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Five Species of Eriophyid Mites of Elm in Sapporo¹⁾

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(With 35 Text-figures)

This report is concerned with five species of eriophyid mites of elm in Sapporo. So far as the writer is aware, twenty-four species of eriophyids parasitic on elm trees have hitherto been known from the world. The five species³⁾ here recorded and redescribed are as follows, of which one was recently recorded from Japan (Ehara, 1965) and the remainder is new to this country.

Subfamily Eriophyinae

1. *Eriophyes campestricola* (von Frauenfeld)
2. *Eriophyes brevipunctatus* Nalepa

Subfamily Phyllocoptinae

3. *Anthocoptes punctidorsa* Keifer
4. *Oxypleurites ulmi* Farkas

Subfamily Rhyncaphytoptinae

5. *Rhyncaphytoptus ulmivagrans* Keifer

Key to Eriophyid Mites (♀) of Elm in Sapporo

1. Shield dorsal setae shorter than interval between them. 2
- Shield dorsal setae longer than interval between them. 3
2. Body flattened; chelicerae gently bent down; shield dorsal setae posteriorly directed. *Oxypleurites ulmi* F.
- Body not flattened; chelicerae bent down at about right angles; shield dorsal setae anteriorly directed. *Rhyncaphytoptus ulmivagrans* K.
3. Body fusiform; tergites much broader and fewer than sternite.
- *Anthocoptes punctidorsa* K.
- Body wormlike, tergites similar to sternites. 4

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3) It is noteworthy that these five species were sometimes found on the same leaf. *Jour. Fac. Sci. Hokkaido Univ. Ser. VI, Zool. 15, 1965.*

- 4. Rear margin of shield slightly convex caudally; genital setae adjacent (10.7μ apart); tergites slightly fewer in number than sternites. *Eriophyes campestricola* Nal.
- Rear margin of shield strongly convex caudally; genital setae widely separate (16.2μ apart); tergites more in number than sternites. *Eriophyes brevipunctatus* Nal.

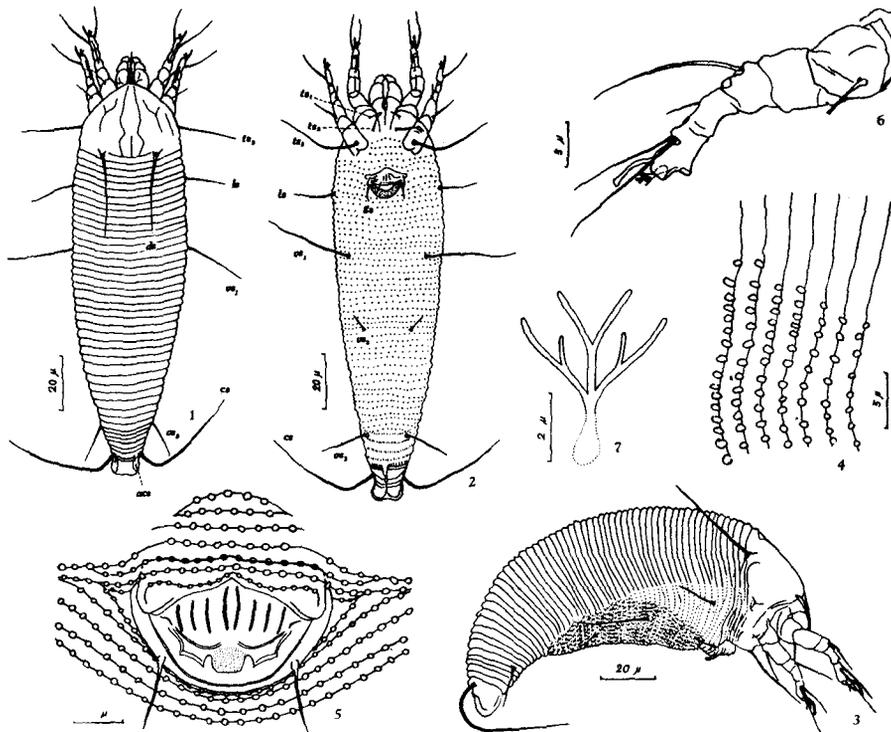
***Eriophyes campestricola* (von Frauenfeld)**

(Figs. 1-7)

Phytoptus campestricola von Frauenfeld, 1865, Zool. -bot. Ges. Wien 15: 895-899.

