# A check list of Japanese *Cinara* CURTIS (Homoptera: Aphididae) with keys to the species

V. F. EASTOP
Department of Entomology, Natural History Museum, Cromwell Road,
London SW7 5BD, United Kingdom

Masahisa MIYAZAKI*
Division of Entomology, National Institute of Agro-Environmental Sciences,
Kannondai 3-1-1, Tsukuba, Ibaraki, 305 Japan

and

Masato SORIN
Kogakkan University, Kuratayama, Ise, Mie, 516 Japan

**Abstract** Thirty one species including 5 undescribed ones of the aphid genus *Cinara* are listed as occurring in Japan. Notes are given on these species as well as to the synomymous names recorded under the genus in Japan. Keys to the species are given for both apterous and alate viviparous females.

*Cinara* is an aphid genus associated solely with coniferous trees. It consists of about 200 described species in the world, and their identification is often difficult due to the close similarities among species. INOUYE (1970) revised 24 Japanese species and subspecies of *Cinara* and provided a key to the apterae. The key has been difficult to use in some places because it relied on the extent of pigmentation and the variation within species was probably underestimated. Another 7 species from Japan have subsequently been seen. New keys have been constructed to these 31 species including 5 undescribed ones, both for apterae and for the alatae which were not previously keyed.

There are still many uncertainties concerning the Japanese fauna. Many of the species described or recorded from Japan are similar to but slightly different from specimens of species described from Europe. In many cases only a few samples are known from one or other, or both localities and the full extent of the morphological variation within each taxon is unknown. More samples from Europe, Japan and the intervening areas are needed to resolve these problems, and cytological and molecular techniques will probably also be needed to establish meaningful relationships between the samples. Nevertheless it is thought that the following keys provide a better basis for identifying Japanese *Cinara* than was previously available.

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* Present address: National Institute of Sericultural and Entomological Science, Owashi 1-2, Tsukuba, Ibaraki, 305 Japan.

## List of *Cinara* species recorded from Japan

The following species have been recorded from Japan. The names in the list with serial numbers are keyed in the present paper. Those without numbers are either synonyms or species that do not actually occur in Japan.

- *Cinara abietis* (MATSUMURA, 1917): See 14, *C. matsumurai* HILLE RIS LAMBERS.

1. *Cinara cembrae* (SEITNER): The correct name for the Japanese specimens hitherto recorded as *cembrae* may be *mongolica* SZELEGIEWICZ and HOLMAN. The precise status of the two forms is unclear. Examination of the INOUYE's collection preserved in the Hokkaido Branch, Forestry and Forest Products Research Institute, revealed that a specimen recorded as the male of *cembrae* by INOUYE (1970: 78) is an alate viviparous female of a *Pyrolachnus*, a genus apparently not previously recorded from Japan, although known from China, Nepal, India, Thailand and Iran.

2. *Cinara chibi* INOUYE, 1962: Placed as a subspecies of *C. laricicola* (MATSUMURA, 1917) by INOUYE (1970). *C. chibi* may be based on small specimens of *laricicola*. They are also similar to *C. cuneomaculata* (DEL GUERCIO, 1909) distributed in Eurasia and their separate identities need experimental or biochemical confirmation.

3. *Cinara costata* (ZETTERSTEDT, 1928): Placed in the subgenus *Cinaropsis* BÖRNER, 1939, by INOUYE (1970), but *costata* is the type species of *Lachniella* DEL GUERCIO, 1909, which has priority.

4. *Cinara etsuhoe* INOUYE, 1970: Placed as a synonym of *sorini* INOUYE, 1970, by EASTOP and HILLE RIS LAMBERS (1976) as it was thought *etsuhoe* was described from true apterae of *sorini* that was described from alatae and alatiform apterae. Further investigation including biochemical analysis is desirable.

- *Cinara ezoana* INOUYE, 1936: Regarded as a subspecies of *C. bogdanowi* (MORDVILKO, 1895) by INOUYE (1970). It is generally accepted that *C. bogdanowi* is identical with *C. pruinosa* (HARTIG, 1841). See also 21, *C. pruinosa ezoana*.

- *Cinara fasciata* (SHINJI, 1922): See 22, *C. shinjii* INOUYE.

5. *Cinara formosana* (TAKAHASHI, 1924): A short-haired member of the subgenus *Cinarella* also known from China and Thailand. Further synonymy is given by EASTOP (1976: 8).

6. *Cinara fresai* BLANCHARD, 1939: Often confused with *juniperi* in literature. Both species occur in Japan.

- *Cinara grossa* (KALTENBACH, 1846): See 18, *C. piceae* (PANZER).

7. *Cinara hattorii* KONO and INOUYE, 1930: The separation from *C. longipennis* (MATSUMURA, 1917) needs experimental confirmation.

8. *Cinara horii* INOUYE, 1956

9. *Cinara juniperi* (DE GEER, 1773): In the past often confused with *C. fresai* but both species are widespread, occurring in Japan, New Zealand and Europe.

- *Cinara konoi* INOUYE, 1941: A synonym of *Cinara hattorii* KONO and INOUYE, 1930.

10. *Cinara kochi* INOUYE, 1939: Very similar to the European *C. kochiana* BÖRNER, 1939, and their precise relationship is not evident.

- *Cinara konoi* INOUYE, 1941: Synonymous with *C. hattorii* KONO and INOUYE, 1930

11. *Cinara laricicola* (MATSUMURA, 1917): Similar to the European *C. cuneomaculata* (DEL GUERCIO,

1909) which is synonymous with *C. boerneri* HILLE RIS LAMBERS, 1956 (= *laricicola* BÖRNER, 1939).

12. *Cinara laricis* (HARTIG, 1839): Japanese specimens have fewer siphuncular hairs and are often more heavily pigmented than European specimens suggesting that they are at least subspecifically distinct.

13. *Cinara longipennis* (MATSUMURA, 1917): *C. hattorii* could be a synonym of this species.

14. *Cinara matsumurana* HILLE RIS LAMBERS, 1966: MATSUMURA (1917) described *abietis* which is homonymous with *abietis* FITCH, 1851, and a new name, *matsumurana*, was given by HILLE RIS LAMBERS (1966).

- *Cinara momii* (SHINJI, 1924): Regarded as a synonym of *C. longipennis* (MATSUMURA, 1917) by INOUYE (1956).

- *Cinara mongolica* SZELEGIEWICZ and HOLMAN, 1980: This may be the correct name for the Japanese specimens hitherto identified with *C. cembrae* (Seitner) (BLACKMAN and EASTOP, 1994: 625)

15. *Cinara nopporoensis* (INOUYE, 1937): Originally described as a distinct species but later (INOUYE, 1970) placed as a synonym of *pilicornis* to which it is very similar. As the hind tarsi of Japanese specimens are relatively rather shorter than in European specimens, *nopporoensis* is probably at least subspecifically distinct.

16. *Cinara orientalis* (TAKAHASHI, 1925)

17. *Cinara ozawai* INOUYE, 1970: Could be a synonym of *C. taiwana* (TAKAHASHI, 1925), of which material is not available.

18. *Cinara piceae* (PANZER, 1801): Recorded from Japan also under the name of *C. vanduzei* (SWAIN, 1929) and *C. grossa* (KALTENBACH, 1846). Japanese specimens agree precisely with specimens from Europe and America suggesting that it has only recently been widely distributed.

- *Cinara piceicola* (CHOLODKOVSKY, 1896): DANIELSSON (1987) discusses the confused nomenclature of *piceicola*. INOUYE (1956) described *horii* as a new species for the taxon previously identified in Japan with *piceicola*.

- *Cinara pilicornis* (HARTIG, 1841): As different chromosome numbers are reported, there is probably a complex of similar species, which includes *nopporoensis*.

- *Cinara pinea* (MORDVILKO, 1895): See 20, *C. piniformosana* (TAKAHASHI).

- *Cinara pineti* (FABRICIUS) of KOCH, 1856: See 20, *C. piniformosana* (TAKAHASHI).

- *Cinara pinicola* (KALTENBACH, 1843): INOUYE (1970) identified the form formerly identified with *C. pinicola* (KALTENBACH) in Japan with *C. pilicornis* (HARTIG).

19. *Cinara pinidensiflorae* (ESSIG and KUWANA, 1918): Similar to *C. shinjii* INOUYE, their separate identity requiring confirmation.

20. *Cinara piniformosana* (TAKAHASHI, 1923): This species was recorded from Japan as *C. pinea* (MORDVILKO) and *C. pineti* (KOCH) which is synonymous with *pinea*. INOUYE (1970) identified the Japanese form with *C. piniformosana*.

21. *Cinara pruinosa ezoana* INOUYE, 1936: *C. pruinosa* (HARTIG) was originally described from Germany. Populations have also been described as *bogdanowi* MORDVILKO, 1895 from Poland, *radicicola* WELLENSTEIN, 1930 from roots in Germany, *intermedia* PASEK, 1954 from Czechoslovakia, and *palmerae* GILLETTE, 1917 from Colorado, USA. Again biochemical investigation could show whether the slightly different biologies reported for these forms distributed in Eurasia and N. America have any taxonomic significance.

22. *Cinara shinjii* INOUYE, 1938: SHINJI (1922) described *Lachnus fasciatus* which is homonymous with *fasciatus* BURMEISTER, 1835, and a new name, *shinjii*, was given by INOUYE (1938). Similar enough

to *C. pinidensiflorae* to require experimental confirmation of its separate identity.

23. *Cinara sorini* INOUYE, 1970: *C. etsuhoe* may well prove to be a synonym.

- *Cinara taeniata* (KOCH, 1857): INOUYE (1970) identified the species previously referred to in Japan as *C. taeniata* with *C. laricicola* (MATSUMURA).

24. *Cinara todocola* (INOUYE, 1936): The usual hosts are *Abies* spp. but for similar specimens on *Torreya* and *Tsuga* see *Cinara* sp. E (no. 31).

- *Cinara todoe* SHINJI, 1941: Regarded as synonymous with *Cinara todocola* (INOUYE, 1936) by INOUYE (1970).

25. *Cinara tujafilina* (DEL GUERCIO, 1909): Probably the most widely distributed species of *Cinara* and probably distributed by commerce on ornamental Cupressaceae. Its most favoured host is *Thuja orientalis* but it also occur on *Callitris* spp. and more rarely other Cupressaceae.

- *Cinara vanduzei* (SWAIN, 1919): See *C. piceae* (PANZER).

26. *Cinara watanabei* INOUYE, 1970: A *Pinus*-feeding species in which the alatae have unusually numerous (21 - 23) rhinaria on the 3rd antennal segment.

27. *Cinara* sp. A: Single alata collected from *Abies sachalinensis* (Koshunai, Bibai, Hokkaido, 27-vi-1969, M. MIYAZAKI 2634). Generally similar to *todocola* but differing in a number of proportions.

28. *Cinara* sp. B: A single aptera collected from *Pinus* sp., Koshuka, 2-iv-1960, R. TAKAHASHI, now in Hokkaido University collection. Probably a fundatrix of the *C.* (*Cinarella*) *maritimae/watsoni* group, possibly *piniformosana*.

29. *Cinara* sp. C: Two apterae from *Abies firma* (Kinkazan, Miyagi Pref., 5-vii-1966, Z. YAMASHITA).

30. *Cinara* sp. D: Two apterae and two alatae from *Picea jezoensis* (Lake Shikotsu, Hokkaido, 23-v-1964, M. MIYAZAKI 323).

