

THE CLEARWING MOTHS OF JAPAN (LEPIDOPTERA: SESIIDAE)

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ABSTRACT.— The clearwing moths recorded for Japan total 39 species (including one subspecies): all species are figured, and their life history, distribution and hostplants are discussed.

KEY WORDS: Aceraceae, Betulaceae, Castanaceae, Cucurbitaceae, Ebenaceae, Fagaceae, hostplant, Juglandaceae, *Macroscylesia*, *Melittia*, *Nokona*, Okinawa, Oriental, Palearctic, *Paranthrene*, *Paranthrenopsis*, *Pennisetia*, Rosaceae, Rubiaceae, Russia, Ryukyu Is., Salicaceae, *Scalarignathia*, *Sesia*, Sesiinae, *Similipepsis*, *Synanthedon*, Taiwan, taxonomy, Tinthiinae, *Toleria*, *Trichocerota*, Vitaceae.

The clearwing moths, family Sesiidae, number 39 species in Japan. Approximately 45 hostplants have been recorded for 26 species and one subspecies in Japan, but the life histories of these clearwings is imperfectly known. The remaining 12 species have no information about hostplants or biology.

Trichocerota constricta (Butler, 1878)

Fig. 1

JAPANESE NAME: Munabuto-hime-sukasiba.

COMMENTS: Alar expanse 14.5-22.0mm. This is the smallest clearwing moth in Japan.

LIFE HISTORY: Adults emerge from June to July, and ever so often rest on flowers of *Cayratia japonica*, Vitaceae. Eggs are laid singly on the foliage, sometimes on the top of stem of the hostplant. The young larvae bore into the shoots, and probably hibernate as last instar larvae in the bored stems.

DISTRIBUTION: Japan (Honshu and Kyushu) and Korea.

HOSTPLANTS: Stems of wild rose (*Rosa multiflora*, Rosaceae) and cultivated rose.

Trichocerota yakushimaensis Arita, 1993

Fig. 2

JAPANESE NAME: Yakushima-hime-sukashiba.

COMMENTS: Alar expanse 19.0-26.0mm. This is very similar in maculation to *Trichocerota constricta* from Honshu and Kyushu. The forewing of the male has the external hyaline stripes as three instead of four. The female forewing external hyaline stripes are variable: one or two.

LIFE HISTORY: Eggs are laid on undersides of leaves or the surface of stems of the hostplant, and larvae bore in stems in September. Pupation occurs in the next summer, August, and adults emerge by September in Yakushima Id.

DISTRIBUTION: Known only from southern Kyushu, Yakushima Id.

HOSTPLANTS: Stems of wild raspberry (*Rubus sieboldii*, Rosaceae).

Trichocerota esakii (Yano, 1960)

JAPANESE NAME: Esaki-hime-sukasiba.

Fig. 3

COMMENTS: Alar expanse 20.5-29.0mm. This species is easily separable from the other species of clearwings by the brownish ground color of the forewing and by the presence of long yellowish setaceous scale tufts laterally on the metathorax.

LIFE HISTORY: Adults are collected in May to July and September. Larvae bore in the pith of stems of the hostplant and emerge from stems at a height of 60-90cm above ground level. There is no gall former by larvae and no cocoon for pupation.

DISTRIBUTION: Ryukyu Is. (Amami-Ohshima Id. and Okinawa-honto Id.) and Izu-shotô Is. (Hachijôjima Id. and Hachijô-kojima Id.).

HOSTPLANTS: Stems of wild raspberry (*Rubus grayanus*, Rosaceae).

Paranthrenopsis editha (Butler, 1878)

Fig. 4

JAPANESE NAME: Shirahoshi-hime-sukasiba.

COMMENTS: Alar expanse 21.0-26.5mm. This small dark brown clearwing has a long longitudinal hyaline blotch on the apical half of the forewing cell.

LIFE HISTORY: Very little is known about the life history. Adults are collected from late July through August each year.

DISTRIBUTION: Japan (Honshu, Shikoku, Kyushu and Tsushima Id., Far East of Russia (Vladivostok)).

HOSTPLANTS: Unknown.

Pennisetia hylaeiformis assimilis Arita, 1992

Fig. 5

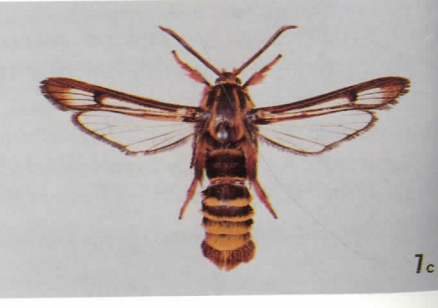
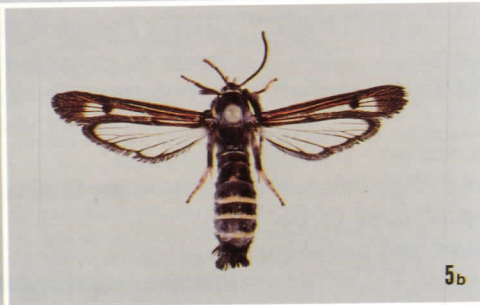
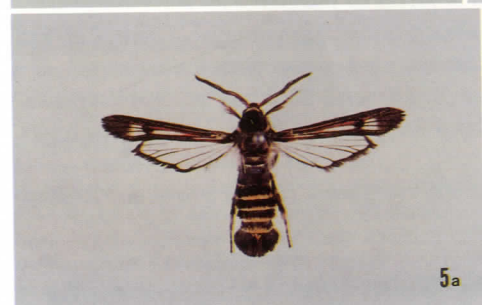
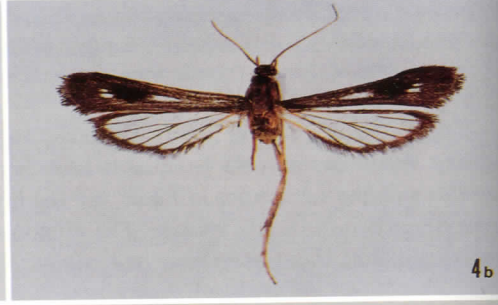
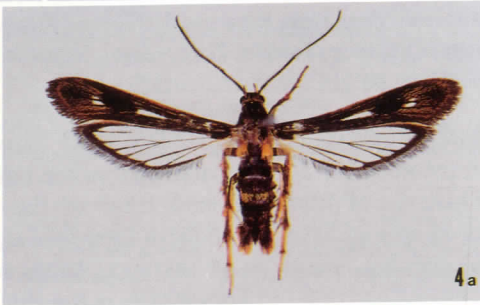
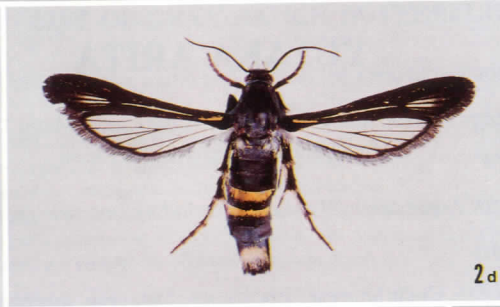
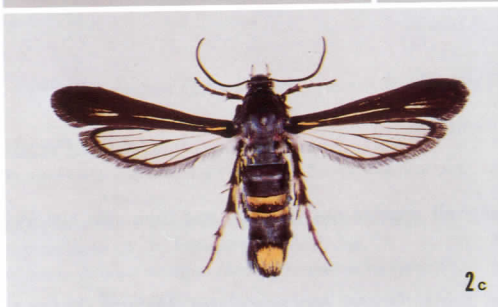
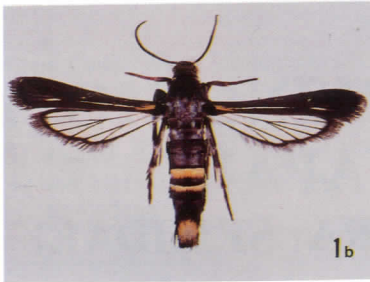
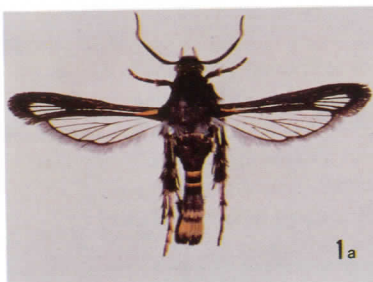
JAPANESE NAME: Hime-sesuji-sukasiba.

