Revision of the Conifer Aphid Fauna of Japan (Homoptera, Lachnidae)

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1. Introduction

Conifer aphids are one of the most abundant and most serious pests occurring in the plantations of coniferous trees in Japan. They not only cause serious damage because of their feeding on the host plant, but also, in many cases, they are vectors of plant diseases.

In 1917 S. MATSUMURA reported on Japanese conifer aphids, *Lachnus longipennis* MATSUMURA, *Lachnus laricicolus* MATSUMURA and *Todolachnus abietis* MATSUMURA for the first time, in formation concerning Japanese conifer aphid fauna vague. Since that time, a number of workers, among them the late E.O. ESSING et I. KUWANA, R. TAKAHASHI, O. SHINJI have contributed to the knowledge of Lachnidae.

Also, the author has published some papers on conifer aphids since 1936 from the service of the Government Forest Experiment Station, Hokkaido Branch, in Japan.

After retiring from the service of the Government Forest Experiment Station in 1962, the author continued his studies at the Ôji Institute for Forest Tree Improvement and is still so engaged.

Hitherto, a total of 24 species were recorded from Japan. However, some typical specimens of European species of conifer aphids have not be seen in Japan, and some determinations are questionable. In the course of his studies the author made brief visits to Dr. Hille Ris LAMBERS, Bennekom, Holland in 1964, Dr. G. Ch. SHAPOSHINIKOV, Zoological Institute Academy of Sciences, Leningrad, U.S.S.R., Dr. H. SZELEGIEWICZ, Polish Academy of Sciences, Institute of Zoology, Warszawa, Poland, Dr. Albert PINTERA, Czechoslovak Akademy of Science, Institute of Biology, and Dr. V. F. EASTOP, British Museum, Natural Histry, London in 1968, and gained some knowledge on the conifer aphids by their kind guidance.

Therefore, the author proposes some revision on Japanese conifer aphid, and at the same time describes four new species in this paper.

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University, Dr. M. SORIN, Kôgakukan College, Prof. Dr. ISHIKUBO, Kagoshima University, Prof. W. H. PAIK, Seoul National University, Dr. S. CHIBA and Dr. S. SATO, Ôji Institute, Mr. M. YOGO and Mr. H. YAMAGUCHI, Entomologists of the Government Forest Experiment Station, Hokkaido Branch for their kind advice and assistance in many ways ; Mr. K. TAMURA, President of Hokkaidô Forest Protection Association for providing research-aid fund ; Mr. C. NISHIGUCHI, Tokyo, Mr. E. INOUYE, Okayama, Mr. Y. TAKIZAWA, Nagasaki, Mr. A. KITAMURA, Mie Pref., Mr. T. OZAWA, Kiso-Fukushima, Mr. T. HIRASA, Mr. S. TAKAI, Sapporo and Mr. S. KOIZUMI, Kuriyama for collecting aphid materials.

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2. Historical review

In 1917 MATSUMURA described the following 6 species of conifer aphids in his first paper in "Jour. Coll. Agr. Tohoku Imp. Univ. Sapporo, Vol. VII, Pt. 6".

1. *Lachnus laricicolus* MATSUMURA=*Cinara* (*Cinarellia*) *laricicola* MATSUMURA.
2. *Lachnus longipennis* MATSUMURA=*Cinara* (*Dinolachnus*) *longipennis* MATSUMURA.
3. *Todolachnus abistis* MATSUMURA=*Cinara* (*Cinaropsis*) *matsumurana* HILLE RIS LAMBERS.
4. *Nippolachnus abistis* MATSUMURA=*Nippolachnus piri* MATSUMURA ?
5. *Hyalopterus abietinus* MATSUMURA……(perhaps not conifer aphid)
6. *Yamatocallis hirayamae* MATSUMURA……(perhaps not conifer aphid)

In 1924 R. TAKAHASHI added 1 species of conifer aphid in Aphididae of Formosa, Pt. 3. *Lachnus laricis* WALKER=*Cinara* (*Cinarellia*) *laricicola* MATSUMURA.

In the same year O. SHINJI described the following 3 species in "Dobutsu zasshi, vol. 36, No. 431".

1. *Dilachnus momi* SHINJI=*Cinara* (*Dinolachnus*) *longipennis* MATSUMURA.
2. *Aphids momifoliae* SHINJI……(perhaps not conifer aphid)
3. *Phorodon abietifoliae* SHINJI……(perhaps not conifer aphid)

In 1929 M. HORI recorded the following 4 species from Hokkaido in "Hokkaido Agr., Expt. Rept. No. 23."

1. *Dilachnus piniformosanus* TAKAHASHI=*Cinara* (*Cinara*) *piniformosana* TAKAHASHI.
2. *Mindarus abietinus* KOCH=*Mindarus japonicus* TAKAHASHI.
3. *Lachnus laricis* WALKER=*Cinara* (*Cinarellia*) *laricicola* MATSUMURA.
4. *Prociphilus bumeliae* SCHRANK=*Prociphilus oriens* MORDWILKO.

A part from the above-mentioned species, the author described or recorded 2 species in "Ins. Mats., vol. X, No. 4, 1936" ; ibid., "vol. XI, No. 3, 1937" 3 species ; ibid., "vol. XII, No. 2 and 3, 1938" 2 species ; "ibid. ; vol. XVIII, No. 4, 1939" 8 species.

H. KÔNO and M. INOUYE described a new species in "Ins. Mats., vol. VIII, No. 1, 1938".

In 1941 the author reported "Beiträge zur Kenntnis der Koniferen-Läuse, vorkommend in nördlichen Teil Japans" in "Bull. Hokkaido Forestry Expt. St., No. 33 in Jiho" and in

Rept. Hokkaidô Branch, Gov. Forest Expt. St. Special Rept. No. 5, 1936.

In 1941 O. SHINJI reported the following species from Japan in "Monograph of Japanese Aphididae, Tokyo".

1. *Eulachnus piniformosanus* TAKAHASHI=*Eulachnus thunbergii* WILSON.
2. *Unilachnus orientalis* TAKAHASHI=*Schizolachnus orientalis* TAKAHASHI.
3. *Cinara fasciatus* SHINJI=*Cinara* (*Cinara*) *shinji* INOUYE.
4. *Cinara laricis* WALKER (non WALKER)=*Cinara* (*Cinarellia*) *laricicola* (MATSUMURA).
5. *Cinara longipennis* MATSUMURA=*Cinara* (*Dinolachnus*) *longipennis* MATSUMURA.
6. *Cinara pineti* KOCH (nec KOCH)=*Cinara* (*Cinara*) *piniformosana* TAKAHASHI.
7. *Cinara pinidensiflorae* ESSIG et KUWANA=*Cinara* (*Cinara*) *pinidensiflorae* ESSIG et KUWANA.
8. *Cinara todoe* SHINJI (1941)=*Cinara* (*Cinaropsis*) *todocola* INOUYE (1936).
9. *Stomaphis pini* TAKAHASHI=*Stomaphis quercus pini* TAKAHASHI.

In 1962 the author revised Japanese larch-infesting aphids in "Bull. Gov. Forest Expt. St. No. 139".

In the present paper, the author has presented a revision of the taxonomic and biological study on all conifer aphids (Lachnidae) in Japan, and listed them as in the following table.

A list of conifer aphids in Japan

No.	Species name of conifer aphid	Host plant	Feeding site	Distribution
1	*Cinara* (*Cinara*) *piniformosana* (TAKAHASHI)	*Pinus* spp.	Branch of young tree	Hokkaidô, Honshû, Kyûshû, Korea and Formosa
2	*Cinara* (*C.*) *laricis* (HARTIG)	*Larix* spp.	〃	Hokkaidô, Honshû, Europe and U.S.A.
3	*Cinara* (*C.*) *pinidensiflorae* (ESSIG et KUWANA)	*Pinus* spp.	〃	Japan, Korea, Formosa and China
4	*Cinara* (*C.*) *orientalis* (TAKAHASHI)	*Pinus* spp.	〃	Honshû and Formosa
5	*Cinara* (*C.*) *shinji* INOUYE	*Pinus* spp. (Zirbe)	Branch and stem of young trees	Hokkaidô and Honshû
6	*Cinara* (*C.*) *formosana* (TAKAHASHI)	*Pinus* spp.	Young branch	Hokkaidô, Honshû, Kyûshû, Formosa and China
7	*Cinara* (*C.*) *kochiana kochi* INOUYE	*Larix* spp.	Main stem or older branches	Hokkaidô and Honshû
8	*Cinara* (*C.*) *grossa* (KALTENBACH)	*Picea* spp.	Older branches and trunks	Hokkaidô, Honshû and Korea
9	*Cinara* (*C.*) *sorini* n. sp.	*Pinus* sp. (Black pine)	Trunk and root	Honshû

No.	Species name of conifer aphid	Host plant	Feeding site	Distribution
10	*Cinara* (*C.*) *etsuhoe* n. sp.	*Pinus* sp. (Red pine)	Trunk aud root	Honshû
11	*Cinara* (*C.*) *bogdanowi ezoana* INOUYE n. comb.	*Picea* spp.	Young stem and older branches	Hokkaidô and Saghalien
12	*Cinara* (*C.*) *watanabei* n. sp.	*Pinus* spp. (Zirbe)	Older branches and trunk	Hokkaidô
13	*Cinara* (*C.*) *cembrae* (SEITNER)	*Pinus* spp. (Zirbe)	Branches of young tree	Hokkaidô
14	*Cinara* (*Cinaropsis*) *matsumurana* HILLE RIS LAMBERS	*Abies* spp.	Among needles of twig	Hokkaidô and Honshû
15	*Cinara* (*Cinaropsis*) *horii* INOUYE	*Picea* sp.	Twig and young shoot	Hokkaidô and Saghalien
16	*Cinara* (*Cinaropsis*) *pilicornis* (HARTIG)	*Picea* sp.	Twig and stem of young trees	Hokkaidô
17	*Cinara* (*Cinaropsis*) *ozawai* n. sp.	*Tsuga* sp.	Young twig	Honshû
18	*Cinara* (*Cinaropsis*) *todocola* INOUYE	*Abies* spp.	Stem and branches of young tree	Hokkaidô, Honshû and Saghalien
19	*Cinara* (*Cinaropsis*) *costata* (ZETTERSTEDT)	*Picea* spp.	Older twigs and branches	Hokkaidô, Honshû, Saghalien and Europe
20	*Cinara* (*Cinarellia*) *laricicola* (MATSUMURA)	*Larix* spp.	Twig and stem of young tree	Hokkaidô, Honshû and Korea
21	*Cinara* (*Cinarellia*) *laricicola chibi* INOUYE n. comb.	*Larix* sp.	Stem of young tree	Hokkaidô, Honshû and Kyûshû
22	*Cinara* (*Dinolachnus*) *longipennis* (MATSUMURA)	*Abies* spp. *Cephalotaxus* sp.	Main stem of young tree	Hokkaidô, Honshû and Korea
23	*Cinara* (*Dinolachnus*) *hattori* KÔNO et INOUYE	*Abies* spp.	Twigs and trunk	Hokkaidô and Honshû
24	*Cinara* (*Cupressobium*) *juniperi* (DE GEER)	*Juniperus* sp.	Twigs and needles	Honshû
25	*Schizolachnus orientalis* (TAKAHASHI)	*Pinus* spp.	Needles	Honshû and Kyûshû

No.	Species name of conifer aphid	Host plant	Feeding site	Distribution
26	*Eulachnus thunbergii* WILSON	*Pinus* spp.	Needles	Hokkaidô, Honshû, Formosa and Korea
27	*Eulachnus pumilae* INOUYE	*Pinus* spp. (Zirbe)	Needles	Hokkaidô, Siberia and Europe
28	*Stomaphis quercus pini* TAKAHASHI	*Pinus* sp.	Trunk and roots	Honshû

3. Taxonomy of Japenese Conifer Aphids

Family Lachnidae

Antenna and body usually hairy. Eyes of all forms large. Processus terminals much shorter than base of VI. Rhinaria circular. Wing venation usually normal, sometimes reduced. Siphuneli mere rim usually on broad hairy cone, rarely mere pore or not evident. Cauda always broader than long, appearing semilunar and rounded. Anal plate rounded entire.

Free-living, mostly on barks, some are on living needles (in *Eulachnus*, *Schiaolzchnus* and *Cinara*). Some species of *Cinara*, and *Stomaphis* with long ultimate rostral segment and mostly associated with the ants which builds shelter.

Two subfamilies, Cinarinae and Lachninae are recognized, the latter mostly on aerial parts of broad-leaved trees and other plants, but only one species of stomaphis in Lachninae are known to attack coniferous trees.

I. Subfamily : Cinarinae

1. **Tribus : Cinarini** BÖRNER (1930)

Usually large and thick-set, with many kinds of hairs, body brown or greenish to black, often with pattern of white secretion. Antennae of 6 segments, primary rhinaria with chitinous rim or without it, rims of the accessory rhinaria well developed, partly or absolutely connected with each other.

Fore-wing with stigma elongate and radial sector straight reaching almost to tip of wing. Oculer tubercle usually evident. Living free on Coniferae, on needles and bark of limbs and twigs.

Only one genus *Cinara* represent in Japan.

1. Genus *Cinara* CURTIS, 1835

Cinara CURTIS, British Entomology, 12, p.576 (1835)

Genotype : *Aphis pini* LINNÉ, 1758.

Characters=Body usually large and thick-set, with many hairs of various quality and length, often with basal scleroits. Color usually brown or black, rarely green and often with more or less a pattern of white powdery secretion. Antenna shorter than body, hairy, six-segmented and with processus terminalis shorter than half of base. Primary rhinaria of antennal VI with chitinous rim or without it, rims of the accessory rhinaria well developed, partly or absolutely connected with each other. First segment of the hind tarsus with dorsal

length of various value, ventrally with a great number of hairs. Siphunculi mere rim, usually on conelike or mammiform hairy base. Rostrum attaining abdomen or exceeding body, segments IV and V elongate and lance-like in shape, V distinct. Fore with stigma rather elongate, radial sector straight, media faint and either once or twiced-forked.

Living on the bark of trunk or branches and root, often attended by ants.

Key to the subgenera of Japanese *Cinara*

Apterous viviparous female

1. Primary rhinaria with an evident chitinous rim ……2
-. Primary rhinaria without an evident chitinous rim……3
2. Dorsal length of first hind tarsus distinctly longer than basal length of the same segment. On *Pinus*, *Picea* and *Larix* ……1, Subgenus *Cinara* (s. str.)
-. Dorsal length of first hind tarsus as long as or shorter than basal length of the same segment. On *Picea*, *Abies* and *Tsuga*……2, Subgenus *Cinaropsis* BÖRNER
3. Dorsal length of first hind tarsus as long as or shoter than basal length of the same segment ……4
-. Dorsal length of first hind tarsus distinctly longer than basal length of the same segment. On *Larix* ……3, Subgenus *Cinarellia* BÖRNER
4. Antennal VI segment bearing a large and prominent primary rhinarium. From mesonotum to abdominal VIII segment with two continuous rows of large and dark sclerotic plates ; often, some of these plate are inconspicuous. On *Abies* …… 4, Subgenus *Dinolachnus* BÖRNER
-. Antennal VI segment bearing not very large and prominent primary rhinarium. From mesonotum to II abdominal tergites with two continuous rows of large and dark sclerotic plates. On *Juniperus*……5, Subgenus *Cupressobium* BÖRNER

1. Subgenus *Cinara* s. str.

Key to the Species

Apterous viviparous females

1. Dorsum of abdomen with small or large sclerotic plates on all segments……2
-. Dorsum of abdomen with dark, sclerotic plates not on all of the segments……6
2. Abdomen with many small scattered sclerotic plates on *Pinus densiflora*, *Pinus thunbergii*, *Pinus sylvestris* and *Pinus* spp. ……1. *piniformosana* (TAKAHASHI)
-. Abdomen with large, not scattered sclerotic plates……3
3. Abdomen with two continuous rows of large dark sclerotic plates ……4
-. Abdomen covered by two continuous rows of large dark sclerotic plates and scattered marginal sclerotic plates. On *Larix leptolepis*……2. *laricis* (HARTIG)
4. Marginal sclerotic plates on I~II abdominal tergites developed ……5
-. Marginal sclerotic plates on I~II abdominal tergites not developed. On *Pinus densiflora* and *Pinus thunbergii* ……3. *pinidensiflorae* (ESSIG et KUWANA)
5. Dark sclerotic plates on II~IV abdominal tergites divided into small pieces. Hind tibia with many long hairs. On *Pinus densiflora* and *Pinus* spp. ……4. *orientalic* (TAKAHASHI)
-. Dark sclerotic plates on I~VI divided into small pieces. Hind tibia with spiny and short pointed hairs. On *Pinus pentaphylla*, *P. p.* var. *Himekomatsu* and *Pinus strobus*…… 5. *shinji* INOUYE
6. Abdominal tergites without sclerotic plates on all the segment, and with prominent muscle

attachment plates on all the segments of abdomen. On *Pinus thunbergii* and *P. massoniana* ..... 6. *formosana* (TAKAHASHI)

-. Abdominal tergites with large sclerotic plates on fore segment 7
7. Antennal hairs shorter than the basal diameter of III antennal segment 8
-. Antennal hairs longer than the basal diameter of III antennal segment 11
8. Body oval, sparsely overgrown with short hairs on dorsum of abdomen 9
-. Body long oval, densely overgrown with short hairs on dorsum of abdomen 10
9. Rostrum long and slender, nearly reaching to the tip of abdomen. VII and VIII abdominal tergites with narrow, dark sclerotic bars. Body large, more than 4.5 mm in length. Antennal segments with secondary rhinaria on III 2, on IV 1, on V 2. On *Larix leptolepis* and *L. koraiensis* .....7. *kochiana kochi* INOUYE
-. Rostrum long and slender at least reaching past siphuncle, VII abdominal tergites with narrow, dark sclerotic band. Body large, more than 4.0 mm in length. Antennal segments with secondary rhinaria on V 1. On *Picea jezoensis*, *P. j.* var. *hondoensis*, *P. Abies* and *Picea canadensis* .....8. *grossa* (KALTENBACH)
10. Body large, more than 6 mm in length. Rostrum very long, much longer than body. Short pointed hair on abdominal tergite has an unusually large base. Antennal segments with secondary rhinaria on III 2. The V antennal segment longer than the length of rostral segment IV. On *Pinus thunbergii* .....9. *sorini* n. sp.
-. Body large, more than 5 mm in length. Rostrum very long, much longer than body. Short and pointed hair on abdominal tergite having an usually small base. Antennal segment with secondary rhinaria on III 1-2, on IV 1, on V 1. The antennal segment shorter than the length of rostral segment IV. On *Pinus densiflora* .....10. *etsuhoe* n. sp.
11. Antennal V+VI segments evidently shorter than diameter of siphuncular cone. On *Picea jezoensis* ..... 11. *bogdanowi ezoana* n. comb.
-. Antennal V + VI segments as long as or larger than diameter of siphuncular cone.....12
12. Body large, more than 4.5 mm in length. Antennal segment with secondary rhinaria on III 4～5, on IV 3～4, on V 2～3. On *Pinus koraiensis*, *P. strobus* and *Pinus pentaphylla* .....12. *watanabei* n. sp.
-. Body medium-sized, more than 3.0 mm in length. Antennal segment with secondary rhinaria on III 1～3, on IV 1～2, on V 1～2. On *Pinus pumila* and *Pinus pentaphylla*..... .....13. *cembrae* (SEITNER)

1. ***Cinara* (*Cinara*) *piniformosana*** (TAKAHASHI)

Dilachnus species, TAKAHASHI, Aphididae of Formosa, pt. 1. p. 82 (1921)

Dilachnus piniformosanus TAKAHASHI, Aphididae of Formosa, Pt. 2, p.47 (1923) ; HORI, Hokkaidô Agri., Expt. St. Rept., No.23, p.58 (1929)

Neochmosis piniformosanus TAKAHASHI, Trans. Nat. Hist. Soc. Formosa, XX. p. 325 (1930)

Cinara pineti TAKAHASHI (nec KOCH), Aphididae of Formosa, Pt. 6, pp. 22～23 (1931)

Cinara formosana INOUYE, (nec TAKAHASHI), Ins. Mats., vol. XIII, No.4, p.141～142 (1939)

Cinara pinea INOUYE (non MORDVILKO), Hokkaidô Forstversuchsanstalt Bull , Nr. 33, S. 11～12 (1941) ; ibid., Rept. Hokkaidô Branch, Gov. Forest Expt. St. Special Rept., No.5, S. 215～216 (1956) ; MORITSU, Iconographia Insectorum Japonicorum, Tokyo. p. 338 (1956). *Cinara pineti*, PAIK (non KOCH), Aphids of Korea, Seoul National University, pp. 17～18 (1665)

Host.....*Pinus densiflora* SIEB. et ZUCC., *Pinus thunbergii* PARL., *Pinus sylvestris* L. and

Pinus spp.

Biology……In spring fundatrices of this species appear on the bases of shooting sprouts, and in summer they move to one or two-year-old portions of branches near periphery of the crown of the young host plants.

They are attended by various ants (*Formica truncicola yessensis* FOREL, *Formica sanguinea fasciceps* EMERY, *Formica fusca japonica* MOTSCHULSKY and other species of ants).

Alate viviparous females occur in June at Sanada in Nagano prefecture, at Kumamoto in Kyûshû, and in July at Iwanai, Hokkaidô.

Apterous viviparous female and alate viviparous female periodically attack new shoots and twigs of the host plant from late spring to late autumn. In autumn the oviparous females and alate males move to the young twigs where they lay eggs in rows of 2～10 pieces on the upper side of needles ; are black and about 1.2 mm.

Habitat……Hokkaidô (Nopporo, Sapporo, Kotoni, Otaru, Iwanai, Tomakomai and Kuriyama), Honshû (Sanada, Nagano Pref. ; Asakawa, Tokyo ; Hirao and Tondabayashi, Osaka ; Koza, Wakayama Pref. ; Kameyama, Mie Pref. ; Fukuyama, Hiroshima Pref.) and Kyûshû (Najima, Fukuoka Pref. ; Kumamoto, Kumamoto Pref. ; and Isahaya, Nagasaki Pref.).

Data associated with our specimens are as follows :

Many specimens were collected from Hokkaido (Nopporo, Fundatrices, 27, V, 1938 ; apterous viviparous females, 27. VIII, 1938 ; ex *Pinus densiflora*, M. INOUYE leg.) (Sapporo, apterous viviparous females and alate viviparous females, 10. VII, 1937, ex *Pinus densiflora*, M. INOUYE leg.) (Otaru, apterous viviparous females and alate viviparous females, 20. VII, 1960, ex *Pinus sylvestris*, M. INOUYE leg.) (Riyamnai, Iwanai, apterous viviparous females and alate viviparous females. 12. VII, 1943, ex *Pinus thunbergii*, M. INOUYE leg.) (Tomakomai, apterous viviparous females and alate viviparous females, 14. VII, 1960, ex *Pinus densiflora*, M. INOUYE leg.) (Kotoni, apterous viviparous female and alate viviparcus females, 26. VI, and 29. X, 1929, ex *Pinus* sp., M. HORI leg.) (Kuriyama, apterous viviparous females, 4. VI, 1965, ex *Pinus densiflora*, M. INOUYE leg.) Honshû (Sanada, Nagano Pref., apterous viviparous females and alate viviparous female, 5. VI, 1960, ex *Pinus densiflora*, M. INOUYE leg.) (Asakawa, Tokyo, apterous viviparous females and alate viviparous females. 15. X, 1967, ex *Pinus densiflora*, M. INOUYE leg.) (Hirano and Tondabayashi, Ôsaka, apterous viviparous females and alate viviparous females, 12～17. IV, 1963, ex *Pinus densiflora*, M. SORIN leg.) (Kameyama, Mie Pref. apterous viviparous females, 12. V, 1965, ex *Pinus densiflora* and 19. X, 1965, ex *Pinus thunbergii*, M. INOUYE leg.) (Koza, Wakayama Pref. apterous viviparous females, 17. V, 1965, ex *Pinus densiflora*, M. INOUYE leg.) (Fukuyama, Hiroshima Pref., apterous viviparous females, 11. IV, 1942, ex *Pinus densiflora*, M. INOUYE leg.) Kyûshû (Najima, Fukuoka Pref., apterous viviparous females, 14. IV, 1942, ex *Pinus densiflora*, M. INOUYE leg.) (Kumamoto, apterous viviparous females, 14. IV, 1942, ex *Pinus densiflora*, M. INOUYE leg.) (Isahaya and Koraicho, Nagasaki Pref., apterous viviparous females and alate viviparous females, 7. VII and 27. XI, 1965, ex *Pinus densiflora*, Y. TAKIZAWA leg.).