31. *Cinara* sp. E: From *Torreya* and *Tsuga*. This could be *C. taiwana* (TAKAHASHI, 1925) of which material is not available. It could also be a starvation form of *C. todocola*, feeding on the wrong host (6 apterae, ?*Abies*, Utsunomiya, 3-viii-1962, R. TAKAHASHI, 2 apterae, *Tsuga*, Mt. Futatabi, nr. Kobe, 22-x-1963, M. SORIN, 2 apterae, *Torreya nucifera*, Shinaji, Ise, Mie, M. SORIN).

## Key to the apterae viviparae of Japanese *Cinara*

1 Rostral IV with 12 - 34 accessory setae arranged in 4 longitudinal rows, 2 along the stylet groove and the other 2 laterally, each row containing 3 - 11 setae. ..... 2

- Rostral IV with only (3 -) 4 - 17 accessory setae arranged in only 2 longitudinal rows along the stylet groove, other surfaces without accessory setae. ..... 7

2(1) Medium to long haired: hind tibia 7 - 19 x longest hair on it, antennal III 1.8 - 3.5 x longest hair on it. ..... 3

- Shorter haired: hind tibia 25 - 80 x longest hair on it, antennal III 7 - 18 x longest hair on it. ..... 4

3(2) Hind tarsal II 2.3 - 2.6 x I and 1.1 - 1.4 x rostral IV which is 1.8 - 2.1 x hind tarsal I. On Abies. ..... *C. todocola*

- Hind tarsal II 2.0 - 2.4 x I and 0.7 - 0.9 x rostral IV which is 2.4 - 3.0 x hind tarsal I. On

*Torreya* and *Tsuga*. ..... *C.* sp. E

4(2) Hind tarsal II 1.1 - 1.7 x rostral IV which is 1.4 - 2.0 x hind tarsal I; antennal V 1.65 - 2.20 x VI. Abdominal tergite VIII bearing 60 - 80 hairs, 4 times as many as the short (14 - 20 $\mu$) hairs on abdominal tergite V between the siphunculi. Processus terminalis bearing 5 - 7 short subapical setae. On *Larix*. ..... *C. kochi*

- Hind tarsal II 0.7 - 1.2 x rostral IV which is 2.2 - 3.7 x hind tarsal I; antennal V 1.4 - 1.8 x VI. Abdominal tergite VIII with 28 - 45 hairs, usually fewer than the 40 - 55 hairs (either very short, 8 - 10 $\mu$, or much longer, 60 - 140 $\mu$) on abdominal tergite V between siphunculi. On *Pinus*. ..... 5

5(4) Hind tarsal II 0.8 - 1.2 x rostral IV which is 2.2 - 2.7 (2.7 - 3.0 in small midsummer specimens) x hind tarsal I. Processus terminalis bearing only 4 short subapical setae. Dorsal hairs on abdominal I to V very short, ca 8 - 10 $\mu$. On *Pinus parviflora*. ..... *C. watanabei*

- Hind tarsal II 0.6 (mostly 0.7) - 0.8 x rostral IV which is 2.9 - 3.7 (2.6 - 2.9 in fundatrices) x hind tarsal I. Processus terminalis usually bearing 5 or 6 short subapical setae, sometimes with only 4 in small specimens in which the hind tarsal II is 0.60 - 0.75 x rostral IV. Dorsal hairs on abdominal I to V 60 - 140 $\mu$ long. ..... 6

6(5) Shorter haired: antennal III 15 - 18 x longest hair on it, hind tibia 50 - 80 x longest hair on it. Mostly on *Pinus thunbergii*. ..... *C. sorini*

- Longer haired: antennal III 5.4 - 12 x longest hair on it, hind tibia 25 - 40 x longest hair on it. Mostly on *Pinus densiflora*. ..... *C. etsuhoe*

7(1) Hind tarsal II only 0.70 - 0.95 x rostral IV. On *Picea*. ..... *C. pruinosa ezoana*

- Hind tarsal II as long or longer (1.0 - 2.5) than rostral IV. ..... 8

8(1) Very short haired: hind tibia 30 - 85 x longest hair on it. Rarely with rhinaria on antennal III. Rostral IV bearing 4 - 9 or 12 - 17 accessory hairs. ..... 9

- Medium length haired: hind tibia 12 - 29 x longest hair on it. Without or with 1 - 3 rhinaria on antennal III. Rostral IV with 4 - 11 accessory hairs. ..... 13

- Longer haired: hind tibia 5.5 - 11 x longest hair on it. Often without rhinaria on antennal III. Rostral IV bearing only 3 - 8 accessory hairs. ..... 23

9(8) Rostral IV 1.8 - 2.5 x hind tarsal I and bearing 12 - 17 accessory hairs. Processus terminalis with 6 - 11 short subapical setae. Abdominal tergite V bearing only 6 - 17 hairs between the siphuncular cones. Large aphid, body length 4.5 - 8.0 mm. On *Picea*. ..... *C. piceae*

- Rostral IV 1.1 - 1.7 x hind tarsal I and bearing 4 - 9 accessory hairs. Processus terminalis with mostly 4, sometimes 5 short subapical setae. Abdominal tergite V bearing 16 - 58 setae between the siphuncular cones. Body length 2.5 - 5.0 mm. On *Abies*, *Larix* or *Pinus*. ..... 10

10(9) Antennal III 1.8 - 2.6 x maximum diameter of the siphuncular cones which bear about 3 concentric

rings of hairs around the operculum and are then without hairs until the peripheral ring. Hind tarsal II 1.8 - 2.3 x rostral IV which is 1.1 - 1.2 x hind tarsal I. Antennal V 1.5 - 2.1 x VI on which the accessory rhinaria are mostly proximal to the primary rhinarium. On *Larix*. ..... *C. laricicola*

- Antennal III 0.3 - 1.3 x maximum diameter of the siphuncular cones on which the hairs are more evenly distributed and are without a hair-free area within the peripheral ring. Hind tarsal II 1.15 - 1.80 x rostral IV which is 1.2 - 1.7 x hind tarsal I. Antennal V 0.9 - 1.7 x VI on which the accessory rhinaria are more laterad to the primary rhinarium. On *Abies* or *Pinus*. ..... 11

11(10) Antennal III 4.4 - 8.7 x longest hair on it, 3.8 - 4.4 x longest hair on abdominal tergite VIII and 0.9 - 1.10 x combined lengths of antennal IV and V. Antennal III with 1 - 3 and IV with 1 or 2 rhinaria. Antennal V 1.3 - 1.7 x VI and 1.0 - 1.25 x hind tarsal II which is 1.9 - 2.3 x hind tarsal I. Base of antennal VI with 12 - 16 hairs. Longest hair on abdominal tergite III 85 - 100 $\mu$. Body length 2.6 - 3.9 mm. On *Pinus pumila*. ..... *C. cembrae*

- Antennal III 11 - 18 x longest hair on it, 4.5 - 10 x longest hair on abdominal tergite VIII and 1.15 - 1.60 x combined lengths of antennal IV and V. Antennal III without and IV with or without a rhinarium. Antennal V 0.9 - 1.3 x VI and 0.45 - 0.75 x hind tarsal II which is 1.6 - 1.9 or 2.6 - 2.8 x hind tarsal I. Base of antennal VI with 6 - 8 hairs. Longest hair on abdominal tergite III 14 - 50 $\mu$. ..... 12

12(11) Hind tarsal II 1.6 - 1.9 x I and 1.1 - 1.5 x rostral IV which is 1.9 - 2.0 x rostral V. On *Pinus*. ..... *C. formosana*

- Hind tarsal II 2.7 - 2.8 x I and 1.6 - 2.8 x rostral IV which is 2.2 - 2.3 x rostral V. On *Abies*. ..... *C.* sp. C

13(8) Siphuncular cones small, so that the antennal III is 1.6 - 2.5 x maximum diameter of the cone. Antennal III 7 - 9 x longest hair on it, antennal V 1.5 - 2.1 x VI. Antennal II and base of VI each bearing only 7 - 11 hairs. Siphuncular cone with about 3 concentric rings of hairs around the operculum and then a hair-free area within the peripheral ring of hairs. On *Larix*. ..... *C. chibi*

- Siphuncular cones usually larger, so that the antennal III is only 0.8 - 2.1 x maximum diameter of the cone, but if 2.1 - 2.3 x the diameter, then antennal III only 3.5 - 4.2 x longest hair on the segment and antennal V 1.4 - 1.6 x VI. Antennal II bearing 11 - 19 hairs and base of VI 7 - 13 hairs. Siphuncular cones with hairs more uniformly distributed or with only a single ring of hairs around the operculum. ..... 14

14(13) Antennal V 1.7 - 2.0 x VI, and base of VI bearing 19 - 23 hairs. Rostral IV 2.2 - 2.4 x hind tarsal I and with about 10 accessory hairs. On *Pinus*. ..... *C. orientalis*

- Antennal V 1.05 - 1.65 x VI (or 1.4 - 2.5 in *laricis*, in which base of VI bears only 5 - 11 hairs). ..... 15

15(14) Rostral IV and hind tarsal II respectively 1.8 - 3.1 and 2.5 - 3.3 x hind tarsal I. On *Abies* and *Chamaecyparis*. ..... 16
- Rostral IV and hind tarsal II respectively 0.8 - 1.9 and 1.5 - 2.5 x hind tarsal I. On *Pinus*, *Larix* and *Picea*. ..... 18

16(15) Hind tarsal II 1.0 - 1.2 x rostral IV which is 2.2 - 3.1 x hind tarsal I. Antennal V 1.2 - 1.3 x VI. Body length 3.2 - 5.9 mm. On *Abies*. ..... *C. hattorii*
- Hind tarsal II 1.3 - 1.5 x rostral IV which is 1.8 - 2.3 x hind tarsal I. Antennal V 1.35 - 1.60 x VI. Body length 5.3 - 7.5 mm. ..... 17

17(16) Rostral IV 2.1 - 2.2 x hind tarsal I. On *Abies*. ..... *C. longipennis*
- Rostral IV 1.8 - 1.9 x hind tarsal I. On *Chamaecyparis*. ..... ? *C. longipennis*

18(15) Hind tarsal II 1.1 - 1.4 x rostral IV which is 1.6 - 1.9 x hind tarsal I. Antennal V 1.1 - 1.3 x VI, base of VI bearing 12 - 16 hairs. On *Pinus*. ..... *C. pinidensiflorae*
- Hind tarsal II 1.4 - 2.4 x rostral IV which is 0.8 - 1.7 x hind tarsal I. Antennal V 1.3 - 2.6 x VI, or if 1.0 - 1.3 times then base IV bears only 6 - 12 hairs. Base of antennal VI mostly with only 4 - 11 hairs (except for 12 in *shinjii* and 12 - 16 in *cembrae* and sp. D). ..... 19

19(18) Antennal II bearing 17 - 23 hairs, base of VI with 15 - 16 hairs. Rostral IV with 8 - 10 accessory hairs. On *Picea*. ..... *C.* sp. D
- Antennal II bearing 5 - 14 hairs, base of VI with 4 - 16 hairs. Rostral IV with 4 - 9 accessory hairs. On *Larix* or *Pinus*. ..... 20

20(19) Siphunculus bearing only 10 - 21 hairs, an inner ring of 5 - 12 and 3 - 9 more peripherally. Antennal V 1.5 - 2.5 x VI; base of VI with only 4 - 7 hairs. On *Larix*. ..... *C. laricis*
- Siphunculus bearing at least 30 and usually many more hairs more evenly distributed. Antennal V 1.0 - 1.5 x VI; base of VI with 6 - 16 hairs. On *Pinus*. ..... 21