Eriophyes campestricola, Liro, 1951, p. 91, fig. 47, 6.

Female. Body wormlike, pale yellow in color. Rostrum gently curved down. Shield wide; ratio of width/length 1.49; the rear margin slightly convex; median line and submedians incomplete, admedians prominent. Abdomen microtuberculated, with 39-43 tergites and 45-52 sternites. Relative lengths of segments of



Figs. 1-7. *Eriophyes campestricola*, ♀. 1, dorsum. 2, venter. 3, lateral aspect. 4, side skin structure (left). 5, genitalia. 6, left anterior leg. 7, feather-claw.

anterior leg: tarsus \geq tibia = claw > featherclaw; claw slightly knobbed; feather-claw 2-rayed. Genitalia 15.2–24.3 μ wide, 9.9–13.7 μ long; genital coverflap with about 8 furrows. Thoracic setae I (ts_1)¹⁾ slightly longer than accessory setae (*acs*); interval ts_2 - ts_2 as long as distance ts_2 - ts_3 ; relative lengths of setae: $cs > ds > vs_1 \geq ts_3 \geq ls \geq vs_3 > ts_2 > vs_2 = gs > ts_1 \geq acs$. Setae *ls* on 5–8 sternite, vs_1 on 17–19, vs_2 on 26–34, vs_3 on 41–47. Ratio of length/interval between bases of setae $ts_1=0.4$, $ts_2=1.6$, $ts_3=1.4$, $ds=2.3$, $ls=0.5$, $vs_1=1.0$, $vs_2=0.4$, $vs_3=1.2$, $acs=0.5$, $cs=7.5$, $gs=0.7$. Average measurements in micra (n=5): body length 145.5, thickness 49.5, width 44.5; shield length 28, width 42; lengths: fore-leg, tibia 5.8, tarsus 6.2, claw 5.8, feather-claw 5.1; hind-leg, tibia 4.8, tarsus 6.1, claw 6.0; setae ts_1 4.0, ts_2 12, ts_3 30.5, ds 45.5, ls 21, vs_1 34, vs_2 7.6, vs_3 19.5, acs 3.7, cs 77, gs 7.6; intervals of setae: ds - ds 19.5, ts_1 - ts_1 10.5, ts_2 - ts_2 7.8, ts_3 - ts_3 22, gs - gs 10.5, ls - ls 43, vs_1 - vs_1 34, vs_2 - vs_2 19.5, vs_3 - vs_3 16.0, cs - cs 10.5, acs - acs 7.2, ts_1 - ts_2 5.5, ts_2 - ts_3 7.8, ts_3 - gs 19, gs - ls 16.5, ls - vs_1 26, vs_1 - vs_2 27, vs_2 - vs_3 38, cs - acs 2.3.

Male. Not available to the writer.

Specimens examined. Specimens on *Ulmus Davidiana* Planch. var. *japonica* Nakai in Hokkaido University campus, Sapporo, were collected on Aug. 23, Sept. 16 and Oct. 14, 1963, and Sept. 20, 1964, by the writer.

Distribution and hosts. Japan (Hokkaido), Europe (Nalepa, 1898; Liro and Roivainen, 1951); on elm.

Remarks. Judging from literature (Nalepa, Liro and Roivainen), abdominal rings of the present specimens are less numerous than those of European specimens. This mite seems to be a vagrant on the undersurfaces of the leaves. No significant damage appears to result from the presence of this mite. This is the first record of *E. campestricola* from Japan.