COMMENTS: Alar expanse 21.0-29.0mm. This widely distributed Palearctic species is known as subspecies *P. h. assimilis* from northern Japan (Hokkaido); distinguished by the entirely blackish anal tufts.

LIFE HISTORY: Adults emerge from the end of July to August. Larvae bore in the pith of stems of wild raspberry in Hokkaido.

DISTRIBUTION: Japan (Hokkaido).

HOSTPLANTS: Stems of wild raspberry (*Rubus idaeus* var. *aculeatissimus*, Rosaceae).



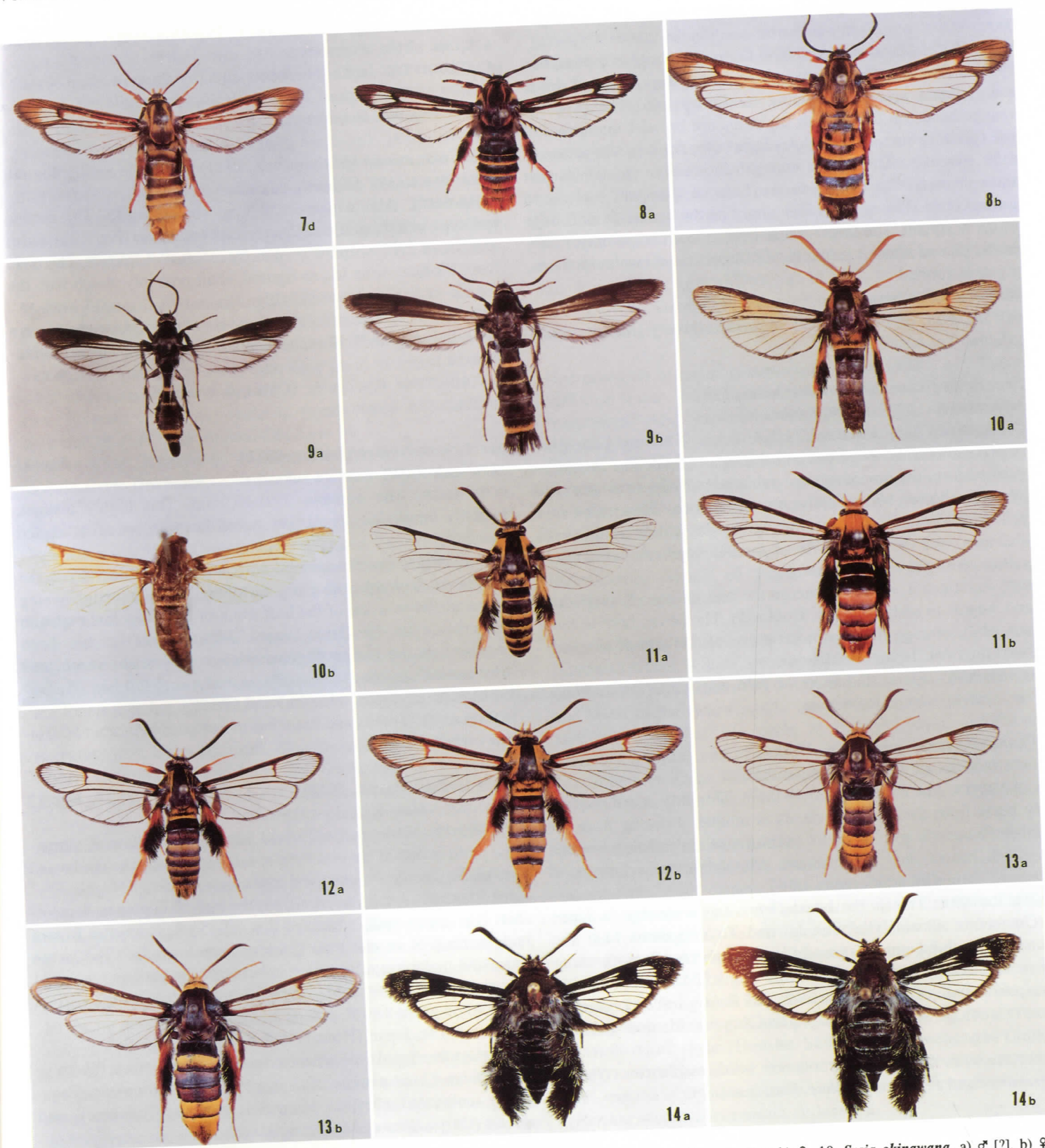


Fig. 8-14. Adults of clearwing moths of Japan: 8. *Pennisetia insulicola*, a) ♂, b) ♀; 9. *Similipepsis takizawai*, a) ♂, b) ♀; 10. *Sesia okinawana*, a) ♂ (?), b) ♀ [holotype]; 11. *Sesia rhynchioides*, a) ♂, b) ♀; 12. *Sesia scribai*, a) ♂, b) ♀; 13. *Sesia yezoensis*, a) ♂, b) ♀; 14. *Melittia formosana*, a) ♂, b) ♀.

Fig. 1-7. Adults of clearwing moths of Japan: 1. *Trichocrota constricta*, a) ♂, b) ♀; 2. *Trichocrota yakushimaensis*, a) ♂, b) ♀, c) ♀, d) ♀; 3. *Trichocrota esakii*, a) ♂, b) ♀; 4. *Paranthrenopsis editha*, a) ♂, b) ♀; 5. *Pennisetia hylaeiformis assimilis*, a) ♂, b) ♀, c) ♂, d) ♀; 6. *Pennisetia fixseni fixseni*, a) ♂, b) ♀, c) ♂, d) ♀; 7. *Pennisetia fixseni admirabilis*, a) ♂, b) ♀, c) ♂, d) ♀ [p. 71].