21(20) Rostral IV only 0.8 - 1.2 x hind tarsal I. Hind tarsal II 1.7 - 2.4 x Rostral IV. Base of antennal VI with only 6 - 10 hairs. On *Pinus densiflora*. ..... *C. piniformosana*
- Rostral IV 1.25 - 1.70 x hind tarsal I. Hind tarsal II 1.2 - 1.8 x rostral IV. Base of antennal VI with 8 - 16 hairs. ..... 22

22(21) Hind tarsal II 1.20 - 1.45 x rostral IV which is 1.5 - 1.7 x hind tarsal I. Antennal II with 9 - 13 hairs, base of VI with 12 - 16 hairs. Genital plate with 22 - 52 hairs. On *Pinus pumila*. ..... *C. cembrae*
- Hind tarsal II 1.5 - 1.8 x rostral IV which is 1.25 - 1.45 x hind tarsal I. Antennal II with only 6 - 9 hairs, base of VI with 8 - 12 hairs. Genital plate with 13 - 17 hairs. On *Pinus parviflora* mostly. ..... *C. shinjii*

23(8) Hind tarsal II and rostral IV respectively 1.6 - 1.8 and 1.3 - 1.4 x elongate (190 - 200 $\mu$) hind

tarsal I. Antennae without secondary rhinaria. On *Pinus*. ..... *C. sp. B*

- Hind tarsal II and rostral IV respectively 2.6 - 4.1 and 1.4 - 2.5 x hind tarsal I (60 - 150 μ). Antennal V usually and IV often bearing at least 1 secondary rhinarium. On *Abies, Picea, Tsuga* and Cupressaceae. ..... 24

24(23) Siphuncular cones very small so that antennal III is 3.3 - 4.5 x their maximum diameter which is only 1.7 - 3.2 times the length of the processus terminalis. Antennal II bearing 13 - 23 hairs. Tibiae black. On *Abies* or *Picea*. ..... 25

- Antennal III 0.5 - 2.2 x maximum diameter of the siphuncular cone which is at least 2.5 and usually 4 - 28 times the length of the processus terminalis. Antennal II bearing 16 - 18 hairs. Tibiae black or pale, if on *Picea* then tibiae pale or dusky. On *Picea, Tsuga* or Cupressaceae. ..... 26

25(24) Antennal III 2.5 - 2.9 x its longest hair. Hind tibia 8 - 9 x its longest hair. Rostral IV 2.0 - 2.4 x hind tarsal I. On *Picea*. ..... *C. horii*

- Antennal III 3.2 - 3.7 x its longest hair. Hind tibia 9 - 11 x its longest hair. Rostral IV 1.8 - 2.0 x hind tarsal I. On *Abies*. ..... *C. matsumurana*

26(24) Processus terminalis usually bearing 4 subapical setae, sometimes with only 3. Antennal V 0.8 - 1.4 x VI. Primary rhinaria with chitinous rim. Abdominal tergite VIII bearing 16 - 77 hairs. On *Picea* or *Tsuga*. ..... 27

- Processus terminalis usually bearing only 3 subapical setae, rarely with 4 or only 2. Antennal V 0.7 - 1.1 x VI. Primary rhinaria without strongly chitinised rim. Abdominal tergite VIII bearing 17 - 27 hairs. On Cupressaceae. ..... 29

27(26) Black hind tibiae 2.5 - 5.9 x longest hair on them. Abdominal tergite VIII with 15 - 18 hairs. Antennal II with 7 - 11 hairs, base of VI with 7 - 10 hairs. Hind tarsal II only 3.4 - 5.0 x processus terminalis. On *Tsuga*. ..... *C. ozawai*

- Pale or dusky hind tibiae 6 - 12 x longest hair on them. Abdominal tergite VIII bearing 20 - 77 hairs. Antennal II with 9 - 18 hairs, base of VI with 6 - 17 hairs. Hind tarsal II 4.6 - 18 x processus terminalis. On *Picea*. ..... 28

28(27) Antennal III 0.7 - 1.2 x large (diameter 0.33 - 0.53 mm) dark siphuncular cones. Hind tarsal II 1.2 - 1.6 x rostral IV. Hind tibiae 6 - 9 x longest hair on them, antennal II 2.0 - 2.8 x longest hair on it. ..... *C. costata*

- Antennal III 1.2 - 2.2 x paler and smaller (diameter 0.13 - 0.39 mm) siphuncular cones. Hind tarsal II 1.5 - 2.4 x rostral IV. Hind tibiae 7 - 12 x longest hair on them, antennal III 2.3 - 4.5 x longest hair on it. ..... *C. nopporoensis*

29(26) Processus terminalis short, 18 - 35 μ, only 11 - 20 (exceptionally - 28) % of the total length (150 - 215 μ) of the antennal VI. Hind tibiae pale except for the apex which is darker. On *Thuja, Callitris* and other Cupressaceae. ..... *C. tujafilina*

- Processus terminalis elongate, 40 - 70 μ, 20 - 30 % of the total length (180 - 300 μ) of the antennal VI. Hind tibiae darker, either completely black or with a yellow - brown area at about the basal 1/3. On *Juniperus* and *Cupressus*. ..... 30

30(29) Hind tibiae black and relatively short, less than half (30 - 45 %) as long as the body. Antennal III (240 - 410 μ) shorter than IV and V together and 0.5 - 1.1 x maximum diameter of the siphuncular cone. On *Juniperus communis, chinensis, rigida*. ..... *C. juniperi*
- Hind tibiae dark at base and apical half but with a paler area from about the basal 1/5 to mid length, usually more than half (50 - 60 %) as long as the body. Antennal III usually longer than IV and V together and usually longer (0.7 - 1.7) than the maximum diameter of the siphuncular cone. On *Cupressus macrocarpa, torulosa* and *Juniperus horizontalis, sabina* and *silicicola*, more rarely on *Cupressus arizonica, Juniperus chinensis, scopulorum* and *squamata*. Recorded from *Cryptomeria japonica*. ..... *C. fresai*

## Key to the alatae viviparae of Japanese *Cinara*

Alatae of following species have not been available to the present study: *C. etsuhoe* and *C.* sp. B, C and E.

1 Rostral IV with 16 - 41 accessory setae arranged in 4 (sometimes 6) longitudinal rows. Antennal II with 17 - 26 and base of VI with 13 - 31 setae. ..... 2
- Rostral IV with 4 - 17 accessory setae arranged in only 2 rows along the stylet groove. Antennal II with 5 - 20 and base of VI with 5 - 22 setae. ..... 6

2(1) Long haired: antennal III 2.0 - 3.7 x longest hair on it and 1.1 - 1.3 x maximum diameter of the siphuncular cone. Hind tibia 9 - 13 x longest hair on it. Antennal V 1.1 - 1.3 x VI. From *Abies*. ..... 3
- Shorter haired: antennal III 7 - 25 x longest hair on it and 1.5 - 2.1 x diameter of the siphuncular cone. Hind tibia 23 - 80 x longest hair on it. Antennal V 1.35 - 2.40 x VI. From *Pinus* or *Larix*. ..... 4

3(2) Hind tarsal II 2.5 - 2.6 x hind tarsal I and 0.9 - 1.3 x rostral IV which is 1.9 - 2.8 x hind tarsal I. ..... *C. todocola*
- Hind tarsal II 2.4 - 2.5 x hind tarsal I and 1.5 - 1.6 x rostral IV which is 1.6 - 1.7 x hind tarsal I. ..... *C.* sp. A

4(2) Antennal III bearing 21 - 23 rhinaria and 7 - 8 x longest hair on it. Hind tibia 20 - 30 x its longest hair. Antennal V 1.35 - 1.75 x VI. Rostral IV 2.2 - 2.4 x hind tarsal I. Processus terminalis bearing only 4 short subapical setae. From *Pinus*. ..... *C. watanabei*
- Antennal III bearing 5 - 15 rhinaria and 11 - 15 x its longest hair. Hind tibiae 50 - 95 x its longest hair. Antennal V 1.75 - 2.40 x VI. Rostral IV 1.5 - 2.0 or 2.9 - 3.5 x hind tarsal I. Processus terminalis bearing 5 - 8 short subapical setae, sometimes with fused bases so that

5 setae may arise from only 4 bases. ..... 5

5(4) Rostral IV 1.5 - 2.0 x hind tarsal I. Hind tarsal II 1.2 - 1.4 x rostral IV. Base of antennal VI bearing 10 - 18 hairs. Abdominal tergite V with 25 - 40 hairs between the siphuncular cones. From *Larix*. ..... *C. kochi*

- Rostral IV 2.9 - 3.5 x hind tarsal I. Hind tarsal II 0.70 - 0.85 x rostral IV. Base of antennal VI bearing 24 - 31 hairs. Abdominal tergite V densely hairy between the siphuncular cones. From *Pinus*. ..... *C. sorini*

6(1) Antennal III 3.5 - 5.0 x diameter of the small siphuncular cones (0.09 - 0.15 mm) which are only 1.5 - 2.5 times as wide as the length of the processus terminalis. Head, thorax, tibiae and most of femora black, abdominal muscle plates, genital plate and spiracular plates dark but abdominal tergites including the 8th pale. From *Picea*. ..... *C. horii*

- Antennal III 0.8 - 2.6 x diameter of the siphuncular cones (0.17 - 1.0 mm) which are 4 - 20 times as wide as the length of the processus terminalis. At least abdominal tergite VIII pigmented. ..... 7

7(6) Very short haired: hind tibia 65 - 120 x its longest hair. Antennal III 17 - 26 x its longest hair. Antennal V 1.8 - 2.3 x VI. Rostral IV 1.5 - 1.9 x hind tarsal I and bearing 10 - 17 accessory hairs. Processus terminalis with 7 - 11 subapical setae. From *Picea*. ..... *C. piceae*

- Short haired: hind tibia 35 - 50 x its longest hair. Antennal III 11 - 15 x its longest hair. Antennal V 1.3 - 2.0 x VI. Rostral IV 0.8 - 1.6 x hind tarsal II, bearing 6 - 8 accessory hairs. Processus terminalis with 4 subapical setae. ..... 8
- Hairs of medium length: hind tibia 12 - 34 x its longest hair. Longest hair on abdominal tergite III 70 - 190 $\mu$ . ..... 9
- Long haired: hind tibia 4.5 - 12 x its longest hair. Longest hair on abdominal tergite III 105 - 240 $\mu$ long. ..... 19

8(7) Hind tarsal II 1.25 - 1.50 x rostral IV and 1.8 - 2.0 x hind tarsal I. Rostral IV 1.3 - 1.6 x hind tarsal I. Antennal V 1.3 - 1.6 x VI. Secondary rhinaria distributed on antennal III 4 - 7, IV 0 - 2 and V 1. Accessory rhinaria laterad to primary rhinarium on antennal VI. Abdominal tergite VIII bearing an unbroken transverse band. From *Pinus*. ..... *C. formosana*

- Hind tarsal II 2.1 - 2.6 x rostral IV and 2.2 - 2.3 x hind tarsal I. Rostral IV 0.8 - 1.1 x hind tarsal I. Antennal V 1.9 - 2.0 x VI. Secondary rhinaria distributed on antennal III 10 - 15, IV 1 - 4 and V 1 - 3. Accessory rhinaria proximad to primary rhinarium on antennal VI. Abdominal tergite VIII with pigmented band broken in mid dorsal line. From *Larix*. ..... *C. laricicola*

9(7) Antennal V without secondary rhinaria and only 1.1 - 1.4 x VI. Antennal IV usually without, rarely with one rhinarium. Rostral IV only 0.9 - 1.1 x hind tarsal I. Antennal III 4.2 - 5.1 x its longest hair. Longest hair on abdominal tergite III 120 - 160 $\mu$ . Abdominal tergite VIII with a broad hair bearing dark band unbroken mid dorsally. From *Pinus*.