Eriophyes brevipunctatus Nalepa

(Figs. 8-14)

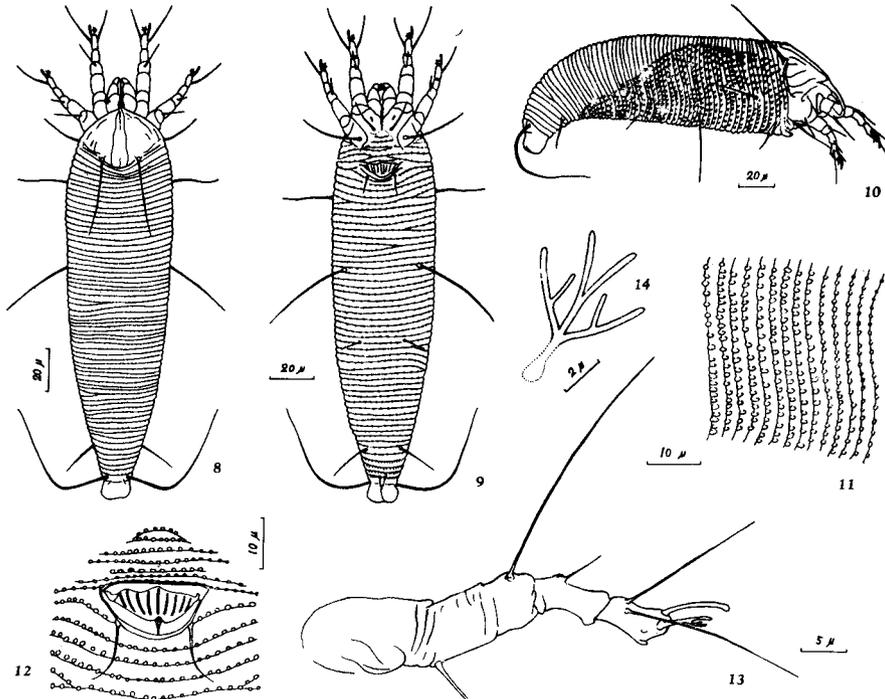
Phytoptus brevipunctatus Nalepa, 1889, Sitzb. Akad. Wiss. Wien 98: 130, pl. 4, figs. 1-2.

Eriophyes brevipunctatus Nalepa, 1898, p. 15; Nalepa, 1911, p. 223, pl. II, figs. 12a-b; Liro and Roivainen, 1951, p. 85, fig. 47, 4.

Female. Body wormlike, light yellow to light amber in color. Rostrum gradually curved down. Shield: ratio of width/length 1.36; the rear margin strongly convex; the median line noncontinuous, the admedians distinct. Abdomen microtuberculated, with 57–68 tergites and 52–58 sternites. Relative lengths of segments of anterior leg: feather-claw \geq tibia = tarsus \geq claw; claw slightly knobbed; feather-claw 2-rayed. Genitalia 19.7–24.6 μ wide, 11.3–15.1 μ long; genital coverflap with about 9 longitudinal furrows. Interval ts_2 - ts_2 slightly longer than distance ts_2 - ts_3 . Relative lengths of setae: $cs > vs_1 > ds > ts_3 \geq ls \geq vs_3 > ts_2 > vs_2 \geq gs > ts_1 > acs$. Setae *ls* on 7–9 sternite, vs_1 on 16–20, vs_2 on 28–32, vs_3 on 45–50.

1) The abbreviations of names of setae are those of Hassan (1928).