Gen. distribution……Japan (Hokkaidô, Honshû and Kyûshû) Korea and Formosa.

Jap. name……Matsu-no-Ôabura.

Discussion……The late Dr. R. TAKAHASHI kindly sent to the author five specimens of apterous viviparous females of *Cinara piniformosana* = *C. pineti* (non KOCH) from Formosa in 1937, and Dr. D.H.R. LAMBERS four apterous viviparous females of *Cinara pinea* MORDWILKO of European materials.

Also Dr. H. SZELEGIEWICZ gave the author many European materials of apterous viviparous females and alate viviparous females of *Cinara pinea* MORDWILKO, and after careful examination of Japanese specimens which the author brought with him last year, kindly advised the author the following.

This species closely resembles the European species, *Cinara pinea* MORDWILKO, but it may be clearly differentiated from *C. pinea* in having one or two hairs on the dorsal side of the first tarsal segment (in *piniformosana* without hairs on the dorsal side of the first tarsal segment). Also this species is distinct from *C. pinea* by the black color of hind tibiae of apterous viviparous female (in *C. pinea* MORDWILKO hind legs dark brown to black, middle part of tibia yellowish brown).

2. ***Cinara* (*Cinara*) *laricis*** (HARTIG)

Lachnus laricis HARTIG, Jahresber. über d. Fortsch. d. Fortswiss. u. Forst Naturk. im Jahr. 1836 u. 1837, Berlin, S. 145 (1839)

Aphis laricis WALKER, Ann. Mag. Nat. Hist., Vol. II, 2nd Se., p. 102 (1848)

Lachnus laricis MORDWILKO, Horae Ent. Soc. Rossicae, pp. 666～669 (1898)

Lachnus laricis VAN DER GOOT, Beitr. z Kennt. Holl. Blattläuse, S. 399～400 (1915)

Panimerous laricis THEOBALD, Plant lice Gr. Brit., III, pp. 135～139 (1929)

Cinara laricis HOTTES and FRISON, State of Illinois Dept. of Registration and Education, Bull. Article III, Vol. XIX, pp. 155～156 (1931)

Cinara laricis BRAUN, Z. ang. Ent., Bd. XXIV, S. 478 (1938)

Cinara laricis INOUYE, Hokkaidô Forstversuchsanstalt, Bull., Nr. 33, S. 12 (1941)；ibid., Rept. of Hokkaido Branch, Gov. Forest Expt. St. Special Report, No. 5, S. 216 (1956)；ibid., Bull. Gov. Forest Expt. St., No. 139. pp. 147～151 (1962)；PAIK, Aphids of Korea, Seoul National Univ., p. 19 (1965)；PINTERA, Acta entomologica bohemoslovoca, Tom. 63, No. 4, pp. 293～295 (1966)

Host……*Larix leptolepis* GORD. (*L. kaempferi* SARG).

Biology……From early spring to late autumn this species occurs on the main stem and lower branches of the young larch tree, and also on one to three-year-old portions at the end of the main branches.

Alate viviparous female mostly appears in the second generation, and we have found this now and then on needles.

Alate males and oviparous females appear in October at Sapporo；the latter deposit their eggs on the main stem and branches of young trees. Hibernated eggs hatch at the beginning of April at Sapporo, and young larvae attack the above-mentioned sites of the young larch trees.

This species is apparently uncommon in Japan.

Habitat……Japan (Hokkaidô and Honshû).

Data associated with our specimens are as follows：

Many apterous viviparous females, 7. VII, 1938 and 25. V, 1959, Nopporo, Hokkaidô. Eight apterous viviparous females, (Fundatrices), 27. V, 1960, Toyohira, Sapporo. Many alate and apterous viviparous females, 7. VI, 1960, Miyoda, Nagano, Pref. Five specimens of the alate viviparous females, 28. VI, 1960, Toyohira, Sapporo. Many oviparous females and alate males, 29. X, 1939 and 5. XI, 1959, Toyohira, Sapporo. All the above-mentioned specimens, ex *Larix leptolepis*, M. INOUYE leg.

Gen. distribution……Japan (Honshû and Hokkaidô), Europe and North America.

Jap. name……Karamatsu-ibo-Ôabura.

3. ***Cinara* (*Cinara*) *pinidensi florae*** (ESSIG et KUWANA)

Lachnus pinidensiflorae ESSIG et KUWANA, Proc. Calif. Acad. Sc., 4th Ser., VIII, 3, p. 99 (1918)

Dilachnus pinidensiflorae TAKAHASHI, Aphididae of Formosa, Pt. 1, p. 81 (1921), Pt. 2, p. 135 (1923) ; OKAMOTO et TAKAHASHI, Ins. Mats., 1, p. 144 (1927)

Cinara pinidensiflorae TAKAHASHI, Aphididae of Formosa, Pt. 6, p. 23 (1931) ; INOUYE, Ins. Mats,. Vol. 13, No. 4, p. 142 (1939) ; ibid., Rept. Hokkidô Branch, Gov. Forest Expt. St. Special Rept., No. 5, p. 215 (1956) ; SHINJI, Monogr. Jap. Aphid. (in Japanes), pp. 256 ~260 (1941)

Cinara pinidensiflorae PAIK, Aphids of Korea, p. 17 (1965)

Host……*Pinus densiflora* SIEB. et ZUCC. and *Pinus thunbergii* PARL.

Biology……This species attacks twigs and branches of the host plant.

Habitat……Honshû (Nagano and Mie Pref.), Hokkaidô (Nanae, Sunasaka and Sapporo).

Data associated with our specimens are as follows :

Seven apterous viviparous females, 19. IV, 1968, Kameyama, Mie Pref. ex *Pinus densiflora*, A. KITAMURA leg.

Many apterous viviparous females and one alate viviparous female, 5. VI, 1960, Soehi, Nagano Pref. ex *Pinus densiflorae*, M. INOUYE leg. Many apterous viviparous females, 10. IX, 1960, Sunasaka, ex *Pinus thunbergii*, M. INOUYE leg. Many apterous viviparous females, 10. X, 1940, Nanae, Kamedagun, ex *Pinus densiflora*, M. INOUYE leg. Many oviparous females and three alate males, 23. X, 1937, Nopporo near Sapporo, ex *Pinus densiflora*, H. KÔNO leg. Many oviparous females and three alate males, 7. XI, 1960, Sunasaka, ex *Pinus thunbergii*, M. INOUYE leg.

Gen. distribution……Japan, Korea, Formosa and China.

Jap. name……Matsu-no-eda-Ôabura.

4. ***Cinara* (*Cinara*) *orientalis*** (TAKAHASHI)

Dilachnus orientalis TAKAHASHI, Aphididae of Formosa, Pt. 4, p. 37~39 (1925)

Cinara orientalis TAKAHASHI, Aphididae of Formosa, Pt. 6, p. 23 (1931)

Cinara orientalis SHINJI, Monogr. Jap. Aphid, p. 252, (1941)

Host……*Pinus densiflora* SIEB. et ZUCC. and *Pinus* sp. (by TAKAHASHI)

Biology……According to the observation of Mr. T. KUSHIDA and Z. IWATA, this species sucks the sap from the branches of the Japanese red pine, and are protected by the *Lasius riger* L. which conceal colonies of aphids within shelters constructed out of the material that they ordinarily use in making their own nests. The numbers of the aphids gradually increase from the beginning of May and reach a peak at the middle of June at Asakawa, Tokyo. This species is not common in Honshû, Japan. Therefore, its behaviour has not been investigated sufficiently to date.

Habitat……Asakawa, Tokyo, Japan.

Data associated with our specimens are as follows :

Many apterous viviparous females, Asakawa, Tokyo, 16. VI, and 11. VII, 1969, ex *Pinus densiflora*, T. KUSHIDA and Z. IWATA.

Gen. distribution……Japan and Formosa (Sakuragamine, Taichu, altitude about 8,000

feet, by R. TAKAHASHI).

Jap. name……Toyo-Ôabura.

Discussion……This species resembles *Cinara pinidensiflorae* ESSIG et KUWANA, but differs from the latter remarkably in the marginal sclerotic plates which, rather irregular in shape, are present on the meso-thorax to the 3rd abdominal tergites.

5. ***Cinara* (*Cinara*) *shinji*** INOUE

Lachnus fasciatus SHINJI, Dobutsu Zasshi, XXXIV, p. 534 (1922) (non BURMEISTER, 1835)

Dilachnus fasciatus SHINJI, Konchugaku Kogi, p. 111 (1928)

Cinara shinji INOUYE, Ins. Mats., Vol. XII, No. 2 & 3, pp. 76～80 (1939). ; ibid., Rept. Hokkaidô Branch, Gov. Forest Expt. St., Special Rept., No. 5, p. 216 (1956)

Host……*Pinus pentaphylla* MAYR., *P. pentaphylla* MAYR, var. *Himekomatsu* KOIZ. and *Pinus strobus* L.

Biology……This speceis attacks the twig, branch and stem of the young tree of the host plant in Hokkaidô. (In summer the aphids live in large colonies on the twigs or branches of the lower parts of the host plants. The aphids are attended by various ants, especially *Formica* sp., *Lasius niger* L. and *Murmica* spp.) The colonies are never on the places exposed to sunshine. In July, that is approximately in 3rd generation, winged viviparous females appear and fly off.

Habitat……Hokkaidô (Shirikishinae, Atsubetsu and Shintotsukawa) Honshû (Asakawa, Tokyo, Kyoto and Okayama Pref.).

Data associated with our specimens are as follows :

Many specimens from Hokkaidô (Atsubetsu, apterous viviparous females (Fundatrices), 19. V～7.VII, 1941 and alate viviparous female, 1. VIII, 1941, ex *Pinus pentaphylla*, M. INOUYE leg.) (Shintotsukawa, many alate viviparous females, 27. VII, 1960, ex *Pinus pentaphylla*, M. INOUYE leg.) (Shintotsukawa, many alate viviparous famales 27 VII, 1960 ex *Pinus pentaphylla*, M. INOUYE leg.) (Shirikishinae, five apterous viviparous females, 19. VII, 1937 and two alate vivparous females, 1～21. VIII, 1937, ex *Pinus pentaphylla*, H. SARAI leg. ; One alate male and many apterous oviparous females, 30. IX,～26. X, 1937, ex *Pinus pentaphylla*, M. INOUYE leg.) (Apoi, Samani, Hidaka, five apterous viviparous females and many alate viviparous females, 10. VIII, 1966, ex *Pinus pentaphylla*, M. INOUYE leg.). Many apterous viviparous females (Fundatrices), 10. IV, 1942, Kyoto Bot. Garden, ex *Pinus pentaphylla*, var. *Himekomatsu*, M. INOUYE leg.).

Many apterous viviparous females and two alate viviparous females, 11. X, 1968, Okayama, ex *Pinus pentaphylla*, var. *Himekomatsu*, M. INOUYE leg. Many apterous viviparous females, 15, X, 1967, Asakawa, Tokyo, ex *Pinus pentaphylla* var. *Himekomatsu*, M. INOUYE leg.

Gen. distribution……Japan (Hokkaidô and Honshû).

Jap. name……Himekomatsu-Ôabura.

Discussion……Media of fore-wings of this species ordinarily twice branches, but the materials which were collectet at Apoi, Samani, Hokkaidô are once-brached. Therefore, the author observed that the media of fore-wings in this species is not of particular significance.

6. ***Cinara* (*Cinara*) *formosana*** (TAKAHASHI)

Dilachnus formosanus TAKAHASHI, Aphididae of Formosa, Pt. 3, pp. 73～74 (1924)

Panimerus piniformosanus TAKAHASHI, Proc. Nat. Hist. Soc. Fukien Christ. Univ., 1. p. 28 (1928) (List)

Neochmosis formosanus TAKAHASHI, Trans. Nat. Hist. Soc. Formosana, XX, p. 325 (1930)

Cinara formosana TAKAHASHI, Aphididae of Formosa, Pt. 6, p. 23 (1931) (List)

Cinara formosana TSENG et TAO, Entom. and Phytopath. Vol. IV. Nos. 7～9, Hangcho, China (1936)

Host……*Pinus thunbergii* PARL and *Pinus massoniana* LAMB.

Biology……The colony of this species found on the bark on one or two-year-old branches of *Pinus thunbergii*, on the side not exposed to the sun. From October apterous females appear, as a rule in great numbers at Sunasaka, Esashi, Hokkaidô.

Habitat……Hokkaidô (Sunasaka), Honshû (Ôsaka and Mie Pref.) and Kyûshû (Nagasaki Pref.).

Data associated with our specimens are as follows :

Four apterous viviparous females and one alate viviparous female, 23, IV, 1968, Kino, Mie Pref., ex *Pinus thunbergii*, A. KITAMURA leg.

Two apterous viviparous females, 29. IV, 1960, Osaka, ex *Pinus thunbergii*, N. SORIN leg. Twelve apterous viviparous females, 27. VII, 1965, Isahaya, Nagasaki Pref., ex *Pinus thunbergii*, S. TAKISAWA leg. Many specimens from Hokkaidô (Sunasaka, Hiyamagun, apterous viviparous female, 1. IX, 1960, ex *Pinus thunbergii*, M. INOUYE leg. ; One alate male and 5 apterous oviparous females, 5. XI, 1960, ex *Pinus thunbergii*, MARUYA leg. ; Many apterous oviparous females, 10. XI, 1959, ex *Pinus thunbergii*, YOGO leg.) Three apterous viviparous females, 25. VIII, 1939, Ansan, Manchuria, ex *Pinus* sp. H. KÔNO leg.

Gen. distribution……Japan (Hokkaidô, Honshû and Kyûshû), Formosa and China (Kanton and Ansan).

Jap. name……Taiwan-Ôabura.

7. ***Cinara* (*Cinara*) *kochana kochi*** INOUE

Cinara kochiana kochi INOUYE, Bull. Gov. Forest Expt. St., No. 139, pp. 151～154 (1962) ; PAIK, Aphids of Korea, Seoul National Univ., pp. 18～19 (1965)

Host……*Larix leptolepis* GORD and *Larix koraiensis* SIEB. et ZUCC. (PAIK)

Biology……This subspecies attacies attacks the stem and branches of the host plants, mostly occurs on the main stem and 3 or more-year-old branches from early spring to late autumn. Alate viviparous female mostly appears in the second generation. Dr. D.H.R. LAMBERS wrote informing the auther that *Cinara laricis* BRAUN is the same as the extremely large *C. kochiana* BÖRNER, a species which in summer lives completely underground, but which in autumn and spring lives above ground on *Larix* species. The Japanes subspecies lives above ground on *Larix* spp. from early spring to late autumn.

Habitat……Hokkaidô and Honshû.

Data associated with our specimens are as follows :

Many specimens were collected from Hokkaidô and Honshû.

Hokkaidô (Atsubetsu apterous viviparous females, 19.V, 1941 ; Nopporo, apterous viviparous females, 6. V, 1936, 5. VII, 1936, 8. VII, 1960, 20. VIII, 1938, alate viviparous females, 8. VII, 1960, oviparous females, 24. X, 1938, alate males, 24. X, 1938, 13. XI, 1936 ; Tomakomai, apterous viviparous females, 13. VII, 1962, 24. VII, 1962 ; Asahigawa, apterous females and alate viviparous females, 8. X, 1960, 18. X, 1960).

Honshû (Togakushi, Nagano Pref., apterous viviparous females, 4. VI, 1960. Soehi, Koumi, Komuro and Saku, Nagano Pref., apterous viviparous females, 6～7. VI, 1960. All the above-mentioned specimens, ex *Larix leptolepis*, M. INOUYE leg.

Gen. distribution……Japan (Honshû and Hokkaidô) and Korea (PAIK)

Jap. name……Karamatsu-miki-Ôabura.

8. ***Cinara* (*Cinara*) *grossa*** (KALTENBACH)

Lachnus grossus KALTENBACH, Stettin. Ent., 2., 7, S. 174 (1846)

Aphis piceae WALKER (non PANZER, 1801), Ann. Mag. Nat. Hist., II, Se. 2. 95 (1848)

Lachnus longipes BUCTON, Mono. Brit. Aph.,III, 58 and 59 (1881)

Dilachnus piceae BÖRNER, Beitr. Tax. Zool., 1, S. 59 (1949)

Panimerus vanduzei THEOBALD (non SWAIN 1921), Plant Lice, Aphididae of Great Britain, III, p. 154 (1929)

Cinaropsis piceae BÖRNER et HEINZE, Hand. Pflanz., Bd. V, 4 Liefg., S. 54 (1957)

Cinara (*Cinara*) *grossa* PINTERA, Acta Ent. Bohemoslov., Tom. 63, No. 4, pp. 314～316 (1966)

Cinara (*Cinara*) *grossa* SZELEGIEWICZ, Catalogus faunae Poloniae, No. 12, p. 16 (1968)

Cinara vanduzei INOUYE (non SWAIN 1921), Rept. Hokkaidô Branch, Gov. Forest Expt. St. Special Rept. No. 5, p. 220 (1956)

Host …… *Picea jezoensis* CARR., *P. jezoensis* CARR, var. *hondoensis* REHDER, *Picea Abies* KARST und *Picea canadensis* BRITT.

Biology……The hibernated eggs of this species hatch in spring relatively later and their progeny suck as a rule in numerous colonies on older branches and trunks, mostly on one side. The aphids are attended by various ants, especially *Formica* (*Formica*) *rufa* LINNE, *Formica* (*Raptiformica*) *sanguinea fusiciceps* EMERY, *Formica* (*Serviformica*) *fusca japonica* MOTSCHULSKY and *Camponotus* (*Camponotus*) *herculeanus obsucripes* MAYR. I have found that on places where the aphids have sucked, the bark cracks and resin secretion oozes in summer. But we can not rank this species under severe harmful aphids in Japan. From the end of June to the end of July, colonies of this species consists exclusively of alate viviparous females at Nopporo, Hokkaidô. In October the alate males and oviparous females appear and move to the tree tops or branches of the host trees where they lay eggs covered with wax at the base of the needles or the bark of young sprouts.

Habitat……Hokkaidô (Nopporo, Muroran and Nukabira), Honshû (Togakushi, Nagano Pref.).

Data associated with our specimens are as follows :

Many specimens from Hokkaidô (Nopporo, apterous viviparous female 8～28. VI, 1936, ex *picea canadensis* and 2. VII, 1937, ex *Picea jezoensis* ; alate viviparous female 2. VII, 1936, ex *Picea canadensis*, 3. VII, 1937, ex *Picea jezoensis* ; apterous oviparous female and alate male, 30. X, 1936, ex *Picea jezoensis*, M. INOUYE leg.) (Muroran, apterous viviparous female, 29. VII, 1937, ex *Pinusensis*, *Abies*, M. INOUYE leg.) (Nukabira, apterous oviparous female and alate male, 2. X, 1966, ex *Picea jezoensis*, M. INOUYE leg.) (Eight apterous viviparous females, 4. VI, 1960, Togakushi, Nagano Pref. ex *Picea j.* var. *hondoesis*, M. INOUYE leg.) (Three apterous viviparous females and eight alate viviparous females, 18. VIII, 1968, Mt. Ontake, Nagano Pref., ex *Picea jezoensis* var. *hondoensis*, Z. YAMASHITA leg.).

Gen. distribution …… Japan (Hokkaidô and Honshû). Europe and U. S. A. (Minesota, after PINTERA).

Jap. name……Kuro-Ôabura.

9. ***Cinara* (*Cinara*) *sorini* n. sp.**

Apterous viviparous female

Colour notes taken from living specimen. Body brown to dark brown. Venter dark grey to

brown. Antennae pale brown to brown distal part of III., IV. and V. to VI. dark brown to black. Eyes and siphuncle dark brown to black. Rostrum dark brown, paler at base. Legs dark brown to black. Coxae dark brown, trochanters black ; femora pale ochreous at base, tibiae except basal and distal portions pale yellow. Cauda and anal plate dark brown to black.

Body long oval. Head divided, with short hairs. Meso- and metathorax with large sclerotic plates from each of which arise short hairs. Abdomen with medium-sized muscle attachment plates, and small mesial ones visible on the I. and II. abdominal tergites. The VII. and VIII. abdominal tergites with narrow dark, sclerotic bars of which the former one's is rather small. Venter of abdomen with many short hairs. Antennae with many, short hairs ; III. the largest, nearly equal to IV. plus V. ; IV. much shorter than V., VI. very short, about one-half of V. The III. antennal segment with 2～7 small rhinaria near apex, IV. segment near apex with 1～2 medium-sized rhinaria, V. segment with a medium-sized rhinarium below the large apical one ; VI. segment with a large primary rhinarium and some very small marginal ones.

Rostrum long and slendar, nearly extending to the end of abdomen, acuminate, hairy, siphuncle bearing only one kind of hairs. Hind tibiae with many hairs about 0.05 mm long on inner side, which are remarkably dense and longer than those on outer side. Cauda very short, semi-rounded, wider than long, with many long hairs. Anal plate broadly rounded, with many long hairs.

Measurements in mm. (Apterous viviparous female)

No.	Collection		Length							Width	Diam
	Date	Locality	Body	Ant.	Cau.	Rostr.	Hind tibia	Tarsi I.s	Tarsi II.s	Head o.e	Siph.b
1.101	4-IX 1963	Kongo, Ôsaka	6.20	2.60	0.25	5.75	4.25	0.07	0.37	1.25	0.4
1.102	29-IX 1963	Makio, Kawachi-nagano, Ôsaka	6.75	2.75	0.25	5.75	4.35	0.07	0.37	–	0.35
1.103	〃	〃	6.15	2.80	0.25	5.75	3.50	0.07	0.37	–	0.30

No.	Rhinaria on				Ant. segments				Length of hairs on				
	III	IV	V	VI	III	IV	V	VI	Head	Ant.	D.abd.	Siph.	Hind tibia
1.101	2-2	1-1	2-2	1-1	0.97	0.37	0.61	0.33 (0.24+0.09)	0.07	0.03	0.03	0.05	0.05
1.102	3-4	2-2	2-2	1-1	1.01	0.43	0.63	0.33 (0.26+0.07)	0.07	0.05	0.05	0.05	0.05
1.103	7-7	1-2	2-2	1-1	0.84	0.33	0.58	0.33 (0.26+0.07)	0.07	0.03	0.05	0.05	0.05

Alate viviparous female

Closely allied to the apterous viviparous female in colour and structure except wings. Body oblong, wings hyaline, stings dark brown, veins brown. Antennae with many short hairs ; III. segment the longest, little shorter than IV. plus V., IV. shorter than V. ; VI. shorter than IV.

Third antennal segment with 13～15 medium-sized round rhinaria ; IV. with 3～4 medium-sized

rhinaria ; V. 1～2 rhinaria below apical large ones ; VI. with a large-primary rhinarium and some very small marginal ones.

Rostrum long and slender, reaching past 3rd coxae. Hind tibiae with many long hairs about 0.05 mm on inner side, which are remarkably dense and longer than those on outer side.