..... *C. piniformosana*

- Antennal V usually with a secondary rhinarium and 1.4 - 2.7 x VI. Antennal IV usually with at least one rhinarium. Rostral IV 1.0 - 1.4 x hind tarsal I, when less than 1.1 then antennal III 7 - 12 x its longest hair and longest hair on abdominal tergite III only 70 - 110 $\mu$. Hair bearing band on abdominal tergite VIII broken mid dorsally. ..... 10

10(9) Hind tarsal II 0.9 - 1.2 x rostral IV which is 2.2 - 2.8 x hind tarsal I and 2.2 - 2.6 x rostral V. Antennal III 3.1 - 4.1 x its longest hair. Hind tibia 12 - 15 x its longest hair. Chitinized stylet track of rostral II+III 1.4 - 1.7 mm. Longest hair on abdominal tergite III 105 - 135 $\mu$. Both antennal II and base of VI with 13 - 20 hairs. Rostral IV with 8 - 14 accessory hairs. ..... 11

- Hind tarsal II 1.35 - 2.10 x rostral IV which is 1.10 - 1.65 x hind tarsal I and 1.6 - 2.4 x rostral V. Antennal III 4.4 - 12 x its longest hair. Hind tibia 15 - 30 x its longest hair. Stylet track of rostral II+III 0.9 - 1.4 mm. Longest hair on abdominal tergite III 50 - 120 $\mu$. Antennal II bearing 5 - 19 hairs, base of VI with 7 - 17 hairs. Rostral IV with 4 - 9 accessory hairs. ..... 12

11(10) Processus terminalis with 5 or 6 short subapical setae. From *Pinus*. ..... *C. orientalis*

- Processus terminalis with only 4 short subapical setae. From *Picea*. ..... *C. pruinosa ezoana*

12(10) Longer haired: antennal III 3.0 - 5.0 x its longest hair, hind tibia 13 - 22 x its longest hair. Longest hair on abdominal tergite III 120 - 180 $\mu$. Antennal II bearing 13 - 19 hairs, base of VI with 9 - 17 hairs. From *Abies, Picea* or *Pinus*. ..... 13

- Shorter haired: antennal III 5.3 - 12 x its longest hair, hind tibia 16 - 30 x its longest hair. Longest hair on abdominal tergite III 65 - 120 $\mu$. Antennal II bearing 5 - 12 hairs, base of VI with 5 - 16 hairs. From *Larix* or *Pinus*. ..... 16

13(12) Hind tarsal II 2.4 - 2.7 x I. Hind tibia 13 - 16 x its longest hair. Rostral IV 1.6 - 2.0 x V. Base of antennal VI bearing 11 - 17 hairs. Abdominal tergite V bearing 25 - 45 hairs between the siphuncular cones. Secondary rhinarium on antennal V 2 or more diameters away from the primary rhinarium. From *Picea* or *Pinus*. ..... 14

- Hind tarsal II 2.7 - 3.5 x I. Hind tibia 16 - 22 x its longest hair. Rostral IV 1.9 - 2.5 x V. Base of antennal VI bearing 9 - 11 hairs. Abdominal tergite V bearing more than 50 hairs between the siphuncular cones. Secondary rhinarium on antennal V placed about one diameter away from the primary rhinarium. From *Abies*. ..... 15

14(13) Antennal V 1.2 - 1.4 x VI. Hind tarsal II 1.5 - 1.6 x rostral IV which is 1.6 - 1.8 x hind tarsal I. From *Pinus*. ..... *C. pinidensiflorae*

- Antennal V 1.5 - 1.8 x VI. Hind tarsal II 1.7 - 1.8 x rostral IV which is 1.2 - 1.5 x hind tarsal I. From *Picea*. ..... *C.* sp. D

15(13) Hind tarsal II 2.7 - 3.0 x I. Antennal III 1.2 - 1.5 x diameter of siphuncular cone which is 10 -

13 x processus terminalis. Antennal V (1.3 -) 1.5 - 1.7 x VI. Antennal II bearing 13 - 15 hairs. Body length 5.2 - 7.0 mm. ..... *C. longipennis*

- Hind tarsal II 3.2 - 3.5 x I. Antennal III 1.6 - 2.6 x diameter of the siphuncular cone which is 6 - 8 x processus terminalis. Antennal V 1.3 - 1.5 x VI. Antennal II bearing 15 - 18 hairs. Body length 3.7 - 5.9 mm. ..... *C. hattorii*

16(12) Secondary rhinarium on antennal V close to the primary rhinarium, only about one rhinarial diameter apart. Antennal V 1.7 - 2.7 x VI. Antennal III 7 - 12 x its longest hair. Chitinized stylet track of rostral II+III 1.0 - 1.15 mm. Antennal II bearing 5 - 9 hairs, base of VI with 4 - 7 hairs. From *Larix*. ..... 17

- Secondary rhinarium of antennal V placed 2 or more rhinarial diameters from the primary rhinarium. Antennal V 1.40 - 1.75 x VI. Antennal III 5.3 - 7.2 x its longest hair. Chitinized stylet track of rostral II+III usually longer (1.25 - 1.40 mm) or shorter (0.9 - 1.0 mm). Antennal II bearing 7 - 12 hairs, base of VI with 7 - 16 hairs. From *Pinus*. ..... 18

17(16) Siphuncular cone with a multiple inner ring of 35 - 40 setae similar to the 8 - 10 of the peripheral ring. Dorsal abdominal hairs on anterior tergites 50 - 80 $\mu$ long, without or with only very small pigmented scleroites at their base. ..... *C. chibi*

- Siphuncular cone with a single inner ring of 7 - 11 setae that are finer than the 4 - 8 of the peripheral ring. Dorsal abdominal hairs on anterior tergites 70 - 110 $\mu$ long and arising from evident dark scleroites many times the diameter of the hair bases. ..... *C. laricis*

18(16) Antennal V 1.50 - 1.75 x VI and 1.1 - 1.3 x hind tarsal II which is 1.35 - 1.50 x rostral IV which is 2.0 - 2.4 x rostral V and 1.35 - 1.65 x hind tarsal I. Larger, body mostly 3.8 - 4.3 mm, with more numerous but shorter hairs. Longest hair on abdominal tergite III 65 - 100 $\mu$. Antennal III 6.0 - 7.2 x its longest hair. Antennal II bearing 9 - 12 hairs, base of VI with 12 - 16 hairs. Rostral IV bearing 7 - 9 accessory hairs. Genital plate bearing 34 - 41 or more hairs. Abdominal tergite V bearing 44 or more hairs between the siphuncular cones, tergite VIII with 29 - 42 hairs. From *Pinus pumila*. ..... *C. cembrae*

- Antennal V 1.4 - 1.5 x VI and 0.8 - 1.1 x hind tarsal II which is 1.5 - 2.1 x rostral IV which is 1.7 - 2.1 x rostral V and 1.1 - 1.4 x hind tarsal I. Smaller aphids, body 2.9 - 3.5 mm, with fewer but longer hairs. Longest dorsal hair on abdominal tergite III 110 - 120 $\mu$. Antennal III 5 - 6 x its longest hair. Antennal II bearing 7 - 9 hairs, base of VI with 7 - 10 hairs. Rostral IV bearing 4 - 6, rarely 7 accessory hairs. Genital plate bearing 18 - 28 hairs. Abdominal tergite V with 17 - 24 hairs between the siphuncular cones, tergite VIII with 20 - 25 hairs. From *Pinus* and mostly *P. parviflora*. ..... *C. shinjii*

19(7) Antennal III 4.2 - 5.1 x its longest hair. ..... 20

- Antennal III 2.0 - 4.2 x its longest hair. ..... 22

20(19) Rostral IV 0.9 - 1.1 x hind tarsal I. Rarely with secondary rhinaria on either antennal IV or V. Abdominal tergite VIII with a broad pigmented band unbroken mesially. From *Pinus*.

..... *C. piniformosana*

- Rostral IV 1.4 - 2.0 x hind tarsal I. Often with 1 - 3 secondary rhinaria on antennal IV and/or V. Abdominal tergite VIII with pigmented band broken mesially. ..... 21

21(20) Hind tarsal II 2.5 - 2.6 x hind tarsal I and 1.5 - 1.6 x rostral IV which bears 8 accessory hairs. Hind tibia 13 - 14 x longest hair on it. From *Pinus*. ..... *C. pinidensiflorae*

- Hind tarsal II 3.1 - 3.5 x hind tarsal I and 1.6 - 1.9 x rostral IV which bears 4 - 6 accessory hairs. Hind tibia 6.5 - 11 x longest hair on it. From *Picea*. ..... *C. nopporoensis*

22(19) Hind tibia 12 - 14 x its longest hair. ..... 23

- Hind tibia 4.5 - 11.5 x its longest hair. ..... 24

23(22) Antennal V 0.75 - 1.15 x VI. Rostral IV 1.7 - 2.0 x hind tarsal I. Hind tarsal II 3.6 - 3.9 x hind tarsal I and 1.8 - 2.2 x rostral IV which bears 5 - 6 accessory hairs. From *Picea*.
..... *C. horii*

- Antennal V 1.60 - 1.85 x VI. Rostral IV 2.2 - 2.5 x hind tarsal I. Hind tarsal II 2.3 - 2.7 x hind tarsal I and 1.0 - 1.2 x rostral IV which bears 8 - 14 accessory hairs. From *Pinus*.
..... *C. orientalis*

24(22) Media of forewing only once branched. Forewing pigmented near apex and near apex of vein Cu1b. Hind tarsal II 1.3 - 1.7 x rostral IV. Secondary rhinaria distributed on antennal III 1 - 3, IV 1 - 2 and V 0 - 2. From *Picea*. ..... *C. costata*

- Media of forewing twice branched, wing membrane pale. Hind tarsal II 1.6 - 2.2 x rostral IV. Secondary rhinaria distributed on antennal III 1 - 11, IV 0 - 4 and V 1 - 2. From *Abies*, *Tsuga* and Cupressaceae. ..... 25

25(24) Primary rhinaria on both antennal V and VI with chitinized rims. Processus terminalis with 4 subapical setae. Hind tarsal II 3.3 - 3.7 x hind tarsal I. From *Tsuga*. ..... *C. ozawai*

- Primary rhinarium of antennal V without a chitinized rim. Processus terminalis usually with only 3 subapical setae. Hind tarsal II 2.6 - 3.5 x hind tarsal I. ..... 26

26(25) Tibiae black, in marked contrast to the basal 3/4 of the femora which are pale or mottled, only about the apical 20 % of the femora dark like the tibiae. Hind tibia rather short (1.3 - 1.7 mm), 4.5 - 5.9 x longest hairs (280 - 310 $\mu$) on them. Primary rhinarium on antennal VI with a chitinized rim. From *Abies*. ..... *C. matsumurana*

- Tibiae pale in the middle or completely black, in which case the femora are also dark over most of their length, with only the basal 1/3 or less paler. Hind tibiae 5.7 - 8.6 x its longest hair. Primary rhinarium on antennal VI without a chitinized rim. From Cupressaceae. ..... 27

27(26) Tibiae pale to dusky, rarely dark brown, except for the distal apex which is dark brown. Processus terminalis 10 - 30 $\mu$ long, 8 - 16 % of the total length of the antennal VI. Antennal III 300 - 450 $\mu$ long, 1.0 - 1.9 but rarely less than 1.3 x diameter of the siphuncular cone. Antennal

