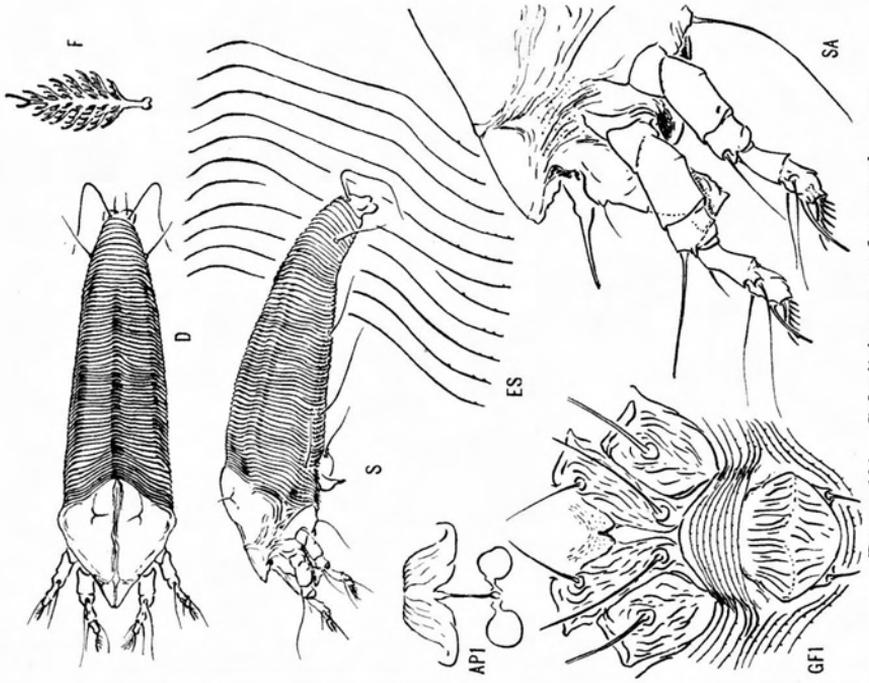


PLATE 191. *Calepitrimerus andropogonis*, n. sp.

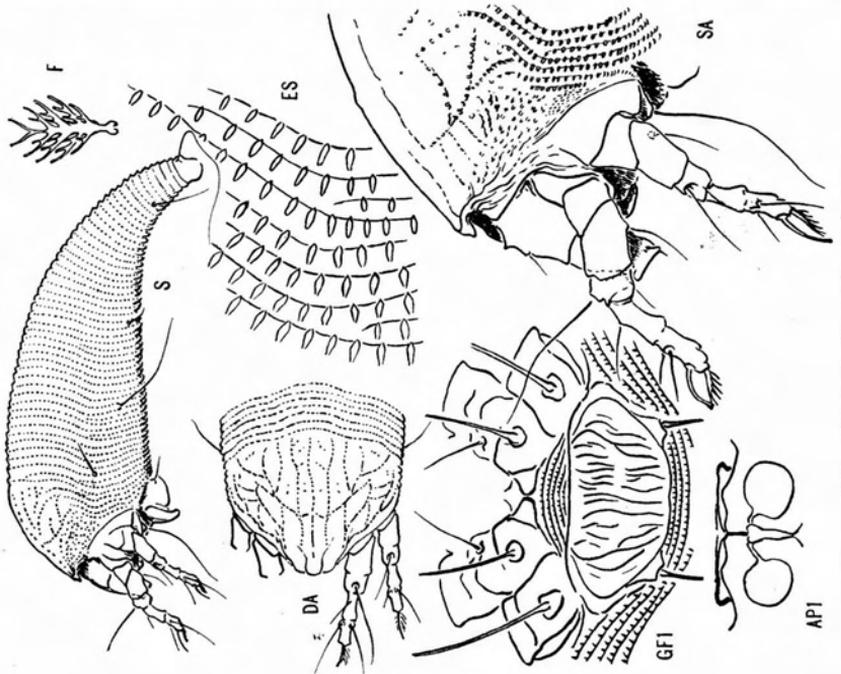


PLATE 190. *Coptophylla caltiqueris*, n. sp.

