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Tetranychoid Mites of Conifers in Hokkaido[1),2)]

By

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(*With 47 Text-figures*)

Two species of tetranychid mites were recorded from conifers in Hokkaido (Ehara 1954, 1956). The following eight species of the superfamily Tetranychoidea, including the two ones, are herein recognized to occur on conifers in Hokkaido.

Family Tetranychidae

1. *Oligonychus pustulosus* n. sp.
2. *Oligonychus karamatus* (Ehara)
3. *Oligonychus hondoensis* (Ehara)
4. *Oligonychus perditus* Pritchard et Baker
5. *Oligonychus ununguis* (Jacobi)
6. *Tetranychus ezoensis* n. sp.

Family Tenuipalpidae

7. *Pentamerismus oregonensis* McGregor
8. *Pentamerismus taxi* (Haller)

Descriptions of new species and redescriptions, host records and locality records of other species are presented in this paper. The types of the new species are placed in the Zoological Institute, Hokkaido University.

Family TETRANYCHIDAE

Genus ***Oligonychus*** Berlese

Oligonychus Berlese, 1886, Acari Dann. Piante Coltiv., p. 24.
Paratetranychus Zacher, 1913, Mitt. kais. biol. Anst. Land-Forstw., 14: 39.

Recent authors have considered *Oligonychus* to have priority over *Paratetranychus*, and this synonymy is possibly correct.[3)]

1) Contribution No. 573 from the Zoological Institute, Faculty of Science, Hokkaido University, Sapporo, Japan.

2) This study was supported by grants from the Scientific Research Fund of the Ministry of Education.

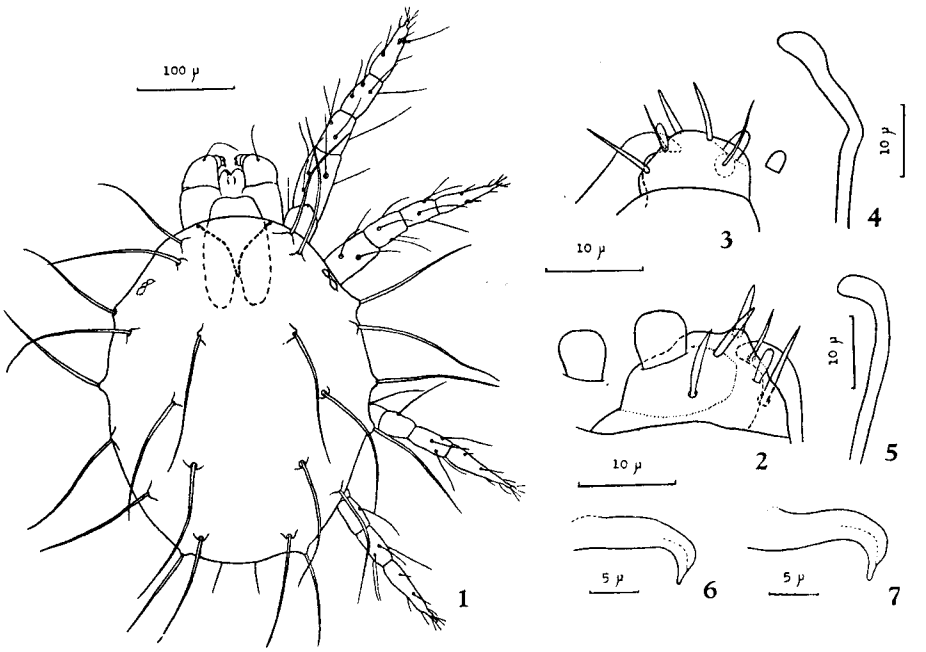
3) Accordingly, the names of the two Japanese mites of *Paratetranychus*, *clavatus* (on pines) and *ilicis* (on tea and chrysanthemum), not found in Hokkaido, are changed:

Oligonychus clavatus (Ehara)
Oligonychus ilicis (McGregor)

1. *Oligonychus pustulosus* n. sp. (Figs. 1–11)

(Jap. Name: Ezo-sugi-hadani)

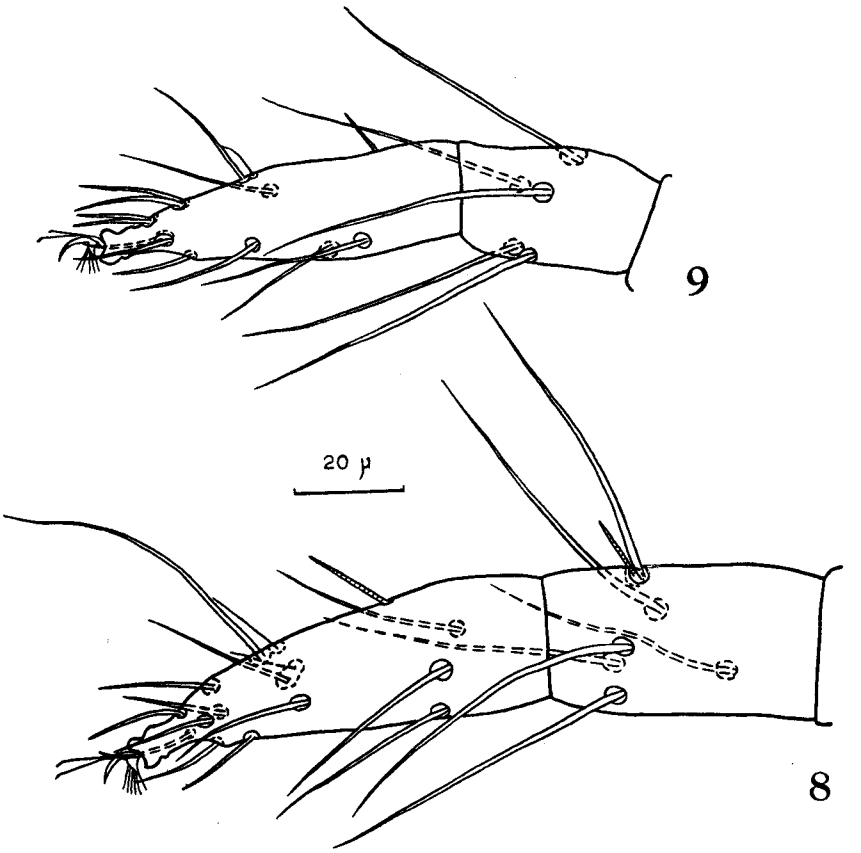
Female. Body from above oval, 350μ long and 290μ wide, reddish brown in colour. Rostrum reaching the middle of femur I. Terminal sensillum of palpus spatulate distally, about as long as wide; dorsal sensillum slender, fusiform. Ratio of length to breadth of mandibular plate, 5.7:10. Relative lengths of segments in leg I: trochanter, 14; femur, 30; genu, 15; tibia, 16; tarsus (empodium exclusive), 24. Tactile setae of legs slender but generally strongly serrate. Tarsus I with three



Figs. 1–7. *Oligonychus pustulosus* n. sp. 1, dorsal view of female. 2, distal segment of palpus of female. 3, distal segment of palpus of male. 4, 5, lateral view of peritreme of female. 6, 7, aedeagus.

