ERIOPHYID STUDIES B - 21

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California Department of Agriculture

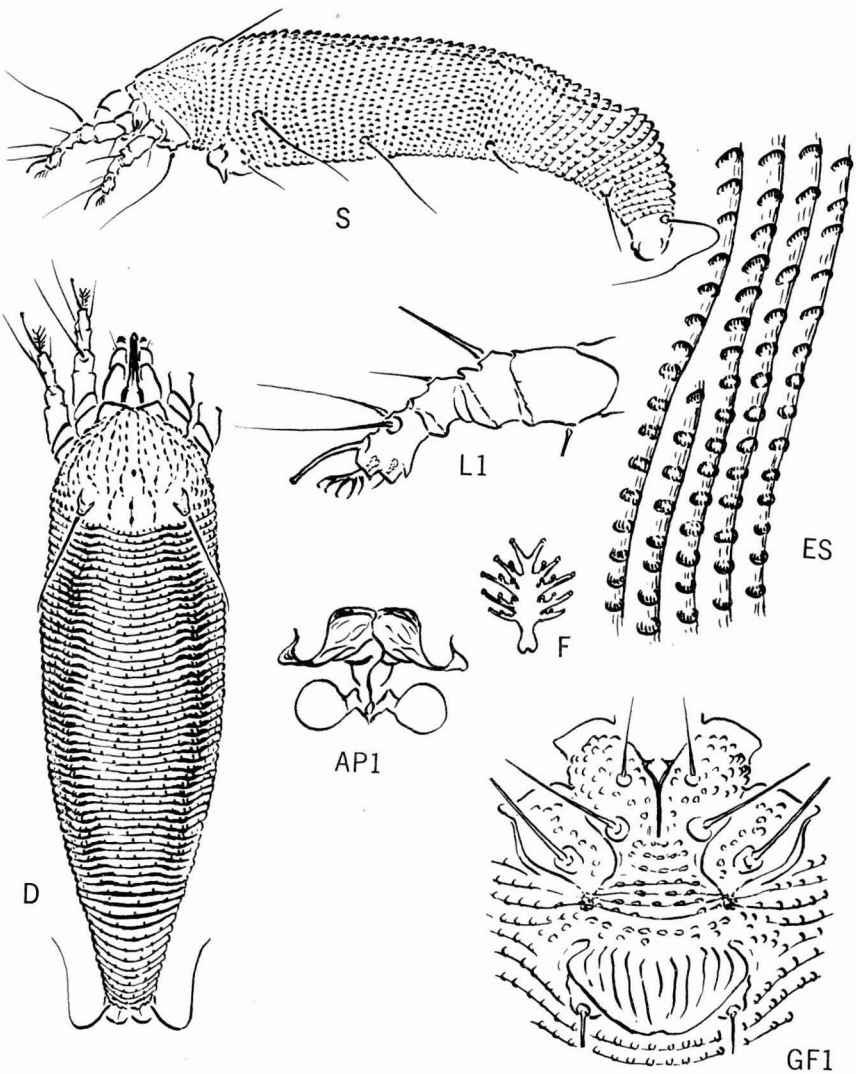

Plate 1 - Acaralox harperi, new species

ISSUED - Nov. 23, 1966

Acaralox, new genus

Body somewhat flattened-fusiform, the cephalothoracic shield not projecting over rostrum base, abdomen with broad dorsal depression for 4/5 of length, telosome plus about 5 rings of thanosome abruptly downturned. Rostrum small, with short form oral stylet. Shield subtriangular: dorsal tubercles slightly ahead of rear margin, with transverse base, directing dorsal setae divergently to rear. Legs with all usual segments and setae, empodium (featherclaw) simple, undivided. Abdomen not laterally differentiated into tergites and sternites, the rings approximately equal above and below; all usual setae typical of the Eriophyidae present. Female genitalia a moderate distance behind coxae; coverflap ribbed; internal genital apodeme projecting forward.

The genotype is an open leaf mite, lying on the undersurface of the leaf similar to rust mites. But since the species has no anterior projection from the shield overhanging the rostrum base, and since there is no dorsoventral ring differentiation, it must be considered as a member of the Eriophyidae-Eriophyinae. The conclusion is that this is an Eriophyine mite which has taken up an open habitat and that the dorsal trough it possesses is in response to the habitat.

Nalepa has named and figured a beech mite as Monochetus sulcatus, 1892. He puts it in the Eriophyinae but shows an anterior projection over the rostrum. This beech mite is described as having a narrow dorsal trough, apparently narrower than Acaralox. I have not had the opportunity to properly study Monochetus.

I am naming the genotype for R. W. Harper, Chief of the California Bureau of Entomology, with whom I have had a very pleasant association for a number of years.

Genotype - Acaralox harperi, new species

Acaralox harperi, new species

Plate 1

Female 115µ-155µ long, 35µ wide, 28µ thick; flattened-fusiform; color in life brown. Rostrum 20µ long, curved down; antapical seta 3.5µ long. Shield 23µ long, 25µ wide, subtriangular in dorsal view, slightly raised between dorsal tubercles. Shield design of lines of granules: median line present on rear half, principally between dorsal tubercles; admedian lines from above rostrum base, subparallel for first half, slightly arching and recurving to 3/4, the anterior part ending at 3/4, with rear parts of admedians somewhat farther apart than anterior, arching back to rear margin. First submedian line from side of admedian at front, gently diverging toward dorsal tubercle and arching inward before tubercle. A lateral line from anterior side of first submedian, running back to partial rings below tubercle and giving off submedians subparallel to first. Sides of shield granular. Dorsal tubercles 19µ apart; dorsal setae 17µ long. Foreleg 21µ long; tibia 4µ long, with 3µ seta at 1/2; tarsus 5.5µ long; claw 7µ long, knobbed; featherclaw 5-rayed. Hindleg 20µ long, tibia 3.5µ long, tarsus 5µ long, claw 7.5µ long. Coxae granular, anterior coxae broadly connate with moderate sternal line between; first setiferous coxal tubercles slightly closer than second and a little behind anterior coxal approximation; second tubercles well ahead of line across third tubercles. Dorsal longitudinal trough on abdominal thanosome extending back to about ring 50, there being about 56 rings to telosomal seta; anterior central part of trough somewhat convex. Microtubercles rounded or elliptical, touching ring margins, sparser toward rear in trough. Lateral seta 13µ long, on ring 7; first ventral seta 19µ long, on ring 20; second ventral 5µ long, on ring 37. Telosome with 4-6 rings from seta to rear, but with deflexed functional telosome consisting of about 10 rings. Telosomal microtubercles more beadlike than on thanosome; seta moderately stiff, 10µ long. Accessory seta about 2.5µ long. Female genitalia 16µ across, 11µ long; coverflap with 10-12 longitudinal ribs; seta 5.5µ long.

Type locality: South end of Chiles Valley, Napa County, Cal.

Collected: September 7, 1966, by the writer

Host: Cercocarpus betuloides Nutt. (Rosaceae) mountain mahogany

Relation to host: the mites lie on the undersides of the leaves over the hairs which fill the depressions between the network of veins, and insert their heads down into the hair mass.

Type material: there are 9 slides with the above data, and a vial of leaves and mites in liquid. A type slide is so designated, with emphasis on a lateral view. The other 8 slides are paratypes.

Acaralox harperi occurs in company with Epitrimerus chilesi K. (B-19). I first collected both species in this location in 1952.

Aceria plantagicola, new species

Plate 2

This is a grass-type mite with the first submedian line running back toward the dorsal tubercle and then turning laterally just in front of the tubercle. This species has a 5-rayed featherclaw. The time-honored grass mite of Europe is Aceria tenuis (Nal.), 1891 (Denk. Ak. Wiss. Wien 58:871) which Nalepa characterizes as having a 5-rayed featherclaw. In addition he states that tenuis has a long rostral seta, a longer tibia than tarsus, and 80-90 body rings. But we still are without information as to whether the shield pattern is of lines of granules or these lines are solid, what the ornamentation of the coxae is, and the form of the microtubercles. The 5-rayed featherclaw is the key to recognizing tenuis. Featherclaws are somewhat irregular, but an examination of a series of examples of each population studied will soon disclose the standard number of rays in any case. Mites with more than five rays on the empodium cannot be Nalepa's species. Nalepa gives the length of tenuis as 200µ. which is shorter than the average for the new species.

Plantagicola would seem to differ from Nalepa's figure of tenuis by lacking a line between the admedian and the dorsal tubercle. It also does not have a long rostral seta and the tibia is shorter than the tarsus. The body rings, however, are approximately the same in number as tenuis.

The host of plantagicola offers a problem. It is a native Plantago characterized as an annual. Since Eriophyids are not facultative travelers they must depend on overwintering hosts for survival, so this host is a contradiction, or, as in the case of some other species it has a perennial host as yet unknown, from which it can infest suitable annuals.

Female 190µ-270µ long, 55µ-60µ thick; elongate-wormlike; color in life probably light yellowish-white. Rostrum 25µ long, projecting ahead and down; antapical rostral seta 6µ-7µ long. Shield 37µ long, 41µ wide, anterior outline subsemicircular. Shield design of solid lines except laterally below the dorsal tubercle; median line present except at extreme anterior, broken. Admedian shield lines complete, gently diverging to rear, arched out at about 3/4. First submedian line from side of admedian at anterior edge, running back toward dorsal tubercle but curving outward for short distance in front of tubercle. Numerous granules and short dashes in area between dorsal tubercles. A lateral line from anterior end of submedian soon becoming granular and fading in general lateral area; some partial rings below tubercle. Dorsal tubercles 27µ apart; dorsal seta 60µ long. Foreleg 40µ long; tibia 9µ long, with 7.5µ seta from near base; tarsus 10µ long; claw 9µ long, tapering; featherclaw 5-rayed. Hindleg 37µ long, tibia 7µ long, tarsus 10µ long, claw 9.5µ long. Coxae ornamented with numerous curved dashes and curved lines of granules on each side of sternal line; first coxae somewhat divergent, with short sternal line between. First setiferous coxal tubercles farther apart than second and a little behind anterior coxal approximation; second tubercles a little ahead of line through third tubercles. Abdominal thanosome with about 73 rings, completely microtuberculate, these structures pointed; dorsally the microtubercles touching ring margins but drawn ahead usually ventrally. Lateral seta 25µ long, on ring 10; first ventral seta 58µ long, on ring 27; second ventral 15µ long, on ring 46. Telosome with 7 rings, the microtubercles similar to those on the thanosome except more beadlike on margins and elongate anteriorly ventrally. This ventral elongation extending somewhat ahead of telosome. Telosomal seta 24µ long. Accessory seta 4.5µ long. Female genitalia 29µ across, 19µ long; coverflap with about 20 somewhat irregular longitudinal ribs; seta 19µ long.