Measurement in mm. (Alate viviparous female)

No.	Collection	Length								Width	Diam.
	Date, Locality	Body	Ant.	Cau	Wings Fore, Hind	Rostr.	Hind tibia	Tarsi I.s	Tarsi II.s	Head o.e.	Siph. b.
1.104	4-IX Kongo 1963 Ôsaka	5.80	2.63	0.25	bro. bro.	5.00	2.75	0.15	1.05	1.05	0.60

Rhinaria on				Ant. segments				Length of hairs on				
III	IV	V	VI	III	IV	V	VI	Head	Ant.	D. abd.	Siph.	Hind tibia
13-15	3-4	2-3	1-1	0.93	0.41	0.63	0.33 (0.26+0.07)	-	0.03	0.05	0.05	0.05

Described from three apterous and two alate viviparous females (cotypes), collected by Dr. M. SORIN at Mt. Kongo, Ôsaka and Mt. Makio, near Kawachinagano, Ôsaka, 4～29/IX, 1963, ex *Pinus thunbergii*. Many apterous viviparous females were collected by M. INOUYE, at Ise, Mie Pref. 21.X, 1967, ex *Pinus thunbergii*.

Host……*Pinus thunbergii* PARL.

Biology……This species attacks the bark of the trunk of old trees, mostly occurs on the parts of trunk near the earth. The aphids always live with ants, *Lasius niger* LINNE and others. The ants prepare for the aphids special chambers and ways by tent rounded the roots and trunk, where the aphids live from spring till autumn. This species is neither useful nor harmful. No overpopulation was observed till now. The biology is not sufficiently clear.

Type-locality……Honshû (Ôsaka), Japan.

The type-specimens are in the Ôji Institute for Forest Tree Improvement.

Jap. name……Kuromatsu-miki-Ôabura.

Discussion……The first specimens of this species were collected by Dr. M. SORIN in Ôsakafu, November, 1963 and he kindly sent them to the author. Therefore, the author is pleased to name this species for him. This species, though closely allied to *Cinara kochiana kochi* INOUYE, is easily distinguished from the latter by the third antennal segment with 2～7 rhinaria in apterous viviparous females and with 13～15 rhinaria in alate viviparous female, and by the hairs on the dorsum of abdomen having an unusually large base in apterous viviparous female.

10. *Cinara* (*Cinara*) *etsuhoe* n. sp.

Apterous viviparous female

Body brown to dark brown. Body long oval, head divided, with many hairs. Head, thorax, cauda, anal and genital plate darkish sclerotic. Meso- and metathorax with large sclerotic plates from each of which arise short hairs. Abdomen with medium-sized muscle attachment plates.

The VII. and VIII. abdominal tergites with narrow dark, sclerotic bars which, on the former ones are rather small.

Antennae with many, short hairs, III. the longest, shorter than IV. plus V. ; IV. much shorter than V. ; VI. nearly equal to IV. or longer than one-half of V. The III. antennal segment with 1～2 small rhinarium near apex ; IV. segment with one small rhinarium near apex ; V. segment with a medium-sized rhinarium below the large apical one ; VI. segment with a large primary rhinarium and some very small marginal ones.

Rostrum long and slender, nearly extending to the end of abdomen, acuminate, hairy. Siphuncli bearing only one kind of hairs. Hind tibiae with short hairs on both sides.

Measurements in mm. (Apterous viviparous female)

No.	Collection		Length							Width	Diam.
	Date	Locality	Body	Ant.	Cau.	Rostr.	Hind tibia	Tarsi I.s	Tarsi II.s	Head o.e.	Siph.b.
1201	24-X	Tsudaka	5.25	1.90	0.20	0.40	2.20	0.05	0.30	0.95	0.50
1202	1966	Kanayama	4.50	1.85	0.20	—	2.35	0.07	0.30	0.90	0.45
1203	〃	Okayama	4.90	1.90	0.17	0.40	2.40	0.08	0.32	0.90	0.45
1204	〃	Pref.	5.75	2.00	0.20	4.75	2.40	0.08	0.32	0.90	0.45
1205	〃		5.10	1.80	0.17	4.50	2.30	—	—	0.90	0.45

No.	Rhinaria on				Ant. segments				Length of hairs on				
	III	IV	V	VI	III	IV	V	VI	Head	Ant.	D. abd.	Siph.	Hind tibia
1201	1-1	1-1	2-2	1-1	0.58	0.24	0.39	0.26 (0.18-0.08)	0.09	0.05	0.07	0.09	0.07
1202	1-1	1-1	2-2	1-1	0.60	0.26	0.41	0.26 (0.18-0.08)	0.09	0.05	0.07	0.09	0.09
1203	2-2	1-1	2-2	1-1	0.60	0.24	0.43	0.26 (0.18-0.08)	0.11	0.05	0.07	0.09	0.07
1204	1-1	1-1	2-2	1-1	0.61	0.28	0.43	0.28 (0.20+0.08)	0.09	0.07	0.07	0.09	0.07
1205	2-2	1-1	2-2	1-1	0.56	0.24	0.37	0.26 (0.20+0.06)	0.09	0.07	0.07	0.09	0.07

Described from seven apterous viviparous females (Cotypes), collected by E. INOUYE, Tsudaka-Kanayama, Okayama Pref. 24. X. 1966, ex *Pinus densiflora*.

Host……*Pinus densiflora* SIEB. et ZUCC.

Biology……This species, collected on the bark of the trunk of the host plant, occurs mostly on the parts of the trunk near the earth. They are attended by the ants *Lasius niger* L. and others which build shelters upward from the base of the trunk covering parts of the surface of the tree. The biology to date is not sufficiently clear.

Type-locality……Honshû (Okayama), Japan.

Type-specimens are in the Ôji Institute for Forest Tree Improvement.

Jap. name……Akamatsu-miki-Ôabura.

Discussion……This species resembles *Cinara* (*C.*) *sorini* n. sp., but is easily distinguished from it by the V. antennal segment shorter than the length of rostral segment IV., by the

number of rhinaria on the III. antennal segment, and by the length of antenna which is nearly as long as the hind tibia.

11. ***Cinara* (*Cinara*) *bogdanowi*** (MORDWILKO) **subspec. *ezoana*** INOUYE, **n. comb.**

Lachnus bogdanowi MORDWILKO, Rab. zool. kab. Imp. Warsav. Univ., 1 : 115 (1895) (protospecies)

Cinara (*Cinara*) *bogdanowi* PINTERA, Acta entom. Bohemoslovaca, Tom. 63, No. 4, pp. 307～311 (1966) (protospecies).

Cinara ezoana INOUYE, Ins. Mats., Vol. X, No. 4, pp. 128～131 (1936) ; INOUE, Hokkaidô Ringyoshikenjo, Jiho, No. 14, p. 3 (1938) ; ibid., Rept. Hokkaidô Branch, Gov. Forest Expt. St., Special Rept.,No. 5, pp. 222～223 (1956)

Host……*Picea Glehni* MASTERS, *Picea jezoensis* CARR. and *Picea Abies* KARST.

Biology……This species lives on two-year-old and older twigs, and on the trunk of young host plants. The colonies are never on the places exposed to sunshine. In Hokkaidô the aphids attack new plantations on the above-listed host plants and sucks the sap from the stems and branches of them.

The aphids always live with ants *Lasius niger* L. which build shelters upward from base to the stem, sometimes covering the whole surface of the tree.

The numbers of the aphids gradually increase from the beginning of June and reach a peak at the end of August at Kuriyama, Hokkaidô. Attacks on young host plants continue to the end of September without any reduction of the population. We can not speak of any real harmfulness of this species.

Habitat……Hokkaidô (Kuriyama, Nopporo, Menashi, Setsuri, Ochiai, Kamifurano, Kamishihoro, Shikaoi and Rikubetsu) and Saghalien (Konuma).

Data associated with our specimens are as follows : Many specimens were collected from Hokkaidô (Kuriyama, Apterous viviparous females (fundatrices), 4. VI, 1965, ex *Picea jezoensis* ; 6. VI, 1964, ex *Picea Glehni*, M. INOUYE leg.) (Nopporo, Apterous viviparous females (fundatrices), 17～18. VI, 1936, ex *Picea Glehni* ; Alate viviparous females, 27, VI, 1937, ex *Picea jezoensis* ; 1～18. VII, 1935, ex *Picea Glehni*, Apterous oviparous females, 8～14. VIII, 1935, ex *Picea Glehni* ; Apterous oviparous females, 28. IX, ～30. X, 1935, ex *Picea Glehni* ; Apterous males, 7. X, 1935, 30. X, 1936, ex *Picea Glehni*, M. INOUYE leg.).

(Many alate viviparous females, 6. VIII, 1937, Menashi, ex *Picea Glehni*, M. INOUYE leg. Four apterous viviparous females, 15. VIII, 1935, Setsuri, ex *Picea jezoensis*, M. INOUYE leg.) (Eight apterous viviparous females, 18. VIII, 1935, Ochiai, ex *Picea Abies*, M. INOUYE leg. Ten apterous viviparous females, 24. VIII, 1935, Kamifurano, ex *Picea Abies*, M. INOUYE leg.) (Many apterous oviparous females and apterous males 2. X, 1966, Kamishihoro, ex *Picea Glehni*, M. INOUYE leg.) (Many apterous oviparous females and one apterous male, 3. X, 1966, Shikaoi, ex *Picea Glehni*, M. INOUYE leg.) (Many apterous viviparous females, 9. IX, 1966, Rikubetsu, ex *Picea Glehni*, M. INOUYE leg.) (Many apterous oviparous females, Shikaoi, ex *Picea Glehni*, M. INOUYE leg.) (Two apterous viviparous females, 20. VIII, 1937, Tokyohara, Sahalien, ex *Picea jezoensis*, H. KÔNO, M. INOUYE leg.).

Gen. distribution……Japan (Hokkaidô) and Saghalien.

Jap. name……Ezomatsu-Ôabura.

Discussion……Through the kindness of Dr. A. PINTERA, the author obtained three apterous viviparous females of *Cinara bogdanowi* MORDWILKO collected from *Picea Abies*, at Kaproun, Czechoslovakia, 22. VIII, 1965, by Dr. A. PINTERA, and two alate viviparous females of *C.*

bogdanowi MORDWILKO collected from *Picea Abies* at Gelnica, Czechoslovakia, 17. VI, 1952, by Dr. PASEK.

Typical of the above-mentioned material in that the hairs on the antennae and the dorsal sides of the abdomen are longer than those in typical *C. ezoana* INOUYE from Hokkaidô as in the following table.

For the rest the Japanese specimens differ so little from normal *C. bogdanowi* that they could considered at most subspecies. This is described here as *Cinara* (*C.*) *bogdanowi* subsp. *ezoana* INOUYE, n. comb.

Measurements in mm.

No.	Length body	Ant.	Antennal Segments				Rhin.	Siph.	Hairs	Hairs
			III	IV	V	VI	on III		on III	on abd.
1	4.60	1.85	0.65	0.30	0.35	0.16+0.04	1	0.75	0.16	0.18
2	4.55	1.90	0.63	0.31	0.35	0.16+0.03	1	0.76	0.15	0.18
3	4.60	1.85	0.63	0.30	0.33	0.16+0.04	1	0.80	0.15	0.18
4	4.00	1.40	0.45	0.15	0.28	0.15+0.02	0	0.56	0.07	0.09
5	4.00	1.40	0.46	0.19	0.30	0.15+0.02	0	0.50	0.09	0.09
6	3.95	1.35	0.45	0.20	0.28	0.15+0.02	0	0.52	0.09	0.09

(No. 1-3 = Apterous viviparous females of *Cinara bogdanowi* MORDWILKO :
No. 4-6 = Apterous viviparous females of *C. bogdanowi ezoana* INOUYE)

12. ***Cinara* (*Cinara*) *watanabei*. sp. nov.**

Apterous viviparous female

Color notes taken from living specimen. Head and thorax dark brown. Abdomen shiny brown, eyes black. Antennae pale brown, distal end of III., IV., V. and VI black., Rostrum pale, apex darkened. Legs black ; femorae at base and tibiae except basal and distal portion, pale yellow. Rostrum pale, apex darkened. Siphuncle and plates black.

Body long, oval round. Head divided with long hairs. Rostrum long and slender, reaching past the siphuncle. Head and prothorax sclerotic, meso- and metathorax and I. to VII. abdominal tergites with large sclerotic plates from each of which arise short hairs. III. abdominal tergite with dark, sclerotic bars, from which arise long stout hairs. Marginal sclerotic plates visible on the metathorax to III. abdominal tergites. Abdomen with scattered, very short hairs on dorsum, and with medium-sized muscle attachment plates ; small mesial ones visible on the thorax and I. abdominal tergites.

Antennae longer than head and thorax ; III. longest, a little longer than IV. and V. ; IV. little shorter than V., VI. short, more than one-half of V. III. antennal segment with 4~6 round rhinaria ; IV. with 3~4 medium-sized rhinaria near apex ; V. with 2~3 small or medium-sized rhinaria below apical large one ; VI. with a large primary rhinarium and some very small

Measurements in mm. (Apterous viviparous females)

No.	Collection		Length					Tarsi		Width	Diam.
	Date	Locality	Body	Ant.	Cau.	Rostr.	Hind tibia	I .s	II.s	Head o.e	Siph.b.
1.1001	29—VI 1966	Yamabe	5.15	2.25	0.30	3.25	4.20	0.10	0.35	0.95	0.60
1.002	〃	〃	5.40	2.60	0.30	3.60	4.70	0.10	0.37	1.00	0.60
1.003	10—VII 1966	〃	4.80	2.05	0.25	3.40	—	—	—	0.90	0.60

Rhinaria on				Ant. segment				Length of hairs on				
III	IV	V	VI	III	IV	V	VI	Head	Ant.	D.abd.	Siph.b.	Hind tibia
5−5	3−4	3−3	1	0.91	0.31	0.43	0.22 (0.16± 0.06)	0.10	0.13	0.07	0.07	0.13
4−5	3−3	4−4	1	1.05	0.37	0.48	0.26 (0.18± 0.08)	0.10	0.13	0.07	0.07	0.09
5−6	4−4	3−4	1	0.90	0.33	0.45	0.26 (0.18± 0.08)	0.10	0.13	0.07	0.09	0.07

On *Pinus koraiensis*, M. INOUYE leg.

marginal ones. Genitial plate broadly arcuated, with many hairs. Siphuncles on medium-sized cones, bearing many hairs.

Cauda very short, semi-rounded, wider than long, with many long hairs. Anal plate broadly rounded, with many long hairs.

Alate viviparous female

Color described from living specimens. Head and thorax dark brown to black. Abdomen bronze brown. Eyes black. Antennae black ; basal portion of III. pale yellow. Rostrum pale, apex darkened, legs black ; femora at base and tibiae except basal and distal portion, pale yellow.

Wings hyaline, stigma dark brown, veins brown. Siphuncle, and plate, genitial plate and cauda black. Body long, oval round. Rostrum long and slender, reaching nearly past the siphuncle.

Head dark sclerotic, and divided, with many long hairs on front. Eyes rather small. Thorax dark sclerotic, abdomen with dark medium-sized muscle attachment plates, and small ones on dorsum as in apterous viviparous female. Antennae as long as head and thorax ; III. longest, a little longer than IV. and V. ; IV. much shorter than V. ; VI. shortest, more than one-half of V.

Third antennal segment with 19～23 round rhinaria ; IV. with 3～4 round rhinaria ; V. with 1～3 medium-sized rhinaria below apical large one ; VI. with a large primary rhinarium and some very small marginal ones. The primary rhinarium with rim.

Legs rather long, with short hairs. Siphuncles on medium-sized cones, which bear one kind of many long hairs. Third oblique of the fore-wing faintly indicated, twice forked ; hind wing with two obliques. Cauda, anal plates, venter and dorsum of abdomen closely resemble the apterous viviparous female in structure.

Measurements in mm. (Alate viviparous female)

Collection			Length									Width	Diam.
No.	Date	Locality	Body	Ant.	Cau.	Rostr.	Hind tibia	Tarsi		Wings		Head o.e	Siph. b.
								I .s	II .s	Fore	Hind		
1.004	30−VI 1960	Yamabe	4.70	2.42	0.20	3.50	4.00	0.10	0.40	5.75	3.75	0.85	0.60
1.005	〃	〃	4.45	2.35	0.20	3.00	3.80	0.08	0.35	5.50	3.50	0.85	0.60
1.006	7−VII 1937	Sapporo	4.90	2.15	0.22	—	3.65	0.08	0.32	5.60	3.40	0.85	0.45

Rhinaria				Ant. segment				Length of hairs on				
Ⅲ	Ⅳ	Ⅴ	Ⅵ	Ⅲ	Ⅳ	Ⅴ	Ⅵ	Head	Ant.	D. abd.	Siph.	Hind tibia
20−21	3−4	3−3	1	0.97	0.30	0.43	0.26 (0.20+ 0.06)	0.09	0.09	0.11	0.13	0.13
22−23	4−4	2−4	1	0.97	0.30	0.45	0.26 (0.19+ 0.07)	0.09	0.09	0.09	0.13	0.13
19−20	3−3	3−3	1	0.86	0.30	0.39	0.20 (0.15+ 0.05)	0.09	0.09	0.09	0.13	0.14

Oviparous female

Colour and structure as in apterous viviparous female except the following characters.

(1) Genitial plate broadly, semi-rounded, with many hairs.

(2) Each tergite of abdomen with continuous row of dark, broken irregular sclerotic plates, from which arise stout hairs.

Measurements in mm. (oviparous females)

Collection		Length							Width	Diam.
Date	Locality	Body	Ant.	Cau.	Rostr.	Hind tibia	Tarsi Ⅰ.s	Tarsi Ⅱ.s	Head o.e	Siph. b.
7−Ⅺ 1960	Yamabe	5.00	2.30	0.20	3.65	3.15	0.08	0.32	0.95	0.50
〃	〃	5.10	2.40	0.20	4.00	3.25	0.08	0.35	1.00	0.55
〃	〃	5.35	2.45	0.22	3.70	3.50	0.08	0.35	0.95	0.60

Rhinaria on				Ant. segment				Length of hairs on					
Ⅲ	Ⅳ	Ⅴ	Ⅵ	Ⅲ	Ⅳ	Ⅴ	Ⅵ	Head	Ant.	D. abd.	Siph.	Hind tibia	
4−5	2−2	2−2	1	0.90	0.35	0.45	0.26 (0.18+ 0.08)	0.11	0.09	0.10	0.10	0.09	On *Pinus strobus*
5−6	−3	−3	1	0.91	0.35	0.45	0.26 (0.18+ 0.08)	0.10	0.10	0.10	0.11	0.08	〃
5−5	3−3	2−2	1	0.97	0.37	0.45	0.28 (0.20+ 0.08)	0.11	0.10	0.09	0.11	0.08	〃

Alate male

Closely resembles the alate viviparous female in colour and structure except male genitalia and presence of small broken sclerotic plates of each tergite of abdomen.

Measurement in mm. (Alate male)

No.	Collection Date Locality	Length									Width	Diam.
		Body	Ant.	Cau.	Wings		Rostr.	Hind tibia	Tarsi		Head	Siph.b.
					Fore	Hind			I .s	II .s	o.e	
No.1010	7-XI 1960 Yamabe	3.70	2.30	—	6.00	3.25	2.80	2.75	0.05	0.30	0.75	0.45
No.1011	〃 〃	3.75	2.30	—	5.25	3.35	3.15	2.70	0.05	0.30	0.85	0.45

Rhinaria on				Ant. segment				Length of hairs on					
III	IV	V	VI	III	IV	V	VI	Head	Ant.	D.abd.	Siph.	Hind tibia	
44—54	12—13	4-4	1	0.90	0.33	0.45	0.30 (0.22+ 0.08)	0.11	0.10	0.09	0.13	0.08	On *Pinus strobus*
47—52	—15	-6	1	0.88	0.35	0.43	0.28 (0.20+ 0.08)	0.11	0.09	0.09	0.12	0.09	

Described from the following specimens. Yamabe, three apterous females (cotypes). 29. VI～10. VII, 1966, ex *Pinus koraiensis*, M. INOUYE leg. Yamabe, two alate viviparous females (cotypes), 30. VI, 1960, ex *Pinus strobus*, C. WATABE leg. Sapporo, one alate viviparous female (cotype), 7. VII, 1937, ex *Pinus koraiensis*, H. KÔNO leg.

Shirikishinai, many oviparous females and two alate males, 10. X, 1966, ex *Pinus pentaphylla*, M. INOUYE leg.

Yamabe, many oviparous females and two alate males, 1. XI, 1966, ex *Pinus strobus*, M. INOUYE leg.

Yamabe, three oviparous females and two alate males, (paratype), 7. XI, 1960, ex *Pinus strobus*, C. NISHIGUCHI leg.

Host……*Pinus koraiensis* SIEB. et ZUCC., *Pinus strobus* L. and *Pinus pentaphylla* MAYR.

Biology……This new species is found in large families attended by ants on the 3 to 5-year old portion of the branches of the old tree or the main stem of the young tree from spring to autumn. The biology is not sufficiently clear.

Type-locality……Hokkaidô (Yamabe).

The type-specimens are in the Ôji Institute for Forest Tree Improvement.

Jap. name……Yamabe-Ôabura.

Discussion……Dr. H. R. LAMBERS (Holland) kindly pointed out to the author after a careful examination of Japanese specimens which the author sent him in 1965, that this species may be new to science, and he also sent the author the European materials of *Cinara cembrae* SEITNER of two apterous and one alate viviparous females from Switzerland.

This species is nearly related to *Cinara cembrae* SEITNER but easily distinguished from the latter by the relative length of the antennal segments, especially by the third segment which is much longer than the fourth plus fifth in both apterous and alate viviparous female, by the third antennal segment with 4～6 rhinaria in apterous viviparous female, and by the third antennal segment with 19～23 rhinaria in alate viviparous female.

Also this species has dense and rather longer hairs on the third tibiae of apterous and alate viviparous females than those of *Cinara cembrae* SEITNER. It is also easily distinguished from

Cinara shinji INOUYE by the absence of dusky spots on dorsum of the apterous viviparous females.

13. ***Cinara* (*Cinara*) *cembrae*** (SEITNER)

Lachnus cembrae SEITNER, Centrbl. t.d. ges. Forstwesen, S. 33～49 (1936)

Cinara cembrae BRAUN, Z. ang. Ent., Bd. XXIV, S. 485 (1938)

Cinara cembrae INOUYE, Hokkaidô Forstversuchsanstalt Bull., Nr. 33, S. 11～12 (1941); ibid., Rept. Hokkaidô Branch, Gov. Forest Expt. St. Special Rept., No. 5, p. 226～227 (1956)

Cinara cembrae SHAPOSHINIKOV, In descriptive catalogue of the European part of USSR, Vol. 1, p. 523 (1964)

Cinara cembrae PINTERA, Acta, ent. bohemoslov, Tom. X, Nr. 6, p. 295 (1966)

Host……*Pinus pumila* REGEL and *Pinus pentaphylla* MAYR.

Biology……This species lives on the bark of two-year-old and older branches of host plant where they are attended by ants *Formcia* spp. In the course of summer small number of one generation develop on the host plant, at Kawayu, Kushiro District of Hokkaidô.

Development of this species is due to mountainous climatic conditions where they live on host plant. In the low-lying districts where the pine has been artificially introduced, this species has never been found in Hokkaidô.

Habitat……Hokkaidô (Kawayu and Niseko) and Honshû (Tokyo).

Date associated with our specimens are as follows:

Many specimens were collected from Hokkaidô (Kawayu, apterous viviparous females, 15. VI, 1938, 27. VIII, 1962; alate viviparous females, 15. VI, 1938; apterous oviparous female, 2. X, 1939; alate males, 29. IX, 1940, 2. X, 1939, ex *Pinus pumila* M. INOUYE leg.) (Niseko Mountain, apterous viviparous females, 11. VII, 1943, ex *Pinus pumila*, M. INOUYE leg.) Honshû (Tokyo, five apterous viviparous females, 22, VII, 1959, ex *Pinus pentaphylla*, R. TAKAHASHI leg.).