tactile and one sensory setae proximal to proximal set of duplex setae, one tactile seta ventrad of duplex setae; proximal duplex setae of tarsus I with proximal member about one-half as long as distal member; distal duplex setae of tarsus I with proximal member about one fifth to one fourth as long as distal member. Tibia I with six tactile and one sensory setae. Tarsus II with two tactile and one sensory setae proximad of duplex setae, one tactile seta close to duplex setae,

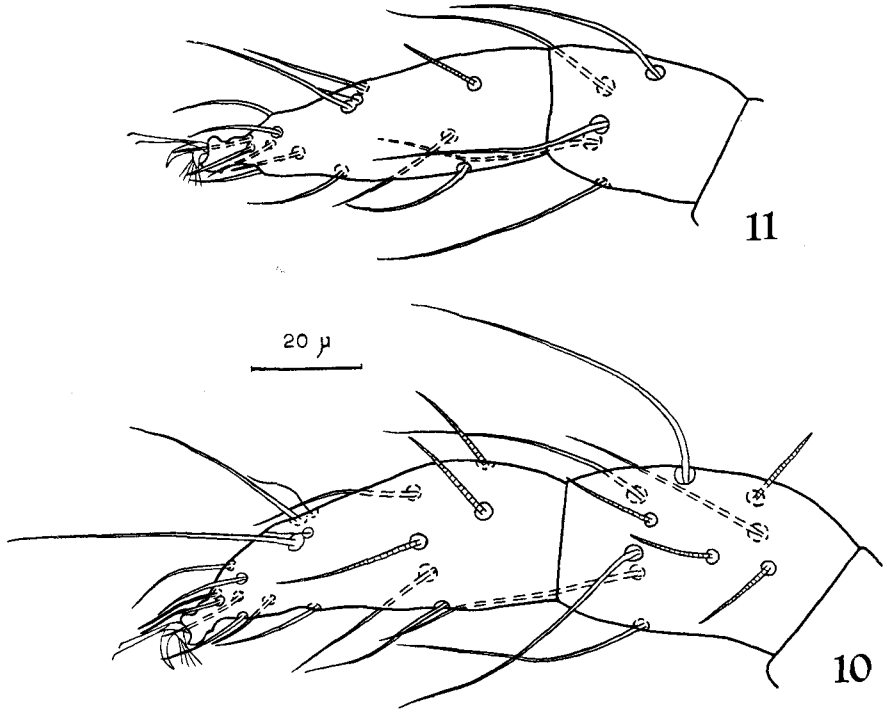
one tactile seta ventrad of duplex; tibia II with five tactile setae; tibia III with five tactile setae. Empodial claw of leg I with six pairs of proximoventral setae; empodial claw II with five pairs of proximoventral setae. Peritreme narrow, slightly dilated distally. Setae on dorsum of idiosoma arising from conical tubercles, pubescent, lanceolate, much longer than distances between their bases. Medioventral opisthosomals robust. Genital flap with transverse striae; area immediately anterior to flap with transverse striae medially, and with longitudinal striae laterally.



Figs. 8–9. *Oligonychus pustulosus* n. sp. 8, tarsus and tibia I of female. 9, tarsus and tibia II of female.

Male. Body 280μ long and 160μ wide. Terminal sensillum of palpus longer than wide, and considerably variable in shape individually. Tarsus I with three tactile and three sensory setae proximal to proximal set of duplex setae, one tactile seta ventrad of duplexes; tibia I with six tactile and four sensory setae.

Tarsus II with two tactile and one sensory setae proximal to duplex setae, one tactile seta close to duplex, one tactile seta ventrad of duplex; tibia II with five tactile setae; tibia III with five tactile setae. Empodial claw I with four pairs of proximoventral setae; empodial claw II with five pairs of proximoventral setae. Aedeagus bent downward to form the hook which attenuates to a tip abruptly.



Figs. 10–11. *Oligonychus pustulosus* n. sp. 10, tarsus and tibia I of male. 11, tarsus and tibia II of male.

Types. Holotype: ♂, Sapporo, 16-VIII-1962, on the Japanese cedar, *Cryptomeria japonica*, S. Ehara leg. Allotype: ♀, same data as holotype. Paratypes: 4♂♂ & 22♀♀, 16-VIII-1962, 5♂♂ & 10♀♀, 24-VIII-1955, other data same as in holotype.

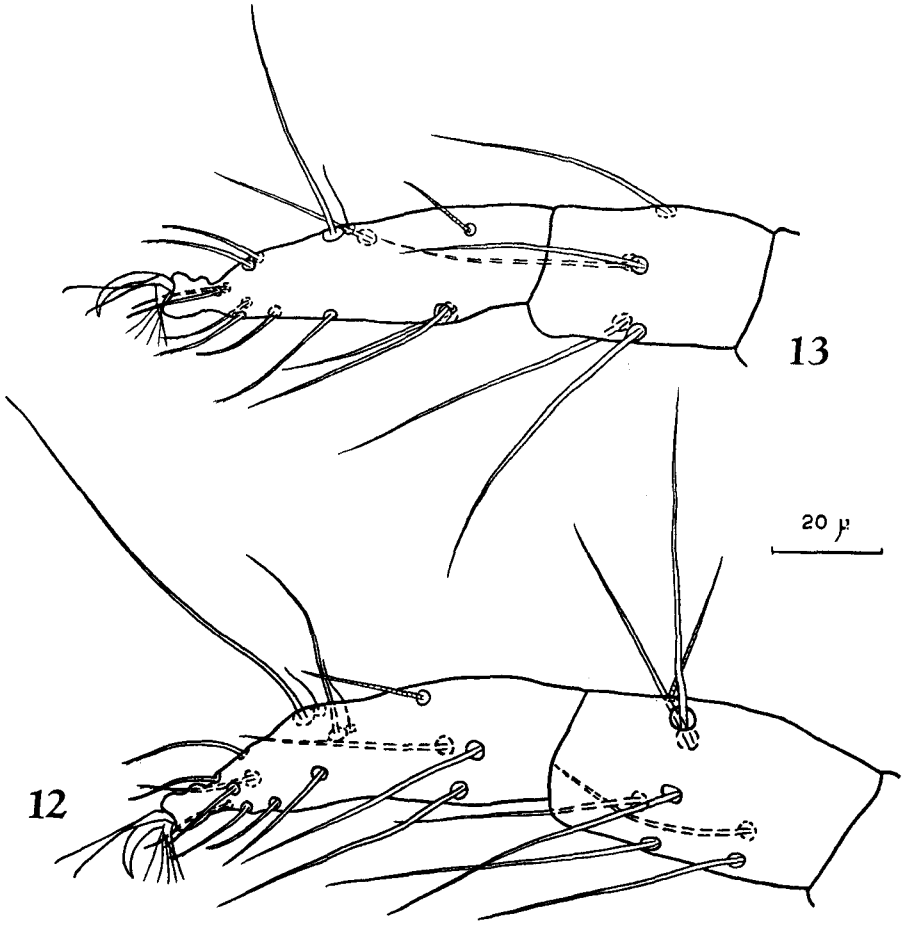
Remarks. Oligonychus pustulosus n. sp. resembles *O. aceris* (Shimer), 1869, and *O. endytus* Pritchard and Baker, 1955, in having six tactile setae on tibia I of both sexes. *O. pustulosus* n. sp. differs, however, from *aceris* in colouration of body and in relative lengths of sensory seta and dorsal tactile seta on tibia I of female. Further, it differs from *endytus* in relative lengths of proximal duplex setae on leg I of female and in number of proximoventral setae of empodial claws.