Type locality: Prescott, Arizona

Collected: August 19, 1965, by D. M. Tuttle

Host: Plantago purshii R.& S. (Plantagenaceae) plantain

Relation to host: unstated, probably around buds and at petiole bases.

Type material: the specimens were received in syrup from which five slides were made, with some mites remaining in the liquid. A type slide, with the above data is designated, with emphasis on a specimen in a dorsoventral position. The remaining four slides are paratypes.

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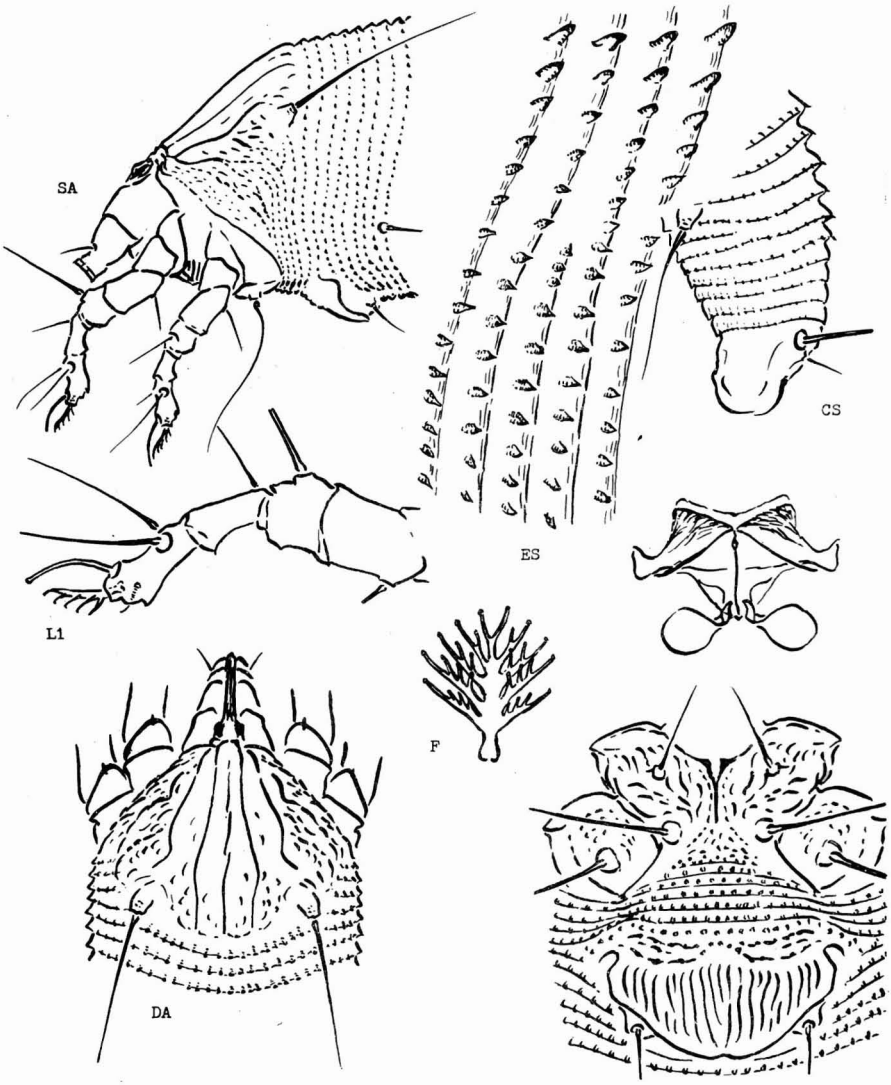

Plate 2 - Aceria plantagicola, new species

Aceria beniciae, new species

Plate 3

With its 5-rayed featherclaw, this species differs from allenrolfeae K.(ES-XIX,Bul. Cal. Dept. Agr. 41:67, 1952), a 6-rayed species found also on Salicornia but in Southern California,by the following characters: definite lines on shield at rear margin between dorsal tubercles, curved line across center linking each second setiferous coxal tubercle, no ribs on coverflap.

Female 190µ-220µ long, 50µ-55µ thick; wormlike; color in life light yellowish-white. Rostrum 22µ long, curved down; antapical seta 8µ long. Shield 25µ long, 38µ wide,anterior outline semicircular in dorsal view. Shield with no design except line in front of dorsal tubercle running diagonally back and centrad to rear margin and there meeting cross line from opposite diagonal line. Shield laterally with a longitudinal line above coxae and about three partial rings below dorsal tubercle. Dorsal tubercles 25µ apart; dorsal setae 45µ long.Foreleg 28µ long; tibia 5µ long, with 8µ seta from about 1/3-1/2; tarsus 7.5µ long; claw 6.5µ long, downcurved; featherclaw 5-rayed.Hindleg 26µ long,tibia 4,5µ long,tarsus 7µ long, claw 9µ long.Coxae unmarked except for cross linefrom second tubercles;anterior coxae with no sternal line between,the connation line unclear. First setiferous coxal tubercles closer than second and situated toward anterior end of coxae. Second tubercles but little inside hypothetical line from first to third tubercles; second tubercles connected across by anteriorly concave line. Abdominal thanosome with about 60 rings, completely microtuberculate; the microtubercles more or less ahead of ring margins,rounded except for those on venter just behind genitalia which are pointed. Lateral seta 31µ long, on about ring 8 behind shield; first ventral seta 92µ long, on ring 19;second ventral 10µ long, on ring 36. Telosome with 5 rings; completely microtuberculate, these structures bead-like on ring margins,projecting slightly over margins and more or less pointed, especially ventrally; ventral microtubercles with anterior thread-like extensions.Telosomal seta 38µ long. Accessory seta 4µ long. Female genitalia 19µ across, 15µ long; coverflap unmarked; seta 10µ long.

Type locality: 5 miles north of Benicia, Cal.

Collected: July 21, 1964, by the writer

Host: Salicornia virginica L. (Chenopodiaceae) pickleweed

Relation to host: the mites live between the joints

Type material: there are six slides bearing mites with the above data; a type slide is designated, with emphasis on a dorsoventral view; the other five slides are paratypes.

Designations on Plates

AP1 - Internal female genital structures
CS - Telosome and anal lobes, side view of caudal section
D - Dorsal view of mite
DA - Dorsal view of anterior section of mite
ES - Side skin structures
F - Empodium or featherclaw
GF1 - Female genitalia and coxae
L1 - First left leg
S - Side view of mite
SA - Side view of anterior part of mite

Thanosome - that part of the abdomen ahead of third ventral seta
Telosome - the abdomen from about the third ventral seta to anal lobes

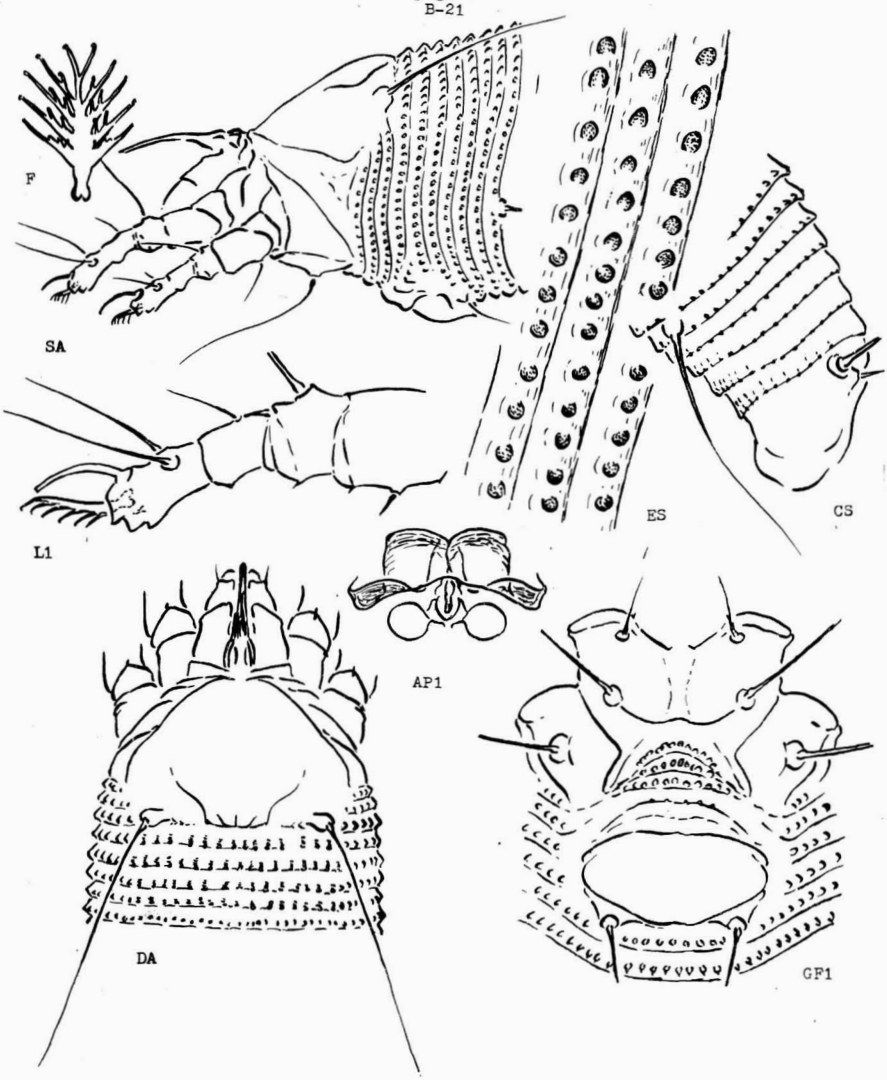

Plate 3 - Aceria beniciae, new species

Paraphytoptus bativagrans, new species

Plate 4

The new species has a 6-rayed featherclaw as on Paraphytoptus brickelliae K. and on arceuthobii K.,but differs from the former by having the strong sternal doubling restricted to the rear of the abdomen, and from the latter species by having less of a network shield pattern.