Gen. distribution……Japan (Hokkaidô), Honshû (Tokyo and Nagano) and Europe (Czechoslovakia, Austria, Switzerland and Leningrad, USSR).

Jap. name……Haimatsu-Ôabura.

2. **Subgenus *Cinaropsis*** BÖRNER

Cinaropsis BÖRNER, Arb. phys. angew. Ent. Berlin-Dahlen, Bd. 6, Nr. 1, S. 76 (1939)

Subgenotype……*Cinara* (*Cinaropsis*) *pinicola* (KALT.) (1843)

= *Cinara pilicornis* HARTIG (1841)

Key to the species

Apterous viviparous female

1. Body elongated oval, somewhat broader at the part of siphuncle. Head and thorax brown with a greenish tinge. Abdomen pale green to green. Siphuncle very small, wartlike, not broader at base. On *Abies* …… 1, *matsumurana* HILLE RIS LAMBERS = (*Todolachnus abietis* MATSUMURA).
-. Body oval, broadest at the middle of abdomen. Siphuncle on rather broad hairy cones……2
2. Abdominal VIII. tergite with dark sclerotic bars or sclerotic plates ……3
-. Abdominal VIII. tergite without sclerotic bars. On *Picea* ……2, *horii* INOUYE.
3. Antennal V. much shorter than diameter of siphuncular cone ……4
-. Antennal V. as long as diameter of siphuncular cone. On *Picea*……3, *pilicornis* (HARTIG).
4. Base VI 2 1/3 times as long as processus terminalis. On *Tsuga*……4, *ozawai* n. sp.

-. Base VI 4 1/2～10 times as long as processus terminalis ……5

5. Thorax and abdomen dark green to black with a greenish tinge. Antennal hairs exceed the basal diameter of III. ant. segment more than 2 times. Thorax and abdomen with large and dark sclerotic plates which sometimes divide into small pieces on all segments (Only thorax with large sclerotic plates, and often abdominal ones are inconspicuous.) On *Abies* …… 5, *todocola* (INOUYE).

Thorax and abdomen brown, and much covered with white powder. Antennal hairs exceed the basal diameter of III. ant. segment more than 3 times. Thorax with two continuous rows of dark sclerotic plates. On *Picea*……6, *costata* (ZETTERSTEDT).

1. ***Cinara* (*Cinaropsis*) *matsumurana*** HILLE RIS LAMBERS

Cinara matsumurana HILLE RIS LAMBERS, Ent. Bericht., Deel. 26, p. 124 (1966) *Todolachnus abietis* MATSUMURA, Jour. College., Agr., Tohoku Imp. Univ., Sapporo, Vol. VII, Pt. 6, pp. 38～382 (1917)

Lachnus abietis FITCH, Fourth Annual Report of the Regents of the University on the condition of the State Cabinet of Natural History, Albany, New York, pp. 385～413 (1851)

For *Todolachnus abietis* MATSUMURA, 1917 (transferred to *Cinara* CURTIS), nec *Lachnus abietis* FITCH., 1851 (transferred to *Cinara* CURTIS), D. HILLE RIS LAMBERS gave new name *Cinara matsumurana*, as a homonym.

Host……*Abies sachalinensis* FR. SCHMIDT and *Abies homolepis* SIEB. et Zucc.

Biology……We can find this species on young branches and twigs among the needles as a rule, mostly in the upper parts of young trees. Small colonies usually appear from May and then the number of individuals increases, and besides apterous viviparous females the alate ones occur in the second generation.

The adults of apterous viviparous females are very sensitive, and after a slight disturbance they crawl up and down on the branches and trunk of the tree. The colonies are usually attended by ants, and sometimes the quantity of honey-dew is abundant.

Habitat……Hokkaidô (Nopporo, Sapporo, Onuma, Kuriyama, Tokachi), Honshû (Nagano Pref.).

Data associated with our specimens are as follows :

Many specimens from Hokaidô (Sapporo, apterous viviparous females, 15. V, 1966, ex *Abies sachalinensis*, M. INOUYE leg.) (Nopporo, apterous viviparous females, 17. V～29. VIII and alate viviparous females, 18. VI～5. VII, ex *Abies sachalinensis*, M. INOUYE leg.) (Ônuma, two apterous (viviparous females, 3. VI, 1939, ex *Abies sachalinensis*, M. INOUYE leg.) (Kuriyama, ten apterous viviparous females, 6. VI, 1964, ex *Abies sachalinensis*, M. INOUYE leg.) (Mitsumata, Tokachi, twelve apterous viviparous females, 21. IX, 1941, ex *Abies sachalinensis*, M. INOUYE leg.) (Many alate males and apterous oviparous females, 15. X, ～5. XI, 1935, M. INOUYE leg.). Many apterous viviparous females, 6. VI, 1960, ex *Abies homolepis*, M. INOUYE leg.

Gen. distribution……Japan (Hokkaidô and Honshû).

Jap. name……Todo-midori-Ôabura.

2. ***Cinara* (*Cinaropsis*) *horii*** INOUYE

Cinara piceicola INOUYE (nec CHOLODKOVSKY), Ins. Mats., Vol. XII, No. 243, p. 80 (1938)

Cinara horii INOUYE, Hokkaidô Forstversuchsanstalt Nopporo, Hokkaidô, Japan, Bull., Nr. 33, S. 13 ～17 (1941).

Cinara horii INOUYE, Rept. Hokkaidô Branch, Gov. Forest Expt. St. Special Report No. 5. S. 217～220 (1956)

Host……*Picea jezoensis* CARR.

Biology……This species attacks the twigs and the young shoots of host plant. We found this species on last year's twigs in spring at Tôma, Hokkaidô.

Habitat……Hokkaidô (Tôma, Tomakomai and Kuriyama) and Saghalien (Toyohara).

Data associated with our specimens are as follows:

Many specimens were collected from Hokkaidô (Kuriyama, apterous viviparous females and alate viviparous females, 6～22. VI, 1964, ex *Picea jezoensis*, M. INOUYE leg.) (Tôma, apterous viviparous females and alate viviparous females, 14. VI, 1941; and apterous viviparous females, 1. VIII, 1941, ex *Picea jezoensis*, M. INOUYE leg.) (Tomakomai, apterous viviparous females and alate viviparous females, 24. VII, 1959, ex *Picea jezoensis*, M. INOUYE leg.) Saghalien (Toyohara, three apterous viviparous females (two fundatrices), 8～24. V, 1937, and five alate viviparous females, 17～24. V, 1937, ex *Picea jezoensis*, M. INOUYE leg.) Saghaliens materials were sent to the writer by the late Mr. M. HORI of the Saghalien Central Experiment Station, Konuma, Saghalien in 1937.

Gen. distribution……Japan (Hokkaidô) and Saghalien.

Jap. name……Hori-Ôabura.

Discussion……This species very closely related to *Cinara pilicornis* HTG., but differs from the latter remarkably in lacking darks sclerite-bands of VIII. abdominal tergite of the wingless viviparous female, and in the pigmentation of hind tibiae and the acute last rostral segment.

3. ***Cinara* (*Cinaropsis*) *pilicornis*** (HARTIG)

Aphis pilicornis HARTIG, Germer's Z. f. Ent., 3. 369 (1841)

Lachnus pinicola KALTENBACH, Monographie der Familien der Pflanzenläuse, S. 154～155 (1843)

Aphis abietis WALKER, Ann Mag. Nat. Hist., 2, p. 100 (1848)

Lachnus hyalinus KOCH, Die Pflanzenläuse Aphiden, S. Lief. S. 238 (1856); VAN DER GOOT, Beitr. zur Kentnis der Holländischen Blattläuse, pp. 394～396 (1915)

Lachnus macrocephalus BUCTON, Mono. Brit. Aphid., III, pp. 48～50 (1881)

Cinara nopporensis INOUYE, Ins. Mats., Vol. XI, No. 3, pp. 100～105 (1937)

Cinara pinicola BÖRNER et SCHILDER, Sorauer's Handb. d. Pflanzenkr, V (4 Aufl.), S. 157 (1932), Braun, Z. ang. Ent., Bd. XXIV, S. 480 (1938); INOUYE, Hokkaidô Forstversuchs anstalt, Nopporo, Hokkaidô, Bull. No. 3, 13 (1941); ibid., Rept. Hokkaidô Branch, Gov. Forest Exp. St. Special Report, No. 5, S. 216～217 (1956)

Cinara (*Cinaropsis*) *pilicornis* PASEK, Vosky Nasich Lesnych Drevin, pp. 207～210 (1954)

Cinara (*Cinara*) *pilicornis* PINTERA, Acta ent. bohemoslov, Tom. 63, No. 4, pp. 304～307 (1966)

Host……*Picea Glehni* MASTERS.

Biology……This species found in large families attended by the ants *Lasius niger* and *Murmica* spp. and on the main stem of seedings or last year's twigs of the young trees of the host plant from spring to summer at Nopporo, Hokkaidô.

After the budding of young sprouts of host plant the colonies move on to them and stay there for the rest of the year. Simultaneously when sprouts have lignified the alate sexupara and their progegeny—females and alate males—appear in colonies from September to November.

The fertilized females lay eggs on the upper part of needles in rows.

Habitat……Hokkaido (Nopporo, Kuriyama, Sapporo, Itokushibets and Shibecha).

Data associated with our specimens are as follows :

Many specimens were collected from Hokkaido ; Nopporo, apterous viviparous females (fundatrices and others), 8. V, 1937, 12～22. VI, 1937 and alate viviparous females, 1. VIII, 1936 ; alate males and apterous oviparous female, 18～30. IX～10. X, 1936, ex *Picea Glehni*, M. INOUYE leg.).

(Sapporo, alate viviparous female, 21. VI, 1937 and four apterous viviparous females, 25. VI, 1937, ex *Picea Glehni*, H. KONO leg.) (Kuriyama, apterous viviparous females, 1～23. VI. 1965, ex *Picea Glehni*, M. INOUYE leg.) (Itokushibetsu, Nemuro, apterous viviparous females, 14. VI, 1942, and three alate viviparous females, 1. VIII, 1942, ex *Picea Glehni*, M. INOUYE leg.) (Shibecha, apterous viviparous females and alate viviparous females, 16. VIII. 1937, ex *Picea Glehni*, M. INOUYE leg.).

Gen. distribution……Japan (Hokkaido), Europe and American Continent (Canada).

Jap. name……Ezo-ameiro-Ôabura.

4. ***Cinara* (*Cinaropsis*) *ozawai* n. sp.**

Apterous viviparous female

Colour notes taken from living specimens by Mr. T. OZAWA. Head and thorax brown. Abdomen pale brown to greyish-brown. Eyes black ; femora at base pale yellow. Rostrum brown to dark brown. Antennae pale brown, distal end of III, IV, and V, and VI, darker. Venter of abdomen greyish-brown due to white powder.

Body oval, with many long hairs. Rostrum reaching about the third coxae. Meso- and metathorax and I. abdominal tergite with large sclerotic bars from which arise long hairs. Each tergite of the abdomen with very small dark sclerotic plates from which arise long hairs ; often those plates inconspicuous. VIII. abdominal tergite with narrow dark, sclerotic bars from which arise long hairs. Venter of abdomen with many long hairs.

Antennae with many long hairs ; III. segment the longest, a little longer than IV. plus V. ; IV. shorter than V. ; VI. longer than IV. ; III. segment without rhinarium, IV. segment without rhinaria or with one small rhinarium ; V. segment with one medium-sized rhinarium below the large apical one ; VI segment with a large primary rhinarium and some very small marginal ones. Siphuncles on medium-sized cones, bearing many hairs. Cauda very short, semi-rounded, wider than long, with many long hairs. Anal palte broadly rounded, with many long hairs.

Measurements in mm. (Apterous viviparous female)

No.	Collection		Length							Width	Diam
	Date	Locality	Body	Ant.	Cau.	Rostr.	Hind tibia	Tarsi I .s	Tarsi II .s	Head o.e	Siph. b.
1301	27－VI 1968	Kiso-Fukushima Nagano Pref.	3.90	1.55	0.15	1.15	2.30	0.05	0.35	0.65	0.40
1302	〃	〃	4.00	1.55	0.15	1.00	2.30	0.05	0.35	0.75	0.40
1303	〃	〃	3.75	1.55	0.15	1.05	2.30	—	—	0.75	0.35
1304	〃	〃	4.00	—	0.15	1.10	2.30	0.05	0.35	0.70	0.40

Rhinaria on				Ant. segments				Length of hairs on				
III	IV	V	VI	III	IV	V	VI	Head	Ant.	D. abd.	Siph.	Hind tibia
0	0	2−2	1−1	0.56	0.20	0.28	0.26 (0.18+ 0.08)	0.18	0.20	0.20	0.11	0.28
0	0	2−	1−	0.56	0.20	0.28	0.24 (0.18+ 0.06)	0.18	0.22	0.20	0.11	0.24
0	1−1	2−2	1−1	0.60	0.22	0.28	0.24 (0.16+ 0.08)	0.18	0.20	0.22	0.15	0.28
0	1−1	−	−	0.54	0.22	−	−	0.16	0.20	0.20	0.15	0.26

Alate viviparous female

Colour and structure as in apterous viviparous female except wings. Body redish-brown. Wings hyaline, stigma dark brown, veins brown, third obliques.

Head dark sclerotic, and divided, with many long hairs on front. Thorax dark sclerotic, abdomen with dark muscle attachment plates. VIII. abdominal tergite with narrow, dark, sclerotic bar, having many long, stout hairs. Antennae with many long, stout hairs; III. segment longest, a little longer than IV. plus V.; IV. shorter than V.; VI. longer than IV., III. antennal segment with 7 medium-sized round rhinaria; IV. with 2 rhinaria near apex. V. with one medium-sized circular rhinarium below apical large one; VI. with a large primary rhinarium and some very small marginal rhinaria. Rostrum reaching past 3rd coxae. Legs with many long, stout dark hairs; hairs of hind tibiae dense and fine on outer side, remarkably longer than those on inner side.

Siphuncle on large cones which are rather irregular in shape at base and bear many hairs. Cauda very short, semi-rounded, wider than long, with many hairs. Anal plate broadly rounded, with many long hairs. Venter of abdomen has many rather long hairs.

Measurements in mm. (Alate viviparous female)

No.	Collection		Length									Width	Diam
	Date	Locality	Body	Ant.	Cau.	Wings		Rostr.	Hind tibia	Tarsi		Head o.e	Siph.b.
						Fore	Hind			I.s	II.s		
1.305	29−VI 1968	Kiso-Fukushima Nagano Pref.	3.65	1.65	0.15	4.75	2.75	1.00	2.65	0.05	0.04	0.80	0.40

Rhinaria				Ant. segments				Length of hairs on				
III	IV	V	VI	III	IV	V	VI	Head	Ant.	D. abd.	Siph.	Hind tibia
7−7	1−2	2−2	1	0.61	0.22	0.30	0.26 (0.20+ 0.06)	0.18	0.26	0.22	0.22	0.28

Described from four apterous and one alate viviparous females (Cotypes), collected by T. OZAWA, at Kiso-Fukushima, Nagano Prefecture, 29. VI, 1968, ex *Tsuga diversifolia*. Many apterous and one alate viviparous females, Kiso-Fukushima, Nagano Pref., 19. VII, 1968, ex *Tsuga diversifolia*, T. OZAWA leg.

Three apterous viviparous females, Hirau near Mt. Norikura, Hida, Japan, 12. VIII, 1959,

ex *Tsuga* sp., R. TAKAHASHI leg. Twelve apterous viviparous females, 21. VIII, 1968, Mt. Ontake, Nagano Pref., ex *Chamaecyparis obtusa* and *Tsuga diversifolia*, Z. YAMASHITA leg.

Host……*Tsuga diversifolia* MASTERS and *Chamaecyparis obtusa* SIEB. et ZUCC.

Biology……The aphids live on the bark of young twigs or on the bases of shooting sprouts among the needles of the host plant. According to Mr. T. OZAWA, this species was found mainly on the tip of the lower branches of older trees, and he wrote to the author saying that the species is neither useful nor harmful. To date the biology is not sufficiently clear.

Type-locality……Kiso-Fukushima, Nagano Pref., Honshû, Japan.

The type-specimens are in Ôji Institute for Forest Tree Improvement.

Jap. name……Tsuga-Ôabura.

Discussion……This species is easily distinguished from *Cinara juniperi* DE GEER by the antennae of apterous and alate viviparous female being narrower and more slender than in the latter species, and by the relative length of the antennal segments, especially by III. segment being a little longer than IV. plus V., V. segment longer than VI. segment in apterous female, and by the third antennal segment with 7 rhinaria in alate viviparous female.

This species resembles *Cinara cupressi* (BUCKTON), but differs from the latter remarkably in the black tibiae and in the relative length of antennal segment, especially the VI. segment being a little longer than the IV. segment in apterous and alate viviparous females.

It is also easily distinguished from *Cinara tsugae* BRADLEY by the length of the hairs on the antennae, legs and dorsum of abdomen.

5. ***Cinara* (*sinaropsis*) *todocola*** INOUYE

Tuberolachnus todocolus INOUYE, Ins. Mats., Vol. X, No. 4, pp. 131～134 (1936)

Cinara todocolus (INOUYE) ,Hokkaidô Ringyo shikenjyo-jiho, No. 14, p. 3 (1938)；ibid., Praktische Anleitung für Vorbeugung und Vertilgung von biologischen Forstschäden, S. 99～101 (1942)；KÔNO, Hattori Hokokai Kenkyu Shoroku, No. 5, p. 275 (1937)；KÔNO et SUGIHARA, Trans. Kansai, Ent. Soc., No. 8, pp. 8～14 (1939)；INOUYE, Bull. Hokkaidô Forstversuchsanstalt, Nr. 33, S. 18～19 (1941)

Cinara todoe SHINJI, Monogr. Jap. Aphid. pp. 261-264 (1941)

Cinara todocola (INOUYE), Rept. Hokkaidô Branch, Gov. Forest Expt. St. Special Handb. d. Pflanzkr., V. (4. Lief.), II.Teil, S. 55 (1957)

Host……*Abies sachalinensis* FR. SCHM., *Abies firma* SIEB. et ZUCC. and *Abies homolepis* SIEB. et ZUCC.

Biology……This species suck the sap from the stems and branches of young todo-fir, and is the most destructive member of the conifer aphids attacking young forest trees in Hokkaidô, Japan. The aphids attacking young todo-fir trees usually occur on the stem protected by various species of ants which conceal colonies of aphids within shelters constructed out of the material that they ordinarily use in making their own nests. The most important species is *Lasius niger* L. which builds shelters upward from the base of the stem, sometimes covering the whole surface of the tree. The existence or size of the shelters apparently influences the lives of the aphids and their rate of increase.

The numbers of todo-fir aphids gradually increase from the middle of June and reach a peak at the beginning of August at Nopporo, Hokkaidô. Damage to young todo-fir trees continues until the end of September without and reduction of the population. The most active period of height growth of todo-fir trees is from June to July, when the aphids are feeding. A

heavy aphid attack causes serious damage that shows mainly in the reduction of the growth of young trees and results generally in physiological deficiency. Young trees injured by aphids may therefore easily succumb to secondary insects, fungi, drought, cold, and other factors.

The aphid also exudes much honeydew which covers the needles, twigs and branches. The honeydew is also a fertile medium for the growth of a black smut over the needles and branches, so that the trees appear as if they had been sprayed with some oily substance. Young trees are sometimes so weakened that they die after being infested for two or three years.

Alate male and oviparous females appear on the shoots and twigs in September, October and November at Nopporo. Hibernated eggs of this species hatch at the end of April and the beginning of May at Nopporo.

Habitat……Hokkaidô, Honshû (Miyagi and Nagano Pref.) and Saghalien.

Data associated with our specimens are as follows:

Many specimens from *Abies Sachalinensis* in Hokkaidô (Nopporo, Apterous viviparous female, 26. V~19. VI, 1935, 24~27. VI, 1936, 10~30. VII, 1935, 6~16. VIII, 1937, 10. VIII, 1935, 30. VIII, 1938; Alate viviparous female, 10~12. VII, 1935, 5~8. VII, 1936; Alate male, 7. X, ~7 VI, 1935; Oviparous female (wingless), 28. IX, ~7. X, 1935, 22. X, 1934, M. INOUYE leg.) (Kuriyama, Apterous viviparous female, 6. VI, 1964, 24. VIII, 1964; Alate male, 11. XI, 1964, M. INOUYE leg.) (Kawakita, Nemuro, Apterous viviparous female, 16. VIII, 1937, M. INOUYE leg.) (Hamanaka and Denshikaga, Kushiro Distr., Apterous female, 20~24. VIII, 1935, M. INOUYE leg.) (Kamifurano, Sorachi, Apterous viviparous female, 24. VIII, 1935, M. INOUYE leg.) (Sapporo, Alate male, 2. XI, 1937, H. KÔNO leg.) Seven apterous viviparous females, 6. VI, 1960, Inago, Nagano Pref. Honshû, ex *Abies homolepis* SIEB. et ZUCC. M. INOUYE leg.

Many apterous viviparous females, 18. VIII, 1938, Naka-Niida, Miyagi Pref., ex *Abies firma*, M. INOUYE leg. Six apterous viviparous females, 19. VII, 1938, Konuma, ex *Abies sachalinensis*, late H. KÔNO leg.

Gen. distribution……Japan (Hokkaidô and Honshû) and Saghalien (Russia).

Jap. name……Todomatsu-Ôabura.

6. ***Cinara* (*Cinaropsis*) *costata*** (ZETTERSTEDT)

Aphis costata ZENTTERSTEDT, Fauna insectorum Lapponica, I, p. 559 (1828)

Schizoneura costata HARTIG, Germar's Z. Ent., 3, p. 367 (1841)

Lachnus fasciatus KALTENBACH (non BURMEISTER, 1835), Monographie Familien Pflanzenlaüse, p. 160 (1843)

Lachnus farinosus CHOLODKOVSKY, Zool. Anz, 15, S. 74 (1892)

Lachnus costatus THEOBALD, Plant Lice Gr. Brit., III, p. 157~161 (1929)

Lachniella costata BÖRNER et SCHILDER, Sorauer's Handb. d. Pflanzenkr., V (4 Aufl.) p. 571 (1932); V (4 Liefer.), (5 Aufl.), p. 58 (1957); INOUYE, Ins. Mats., Vol. XI, No. 3, p. 105 (1937); Ibid., Hokkaidô Forstversuchsanstalt Bull. Nr. 33, S. 13 (1941); Ibid., Rept., Hokkaidô Branch, Gov. Forest Expt. St. Special Rept. No. 5, S. 212~213 (1956); BRAUN. Z. ang. Ent., Bd. XXIV., S. 482 (1938); PASEK, Vosky Nasich Lesnych Drevin, pp. 195~197 (1954); KLOFT, KUNKEL et EHRHORT, Beitr. z. Ent., Bd., 10. Nr. 1/2, S. 166~167 (1960)

Cinara costata SZELEGIEWICZ, Fragmenta Faunistica, Tom. X, Nr. 6, p. 71 (1962); SHAPOSHINIKOV, Aphidinea-Plant lice aphids of USSR., Pt. III, p. 522 (1964)

Cinara (*Cinara*) *costata* PINTERA, Acta. ent. bohemoslov, Tom. 63, No. 4, p. 311~314 (1966)

Cinara (*Lachniella*) *costata* SZELEGIEWICZ, catalogus faunae Poloniae, No. 12, p. 16 (1968)

Host……*Picea canadensis* BRITT., *Picea Glehni* MASTERS, *Picea jezoensis* CARR., *Picea jezoensis* CARR. var, *hondoensis* REHDER and *Picea Abies* KARST.

