

A REVISIONAL SYNOPSIS OF THE NEUROPTERA IN JAPAN¹

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INTRODUCTION

When Linné erected the order Neuroptera in 1758, it included Plecoptera, Isoptera, Embioptera, Odonata, Corrodentia, Mallophaga, Mecoptera and Trichoptera in addition to Neuroptera, *s. str.* Packard (1869)², Kirby (1892) and even Sharp (1910) used the term Neuroptera in this wide sense. However, with progress of studies during the Nineteenth Century, it was divided into several orders. Since 1900 it has generally been considered that the order Neuroptera constitutes a natural and homogeneous group characterized as follows: endopterygote insects whose adults possess a primitive head and thorax, with mandibles, 4 equal or subequal membranous wings which usually have complex venation and are held roofwise over the back at rest, and legs with 5-segmented tarsi; carnivorous larvae with suctorial jaws formed of mandibles and maxillae; pupae exarate, often in a silken cocoon. Matsumura (1907), Comstock (1924), Imms (1925) and Tillyard (1926) applied the order Neuroptera to this restricted assemblage. Imms and Tillyard again divided it into 2 suborders, Megaloptera and Planipennia. Lefroy (1923) treated these suborders as the orders Megaloptera and Neuroptera. Then Handlirsch (1925), Stitz (1927), Brues and Melander (1932), Essig (1942), Ross (1949), Shiraki (1954) and others split Neuroptera into 3 orders, Megaloptera (Sialoidea), Raphidioidea (Raphidioidea) and Neuroptera *s. str.* (Planipennia). Tjeder (1957) supported this opinion on the basis of studies of ♂ and ♀ genitalia, but retained Megaloptera and Planipennia as suborders of Neuroptera. In their revised edition of "Classification of Insects", Brues, Melander and Carpenter (1954) again treated it as 1 order, Neuroptera, with 3 suborders, Sialodea, Raphidioidea and Planipennia. I follow this classification.

The first to study Japanese Neuroptera was Thunberg. In 1781 he described *Hemerobius grandis* (now *Protohermes grandis*). In 1839 Burmeister named *Chrysopa bipunctata* (presumably a synonym of *C. septempunctata*). Since 1867 MacLachlan has described new species from our fauna, but his 1875 paper is comprehensive and established a basis of study of our neuropterous fauna. He recorded 21 species (10 new) of 8 families. During

1. Japan here refers to 4 major islands, Hokkaido, Honshu, Shikoku and Kyushu, and adjacent minor islands such as Rishiri, Rebun, Okushiri, Sado, Iki, Tsushima, Goto, Yakushima, Tanegashima, Amami-Oshima, Izushichi-to and so on.
2. Packard proposed in his 1883 paper that Neuroptera be divided into Neuroptera as defined further on and Pseudoneuroptera. According to him, the defined Neuroptera was again divided into 2 suborders: Planipennia (Sialidae, Hemerobiidae, Panorpidae) and Trichoptera (Phryganeidae).

1900–1925 Gerstaecker, Enderlein, Matsumura, Navás, Miyake, Okamoto, van der Weele, Nakahara, Kuwayama and others contributed research on Neuroptera of Japan. Through their efforts (especially of Okamoto and Nakahara), the census of this order in Japan has nearly been completed.

This paper is based chiefly on materials in Hokkaido National Agricultural Experiment Station and Entomological Institute, Faculty of Agriculture, Hokkaido University. In addition some material was placed at my disposal by Dr. K. Baba and Dr. J. Minamikawa. Also the Laboratory of Insect Identification and Taxonomy, Department of Phytopathology and Entomology, National Institute of Agricultural Sciences has generously lent specimens.

I would like to express my thanks to the late Professor Emeritus S. Matsumura and the late Dr. H. Okamoto, under whose supervision and encouragement my work on Neuroptera began. I am indebted to Dr. W. Nakahara for many helpful suggestions and criticisms during the course of my work. Thanks are also due Professor Emeritus Toichi Uchida and Professor C. Watanabe for freedom of collections and literature of the Entomological Institute, Faculty of Agriculture, Hokkaido University, and to Messrs. K. Baba, M. Chujo, K. Endo, the late T. Esaki, I. Fujiyama, A. Fukuda, H. Hasegawa, H. Hirai (Kichijo), the late S. Hirayama, H. Hori, the late M. Hori, S. Imabayashi, the late S. Ishida, T. Ishihara, S. Issiki, S. Ito, I. Izaki, the late T. Kano, S. Kato, H. Kawase, K. Kishida, K. Kojima, J. Minamikawa, M. Miyatake, Y. Nishijima, Y. Nishio, A. Nohira, K. Oda, I. Okada, T. Okutani, K. Sakurai, S. Sasaki, T. Shirozu, T. Tachikawa, G. Takagi, R. Takahashi, K. Takeuchi, the late M. Takizawa, K. Tamanuki, the late C. Teranishi, T. Tsuchiyama, T. Ue, Y. Yamada, M. Yano, T. Yano, K. Yasumatsu, and the late K. Yokoyama for supplying specimens. Finally I express my sincere thanks to Professor Emeritus Tohru Uchida and Professor S. Makino, Faculty of Science, Hokkaido University.

Geographical records are new for areas asterisked.

KEY TO SUBORDERS OF ORDER NEUROPTERA

1. Wing venation with little or no end-twigging of veins and little extra branching of Rs 2
 Wing venation with definite, frequently abundant, end-twigging of veins, generally also with numerous branches of Rs. Hindwing without separated anal area, not folded in repose. In Coniopterygidae, venation with only 2 branches to Rs and no terminal twigging, wings covered with whitish powder. Prothorax small or only moderately long (long in Mantispidae but foreleg raptorial)..... Planipennia
2. Wings large, with dense venation and ill-defined pterostigma. Sc long, fused distally with R_1 . Hindwing with separated anal area, folded in repose, slightly broader than forewing. Prothorax short, scarcely longer than other thoracic segments. ♀ without ovipositor..... Sialodea
- Wings small, with open venation and well-defined pterostigma. Sc shorter, not fused with R_1 distally. Hindwing without separated anal area. Prothorax nearly as long as rest of body, cylindrical; foreleg normal and cursorial. ♀ ovipositor long Raphidiodea

KEY TO FAMILIES OF SUBORDER SIALODEA

- Ocelli present. Tarsal segment 4 simple, not bilobed. Wing venation regular, with cross-veins weakly formed, branches of Rs directed backward. Larger sized insects, more than 60 mm in wing expanse *Corydalidae*
- Ocelli absent. Tarsal segment 4 prominently bilobed. Some branches of Rs directed forward. Mediocre insects, less than 35 mm in wing expanse *Sialidae*

Family CORYDALIDAE Burmeister, 1839

According to van der Weele, of the 2 subfamilies in this primitive family, *Neurominae* is the more primitive.

KEY TO SUBFAMILIES

- Male with 2 pairs of appendages. Antenna moniliform or filiform in both sexes, never pectinate. Head nearly quadrangular. Wings with more than 3 cross-veins between radius and its sector *Neurominae*
- Male with only 1 pair of appendages. Antenna moniliform, serrate or pectinate in ♂, moniliform, subserrate or rarely pectinate in ♀. Head triangular. Wings with normally not more than 3 cross-veins between the radius and its sector *Chauliodinae*

Subfamily NEUROMINAE van der Weele, 1909

Genus *Protohermes* van der Weele

Protohermes v. d. W., 1907: 243.—Banks, 1908: 28, 29.—v. d. W., 1910: 35.—Kimmins, 1949: 765. Type: *Hermes costalis* Walker (= *Protohermes anticus* v. d. W., not Walker); India, China and Taiwan.

Van der Weele erected this genus for species intermediate between *Neuromus* and *Hermes*.

Protohermes grandis (Thunberg)

Hemerobius grandis Th., 1781: 28, fig. 44.—Esaki, 1933: 694.

Hermes (?) *grandis*, Walker, 1853: 208.

Hermes grandis, Okamoto, 1910b: 259.—Nakahara, 1914 b: 274.—Okazaki, 1918: 63, fig. 24.

Chauliodes grandis, MacLachlan, 1867: 232.

Corydalis grandis, Matsumura, 1900a: 75.

Neuromus grandis, MacLachlan, 1869a: 45; 1875: 173.—Matsumura, 1900b: 16; 1904: 154, pl. 10, fig. 1.—Okamoto, 1905: 112.—Matsumura, 1907: 165, fig. 200; 1908: 35.—Iguchi, 1908: 251.—Matsumura, 1917: 469.—Marumo, 1927: 720, fig. 1394.—Shinji, 1928: 121, fig. 80.—Kuwana, 1930: 515.