Female 105μ-115μ long, 40μ thick, robust; color light yellowish-white. Rostrum 23μ long,projecting down; antapical rostral seta 6.5μ long, somewhat attenuate. Shield 28μ long, 35μ wide, semicircular in anterior outline; median line almost complete, sinuate, ending at rear margin in a dart-shaped mark, and a faint dart-shaped mark at about 3/4; admedian lines roughly parallel to median, complete, sinuate; first submedian line curving back from chelicera base to about 1/3; then recurving slightly and extending toward dorsal tubercles, ending in front of these tubercles in granulations suggesting a fork; second submedian lines faint, of granules, marking inner margin of extensive lateral granular area. Dorsal tubercles 26μ apart, on rear margin;dorsal setae 27μ long,diverging somewhat to rear.Forelegs 27μ long; tibia 6μ long, with 7μ long seta at about 1/3; tarsus 7μ long; claw 6.5μ long, tapering, with slight knob; featherclaw 6-rayed. Hindlegs 24μ long, tibia 5μ long, tarsus 7μ long, claw 8.5μ long. Anterior coxae rather narrowly contiguous centrally, first coxal setiferous tubercles slightly farther apart than second, opposite anterior junction of coxae; second tubercles ahead of transverse line through third setiferous coxal tubercles.Abdomen completely microtuberculate, the microtubercles touching rear ring margins;some ventral to dorsal decrease in ring number, but strong doubling of ventral rings starts about 9 or 10 rings ahead of third ventral seta;about 45-50 dorsal rings and 60 ventral rings.Lateral seta 17μ long,on about ring 9; first ventral seta 38μ long, on about ring 21; second ventral 14μ long, on ring 36; third ventral seta 23μ long, on ventral ring 5 from rear. Accessory seta 4.5μ long. Female genitalia 23μ wide, 15μ long;coverflap with 14-16 longitudinal ribs; seta 29μ long.

Type locality: "Fossil Beds", Dayville district, Grant County, Oregon

Collected: August 7, 1962, by the writer.

Host: Sarcobatus vermiculatus (Hook.) (Chenopodiaceae), alkali greasewood

Relation to host: the mites are vagrants on the fleshy finger-like leaves and in the flower heads.

Type material: a type slide
six paratype slides
mites in liquid and on dry host material

Note on Eriophyid leg setation and on the empodium (featherclaw)

The general structural reductions undergone by Eriophyoid mites have swept away all but a few of their setae. It is therefore easy to learn the position of every seta, to properly place each one, or to note the absence of any of them. There is, in the main, a regular setal pattern on Eriophyoids, and rearrangements of setae, or their absence, are criteria for generic, subfamily,or even family definitions. Leg setae are no exception to this and when describing and figuring an Eriophyoid it is essential that these leg setae be properly placed. It is also essential that leg segments be adequately understood.

The Eriophyoid foreleg has a ventral seta on the femur as a standard feature, not on the side or on top. When this femoral seta is absent that fact is of generic importance. The patella has one seta on top, or occasionally lateral (some Phytoptids), or the seta is rarely absent, as in some Rhyncaphytoptids. The foretibia usually has a dorsal seta although this may be absent in some species and genera. Nothopodines lack the tibia or have a vestigial one. On the Phytoptidae there is usually a lateral foretibial spur. This spur seems to take on the characteristics of a seta at times. The foretarsus possesses a pair of upper setae near the base, with few exceptions, and it has a small seta on the inner face. Novophytoptus has a small seta on the lower, outer side of the foretarsus.The hindleg has the same setae as the foreleg except there is never a hindtibial seta.

The socalled 'claw' on the Eriophyoid tarsus is not a true claw,as has been pointed out. It is possibly an adapted sensory club.

The Eriophyoid empodium is a branched structure which articulates from a ball and socket base.It is in effect a clinging brush.Each branch from the main stem has one or more lesser branches (usually a maximum of about 4), except the terminal pair. All these branches curve down and terminate in a hook or enlargement. In other words these branches are tennant hairs. In this respect Eriophyoid empodia resemble the claw hairs on Tetranychids, and on some of the Tetranychid empodia.Occasionally the Eriophyoid empodial branches lack these terminal hooks, or are bifurcate. These structures are of specific importance and such data will help specific definitions.

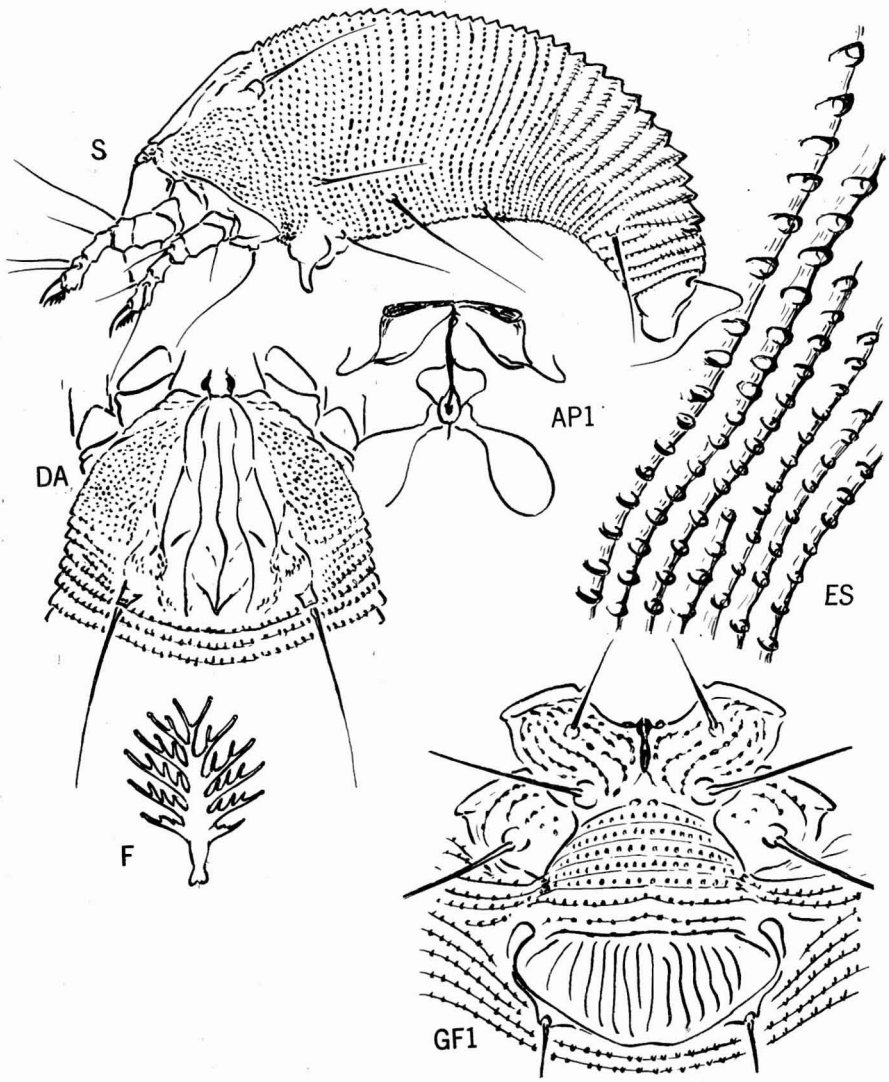

Plate 4 - Paraphytoptus bativagrans, new species

Anthocoptes shepherdiae, new species

Plate 5

Anthocoptes as a genus is characterized by dorsal tubercles located on the rear shield margin, directing the setae backwards, by simple featherclaws, and by the broad tergites on the thanosome that end rather abruptly at the telosome. This species qualifies for the genus except possibly the distinction between the telosome and thanosome is not too clear cut. Shepherdiae has a 5-rayed featherclaw, and from other members of the genus, that are known in North America, it differs by having a shield pattern of lines of granules.

Female 125μ-155μ long, 35μ-40μ thick, 40μ-43μ wide; fusiform; color in life light yellowish-white. Rostrum 23μ long, projecting diagonally down; antapical seta 3μ long. Shield 31μ long, 37μ wide, with short moderately acute lobe over rostrum base. Shield design rather faint but of granular lines: median line slightly indicated, usually ending in a dart-shaped mark; admedian lines from sides of anterior lobe, diverging, branching ahead of dorsal tubercles and a little centrad, the inner line curving back centrad to rear margin, the outer branch meeting the first submedian. First submedian line stronger than admedian, running back from side of anterior lobe subparallel to admedian, branching laterally about at 1/2, meeting branch from admedian and joining dorsal tubercle base. Shield laterally with about two granular lines and a band of granules above coxae; partial rings below dorsal tubercle. Dorsal tubercles 23μ apart; dorsal setae 18μ-22μ long. Foreleg 24μ long; tibia 5μ long, with 7.5μ seta from 1/3; tarsus 6μ long; claw 8μ long; featherclaw 5-rayed. Hindleg 23μ long, tibia 4μ long, tarsus 6μ long, claw 8μ long. Coxae with faint granular ornamentation, the anterior coxae somewhat divergent, with short sternal line between. First setiferous coxal tubercles slightly farther apart than second and slightly behind anterior coxal approximation; second tubercles ahead of line across third tubercles. Abdominal thanosome with about 15 broad tergites and some partial lateral ones, the microtubercles on tergites elongate, varying in distinctness, reaching tergal margins. About 55 thanosomal sternites with somewhat elongate microtubercles, unpointed. Lateral abdominal seta 12μ long, on about sternite 8; first ventral seta 30μ long, on sternite 21; second ventral 6.5μ long, on sternite 36. Telosome with 5 rings, the microtubercles beadlike on margins and with thread-like anterior elongations; seta 14μ long, on second ring. Accessory seta 2μ long. Female genitalia 19μ across, 14μ long; coverflap with about 3 basal cross lines of granules and 10-12 rather faint longitudinal ribs; seta 13μ long.

Type locality: Slinkard Canyon, Topaz district, Mono County, Cal.

Collected: July 28, 1960, by the writer

Host: Shepherdia argentia Nutt. (Elaeagnaceae) buffalo berry

Relation to host: the mites are undersurface leaf vagrants

Type material: there are mites in syrup, with leaves, that bear the above data, and from which the type slide and paratypes came. The type slide is so labeled, with emphasis on a side view, but also a dorso-ventral setting. The remainder of the slides are paratypes. There are a few examples of Aceria shepherdiae K. (B-20) mixed in with the Anthocoptes, but these are easily separated by not having the broad back plates.

Aculops, new genus

Fusiform mites belonging to the Eriophyidae-Phyllocoptinae, with short oral stylet. All regular Eriophyid setae present. Like Aculus in having an anterior cephalothoracic shield lobe over rostrum base, this lobe small or of moderate size, acuminate-rounded or terminating in a sharp or spinelike point. Differs from Aculus by lacking pair of small spines projecting forward from lower front of anterior lobe margin. Dorsal shield tubercles usually subcylindrical, projecting back over rear shield margin, directing dorsal setae to rear, usually divergently. Abdominal thanosome on non-gallmakers clearly divided laterally into broader tergites and narrower sternites; this distinction less clear on most gallformers, the deutogynes tending to have clearer dorsoventral distinction. Thanosomal microtubercles round, elliptical, or produced as spinules; either set ahead of ring margins dorsally, extending anteriorly from margins, or, as spinules bent either ahead or caudad from ridges. Genitalia not closely appressed to coxae; interior female apodeme extending forward from base.