***Pennisetia fixseni fixseni* (Leech, 1889)**

Fig. 6

JAPANESE NAME: Sesuji-sukasiba

COMMENTS: Alar expanse 30.0-44.0mm. This large-sized raspberry borer has an orange form in both sexes; the costal and dorsal margin, and apical area being reddish brown. The posterior orange bands on the 3rd-6th segments are broader than those of the typical form. A strongly orange color form is also known. LIFE HISTORY: The adults emerge during the end of August through early October, from the base of the stem just above ground level. The eggs are laid singly on the underside of foliage of the hostplant. The larger larvae bore in the roots mainly, rarely in the pith of stems. In the case of large-sized raspberry stems, a gall is formed.

DISTRIBUTION: Japan (Honshu and Kyushu).

HOSTPLANTS: Stems and roots of wild raspberry (*Rubus crataegifolius*, Rosaceae).***Pennisetia fixseni admirabilis* Arita, 1992**

Fig. 7

JAPANESE NAME: Ezo-sesuji-sukasiba.

COMMENTS: Alar expanse 23.0-33.0mm. This medium-sized raspberry borer, known from northern Japan (Hokkaido), is distinguished from the nominotypical subspecies by its small size and by the yellower abdominal segmental bands. There also is a yellowish form in both sexes, having broader yellow bands on the abdomen, and the 6th and 7th abdominal segments are entirely yellow, with the anal tuft orange.

LIFE HISTORY: The adults emerge the end of June through July and August in northern Japan, Hokkaido. The larvae bore in roots and adults emerge from extruded pupae at the base of stems.

DISTRIBUTION: Japan (Hokkaido).

HOSTPLANTS: Stems and roots of wild raspberry (*Rubus idaeus* var. *aculeatissimus*, Rosaceae).***Pennisetia insulicola* Arita, 1992**

Fig. 8

JAPANESE NAME: Minarai-sesuji-sukasiba.

COMMENTS: Alar expanse 27.0-48.0mm. This large-sized raspberry borer from the Ryukyu Islands is unique, differing from the other *Pennisetia* species by its anal tufts of males being brighter reddish brown, and the 3rd and 4th abdominal segments of females being broadly orange-sided.

LIFE HISTORY: This is the latest clearwing to emerge in Japan (October in Amami Ohshima Id. and Tokuno-shima Id.). The larvae bore in the pith of stems of large raspberry (*Rubus grayanus*), and usually bore in the base of stems and roots of smaller raspberry species (*Rubus gravanus* and *Rubus croceacanthus*).

DISTRIBUTION: Ryukyu Is. (Amami-Ohshima Id. and Tokuno-shima Id.).

HOSTPLANTS: Stems and roots of wild raspberries (*Rubus grayanus* and *R. croceacanthus*, Rosaceae).***Similipepsis takizawai* Arita & Spatenka, 1989**

Fig. 9

JAPANESE NAME: Koshiboso-sukasiba.

COMMENTS: Alar expanse 18.0-20.0mm. This wasp-like waisted clearwing moth is a good mimic of wasps. This species is easily determined from the other clearwings in Japan by the extremely narrowed 2nd abdominal segment.

LIFE HISTORY: Adults emerge in July and August. Larvae tunnel

in very thin twigs of hostplants. Pupation occurs in the early summer of the second year.

DISTRIBUTION: Japan (Hokkaido and Honshu).

HOSTPLANTS: Twigs of birches (*Betula platyphylla* var. *japonica* and *B. ermanii*, Betulaceae).***Sesia okinawana* (Matsumura, 1931)**

Fig. 10

JAPANESE NAME: Okinawa-sukasiba.

COMMENTS: Alar expanse: 39.5mm (holotype ♀). The female holotype is damaged and in very bad condition (Fig. 10b) and it is difficult to identify the species by external characters. The male from Iriomote-jima Id., as figured, shall probably match with the female of *Sesia okinawana* (Fig. 10a).

LIFE HISTORY: The life cycle is poorly known, but adults were collected on June 30 from the southern Ryukyu Islands (Iriomote-jima Id.).

DISTRIBUTION: Ryukyu Is. (Okinawa-honto Id.).

HOSTPLANTS: Unknown.

***Sesia rhynchioides* (Butler, 1881)**

Fig. 11

JAPANESE NAME: Kasiwa-sukasiba.

COMMENTS: Alar expanse 29.0-40.0mm. This highly distinct, sexually dimorphic species, is a well-known pest of cultivated chestnut.

LIFE HISTORY: Adults emerge in the early morning, from the middle of September to early October. The hibernating young larvae tunnel in wood of the host trunk or branches, and pupation takes place in the larval tunnel. Mating behavior has been observed on the leaves of the hostplant just before sunset and after sunset.

DISTRIBUTION: Japan (Honshu) and China.

HOSTPLANTS: Trunks and branches of cultivated chestnut (*Castanea crenata*, Fagaceae).***Sesia scribai* (Bartel, 1912)**

Fig. 12

JAPANESE NAME: Kosiaka-sukashiba

COMMENTS: Alar expanse 26.5-43.0mm. This yellowish hornet-like moth is one of the common species in Japan. The adults and larvae frequently are observed at the city shrine of Nagoya.

LIFE HISTORY: Adults emerge from the end of August to September. It is occasionally observed that 30-45 adults emerge from a single trunk of an oak tree, *Quercus myrsinaefolia*. The larvae bore and make irregular galleries between the bark and wood of the trunk of the hostplant. Pupation takes place in the cocoon close to or in the larval gallery in August.

DISTRIBUTION: Japan (Honshu and Kyushu).

HOSTPLANTS: Trunks of various species of oak trees (*Quercus sessilifolia*, *Q. acutissima*, *Q. serrata*, *Q. myrsinaefolia*, Fagaceae), cultivated chestnut (*Castanea crenata*, Fagaceae), and pecan (*Carya illinoensis*, Juglandaceae).

***Sesia yezoensis* (Hampson, 1919)**

Fig. 13

JAPANESE NAME: Kita-sukasiba.

COMMENTS: Alar expanse 35.0-52.0mm. This conspicuous hornet-like moth is one of the larger clearwings in Japan.

LIFE HISTORY: Adults emerge July and early August; the female adults fly actively around trunks of the hostplant. Eggs are

usually deposited singly (rarely in clusters), in crevices, in cracks or on the surface of the lower part of the trunk of the hostplant. Larvae make irregular galleries between the bark and wood in the lower part of the trunk or into the thick roots near the surface of the ground. The elongate-oval cocoon, constructed by small pieces of wood chips and lined with tough silk, is placed in the larval gallery close to the bark.

DISTRIBUTION: Japan (Hokkaido and Honshu), Far East of Russia (Primorie, Sakhalin).