2. *Oligonychus karamatus* (Ehara) (Figs. 12–15)

Paratetranychus karamatus Ehara, 1956, p. 247, Figs. 5–10; Ehara, 1959, p. 24, Figs. 3–4; Reck, 1959, p. 68.

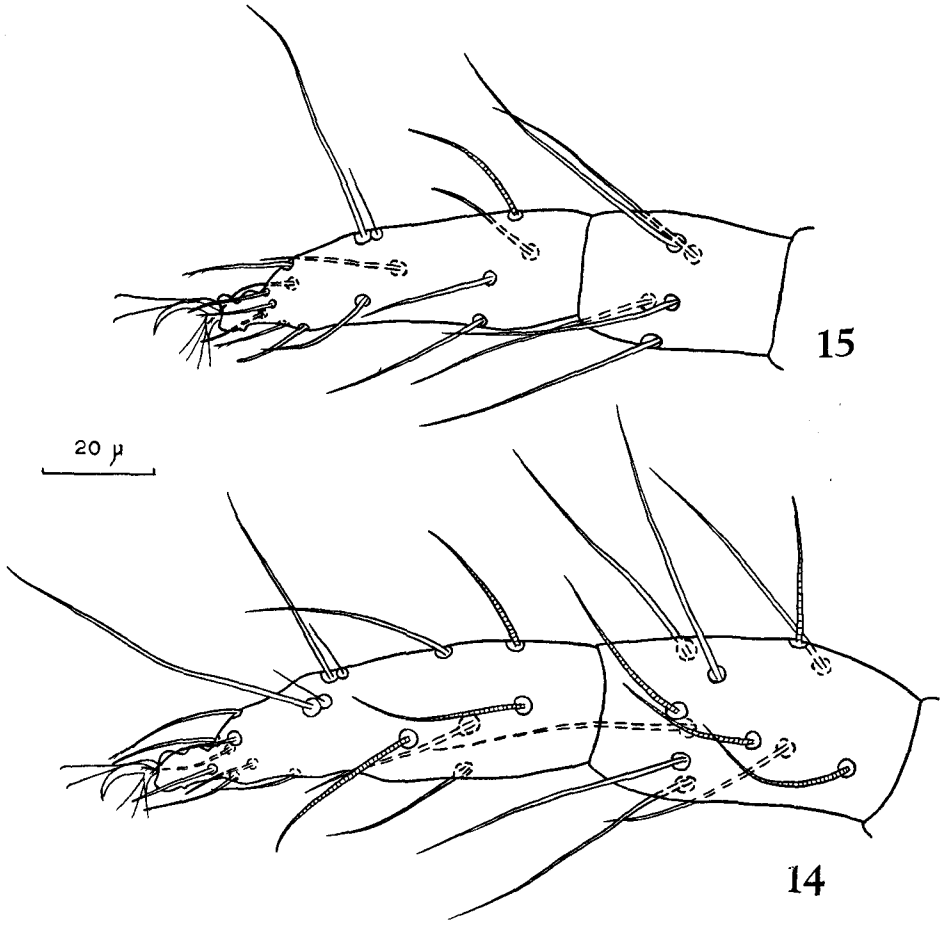
Oligonychus (*Oligonychus*) *karamatus*, Wainstein, 1960, p. 207, Figs. 252–253.

The chaetotaxy of legs of *Oligonychus karamatus* is as follows. Female: tarsus I with three tactile and one sensory setae proximal to proximal set of duplex setae, one tactile seta ventrad of duplex setae; tibia I with seven tactile and one sensory setae; tarsus II with two tactile and one sensory setae proximad



Figs. 12–13. *Oligonychus karamatus*. 12, tarsus and tibia I of female. 13, tarsus and tibia II of female.

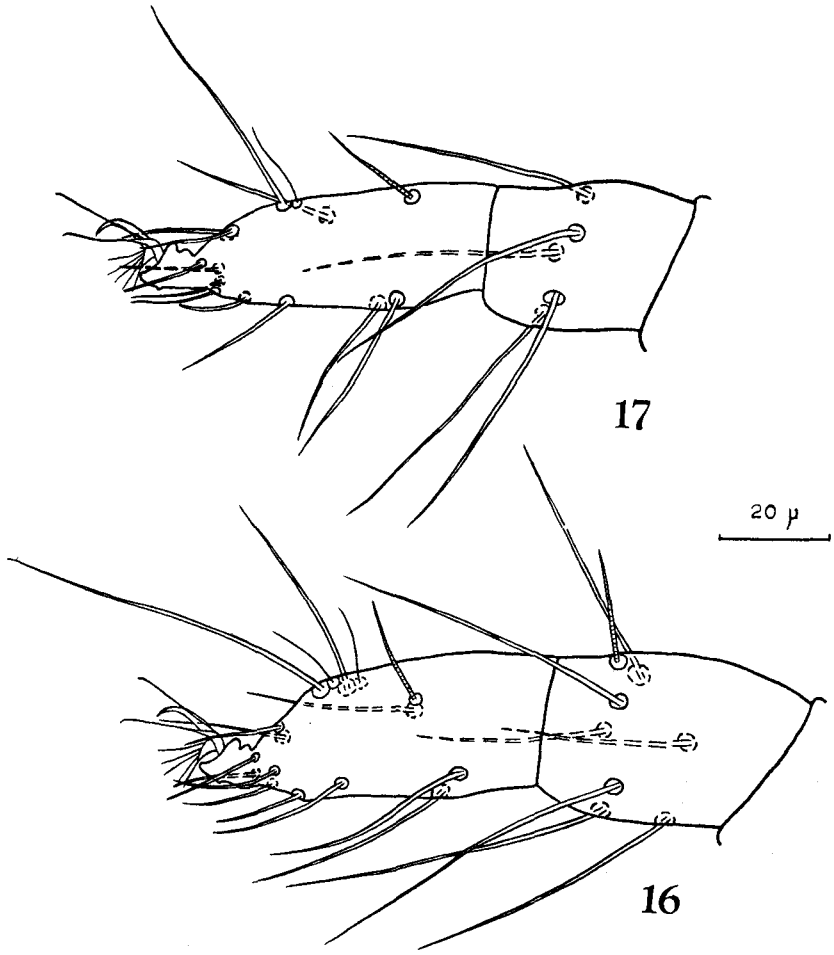
of duplex setae, one tactile seta close to duplex, one tactile seta ventrad of duplex; tibia II with five tactile setae; tibia III with five tactile setae; male: tarsus I with three tactile and three sensory setae proximal to proximal set of duplex setae, one



Figs. 14–15. *Oligonychus karamatus*. 14, tarsus and tibia I of male. 15, tarsus and tibia II of male.

tactile seta ventrad of duplexes; tibia I with seven tactile and four sensory setae; tarsus II with three tactile and one sensory setae proximad of duplex setae, one tactile seta close to duplex, one tactile seta ventrad of duplex; tibia II with five tactile setae; tibia III with five tactile setae. Genital flap with transverse striae; area immediately anterior to flap with transverse striae.