Neuromus sp.? Nawa, 1905: 495.

Protohermes grandis, van der Weele, 1907: 243.—Banks, 1908: 29.—van der Weele, 1910: 37, pl. 3, fig. 19, text figs. 29, 30.—Stitz, 1914: 202.—Navás, 1920: 157; 1928a: 63.—Matsumura, 1931: 1172, fig.—Okamoto, 1932: 1554, fig. 3070.—Kawamura, 1932: 2225, fig. 4370, pl. 24.—Tosawa, 1932: 25.—Matsumura, 1933: 5 (9), pl. 2, fig. 4.—Hirayama, 1933: pl. 81, fig. 1 & text.—Kato, 1933: pl. 42, fig. 1 & text.—Izaki, 1934: 304.—Takahashi, 1935: 487.—Esaki, Hori & Yasumatsu, 1938: 119, fig. 213,

1.—Tanaka, 1939 : 526.—Izaki, 1940 : 120.—Kobayashi, 1942 : 220.—Tsuda, 1944 : 87.—Yasumatsu, 1945 : 214, fig. 1.—Kimmins, 1949 : 772, figs. 8–10.—Okamoto & Kuwayama, 1950 : 388, fig. 1058.—Ishihara *et al.*, 1953 : 40.—Takeuchi, 1955 : 69, fig. 378.—Ishihara, 1957 : 190, fig. 94.—Asahina, 1958 : 81.—Ueno, 1959 : 121, fig. 228.—Kuwayama, 1960 : 29.

DISTRIBUTION: Hokkaido, Honshu, Shikoku, Kyushu; Korea; Taiwan; China.

HOKKAIDO. Akan, Sapporo, Ishikiriyama, Jozankei, Okujiri I. **HONSHU.** AOMORI: Hirosaki; IWATE: Karumai; FUKUSHIMA: Mt. Azuma; TOKYO: Haijima, Hikawa; NIIGATA: Kurokawa, Sado I. (Mt. Myoken, Mt. Kinpoku, Matsugasaki); ISHIKAWA: Kanazawa; NAGANO: Shimauchi; SHIZUOKA: Shuzenji, Kanaya. **SHIKOKU.** KAGAWA: Zentsuji.³

Season: Mid-May to mid-August.

Common throughout Japan. Dried larvae of this species are called "magotaro-mushi", and are believed to be a remedy for infant emotional irritation.

Subfamily CHAULIODINAE van der Weele, 1909

Genus *Parachauliodes* van der Weele

Parachauliodes v. d. W., 1909a : 257, 259; 1910 : 58.—Kimmins, 1954 : 430. Type: *Chauliodes japonicus* MacLachlan; Japan.

Metachauliodes (!) v. d. W., 1910 : 46, 55, 61.

Wings long and narrow; pterostigmatic region brown, indistinct; only 1 branch from cell 2 confined by R and Rs **japonicus**

Wings shorter and broader; pterostigmatic region dark brown; usually 2 branches from cell 2 confined by R and Rs..... **continentalis**

Parachauliodes japonicus (MacLachlan) Fig. 1.

Chauliodes japonicus MacL., 1867 : 232; 1869 : 38; 1875 : 174.—Banks, 1908 : 30.—Iguchi, 1908 : 251.—Okamoto, 1910b : 261.—Nakahara, 1914b : 274.—Okazaki, 1918 : 64.—Shinji, 1928 : 121.—Tosawa, 1932 : 25.—Esaki, Hori & Yasumatu, 1938 : 119, fig. 213, 2.—Tanaka, 1939 : 526.—Izaki, 1940 : 120.—Tsuda, 1944 : 89, fig.

Chauliodes (Sialis) japonicus, Matsumura, 1900b : 16.

Dilar (Chauliodes) japonicus, Mats., 1908 : 36.

Parachauliodes japonicus, van der Weele, 1909a : 259; 1910 : 58, pl. 4, fig. 29, text figs. 46, 48.—Esben-Petersen, 1913a : 262.—Stitz, 1914 : 204.—Navás, 1920 : 157; 1924b : 224; 1926 : 119.—Hirayama, 1933; pl. 81, fig. 2 & text.—Izaki, 1934 : 303.—Yamakoshi, 1936 : 167.—Yasumatsu, 1945 : 214, fig. 1.—Okamoto & Kuwayama, 1950 : 389, fig. 1059.—Ishihara *et al.*, 1953 : 40.—Kimmins, 1954 : 431, fig. 12.—Asahina, 1958 : 81.—Ueno, 1959 : 121.—Kuwayama, 1960 : 29.

Chauliodes magotaro Sasaki, 1915 : 76. **New Synonymy.**

DISTRIBUTION: Honshu, Shikoku, Kyushu; Taiwan.

HONSHU. NIIGATA: Kamo, Kurokawa, Sekigawa; TOKYO: Mt. Takao; SHIZUOKA: Shimoda.

Season: Early June to early July.

Sasaki determined that so-called "magotaro-mushi" was a dried larva of this species.

3. These are records of localities of specimens examined. The same applies to those that follow.

Though his description of *Chauliodes magotaro* is too simple and ambiguous, it is certain that it is synonymous with *P. japonicus* or *P. continentalis*.

Parachauliodes continentalis van der Weele Fig. 2.

Parachauliodes continentalis v. d. W., 1909a: 259; 1910: 60, pl. 4, fig. 30, text fig. 47.—Navás, 1930: 428.—Kimmins, 1954: 432, fig. 12.—Asahina, 1958: 81.—Kuwayama, 1960: 29.

Chauliodes japonicus, Matsumura (not MacLachlan), 1904: 155, pl. 11, fig. 7; 1907: 166, fig. 201; 1917: 469, fig. 247.—Okamoto, 1932: 1555, fig. 3072.—Kato, 1933, pl. 42, fig. 2 & text.

Parachauliodes japonicus, Matsumura (not MacLachlan), 1931: 1171, fig.; 1933: 5 (9), pl. 2, fig. 5.—Takeuchi, 1955: 69, fig. 377.

DISTRIBUTION: Honshu, Shikoku, Kyushu; Korea; China.

HONSHU. AOMORI: Mt. Hakkoda; TOCHIGI: Chuzenji; NIIGATA: Miomote; SHIZUOKA; Shimoda, Kanaya; GIFU: Gifu; ISHIKAWA; Kanazawa (Mt. Tomuro); KYOTO: Kyoto; OSAKA: Minoo. SHIKOKU. KOCHI: Kochi. Van der Weele recorded this species from Korea and Tsushima. Not rare in Japan but heretofore intermingled with preceding species, *P. japonicus*.

Season: End May to early June; mid-August to mid-September.

Family SIALIDAE Samouelle, 1819

Adults much smaller than those of preceding family, black or brown in color. Differences in punctuation and gloss of head and in wing venation may be of taxonomic value, but are subject to considerable individual variation between allied species. Genitalia, however, have provided the best characters for separation. On this point Ross (1937) made a thorough study on the Nearctic species.

Head with some shining ferruginous bars and dots on occiput and behind eyes; usually 2 or more marginal accessory veins from R_3 of both wings, especially in forewing..... **Sialis**
 Head without ferruginous bars and dots on occiput and behind eyes; usually only 1 marginal accessory vein from R_3 of both wings.....**Nipponosialis**