HOSTPLANTS: Trunks and thick roots of willow (*Salix sachalinensis*, Salicaceae), and cultivated poplar (*Populus nigra*, Salicaceae).

***Melittia formosana* Matsumura, 1911**

Fig. 14

JAPANESE NAME: Taiwan-momobuto-sukasiba

COMMENTS: Alar expanse 35.0-38.0mm. The blackish with bluish iridescence, makes this stout clearwing quite different from the other clearwing species in Japan.

LIFE HISTORY: The life cycle is poorly known. Adults are collected in June from Amami-Oshima Id.

DISTRIBUTION: Ryukyu Is. (Amami-Oshima Id.) and Taiwan.

HOSTPLANTS: Unknown.

***Melittia inouei* Arita & Yata, 1987**

Fig. 15

Japanese-name: Shitaki-momobuto-sukasiba.

COMMENTS: Alar expanse 30.5-36.0mm. This yellowish stout clearwing is distinguished by the brush-like yellow and black tufts of the hindlegs.

Life history: The life cycle is partly known. Adults emerge in July and early August. Larvae are gall makers on stems of snake gourds, and full grown larvae hibernate in earthen cocoons which are found together with those of *Melittia sangaika nipponica* in soil close to the hostplants.

DISTRIBUTION: Japan (Honshu, Shikoku and Kyushu).

HOSTPLANTS: Stems of snake gourd, *Trichosanthes kirilowii* var. *japonica* and *T. cucumeroides* (Cucurbitaceae).

***Melittia sangaika nipponica* Arita & Yata, 1987**

Fig. 16

JAPANESE NAME: Oo-momobuto-sukashiba.

COMMENTS: Alar expanse 36.0-41.0mm. This yellowish stout clearwing is very similar to *Melittia inouei* in external coloration, but is quite separable from it by the following points: the black discal-spot on the forewing has a very short longitudinal black line from the middle of the anterior margin in *M. inouei*, but *M. sangaika nipponica* is distinctly longer; the dorsal part of the hindwing cilia is finely yellow in *M. inouei*, but dark grey in *M. sangaika nipponica*.

LIFE HISTORY: Adults emerge from July to August. Eggs are laid on the stems or vines of hostplants. Larva bore into the main stem and produce elongated galls, rarely an enormous gall is formed near the ground by a group of ten or more larvae. The full grown larvae make earthen cocoons in the soil and hibernate, pupating in following June before emergence.

DISTRIBUTION: Japan (Honshu, Shikoku and Kyushu).

HOSTPLANTS: Stem of snake gourd (*Trichosanthes kirilowii* var. *japonica* and *T. cucumeroides*, Cucurbitaceae).

***Macroselesia japona* (Hampson, 1919)**

Fig. 17

JAPANESE NAME: Momobuto-sukasiba.

COMMENTS: Alar expanse 18.0-29.0mm. A blackish little clearwing that is rather common in Japan, and evidently different from *Macroselesia longipes yamatoensis* in having moderately long hindlegs.

LIFE HISTORY: Adults fly June to August in central Honshu. Eggs are laid singly on the tendrils, vines or undersides of leaves of the hostplant. Larvae produce linear-oblong galls on lower parts of the stem. The full grown larvae hibernate in galls and pupate in the following early summer, without cocoons.

DISTRIBUTION: Japan (Hokkaido, Honshu, Kyushu and Tsushima Id.), Ryukyu Is. (Amami-Oshima Id.).

HOSTPLANTS: Stems of five-leaf gynostemma (*Gynostemma pentaphyllum*, Cucurbitaceae).

***Macroselesia longipes yamatoensis* Arita, 1992**

Fig. 18

JAPANESE NAME: Asinaga-momobuto-sukasiba.

COMMENTS: Alar expanse 18.0-28.0mm. This is the most imposing species living in Japan, due to the long hindlegs.

LIFE HISTORY: Adults are collected during the end of June through September. Eggs are laid singly on the leaves, fruits and vines of the hostplant. The linear-oblong gall is formed from larval boring.

Other behavior is very similar to *Macroselesia japona*.

DISTRIBUTION: Japan (Honshu and Kyushu).

HOSTPLANTS: Stems of lobed actinostemma (*Actinostemma lobatum*, Cucurbitaceae).

***Nokona feralis* (Leech, 1889)**

Fig. 19

JAPANESE NAME: Kikubi-sukasiba.

COMMENTS: Alar expanse 38.0-45.0mm. This is one of the largest and rarest of the clearwings in Japan.

LIFE HISTORY: The life cycle is poorly known. Adults are collected from the end of July to early September.

DISTRIBUTION: Japan (Hokkaido, Honshu and Kyushu).

HOSTPLANTS: Unknown.

***Nokona pernix* (Leech, 1889)**

Fig. 20

JAPANESE NAME: Himeato-sukasiba.

COMMENTS: Alar expanse 19.5-30.0mm. This rather small clearwing is almost entirely covered with blackish-brown scales on the forewing, and has two yellow bands on the abdomen.

LIFE HISTORY: Adults emerge during June and July. The larvae are gall makers. The gall is 8-15mm in width and 25-30mm in length. The full-grown larva hibernates in a very tough blackish cocoon in the larval gall and pupates the following May.

DISTRIBUTION: Japan (Honshu, Shikoku and Kyushu) and China.

HOSTPLANTS: Stems and vines of feervine (*Paederia scandens* var. *mairei*, Rubiaceae); only one recorded from Boston ivy (*Parthenocissus tricuspidata*, Vitaceae).

***Nokona rubra* Tosevski & Arita, 1992**

Fig. 21

JAPANESE NAME: Aka-sukasiba.

COMMENTS: Alar expanse 31.0mm. This lovely reddish clearwing seems to be a very rare species and has been known from only one male holotype and two female paratypes.

LIFE HISTORY: Very little is known about the life history of this



Fig. 15-22. Adults of clearwing moths of Japan: 15. *Melittia inouei*, a) ♂, b) ♀; 16. *Melittia sangaika nipponica*, a) ♂, b) ♀; 17. *Macrosclesia japona*, a) ♂, b) ♀; 18. *Macrosclesia longipes yamatoensis*, a) ♂, b) ♀; 19. *Nokona feralis*, ♀; 20. *Nokona pernix*, a) ♂, b) ♀; 21. *Nokona rubra*, a) ♂, b) ♀; 22. *Nokona purpurea*, a) ♂, b) ♀.

species, with only three collection records: the middle of June for a male and early July for females.

DISTRIBUTION: Ryukyu Is. (Amami-Ohahima Id. and Okinawa-honto Id.).

HOSTPLANTS: Unknown.

***Nokona purpurea* (Yano, 1965)**

Fig. 22

JAPANESE NAME: Murasaki-sukasiba.

COMMENTS: Alar expanse 29.5-36.5mm. This elegant clearwing is peculiar by the purplish-black with metallic iridescence of the forewings.