V 160 - 200 μ long. Longest hair on abdominal tergite VIII 130 - 210 μ long. Hind tarsal II 240 - 330 μ long, 0.7 - 1.4, usually 1.0 - 1.3 x diameter of siphuncular cone. From many Cupressaceae but particularly *Thuja orientalis*. ..... *C. tujafilina*

- Tibiae black, or black at base and apex and dark brown in middle. Processus terminalis 35 - 80 μ long, 14 - 29 % of total length of antennal VI. Antennal III 350 - 600 μ long, 0.8 - 1.6 but rarely more than 1.3 x diameter of the siphuncular cone. Antennal V 180 - 300 μ, rarely less than 200 μ. Longest hair on abdominal tergite VIII 190 - 260 μ. Hind tarsal II 280 - 400 μ long, 0.6 - 1.2 (usually 0.7 - 1.0) x diameter of siphuncular cone. From *Cupressus* and *Juniperus*. ..... 28

28(27) Hind tarsal II 1.6 - 2.1 (usually 1.7 - 2.0) x rostral IV, which bears 5 - 8 accessory hairs. Antennal II bearing 10 - 14 hairs. Antennal III 1.2 - 1.6 (rarely less than 1.3) x hind tarsal II. Base of antennal VI 0.8 - 1.3 (usually 1.0 - 1.3) x rostral IV. Longest hair on abdominal tergite VIII 0.9 - 1.2 x longest hair on antennal III. Radial sector of forewing often not reaching wing apex. From *Cupressus* and *Juniperus* spp. ..... *C. fresai*

- Hind tarsal II 2.0 - 2.8 (usually 2.4 - 2.6) x rostral IV, which bears 4 accessory hairs. Antennal II bearing 7 - 11 hairs. Antennal III 1.0 - 1.3 x Hind tarsal II. Base of antennal VI 1.1 - 1.7 (usually 1.4 - 1.6) x rostral IV. Longest hair on abdominal tergite VIII 1.2 - 1.4 x longest hair on antennal III. Radial sector reaching wing apex. From *Juniperus communis* and *J. rigida*. ..... *C. juniperi*

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# 日本産オオアブラムシ属(同翅目：アブラムシ科)のチェックリスト及び種の検索表

V. F. EASTOP（自然史博物館）・宮崎昌久*（農業環境技術研究所）
宗林正人(皇学館大学)

オオアブラムシ属は針葉樹を寄主植物とするアブラムシの一群で，世界で約200種が知られている。属としては寄主関係において，また形態的によくまとまっており，他からの区別が比較的容易であるが，種のレベルでは形態的に近似したものが多く，分類及び同定上の困難が大きい。日本産の種については INOUYE (1970)によって分類学的な再検討がなされ，24種が認められ，無翅胎生雌虫について検索表が与えられている。この検索表は，着色した厚皮板の発達の程度に重きを置いているため，そしてまた形質の種内変異の程度がおそらくは過小評価されているために，使用の難しい部分がある。

本研究では下表に示す31種について，無翅胎生雌虫および有翅胎生雌虫の検索表が与えられた。これら31種の内，５種は検査個体数が少なく，種名の決定には至らなかったが，今後の研究の便に供するため，「species A～E」としてチェックリストおよび検索表に加えた。チェックリストでは，日本産種に関する従前の論文に現れた学名をすべて収録し，同物異名性など，本論文における扱いを明示した。

日本から記載または記録された種の多くは，ヨーロッパから知られている種に形態的に極めて近似しながら，しかし微妙な相違を示している。これら両地域の種について，わずか数個体の標本しか知られていない例が少なからずあり，そのような種では形質の変異幅が不明である。従って，日本のオオアブラムシ属の種構成については，未だに不確かな要素が多く残されている。この問題を解決するためには，日本，ヨーロッパ，そして両者をつなぐ中間の地域からの標本を多数蓄積し，解析することが必要である。また，細胞学的あるいは分子生物学的な手法による解析も重要と思われる。

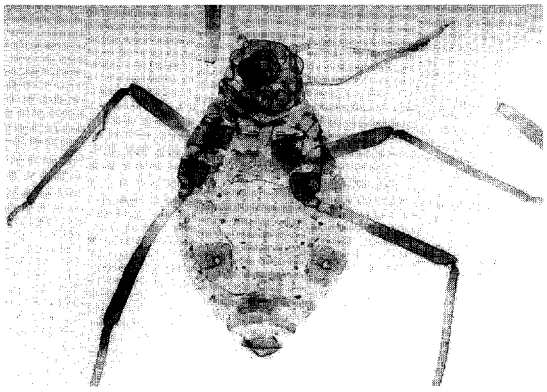
なお，本研究は第一著者に対する日本学術振興会重点領域外国人招聘(RC10514)に基づいて実施された。

日本産オオアブラムシ属種名一覧

| 種　　名 | 寄　主　植　物 | 分　　布 |
|---|---|---|
| *C. cembrae* (SEITNER)<br>ハイマツオオアブラムシ | *Pinus*(ゴヨウマツ，ハイマツ) | 日本(北，本)，ロシア，ヨーロッパ |
| *C. shinjii* INOUYE<br>ヒメコマツオオアブラムシ<br>(ゴヨウマツオオアブラムシ) | *Pinus*(ゴヨウマツ) | 日本(北，本) |
| *C. watanabei* INOUYE<br>ヤマベオオアブラムシ | *Pinus*(キタゴヨウマツ，チョウセンゴヨウ，ストローブマツ) | 日本(北)，韓国，樺太 |
| *C. etsuhoe* INOUYE<br>アカマツミキオオアブラムシ | *Pinus*(アカマツ) | 日本(本) |
| *C. formosana* (TAKAHASHI)<br>タイワンオオアブラムシ | *Pinus*(クロマツ，タイワンアカマツ) | 日本(北，本，九)，韓国，中国，台湾 |
| *C. orientalis* TAKAHASHI<br>トウヨウオオアブラムシ | *Pinus*(アカマツ) | 日本(本)，韓国，中国，台湾，ネパール |
| *C. pinidensiflorae* (ESSIG et KUWANA)<br>マツノエダオオアブラムシ | *Pinus*(アカマツ，クロマツ) | 日本(北，本)，韓国，中国，台湾 |
| *C. piniformosana* (TAKAHASHI)<br>マツオオアブラムシ | *Pinus*(アカマツ，クロマツ) | 日本(北，本，四，九)，韓国，台湾，マレーシア，シベリア |

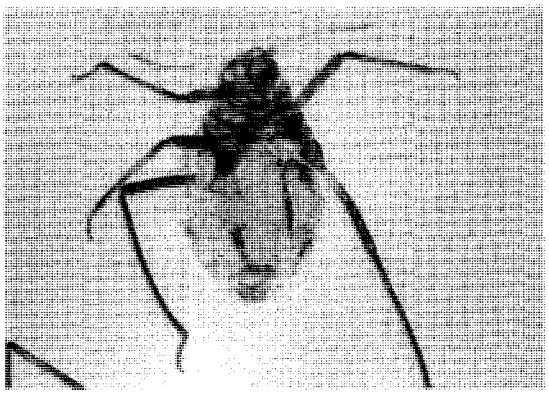
＊現所属：蚕糸・昆虫農業技術研究所

| 種　　名 | 寄 主 植 物 | 分　　布 |
|---|---|---|
| *C. sorini* INOUYE<br>クロマツミキオオアブラムシ | *Pinus*(クロマツ) | 日本(本) |
| *C.* sp. B | *Pinus* | 日本(北) |
| *C. chibi* (INOUYE)<br>カラマツチビオオアブラムシ | *Larix*(カラマツ) | 日本(北，本，九) |
| *C. kochi* INOUYE<br>カラマツミキオオアブラムシ | *Larix*(カラマツ，チョウセンカラマツ) | 日本(北，本)，韓国 |
| *C. laricicola* (MATSUMURA)<br>カラマツオオアブラムシ | *Larix*(カラマツ，グイマツ，オウシュウカラマツ，チョウセンカラマツ) | 日本(北，本)，韓国 |
| *C. laricis* (HARTIG)<br>カラマツイボオオアブラムシ | *Larix*(カラマツ) | 日本(北，本)，中国，蒙古，ヨーロッパ |
| *C. hattorii* KONO et INOUYE<br>ハットリオオアブラムシ | *Abies*(トドマツ，オオシラビソ，ウラジロモミ) | 日本(北，本) |
| *C. longipennis* (MATSUMURA)<br>ハネナガオオアブラムシ | *Abies*(トドマツ，モミ，チョウセンモミ) | 日本(北，本)，韓国 |
| *C. matsumurana* HILLE RIS LAMBERS<br>トドミドリオオアブラムシ | *Abies*(トドマツ，ウラジロモミ) | 日本(北，本) |
| *C. todocola* (INOUYE)<br>トドマツオオアブラムシ | *Abies*(トドマツ，モミ) | 日本(北，本)，樺太 |
| *C.* sp. A | *Abies*(トドマツ) | 日本(北) |
| *C.* sp. C | *Abies*(モミ) | 日本(本) |
| *C. costata* (ZETTERSTEDT)<br>コナフキトビイロオオアブラムシ | *Picea*(エゾマツ，トウヒ，アカエゾマツ，カナダトウヒ) | 日本(北，本)，樺太，ヨーロッパ，オーストラリア，北米 |
| *C. horii* (INOUYE)<br>ホリオオアブラムシ | *Picea*(エゾマツ) | 日本(北)，樺太 |
| *C. piceae* (PANZER)<br>クロオオアブラムシ | *Picea*(エゾマツ，トウヒ，ヨーロッパトウヒ，カナダトウヒ) | 日本(北，本)，中国，ロシア，ヨーロッパ |
| *C. nopporoensis* (INOUYE)<br>エゾアメイロオオアブラムシ | *Picea*(アカエゾマツ) | 日本(北) |
| *C. pruinosa ezoana* INOUYE<br>エゾマツオオアブラムシ | *Picea*(エゾマツ，トウヒ，アカエゾマツ，ヨーロッパトウヒ) | 日本(北)，樺太 |
| *C.* sp. D | *Picea*(エゾマツ) | 日本(北) |
| *C. ozawai* INOUYE<br>ツガオオアブラムシ | *Tsuga*(コメツガ，ヒノキ) | 日本(本) |
| *C. fresai* BLANCHARD<br>イブキオオアブラムシ(仮称) | *Cupressus, Juniperus, Cryptomeria*<br>(ネズ，イブキなど) | 日本(北)，ヨーロッパ，オーストラリア，北米，南米 |
| *C. juniperi* (DE GEER)<br>ネズミサシオオアブラムシ | *Juniperus*(ネズ，イブキなど) | 日本(本州)，台湾，ロシア，ヨーロッパ，北アフリカ，北米 |
| *C. tujafilina* (DEL GUERCIO)<br>コノテガシワオオアブラムシ(仮称) | *Thuja, Callitris*(コノテガシワなど) | 日本(沖)，ネパール，ヨーロッパ，アフリカ，オーストラリア，ニュージーランド，北米 |
| *C.* sp. E | *Torreya, Tsuga*(カヤ，ツガ) | 日本(本) |

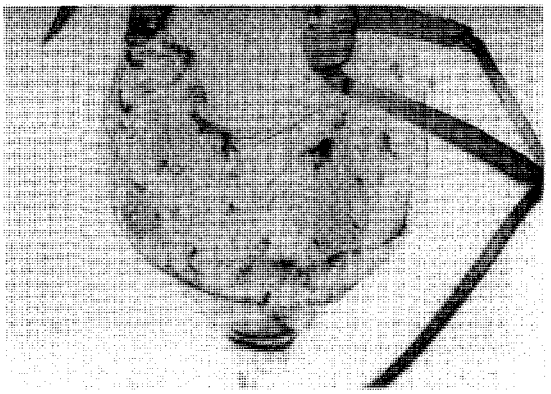


1. *Cinara cembrae* (Kawayu, Hokkaido, 27. VIII. 1962, ex *Pinus pumila*)