Ratio of length/interval between bases of pair $ts_1=0.6$, $ts_2=1.8$, $ts_3=1.3$, $ds=2.3$, $ls=0.5$, $vs_1=1.4$, $vs_2=0.4$, $vs_3=1.3$, $acs=0.4$, $cs=6.7$, $gs=0.5$. Average measurements in micra (n=5): body length 179, thickness 52, width 52; shield length 30.5, width 41.5; lengths: fore-leg, tibia 7.3, tarsus 7.3, claw 7.2, feather-claw 7.3; hind-leg, tibia 5.4, tarsus 7.3, claw 7.3; setae ts_1 6.5, ts_2 17, ts_3 31, ds 43.5, ls 25.5, vs_1 51.5, vs_2 9.7, vs_3 24.0, acs 3.6, cs 78.5, gs 8.3; intervals of setae $ds-ds$ 18.5, ts_1-ts_1 12, ts_2-ts_2 9.5, ts_3-ts_3 24.5, $gs-gs$ 16, $ls-ls$ 49.5, vs_1-vs_1 37.5, vs_2-vs_2 22, vs_3-vs_3 19, $cs-cs$ 11.5, $acs-acs$ 9.1, ts_1-ts_2 6.0, ts_2-ts_3 8.6, ts_3-gs 19, $gs-ls$ 19.5, $ls-vs_1$ 36.5, vs_1-vs_2 38, vs_2-vs_3 54.0, $cs-acs$ 2.4.



Figs. 8-14. *Eriophyes brevipunctatus*, ♀. 8, dorsum. 9, venter. 10, lateral aspect. 11, side skin structure (right). 12, genitalia. 13, right anterior leg. 14, feather-claw.

Male. Not available to the writer.

Specimens examined. Specimens on *Ulmus Davidiana* Planch. var. *japonica* Nakai in Hokkaido University campus, Sapporo, were collected on Sept. 16 and Oct. 14, 1963, and Sept. 20, 1964, by the writer.

Distribution and hosts. Japan (Hokkaido), Europe (Nalepa, 1898, 1911; Liro and Roivainen, 1951); on elm.

Remarks. The mites inhabit the undersurfaces of the leaves, but no apparent

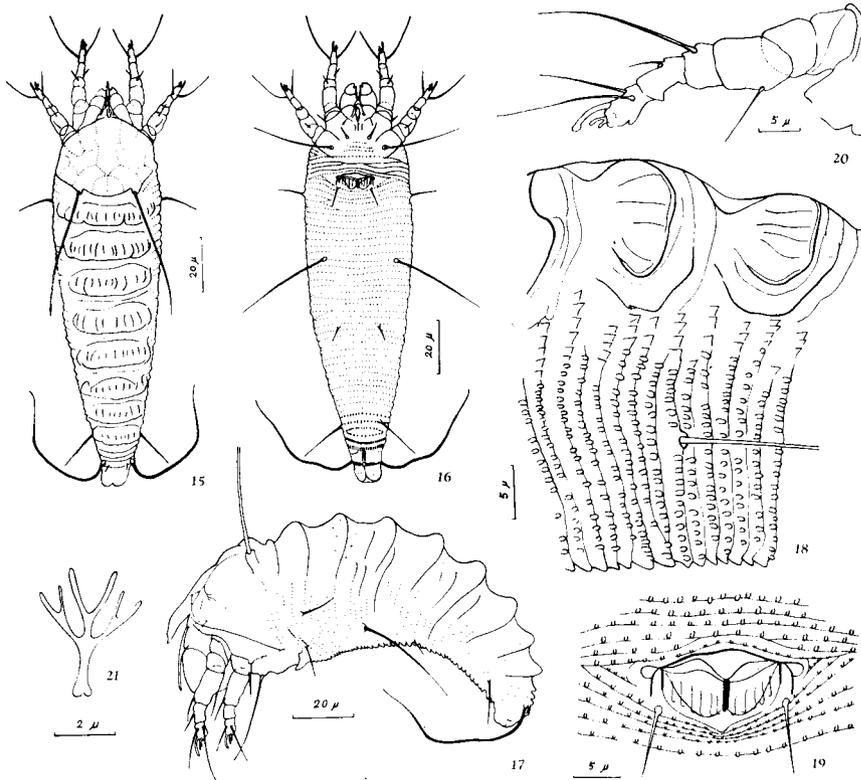
injury can be observed. It was reported as a gall-maker of elm leaf (Schlechtendal, 1916; Liro and Roivainen, 1951), but, so far as the writer observed, no apparent sign of gall-forming could be detected. A number of large aphid galls on the upper surfaces of the leaves, with opening onto the lower surfaces, were observed, and the five eriophyid species considered in this paper were occasionally found near the galls. This mite is new to Japan.