LIFE HISTORY: Adults emerge from the end of May to June. The larvae are gall makers of wild grapevine. The life history is very close to *Nokona regalis*.

DISTRIBUTION: Japan (Honshu and Kyushu).

HOSTPLANTS: Vines of wild grapes (*Vitis ficifolia* and *Ampelopsis brevipedunculata*, Vitaceae).

***Nokona regalis* (Butler, 1878)**

Fig. 23

JAPANESE NAME: Budou-sukasiba.

COMMENTS: Alar expanse 27.5-37.5mm. This is a well-known insect pest of cultivated grapevines in Japan. This species is similar to *Nokona purpurea* in maculation, but is easily separable from it by the reddish-brown color of the forewings.

LIFE HISTORY: Adults emerge during the end of April to June. Eggs are laid singly on foliage, the bases of sprouts or petioles of hostplants. The larvae are gall makers of cultivated and wild grapevines. The gall is 8-20mm in width and 50-70mm in length, sometimes there are two, rarely five galls, joined together. The full grown larvae hibernate in the larval gall and pupate in the larval gall without a cocoon, from April to May.

DISTRIBUTION: Japan (Hokkaido, Honshu, Shikoku and Kyushu), Korea and China.

HOSTPLANTS: Vines of cultivated grapes (*Vitis vinifera*, Vitaceae) and wild vines (*Vitis coignetiae* and *V. ficifolia*, Vitaceae).

***Paranthrene tabaniformis* (Rottemburg, 1775)**

Fig. 24

JAPANESE NAME: Birodo-sukasiba.

COMMENTS: Alar expanse 23.0-30.0mm. The dusky clearwing, a widely distributed Holarctic species, was discovered in 1989 in northern Japan (Hokkaido), on *Salix* sp.

LIFE HISTORY: The life history is partly known in Japan. Adults emerge from the middle of July to early August. The larvae tunnel in the stems of low-growing shrubby willows. Sometimes the stems tunneled by larvae are swollen. Pupation takes place in the larval tunnel without a cocoon.

DISTRIBUTION: Holarctic (known only from northern Japan, Hokkaido).

HOSTPLANTS: Trunk of low-growing willows (*Salix* spp., Salicaceae); poplar (*Populus* spp., Salicaceae) in Europe.

***Toleria contaminata* (Butler, 1878)**

Fig. 25

JAPANESE NAME: Hachimachigai-sukasiba.

COMMENTS: Alar expanse 31.0-40.0mm. This rare clearwing is easily classified by the broad yellow band on the 4th abdominal segment.

LIFE HISTORY: The life cycle is little known. Adults are collected

from late June to August along woodland margins.

DISTRIBUTION: Japan (Hokkaido, Honshu and Kyushu).

HOSTPLANTS: Unknown.

***Toleria romanovi* (Leech, 1889)**

Fig. 26

JAPANESE NAME: Kubiaka-sukasiba.

COMMENTS: Alar expanse 41.0-48.0mm. This large yellowish clearwing is distinguished by the robust body, and by the bright orange color on the apical third of the thorax.

LIFE HISTORY: Adults emerge from the end of June to August. Eggs are laid singly in bark crevices. Larvae bore a linear horizontal ringed tunnel around the trunk between bark and wood, in the lower part of the trunk of cultivated grapevines. The full-grown larvae hibernate in an earthen cocoon, closely lined with silk, in the soil near the hostplant, and pupate the following end of May to early June.

DISTRIBUTION: Japan (Hokkaido, Honshu, Shikoku and Kyushu).

HOSTPLANTS: Trunks of cultivated grapevines (*Vitis vinifera*, Vitaceae).

***Synanthedon esperi* Spatenka & Arita, 1992**

Fig. 27

JAPANESE NAME: Ki-ko-sukasiba.

COMMENTS: Alar expanse 25.0mm. This very rare clearwing, with red anal tufts, is known only from the female holotype from Okinawa-jima Id.

LIFE HISTORY: The only known collecting date is 19th of May.

DISTRIBUTION: Ryukyu Is. (Okinawa-honto Id.).

HOSTPLANTS: Unknown.

***Synanthedon fukuzumii* Spatenka & Arita, 1992**

Fig. 28

JAPANESE NAME: Fukuzumi-ko-sukasiba.

COMMENTS: Alar expanse 21.0-23.0mm. This marvelous clearwing, with an orange-red band on the 4th abdominal segment, is seen very rarely.

LIFE HISTORY: The life cycle is partly known. Adults emerge in May, July and August from *Salix* sp.

DISTRIBUTION: Japan (Honshu and Kyushu).

HOSTPLANTS: Trunks of low-growing shrubby willows (*Salix* sp., Salicaceae).

***Synanthedon hector* (Butler, 1878)**

Fig. 29

JAPANESE NAME: Ko-sukasiba.

COMMENTS: Alar expanse 20.0-31.5mm. This species is abundant in streets and orchards where the hostplants occur; a very important insect pest of cultivated cherry trees, peaches, plums, apricots, and Japanese apricots.

LIFE HISTORY: Adults emerge over a very long period, from the end of May through October. Eggs are laid on the bark of hostplants. Larvae bore and make an irregular gallery between bark and wood. Hibernation is in the larval stage, but these larvae are very variable in size. Pupation takes place in an elongated cocoon in the larval gallery just under the bark.

DISTRIBUTION: Japan (Hokkaido, Honshu, Shikoku and Kyushu), Korea and Manchuria.

HOSTPLANTS: Trunks of various species of *Prunus*, cultivated and wild cherry trees (*Prunus x vedoensis*, *Prunus jamasakura*), peaches (*Prunus persica*), Japanese apricots (*Prunus mume*),