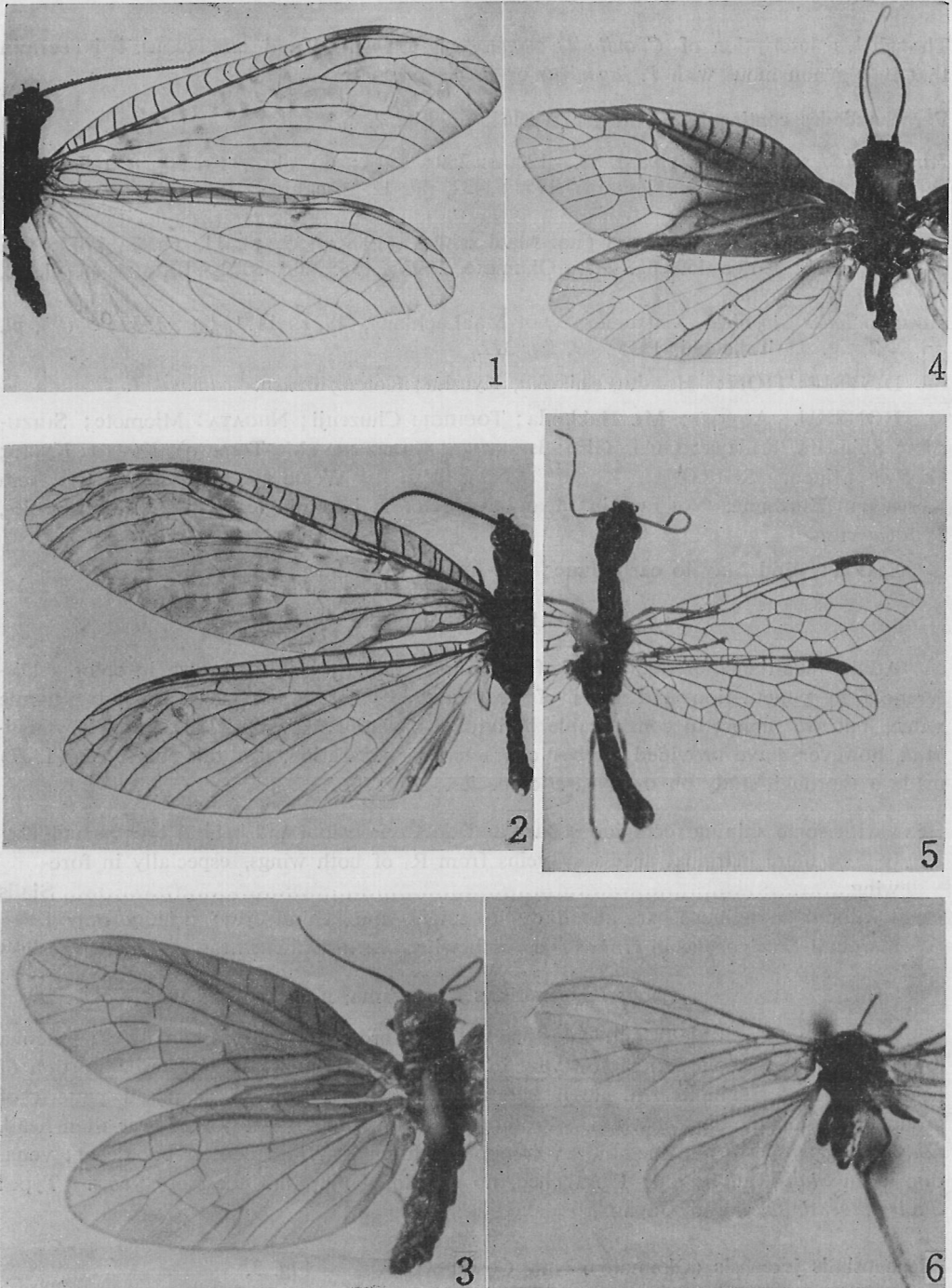
Genus **Nipponosialis** Kuwayama, n. gen.

Similar to *Sialis*. Body and wings black. Head broad and long, prognathous; antenna long and slender, about 2/3 of forewing in length, multisegmented. Posterior portion of head without ferruginous and glossy bars or dots; a scarcely visible raised pattern of ground color on the same portion. Prothorax quadrangular, slightly narrower than head, not so long as meso- and metathorax combined, shining. Wings densely pubescent; venation as in *Sialis*, but R_3 only 1 branched, no additional marginal accessory veins. Type: *Sialis jezoensis* Okamoto; Japan.

Nipponosialis jezoensis (Okamoto), NEW COMBINATION Fig. 3.

Sialis jezoensis Okam., 1910b: 258.—Nakahara, 1914b: 274; 1914c: 318.

DISTRIBUTION: Hokkaido.



Figs. 1-6. 1, *Parachauliodes japonicus* (MacLachlan) ♂, $\times 1.5$; 2, *Parachauliodes continentalis* van der Weele ♂, $\times 1.5$; 3, *Nipponosialis jezoensis* (Okamoto) ♀, $\times 3.7$; 4, *Sialis mitsuhashii* Okamoto ♂, $\times 3.8$; 5, *Inocellia japonica* Okamoto ♂, $\times 5.3$; 6, *Semidalis albata* Enderlein ♀, $\times 13.0$.

HOKKAIDO. Jozankei. Rare.

Season: July.

Genus *Sialis* Latreille

Sialis Latr., 1802: 290.—Burmeister, 1839: 946.—Wallengren, 1871: 57.—Rostock, 1888: 112.—Davis, 1903: 443.—Okamoto, 1910b: 255.—van der Weele, 1910: 77.—Ross, 1937: 60. Type: *Semblis lutarius* Fabricius; Europe.

Semblis Rambur (not Fabricius), 1842: 446.

Protosialis van der Weele, 1909a: 263; 1910: 74.

- | | |
|---|--------------------|
| 1. Wings ferruginous | 2 |
| Wings blackish or fuscous | 4 |
| 2. Forewing uniformly ferruginous..... | 3 |
| Forewing variegated with smoky color on distal portion except at pterostigmatic region. Lateral plates of ♂ genitalia long and narrow, rounded at apex, widely separated | <i>diminuta</i> |
| 3. Larger species; wing expanse ♂ ca 28 mm, ♀ ca 33 mm. Lateral plates of ♂ genitalia large, lateral margins more or less angular; apex bluntly pointed so that apical portion is somewhat triangular..... | <i>sibirica</i> |
| Smaller species; wing expanse ♂ ca 20 mm, ♀ ca 27 mm. Lateral plates of ♂ genitalia rectangular in outline, sharply pointed at distal angle..... | <i>japonica</i> |
| 4. Basal portion of forewing deeply blackish along longitudinal veins; pterostigmatic region blackish. Lateral plates of ♂ genitalia nearly equilaterally triangular in outline, and very close together..... | <i>melania</i> |
| Basal 1/2 of forewing deeply variegated with piceous black..... | 5 |
| 5. Lateral plates of ♂ genitalia large, nearly deltoid in shape, bluntly projected at outer angle | <i>nikkoensis</i> |
| Lateral plates of ♂ genitalia small, somewhat ovoid, appressed for a distance on meson..... | <i>mitsuhashii</i> |

Sialis sibirica MacLachlan

Sialis sibirica MacL., 1872: 55, pl. 1, fig. 10.—Davis, 1903: 452.—van der Weele, 1910: 82, figs. 65, 66.—Navás, 1912c: 421.—Kuwayama, 1924d: 96, fig. 1.—Shinji, 1928: 122.—Matsumura, 1931: 1170, fig.—Kobayashi, 1931: 66.—Okamoto, 1932: 1553.—Matsumura, 1933: 8 (13), pl. 2, fig. 18.—Kuwayama, 1936a: 110.—Tjeder, 1937: 123.—Kuwayama, 1950: 388.

Sialis sibirica ?, Matsumura, 1900b: 16.

Sialis japonicus, Mats. (not MacLachlan), 1900a: 75, fig. 45.

Sialis sibiricus ?, Mats., 1904: 154, pl. 10, fig. 6.

Sialis frequens Okamoto, 1905: 112.—Matsumura, 1907: 167, fig. 202.—Okamoto, 1910b: 256.—Matsumura, 1911: 13.—Nakahara, 1913c: 362; 1914b: 274; 1914c: 315; 1915g: 158, fig. 6.

Sialis japonica, Navás (not van der Weele), in part, 1920: 157; 1923d: 39.

DISTRIBUTION: Hokkaido; Kuriles; Sachalin; Siberia; N. Europe.

HOKKAIDO. Shari, Akan, Kawayu, Onneyu, Teshio, Shikaribetsu, Ikeda, Atsubetsu, Sapporo, Mt. Moiwa. Common.

Season: Mid-May to mid-July.

Sialis japonica van der Weele

Sialis sp. MacLachlan, 1870b : 146; 1875 : 174.

Sialis japonica v. d. W., 1909a : 264; 1910 : 84, fig. 67.—Nakahara, 1913a : 55; 1914b : 274; 1914c : 316, pl. 16b, fig. 1; 1915g : 158, fig. 4.—Navás, in part, 1920 : 157.—Okamoto, 1932 : 1553, fig. 3068.—Tosawa, 1932 : 25.—Hirayama, 1933 : pl. 80, fig. 7 & text.—Kato, 1933 : text.—Izaki, 1934 : 304.—Otsuka, 1938 : 550.—Yasumatsu, 1945 : 206, fig. 2.—Kuwayama, 1950 : 388, fig. 1056; 1954a : 744.—Takeuchi, 1955 : 69.

Sialis (!) *japonica*, Marumo, 1927 : 719, fig. 1393.

Sialis frequens, Iguchi (not Okamoto), 1908 : 251.—Tosawa, 1932 : 25.