Biology……This species is found on older twigs among the needles as a rule, mostly in the lower parts of the above-named host. The neighbourhood of colony is whitish with the wax of aphids. The hibernated eggs of this species hatch at the beginning of May at Nopporo, Hokkaidô. Smaller colonies usually appear till July, then the number of individuals increases, and alate viviparous females mostly appear in second generation. The aphids are very sensitive; they crawl or fall off suddenly at the slightest disturbance. The colonies are not attended by any ants although the quantity of honey-dew is abundant. This species is not notably common in Hokkaidô and Honshû.

Habitat……Hokkaidô (Nopporo, Sapporo, Kuriyama and Nemuro) Honshû (Nagano Pref.) and Saghalien.

Date associated with our specimens are as follows:

Many specimens from Hokkaidô (Nopporo, apterous viviparous females and alate viviparous females, 6～22. VI, 1936, ex *Picea canadensis*, M. INOUYE leg.) (Sapporo, Four apterous viviparous females, 21. VII, 1937, ex *Picea jezoensis*, H. KÔNO leg.) (Kuriyama, Seven apterous viviparous females, 4. VI, 1965, ex *Picea Abies*, M. INOUYE leg.).

Four apterous viviparous females, 25. VI, 1965, Kurokawauchi, Inagun, Nagano Pref., ex *Picea jezoensis* var. *hondoensis*, M. INOUYE leg.).

Many apterous viviparous females and one alate viviparous female, 13. VIII, 1938, Toyohara, Saghalien. ex *Picea Abies*, H. KÔNO leg.

Gen. distribution……Japan (Hokkaidô and Honshû), Saghalien, Europe, U. S. A. (California), Canada and Australia.

Jap. name……Konafuki-tobiiro-ôabura.

3. **Subgenus *Cinarellia*** BÖRNER

Cinarellia BÖRNER, Europae Centralis Aphides, I, S. 41 (1952)

Subgenotype …… *Cinara* (*Cinarellia*) *börneri* HILLE RIS LAMBERS (1956) = *Cinara laricicola* BÖRNER, (1939), non MATSUMURA

Key to the species and subspecies

Apterous viviparous female

1. Rostrum nearly reaching past third coxae. IV. antennal segment much longer than VI. Antennal IV nearly as long as or longer than diameter of siphuncular cone. Length of body less than about 4.5 mm. On *Larix* …… 1. *laricicola* MATSUMURA.
-. Rostrum nearly reaching siphuncle. IV. antennal segment nearly equal to VI. Antennal IV. shorter than diameter of siphuncular cone. Length of body less than about 3.2 mm. On *Larix* …… 2. subsp. *chibi* INOUYE.

1. ***Cinara* (*Cinara*) *laricicola*** (MATSUMURA)

Lachnus laricicolus MATSUMURA, Jour. College Agr., Tohoku Imp. Univ., Sapporo, Vol. VII, Pt. 6, pp. 380～381 (1917); ibid., Oyokonchu-gaku, p. 324 (1917)

Lachnus laricis TAKAHASHI, Aphididae of Formosa, Pt. 3, pp. 115～116 (1924)

Dilachnus laricolus SHINJI, Konchugaku-Kôgi, p. III. (1928)

Cinara laricicolus INOUYE, Ins. Mats., Vol. XIII, No. 4, p. 138 (1939)

Cinara laricis SHINJI, Monog. Jap. Aphid., pp. 224～248 (1941), Tokyo (In Japanese)

Cinara taeniata INOUYE, Hokkaido Forstversuchsanstalt, Bull., Nr. 33, S. 17～18 (1941); ibid., Report of Hokkaido Branch, Governmental Forest Expt. St. Special Report, No. 5, S. 221 (1956)

Cinara laricicola INOUYE, Bull., Government Forest Expt. St., No. 139, pp. 136～161 (1962)

Cinara laricicola PAIK, Aphids of Korea, Seoul National University, Seoul, Korea, p. 20 (1965)

Host……*Larix leptolepis* GORD., *Larix koreiensis* SIEB. et ZUCC., *Larix Gmelini* LEDEB and *Larix europaea* D. C.

Biology……In early spring fundatrices of this species appear on the main stem and on the or two-year old portions of branches near the periphery of the crown of the young host plant. Alate viviparous females appear in second and third generation. Apterous viviparous females and alate viviparous females attack now and then new shoots of the host plant from late spring to late autumn, but some of them remain on main stem and twigs of the host plant.

Alate male and oviparous females appear on the shoots and twigs in October at Sapporo. Hibernated eggs of this species hatch at the end of April and the beginning of May at Sapporo, and young larvae attack the above-mentioned site of young larch tree.

Habitat……(Hokkaidô and Honshû).

Data associated with our specimens are as follows:

Many specimens were collected from Hokkaidô and Honshû.

Hokkaidô (Nopporo, apterous viviparous females, 25～30. VI, 1959, 8. VII, 1960, 16. VII, 1935, 15. VII, 1938, 14. VIII, 1958, 20. VIII, 1938, 6. IX, 1960; alate viviparous famales, 30. VI, 1959, 5. VII, 1937, 8. VII, 1960, 15. VII, 1938, 8. IX, 1938; apterous oviparous females, 8. X, 1937, 5. XI, 1937, 12. XI, 1940; alate males, 5. XI, 1937, 12. XI, 1940) (Toyohira, apterous viviparous females, 28. VI, 1960, 20. VII, 1960, 11. VIII, 1959; alate viviparous females, 28. VI, 1960) (Tomakomai, apterous viviparous females and alate viviparous females, 13～14. VIII, 1960, 23. VII, 1959) (Todohokke, apterous viviparous females, 30. IX, 1959) (Koshunai, apterous viviparous females, 20. VIII, 1960, 20. IX, 1962) (Misumai, apterous females and alate males, 16. X, 1959) (Kotoni, apterous oviparous females, 24. X, 1959) (Uennai, apterous oviparous females and alate males, 29. X, 1938). The above-mentioned specimens, ex *Larix leptlepis*, M. INOUYE leg.

Honshû (Kashiwabara, Togakushi, Soehi, Nagano, Koumi and Karuizawa, Nagano Pref., apterous viviparous females and alate viviparous females, 1～8. VI, 1960, ex *Larix leptolepis*, M. INOUYE leg.) (Asakawa, Tokyo, apterous viviparous females and alate viviparous females, 17. VI, 1961, ex *Larix leptolepis*, M. INOUYE leg.) (Okayama, many apterous oviparous and alate males, 16. X, ～15. XI, 1960, ex *Larix leptolepis*, E. INOUYE leg.).

Gen. distribution……Japan (Hokkaidô and Honshû) and Korea (PAIK).

Jap. name……Karamatsu-Ôabura.

2. ***Cinara* (*Cinarellia*) *laricicola*** (MATSUMURA) **subspec. *chibi*** INOUYE, **n. comb.**

Lachnus laricicolus MATSUMURA, Jour. Coll. Agr., Tohoku Imp. Univ., Sapporo, Vol. VII, Pt. 6, pp. 380～381 (1917) (protospecies)

Cinara laricicola INOUYE, Bull. Gov. Forest Expt. St., No. 139, pp. 154～159 (1962)

Cinara chibi INOUYE, Bull. Gov. Forest Expt. St., No. 139, pp. 159～161 (1962)

Host……*Larix leptolepis* GORD.

Biology……This subspecies is found in large families attended by the ants, *Larisius niger* L. and others on the lower half of the main stem of the young tree, or 3 to 4-year-old portions of the branches from spring to autumn.

There are some biological differences between *Cinara laricicola* MATSUMURA and *C. laricicola chibi* INOUYE, because the latter mostly attack the main stem of young trees, or 2 to 3-year-old portions of branches early spring to autumn, instead of which the former protospecies appear now and then mostly on shoots and twigs of the host plant from late spring to late autumn.

Habitat……Hokkaidô (Oshamanbe and Bekkai), Honshû (Asama, Nagano Pref. and Okayama Pref.) and Kyûshû (Unzen, Nagasaki Pref.).

Date associated with our specimens are as follows :

Hokkaidô (Oshamanbe, many apterous and two alate viviparous females, 10. IX, 1960 ; many oviparous females and three alate males, 26. X, 1960, ex *Larix leptolepis* GORD., M. INOUYE leg.) (Bekkai, Nemuro, many apterous and alate viviparous females, 20. VIII, 1961, ex *Larix leptolepis*, M. INOUYE leg.) (Tate, Atsusabu, many apterous viviparous females, 9. IX, 1960 ; many oviparous females and alate males, 27. X, 1960, ex *Larix leptolepis*, M. INOUYE leg.)

Honshû (Kami-sai-bara, Okayama, oviparous females and alate males, 19. X, 1961, ex *Larix leptolepis*, M. INOUYE leg.) (Oiwake and Miyoda, many apterous viviparous females and two alate viviparous females, 23. VI, 1961, ex *Larix leptolepis*, M. INOUYE leg.).

Kyûshû (Unzen, Nagasaki Pref., three apterous viviparous females, 7. VIII, 1962, ex *Larix leptolepis*, Y. TAKIZAWA leg.).

Gen. distribution……Japan (Hokkaidô, Honshû and Kyûshû).

Jap. name……Karamatsu-chibi-Ôabura.

Discussion……This subspecies is easily distinguished from *Cinara laricicola* MATSUMURA by the body of apterous viviparous female being very small and shiny brown to black, and by the relative length of the antennal segments, especially by the IV. segment which is nearly equal to the VI. and by the III. antennal segment with 3～7 sensoria in alate viviparous female.

For the rest *Cinara chibi* differ so little from normal *C. laricicola* that I consider them at most a subspecies. This is described here as *Cinara-laricicola* subsp. *chibi* nov. on the kind advice of Dr. A. PINTERA.

4. **Subgenus *Dinolachnus*** BÖRNER

Dinolachnus BÖRNER, Neue Blattläuse aus Mitteleuropa, Selbstverlg. Naumburg. S. 1 (1940)

Subgenotype……*Cinara* (*Dinolachnus*) *cecconi* (DEL GUERC.) (1908)
= *Cinara* (*D.*) *abieticola* (CHOL.) (1899)

Key to the species

Apterous viviparous female

1. Length of body about 5.6～6.6 mm. Length of antenna 2.53 mm (in length of body 6.6 mm.). Relative length of the antennal segment ; III-113, IV-50, V-53, VI-35 (26.8 + 8.2) ; VI. segment shorter than one-third of the III. segment. On *Abies*……
……1, *longipennis* MATSUMURA.

-. Length of body about 3.18 mm. Length of antenna 1.91 mm. Relative length of the antennal segment ; III-78, IV-36, V-43, VI-34 (23.6 + 10.4) ; VI. segment much longer than one-third of the III. segment. On *Abies* ..... 2, *hattorii* KÔNO et INOUYE = (*Konoi* INOUYE)

1. ***Cinara* (*Dinolachnus*) *longipennis*** MATSUMURA

Lachnus longipennis MATSUMURA, Jour. College Agr., Tohoku Imp. Univ., Sapporo, Vol. VII. Pt. 6, pp. 379～380 (1917) ; ibid., Oyo-konchugaku, P. 325 (1917) ; ibid., Nippon Konchu Daizukan, P. 1281 (1931) ; ibid., Dai Nippon Gaichu Zusetsu, pp. 150～151 (1932)

Dilachnus momi SHINJI, Dobutsu-zasshi, Vol. 36, pp. 343～373 (1924)

Cinara longipennis INOUYE, Hokkaido Forstversuchsanstalt, Nr. 33, S. 19～21 (1941) ; ibid., Rpt. Hokkaidô Branch, Gov. Forest Expt. St. Special Rpt., No. 5, S. 223～224 (1956) ; SHINJI, Monogr. Jap. Aphid., pp. 261～264 (1941) ; PAIK, Aphids of Korea, Seoul Nat. Univ. p. 20 (1956)

Host……*Abies sachalinensis* FIR SCHIM., *Abies firma* SIEB. et ZUCC., *A. holophylla* MAXIM. and *Cephalotaxus drupacea* SIEB. et ZUCC.

Biology……Alate viviparous females of the first generation live in large colonies on the main stem of young host plant, and often occur on 3 or more-year-old branches of the host plant in April and May at Nopporo near Sapporo, Hokkaidô. Apterous viviparous female and alate viviparous ones appear in second generation in June and July. Alate viviparous females fly periodically on to the main stem and branches of the host plant in June and August, and apterous viviparous ones leave the main stem of the host plants approximately on 20th of June ; then they move and live completely underground on *Abies* spp. in the summer season.

In late autumn alate viviparous females appear, and live on the main stem and branches of the host plant. The author could not find any oviparous female and male of this species ; he was able to collect only alate viviparous females at the end of October in Hokkaido. Complete life-cycle of this species has been unknown till now.

Habitat……Hokkaidô (Nopporo, Akagawa near Hakodate, Kuriyama, Meto, Horokanai, Horonai, Haboro and Kamishibetsu) and Honshû (Kyoto and Tokyo).

Data associated with our specimens are as follows :

Many specimens were collected from Hokkaido (Nopporo, alate viviparous females, 24. IV ～18. VI, 1937, 19. VI, 1937, 13. VII, 1938, 9. VIII, 1935, 22. X, 1966, 28. IX, 1937, 28. X, 1936, 9. XI, 1936 ; apterous viviparous females, 4～8. 1937, 14. VI, 1935, 5. VII, 1936, ex *Abies sachalinensis*, M. INOUYE leg.) (Akagawa, alate viviparous females. 12. V, 1958, 26. V, 1959 ; nymph, 26. V, 1959 ; apterous viviparous females, 12. V, ～20. VI, ～26, VIII, 1958, ex *Abies sachalinensis*, M. INOUYE leg.) (Kuriyama, alate viviparous females, 29. V. 1964 ; apterous viviparous females, 29. V, 1964, 31. V, 1967, ex *Abies sachalinensis*, M. INOUYE leg.) (Meto, Tokachi, alate viviparous females, 8. VII, 1958, ex *Abies sachalinensis*. M. INOUYE leg.) (Horokanai, alate viviparous females, 9. VI, 1954, ex *Abies sachalinensis*, M. INOUYE leg.) (Horonai, near Azuma, apterous viviparous females, 17. VII, 1954, ex root of *Abies sachalinensis*, M. INOUYE leg.) (Haboro, apterous viviparous females, 4. VIII, 1958, ex *Abies sachalinensis*, M. INOUYE leg.) (Kamishibetsu, apterous viviparous females, 7. VIII, 1957, ex *Abies sachalinensis*, M. INOUYE leg.).

Honshû (two apterous viviparous females and 3 nymphs, 9. IV, 1942, ex *Abies firma*, M. INOUYE leg.) (Meguro, Tokyo, 7 apterous viviparous females, 4. IV, 1941, ex *Abies firma*,

M. INOUYE leg.) (Kuroyama, Ôsaka, one alate viviparous female and one apterous viviparous female, 5. IV, 1960, ex *Cephalotaxus drupacea*, M. SORIN leg.)

Gen. distribution……Japan and Korea.

Jap. name……Hanenaga-Ôabura.

2. ***Cinara* (*Dinolachnus*) *hattorii*** KÔNO et INOUYE

Cinara hattorii KÔNO et INOUYE, Ins. Mats., Vol. XIII, No. 1, S. 41～43 (1938)

Cinara konoi INOUYE, Hokkaido Forstversuchsanstalt, Bull., Nr. 33. S. 21～23 (1941); ibid., Rpt. Hokkaido Branch, Gov. Forest Expt. St. Special Rpt., No. 5, S. 224～226 (1956)

Host……*Abies sachalinensis* FR. SCHM. and *Abies Mariesii* MAST.

Biology……In autumn the apterous oviparous females and alate males appear on the young twigs where the former lay eggs, in longitudinal rows of few pieces. In spring of the following year hatched fundatrices of these aphids colonize on the trunk or the old twigs, about 1 meter above ground, and their progeny suck as a rule in numerous colonies. In the course of time, the whole colony moves downwards, and in summer can sometimes be found on the ground parts of the roots of tree.

Alate viviparous females appear in the second generation in June. Colonies of the aphids are attended by various ants, especially *Formica* spp. and *Camponotus* spp.

Habitat……Hokkaidô (Nopporo, Sapporo, Kuriyama, Horokanai and Akagawa) and Honshû (Nagano Pref.).

Date associated with our specimens are as follows:

Many specimens were collected from Hokkaidô (Nopporo, apterous viviparous females, 24. VI, 1937, 2. VIII, 1939 and 28. IX, 1935; alate males and oviparous females, 2. X, 1966, 15～29. X, 1935, 30. X, 1937 and 1. XI, 1935, ex *Abies sachalinensis*, M. INOUYE leg.) (Sapporo, alate viviparous females, 8. VI, 1938, ex *Abies sachalinensis*, H. KÔNO leg.) (Kuriyama, apterous viviparous females, 31. V, 1966, ex *Abies sachalinensis*, M. INOUYE leg.) (Horokanai, apterous viviparous females, 9. VI, 1954, ex *Abies sachalinensis*, M. INOUYE leg.) (Akagawa, alate viviparous females and apterous viviparous females, 20. VI, 1958, ex *Abies sachalinensis*, M. INOUYE leg.). (Three apterous viviparous females, 16. VIII, 1968, Mt. Ontake, Nagano pref., ex *Abies mariesii*, Z. YAMASHITA leg.).

Gen. distribution……Japan (Hokkaidô).

Jap. name……Hattori-Ôabura.

5. **Subgenus *Cupressobium*** BÖRNER

Cupressobium BÖRNER, Neue Blattläuse aus Mitteleuropa, Selbstverlg. Naumburg. S. 1 (1940)

Subgenotype……*Cinara* (*Cupressobium*) *juniperi* (DEG.)

1. ***Cinara* (*Cupressobium*) *juniperi*** (DE GEER)

Aphis juniperi DE GEER, Memories pour servir a'l'historire des insectes, III. P. 56 (1773)

Lachnus juniperi KALTENBACH, Mono. Pflanz., S. 153～154 (1843)

Panimerus juniperi THEOBALD, Plant lice or Aphididae of Great Britain, Vol. III, pp. 149～152 (1924)

Cinara juniperi TAKAHASHI, Philippine Jour. Sci., Vol. 63, No. 1. pp. 1～18 (1937)

Cinara juniperi BRAUN, 2. Aug. Ent. Bd. 24, Heft. 4, p. 480 (1938)

Cupressobium juniperi BÖRNER, Neue Blattläuse aus Mitteleuropa, S. 1 (1940)

Cupressobium juniperi PASEK, Vŏsky Nasich Lesnych Drevin, pp. 304～306 (1954)

Cupressobium juniperi BÖRNER et HEINZE, Handb. Pflanzenkrank. Bd. V, 4 lief. S. 56 (1957)

Cinara (*Cupressobium*) *juniperi* EASTOP, A study of the Aphididae (Homoptera) of West Africa, pp. 74～75 (1961)；ibid., Australian Journal of Zoology, 14. p. 527 (1966)

Cinara (*Cupressobium*) *juniperi* SZELEGIEWICZ, Catalogus faunae Poloniae, No. 12, p. 19 (1968)

Apterous viviparous female

Head, thorax and abdomen dark browh to black. Antennae fuscous to dark brown, I. III. to IV. segments at distal portion, V. and VI. segments dark brown. Eyes and siphuncle black. Legs black；femora at base pale brown.

Body oval to longish oval. Head with many hairs about 0.11 mm long. Head and prothorax sclerotic, meso- and metathorax, and first abdominal tergite with large sclerotic patches from each of which aries many hairs about 0.1 mm long.

Abdomen with many hairs about 0.10 mm long on dorsum, and small muscle attachment plates；very small mesial ones visible on the I. to III. abdominal tergites. VIII. abdominal tergite with large dark, sclerotic bars, from which arise many hairs about 0.15 mm long.

Antennae about as long as head and thorax, with many long hairs about 0.15 mm；V. longer than IV., VI. longer than V. or about equal to V. Relative length of body and antenna and rhinaria are as in the following table.

The III. antennal segment without rhinaria, IV. with 2～3 round rhinaria, V. with 1～3 circular rhinaria below apical large one；VI. with a large primary rhinarium and five very small marginal secondary rhinaria. Primary rhinaria without chitinized rim.

Rostrum reaching nearly middle of abdomen. Diameter of siphuncular cones at base about 0.38 mm and with many hairs about 0.09 mm long.

Cauda and anal plate with many hairs about 0.1～0.15 mm long on outer side, which is remarkably longer than those on inner side.

Dorsal length of the first hind tarsus distinctly shorter than basal length of the same segment.

Measurement in mm.

No.	Length		Antennal Segments				Rhin. on				Siph.	Cau.
	body	ant.	III	IV	V	VI	III	IV	V	VI		
1	2.06	1.00	0.90	0.35	0.45	0.50 (0.4+0.1)	0	2—3	2—3	1	0.45	0.10
2	2.45	1.00	0.80	0.40	0.50	0.50 (0.4+0.1)	0	3—3	2—4	1	0.35	0.10
3	2.35	1.00	0.80	0.35	0.45	0.55 (0.40—0.15)		2—3	3—3	1	0.35	0.10
Av.	2.46	1.00	0.83	0.36	0.46	0.52 (0.40+0.12)	0	2—3	2—4	1	0.38	0.10

Host……*Juniperus rigida* SIEB. et ZUCC.

Biology……These aphids found on the shoots, twigs and leaves. Full life-history of this species is unknown in Honshû, Japan.

Habitat……Japan (Hirao near Ôsaka, Honshû).

Data associated with our specimens sre as follows :

Three apterous viviparous females, 27. V, 1962, ex *Juniper rigida*, M. SORIN leg.

Gen. distribution ……(Japan), Europe, England, Australia, New Zealand, North America and Africa.

Jap. name……Nezumisashi-Ôabura.

2. **Tribe : Schizolachnini**

Body elongate and narrow, hardly broader than head. Eyes prominent, lacking tubercles. The accesoric part of the last rostral segment is short, mostly broader than long, indistinctly separated from the basal part. Hind tarsal I. elongate, dorsal side over half as long as ventral side, in *Eulachnus* DEL GUERCIO with 2 hairs on the dorsal side. The siphuncule shallow, without hairs or with few hairs (in *Schizolachnus* MORDV). Cauda rounded. Alate : Forewings with forked or single media. Living on needles of coniferae, without ants.

Key to the genera of the tribe

1. The egg-shaped body, as thickly haired as the legs. First segment of hind tarsus dorsally without noticeable hairs. Primary rhinarium with the chitin rim. Genitial plate rather round and small……1. *Schizolachnus* MORDVILKO
-. Body elongated or spindle-shaped. First segment of hind tarsus with dorsal hairs. Primary rhinarium without chitin rim. Genitial plate rather developed……2. *Eulachnus* DEL GUERCIO.

1. **Genus *Schizolachnus*** (MORDVILKO) (1908)

Schizolachnus MORDVILKO, Ann. Mus. zool. l'Acad. Imp. des sei., St. Petersburg, V. 13, p. 375 (1908)

Genotype : *Aphis tomentosa* VILLERS, 1789 = *pineti* FABRICIUS

Characters = Body egg-oval.

Compound eyes large and with ocular tubercles present. Antennae of six segments, and body with very long hairs. Processus terminalis very short, primary and secondary rhinaria with chitin rims. Siphuncle on somewhat shallow hairy cones. Rostrum short, last segment also short and tip obtuse. Fore-wing with the radial sector straight ; stigma elongate ; media once forked.

The aphid secrete a large amount of dirty white wax. They live on the pine-tree needles, and are not attended by ants.

The only one species, *Schizolachnus orientalis* TAKAHASHI recorded from Japan.

1. ***Schizolachnus orientalis*** TAKAHASHI

Unilachnus orientalis TAKAHASHI, Aphididae of Formosa, Pt. 3, p. 79 (1924) ; ibid., Bull. Lab. Zool. Portici, XX, pp. 147 (1927)

Host……*Pinus densiflora* SIEB. et ZUCC. and *P. thunbergii* PARL.