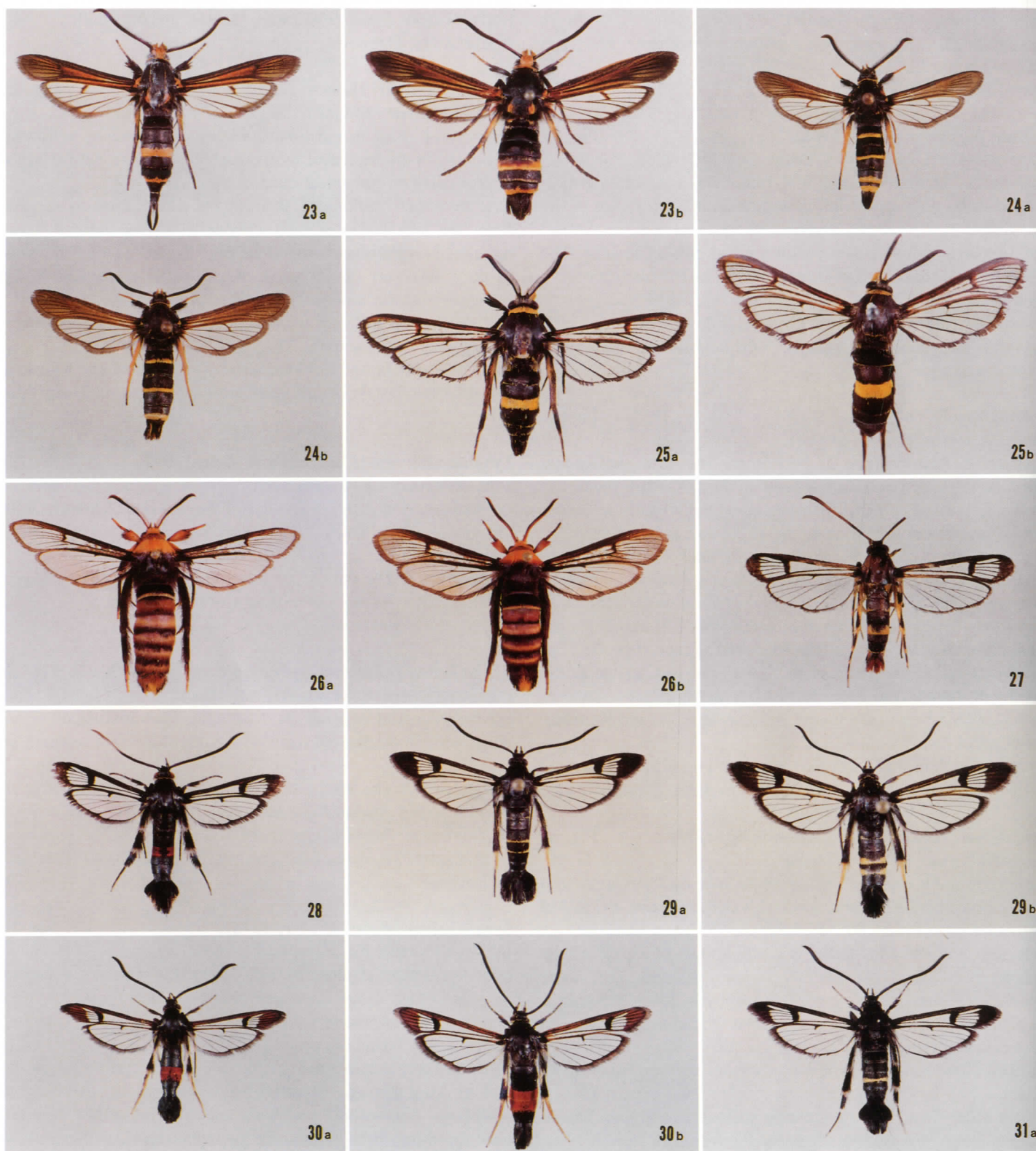


Fig. 23-31. Adults of clearwing moths of Japan: 23. *Nokona regalis*, a) ♂ b) ♀; 24. *Paranthrene tabaniformis tabaniformis*, a) ♂, b) ♀; 25. *Toleria contaminata*, a) ♂, b) ♀; 26. *Toleria romanovi*, a) ♂, b) ♀; 27. *Synanthedon esperi*, a) ♀; 28. *Synanthedon fukuzumii*, a) ♂; 29. *Synanthedon hector*, a) ♂, b) ♀; 30. *Synanthedon herzi*, a) ♂, b) ♀; 31. *Synanthedon multitarus*, a) ♂.

plums (*Prunus salicina*), apricots (*P. armeniaca* var. *ansu*), Ussurian pear (*Pyrus simonii*), apples (*Malus pumila*), Chinese quince (*Chaenomeles sinensis*) (all Rosaceae), maple (*Acer palmatum*, Aceraceae), cultivated persimmon (*Diospyros kaki*, Ebenaceae). The last three tree species were only once recorded as food plants.

***Synanthedon herzi* Spatenka & Gorbunov, 1992** Fig. 30

JAPANESE NAME: Akaobi-ko-sukasiba.

COMMENTS: Alar expanse 15.5-24.5mm. This fantastic clearwing is peculiar for the broad vivid reddish-orange band on the 4th and 5th abdominal segments in both sexes; known from Hokkaido, Japan.

LIFE HISTORY: The life cycle is partially known in Hokkaido. Adults emerge from July to August together with *Synanthedon multitarsus* Spatenka & Arita from low-growing willows along rivers.

DISTRIBUTION: Japan (Hokkaido), Mongolia, Russia (Siberia).

HOSTPLANTS: Trunks of low-growing willows (*Salix* spp., Salicaceae) in Hokkaido, Japan.

***Synanthedon multitarsus* Spatenka & Arita, 1992** Fig. 31

JAPANESE NAME: Hitosuji-ko-sukasiba.

COMMENTS: Alar expanse 15.0-25.0mm. This often tiny clearwing is very similar to *Synanthedon unocingulatum* Bartel in maculation, but separable by the shape of the external transparent area, and by the male and female genitalia.

LIFE HISTORY: Adults emerge from the middle of June to the end of August. Eggs are laid singly on the surface of trunks of shrubby willows, *Salix gracilistyla*, and low-growing alder, *Alnus serrulatoidea*. Larvae make a gallery between bark and wood, and rarely tunnel into the stem of the host. The full-grown larva hibernates in a compact cocoon in the larval gallery, and pupates the end of May.

DISTRIBUTION: Japan (Hokkaido and Honshu).

HOSTPLANTS: Trunks and branches of willows (*Salix gracilistyla* and *Salix* spp., Salicaceae) and alder (*Alnus serrulatoidea*, Betulaceae).

Synanthedon pseudoscoliaeforme Fig. 32

Spatenka & Arita, 1992

JAPANESE NAME: Futasuji-ko-sukasiba.

COMMENTS: Alar expanse 22.5mm. This unique clearwing seems to be a very rare species, known only from the female holotype specimen from Kyoto.

LIFE HISTORY: The life history is very poorly known. The collection data is the 10th of May in Honshu.

DISTRIBUTION: Japan (Honshu).

HOSTPLANTS: Unknown.

***Synanthedon quercus* (Matsumura, 1911)** Fig. 33

JAPANESE NAME: Kasi-ko-sukasiba.

COMMENTS: Alar expanse 19.0-34.0mm. This is the most unique member of the genus *Synanthedon* in Japan, with its tinged yellow-brown forewings, thorax and abdomen.

LIFE HISTORY: Adults emerge from June through September. Eggs are laid singly on cracks or scars of trunks. Larvae bore under

the bark. It is reported that "a large number of larvae, ten or more, attack the same part of the bark which is located near the base of the tree trunk, often within 50cm above the soil level." (Yano, 1961).

DISTRIBUTION: Japan (Honshu, Kyushu and Yaku-shima Id.) and Korea.

HOSTPLANTS: Trunks of various oak trees (*Quercus acuta*, *Q. serrata*, *Q. glauca*, *Shiia cuspidata*, and *Shiia* sp., Fagaceae) and cultivated chestnut (*Castanea crenata*, Fagaceae).

Synanthedon scoliaeforme japonicum Fig. 34

Spatenka & Arita, 1992

JAPANESE NAME: Futomon-ko-sukasiba.