Oligonychus karamatus was originally described based on specimens collected on *Larix leptolepis* in Hokkaido and Aomori Prefecture. In addition to materials from these regions specimens from Nagano Prefecture (Minami-Minowa, Nagano Pref., 4–VII–1959, on *Larix leptolepis*, Y. Takizawa leg.) were here studied. *O. karamatus* is common in Hokkaido, and is very often found to be highly injurious to larches. Recently, Reck (1959) and Wainstein (1960) recorded this mite from Russia (Moscow and Leningrad).



Figs. 16–17. *Oligonychus hondoensis*. 16, tarsus and tibia I of female. 17, tarsus and tibia II of female.

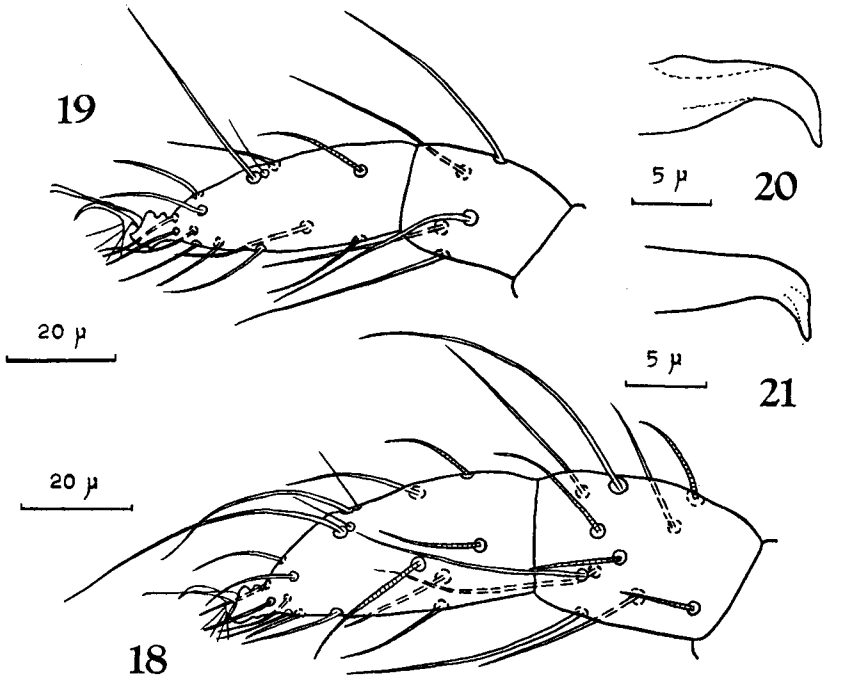
3. *Oligonychus hondoensis* (Ehara) (Figs. 16–21)

Paratetranychus hondoensis Ehara, 1954, p. 102, Figs. 1–5; Ehara, 1959, p. 23, Fig. 2; Reck, 1959, p. 67.

Oligonychus hondoensis, Pritchard & Baker, 1955, p. 284.

Oligonychus (*Oligonychus*) *hondoensis*, Wainstein, 1960, p. 207.

The chaetotaxy of legs is as follows. Female: tarsus I with three tactile and one sensory setae proximal to proximal set of duplex setae, one tactile seta ventrad of duplex setae; tibia I with seven tactile and one sensory setae; tarsus II with two tactile and one sensory setae proximal to duplex setae, one tactile seta close to duplex, one tactile seta ventrad of duplex; tibia II with five tactile setae;



Figs. 18–21. *Oligonychus hondoensis*. 18, tarsus and tibia I of male. 19, tarsus and tibia II of male. 20, 21, aedeagus.

tibia III with five tactile setae; male: tarsus I with three tactile and three sensory setae proximad of duplex setae, one tactile seta ventrad of duplexes; tibia I with seven tactile and four sensory setae; tarsus II with two tactile and one sensory setae proximal to duplex setae, one tactile seta close to duplex, one tactile seta ventrad of duplex; tibia II with five tactile setae; tibia III with five tactile setae. Genital flap with transverse striae; area immediately anterior to flap with

transverse striae.

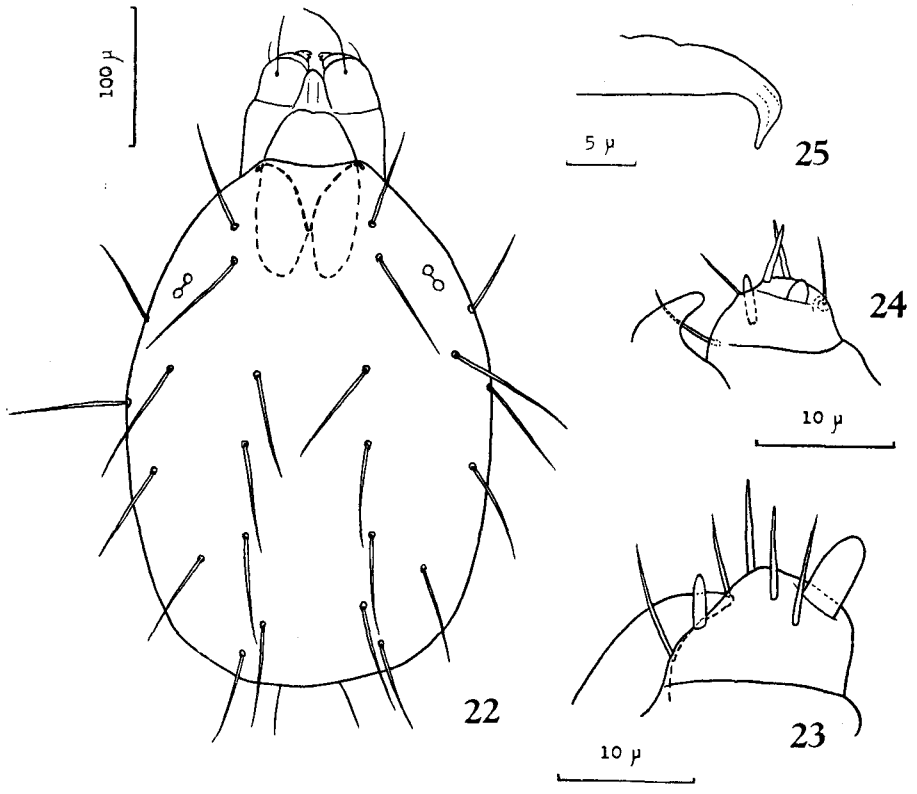
Oligonychus hondoensis is well known as one of the most serious pest of Japanese cedar in Honshu, Shikoku and Kyushu. Together with numerous specimens from the three islands, many specimens from Nanaé, southern Hokkaido, are examined in the present study. *O. hondoensis* is new to the fauna of Hokkaido; it is probably not rare in southern Hokkaido. It should be noted that it is highly variable in lengths of dorsal setae among specimens from different localities of this country.