Genotype- Vasates populivagrans K. (ES-XXI, Bul.Cal.Dept.Agr.42:68,1953), which will hereafter be quoted as Aculops populivagrans (K.). This species is a leaf vagrant, it has strong tergal-sternal differentiation and is deuterogynous. The anterior shield lobe terminates in a point. Aculops contains leaf vagrants, rust mites and gall makers. The genus is erected to separate typical Aculus species with anterior lobe points from these other species which lack these points.

Examples of species now falling into Aculops are: laevigatae (Hassan), lobuliferus (K.) morgani (K.), pelakassi (K.), copallina (K.), magnolivora (K.), euphorbicolus (K.), tephrosiae (K.). The tomato russet mite, lycopersici Massee, fits into Aculops better than it does into Aculus, but the anterior shield lobe on lycopersici is still unique.

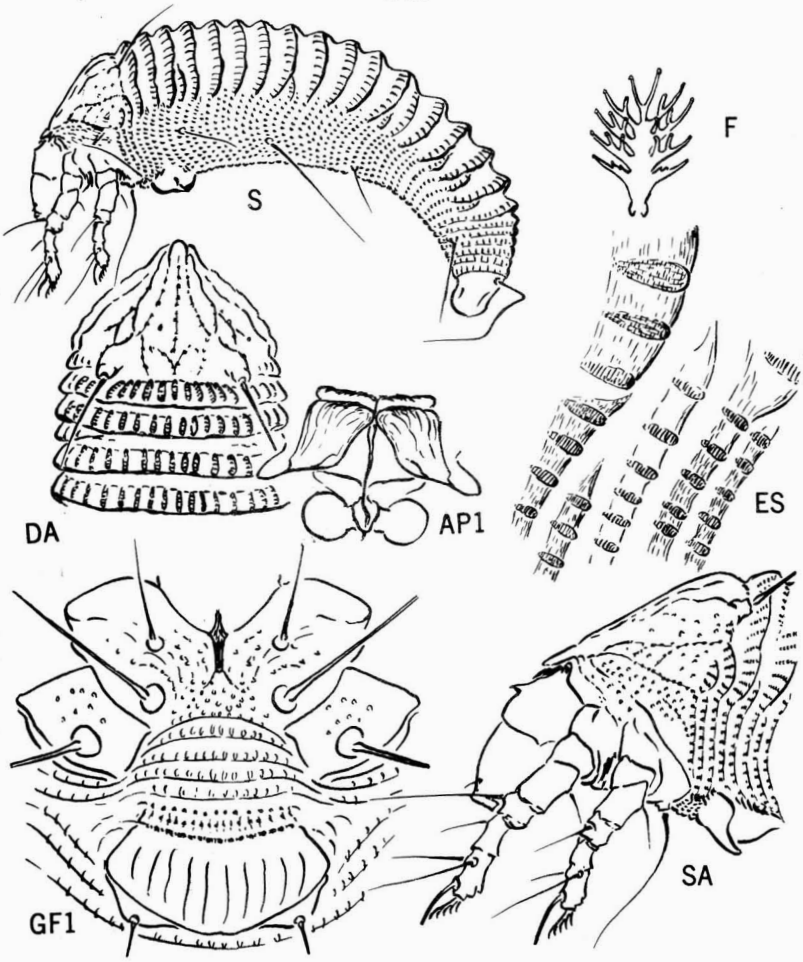

Plate 5 - Anthocoptes shepherdiae, new species

Aculops hussongi, new species

Plate 6

Hussongi looks superficially like a Paraphytoptus but the anterior lobe over the rostrum and the division of the thanosome into tergites and sternites for the whole length separates this species from Paraphytoptus. In casting about for a species to compare this new one to no very plausible relative comes to light. In case it might be confused with Aceria calilupini K.(ES-V), this latter species has no tergal-sternal division on the thanosome, and the shield has no anterior lobe.

I am pleased to name this mite for Merle Hussong, chief of the publicity section of the Calif. Dept. of Agriculture for his continued interest in Entomology and his assistance to me through the years.

Female 190µ-215µ long, 39µ thick; body wormlike in shape; color light yellowish. Rostrum 28µ long, curved down; antapical seta 7.5µ long. Shield 37µ long, 37µ wide, rather acuminately triangular in anterior outline. Shield lobe over rostrum narrow with point rounded. Shield design a network: median line only plain on rear fourth where it branches into a cross line between rear part of admedians; admedian lines faint on anterior lobe, with a cross line just behind anterior shield lobe, branching outwardly at about 1/3, extending back and forking at 2/3, the inner lines joining across middle, the outer forking again, the inner branch being the rear convex extension of the admedian to near the rear shield margin, the outer meeting the first submedian line in front of the dorsal tubercle. Anterior outer fork of the admedian forming an upper lateral line extending to rear below dorsal tubercle and giving off the submedian complex of lines in front of and to the side of the dorsal tubercle. Sides of shield with lines and granular bands; 2 or 3 partial rings below tubercle. Dorsal tubercles 22µ apart; dorsal setae 31µ long, usually extending in subparallel manner to rear. Forelegs 33µ long; tibia 8µ long, with 6.5µ seta from 1/3; tarsus 7µ long; claw 8.5µ long, slender, tapering, downcurved; featherclaw 7-rayed. Hindleg 31µ long, tibia 6µ long, tarsus 7.5µ long, claw 7.5µ long. Coxae ornamented with lines of granules, the anterior coxae broadly joined at a heavy central sternal line; first setiferous coxal tubercles slightly farther apart than second and slightly behind anterior coxal approximation; second tubercles ahead of line across third tubercles. Abdominal thanosome with about 39 tergites and 66 sternites, the tergites becoming progressively broader and more projecting to rear; tergal microtubercles somewhat elongate, projecting up from each tergal ridge as small rounded knobs; sternal microtubercles beadlike, somewhat ahead of ring margins and acuminate. Lateral seta 29µ long, on about sternite 10; first ventral seta 42µ long, on sternite 24; second ventral 21µ long, on sternite 42. Telosome with 6 rings the first 2 or 3 similar to those ahead; microtubercles beadlike on ring margins, finely elongate anteriorly; seta 21µ long. Accessory seta 4µ long. Female genitalia 22µ wide, 11µ long; coverflap with a coarse granular cross line at base and with 12-14 longitudinal ribs; seta 35µ long.

Deutogyne with about same dimensions as protogyne, dull yellow brown in color, completely lacking microtubercles.

Type locality: upper Kings Creek, Lassen National Park, Shasta County, Cal.

Collected: August 18, 1966, by the writer

Host: Lupinus obtusilobus Heller (Leguminosae) satin lupin

Relation to host: the mites are common on the upper surfaces of the leaves where they crawl around among the hairs. In this respect they live in a Paraphytoptus habitat.

Type material: six slides bear the above data
one slide is designated as type, the others are paratypes
there are also leaves with mites in syrup and dry leaves with mites.

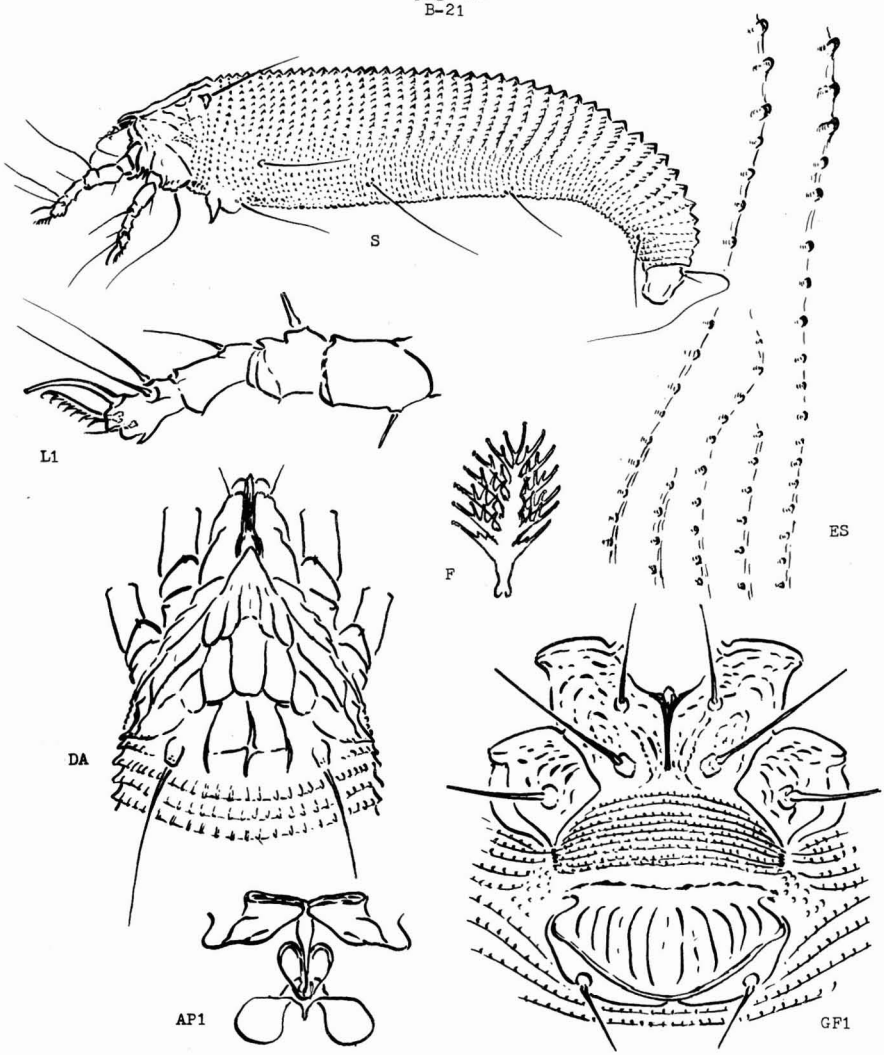

Plate 6 - Aculops hussongi, new species

Aculops alachuae, new species

Plate 7

The protogyne of alachuae looks almost like a species of Aceria except for the small, sharp anterior shield lobe over the rostrum base. The deutogyne of alachuae which has considerably less strong microtubercles has a slightly better dorsoventral differentiation in ring number. Within the genus Aculops the new species is similar to a western Rhus leaf gallformer, namely rhoicecis (K.) (B-7, May 9, 1962). The new species differs from rhoicecis by being smaller, having more coxal granulations, and by having the first submedian line granular to the rear.