DISTRIBUTION : Honshu.

HONSHU. NIIGATA : Nagaoka, Miomote; TOKYO : Tokyo; SHIZUOKA : Hamamatsu (Tani); NARA : Nara. Common.

Season : End April to end May.

Sialis mitsuhashii Okamoto Fig. 4.

Sialis mitsuhashii Okam., 1910b : 257.—Nakahara, 1914b : 274; 1914c : 318; 1915g : 158, fig. 5.—Okazaki, 1918 : 64.—Okamoto, 1932 : 1554, fig. 3069.—Tosawa, 1932 : 25.—Kato, 1933 : pl. 42, fig. 3 & text.—Izaki, 1934 : 304.—Tanaka, 1939 : 645.—Izaki, 1940 : 120.—Kobayashi, 1942 : 220.—Kuwayama, 1950 : 388, fig. 1057.—Takeuchi, 1955 : 69, fig. 379.

Sialis japonica, Nakahara, in part, 1913c : 362.—Esaki, Hori & Yasumatsu, 1938 : 119, fig. 214, 2.

DISTRIBUTION : Honshu.

HONSHU. AOMORI : Aomori; YAMAGATA : Otori-ike, Shizu; NIIGATA : Iwafune (Momogawa pass), Sasaguchi-hama, Kurokawa.

Season : End April to mid-July.

Sialis diminuta Nakahara

Sialis sp. Naka., 1914c : 319, pl. 16b, fig. 2.

Sialis diminuta Naka., 1915g : 157, fig. 1.

DISTRIBUTION : Honshu.

HONSHU. TOKYO : Seta. After Nakahara. Only type specimen known.

Season : April.

Sialis melania Nakahara

Sialis sp. Naka., 1914c : 320, pl. 16b, fig. 3.

Sialis melania Naka., 1915g : 158, fig. 2.—Tosawa, 1932 : 25.

DISTRIBUTION : Honshu.

HONSHU. OSAKA : Minoo. After Nakahara. I have not seen this species.

Season : May.

Sialis nikkoensis Nakahara

Sialis nikkoensis Naka., 1915g : 159, fig. 3.—Kuwayama, 1954a : 744.

DISTRIBUTION : Honshu.

HONSHU. NIIGATA: Miomote; TOCHIGI: Chuzenji; GUNMA: Ozegahara, Hoshi; TOKYO: Tokyo. Uncommon.

Season: End April to mid-July.

KEY TO FAMILIES OF SUBORDER RAPPHIDIODEA

Ocelli present. Prosternum mostly concealed by sides of prothorax. Pterostigma divided by 1 or more cross-veins Raphidiidae
 Ocelli absent. Prosternum free. Pterostigma without cross-veins Inocelliidae

Family RAPPHIDIIDAE Stephens, 1836

Genus *Raphidia* Linné

Raphidia Linné, 1767: 916.—Wallengren, 1871: 60.—Rostock, 1888: 113.—Esben-Petersen, 1913b: 6.—Okamoto, 1917: 148. Type: *Raphidia ophiopsis* Linné; Europe.

Rhaphidia Burmeister, 1839: 962.—Schneider, 1843: 55.—Navás, 1918: 36.

Rhaphidilla Navás, 1915c: 477; 1918: 49.

Lesna Nav., 1915c: 396; 1918: 12.

Using various venational characters Navás gave generic names to the sections of Albará's classification in 1891 and also to some he himself separated from typical *Raphidia*. As Banks (1922) mentioned, minor venational characters are variable and are of no generic value, or even of no specific value.

Raphidia harmandi Navás

Raphidia harmandi Navás, 1909e: 144, fig. 1.—Esben-Petersen, 1913b: 7.—Okamoto, 1917: 151, pl. 5, fig. 4.—Kuwayama, 1920c: 376; 1932: 1552, fig. 3066.—Mitsuhashi, 1936: 366.—Kuwayama, 1950: 389, fig. 1060.

Rhaphidia harmandi, Navás, 1918: 39.

Raphidia xanthopus Nav., 1913b: 441, fig. 1.—Okamoto, 1917: 153, pl. 5, figs. 5, 1a, 2a.

DISTRIBUTION: Honshu.

HONSHU. TOCHIGI: Nikko; GUNMA: Ozegahara. Rare.

Season: June.

Belongs to section *Dichrostigma* of Navás' *Rhaphidia* near *flavipes* Stein (Europe and Asia Minor).

Family INOCELLIIDAE Navás, 1916

Genus *Inocellia* Schneider

Inocellia Schn., 1843: 32, 84.—Rostock, 1888: 114.—Esben-Petersen, 1913b: 11.—Okamoto, 1917: 154.—Navás, 1918: 75. Type: *Raphidia crassicornis* Schummel; Europe, Siberia.

Inocellia japonica Okamoto Fig. 5.

Inocellia japonica Okam., 1917: 159, fig. 14. Larva.

Inocellia crassicornis MacLachlan (not Schummel), 1875: 174.—Matsumura, 1904: 156, pl. 10, fig. 5; 1907: 167, fig. 203; 1908: 36.—Iguchi, 1908: 251.—Esben-Petersen, in part, 1913b: 11.—Nakahara, 1915d: 336.—Matsumura, 1917: 470, fig. 248.—Okamoto,

1917: 155, pl. 5, figs. 6, 1b, 2b.—Okazaki, 1918: 64.—Navás, 1918: 77.—Kuwayama, 1920c: 376.—Marumo, 1927: 719, fig. 1392.—Shinji, 1928: 122, fig. 81.—Matsumura, 1931: 1170, fig.—Kuwayama, 1932: 1553, fig. 3067.—Kinoshita, 1932: 2194, fig. 4308.—Tosawa, 1932: 25.—Matsumura, 1933: 6 (10), pl. 2, fig. 9.—Hirayama, 1933: pl. 80, fig. 4 & text.—Kato, 1933: pl. 50, fig. 1 & text.—Izaki, 1934: 304.—Esaki, Hori & Yasumatsu, 1938: 119, fig. 214, 1.—Tanaka, 1939: 526.—Kuwayama, 1950: 389, fig. 1061; 1954a: 744.—Takeuchi, 1955: 69, fig. 380.—Ishihara, 1957: 190. **New Synonymy.**

Inocellia (*Raphidia*) *crassicornis*, Matsumura, 1900b: 16.

Inocellia crassicornis ?, Umawatari, 1925: 10, fig., Larva.—Yasumatsu, 1945: 206, fig. 3.

Rhaphidia ————— Matsumura, 1900a: 75.

DISTRIBUTION: Honshu, Shikoku, Kyushu.

HONSHU. IWATE: Karumai; TOCHIGI: Chuzenji; CHIBA: Konodai; TOKYO: Mt. Takao; KYOTO: Kyoto. **SHIKOKU.** EHIME: Iyo.

Season: End May to mid-July. Nakahara collected many at end May 1958 at Mt. Takao near Tokyo.

I have seen 5 ♀ specimens of *Inocellia* from Korea, which probably belong to this species, but must postpone exact determination as to whether it is this species or *I. crassicornis*. Okamoto discovered the larvae of *Inocellia* under the bark of pine trees in the vicinity of Kyoto. It was quite different from those of European *I. crassicornis*, and he proposed *I. japonica*. Though Okamoto did not find specific difference between Japanese and European adult specimens, I found in my recent studies some differences to be adopted specifically in the coloration of wing-venation and that of meso- and metathorax.