***Anthocoptes punctidorsa* Keifer**

(Figs. 15-21)

Anthocoptes punctidorsa Keifer, 1943, p. 216, pl. 178; Keifer, 1952, p. 42, pl. 17-1.

Female. Body spindle-shaped, pale brownish yellow in color. Rostrum curving down. Shield with a ridges network-like; ratio of width/length of shield 1.5. Dorsal tubercles largely protruded on rear margin of shield; dorsal



Figs. 15-21. *Anthocoptes punctidorsa*, ♀. 15, dorsum. 16, venter. 17, lateral aspect. 18, side skin structure (left). 19, genitalia. 20, left anterior leg. 21, feather-claw.

setae projecting up or backward. Tergites exceedingly broader and less numerous (15–18) than sternites (47–49). Relative lengths of segments of anterior leg; tarsus \geq tibia \geq claw \geq feather-claw; claw knobbed; feather-claw 2-rayed. Genitalia 15.1–19.0 μ wide, 6.4–11.5 μ long. Setae *ls* on 7–8 sternite, *vs*₁ on 16–19, *vs*₂ on 26–28, *vs*₃ on 43–44. Relative lengths of setae: $cs > ds > vs_1 > ts_3 > vs_3 > ls \geq gs \geq ts_2 \geq vs_2 > ts_1 \geq acs$. Ratio of length/interval between bases of pair $ts_1=0.4$, $ts_2=1.5$, $ts_3=1.3$, $ds=2.8$, $ls=0.4$, $vs_1=1.9$, $vs_2=0.7$, $vs_3=1.6$, $acs=0.4$, $cs=7.0$, $gs=1.0$. Average measurements in micra (n=5): body length 137.5, thickness 46, width 55.5; shield length 31.5, width 47; lengths: fore-leg, tibia 5.8, tarsus 5.9, claw 5.2, feather-claw 4.2; hind-leg, tibia 4.6, tarsus 5.7, claw 6.1; setae ts_1 4.1, ts_2 12, ts_3 26.5, ds 59.5, ls 15.5, vs_1 52.5, vs_2 9.6, vs_3 25.5, acs 3.2, cs 73, gs 12; intervals of setae: $ds-ds$ 21.5, ts_1-ts_1 10.5, ts_2-ts_2 8.1, ts_3-ts_3 20.5, $gs-gs$ 12.5, $ls-ls$ 40.5, vs_1-vs_1 28, vs_2-vs_2 14.5, vs_3-vs_3 15.5, $cs-cs$ 10.5, $acs-acs$ 7.2, ts_1-ts_2 5.5, ts_2-ts_3 6.9, ts_3-gs 16.5, $gs-ls$ 14.5, $ls-vs_1$ 23, vs_1-vs_2 21.5, vs_2-vs_3 33.5, $cs-acs$ 2.0.

Male. Not available to the writer.

Specimens examined. Specimens on *Ulmus Davidiana* Planch. var. *japonica* Nakai in Hokkaido University campus, Sapporo, were collected on Aug. 23, Sept. 16 and Oct. 14, 1963, and Sept. 20, 1964 by the writer.

Distribution and hosts. Japan (Hokkaido), U.S.A. (Keifer, 1943); on elm.