Female 160μ-180μ long, 40μ thick; fusiform in shape; color in life probably light yellowish-white. Rostrum 20μ long, downcurved; antapical rostral seta 6μ long. Shield 34μ long, 35μ wide, triangular in anterior outline with a very short acute anterior lobe over rostrum base. Median line broken but discernable on rear 4/5 and ending as a dart-shaped mark just ahead of rear margin. Admedian lines complete, from sides of small anterior lobe, gently arching laterally and recurving to 2/3, then reaching and recurving to rear margin. First submedian from side of anterior lobe, subparallel to admedian and with same sinuations, becoming a line of granulations at 2/3 ahead of dorsal tubercle, forking in front of tubercle, the inner branch arching to rear margin centrad and meeting rear end of admedian. Outer branch of submedian extending laterally past dorsal tubercle to upper end of partial ring. A strong lateral line from front margin diverging from first submedian to first partial ring. Moderate granular band above coxae. Dorsal tubercles 24μ apart; dorsal setae 27μ long. Foreleg 32μ long; tibia 8μ long, with 6μ seta at 1/4; tarsus 7μ long; claw 7.5μ long; featherclaw 4-rayed. Hindleg 29μ long, tibia 6μ long, tarsus 7μ long, claw 7.5μ long. Coxae ornamented with granules that extend to suboral plate; anterior coxae broadly connate centrally with moderate sternal line. First setiferous coxal tubercles slightly farther apart than second and a little behind anterior coxal approximation; second tubercles ahead of line across third tubercles. Abdominal thanosome with about 55 rings almost equal dorsoventrally completely microtuberculate except for dorsum of rear 8 or 10 rings, the microtubercles more elongate dorsally, more beadlike ventrally, rounded, touching rear ring margins except for anterior venter where they are a little ahead. Lateral seta 16μ long, on ring 9; first ventral seta 47μ long, on ring 21; second ventral 15μ long, on ring 36. Telosome of about 6 rings, the microtubercles as fine marginal beads, obscure dorsally, slightly pointed, possessing anterior lines; seta 20μ long. Female genitalia 20μ across, 13μ long; coverflap with recurved basal cross lines bearing granules, and 10-12 longitudinal ribs; seta 21μ long.

Type locality: Alachua County, Florida

Collected: July 14, 1966, and Oct. 3, 1966, by H. A. Denmark

Host: Rhus copallina L. (var. leucantha) (Anacardiaceae) winged sumach

Relation to host: the mites form dark red or black bead galls on the leaves

Type material: consisting of 11 slides and dry leaves with galls bearing the above data. The type slide has the date: Oct. 3. The other ten slides are paratypes.

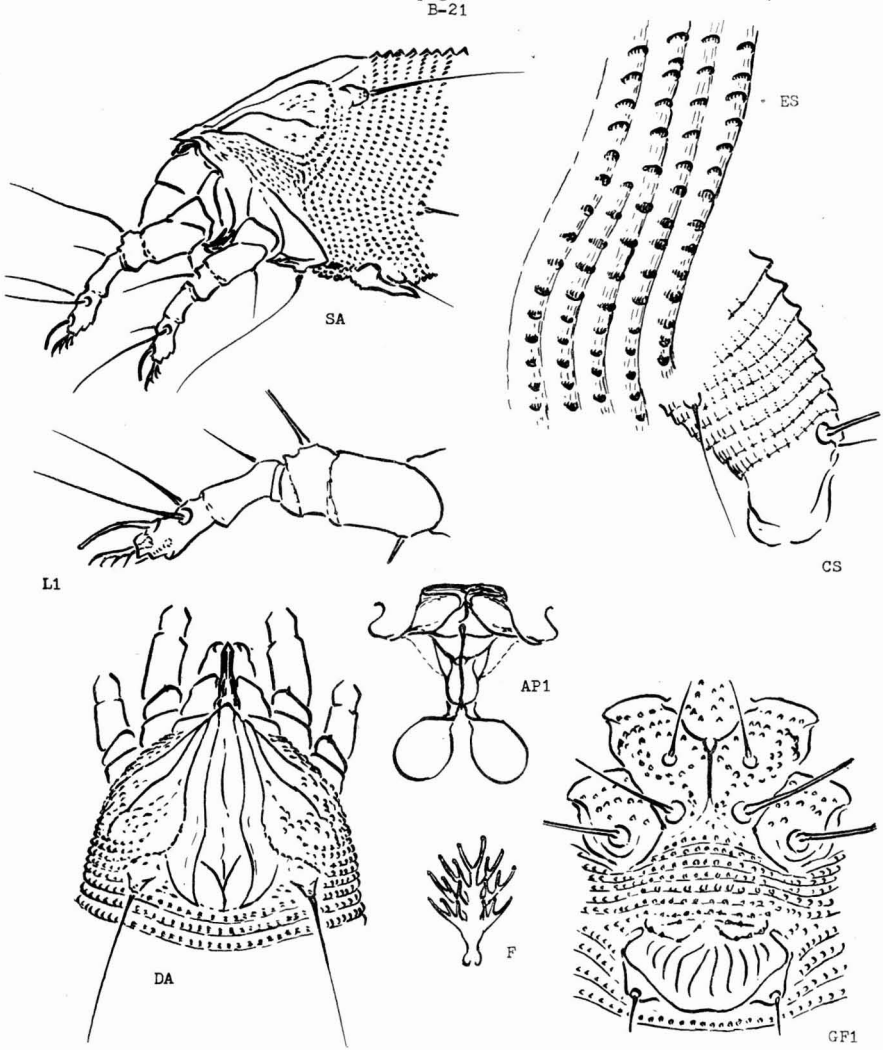

Plate 7 - Aculops alachuae, new species

Aculops arizonarhus, new species

Plate 8

Arizonarhus has a moderate size anterior shield lobe over the rostrum which is rounded in dorsal view and rather thin in side view. The shield pattern consists of the rear part of the admedian lines reaching the rear margin and curving to meet eachother along the margin. Of the 4-rayed featherclaw species of Aculops the closest structurally is parapycnanthemi (K.)(B-11,p.5,1964) but it lacks as strong dorsal microtubercles as the new species. Parapycnanthemi may after all prove to be the deutogyne of Aculops pycnanthemi (K.). Pycnanthemi has a pointed anterior shield lobe.

Female (arizonarhus) 180µ-195µ long, 45µ-50µ thick;fusiform; color in life probably light yellowish-white.Rostrum 24µ long,projecting down;antapical seta 5µ long. Shield 37µ-40µ long, 40µ-43µ wide, anterior lobe of moderate size over rostrum, acuminate-rounded,thin in lateral view. Shield design obsolete except for rear part of admedian lines between dorsal tubercles,curving back to rear margin and extended centrad along the margin to meet centrally; shield laterally with a band of granules above coxae. Dorsal tubercles 24µ apart;dorsal setae 22µ long,diverging to rear. Foreleg 32µ long; tibia 7µ long, with 5µ seta from 1/3;tarsus 7µ long;claw 7µ long; featherclaw 4-rayed. Hindleg 28µ long, tibia 6µ long, tarsus 6µ long, claw 7µ long. Coxae ornamented with curved lines of granules;anterior coxae with moderate sternal line between. First setiferus coxal tubercles farther apart than second and behind anterior coxal approximation; second tubercles a little ahead of a hypothetical transverse line across third tubercles. Abdominal thanosome with about 45 tergites and 60 sternites. Microtubercles dorsally strong, reaching ring margins, elliptical-linear and produced or acuminate;ventrally the microtubercles more beadlike,ahead of rear margins but touching margins toward rear and becoming pointed and elongate. Lateral seta 18µ long, on sternite 7; first ventral seta 55µ long, on sternite 19; second ventral 14µ long, on sternite 39. Telosome with 6 rings, the microtubercles narrowly elongate and pointed over ring margins;seta 19µ long.Accessory seta 2.5µ long. Female genitalia 22µ across, 14µ long;coverflap with about three basal transverse lines bearing granules, the flap with 12-14 longitudinal ribs; seta 16µ long.

Deutogyne 130µ-160µ long, 45µ-50µ thick; anterior shield lobe considerably thicker in lateral view than the protogyne lobe. Deutogyne coxae with short lines as ornament rather than granules. Thanosomal tergites broader than on protogyne and about 28 in number;about 55 sternites.Dorsal microtubercles larger than on protogyne but fainter.

Type locality: Portal, Arizona

Collected: June 20, 1966, by V. D. Roth, and sent me by Don M. Tuttle

Host: Rhus microphylla Engelm. (Anacardiaceae) a sumach

Relation to host: the mites apparently deform the flower head

Type material: a vial of plant parts with mites, in syrup, with the above data, from which source the slides were made.
A type slide with protogynes is designated.
There are 10 paratype slides.