KEY TO FAMILIES OF SUBORDER PLANIPENNIA

1. Wings and most of body covered with whitish waxy powder; veins and cross-veins of wings few in number, costal area without or with but 1 or 2 cross-veins near the root; veins with no terminal twiggings. Very small insects, less than 10 mm in wing expanse. (Superfamily Coniopterygoidea) Coniopterygidae
- Wings and body not covered with a whitish powder; veins and usually cross-veins numerous, costal area with many cross-veins; veins usually with terminal twiggings. Mediocre or larger insects, more than 10 mm in wing expanse..... 2
- 2 (1). Antenna moniliform or filiform, rarely pectinate, never clubbed, nor with thickened apex (Superfamily Hemerobioidea) 3
- Antenna gradually thickened towards apex, or filiform with a terminal knob (Superfamily Myrmeleontoidea) 11
- 3 (2). Foreleg normal and cursorial; prothorax short..... 4
- Foreleg raptorial, with strongly thickened femur; prothorax usually greatly lengthened; antenna short, wings narrow Mantispidae
- 4 (3). Forewing with 2 or more apparent sectors, arising from R 5
- Forewing with only a single sector, arising from R near its base 7
- 5 (4). Antenna moniliform or filiform in both sexes; ovipositor not exerted; cross-veins few; ocelli absent 6

- Antenna of ♂ pectinate; ovipositor exerted and long; vertex with 3 prominent ocellus-like tubercles; cross-veins numerous Dilaridae
- 6 (5). Forewing with 3 or more radial sectors, veins R_4 and R_5 arising separately ...
..... Hemerobiidae
- Forewing with apparently 2 radial sectors, R_{2+3} and R_{4+5} Sympherobiidae
- 7 (4). Ocelli present. Discal area of wings with many cross-veins, marginal area with no cross-veins but with many forked veinlets..... Osmylidae
- Ocelli absent..... 8
- 8 (7). Costal cross-veins forked in forewing; Cu_1 in hindwing for a long distance close to hind border. Wings and body hairy, especially on hind margins of wings Berothidae
- Costal cross-veins usually not forked in forewing; Cu_1 in hindwing not parallel to hind margin 9
- 9 (8). Wing margins with trichosors or small hairy thickenings between tips of veins; cross-vein r-m in hindwing long and placed longitudinally..... Sisyridae
- Wing margins without trichosors; cross-vein r-m in hindwing short and placed obliquely or transversely 10
- 10 (9). Wings of nearly equal width; a cross-vein placed near base of subcostal cell; less than 30 cross-veins in costal cell before pterostigma..... Chrysopidae
- Forewing distinctly wider than hindwing, no cross-veins near base of subcostal cell; more than 40 costal cross-veins before pterostigma..... Apochrysidae
- 11 (2). Antenna short, weakly clubbed or flattened towards apex; hypostigmatic cell elongate..... Myrmeleontidae
- Antenna long and slender, strongly clavate apically; no elongate hypostigmatic cell differentiated Ascalaphidae

Family CONIOPTERYGIDAE Burmeister, 1839

Smallest known neuropterous insects. Body and wings covered with whitish waxy substance, resembling Aleurodidae. Venation highly reduced, but characters usually reliable for generic or specific determination. However, position of cross-veins exceedingly variable. World-wide distribution with more than 100 species belonging to 24 genera. Of these, 5 genera each containing 1 species represented in Japan.

KEY TO SUBFAMILIES

- M of forewing with 2 thickenings which bear bristles, plicaturae, or remainders of such structure; M and Cu_1 of hindwing in close proximity for more than 1/2 their length. Galea of maxilla 3-segmented. Abdominal ventral pouches present Aleuropteryginae
- M of forewing without 2 conspicuous plicaturae; M and Cu_1 in hindwing not in close proximity. Galea of maxilla 1-segmented. No abdominal ventral pouches Coniopteryginae

Subfamily CONIOPTERYGINAE Enderlein, 1905

1. Hindwing much reduced in size **Conwentzia**
- Hindwing normal, i. e., wings subequal 2

2. M in hindwing unbranched **Coniopteryx**
 M in hindwing branched **Semidalis**

Genus **Conwentzia** Enderlein

Conwentzia End., 1905a: 10; 1906: 190; 1908: 7.—Killington, 1936: 185. Type: *Coniopteryx psociformis* Curtis (= *C. pineticola* Enderlein); Europe.

Conwentzia psociformis (Curtis)

Coniopteryx psociformis Curt., 1834: pl. 528, text figs. 1-8 & text.—Burmeister, 1839: 772.—Rambur, 1842: 316.—Wallengren, 1871: 55.—Rostock, 1888: 112, pl. 7, fig. 38.—Tullgren, 1906: 13, fig. 8.

Coniopteryx aphidiformis Rambur, 1842: 316.

Coniopteryx reticulata Tullgren, 1906: 14, fig. 9.

Conwentzia psociformis, Enderlein, 1905a: 10, fig. 2; 1906: 191, figs. 1, 38, 39, 64; 1908: 8.—Killington, 1936: 187, figs. 55A, 56.

Conwentzia pineticola Enderlein, 1905a: 10, fig. 1; 1906: 193, figs. 2, 34, 45; 1908: 7, pl. 1, figs. 2, 4.

DISTRIBUTION: Hokkaido*, Honshu*: Europe; Egypt.

HOKKAIDO. Sapporo. HONSHU. TOKYO: Komaba; KYOTO: Kyoto.

Season: Mid-June to end July; October.

New to Japan; common in Europe. In forewing of ♀ specimen from Kyoto, Sc₂ crosses to R₁ before the point where cross-vein R₁ to Rs strikes R₁ as in case of *Conwentzia inverta* Withycombe from India. As Withycombe states, this is most unusual feature in Coniopterygidae although also found in *Coniocompsa*. I have been unable to discover any difference in other morphological characters, so I regard this specimen as only a form of individual variation.

Genus **Coniopteryx** Curtis

Coniopteryx Curtis, 1834: pl. 528 & text.—Burmeister, 1839: 771.—Wallengren, 1871: 53.—Rostock, 1888: 111.—Enderlein, 1906: 195; 1908: 8.—Nakahara, 1913d: 197.—Withycombe, 1925b: 6.—Killington, 1936: 194.—Tjeder, 1957a: 122. Type: *Coniopteryx tineiformis* Curtis; Europe.

Malacomyza Wesmael, 1836: 166.

Coniopteryx abdominalis Okamoto

Coniopteryx abdominalis Okam., 1905: 115.—Matsumura, 1907: 173, fig. 207.

Coniopteryx pulverulenta Enderlein, 1907: 3; 1908: 9, pl. 1, fig. 10.—Nakahara, 1913d: 197.—Matsumura, 1931: 1153, fig.—Kuwayama, 1932: 1552, fig. 3065; 1950: 400, fig. 1094; 1956b: 19; 1957: 1. **New Synonymy.**

Malacomyza pulverulenta, Banks, 1937: 277.

DISTRIBUTION: Hokkaido, Honshu, Shikoku, Kyushu; Taiwan.

HOKKAIDO. Mt. Moiwa, Sapporo, Toyohira, Otaru (Zenibako). HONSHU. TOKYO: Miyake I. SHIKOKU. EHIME: Mt. Sara, Mt. Takanawa, Gunchu. KYUSHU. FUKUOKA: Kashii.

Season: Early May to mid-August.

Genus *Semidalis* Enderlein

Semidalis End., 1905b: 197; 1906: 209; 1908: 11.—Nakahara, 1913d: 197.—Killington, 1936: 206.—Tjeder, 1957a: 136. Type: *Coniopteryx aleurodifformis* Stephens; Europe. *Niphetia* Enderlein, 1929: 106.

Semidalis albata Enderlein Fig. 6.

Semidalis albata End., 1907: 5; 1908: 11, pl. 1, figs. 5, 6.—Nakahara, 1913d: 198; 1914e: 457.—Esaki, 1930a; 4.—Matsumura, 1931: 1153, fig.—Kuwayama, 1932: 1551, fig. 3064.—Tosawa, 1932: 27.—Esaki, Hori & Yasumatsu, 1938: 120, fig. 215, 3.—Kobayashi, 1942: 221.—Kuwayama, 1950: 400, fig. 1093; 1956b: 20; 1957: 1.—Ishihara, 1957, fig. 92.

Coniopteryx albata, Banks, 1937: 277.

DISTRIBUTION: Hokkaido*, Honshu, Shikoku, Kyushu; Taiwan.

HOKKAIDO. Sapporo. HONSHU. TOKYO: Tokyo; NARA: Nara. SHIKOKU. EHIME: Gunchu, Satamisaki. KYUSHU. FUKUOKA: Wakasugiyama.

Season: Mid-April to mid-June.

Subfamily ALEUROPTERYGINAE Enderlein, 1905

Wings narrow, curved and subacute, fringed with long hairs; M in both wings simple and unbranched. Antenna normal..... **Coniocompsa**
 Wings of fairly normal shape and not strikingly fringed; M in both wings branched.
 Basal 2 segments of antenna very long and broader than the following segments
 **Spiloconis**

Genus *Spiloconis* Enderlein

Spiloconis End., 1907: 6; 1908: 16.—Nakahara, 1913d: 199. Type: *Spiloconis sexguttata* End.; Japan.

Spiloconis sexguttata Enderlein

Spiloconis sexguttata End., 1907: 7, fig. 1; 1908: 16, pl. 2, fig. 17.—Nakahara, 1913d: 200.—Carpenter, 1955: 70.

Spiloconis rufa Nakahara, 1913d: 199, fig.