COMMENTS: Alar expanse 29.0-36.5mm. This species is most distinctive by the large forewing discal spot. The subspecies *S. s. japonicum* from Japan differs from the nominotypical subspecies by its black anal tufts, instead of orange.

LIFE HISTORY: The life history is partly known. Adults emerge on July from base of trunk of birch.

DISTRIBUTION: Japan (Hokkaido and Honshu).

HOSTPLANTS: Trunks of birch (*Betula platyphylla* var. *japonica*, Betulaceae).

***Synanthedon subproductum* Inoue, 1982** Fig. 35

JAPANESE NAME: Yama-ko-sukasiba.

COMMENTS: Alar expanse 21.0mm. This clearwing moth is known only from the female holotype from Hokkaido.

LIFE HISTORY: The life cycle is known only from one specimen. The date of 3rd September is an unusually late record in Hokkaido, so this may represent the end of the generation period.

DISTRIBUTION: Japan (Hokkaido)

HOSTPLANTS: Unknown.

***Synanthedon tenue* (Butler, 1878)** Fig. 36

JAPANESE NAME: Hime-ko-sukasiba.

COMMENTS: Alar expanse 14.0-21.0mm. This tiny clearwing is one of the smallest clearwing moths in Japan. The larvae bore in cultivated persimmon and do considerable damage in orchards.

LIFE HISTORY: Adults emerge from May until June. Larvae bore in forks of branches and the bases of a young shoots between the bark and wood. The remaining life history is similar to that of *Synanthedon Hector*.

DISTRIBUTION: Japan (Hokkaido, Honshu, Shikoku and Kyushu), Korea and Manchuria.

HOSTPLANTS: Cultivated persimmon (*Diospyros kaki*, Ebenaceae).

***Synanthedon unocingulatum* Bartel, 1912** Fig. 37

JAPANESE NAME: Kiobi-ko-sukasiba.

COMMENTS: Alar expanse 22.0-26.5mm. This clearwing is rarely collected and only a few specimens are known from Japan.

LIFE HISTORY: The life cycle is poorly known, but adults are collected in June, July and September in Japan.

DISTRIBUTION: Japan (Hokkaido?, Honshu and Kyushu) and Korea. HOSTPLANTS: Unknown.

***Synanthedon yanoi* Spatenka & Arita, 1992** Fig. 38

JAPANESE NAME: Yano-ko-sukasiba.

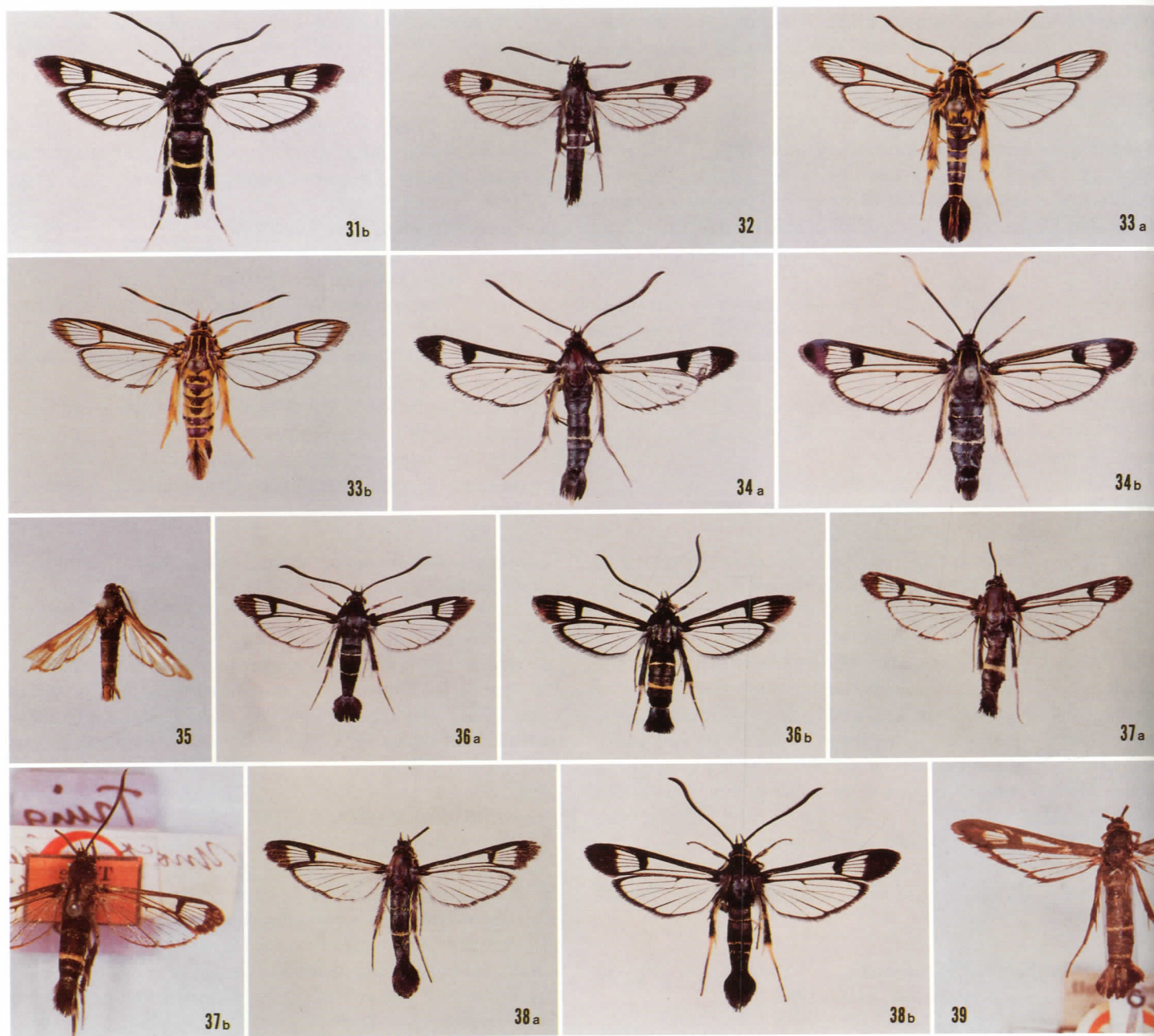


Fig. 31-39. Adults of clearwing moths of Japan: 31. *Synanthedon multitarus*, b) ♀; 32. *Synanthedon pseudoscoliaeforme*, ♀; 33. *Synanthedon quercus*, a) ♂, b) ♀; 34. *Synanthedon scoliaeforme japonicum*, a) ♂, b) ♀; 35. *Synanthedon subproductum*, ♀ [holotype of *Conopia producta*]; 36. *Synanthedon tenue*, a) ♂, b) ♀; 37. *Synanthedon uncingulatum*, a) ♀, b) ♀ [holotype]; 38. *Synanthedon yanoi*, a) ♂ [paratype], b) ♂; 39. *Scalarignathia montis*, ♂ [holotype].