Biology……This species attacks the needles of above-listed host. The apterae and nymphae cluster in rows down to the pine needles and are easily detected by the covering of fine white meal over their bodies and legs. A very common species in the southern part of Japan. Alate males and oviparous females appear in October and November at Okayama.

Habitat……Kyûshû (Tsushima) and Honshû (Okayama and Mie Pref.).

Many apterous viviparous and two alate viviparous females, 11. VII, 1968, Amicho, Mie Pref., ex *Pinus thunbergii*, A. NOBUCHI leg.

Many apterous viviparous females and alate viviparous females, 9 ~ 11.~ 22. X, 1966,

Okayama, Okayama Pref., ex *Pinus densiflora* M. INOUYE leg.

Ten apterous viviparous females, 25. X, 1961, Tsushima Island, Nagasaki Pref., ex *Pinus densiflora*, M. INOUYE leg.

Gen. distribution……Japan (Honshû, Kyûshû), Formosa and China.

Jap. name……Tôyô-ha-Ôabura.

2. **Genus *Eulachnus*** DEL GUERCIO (1909)

Eulachnus DEL GUERCIO, Revista Patol. Vegetable n, s. Vol. 3, p. 329 (1909)

Protolachnus THEOBALD. Bull. Ent. Res., V. 6, p. 145 (1915)

Genotype : *Lachnus agilis* KALTENBACH, 1843.

Characters = Body elongate and narrow. Hairs on body, antennae and legs spiny, of various lengths. Primary rhinaria without chitin rims. Head divided, eyes rather large and outstanding. Siphuncle poriform, small. Perisphonal sclerits narrow ringshaped and without hairs. Cauda rounded. Fore-wing with media faint, usually once-forked.

Living on needles of pine trees. According to V. E. EASTOP, the genus has been called *Protolachnus* THEOBALD, 1915, type species *P. tuberculostemmata* THEOBALD. DEL GUERCIO did not select a type and defined the genus in such a way as to exclude the species, subsequently elected as type by WILSON (1911). The matter was put before the International Commission on Zoological Nomenclature (EASTOP 1963) which has ruled (1965) that *Eulachnus* is correct name for the genus containing *Lachnus agilis* KALTENBACH.

Key to the species of *Eulachnus*

Apterous viviparous female

1. The basal scleroites developed on all abdominal segments. Dorsum and legs with long-pointed hairs. On *Pinus densiflora* and *P. thunbergii* ……1. *thunbergii* WILSON
-. The basal scleroites, at least on the fore abdominal segments are not developed. Dorsum and legs only with rare and short hairs. On *Pinus pumela* and *P. pentaphylla*…… …… 2, *pumilae* INOUYE (1939) = cembrae BÖRNER (1950)

1. ***Eulachnus thunbergii*** WILSON

Eulachnus thunbergii WILSON, Ent. News. XXX, p. 3. (1919)

Eulachnus piniformosanus TAKAHASHI, Aphididae of Formosa, pt. 1, p. 83 (1921) ; pt. 2, p. 138 (1923) ; pt. 3, p. 75 (1924) ; ibid., Nippon Konchu Zukan, p. 1850 (1932) ; SHINJI, Konchugaku Kogi, 8. lll, (1928) ; INOUE, Ins. Mats., Vol. XIII, No. 4, pp. 137 (1939) ; SHINJI, Monogr. Jap. Aphid. (in Japanese), pp. 231～237 (1941)

Eulachnus thunbergii INOUYE, Hokkaidô Forstversuchsanstalt Bull., Nr. 33, S. 7 (1941) ; ibid., Report, Hokkaidô Branch, Govern. Forest Expt. St. Special Report, No. 5, S. 211 (1956)

Eulachnus thunbergii MORITSU, Iconograph Insectorum Japonicorum, p. 338 (1950)

Eulachnus thunbergii EASTOP, Aust. J. Zool., 14, p. 529 (1966)

Eulachnus thunbergii PAIK, Aphids of Korea, p. 16 (1965)

Host……*Pinus densiflora* SIEB. et ZUCC., *P. thunbergii* PARL, *Pinus montana* MILL, *P. luchuensis* MAYR, *P. massoniana* LAMB. and *P. taeda* L.

Biology……Fairly common on the needles of above-listed hosts, especially on and amongst the tender needles. This species is very active.

Alate viviparous female mostly appears in the second generation and we have found this form now and then on the needles.

Alate males and oviparous females appear in October at Sapporo and Nanae (Hokkaidô), but do not appear in November in the southern part of Japan (Nagasaki, Kyûshû).

Habitat……Japan (Hokkaidô, Honshû, Shikoku and Kyûshû).

Data associated with our specimens are as follows :

Five apterous viviparous females and one alate viviparous female, 8. IV, 1941, Amatsu, Chiba Pref., ex *Pinus densiflora*, M. INOUYE leg. Four apterous viviparous females, 12. IV. 1942. Kyôto, Honshû, ex *Pinus thunbergii*, M. INOUYE leg. Many alate viviparous females, 20. VIII, 1965, Kyôto, Honshû, ex *Pinus densiflora*, M. INOUYE leg. Many apterous viviparous females and apterous viviparous females, 5. VI, 1960, Soehi, Nagano Pref., ex *Pinus densiflora*, M. INOUYE leg. Four apterous viviparous females and two alate viviparous females, 3. VII, 1937, Sapporo, Hokkaido, ex *Pinus densiflora*, H. KÔNO leg. Many apterous viviparous females, 27～30. VIII, 1938, Nopporo Hokkaidô, ex *Pinus densiflora*, M. INOUYE leg. Many alate males and oviparous females 25. IX～1. X, 1940, Nopporo, Hokkaidô, ex *Pinus montana*, M. INOUYE leg. Many oviparous females, 10. X, 1940, Nanae, Hokkaidô, ex *Pinus densiflora*, M. INOUYE leg. Many alate viviparous females and apterous viviparous females, 24. X, 1966, Okayama, southern part of Honshû, ex *Pinus thunbergii*, M. INOUYE leg. Many apterous viviparous females and five alate viviparous females, 31. X, 1967, Yanagawa, Ibaragi Pref., ex *Pinus thunbergii*, A. NOBUCHI leg. Many apterous females and one alate viviparous female, 26. XI, 1965, Futsu, Nagasaki Pref., ex *Pinus densiflora*, Y. TAKIZAWA leg.

Gen. distribution……Japan (Hokkaido, Honshû), Korea, Formosa and Australia.

Jap. name……Matsu-no-hoso-Ôabura.

2. ***Eulachnus pumilae*** INOUYE

Eulachnus pumilae INOUYE, Ins. Mats., Vol. XIII, No. 4, pp. 134～137 (1939)

Eulachnus cembrae BÖRNER, selbstverlag, Naumburg, S. 19 (1950)

protolachnus cembrae BÖRNER, Europae centralis Aphids. Mitt. Thür. Bot. Ges., Weimar, Beiheft 3, p. 40 (1952) ; ibid., Handb. Pflanzenkr., Bd. V, 4. Lief. S. 49 (1957)

Protolachnus cembrae PASEK, Vosky Nasich Lesnych Drevin, p. 180～184 (1954)

Eulachnus cembrae PINTERA, Acta entomologica Bohemoslovaca, Tom. 65, No. 2, pp. 100～108 (1968) ; SZELEGIEWICZ, Polska Akademia Nauk, Inst. Zool., XXI, 4, p. 21 (1968)

Host……*Pinus pumila* REGEL, *Pinus cembrae* L., *Pinus coraiensis* SIEB. et ZUCC. and *Pinus pentaphylla* MAYR.

Biology……This species attacks the needles of the host plants.

Habitat……Hokkaido (Kawayu, Kushiro and Apoi)

Data associated with our specimens are as follows :

Many apterous viviparous females, 15. VI, ～11. VII, 1938 and many alate viviparous females, 26. VI ～29. VII, 1938, Kawayu, Hokkaidô, ex *Pinus pumila* REGEL, M. INOUYE leg.

Many apterous viviparous famales, 5. VI, 1967, Apoi, Hidaka, Hokkaido, ex *Pinus pentaphylla*, M. INOUYE leg.

Gen. distribution……Japan (Hokkaidô), Siberia and Europe (Alpine region).

Jap. name……Haimatsu-no-hoso-Ôabura.

Discussion……Through the kindness of Dr. G. H. SHAPOSHINIKOV on 12, August, 1968, the author was able to examine the two slides named *Eulachnus agilis* KALTENBACH, which were collected at Kodrowaya Pode, near Vladivostok, on 17. V, 1926, from *Pinus coraiensis* SIEB. et ZUCC. by the late Dr. MORDVILKO in the SHAPOSHINIKOV's collection, Leningrad.

These two slides agree fairly well with *Eulachnus pumilae* INOUYE.

According to al letter dated 9, Oct. 1968 from Dr. A. PINTERA who kindly examined many slides of the Japanese species which the author left in his laboratory, Prague, Czechoslovakia, on 19, August, 1968, BÖRNER's *Eulachnus cembrae* is a synonym of *Eulachnus pumilae* INOUYE.

II. Subfamily : Lachninae

1. Tribe : Stomaphidini

1. Genus *Stomaphis* WALKER (1870)

Stomaphis WALKER, Zoologist, XXVIII., 200 (1970)

Genotype : *Aphis quercus* LINNÉ

Characters = Head slightly rounded ; eyes large with distinct ocular tubercles. Antenna six-segmented, and thickly covered with fine hairs. Siphuncle on broad hairy cones. Cauda subconical, slightly rounded. Fore-wings with radical sector somewhat curved, media twice forked. Rostrum long, much longer than body.

Living on the bark of trunk or root of broad-leaf trees or pine trees. Only one species, *Stomaphis quercus pini* TAKAHASHI recorded from *Pinus densiflora* in Japan (Honshû).

1. *Stomaphis quercus pini* TAKAHASHI

Stomaphis pini TAKAHASHI, Canadian Ent., LII, p. 77 (1920) ; ibid., Dept. Agr., Gov. Res. Inst. Formosa, Rept. 4, p. 139 (1923) ; SHINJI, Monogr. Japan. Aphid., pp. 270～272 (1941)

Stomaphis quercus pini TAKAHASHI, Bull. Univ. Ôsaka Pref., Series B, Vol. 10, pp. 7～8 (1960)

Host……*Pinus densiflora* SIEB. et ZUCC.

Biology……This species attacks the parts of trunk near the earth or the roots of the host plant. The aphids always live with ants *Lasius niger* L., *Formica* spp. and *Camponotus* spp. This species is abundant but uncommon. The biology is not sufficiently clear.

Habitat……Honshû (Okayama Pref.).

Data associated with our specimens are as follows :

Four apterous viviparous females and sixth alate viviparous females, 11. XI, 1968, Okayama, ex *Pinus densiflora* E. INOUYE leg.

Gen. distribution……Japan (Morioka, Tokyo, Gifu, Ôsaka and Okayama).

Jap. name……Matsu-kuchinaga-Ôabura.

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本邦産針葉樹のアブラムシ類に関する研究の再検討

井　上　元　則(1)

（摘　　要）

針葉樹のアブラムシ類は，本邦の針葉樹造林地に多発し，重要害虫の一つに数えられている。

本邦産針葉樹のアブラムシ類に関する研究は，松村松年（1917）によって，3種が記載されたのに始まり，その後，故 ESSIG, E. O. et KUWANA, I. 高橋良一，進士織平らによって研究が行なわれた。著者もまた1936年以来林業試験場北海道支場において，針葉樹のアブラムシ類に関する研究を数回発表してきたが，1962年退官後は王子製紙林木育種研究所において，継続研究を行ない，今回完成をみたものである。

これまで針葉樹のアブラムシ類は，日本から24種記録されたが，日本国内では欧州，シベリア産針葉樹のアブラムシ Type 標本を見ることができないので，その同定について幾多の疑問があった。

著者は1964年 LAMBERS, H. R.（オランダのアブラムシ研究所）を，1968年には SHAPOSHINIKOV, G. Ch.（ソ連アカデミー，レニングラード動物学研究所），SZELEGIEWICZ, H.（ポーランド，アカデミー，ワルシャワ動物学研究所），PINTERA, A.（チェコスロバキア，アカデミー，プラハ生物学研究所），EASTOP, V. F.（大英博物館昆虫部）等を歴訪して，日本産の標本と比較し，同定の再検討を行ない，その正確を期した。

著者はこの論文で，さらに4新種を記載し，合計28種の本邦産針葉樹のアブラムシ類を報告する。それらのうちドイツの BÖRNER が欧州のアルプスで採集し，1950年 *Eulachnus cembrae* BÖRNER と発表したものは，井上が1939年すでに *Eulachnus pumilae* INOUYE とし発表したものと同種で，井上に先取権があることが判明した。

第2章は本邦産針葉樹のアブラムシ類の研究史であって，1917年以来の研究を詳細に述べ，旧学名と新学名の比較対照を行なった。

第3章は各論であって，本邦産針葉樹のアブラムシ類の昆虫分類学上の位置を明確にすべく，科，亜科，族，属，種，亜種の特徴を記した。さらに属，亜属，種の検索表を付して，森林保護関係者の便に供した。

また各種ごとに，原記載とその後の研究記録を掲載し，寄生樹種，生態（被害，習性），産地（標本採集地，採集年月日，採集者），分布，和名に，同定上の論義を加えた。新種については，形態の特徴を詳記し，Type の保有場所について記載した。

この論文で特記すべきことは，*Cinara* オオアブラ属は従来種の特徴が少なく，分類の困難なグループとされていた。今回はオオアブラ属を，触角第6節上にある第一次感覚板が，明りょうなキチン質の縁（Rim）を有するか，有さないかによって大きく類別した。さらに後脚第一跗節の背面部が基部より長いか，等しいか，短いかなど，および触角第6節の第一次感覚板が，大きくて盛り上がっているか，あるいはあまり大きく盛り上がっていないことなど，ならびに腹背面の硬板（Sclerotic plates）が中胸背板から第二腹背節まで存在するか，どうかによって，大きく分類できることを明らかにしたのが，本論文の特徴である。

末尾に本研究に関係した文献102編を記して，参考に供した。

以上の研究成果を一覧表に抄録すると，次表のとおりである。

1969年11月15日受理

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種名	寄生 植物名	寄生 部位	分布
1. *Cinara* (*Cinara*) *piniformosana* (TAKAHASHI) マツノオオアブラ	アカマツ，クロマツ，オウシュウアカマツ，その他マツ類	若い木の枝	北海道，本州九州，朝鮮，台湾
2. *Cinara* (*Cinara*) *laricis* (HARTIG) カラマツイボオオアブラ	カラマツ	〃	北海道，本州欧州，北米
3. *Cinara* (*Cinara*) *pinidensiflorae* (ESSIG et KUWANA) マツノエダオオアブラ	アカマツ，クロマツ	〃	日本，朝鮮，台湾，支那
4. *Cinara* (*Cinara*) *orientalis* (TAKAHASHI) トウヨウオオアブラ	アカマツ，その他マツ類	〃	本州，台湾
5. *Cinara* (*Cinara*) *shinji* INOUYE ヒメコマツオオアブラ	ゴヨウマツ，キタゴヨウマツ	若い木の幹，枝	北海道，本州
6. *Cinara* (*Cinara*) *formosana* (TAKAHASHI) タイワンオオアブラ	クロマツ，タイワンアカマツ	若枝	北海道，本州九州，台湾，支那
7. *Cinara* (*Cinara*) *kochiana kochi* INOUYE カラマツミキオオアブラ	カラマツ，チョウセンカラマツ	幹，枝	北海道，本州
8. *Cinara* (*Cinara*) *grossa* (KALTENBACH) クロオオアブラ	エゾマツ，トウヒオウシュウトウヒカナダトウヒ	幹，枝	北海道，本州朝鮮
9. *Cinara* (*Cinara*) *sorini* n. sp. クロマツミキオオアブラ	クロマツ	幹，根ぎわ	本州
10. *Cinara* (*Cinara*) *etsuhoe* n. sp. アカマツミキオオアブラ	アカマツ	幹，根ぎわ	本州
11. *Cinara* (*Cinara*) *bogdanowi ezoana* INOUYE n. comb. エゾマツオオアブラ	アカエゾマツ，エゾマツ，オウシュウトウヒ	若い木の幹，枝	北海道，樺太
12. *Cinara* (*Cinara*) *watanabei* n. sp. ヤマベオオアブラ	チョウセンゴヨウ，ストローブマツ，キタゴヨウマツ	幹，枝	北海道
13. *Cinara* (*Cinara*) *cembrae* (Seitner) ハイマツオオアブラ	ハイマツ，キタゴヨウマツ	若い木の枝	北海道
14. *Cinara* (*Cinaropsis*) *matsumurana* HILLE RIS LAMBERS トドミドリオオアブラ	アカトドマツ，ウラジロモミ	若い枝の針葉間	北海道，本州
15. *Cinara* (*Cinaropsis*) *horii* INOUYE ホリオオアブラ	エゾマツ	若枝と新梢	北海道，樺太
16. *Cinara* (*Cinaropsis*) *pilicornis* (HARTIG) エゾアメイロオオアブラ	アカエゾマツ	幼齢木の幹，枝	北海道
17. *Cinara* (*Cinaropsis*) *ozawai* n. sp. ツガオオアブラ	コメツガ，ヒノキ	若枝	本州
18. *Cinara* (*Cinaropsis*) *todocola* INOUYE トドマツオオアブラ	アカトドマツ，モミ，ウラジロモミ	若い木の幹，枝	北海道，本州樺太
19. *Cinara* (*Cinaropsis*) *costata* (ZETTERSTEDT) コナフキトビイロオオアブラ	カナダトウヒ，アカエゾマツ，エゾマツ，トウヒ，オウシュウトウヒ	枝条部	北海道，本州樺太，欧州
20. *Cinara* (*Cinarellia*) *laricicola* (MATSUMURA) カラマツオオアブラ	カラマツ，チョウセンカラマツ，グイマツ，オウシュウカラマツ	若い木の幹，枝	北海道，本州朝鮮

種名	寄生		分布
	植物名	部位	
21. *Cinara* (*Cinarellia*) *laricicola chibi* INOUYE n. comb. カラマツチビオオアブラ	カラマツ	若木の幹	北海道，本州 九州
22. *Cinara* (*Dinolachnus*) *longipennis* (MATSUMURA) ハネナガオオアブラ	アカトドマツ，モミ，イヌガヤ	若木の主幹	北海道，本州 朝鮮
23. *Cinara* (*Dinolachnus*) *hattori* KONO et INOUYE ハットリオオアブラ	アカトドマツ，オオシラビソ	若枝と幹	北海道，本州
24. *Cinara* (*Cupressobium*) *juniperi* (DE GEER) ネズミサシオオアブラ	ネズミサシ	若枝と針葉基部	本州
25. *Schizolachnus orientalis* (TAKAHASHI) トウヨウハオオアブラ	アカマツ，クロマツ	針葉	本州，九州
26. *Eulachnus thunbergii* WILSON マツノホソオオアブラ	アカマツ，クロマツ，モンタナマツ，リュウキュウマツ，タイワンアカマツ，テーダマツ	針葉	北海道，本州 台湾，朝鮮
27. *Eulachnus pumilae* INOUYE ハイマツノホソオオアブラ	ハイマツ，センブラゴヨウ，チョウセンゴヨウ，キタゴヨウ	針葉	北海道，シベリヤ，欧州
28. *Stomaphis quercus pini* TAKAHASHI マツクチナガオオアブラ	アカマツ	幹と根ぎわ	本州

Fig. 1-a

Fig. 1-b

Fig. 2-a

Fig. 2-b

Fig. 3

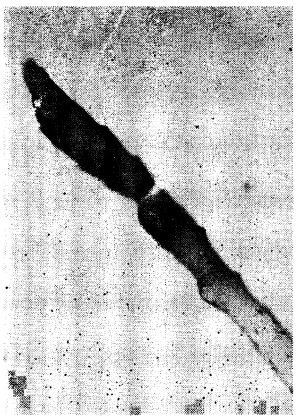

Fig. 4-a

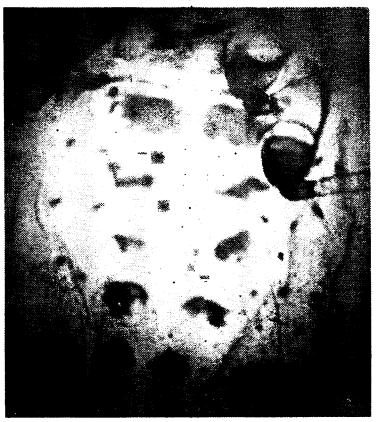

Fig. 4-b

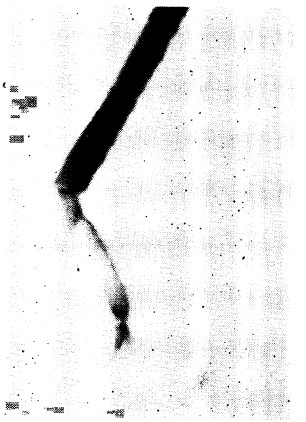

Fig. 4-c

Fig. 1　Apterous viviparous female of *Cinara* (*Cinara*) *piniformosana* (TAKAHASHI).
a. Total view.　b. Hind tarsus.
Fig. 2　Apterous viviparous female of *Cinara* (*Cinara*) *laricis* (HARTIG).
a. Total view.　b. Hind tarsus.
Fig. 3　Apterous viviparous female of *Cinara* (*Cinara*) *laricis* (HARTIG) : VI. ant. segment.
Fig. 4　Apterous viviparous female of *Cinara* (*Cinara*) *pinidensiflorae* (ESSIG et KUWANA)
a. VI. ant. segment.　b. Dorsal view of abdomen.　c. Hind tarsus.

Fig. 5-a

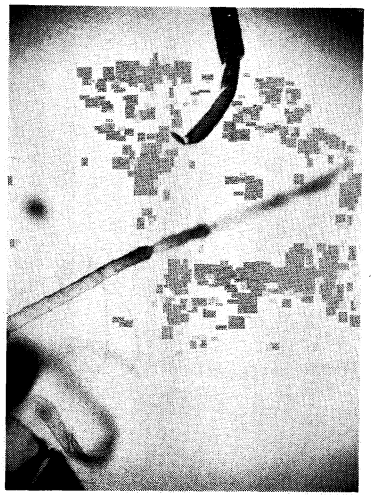

Fig. 5-b

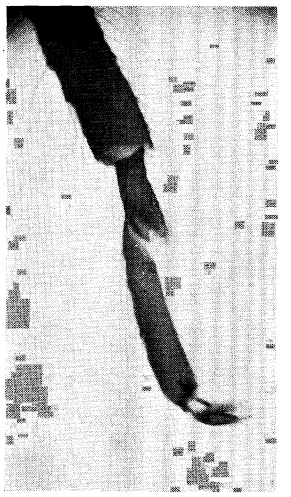

Fig. 5-c

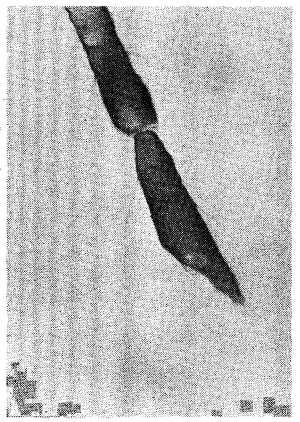

Fig. 5-d

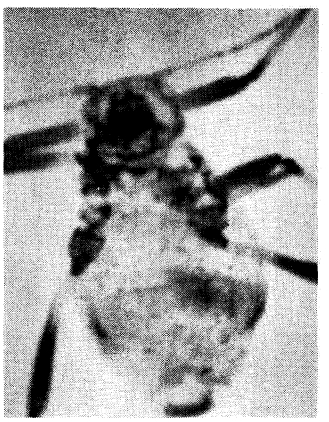

Fig. 6-a

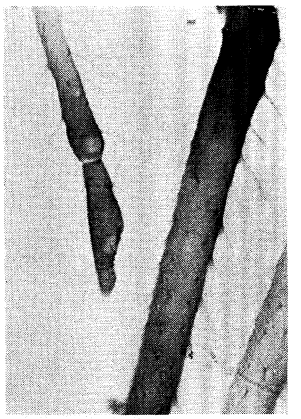

Fig. 6-b

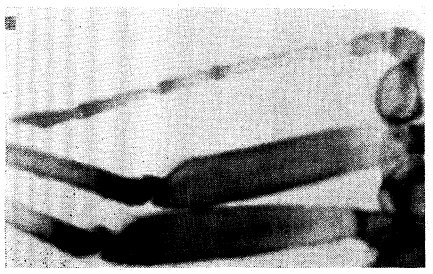

Fig. 6-c

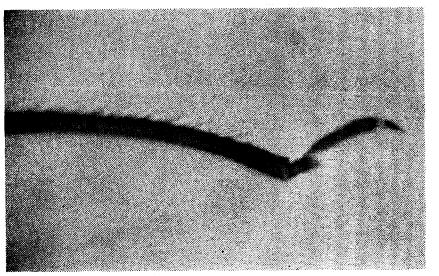

Fig. 6-d

Fig. 5 Apterous viviparous female of *Cinara* (*Cinara*) *orientalis* (TAKAHASHI).
a. Total view. b. Antenna. c. Hind tarsus. d. VI. ant. segment.
Fig. 6 Apterous viviparous female of *Cinara* (*Cinara*) *shinji* INOUYE.
a. Total view. b. VI. ant. segment. c. antenna. d. Hind tarsus.