4. *Oligonychus perditus* Pritchard et Baker (Figs. 22–29)

(Jap. Name: Byakushin-hadani)

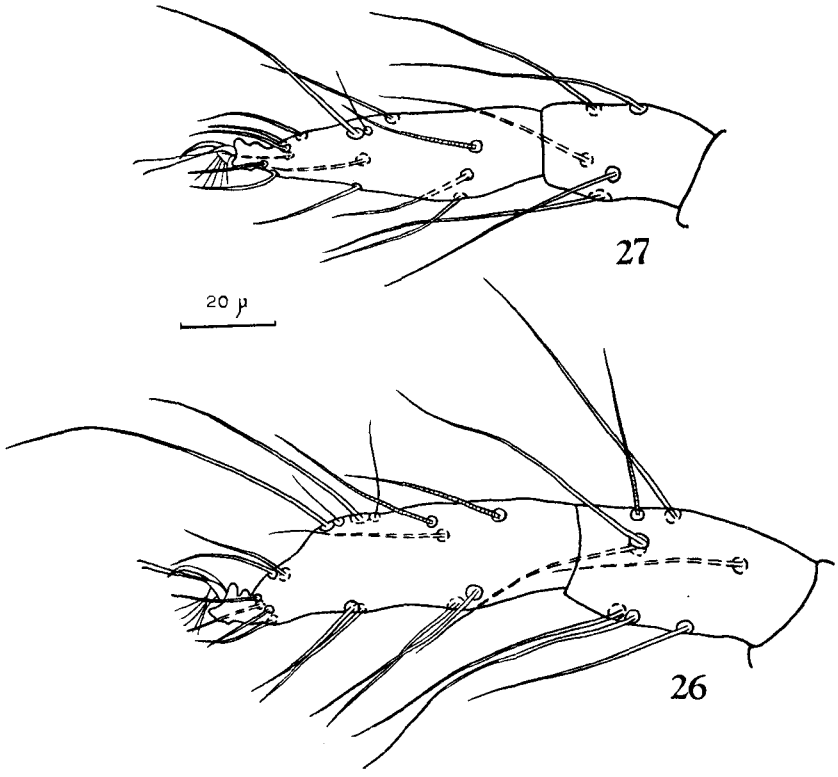
Oligonychus perditus Pritchard & Baker, 1955, p. 316, Figs. 270–273.

Female. Body from above oval, 360μ long and 250μ wide, reddish brown in



Figs. 22–25. *Oligonychus perditus*. 22, dorsal view of female (legs excluded). 23, distal segment of palpus of female. 24, distal segment of palpus of male. 25, aedeagus.

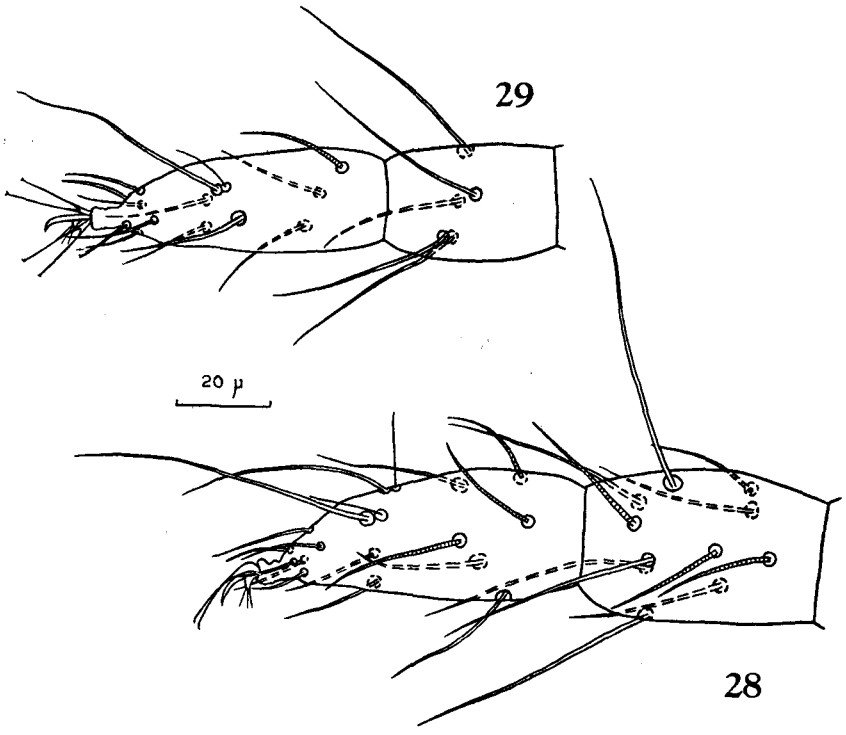
colour. Rostrum reaching the middle of femur I. Terminal sensillum of palpus more than twice as long as wide, much longer than dorsal sensillum. Ratio of length to breadth of mandibular plate, 6.4: 10. Relative lengths of segments in leg I: trochanter, 13; femur, 28; genu, 15; tibia, 16; tarsus (empodium exclusive), 25. Tarsus I with three tactile and two sensory setae proximal to proximal set of duplex setae, two tactile setae ventrad of duplex setae; proximal duplex setae



Figs. 26–27. *Oligonychus perditus*. 26, tarsus and tibia I of female. 27, tarsus and tibia II of female.

of tarsus I with proximal member about one third as long as distal member; distal duplex setae of tarsus I with proximal member about one fifth as long as distal member. Tibia I with seven tactile and one sensory setae. Tarsus II with two tactile and one sensory setae proximal to duplex setae, one tactile seta close to duplex setae, two tactile setae ventrad of duplex; tibia II with five tactile setae; tibia III with five tactile setae. Empodial claw I with five pairs of proximoventral setae. Peritreme narrow, slightly dilated at distal end. Setae

on dorsum of idiosoma not set on tubercles, slender, tapering, pubescent, slightly longer than intervals between their bases. Genital flap with transverse striae; area immediately anterior to flap with transverse striae.



Figs. 28–29. *Oligonychus perditus*. 28, tarsus and tibia I of male. 29, tarsus and tibia II of male.

Male. Body 280μ long. Terminal sensillum of palpus slightly longer than wide; dorsal sensillum slender, fusiform, much longer than terminal sensillum. Tarsus I with three tactile and three sensory setae proximad of proximal set of duplex setae, two tactile setae ventrad of duplexes; tibia I with seven tactile and four sensory setae. Tarsus II with two tactile and one sensory setae proximal to duplex setae, one tactile seta close to duplex, two tactile setae ventrad of duplex; tibia II with five tactile setae; tibia III with five tactile setae. Aedeagus as shown in Fig. 25: shaft dorsally with a minute notch near base, bent downward nearly 90° from its axis to form the hook which is much shorter than shaft; hook is tapering to a tip.