Remarks. *Anthocoptes punctidorsa* is a leaf vagrant on the undersurfaces. This mite is new to Japan.

Oxypleurites ulmi Farkas

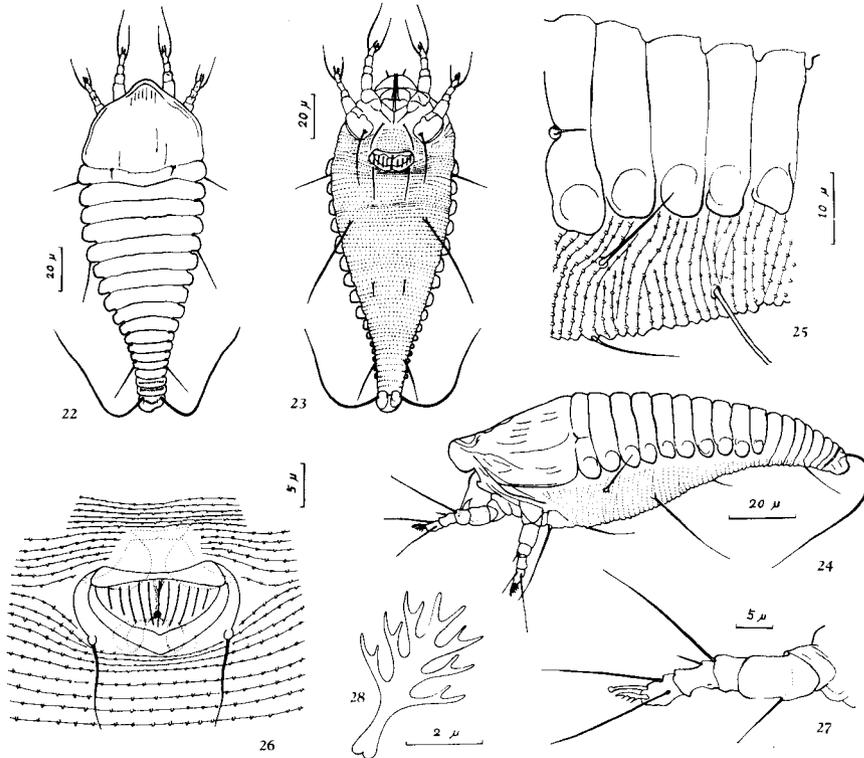
(Figs. 22–28)

Oxypleurites ulmi Farkas, 1960, p. 330, figs. 41–43.

Female. Body flattened, wedge-shaped, light yellow to light amber in color. Rostrum projecting down. Shield almost smooth, anterior lobe covering rostrum; ratio of width/length of shield 1.1. Dorsal setae very short, projecting backward. Tergites about 18 in number, flattened, smooth, moderately broad, more or less elongated laterally to form lateral lobes; 62–64 sternites. Relative lengths of segments of anterior leg: tarsus \geq tibia \geq claw > feather-claw; claw knobbed; feather-claw 4-rayed. Genitalia 15.7–23.1 μ wide, 7.9–11.0 μ long. Setae *ls* on 9 sternite, *vs*₁ on 22–24, *vs*₂ on 38–40, *vs*₃ on 57–59. Relative lengths of setae: $cs > vs_1 > ts_3 > vs_3 \geq ls \geq ts_2 > gs > vs_2 > ts_1 > ds > acs$. Ratio of length/interval between bases of pair $ts_1=0.4$, $ts_2=1.5$, $ts_3=1.1$, $ds=0.1$, $ls=0.3$, $vs_1=1.1$, $vs_2=0.4$, $vs_3=1.7$, $acs=0.4$, $cs=4.7$, $gs=0.6$. Average measurements in micra (n=5): body length 150.5, thickness 40, width 58; shield length 50, width 54; lengths: fore-leg, tibia 5.3, tarsus 5.4, claw 5.1, feather-claw 4.8; hind-leg, tibia 4.5, tarsus 5.2, claw 4.8; setae ts_1 4.7, ts_2 13.5, ts_3 28, ds 4.2, ls 14.5, vs_1 39, vs_2 7.2, vs_3 18.5, acs 2.2, cs 49.5, gs 11; intervals of setae: $ds-ds$ 30.5, ts_1-ts_1 12, ts_2-ts_2 9.2, ts_3-ts_3 25, $gs-gs$ 18, $ls-ls$ 53, vs_1-vs_1 36.5, vs_2-vs_2 16.5, vs_3-vs_3 10.5, $cs-cs$ 10.5, $acs-acs$ 6.2, ts_1-ts_2 6.8, ts_2-ts_3 8.9, ts_3-gs 18.5, $gs-ls$ 18, $ls-vs_1$ 22.0, vs_1-vs_2 32.5, vs_2-vs_3 37.5, $cs-acs$ 2.1.