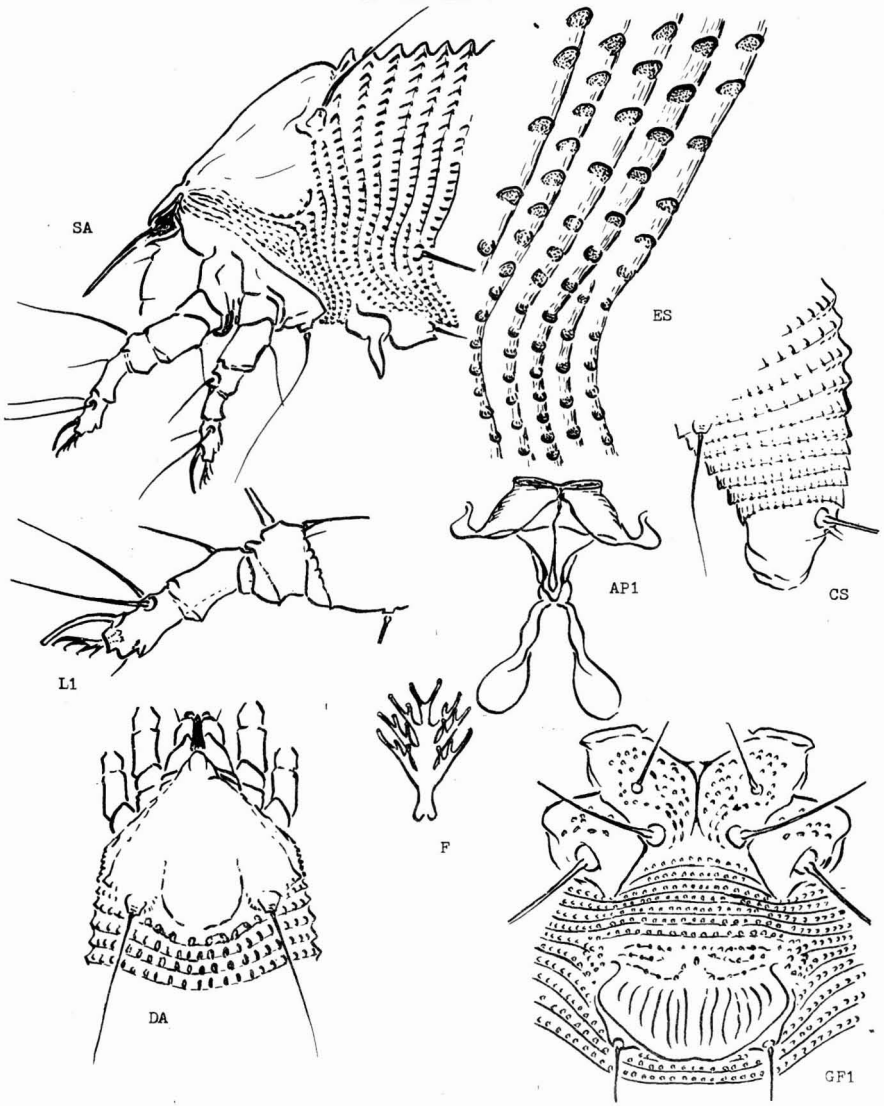

Plate 8 - Aculops arizonarhus, new species

Aculops carsonellus, new species

Plate 9

Carsonellus is comparable in a general way to the tetanothrix complex of willow leaf gall mites, but, whereas the tetanothrix series has 4-rayed featherclaws, this new one has 5-rayed structures. In addition, this one does not form what could be precisely called bead galls on the leaves. It makes elongate folds which have buldges, which buldges are slightly like bead galls.

Female 175µ-280µ long, 45µ-60µ thick; fusiform; color in life light yellowish-white. Rostrum large, about 38µ long, somewhat curved down; antapical seta 10µ long. Shield 45µ long, 40µ wide, subtriangular with prominent bluntly rounded anterior lobe over rostrum base; shield design a network, the lines fainter anteriorly and toward sides, wide and coarse centrally. Median shield line indicated on rear half; admedians faint from anterior lobe, becoming wide at about 1/2 and forming cells with median and first submedian, extending diagonally centrad and making an angle at their junction on rear margin. First submedian faintly extending back from side of anterior lobe, joining admedian before 1/2 at faint cross line, branching away from admedian at beyond 1/2, running toward dorsal tubercle and giving off two branches, a fainter lateral one at about 2/3, and the other at 4/5 to admedian. The cross line at 1/3 continuing laterally, giving off faint lines ahead and below it; a granular band above coxae and partial rings below dorsal tubercle. Dorsal tubercles 27µ apart; dorsal setae 45µ long. Foreleg 45µ long; tibia 13µ long, with 9µ seta from near base; tarsus 9µ long; claw 8µ long; featherclaw 5-rayed. Hindleg 43µ long, tibia 10µ long, tarsus 8.5µ long, claw 10µ long. Coxae ornamented with faint lines, the anterior coxae broadly connate with moderate sternal line between; first setiferous coxal tubercles slightly farther apart than second and behind anterior coxal approximation; second tubercles a little ahead of line across third tubercles. Abdominal thanosome with 40-44 tergites and about 74 sternites; microtubercles somewhat acuminate, tending to be pointed below; dorsal microtubercles larger, closer to ring margins than ventral microtubercles on the average. Lateral seta 35µ long, on sternite 11; first ventral seta 44µ long, on sternite 27; second ventral 30µ long, on sternite 52. Telosome with 5 rings; microtubercles as beads on ring margins, with fine anterior lines, projecting over margins dorsally; seta 40µ long. Accessory seta 3µ long. Female genitalia 23µ across, 16µ long; coverflap with about four basal cross lines with granules and 16 longitudinal ribs; seta 36µ long.

Type locality: Carson River about 5 miles south of Markleville, Alpine Co., Cal.

Collected: August 12, 1952, by the writer

Host: Salix exigua Nutt. (Salicaceae) a sandbar willow

Relation to host: the mites form elongate galls or folds in the leaf or on its edge.

Type material: the source of the slide material for this description comes from dry leaves with galls, in an envelope, that bears the above data
A type slide is so designated
There are 10 paratype slides

Note on synonymy

It is now apparent that Oxypleurites ferruginator K. is a synonym of Oxypleurites carinatus (Nal.). I named ferruginator from Brooklyn horse chestnut in 1956. Since then, specimens direct from European horse chestnut in Germany, and the coming of carinatus to California on planted trees, have confirmed the synonymy.

Nalepa - Zool.Jahrb.Syst. 6:329, 1892, carinatus described under Tegonotus
Nalepa - Zoologica 61:272, 1910
Keifer - Bul.Cal.Dept.Agr. 44(4):159, 1956, ferruginator

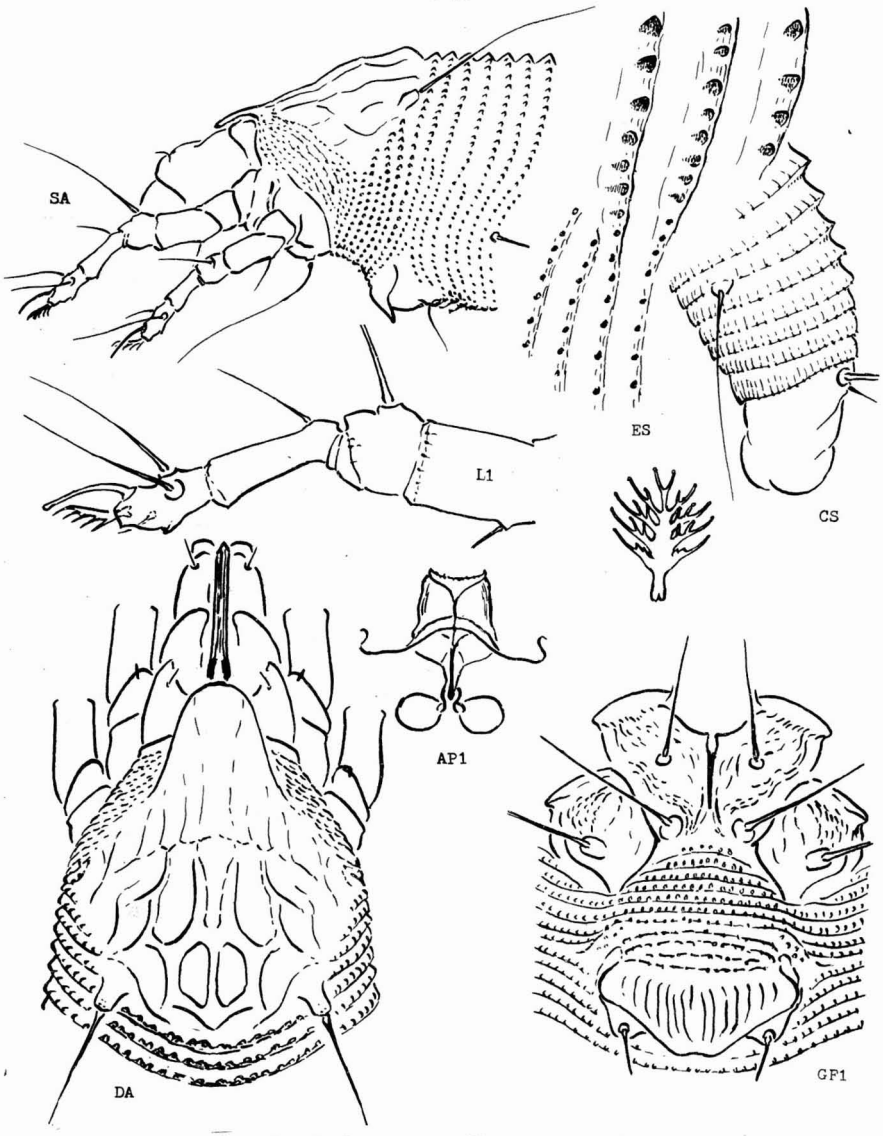

Plate 9 - Aculops carsonellus, new species

Aculops niphocladae, new species

Plate 10

Narrow shield lines and relatively small pointed microtubercles distinguish this northern willow leaf gall species from such members of the "tetanothrix complex" as laevigatae Hassan and vallis K. These two species have broad shield lines. One of the members of this complex which is common on eastern Salix nigra L., forming extensive gall colonies on the leaves of its host, is very similar to laevigatae, there being no immediately discernable structural difference.

Female 185µ-235µ long,45µ-60µ thick; wormlike-fusiform; color in life probably light yellowish-white.Rostrum 30µ long,projecting diagonally down;antapical seta 6µ-7µ long. Shield 38µ long,45µ wide, the anterior lobe short and blunt-rounded. Shield design of narrow lines bearing granules and short dashes: median line moderately clear on rear 2/3, meeting cross line at 1/3, another at about 2/3, and a dart-shaped mark at rear margin; admedian lines complete from side-center of anterior lobe, gently out-arched and back to cross line at 1/3, arching out farther from there back to cross line at 2/3, from there arching out still farther and back to cross lines just ahead of rear margin. First submedian line from side of anterior lobe,subparallel to admedian to first cross line, following it out shortly and then extending back toward dorsal tubercle, ending at second cross line.First cross line extending laterally to below dorsal tubercle and giving off lower diagonal lines, with a network between it and dorsal tubercle formed by second cross line and intermediate line. Shield laterally with a band of granules above coxae and partial rings below dorsal tubercle.Dorsal tubercles 25µ apart, somewhat produced as narrow cylinders; dorsal seta 60µ long. Foreleg 37µ long; tibia 10µ long, with 7µ seta from 1/5; tarsus 8µ long; claw 8µ long, with slight knob; featherclaw 4-rayed.Hindleg 35µ long, tibia 8µ long, tarsus 7.5µ long, claw 8.5µ long. Coxae ornamented with curved lines of fine granules and short dashes; anterior coxae moderately connate with narrow sternal line;first setiferous coxal tubercles farther apart than second and behind anterior coxal approximation; second tubercles ahead of line across third tubercles. Abdominal thanosome with about 57 tergites and 67 sternites, the microtubercles larger dorsally,but otherwise little dorsoventral differentiation. Microtubercles pointed,tending to be ahead of ring margins,especially ventrally. Lateral seta 25µ long,on sternite 10; first ventral seta 44µ long,on sternite 27; second ventral 26µ long, on sternite 47. Telosome with 6 rings, completely microtuberculate, these structures beadlike on margins, pointed, extended thread-like anteriorly. Telosomal seta 30µ long. Accessory seta 3.5µ long. Female genitalia 25µ across, 20µ long; coverflap with three basal cross lines of rather coarse dashes, about 12 longitudinal ribs; seta 41µ long.