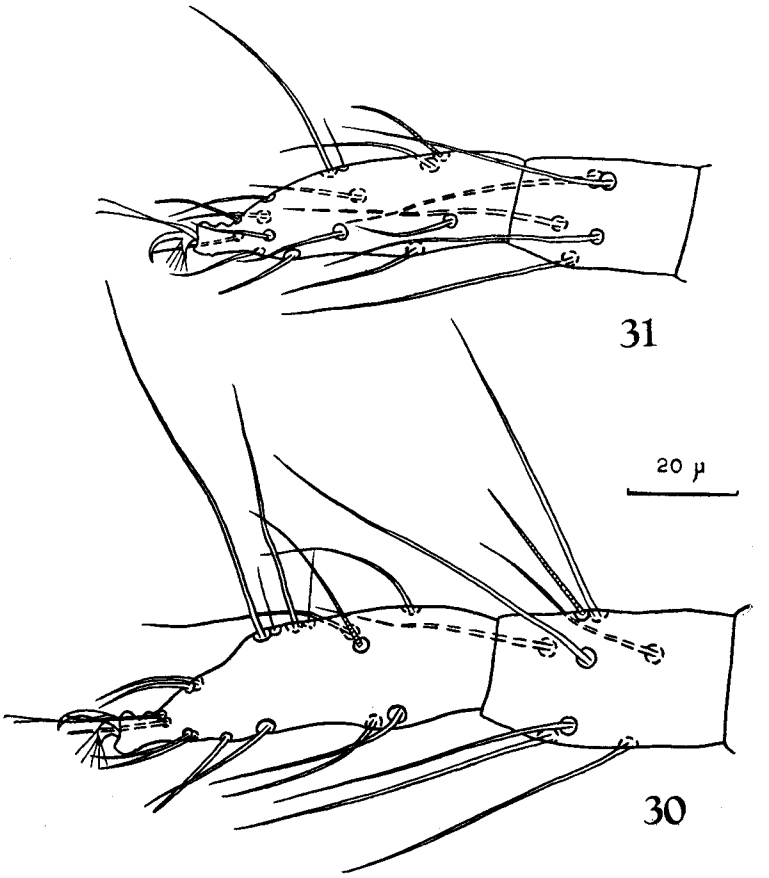
Specimens examined. Sapporo, 4♂♂ & 7♀♀, 5-VII-1955, 10♀♀, 17-IX-1962, on *Juniperus chinensis* L. var. *Sargentii* Henry, S. Ehara leg.

Distribution and Hosts. Japan (Hokkaido; detailed localities of type specimens unknown), on *Juniperus*.

Remarks. *Oligonychus perditus* was originally described based on specimens discovered in U.S.A. on juniper imported from Japan into that country. This species is unique in having two tactile setae ventrad of the duplex setae on tarsi I and II of both sexes, and in lacking unpaired ventral sensory seta just beyond the level of the duplex setae on these segments.

5. *Oligonychus ununguis* (Jacobi) (Figs. 30–36)

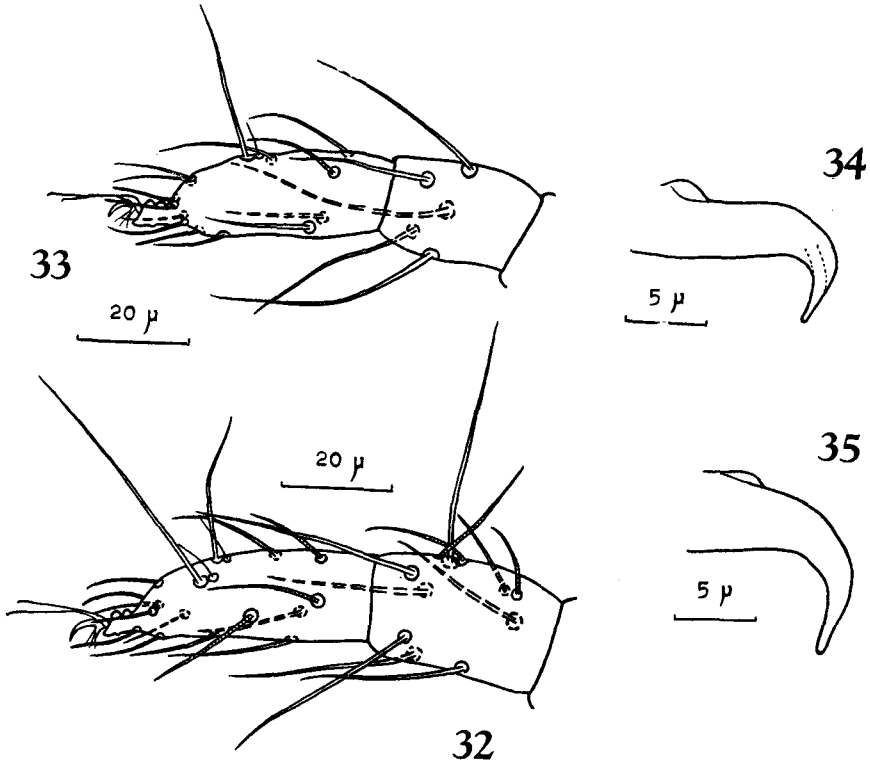
Tetranychus ununguis Jacobi, 1905, Naturw. Zts. Land-Forstw., 3: 239.
Paratetranychus ununguis, Zacher, 1913, Mitt. kais. biol. Anst. Land-Forstw., 14: 39.



Figs. 30–31. *Oligonychus ununguis*. 30, tarsus and tibia I of female. 31, tarsus and tibia II of female.

Oligonychus ununguis, Hirst, 1920, Proc. Zool. Soc. Lond., 1920: 59, Figs. 1k, 5d, 5h; Pritchard & Baker, 1955, p. 319, Figs. 274–277.
Oligonychus (*Paratetranychus*) *ununguis*, Wainstein, 1960, p. 211, Figs. 257–261.
Paratetranychus inouei Ehara, 1954, p. 104, Figs. 6–10; Ehara, 1959, p. 22, Fig. 1.

The chaetotaxy of legs is as follows. Female: tarsus I with four tactile and one sensory setae proximal to duplex setae, one tactile seta ventrad of duplexes; tibia I with seven tactile and one sensory setae; tarsus II with three tactile and one sensory setae proximal to duplex setae, one tactile close to duplex, one tactile ventrad of duplex; tibia II with five tactile setae; tibia III with five



Figs. 32–35. *Oligonychus ununguis*. 32, tarsus and tibia I of male. 33, tarsus and tibia II of male. 34, 35, aedeagus (34: Hokkaido, 35: Kurume, Kyushu, on chestnut).

tactile setae; male: tarsus I with three tactile and three sensory setae proximal to duplex setae, one tactile seta ventrad of duplex; tibia I with seven tactile and four sensory setae; tarsus II with three tactile and one sensory setae proximad of duplex setae, one tactile seta close to duplex, one tactile seta ventrad of duplex; tibia II with five tactile setae; tibia III with five tactile setae. Genital flap

transversely striated; area immediately anterior to flap transversely striated.

This mite is well known to be a serious pest of todo-fir and ezo-spruce in Hokkaido. The present materials from Hokkaido were collected on todo-fir, *Abies firma*, ezo-spruce, *Picea excelsa*, *Pinus Thunbergii*, chestnut, *Quercus rubra* and *Quercus crispula*.