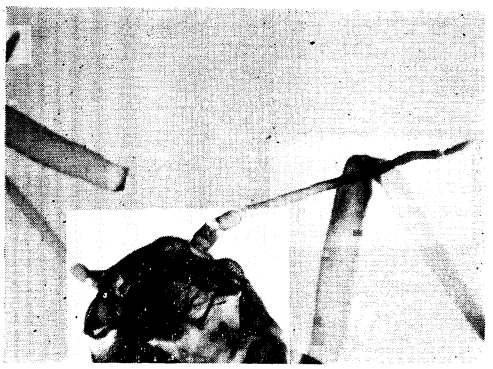

Fig. 9-a

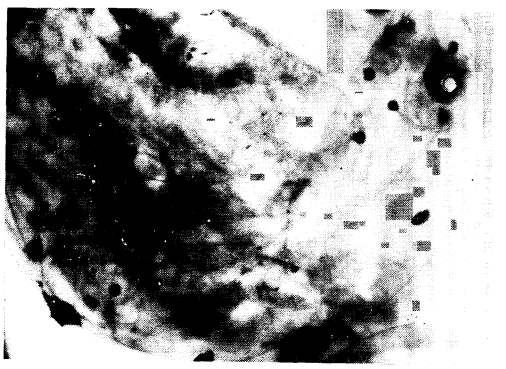

Fig. 9-b

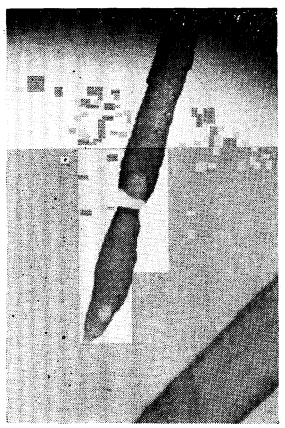

Fig. 9-c

Fig. 9-d

Fig. 10-a

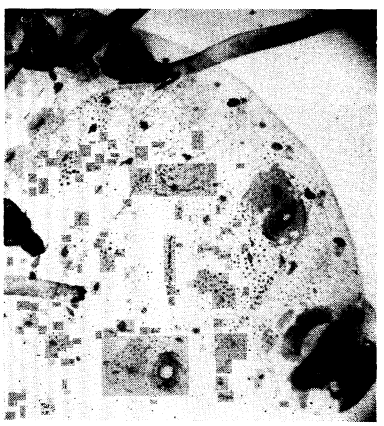

Fig. 10-b

Fig. 10-c

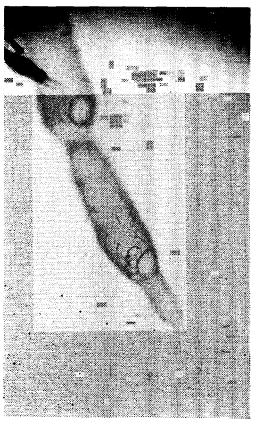

Fig. 10-d

Fig. 9 Apterous viviparous female of *Cinara* (*Cinara*) *grossa* (KALTENBACH).
a. Head. b. Dorsal view of abdomen. c. VI. ant. segment.
d. Hind tarsus.

Fig.10 Apterous viviparous female of *Cinara* (*Cinara*) *sorini* n. sp. a. Head and thorax b. Dorsal view of abdomen. c. Siphunculus. d. VI. ant. segment.

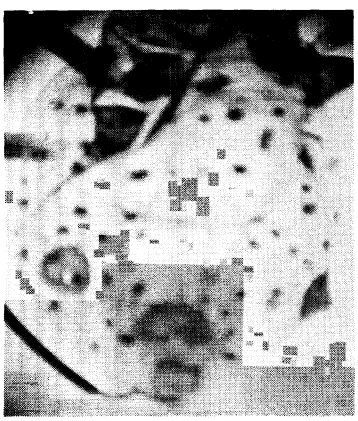

Fig. 7-a

Fig. 7-b

Fig. 7-b

Fig. 7-a

Fig. 8-a

Fig. 8-b

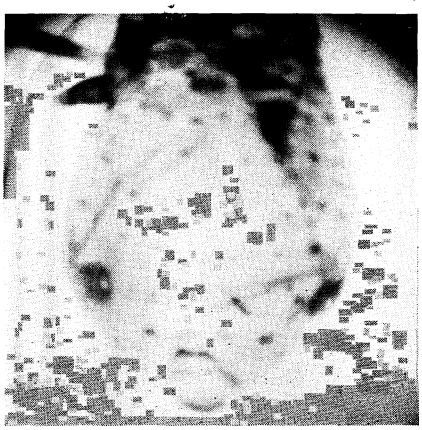

Fig. 8-c

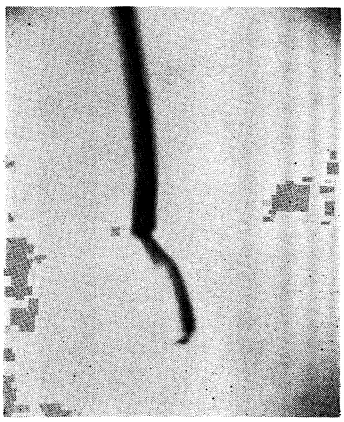

Fig. 8-d

Fig. 7 Apterous viviparous female of *Cinara* (*Cinara*) *formosana* (TAKAHASHI).
a. Dorsal view of abdomen. b. V. and VI. ant. segments. c. Antenna.
d. Hind tarsus.

Fig. 8 Apterous viviparous female of *Cinara* (*Cinara*) *kochiana kochi* INOUYE.
a. Head and thorax. b. VI. ant. segment. c. Dorsal view of abdomen.
d. Hind tarsus.

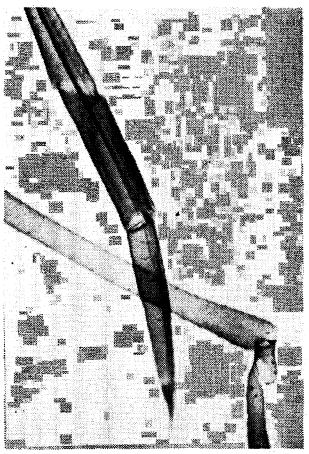

Fig. 11-a

Fig. 11-b

Fig. 12-a

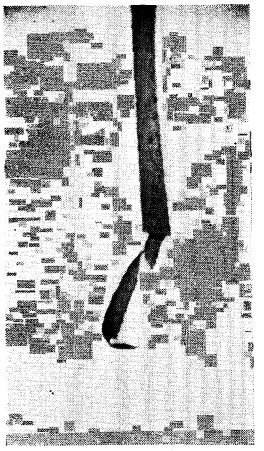

Fig. 12-b

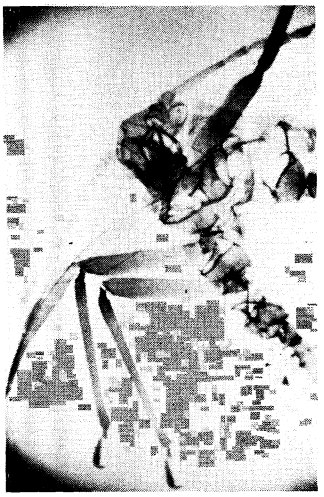

Fig. 13-a

Fig. 13-b

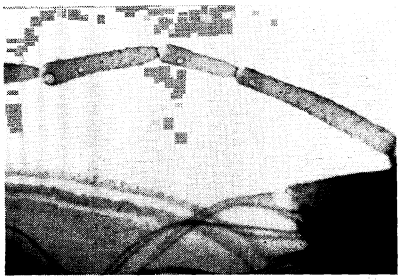

Fig. 13-c

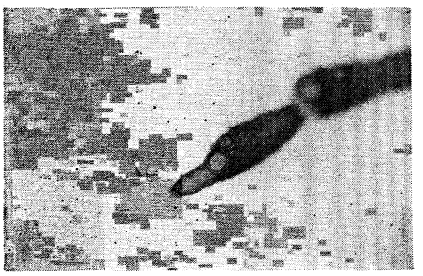

Fig. 13-d

Fig.11　Apterous viviparous female of *Cinara* (*Cinara*) *sorini* n. sp.　a. Rostral segment. b. Hind tarsus.

Fig.12　Apterous viviparous female of *Cinara* (*Cinara*) *etsuhoe* n. sp.　a. Rostral segment.　b. Hind tarsus.

Fig.13　Apterous viviparous female of *Cinara* (*Cinara*) *etsuhoe* n. sp.　a. Head and thorax.　b. Dorsal view of abdomen.　c. Antenna.　d. VI. ant. segment.

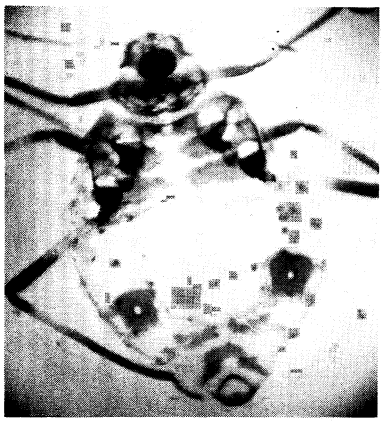

Fig. 14-a

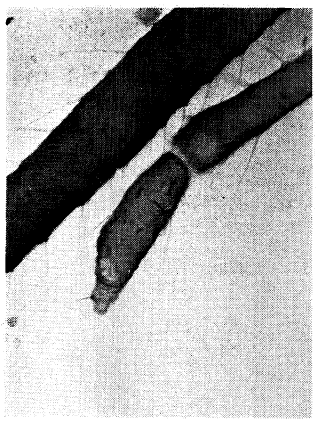

Fig. 14-b

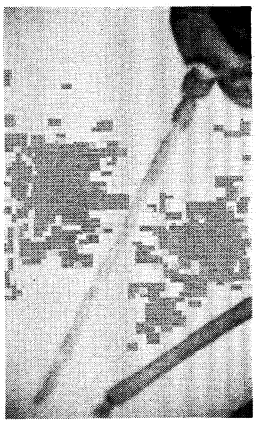

Fig. 14-c

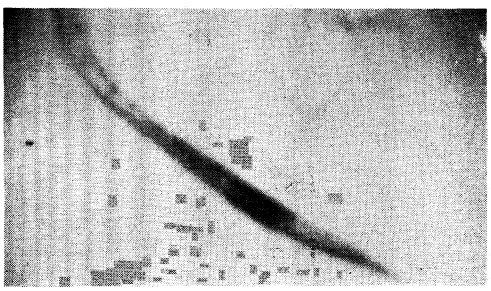

Fig. 14-d

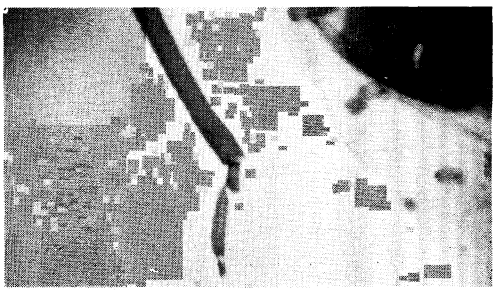

Fig. 15

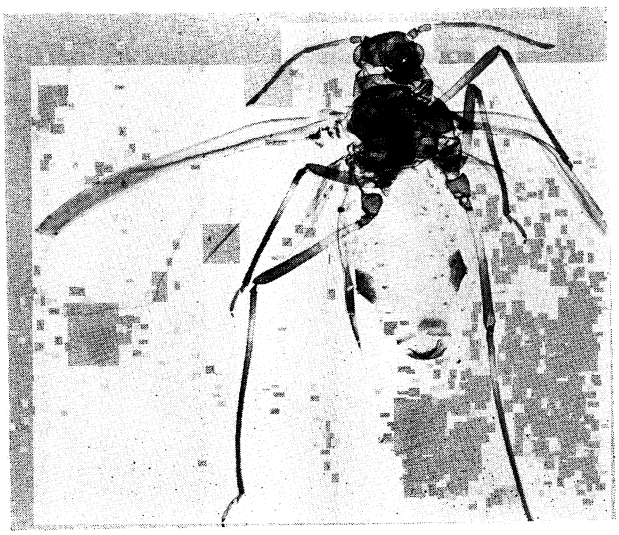

Fig. 16

Fig.14　Apterous viviparous female of *Cinara* (*Cinara*) *bogdanowi ezoana* INOUYE.
a. Total view. b. VI. ant. segment. c. Antenna. d. Rostral segment.
Fig.15　Apterous viviparous female of *Cinara* (*Cinara*) *bogdanowi ezoana* INOUYE : Hind tarsus.
Fig.16　Alate viviparous female of *Cinara* (*Cinara*) *bogdanowi ezoana* INOUYE : Total view.

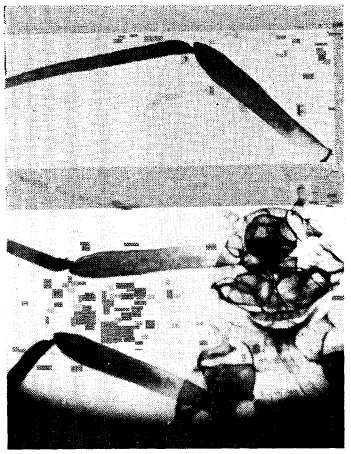

Fig. 17-a

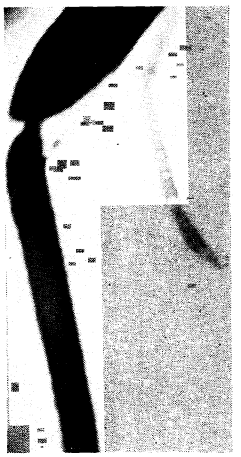

Fig. 17-b

Fig. 17-c

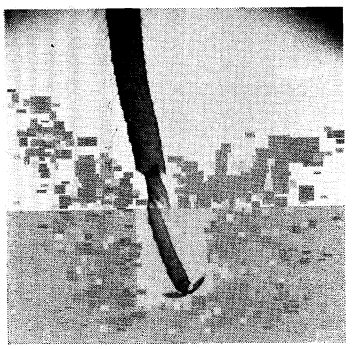

Fig. 17-d

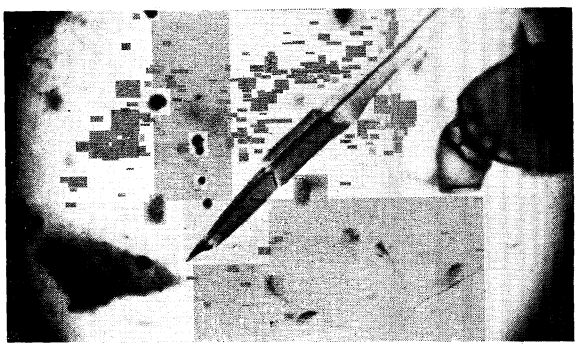

Fig. 18

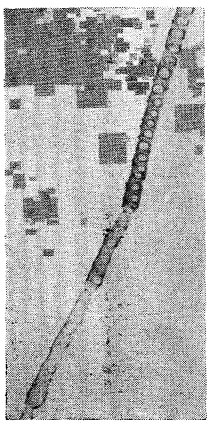

Fig. 19-a

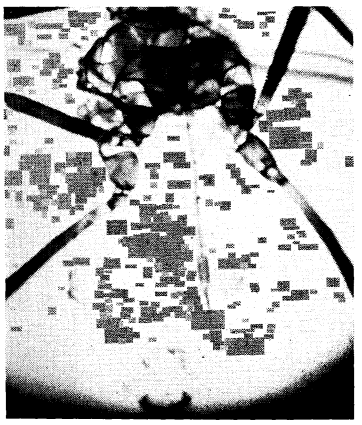

Fig. 19-b

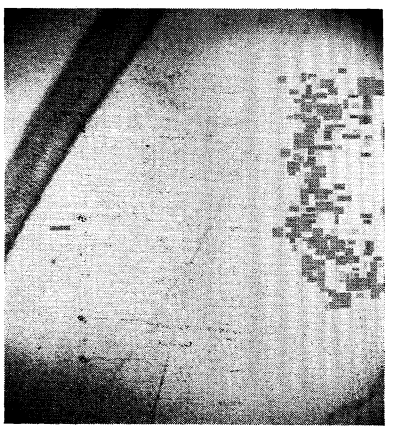

Fig. 19-c

Fig. 17 Apterous viviparous female of *Cinara* (*Cinara*) *watanabei* n. sp. a. Head and thorax. b. V. and VI. ant. segments. c. Dorsal view of abdomen. d. Hind tarsus.

Fig. 18 Apterous viviparous female of *Cinara* (*Cinara*) *watanabei* n. sp : Rostral segment.

Fig. 19 Alate viviparous female of *Cinara* (*Cinara*) *watanabei* n. sp. a. Antenna. b. Total view. d. Fore wing.

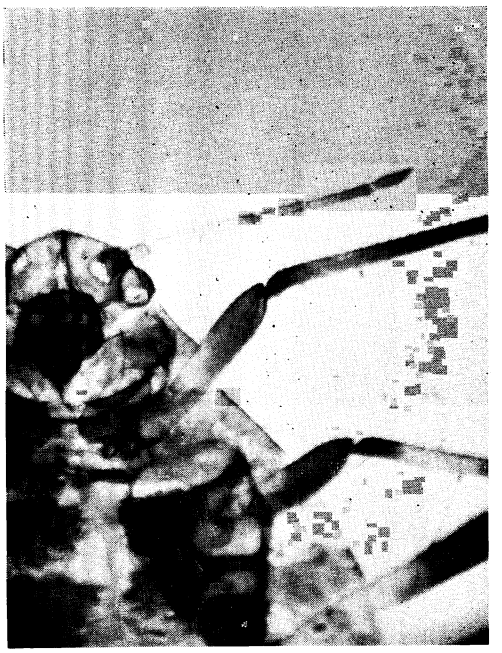

Fig. 20-a

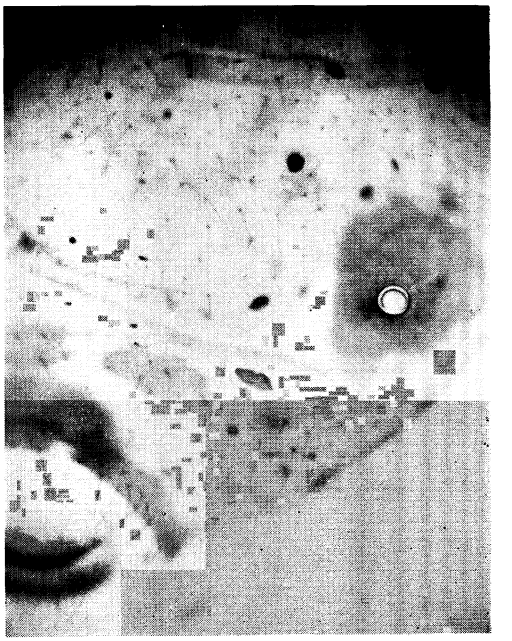

Fig. 20-b

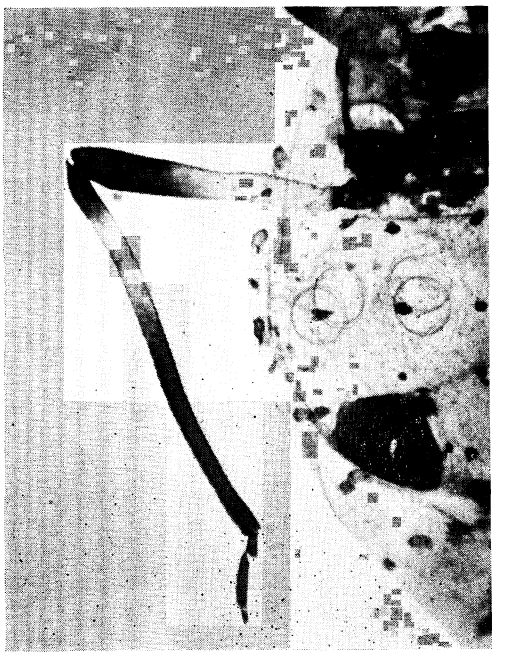

Fig. 20-c

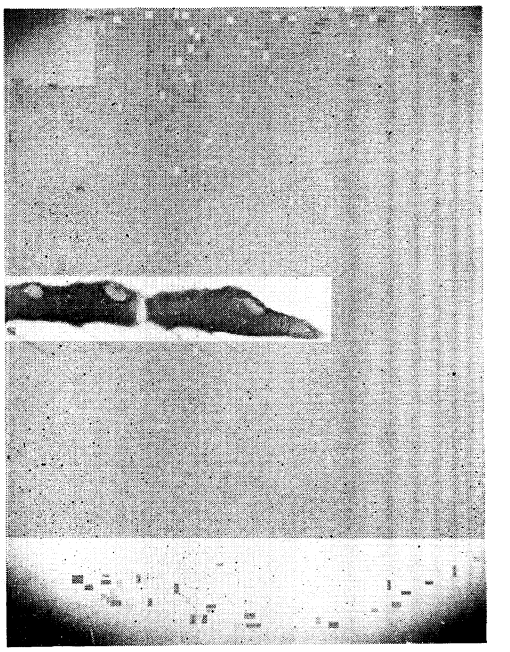

Fig. 20-d

Fig. 20 Apterous viviparous female of *Cinara* (*Cinara*) *cembrae* (SEITNER). a. Head and thorax. b. Dorsal view of abdomen. c. Hind leg and siphunculus. d. VI. ant. segment.