Coniopteryx flavicornis Matsumura, 1907: 173.—Iguchi, 1908: 252.—Nakahara, 1913d: 196.—Tosawa, 1932: 27. **New Synonymy.**

DISTRIBUTION: Honshu, Kyushu; Taiwan.

KYUSHU. KAGOSHIMA: Kagoshima. Rare and restricted in distribution.

Season: July.

Genus *Coniocompsa* Enderlein

Coniocompsa End., 1905c: 225; 1906: 223; 1908: 14.—Tjeder, 1957b: 5. Type: *Coniocompsa vesiculigera* Enderlein; Malacca.

Coniocompsa japonica Enderlein

Coniocompsa japonica End., 1907: 8; 1908: 14, pl. 2, fig. 23.—Nakahara, 1913d: 196;

1914e: 457.—Matsumura, 1931: 1153, fig.—Kuwayama, 1932: 1551, fig. 3063; 1950: 401, fig. 1095; 1956b: 20; 1957: 1.

Coniopteryx maculosa Matsumura, 1907: 173. **New Synonymy.**

Spiloconis (?) *maculosa*, Nakahara, 1913d: 196.

DISTRIBUTION: Honshu, Shikoku, Kyushu.

HONSHU. GIFU: Gifu; **KYOTO:** Yamashiro. **SHIKOKU.** EHIME: Iyo. **KYUSHU.** FUKUOKA: Wakasugiyama. Uncommon.

Season: End May to mid-July.

Family SISYRIDAE Handlirsch, 1906

Sisyridae, known as spongilla-flies, is a group of small insects, similar to Hemerobiidae in appearance. Consisting of 3 subfamilies, this family is widely distributed but the species are not numerous. Though nothing is known concerning the life-history and larvae of Neurorthinae, larvae of the other 2 subfamilies, Sisyrinae and Climaciinae, are aquatic, and larvae of Sisyrinae are regarded as parasitic on fresh-water sponges. Recently Nakahara published a paper on Neurorthinae of the world, while Parfin and Gurney furnished a monograph of this family of the Western Hemisphere.

KEY TO SUBFAMILIES

Two series of gradate cross-veins present in fore- and hindwings.....Neurorthinae
No series of gradate cross-veins present in either wing..... Sisyrinae

Subfamily NEURORTHINAE Nakahara, 1958

Genus *Nipponeurorthus* Nakahara

Nipponeurorthus Nakahara, 1958: 25. Type: *Nipponeurorthus pallidinervis* Nakahara; Japan.

According to Nakahara this Asiatic genus may be distinguished from the Euro-African *Neurorthus* Costa and the Australian *Austroneurorthus* Nakahara by the features of sternites 9 and 10 of ♂ as well as by the characters of costal cross-veins in forewing and by position of furcation of branch 1 of Rs and M_{1+2} in hindwing.

1. Forewing with grayish black spots on radial cross-veins..... **punctatus**
Forewing unspotted..... 2
2. Forewing slightly tinted with grayish brown; venation almost uniformly fuscous brown..... **finctipennis**
Forewing colorless..... 3
3. Longitudinal veins totally pale testaceous **pallidinervis**
Radial, median and cubital branches partly colored with fuscous black **fuscinervis**

Nipponeurorthus pallidinervis Nakahara Fig. 7.

Nipponeurorthus pallidinervis Naka., 1958: 25, pl. 9, fig. 2, text figs. 1B, 1E, 3; 1960: 34.

DISTRIBUTION: Hokkaido, Honshu, Kyushu (Tsushima I.).

HOKKAIDO: Sapporo (Maruyama), Jozankei. Common.

Season: July.

Nipponeurorthus fuscinervis (Nakahara)

Neurorthus fuscinervis Naka., 1915f: 16, fig. 1; 1915e: 99; 1920: 164.

Nipponeurorthus fuscinervis, Naka., 1958: 26, pl. 9, fig. 1, text fig. 4.

DISTRIBUTION: Honshu.

HONSHU. KYOTO: Mt. Atago. After Nakahara. I have not examined this species personally.

Season: July to August.

Nipponeurorthus punctatus (Nakahara)

Neurorthus punctatus Naka., 1915f: 15, pl. 1, fig. 1; 1915e: 99; 1920: 164.—Kuwayama, 1932: 1548, fig. 3058.—Tosawa, 1932: 26.—Kuwayama, 1950: 396, fig. 1065.—Takeuchi, 1955: 70, fig. 386.

Nipponeurorthus punctatus, Naka., 1958: 27, pl. 8, fig. 1, text fig. 6; 1960: 34.

DISTRIBUTION: Hokkaido*, Honshu, Kyushu.

HOKKAIDO. Sapporo. HONSHU. NIIGATA: Kurokawa.

Season: July.

Nipponeurorthus tinctipennis Nakahara

Nipponeurorthus tinctipennis Naka., 1958: 27, pl. 9, fig. 3, text fig. 5.

DISTRIBUTION: Kyushu (Yakushima I.).

KYUSHU. KAGOSHIMA: Yakushima I. After Nakahara.

Season: July.

Subfamily SISYRINAE Banks, 1905

Genus *Sisyra* Burmeister

Sisyra Burmeister, 1839: 975.—Wesmael, 1841: 213.—Rambur, 1842: 415.—Hagen, 1866: 375.—Wallengren, 1871: 25.—Rostock, 1888: 106.—Needham & Betten, 1901: 552.—Banks, 1905: 25; 1913: 211.—Nakahara, 1914h: 492.—Krüger, 1923: 25, 63.—Navás, 1935: 40.—Killington, 1936: 228.—Carpenter, 1940: 253.—Parfin & Gurney, 1956: 456.—Tjeder, 1957: 159. Type: *Hemerobius fuscatus* Fabricius; Europe.

Nopia Navás (not Walker), 1910c: 397. Preoccupied.

Sisyrella Banks, 1913: 218.—Nakahara, 1915f: 18.—Krüger, 1923: 45, 63.—Navás, 1935: 70.—Parfin & Gurney, 1956: 518.

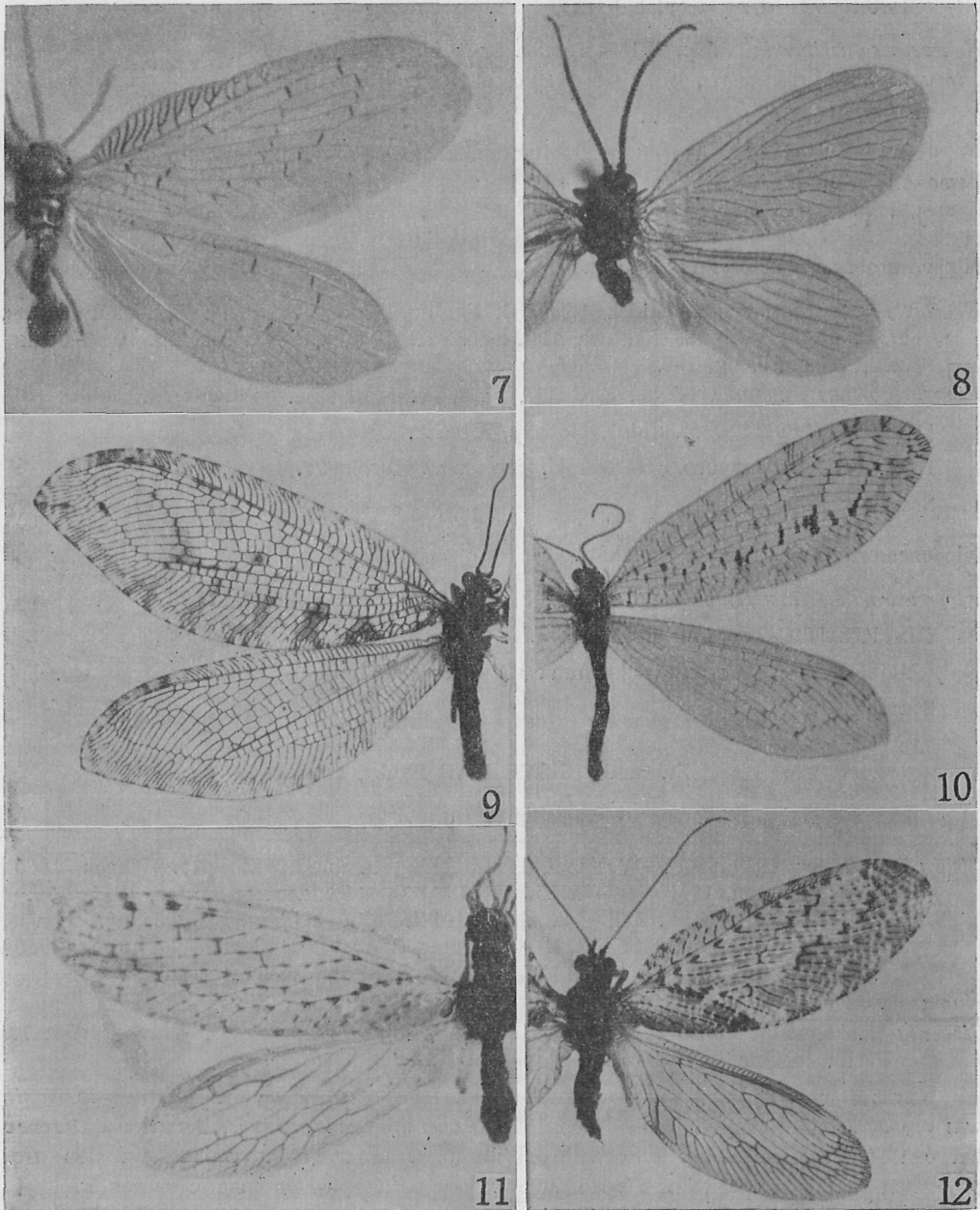
Navás erected genus *Nopia*, for which Banks proposed new name *Sisyrella* as *Nopia* was preoccupied in Lepidoptera. According to descriptions of Navás, the chief difference between *Sisyrella* and *Sisyra* is Sc with or without terminal end atrophied. But this atrophy often occurs in species of *Sisyra*, and can not be adopted as generic character.