Type locality: Inuvik, Northwest Territory, Canada (north of arctic circle)

Collected: July 15, 1965, by W. Newton, and sent me by Dr. E. E. Lindquist

Host: Salix niphoclada Rydb. (Salicaceae) a willow

Relation to host: the mites form bead galls on the leaves.

Type material: dry leaves with galls from which the slides were made
type slide, so designated, property of Canadian National Collection
eight paratype slides - 3 to Canada, 5 retained

Aculodes, new genus

Wormlike grass mites belonging to the Eriophyidae-Phyllocoptinae, with short oral stylet.All regular Eriophyid setae present.Shield elongate-subtriangular,the anterior lobe attenuate-pointed. Dorsal shield tubercles as in Aculus, directing dorsal setae divergently to rear. Abdominal thanosome with some ventrad increase in ring number, but otherwise dorsoventrally similar. Microtubercles beadlike, more or less pointed, close-set,ventrally somewhat ahead of ring margins,dorsally on ring margins or ridges, not extending anteriorly or posteriorly to any extent from margins. Female genitalia as in Aculus bu more bowl-shaped.

Genotype- Vasates mckenziei K.(Bul.Cal.Dept.Agr.33:26,1944), hereafter to be quoted as Aculodes mckenziei (K.). The genus also contains Aculodes fulleri (K.),(B-20,1966) Both species have 7-rayed featherclaws and live in grooves between upper grass blade ribs.These species lack the pair of anterior shield spines possessed by Aculus, having fitted awkwardly into that genus.From Aculops the new genus differs by having a wormlike body with little dorsoventral differentiation,and by having beadlike microtubercles that do not extend in either direction from ring margins.

Since Nalepa's Phytocoptes dubius (Denk.Akad.Wiss.Wien,58:880,1891) possibly impinges upon Aculodes, a note is appropriate. I have not had an adequate opportunity to study dubius, but Nalepa depicts it as having a pointed anterior shield lobe, an arc across in front of each dorsal tubercle,and with a 7-rayed featherclaw. It lives on grasses. Nalepa erected Phytocoptes with dubius as the only species, automatically making it the genotype. Then he put dubius in Phyllocoptes, abandoning Phytocoptes. Donnadieu, Ann. Soc.Lin.Lyon,26:30-180,1876, proposed Phytocoptes as a genus of Tetranychids. He theorized that what we now know as Eriophyids were their larvae.There is ample precedent for using Donnadieu's names and this one is the concern of Tetranychologists.

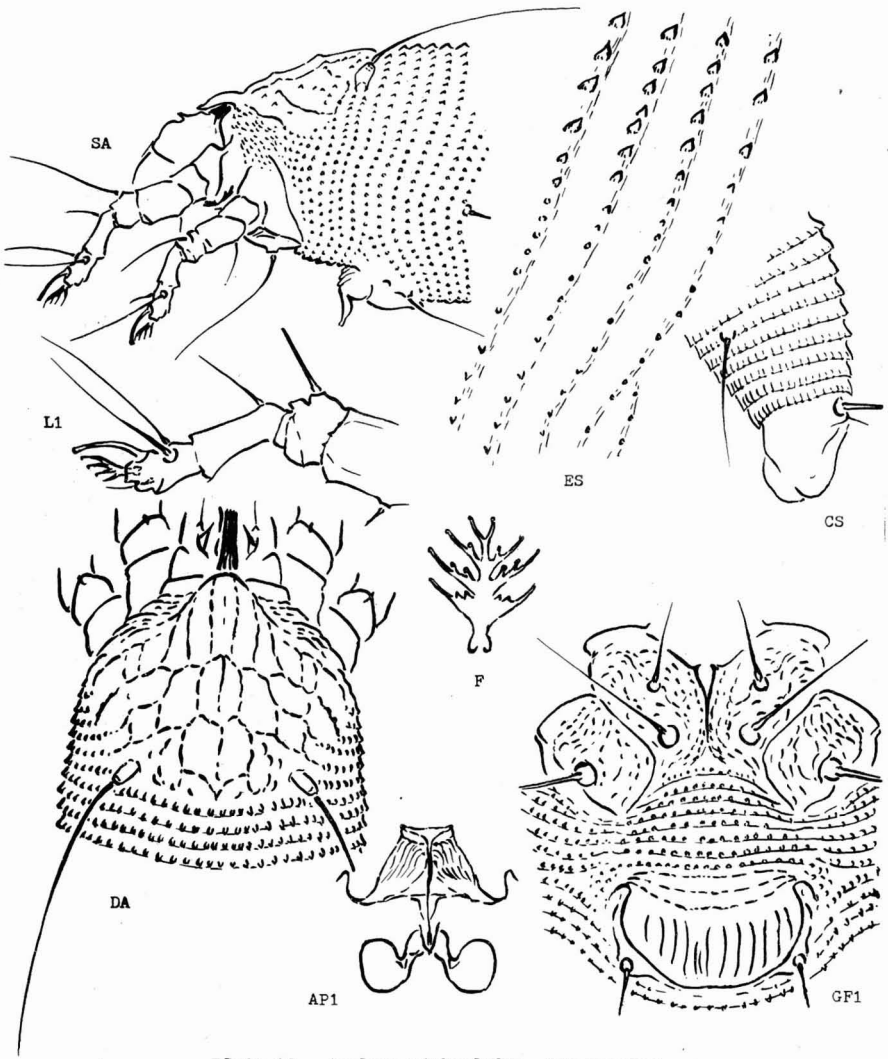

Plate 10 - Aculops niphocladae, new species

Phyllocoptes slinkardensis, new species

Plate 11

This species is exceedingly close to fructiphilus K. (ES-VIII, Bul. Cal. Dept. Agr. 29:30,1940) except that species has rounded or conical dorsal microtubercles whereas slinkardensis has the dorsal microtubercles produced into rather striking spinules.

Female 165µ-205µ long,50µ-57µ thick;fusiform;color light yellowish-white. Rostrum 30µ long,projecting diagonally down;antapical seta 9µ long. Shield 40µ long, 43µ wide, subtriangular in dorsal view with short pointed anterior lobe over rostrum base. Shield design a network:median line present principally between dorsal tubercles where it arises from V-shaped mark at about 2/3 and ends in second at rear margin. Admedian lines sinuate, from sides of anterior lobe, gradually diverging to rear margin, receiving cross line from submedians at 1/3 and a second at 2/3, and joining V-shaped marks of median. First submedian line undulating from front margin to dorsal tubercle, the rear part continuing laterally in a recurved line that becomes a lateral line back to rear margin giving off 2 or 3 oblique lower lines and an upper one to front of dorsal tubercle.Shield with sparse lateral granules and partial rings below dorsal tubercle. Dorsal tubercles 15µ apart; dorsal setae 21µ long.Foreleg 33µ long;tibia 8µ long,with 11µ seta from about 1/3; tarsus 9µ long; claw 9.5µ long, slight knob; featherclaw 5-rayed. Hindleg 27µ long, tibia 5µ long,tarsus 7.5µ long,claw 10µ long. Coxae ornamented with curved lines of granules and short dashes; anterior coxae rather divergent, with moderate sternal line between.First setiferous coxal tubercles farther apart than second and a little ahead of anterior coxal approximation.Second tubercles of coxae somewhat ahead of line across third tubercles. Abdominal thanosome with rings about equal dorsoventrally.Microtubercles each produced into a spinule,the dorsal spinules usually longer and often attenuate. Microtuberculation complete on all rings. Lateral seta 22µ long, on ring 8; first ventral seta 44µ long, on ring 22; second ventral 25µ long, on ring 37.The thanosome with about 57 rings. Telosome with 4-5 rings, tending to be a little broader than those ahead,the microtubercles spinulate,or pointed, and elongate anteriorly ventrally. Telosomal seta 4µ long. Accessory seta 5µ long. Female genitalia 22µ across, 12µ long; coverflap with about 10 longitudinal ribs and a basal cross line; seta 26µ long.

Type locality: Slinkard Canyon, Topaz district, Mono County, California

Collected: May 30, 1966, by H. K. Wagnon of the Cal. Bureau of Plant Pathology

Host: Rosa ultramontana (Wats.) a wild species. The nomenclature of this host is not settled due to recent revisions and to proposals based on chromosome studies. The oldest name is R. gratissima Greene.

Relation to host: the mites were present at the petiole bases on witches' brooms. Grafting tests have shown that this broom is virus induced and the Phyllocoptes, which was found in great numbers on the native rose, could be the vector.

Tyep material: dry portion of broom bearing mites, with the above data
a type slide, so designated, made from this material
six paratype slides

Key separating Phyllocoptes, Vasates, Aculus, Aculops, Aculodes

All or these genera have an anterior cephalothoracic shield lobe over the rostrum; the empodia (featherclaws) are simple (undivided). Dorsal shield tubercles of two principal shapes: either subcylindrical and projecting caudad over rear shield margin, or with base elliptical, or elongate in one transverse dimension and more or less ahead of rear shield margin. A few species have subcylindrical tubercles that incline forward and direct the dorsal setae forward.The key uses these different dorsal tubercle shapes and positions to help define the genera.

1. Fusiform mites with subtriangular shield; dorsal tubercles more or less ahead of rear shield margin, their long basal dimension parallel to body length, or these tubercles subcylindrical and inclined forward, but in any case directing dorsal setae up and ahead or centrad;abdominal thanosome with rings dorsoventrally similar or divided laterally into tergites and sternites - -
Phyllocoptes Nalepa, genotype carpini Nal., Keifer- Bul.Cal.Dept.Agr 27:191, 1938

1. Fusiform or wormlike mites with dorsal tubercles having long dimension either diagonal to body length, or subcylindrical and projecting caudad over rear shield margin, but always directing dorsal setae to rear -2.

2. Wormlike mites on grasses, with large featherclaws;abdominal thanosome dorsoventrally similar, microtubercles beadlike, dorsally on ring margins or ridges, but not extending anteriorly or posteriorly - - - - Aculodes, new genus, genotype mckenziei K.