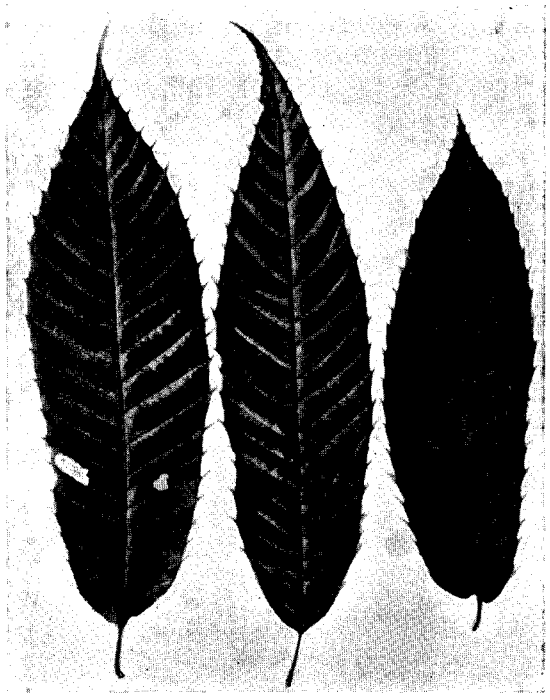


Fig. 36. Chestnut leaves injured with *Oligonychus ununguis*.

Numerous collections taken from Honshu, Shikoku and Kyushu were also available for this study. The mite is new to Shikoku and Kyushu. Specimens from the three islands which the present author studied are as follows: Sawada, Aomori Pref., 24–VIII–1954, on Oregon pine, S. Ehara leg.; Ami, Ibaragi Pref., 5–X–1960, on chestnut, K. Sekiguchi leg.; Meguro, Tokyo, 28–V–1957, on *Pinus densiflora* and *Abies firma*, M. Hagiwara leg., 14–VI–1957, on *Picea jezoensis* var. *hondoensis*, M. Hagiwara leg.; Setagaya, Tokyo, 29–VI–1955, on *Pinus Thunbergii*, S. Aino leg.; Hibiya, Tokyo, 30–IX–1961, on *Pinus Thunbergii*, S. Ehara leg.; Kawasaki, Kanagawa Pref., 13–VIII–1961, on *Quercus serrata* and chestnut, S. Ehara leg.; Hiratsuka, Kanagawa Pref., 12–VIII–1961, on chestnut and *Chamaecyparis obtusa*, S. Ehara leg., 27–VI–1955, on *Pinus Thunbergii*, K. Kato leg.; Ritto, Shiga Pref., 17–IX–1962, on *Chamaecyparis obtusa*, Y. Nishimura leg.;

Hiyoshi, Kyoto Pref., 27–VII–1959, on *Chamaecyparis obtusa*, K. Himoto leg.; Yamazaki, Hyogo Pref., 5–VII–1957, on *Pinus Thunbergii*, Utsumi leg.; Okayama, 5–X–1962, on chestnut and *Pinus Thunbergii*, S. Ehara leg.; Matsuyama, Ehime Pref., 14–XI–1962, on chestnut, S. Mori leg.; Kurume, Fukuoka Pref., 21–VI–1957, on chestnut and *Chamaecyparis obtusa*, K. Inouye leg.

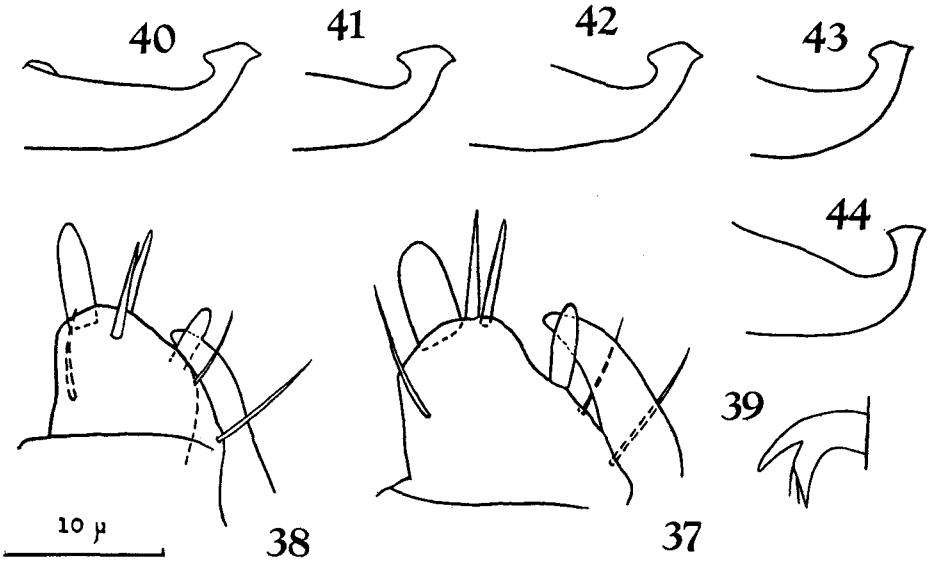
It may vary in leg chaetotaxy among specimens of different populations and among different specimens within a population. Particularly, tarsus II of the male usually carries two tactile and one sensory setae, but sometimes bears two sensory setae, and sometimes one tactile seta disappears.

As is seen above, this mite is not only feed on conifers but also broad-leaved plants belonging to the Fagaceae; it is usually found on the upper surfaces of the leaves of the broad-leaved plants. By the way, from the viewpoint of horticulture of this country, it is possible that it will be regarded as an important pest of chestnut in near future. It is holoarctic in distribution, and is known to feed on conifers and the fagaceous plants in Europe and America.

6. *Tetranychus ezoensis* n. sp. (Figs. 37–42)

(Jap. Name: Araragi-hadani)

The female of *Tetranychus ezoensis* n. sp. measures 400μ long and 260μ wide,



Figs. 37–42. *Tetranychus ezoensis* n. sp. 37, distal segment of palpus of female. 38, distal segment of palpus of male. 39, empodium of tarsus I of male. 40, 41, 42, aedeagus. Fig. 43. *T. cinnabarinus*, aedeagus. Fig. 44. *T. telarius*, aedeagus.

while the male measures 250μ long and 190μ wide. This species belongs to the *telarius* complex, and generally accords in structure with the members belonging to the complex. The lobes of the dorsal integumentary striae of the idiosoma are rather of *T. cinnabarinus*-type (Boudreaux 1956). The species is different from the closely related species, *T. telarius* (Linnaeus) and *T. cinnabarinus* (Boisduval) from the following points:

1. Female pinkish in colour but not carmine.
2. Terminal sensillum of male palpus very slender.
3. Empodium I of male with three pairs of well developed hairs.
4. Barb of aedeagus larger, acutely angled posteriorly and slightly rounded anteriorly; dorsal margin of barb obtusely angulate near the posterior end.

Types. Holotype: ♂, Sapporo, 24–VIII–1955, on *Taxus cuspidata*, S. Ehara leg. Allotype: ♀, same data as holotype. Paratypes: 2♂♂ & 30♀♀, 24–VIII–1955, 4♂♂ & 32♀♀, 3–IX–1954, other data same as in holotype.