COMMENTS: Alar expanse 22.0-23.0mm. This rather small clearwing is apparently a rare species, and only a few specimens are known. This species is similar to *Synanthedon hector*, but distinguished from it by the yellow distal margin on the 2nd and 4th abdominal segments.

LIFE HISTORY: The life history is poorly known, but adults are collected in early June from Kyushu and early August from Hokkaido.

DISTRIBUTION: Japan (Hokkaido and Kyushu)

HOSTPLANTS: Unknown.

Scalarignathia montis (Leech, 1889)

JAPANESE NAME: Misuji-sukasiba.

COMMENTS: Alar expanse 25.0mm. This very rare clearwing was originally described from Oiwake [Nagano-ken], central Honshu; it is known only from the male holotype specimen.

LIFE HISTORY: Life cycle is unknown; the one adult was collected in June.

DISTRIBUTION: Japan (Honshu).

HOSTPLANTS: Unknown.

Fig. 39

HOSTPLANT INDEX

- Acer palmatum* (Aceraceae) (Japanese name: Iroha-momiji)
Synanthedon hector
- Actinosemma lobatum* (Cucurbitaceae) (Japanese name: Goki-zuru)
Macrosclelesia longipes yamatoensis
- Alnus serrulatoidea* (Betulaceae) (Japanese name: Kawara-hannoki)
Synanthedon multitarus
- Ampelopsis brevipedunculata* (Vitaceae) (Japanese name: No-budou)
Nokona purpurea
- Betula ermanii* (Betulaceae) (Japanese name: Dake-kamba)
Similipepsis takizawai
- Betula platyphylla* var. *japonica* (Betulaceae) (Japanese name: Shira-kamba)
Similipepsis takizawai
Synanthedon scoliaeforme japonicum
- Carya illinoensis* (Juglandaceae) (Japanese name: Pekan)
Sesia scribai
- Castanea crenata* (Fagaceae) (Japanese name: Kuri)
Sesia rhynchioides
Sesia scribai
Synanthedon quercus
- Chaenomeles sinensis* (Rosaceae) (Japanese name: Karin)
Synanthedon hector
- Diospyros kaki* (Ebenaceae) (Japanese name: Kakinoki)
Synanthedon hector
Synanthedon tenue
- Gynostemma pentaphyllum* (Cucurbitaceae) (Japanese name: Amacha-zuru)
Macrosclelesia japonica
- Malus pumila* (Rosaceae) (Japanese name: Seiyu-ringo)
Synanthedon hector
- Paederia scandens* var. *mairei* (Rubiaceae) (Japanese name: Hekuso-kazura)
Nokona pernix
- Parthenocissus tricuspidata* (Vitaceae) (Japanese name: Tsuta)
Nokona pernix
- Populus nigra* (Salicaceae) (Japanese name: Seiyu-hakoyanagi)
Sesia yezoensis
- Prunus armeniaca* var. *ansu* (Rosaceae) (Japanese name: Anzu)
Synanthedon hector
- Prunus jamasakura* (Rosaceae) (Japanese name: Yama-zakura)
Synanthedon hector
- Prunus mume* (Rosaceae) (Japanese name: Ume)
Synanthedon hector
- Prunus persica* (Rosaceae) (Japanese name: Momo)
Synanthedon hector
- Prunus salicina* (Rosaceae) (Japanese name: Su-momo)
Synanthedon hector
- Prunus x vedoensis* (Rosaceae) (Japanese name: Someiyoshino)
Synanthedon hector
- Pyrus simonii* (Rosaceae) (Japanese name: Chosen-yama-nasi)
Synanthedon hector
- Quercus acuta* (Fagaceae) (Japanese name: Aka-gasi)
Synanthedon quercus
- Quercus acutissima* (Fagaceae) (Japanese name: Kunugi)
Sesia scribai
- Quercus glauca* (Fagaceae) (Japanese name: Ara-kasi)
Synanthedon quercus
- Quercus myrsinaefolia* (Fagaceae) (Japanese name: Shira-kasi)
Sesia scribai
- Quercus serrata* (Fagaceae) (Japanese name: Konara)
Sesia scribai
Synanthedon quercus
- Quercus sessilifolia* (Fagaceae) (Japanese name: Tsukubane-gasi)
Sesia scribai
- Rosa multiflora* (Rosaceae) (Japanese name: No-ibara)
Trichoceroa constricta
- Rosa* sp. (Rosaceae) (Japanese name: Bara)
Trichoceroa constricta
- Rubus crataegifolius* (Rosaceae) (Japanese name: Kuma-ichigo)
Pennisetia fixseni fixseni
- Rubus croceacanthus* (Rosaceae) (Japanese name: Oobara-ichigo)
Pennisetia insulicola
- Rubus grayanus* (Rosaceae) (Japanese name: Ryukyu-ichigo)
Pennisetia insulicola
Trichoceroa esakii
- Rubus idaeus* var. *aculeatissimus* (Rosaceae) (Japanese name: Ezo-ichigo)
Pennisetia fixseni admirabilis
Pennisetia hylaeiformis assimilis
- Rubus sieboldii* (Rosaceae) (Japanese name: Houroku-ichigo)
Trichoceroa yakushimensis
- Salix gracilistyla* (Salicaceae) (Japanese name: Neko-yanagi)
Synanthedon multitarus
- Salix sachalinensis* (Salicaceae) (Japanese name: Onoe-yanagi)
Sesia yezoensis
- Salix* spp. (Salicaceae) (Japanese name: Yanagirui)
Paranthrene tabaniformis tabaniformis
Synanthedon fukuzumii
Synanthedon herzi
Synanthedon multitarus
- Shiia cuspidata* (Fagaceae) (Japanese name: Tsuburajii)
Synanthedon quercus
- Shiia* sp. (Fagaceae) (Japanese name: Shiirui)
Synanthedon quercus
- Trichosanthes cucumeroides* (Cucurbitaceae) (Japanese name: Karasu-uri)
Melittia inouei
Melittia sangaika nipponica
- Trichosanthes kirilowii* var. *japonica* (Cucurbitaceae) (Japanese name: Kikarazu-uri)
Melittia inouei
Melittia sangaika nipponica
- Vitis coignetiae* (Vitaceae) (Japanese name: Yama-budou)
Nokona regalis
- Vitis ficifolia* (Vitaceae) (Japanese name: Ebi-zuru)
Nokona purpurea
Nokona regalis
- Vitis vinifera* (cultivated grapevine) (Vitaceae) (Japanese name: Budou)
Nokona regalis
Toleria romanovi
- Unknown
Melittia formosana
Nokona feralis
Nokona rubra
Paranthrenopsis editha
Scalarignathia montis
Sesia okinawana
Synanthedon esperi
Synanthedon pseudoscoliaeforme
Synanthedon subproductum
Synanthedon unocingulatum
Synanthedon yanoi
Toleria contaminata

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