Male. Not available to the writer.

Specimens examined. Specimens on *Ulmus Davidiana* Planch. var. *japonica* Nakai in Hokkaido University campus, Sapporo, were collected on Sept. 16 and Oct. 14, 1963, and Sept. 20 and Oct. 17, 1964 by the writer.



Figs. 22–28. *Oxypleurites ulmi*, ♀. 22, dorsum. 23, venter. 24, lateral aspect. 25, side skin structure (left). 26, genitalia. 27, left anterior leg. 28, feather-claw.

Distribution and hosts. Japan (Hokkaido), Hungary (Farkas, 1960); on elm.

Remarks. *O. ulmi* is a vagrant on the undersurfaces of the leaves causing no apparent injury. This mite is first recorded from Japan.

***Rhyncaphytoptus ulmivagrans* Keifer**

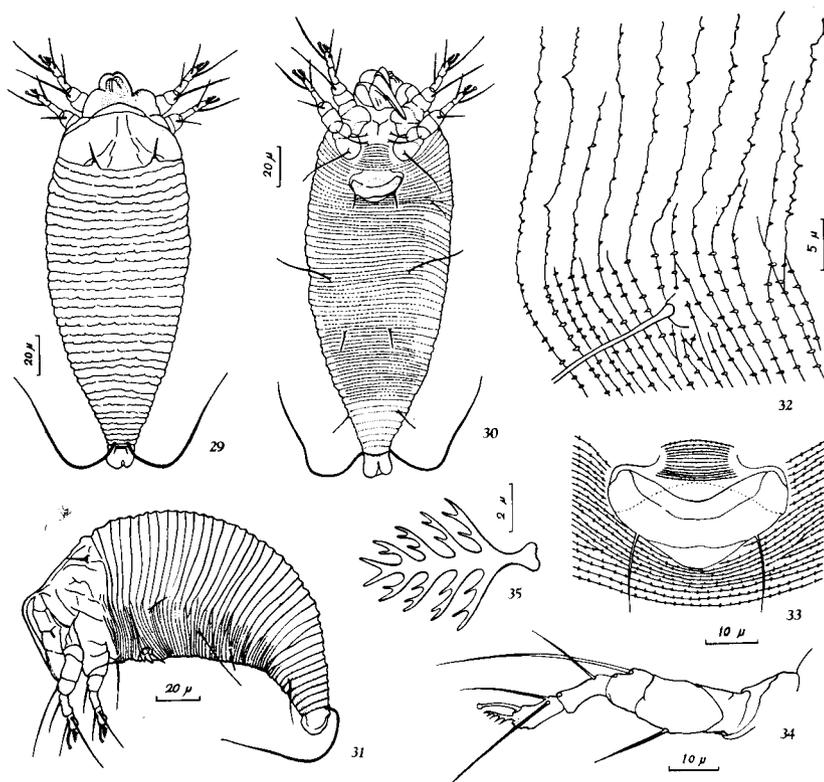
(Figs. 29–35)

Rhyncaphytoptus ulmivagrans Keifer, 1939a, p. 420, pl. XC.