Family TENUIPALPIDAE

7. *Pentamerismus oregonensis* McGregor (Figs. 45–46)

(Jap. Name: Futoge-himehadani)

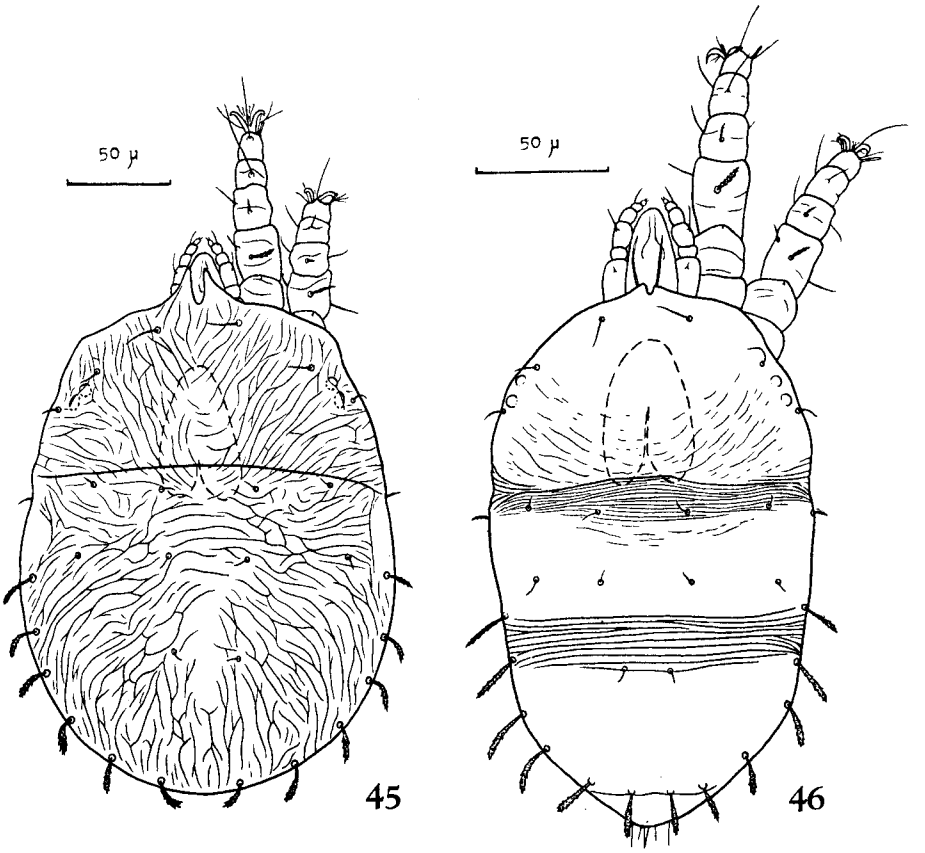
Pentamerismus oregonensis McGregor, 1949, Mem. S. Calif. Acad. Sci., 3(2): 27, Fig. 9, Pl. 9; Pritchard & Baker, 1952, p. 11, Fig. 10.

Female. Body from above oval, widest slightly cephalad of the middle of hysterosoma, 271μ long (including rostral shield), including rostrum 277μ long, 181μ wide. Rostrum reaching the distal portion of femur I. Palpus surpassing rostrum, with three setae (including a rod-like seta) on distal segment. Dorsal setae of femora I, II and III, gena I and II, and tibia II, are serrate. Tarsi I and II with a rod-like sensory seta distally. Legs III and IV usually unvisible under body. Rostral shield broadly emarginate medially. Dorsum of idiosoma striated as figured. All dorsal setae short; propodosomal and humeral setae slightly serrate, slender; dorsolateral hysterosomal setae six-paired, broad, strongly serrate; dorsosublateral and dorsocentral hysterosomals minute. Two pairs of medioventral metapodosomal setae longer than distance between them. Setae on ventral plate, genital setae, and anal setae slender.

Male. Body from above more slender than female, 140μ long (including rostral shield), including rostrum 160μ long, 130μ wide. Dorsum of propodosoma with obscure, semicircular striae. Dorsal border region of propodosoma and hysterosoma very finely striated transversely, except for lateral small portions with coarse striae. Dorsal border region of metapodosoma and opisthosoma coarsely striated transversely. Dorsal propodosomal setae slender, slightly serrate; humeral and dorsolateral hysterosomal setae long and broad, remarkably serrate; dorsosublateral and dorsocentral hysterosomals minute.

Specimens examined. Sapporo, 7♀♀, 5–VII–1955, 1♂ & 15♀♀, 17–IX–

1962, on *Juniperus chinensis* L. var. *Sargentii* Henry, S. Ehara leg. Additional specimens from Iizaka, Fukushima Pref., Honshu, on *Juniperus* sp. (N. Hikichi leg.) were examined.



Figs. 45–46. *Pentamerismus oregonensis*. 45, dorsal view of female. 46, dorsal view of male.

Distribution and Hosts. Japan (Hokkaido and Honshu), on *Juniperus*; U.S.A., on *Libocedrus, Cupressus, Juniperus,* and *Thuja.*

Remarks. From Japan this mite was recorded by Pritchard and Baker (1952), based on specimens found in U.S.A. on Japanese cypress imported from Japan into that country.

8. *Pentamerismus taxi* (Haller) (Fig. 47)

(Jap. Name: Ichii-himehadani)

Tenuipalpus taxi Haller, 1877, Mitt. Schweiz. Zts. Forstw., p. 85.
Pentamerismus morishitai Pritchard & Baker, 1952, p. 12, Fig. 11.

Female. Body measuring 290μ long (including rostral shield), including rostrum 300μ long, 190μ wide. Similar to female of the preceding species, but distinguished from it by the following points:

1. Dorsolateral hysterosomal setae slender and slightly serrate.
2. Dorsum of idiosoma with distinct striae medially.

Male. Unknown.

Specimens examined. Sapporo, 4♀♀, 2-VII-1955, 15♀♀, 16-VIII-1962,

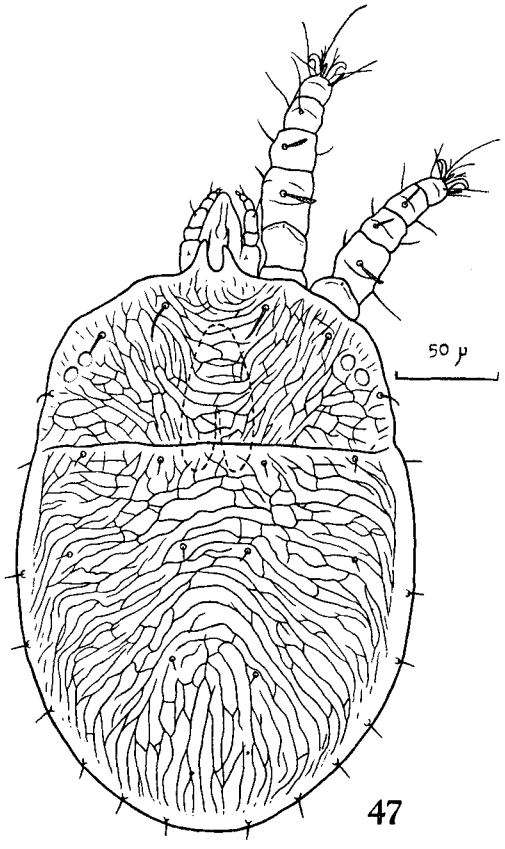


Fig. 47. *Pentamerismus taxi*, dorsal view of female.

on *Taxus cuspidata*, S. Ehara leg.

Distribution and Host. Japan (Hokkaido), new distribution record; Europe, U.S.A. Parasitic on *Taxus*.

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