Sisyra nikkoana (Navás) Fig. 8.

Nopia nikkoana Navás, 1910c: 398.

Sisyrella nikkoana, Nakahara, 1915f: 18; 1915e: 100.—Navás, 1935: 71, fig. 39.

Sisyra nikkoana, Nakahara, 1920: 163.—Esaki, 1930a: 2.—Matsumura, 1931: 1169, fig.—



Figs. 7-12. 7, *Niponeurorthus pallidinervis* Nakahara ♂, $\times 5.4$; 8, *Sisyra nikkoana* (Navás) ♂, $\times 8.4$; 9, *Plethosmylus decoratus* (Nakahara) ♀, $\times 2.1$; 10, *Spilosmylus flavicornis* (MacLachlan) ♀, $\times 2.8$; 11, *Micromus multipunctatus* Matsumura ♂, $\times 9.0$; 12, *Eumicromus maculatipes* Nakahara ♀, $\times 4.5$.

- Kuwayama, 1932: 1549, fig. 3059.—Kato, 1934: 4, fig. 1.—Mitsubishi, 1936: 366.—Esaki, Hori & Yasumatsu, 1938: 120, fig. 216, 1.—Kuwayama, 1950: 390, fig. 1064.—Takeuchi, 1955: 70, fig. 385.—Kuwayama, 1956b: 24; 1957: 2.—Ueno, 1959: 122.
- Sisyra japonica* Nakahara, 1914h: 493, fig. 1; 1915e: 99.—Tosawa, 1932: 26.—Baba, 1955: 12.—Nakahara, 1960: 34.
- Sisyrella japonica*, Navás, 1935: 73, fig. 40.
- Sisyra ozenumana* Nakahara, 1914h: 495; 1915e: 99.—Navás, 1935: 53.
- Sisyra yamamurae* Nakahara, 1914h: 496; 1915e: 99.—Navás, 1935: 54.
- Sisyra esakii* Nakahara, 1915e: 99. No description.
- Sisyra* sp. Ueno, 1929: 139, fig. 1. Larva.

DISTRIBUTION: Hokkaido, Honshu, Shikoku, Kyushu.

HOKKAIDO. Shikotsu, Onuma. HONSHU. TOCHIGI: Chuzenji; OSAKA: Osaka. KYUSHU. FUKUOKA: Fukuoka (Hirao).

Season: Early June; early August to mid-September.

According to Ueno (1929) and Kato (1934), larvae of this species live on the freshwater sponge *Ephydatia mülleri* var. *japonica* Hilgendorf in lakes and ponds.

Family OSMYLIDAE Newman, 1853

Medium-sized graceful insects. Wings have very many cross-veins in discal areas and many forked veinlets in marginal areas, with markings in some species.

KEY TO SUBFAMILIES

- In forewing, costal cross-veins mostly furcate; in hindwing, Cu_2 running parallel to Cu_1 for a considerable distance *Osmylinae*
- In forewing, costal cross-veins mostly simple; in hindwing, Cu_2 very short, bent posteriorly and not running parallel to Cu_1 *Spilosmylinae*

Subfamily OSMYLINAE Krüger, 1913

- In forewing, costal cross-veins without connecting short veinlets; more than 3 cross-veins between stem of Rs and M before basal eye spot *Osmylus*
- In forewing, some of costal cross-veins connected with short veinlets making a network feature; only 2 cross-veins between stem of Rs and M before basal eye spot *Plethosmylus*

Genus *Osmylus* Latreille

- Osmylus* Latr., 1802: 289.—Burmeister, 1839: 983.—Wesmael, 1841: 220.—Hagen, 1866: 375.—Wallengren, 1871: 28.—Rostock, 1888: 105.—van der Weele, 1909b: 48.—Krüger, 1913: 38, 201.—Banks, 1913: 215.—Nakahara, 1914h: 510.—Navás 1917: 13. Type: *Osmylus fulvicephalus* Scopoli; Europe.
- Osmylina* Schneider, 1851: 36.
- Hyposmylus* MacLachlan, 1870a: 200.
- Parosmylus* Needham, 1909, 209.
- Dictyosmylus* Navás, 1910a: 189.

- Face yellowish with a large furcate black mark between antennae; venation of forewing mostly blackish, but partly whitish so as to cause irregular pale and blackish alternate spaces **tessellatus**
- Face yellowish with a broad transverse black band; venation of forewing mostly blackish..... **pryeri**

***Osmylus tessellatus* MacLachlan**

Osmylus tessellatus MacL., 1875: 180.—Matsumura, 1900b: 17.—Okamoto, 1905: 114.—Matsumura, 1907: 172; 1908: 39.—Navás, 1910a: 193.—Nakahara, 1914h: 511, fig. 2.—Krüger, 1915: 75.—Matsumura, 1917: 472.—Navás, 1924b: 223.—Marumo, 1927: 718, fig. 1391.—Matsumura, 1931: 1168, fig.—Kuwayama, 1932: 1537, fig. 3036.—Tosawa, 1932: 26.—Matsumura, 1933: 5 (8), pl. 2, fig. 3.—Hirayama, 1933: pl. 79, fig. 6 & text.—Uchida, 1934: 240.—Izaki, 1934: 304.—Kuwayama, 1936a: 108.—Esaki, Hori & Yasumatsu, 1938: 124, fig. 224, 1.—Tanaka, 1939: 526.—Kobayashi, 1940: 458.—Yasumatsu, 1945: 206, fig. 1c.—Kuwayama, 1950: 399, fig. 1091; 1953b: 178.—Ishihara *et al.*, 1953: 40.—Kuwayama, 1954: 94; 1956c: 79; 1956b: 22; 1957: 1.—Asahina, 1958: 81.—Nakahara, 1960: 34.

Osmylus ? tessellatus, Krüger, 1913: 204, 270.

DISTRIBUTION: Hokkaido, Honshu, Shikoku, Kyushu; Kuriles.

HOKKAIDO. Akan, Mts. Daisetsu, Nukabira, Upepesanke, Sounkyo, Shirogane, Jozankei, Sapporo. HONSHU. AOMORI: Towada; FUKUSHIMA: Numajiri; TOCHIGI: Nikko; GUNMA: Katashina; SAITAMA: Chichibu; TOKYO: Mitaka; NAGANO: Shimajima; SHIZUOKA: Misakubo; KYOTO: Mt. Kibune; NARA: Mt. Odaigahara. SHIKOKU. KOCHI: Honkawa (Mt. Tebako). Common.

Season: End April to early September.

***Osmylus pryeri* MacLachlan**

Osmylus pryeri MacL., 1875: 180.—Matsumura, 1900b: 17; 1908: 39.—Navás, 1910a: 193.—Nakahara, 1914h: 513, fig. 3; 1914f: 493.—Krüger, 1915: 76.—Mitsuhashi, 1936: 366.

Osmylus pryeri ?, Nakahara, 1913i: 626.

Osmylus ? pryeri, Krüger, 1913: 204, 270

Osmylus shikokuensis Kuwayama, 1953b: 178, fig.—Ishihara *et al.*, 1953: 40.—Kuwayama, 1956b: 22; 1957: 1. New Synonymy.