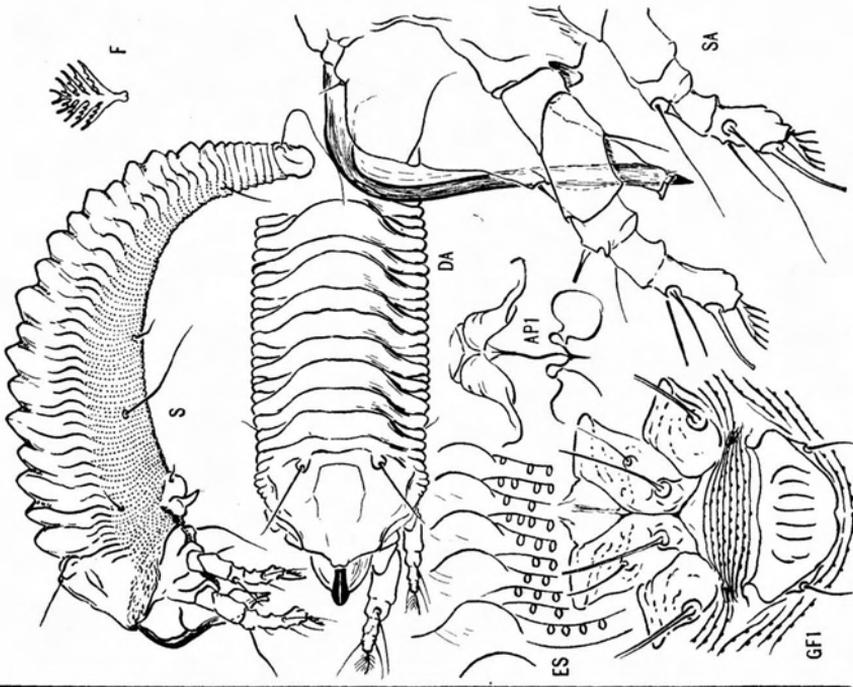


PLATE 193. *Quadracus urticae*, n. sp.

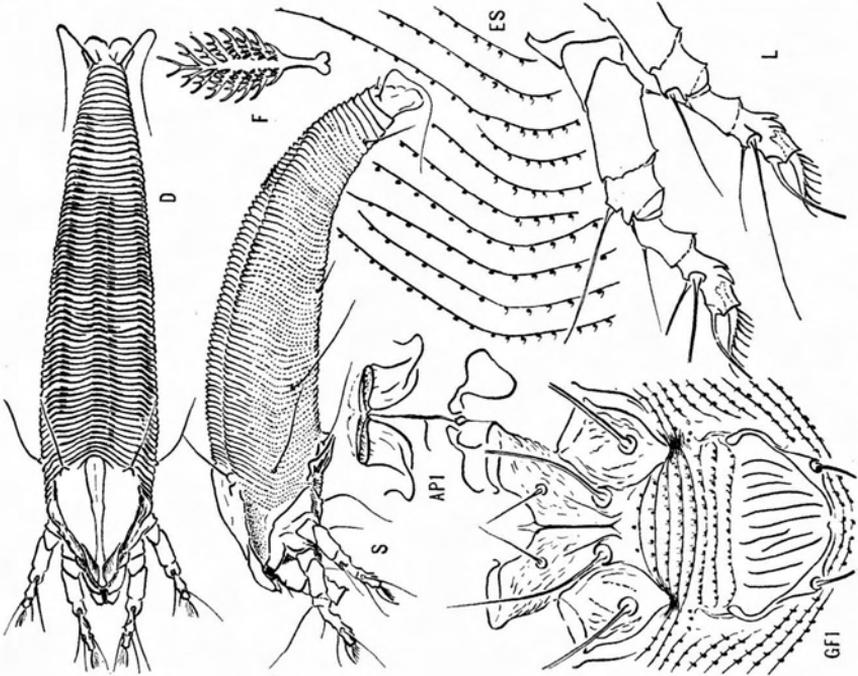


PLATE 192. *Abacarus hystrix* (Nal.)