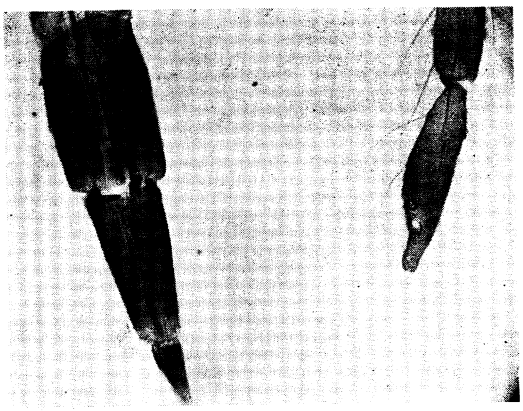

Fig. 21-a

Fig. 21-b

Fig. 22-a

Fig. 21-c

Fig. 22-b

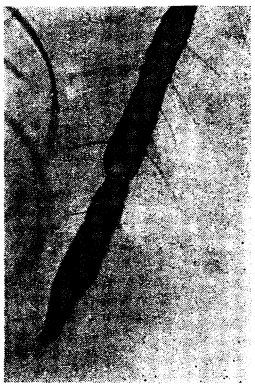

Fig. 22-c

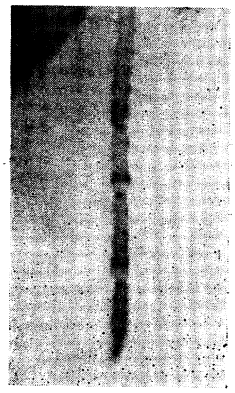

Fig. 22-d

Fig. 21 Apterous viviparous female of *Cinara* (*Cinaropsis*) *matsumurana* H.R.LAMBERS. a. Rostral segment. b. Dorsal view of abdomen. c. Hind tarsus.

Fig. 22 Apterous viviparous female of *Cinara* (*Cinaropsis*) *horii* INOUYE. a. Total view of abdomen. b. Hind tarsus. c. VI. ant. segment. d. antenna.

Fig. 23-a

Fig. 23-b

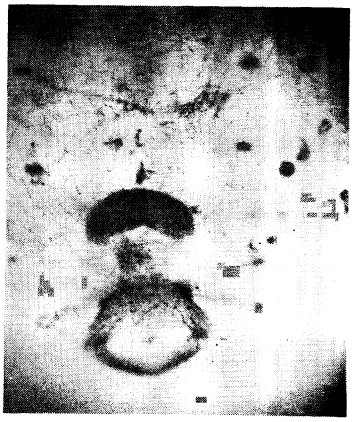

Fig. 23-c

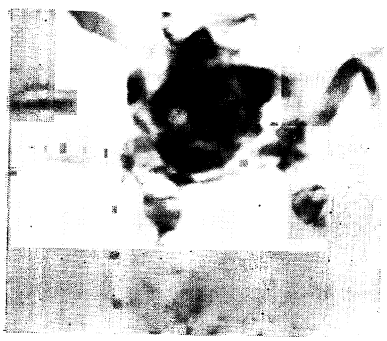

Fig. 24

Fig. 25-a

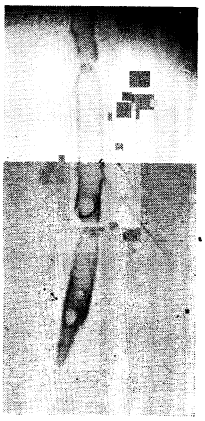

Fig. 25-b

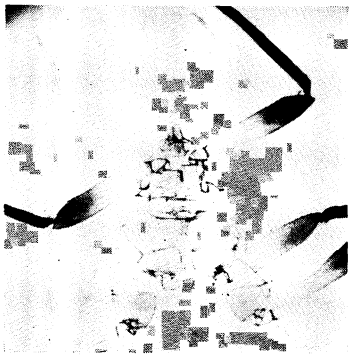

Fig. 25-c

Fig. 25-d

Fig. 23 Apterous viviparous female of *Cinara* (*Cinaropsis*) *pilicornis* (HARTIG)
a. Antenna. b. Hind tarsus. c. Total view of abdomen.

Fig. 24 Alate viviparous female of *Cinara* (*Cinaropsis*) *pilicornis* (HARTIG) : Dorsal view of thorax.

Fig. 25 Apterous viviparous female of *Cinara* (*Cinaropsis*) *ozawai* n. sp. a. Total view. b. V. and VI. ant. segments. c. Head and thorax. d. Hind tarsus.

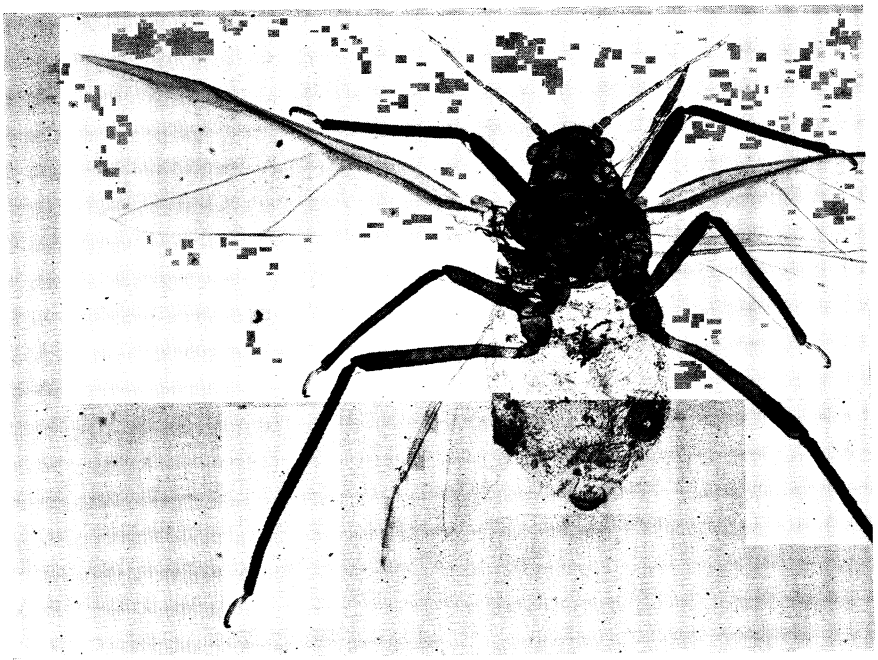

Fig. 26

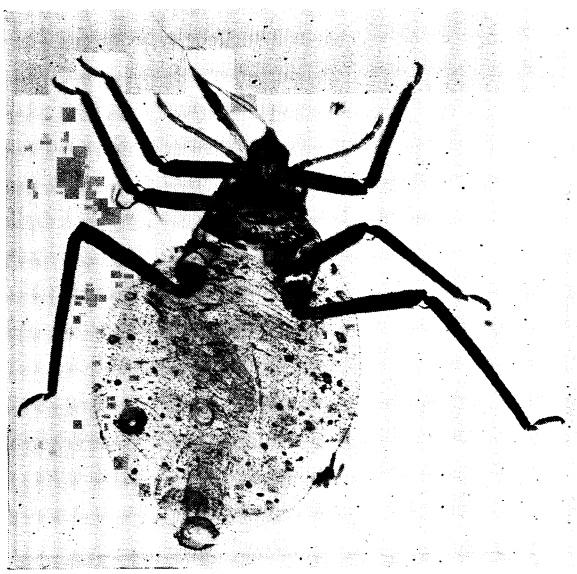

Fig. 27-a

Fig. 27-b

Fig. 26　Alate viviparous female *Cinara* (*Cinaropsis*) *todocola* INOUYE : Total view.
Fig. 27　Apterous viviparous female of *Cinara* (*Cinaropsis*) *todocola* INOUYE.
a. Total view.　b. I～IV. ant. segments.

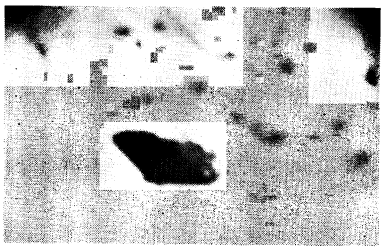

Fig. 28-a

Fig. 29-a →

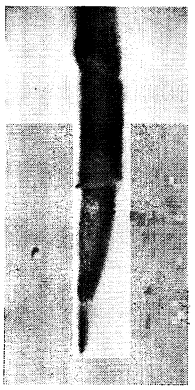

Fig. 28-b

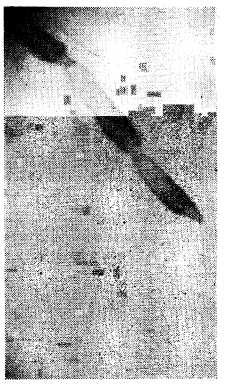

Fig. 28-c

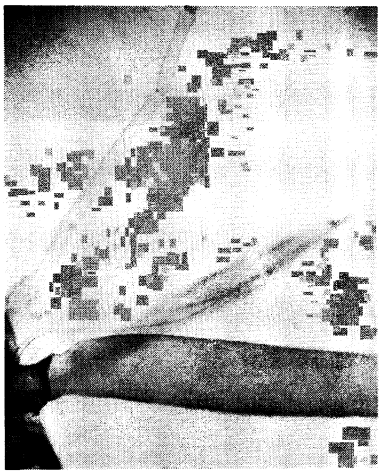

Fig. 29-b

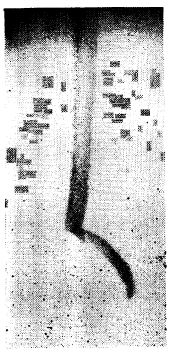

Fig. 28-d

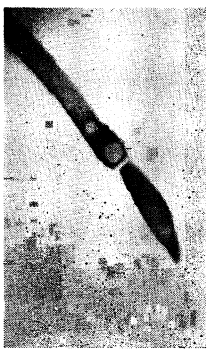

Fig. 29-c

Fig. 29-d

Fig. 28 Apterous viviparous female of *Cinara* (*Cinaropsis*) *costata* (ZETTERSTEDT).
a. Siphunculus b. Rostral segment. c. V. and VI. ant. segments. d. Hind tarsus.

Fig. 29 Apterous viviparous female of *Cinara* (*Cinarellia*) *laricicola* (MATSUMURA).
a. Dorsal view of abdomen. b. Rostral segment c. VI. ant. segment d. Hind tarsus.

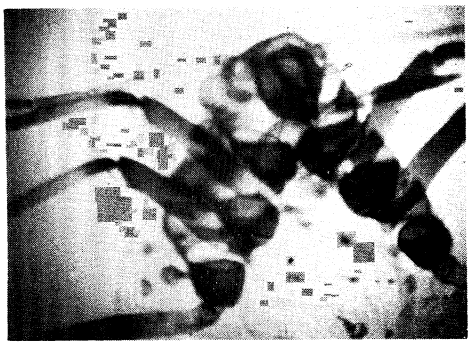

Fig. 30-a

Fig. 30-b

Fig. 30-c

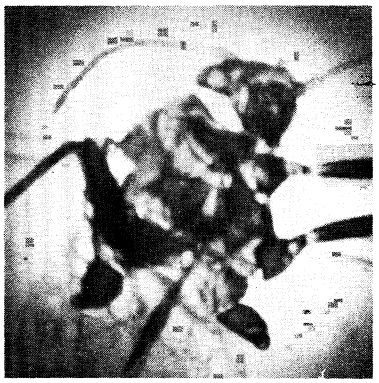

Fig. 31

Fig. 32-a

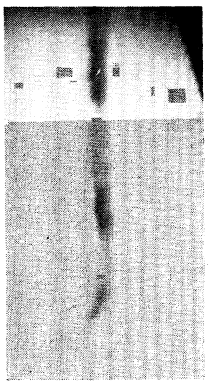

Fig. 32-b

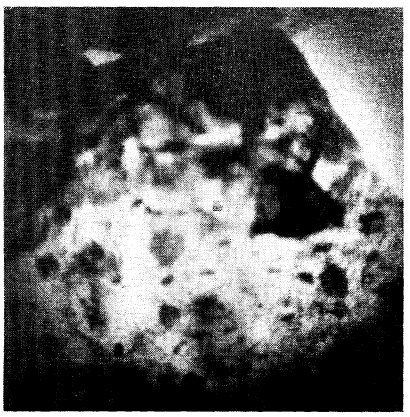

Fig. 32-c

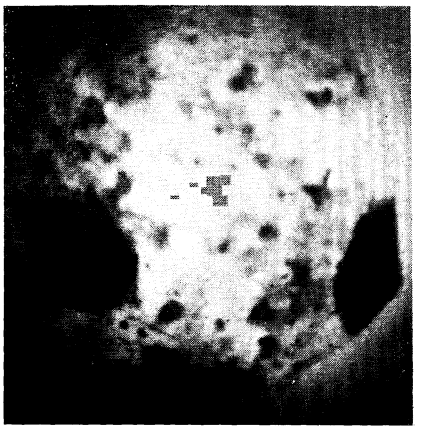

Fig. 32-d

Fig. 30 Apterous viviparous female of *Cinara* (*Cinarellia*) *laricicola chibi* INOUYE.
a. Head and thorox. b. Antenna. c. Hind tarsus.

Fig. 31 Alate viviparous female of *Cinara* (*Cinarellia*) *laricicola chibi* INOUYE : Head and thorax.

Fig. 32 Apterous viviparous female of *Cinara* (*Dinolachnus*) *longipennis* (MATSUMURA).
a. Head. b. Antenna. c. Thorax and abdomen. d. Dorsal view of abdomen.

Fig. 33

Fig. 34-a

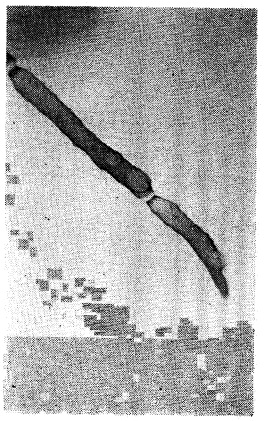

Fig. 34-b

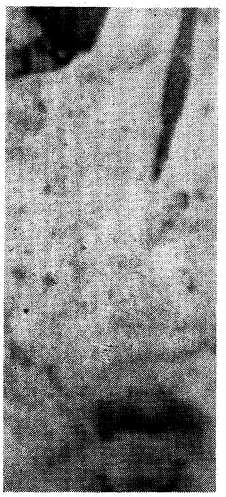

Fig. 34-c

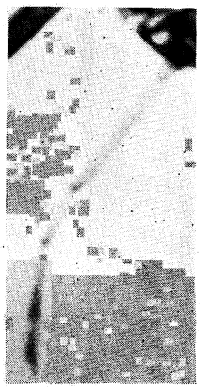

Fig. 35-a

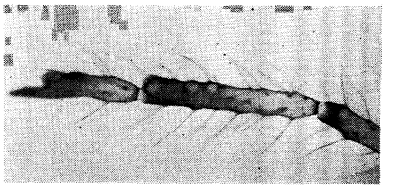

Fig. 35-b

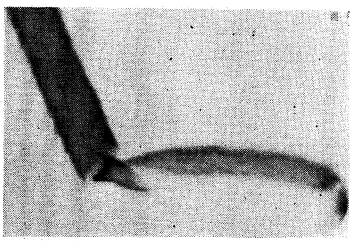

Fig. 35-d

Fig. 35-c

Fig. 33　Apterous viviparous female of *Cinara* (*Dinolachnus*) *longipennis* (MATSUMURA) : Hind tarsi.

Fig. 34　Alate viviparous female of *Cinara* (*Dinolachnus*) *longipennis* (MATSUMURA) a. Siphunculus. b. V. and VI. ant. segments. c. Rostral segment.

Fig. 35　Apterous viviparous female of *Cinara* (*Dinolachnus*) *hattori* KÔNO et INOUYE. a. Antenna. b. V. and VI. ant. segment. c. Total of abdomen. d. Hind tarsus.

Fig. 36-a

Fig. 36-b

Fig. 36-c

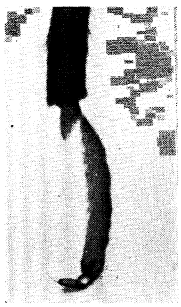

Fig. 36-d

Fig. 37-a

Fig. 37-b

Fig. 37-c

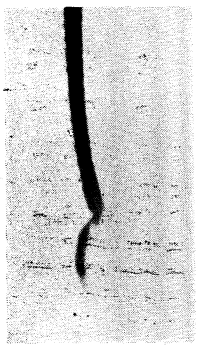

Fig. 37-d

Fig. 36 Alate viviparous female of *Cinara* (*Dinolachnus*) *hattori* KÔNO et INOUYE.
a. Head. b. Rostral segment. c. Siphunculus. d. Hind tarsus.

Fig. 37 Apterous viviparous female of *Cinara* (*Cupressobium*) *Juniperi* (DE GEER).
a. Head and rostral segment. b. Antenna. c. Total view of abdomen. d. Hind tarsus

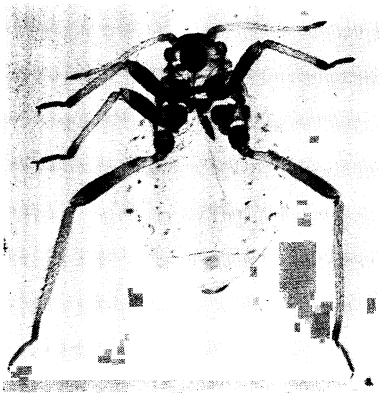

Fig. 38-a

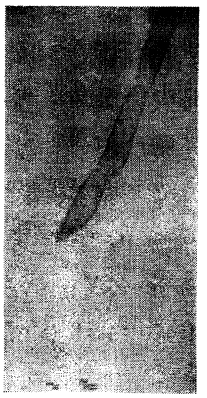

Fig. 38-b

Fig. 38-c

Fig. 38-d

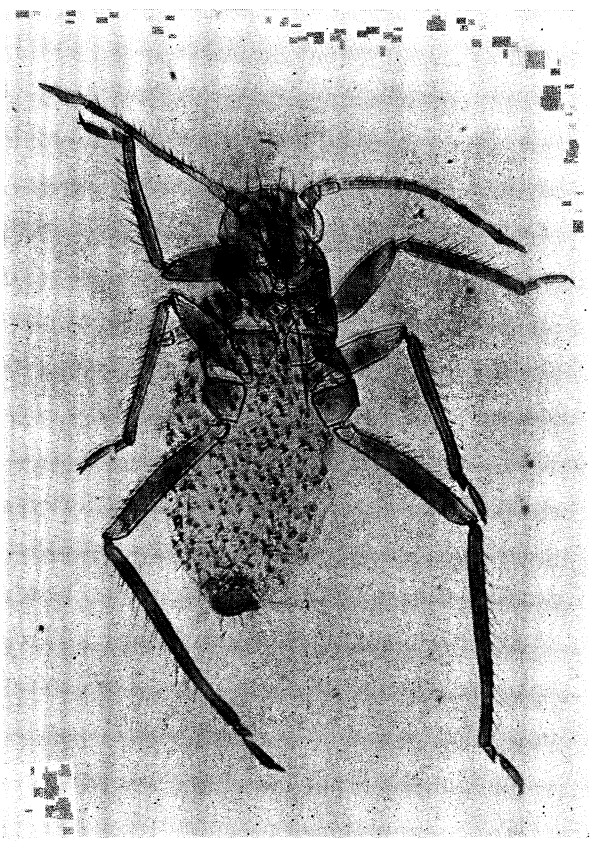

Fig. 39-a

Fig. 39-b

Fig. 38 Apterous viviparous female of *Schizolachnus orientalis* (TAKAHASHI). a. Total view. b. Antenna. c. Rostral segment. d. Hind tarsus.

Fig. 39 Apterous viviparous female of *Eulachnus thunbergii* WILSON. a. Total view. b. Hind tarsus.

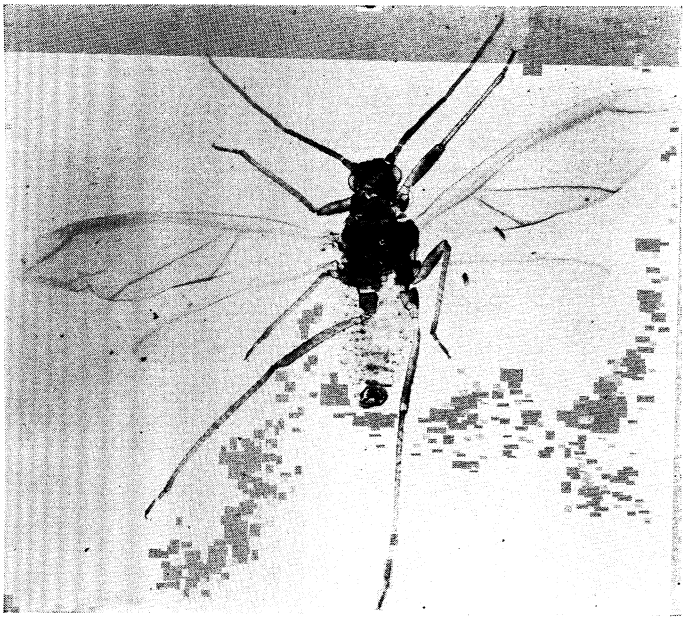

Fig. 40

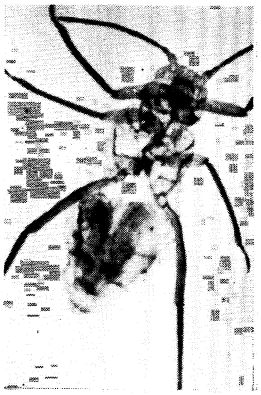

Fig. 41-a

Fig. 41-b

Fig. 41-c

Fig. 41-d

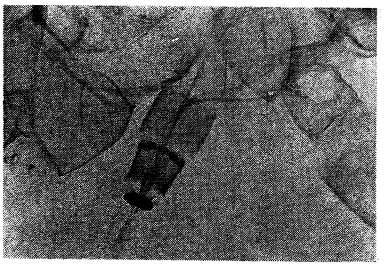

Fig. 42

Fig. 40　Alate viviparous female of *Eulachnus thunbergii* WILSON : Total view.
Fig. 41　Apterous viviparous female of *Eulachnus pumilae* INOUYE.　a. Total view.
b. VI. ant. segment.　c. Total view of abdomen.　d. Hind tarsus.
Fig. 42　Apterous viviparous female of *Eulachnus pumilae* INOUYE : Rostral segment.

Fig. 43-a

Fig. 43-b

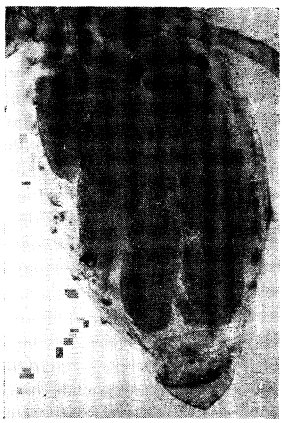

Fig. 43-c

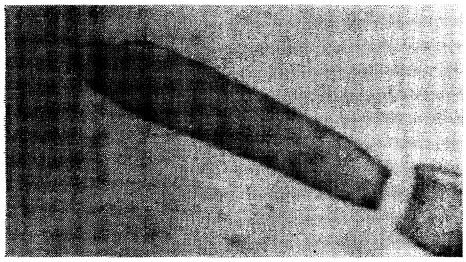

Fig. 44-a

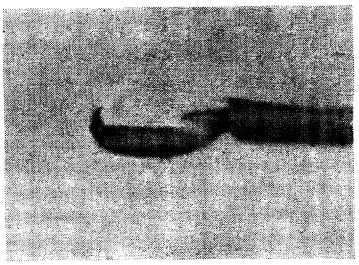

Fig. 44-b

Fig. 44-c

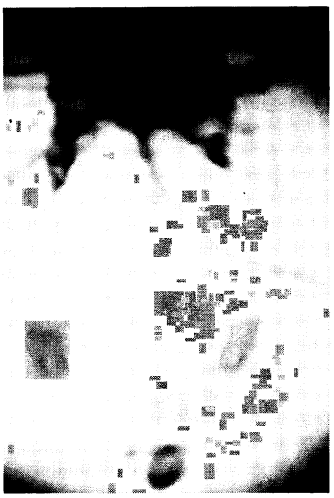

Fig. 45

Fig. 43 Alate viviparous female of *Eulachnus pumilae* INOUYE. a. Antenna. b. Total view. c. Dorsal view of abdomen.

Fig. 44 Apterous viviparous female of *Stomaphis quercus pini* TAKAHASHI. a. VI. ant. segment. b. Hind tarsus. c. Anal and cauda.

Fig. 45 Alate viviparous female of *Stomaphis quercus pini* TAKAHASHI : Dorsal view of abdomen.