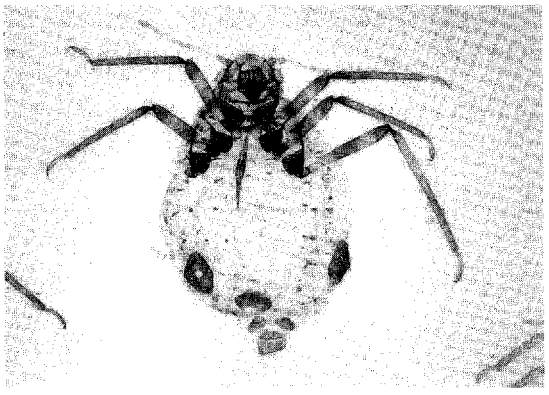
2. *C. cembrae, aptera* (ditto)



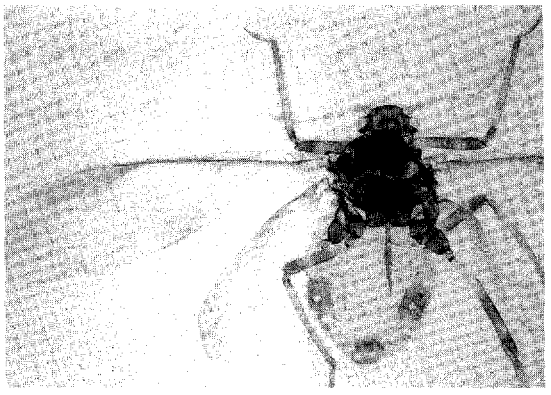
3. *C. chibi* (Kawakami, Okayama, 24. VII. 1975, ex *Larix leptolepis*)



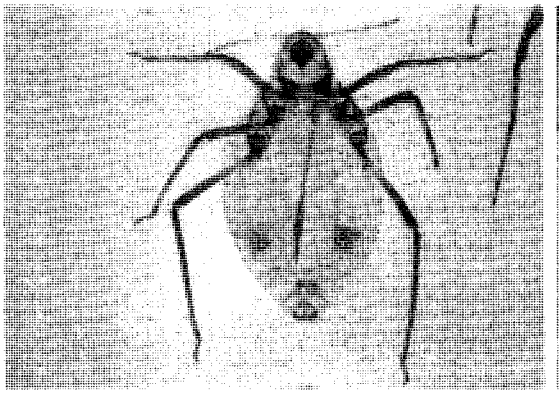
4. *C. chibi, aptera* (ditto)



5. *C. costata* (Mt. Odaigahara, 23. VIII. 1971, ex *Picea* sp.)

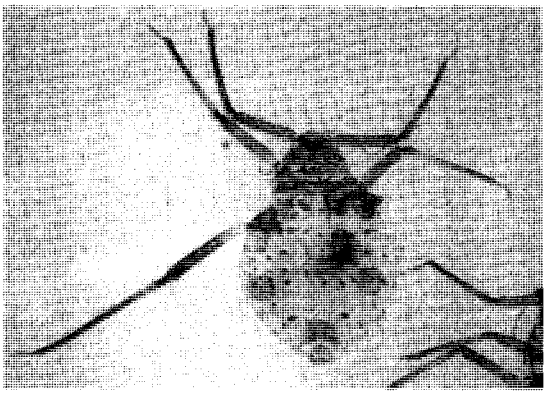


6. *C. costata* (Bibai, Hokkaido, 10. VI. 1969, ex *Picea abies*)

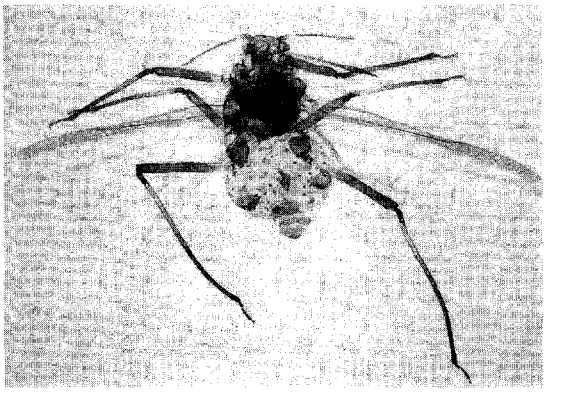


7. *C. etsuhoe* (Ise, Mie, 14. V. 1978, ex *Pinus densiflora*)

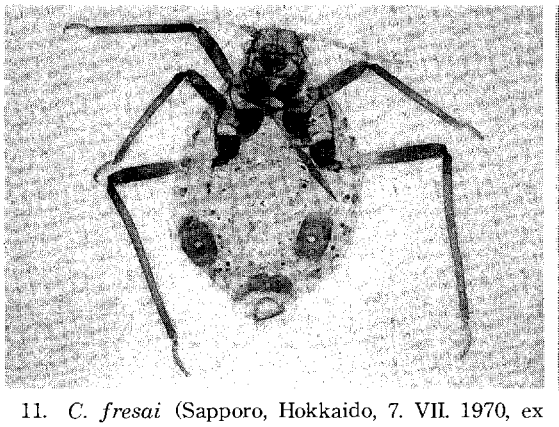
8. *C. etsuhoe, aptera* (ditto)



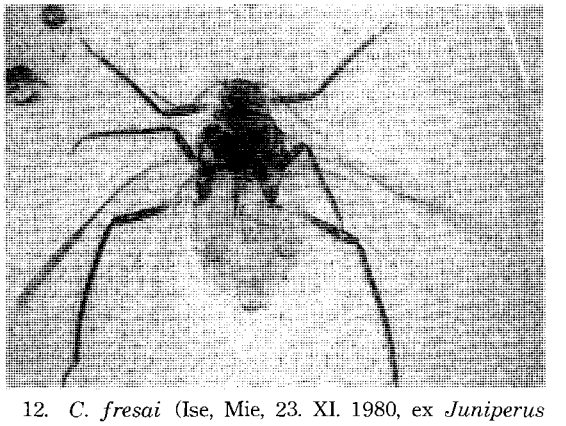
9. *C. formosana* (Hirao, Osaka, 29. IV. 1960, ex *Pinus thunbergii*)



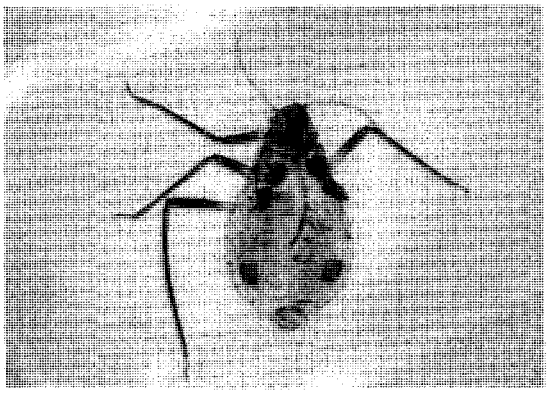
10. *C. formosana* (Osaka, 23. XII. 1956, ex *Pinus* sp.)



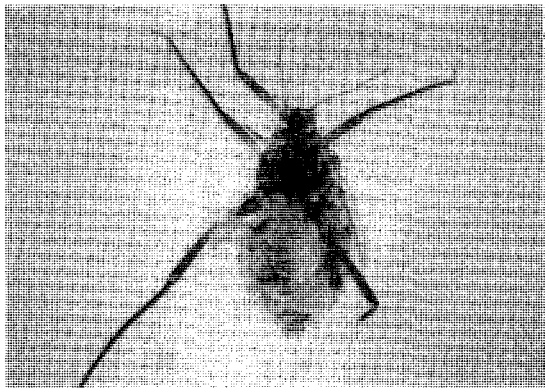
11. *C. fresai* (Sapporo, Hokkaido, 7. VII. 1970, ex *Juniperus conferta*)



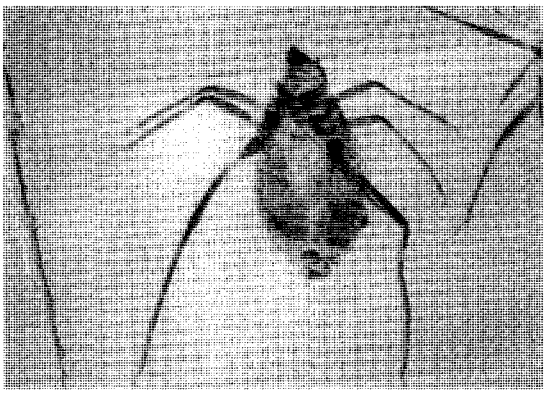
12. *C. fresai* (Ise, Mie, 23. XI. 1980, ex *Juniperus chinensis*)



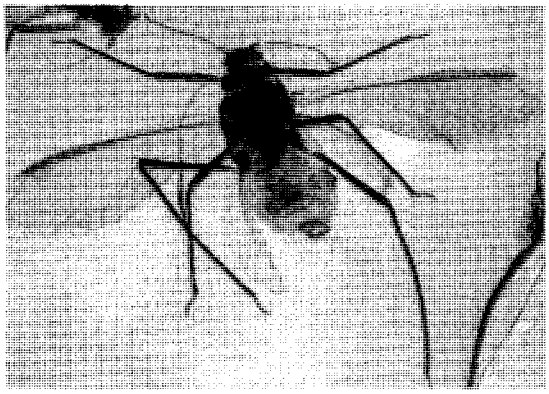
13. *C. hattorii* (Mt. Kirishima, Kagoshima, 29. VII. 1971, ex *Tsuga sieboldii*)



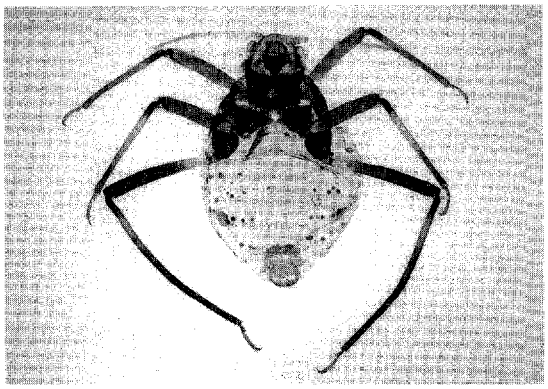
14. *C. hattorii* (Ebetsu, Hokkaido, 23. VI. 1966, ex *Abies sachalinensis*)



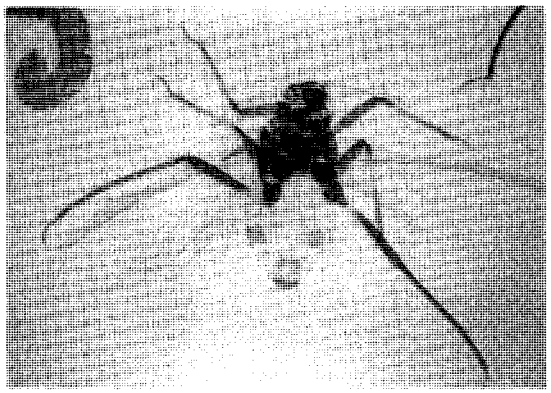
15. *C. kochi* (Tomakomai, Hokkaido, 24. VII. 1962, ex *Larix leptolepis*)