Abacoptes platynus Keifer, 1939b, p. 491, pl. 110 (deutogyne).

Rhyncaphytoptus rugatus Liro, 1941, p. 45, fig. 33 (deutogyne, Finland).

Female (protogyne). Body thick, spindle-shaped, amber to brownish in color. Chelicera steeply bent down at about right angles. Ratio of width/length of shield 1.6. Dorsal setae very short, anteriorly directed. Abdomen with 30–32 tergites and 83–86 microtuberculated sternites. Relative lengths of anterior leg: tibia > tarsus > claw > feather-claw; claw knobbed; feather-claw 5-rayed. Genitalia 32.1–37.2 μ wide, 20.8–24.6 μ long. Setae ls on 19–23 sternite, vs_1 on 39–47, vs_2 on 50–58, vs_3 on 72–78. Relative lengths of setae: $cs > vs_1 > ts_3 > vs_3 > ts_2 \geq ls \geq vs_2 > gs > ds > ts_1 > acs$. Ratio of length/interval between bases of pair $ts_1 = 0.8$, $ts_2 = 2.0$, $ts_3 = 1.7$, $ds = 0.3$, $ls = 0.3$, $vs_1 = 1.3$, $vs_2 = 0.7$, $vs_3 = 1.3$, $acs = 0.4$, $cs = 7.1$, $gs = 0.6$. Average measurements in micra (n=5): body length 185.5, thickness 66.5, width 76; shield length 43, width 69; lengths: fore-leg, tibia 13.5, tarsus 11, claw 9.7, feather-claw 7.6; hind-leg, tibia 12, tarsus 10.5, claw 9.5; setae ts_1 8.6, ts_2 25.5, ts_3 49, ds 12.0, ls 20.0, vs_1 61.5, vs_2 18.0, vs_3 35.0, acs 4.0, cs 93.5, gs 14; intervals of setae: $ds-ds$



Figs. 29–35. *Rhyncaphytoptus ulmivagrans*, ♀. 29, dorsum. 30, venter. 31, lateral aspect. 32, side skin structure (left). 33, genitalia. 34, left anterior leg. 35, feather-claw.

44.5, ts_1-ts_1 11, ts_2-ts_2 12.5, ts_3-ts_3 28, $gs-gs$ 24.5, $ls-ls$ 66.5, vs_1-vs_1 46, vs_2-vs_2 27, vs_3-vs_3 26.5, $cs-cs$ 13, $acs-acs$ 8.9, ts_1-ts_2 4.5, ts_2-ts_3 9.5, ts_3-gs 26.5, $gs-ls$ 21.5, $ls-vs_1$ 57.5, vs_1-vs_2 32.5, vs_2-vs_3 53, $cs-acs$ 3.1.

Male. Not available to the writer.

Specimens examined. Specimens on *Ulmus Davidiana* Planch. var. *japonica* Nakai in Hokkaido University campus, Sapporo, were collected on Aug. 21, 1963 by S. Ehara and the writer. On Aug. 23, Sept. 16 and Oct. 14, 1963, and Sept. 20, 1964 by the writer.

Distribution and hosts. Japan (Hokkaido; Ehara, 1965), U.S.A. (Keifer, 1939a and 1939b), Europe (Liro and Roivainen, 1951; Roivainen, 1951 and 1953; Boczek, 1961); on elm.

Remarks. *R. ulmivagrans* is a vagrant on the undersides of the leaves. No apparent damage could be seen. This mite is the largest among the five species here studied, and is predominant among them. This mite was recently recorded from Japan by Ehara (1965; identified by Keifer). Two types of females of this species, protogyne and deutogyne, are known to occur (Keifer, 1952). No deutogyne was taken by the writer, but it was found that the Japanese materials somewhat vary in tergites among specimens.

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