Generic key continued on page 23

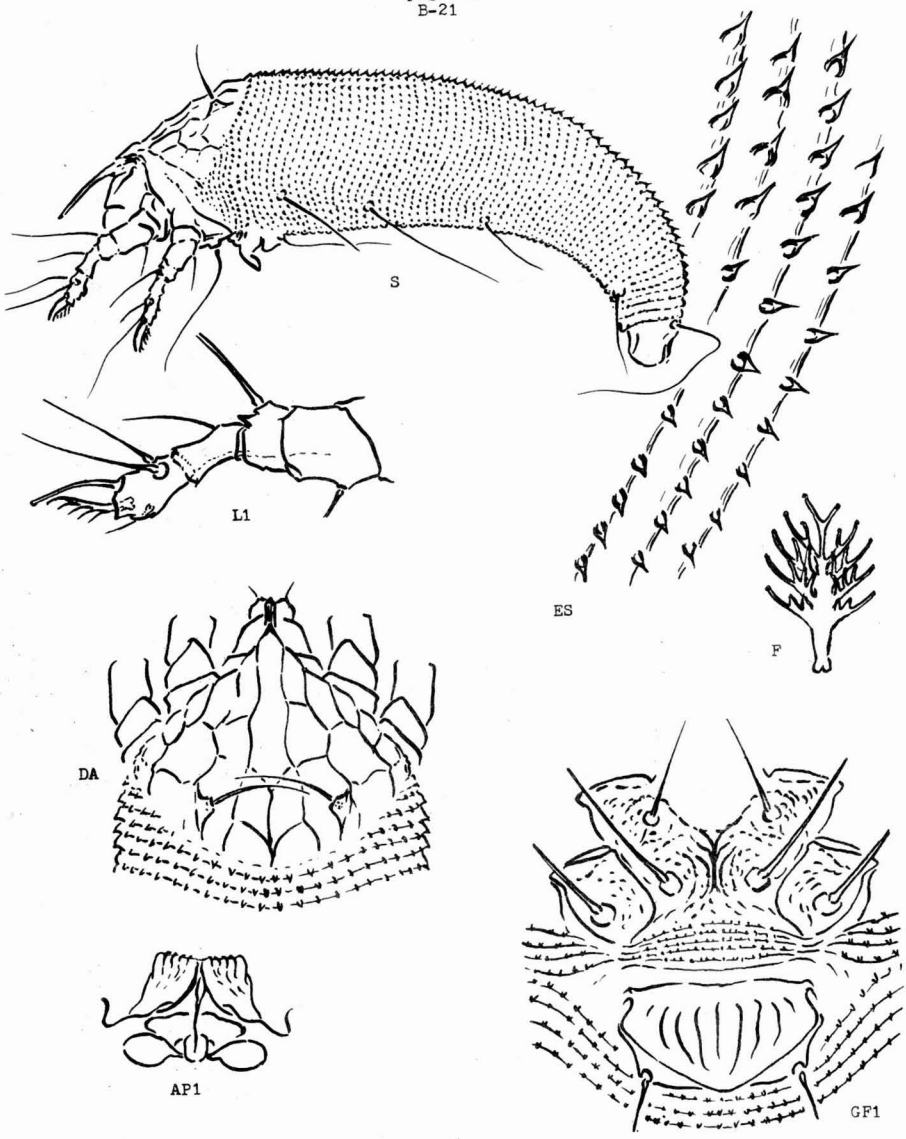

Plate 11 - Phyllocoptes slinkardensis, new species

Rhyncaphytoptus halli, new species

Plate 12

Of the 5-rayed featherclaw species in this genus this has the broadest anterior lobe overhanging the rostrum of any seen by the writer and has a more obscure shield pattern than the others. In a general way it resembles ulmivagrans K. (ES-VI). I am pleased to name the mite after Dr. C. C. Hall who sent it and who has studied Eriophyids for a number of years.

Female 155µ-170µ long,55µ-65µ thick;robust-fusiform; color light amber. Rostrum 48µ long with halberd-shaped cheliceral sheath;antapical seta 7.5µ long; rear apical sensilla recurved forwards.Shield about 44µ long,55µ-60µ wide, anterior lobe over rostrum broad and thick but rather short.Shield design practically obsolete, the remnants of admedian lines faintly indicated at rear margin; shield angled at lateral rear,no granular band above coxae.Dorsal tubercles 39µ apart;dorsal setae 10µ long, projecting forward and diagonally inward from rear margin. Forelegs 46µ long; tibia 13µ long, with 10µ seta from 1/5, a strong lower apical spine; tarsus 10µ long; claw 8µ long, with moderate knob; featherclaw 5-rayed. Hindleg 40µ long, tibia 10µ long,tibia also with spine; tarsus 8µ long, claw 8µ long. Coxae short, unornamented, the anterior coxae with small ridge between; first setiferous coxal tubercles close to and ahead of second; second coxal tubercles somewhat ahead of line across third tubercles.Abdominal thanosome with about 29 tergites and 51 sternites. Tergal microtubercles pointed to rear, on crest line of tergites, these microtubercles lateral anteriorly but on some examples gradually rising and attaining top just before telosome. Abdominal sternites very narrow ahead of genitalia, broadening immediately thereafter and gradually broadening to telosome, the doubling ceasing 3-4 sternites ahead of telosome.Sternal microtubercles more or less pointed, somewhat ahead of rear margin mostly but becoming more pointed and touching rear margin to rear.Lateral seta 17µ long, on sternite 14;first ventral seta 50µ long, on sternite 28; second ventral 12µ long, on sternite 40. Telosome of 6 rings, either completely microtuberculate or with dorsum lacking these structures, the microtubercles elongate and more pointed ventrally;seta 25µ long. Accessory seta 2.5µ long.Female genitalia 32µ across, 21µ long; coverflap with basal transverse subelliptical section, no ribs present; seta 14µ long.

Type locality: Arlington, Texas

Collected: July 24, 1966 by C. C. Hall

Host: Ulmus americana L. (Ulmaceae) American elm

Relation to host: the mites are undersurface leaf vagrants

Type material: dry leaves with mummified mites clinging to the underside
a type slide, so designated, with emphasis on a laterally positioned specimen
two paratype slides

Generic key continued from page 21

2. Fusiform mites on various hosts, featherclaws usually smaller;abdominal thanosome dorsally with microtubercles round, elliptical, or as spinules, and situated either on ring margins, extending ahead from ring margins, or inclined to rear over margins - 3.

3. Dorsal tubercles extending diagonally ahead from rear shield margin, the long basal dimensions converging cephalad, directing dorsal setae caudocentrad - - Vasates Shimer, genotype quadripedes Sh., Tr.Am.Ent.Soc. 2:319,1869

3. Dorsal tubercles subcylindrical, or with long basal dimension transverse to body length,situated on and projecting over rear shield margin, directing dorsal setae to rear, usually divergently -4.

4. Anterior shield lobe with pair of small spines or points projecting forward from under front lobe margin - - - - Aculus K., genotype ligustri K., Oc.Paper,Cal.Dept.Agr. #1:5, 1959

4. Anterior shield lobe small to moderately large, acuminate, round, or with apex forming a single point; no anterior pair of small points - - - Aculops, new genus, genotype populivagrans K. ES-XXI, Bul.Cal.Dept.Agr. 42:68, 1953

Note - Deutogynes of Aculus do not have these anterior lobe points

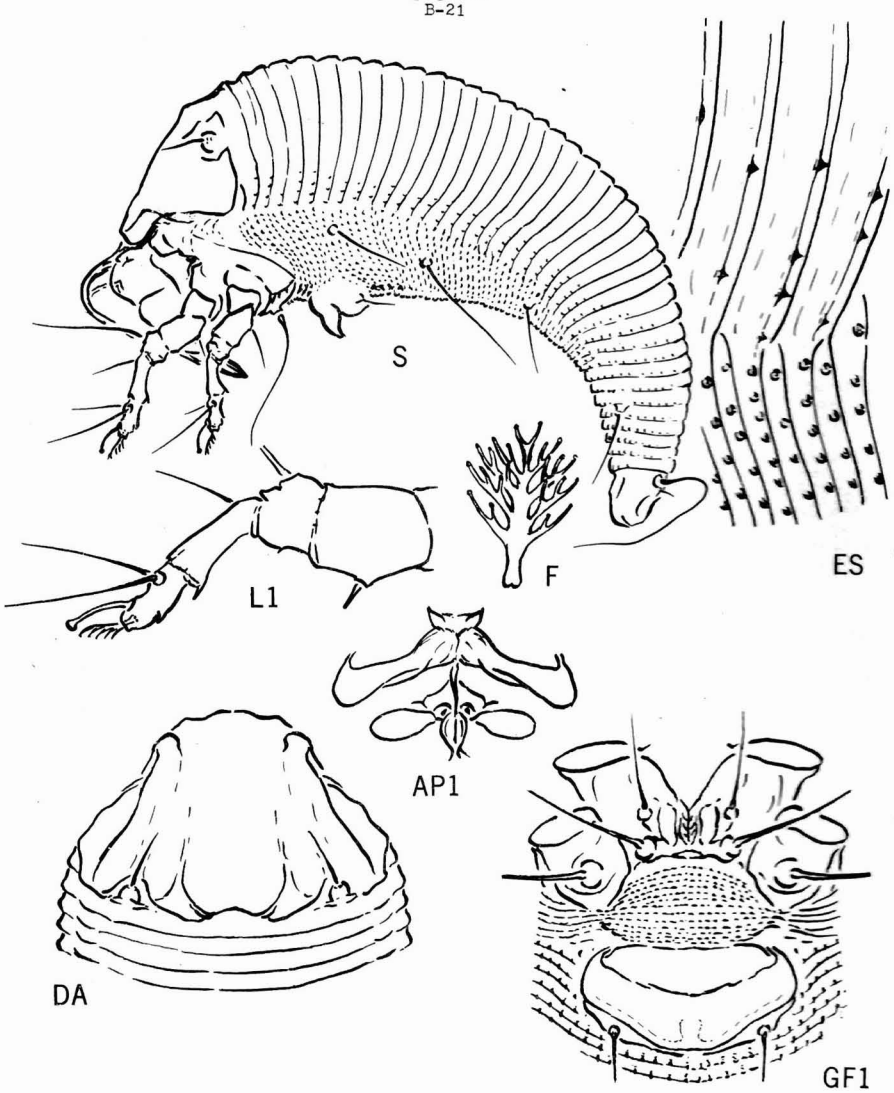

Plate 12 - Rhyncaphytoptus halli, new species

The issuing of the "B" series of Eriophyid Studies has been accomplished by making matrices with the "Itek" process, followed by offset printing. Advantages in this method are that the author can control arrangement of the material in each article, there is no interminable waiting before a number appears, and a page of line drawings costs no more than a text page. I have found these considerations most advantageous.

But, with this twenty first issue it now becomes necessary to suspend the "B" series. Whether or not there will be a resumption of it at some time in the future is dependent on factors not now foreseeable.

H. H. Keifer