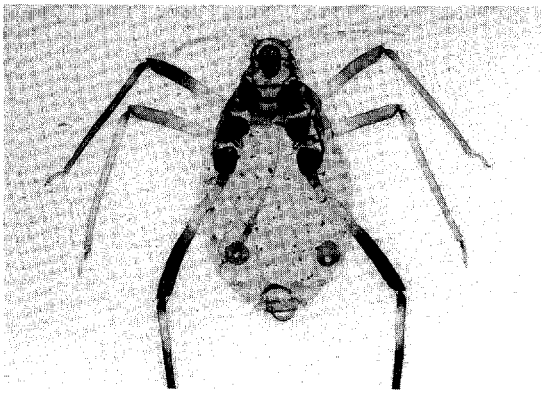
16. *C. kochi* (Koumi, Nagano, 6. VI. 1960, ex *Larix leptolepis*)



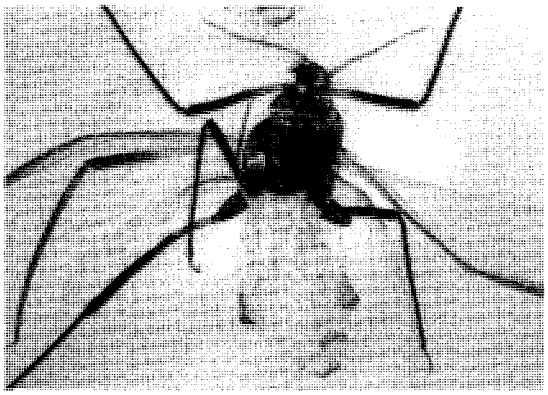
17. *C. laricicola* (Kiyosato, Yamanashi, 25. VIII. 1970, ex *Larix leptolepis*)



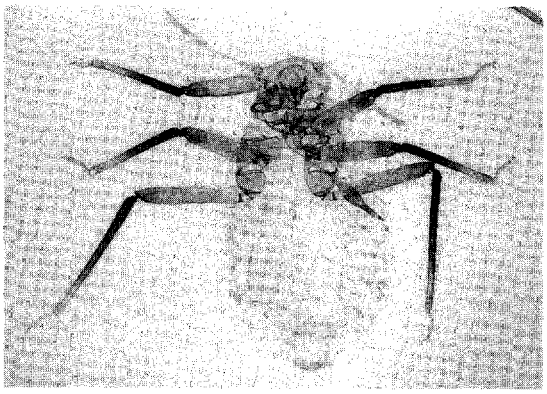
18. *C. laricicola* (Kiso-fukushima, Nagano, 2 VI. 1985, ex *Larix leptolepis*)



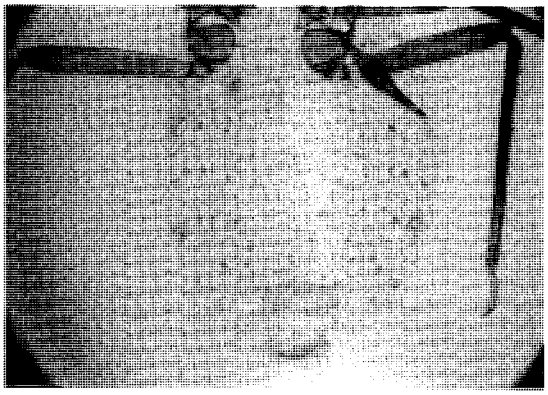
19. *C. longipennis* (Shimodate, Ibaraki, 25. IV. 1986, ex *Chamaecyparis obtusa*)



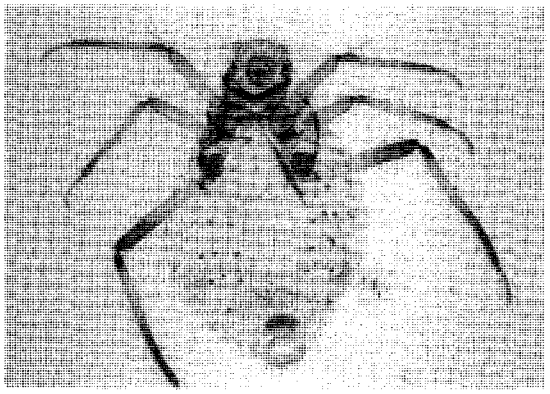
20. *C. longipennis* (Kobe, Hyogo, 27. X. 1956, ex *Abies* sp.)



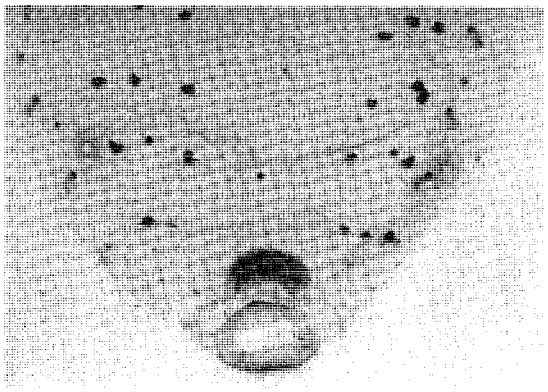
21. *C. matsumurana* (Mt. Kirishima, Kagoshima, 29. VII. 1971, ex *Tsuga* sp.)



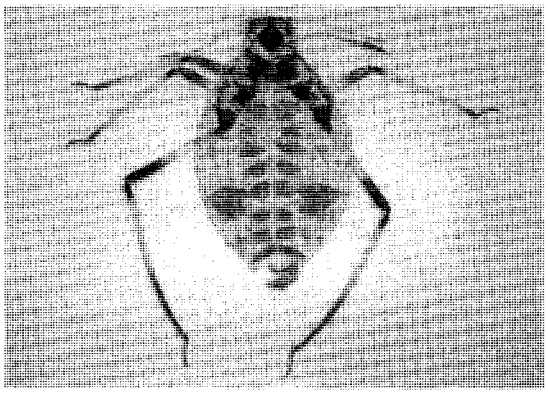
22. *C. matsumurana, aptera* (ditto)



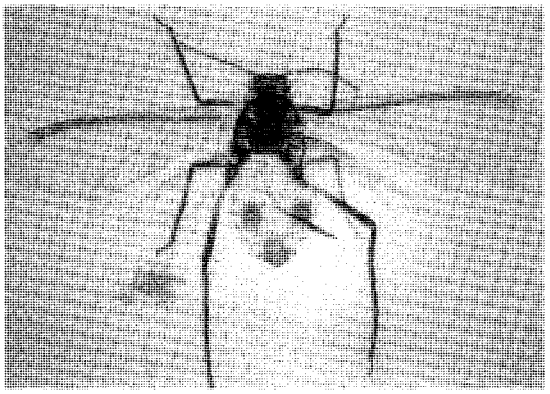
23. *C. nopporoensis* (Bibai, Hokkaido, 16. VI. 1969, ex *Picea abies*)



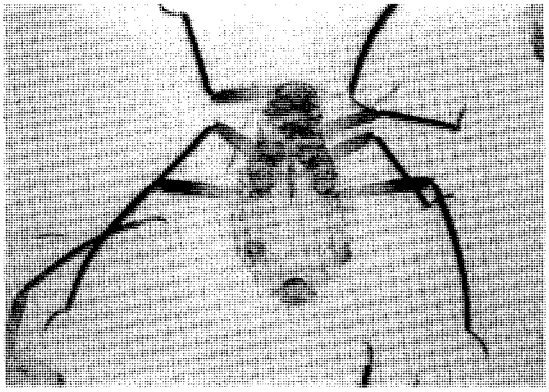
24. *C. nopporoensis, aptera* (ditto)



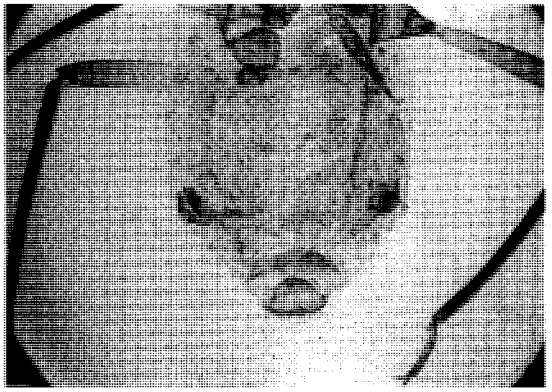
25. *C. orientalis* (Lake Shikotsu, Hokkaido, 23. VI. 1964, ex *Picea jezoensis*)



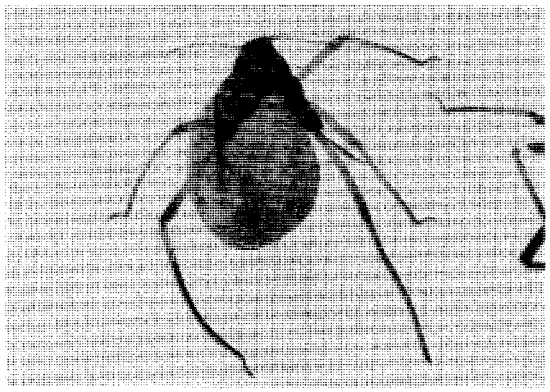
26. *C. orientalis* (Oizawa, Yamagata, 30. VIII. 1964, ex *Pinus densiflora*)



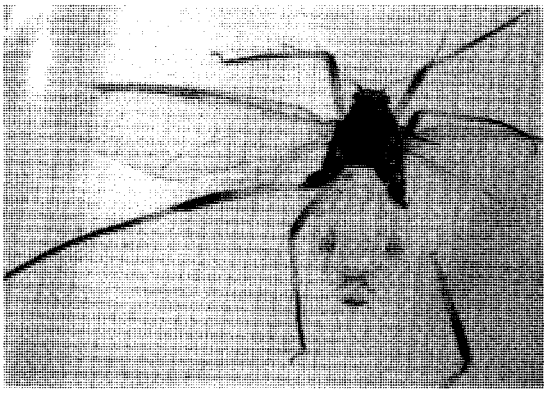
27. *C. ozawai* (Mt. Ishizuchi, Shikoku, 10. VIII. 1969, ex *Tsuga sp.*)



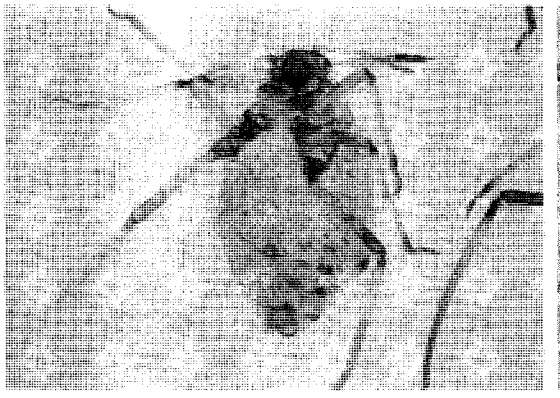
28. *C. ozawai, aptera* (ditto)



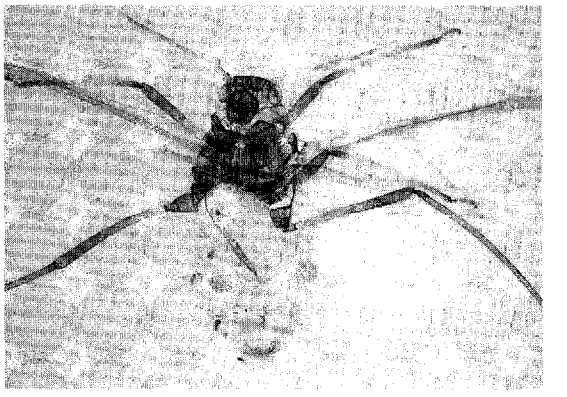
29. *C. piceae* (Ebetsu, Hokkaido, 20. VI. 1936, ex *Picea canadensis*)



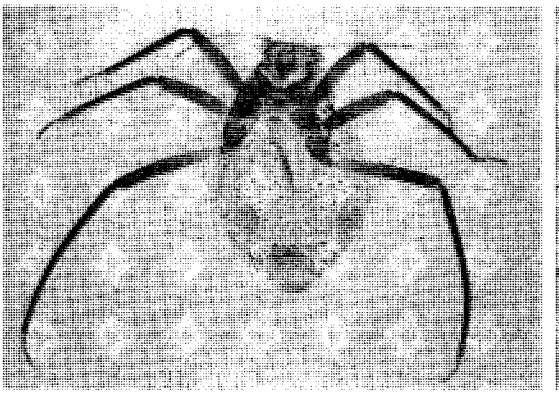
30. *C. piceae* (Mt. Daisetsu, Hokkaido, 11. VIII. 1970, ex *Picea jezoensis*)



31. *C. pinidensiflorae* (Niigata, 13. XI. 1976, ex *Pinus* sp.)

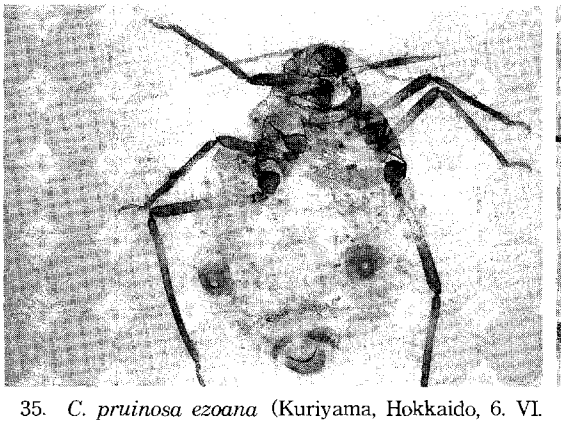


32. *C. pinidensiflorae* (Kiso-otaki, Nagano, 7. VIII. 1976, ex *Pinus densiflora*)

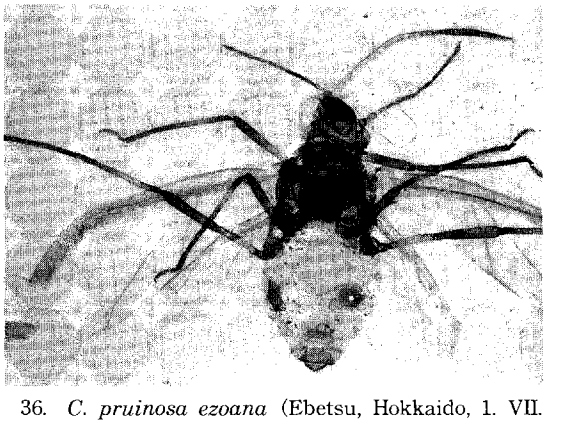


33. *C. piniformosana* (Tanashi, Tokyo, 17. V. 1984, ex *Pinus densiflora*)

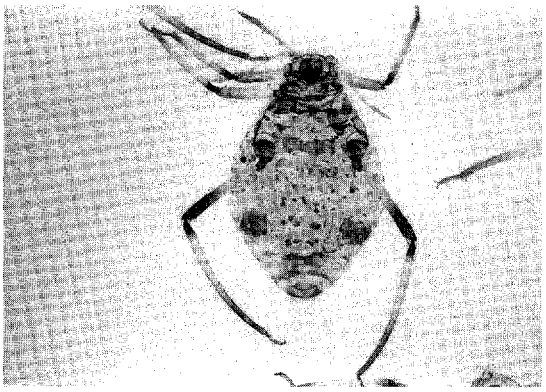
34. *C. piniformosana* (Utsunomiya, Tochigi, 21. V. 1966)



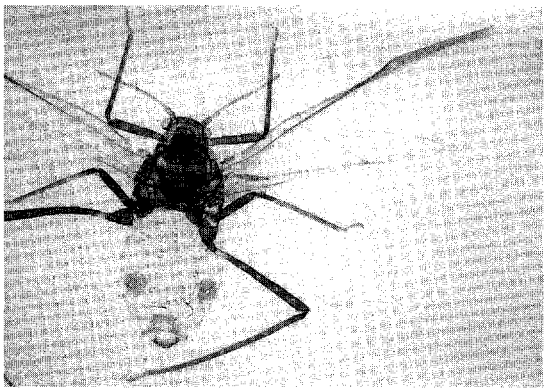
35. *C. pruinosa ezoana* (Kuriyama, Hokkaido, 6. VI. 1964, ex *Picea jezoensis*)



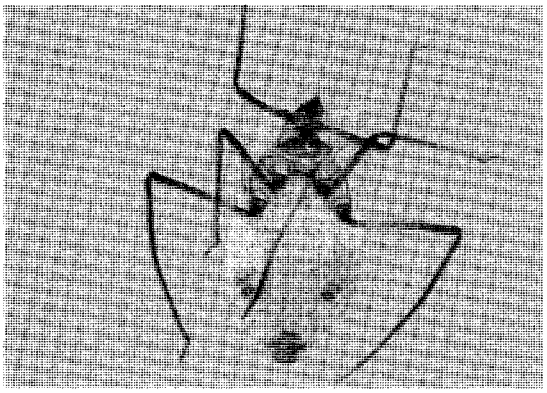
36. *C. pruinosa ezoana* (Ebetsu, Hokkaido, 1. VII. 1937, ex *Picea glehnii*)



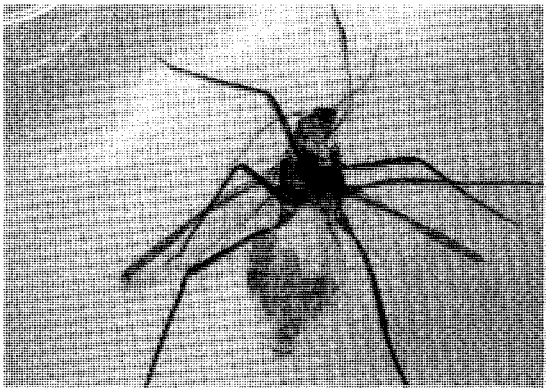
37. *C. shinjii* (Kobe, Hyogo, 23. X. 1960, ex *Pinus parviflora*)



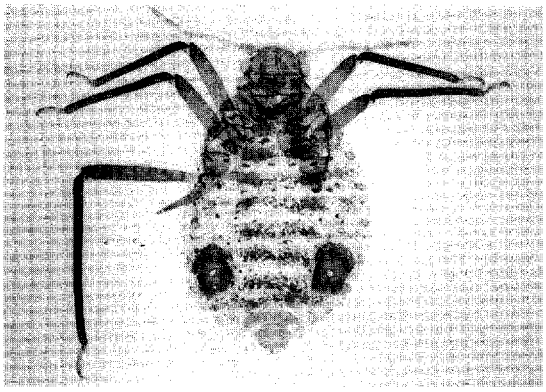
38. *C. shinjii* (Mt. Apoi, Hokkaido, 28. VI. 1967, ex *Pinus parviflora*)



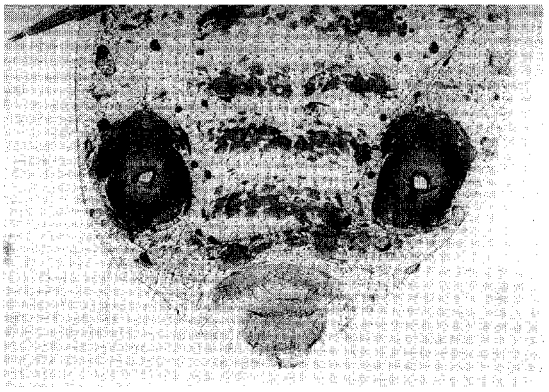
39. *C. sorini* (Osaka, 29. IX. 1963, ex *Pinus* sp.)



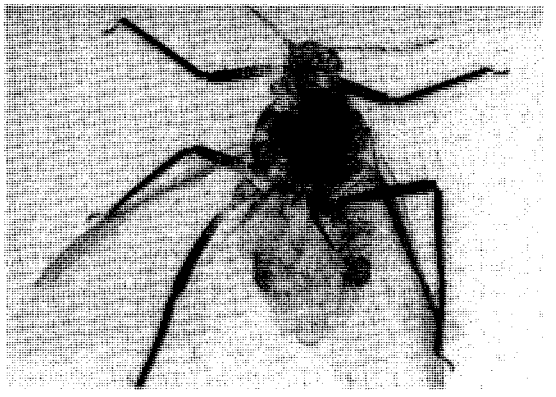
40. *C. sorini* (Taki, Mie, 13. VIII. 1961, ex *Pinus* sp.)



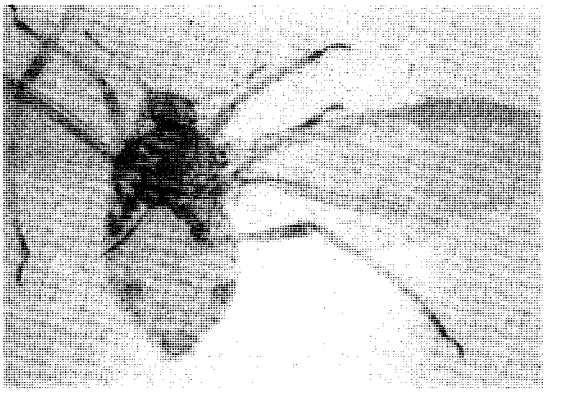
41. *C. todocola* (Bibai, Hokkaido, 27. VI. 1969, ex *Abies sachalinensis*)



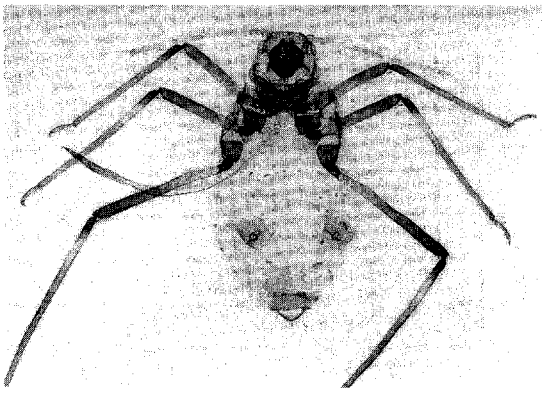
42. *C. todocola, aptera* (ditto)



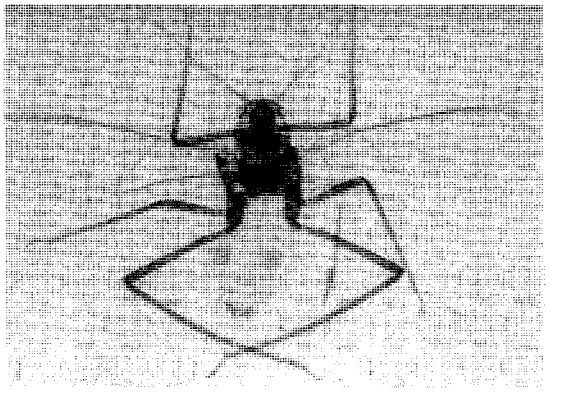
43. *C. todocola* (Ise, Mie, 24. VI. 1975, ex *Abies* sp.)



44. *C. tujafilina* (Tokyo, IX. 1982, ex *Thuja orientalis*)



45. *C. watanabei* (Esan, Hokkaido, 1. ix. 1967, ex *Pinus parviflora*)



46. *C. watanabei* (ditto)