DISTRIBUTION: Hokkaido, Honshu, Shikoku.

HOKKAIDO. Tomuraushi, Sapporo. HONSHU. IWATE: Karumai; NAGANO: Hoppo, Susawatari; SHIZUOKA: Misakubo; TOTTORI: Mt. Daisen. SHIKOKU. EHIME: Joju (Mt. Ishizuchi). Scarce.

Season: Mid-July to early September.

***Osmylus kisoensis* Iwata**

Osmylus kisoensis Iwata, 1928: 215, 219, figs. 1-14.

DISTRIBUTION: Honshu.

HONSHU. NAGANO: Narai River. After Iwata.

Season: April.

Species only known from larval stage. It is quite difficult to determine the relation between this species and hitherto known osmylids in Japan.

Genus *Plethosmylus* Krüger

Plethosmylus Krüger, 1913: 43.—Navás, 1917: 13. Type: *Osmylus hyalinatus* MacLachlan; Japan.

Head yellow without marking; forewing hyaline with grayish tinge, commonly without spot, but sometimes with a small faint discal spot and some more similar spots near apex.....**hyalinatus**

Head yellow with a fuscous mark between antennae; forewing, especially on its marginal area, irregularly clouded with gray causing pale and dark spaces; veinlets on disc usually margined with dark brown; a conspicuous dark spot on disc and some more dark spots near apex **decoratus**

Plethosmylus hyalinatus (MacLachlan)

Osmylus hyalinatus MacL., 1875: 181.—Matsumura, 1900b: 17.—Okamoto, 1905: 115.—Navás, 1910a: 193; 1912c: 421.—Nakahara, 1914h: 516, fig. 8; 1914f: 493; 1915d: 333.—Matsumura, 1917: 472.—Okamoto, 1924: 70.—Tosawa, 1932: 26.

Plethosmylus (*Osmylus*) *hyalinatus*, Matsumura, 1931: 1169, fig.

Plethosmylus hyalinatus, Krüger, 1913: 205, 274; 1915: 76.—Navás, 1924b: 223.—Kuwayama, 1932: 1537, fig. 3035; 1936a: 109.—Esaki, Hori & Yasumatsu, 1938: 125, fig. 225, 2.—Tanaka, 1939: 526.—Kobayashi, 1942: 221.—Kuwayama, 1950: 399, fig. 1090; 1953b: 179.—Ishihara *et al.*, 1953: 40.—Kuwayama, 1954b: 95; 1954a: 745.—Takeuchi, 1955: 71, fig. 393.—Kuwayama, 1956b: 22; 1956c: 79; 1957: 1.—Asahina, 1958: 81.—Nakahara, 1960: 34.

Plethosmylus (!) *hyalinatus*, Navás, 1928a: 90.

Plethosmylus decoratus Matsumura (not Nakahara), 1933: 5(8), pl. 2, fig. 2.

Osmylus tessellatus Kato (not MacLachlan), 1933: pl. 47, fig. 5 & text.

DISTRIBUTION: Hokkaido, Honshu, Shikoku, Kyushu; Kuriles; Sachalin.

HOKKAIDO. Teshio, Sounkyo, Mts. Daisetsu, Mt. Tokachi, Tokachi-mitsumata, Sapporo, Jozankei, Hitaka (Mt. Apoi). HONSHU. TOCHIGI: Chuzenji; KANAGAWA: Yumoto; TOYAMA: Akakura; ISHIKAWA: Yamanaka, Tsurugi, Kanazawa (Mt. Tomuro); NAGANO: Oiwake, Shimajima; SHIZUOKA: Nikenkoya; KYOTO: Mt. Kurama, Kyoto; WAKAYAMA: Wakayama; OSAKA: Mt. Iwawaki. SHIKOKU. EHIME: Mt. Takanawa, Omogokei; KOCHI: Mt. Irazu, Makiyama. Common.

Season: End April to end September.

Plethosmylus decoratus (Nakahara) Fig. 9.

Osmylus decoratus Naka., 1913i; 626; 1914h: 514, figs. 4-7.—Marumo, 1927: 718, fig. 1390.

Osmylus hyalinatus, Matsumura (not MacLachlan), 1907: 172; 1908: 39.

Plethosmylus decoratus, Krüger, 1915: 76.—Nakahara, 1960: 34.

Plethosmylus (*Osmylus*) *decoratus*, Matsum., 1931: 1168, fig.

Plethosmylus hyalinatus, Matsum. (not MacLachlan), 1933, 5 (8), pl. 2, fig. 1.

DISTRIBUTION: Hokkaido, Honshu.

HOKKAIDO. Teshikaga, Hitaka-monbetsu, Mts. Daisetsu, Uriu, Sapporo, Jozankei,

Hattaribetsu. HONSHU. AOMORI: Aomori; TOKYO: Tokyo, Mt. Takao; NAGANO: Kami-kochi, Mt. Taro; KYOTO: Kyoto. Less common.

Season: End May to early August.

Subfamily SPILOSMYLINAE Krüger, 1913

In forewing, 1 or more cross-veins from Rs to M before branch 1 of Rs *Spilosmylus*
 In forewing, no cross-vein from Rs to M before branch 1 of Rs *Lysmus*

Genus *Lysmus* Navás

Lysmus Nav., 1911a: 112.—Krüger, 1913: 68; 1914: 35.—Navás, 1917: 14. Type: *Osmylus harmandinus* Navás; Japan.

? *Lysmus* Krüger, 1913: 210.

Spilosmylus Banks, in part, 1913: 212.—Nakahara, 1914h; 501.—Kimmins, 1942: 854.

Eososmylus Krüger, 1915: 73.

Neolysmus Nakahara, 1955b: 13. New Synonymy.

Kimmins (1942) considered *Lysmus* as synonym of *Spilosmylus*, but I think the better course is to separate them as distinct genera. Nakahara (1955) recognized *Lysmus* as a valid genus, and Tjeder (1957) also stated as follows: "The genus *Lysmus* Navás..... seems to be valid. The spermathecae of available ♀♀ from Japan, determined by Dr. Satoru Kuwayama as *Lysmus harmandinus* Navás (the genotype of *Lysmus*) are of a general type, not similar to that of the available *Spilosmylus*-species."

In forewing, venation mostly blackish, but partly pale, making dark and pale alternate spaces; no dark clouding on disc..... **harmandinus**
 In forewing, venation essentially fuscous, except C, Sc, M and Cu₁ which are mostly pale; a dark transverse clouding over area of inner gradate series of cross-veins..... **ogatai**

Lysmus harmandinus (Navás)

Osmylus harmandinus Nav., 1910a: 190, 194.—Matsumura, 1917: 472, fig. 251.

Lysmus harmandinus, Nav., 1911a: 113; 1917: 14.—Kuwayama, 1954b: 95; 1956c: 79; 1956b: 23; 1957: 2.—Asahina, 1958: 81.—Nakahara, 1960: 34.

Osmylus flavicornis Matsumura (not MacLachlan), 1904: 178, pl. 13, fig. 8.—Okamoto, 1905: 114.—Matsumura, 1907: 172, fig. 206; 1908: 39.—Iguchi, 1908: 252.—Matsumura, 1911: 15.

? *Lysmus harmandinus*, Krüger, 1913: 211; 1914: 89.

Eososmylus ? ? *harmandinus*, Krüger, 1915: 74.

Eososmylus ? ? (*Lysmus*) *harmandinus*, Kuwayama, 1924d: 115.

Eososmylus harmandinus, Matsumura, 1931: 1167, fig.—Kuwayama, 1932: 1538, fig. 3037.—Tosawa, 1932: 26.—Matsumura, 1933: 8 (13), pl. 2, fig. 19.—Izaki, 1934: 304.—Uchida, 1934: 240.—Kuwayama, 1936a: 108.—Esaki, Hori & Yasumatsu, 1938: 124, fig. 224, 2.—Kobayashi, 1942: 221.—Kuwayama, 1950: 400, fig. 1092.—Takeuchi, 1955: 71, fig. 392.

Spilosmylus harmandinus, Nakahara, 1913i: 625; 1914h: 508.

Spilosmylus immaculatus Naka., 1914h: 507.

Eosomylus ? ? *immaculatus*, Krüger, 1915 : 75.

Spilosmylus nigricornis Nakahara, 1914h : 509; 1914f : 493. **New Synonymy.**

Eosomylus nigricornis, Krüger, 1915 : 74.—Kuwayama, 1954a : 745.

Lysmus nigricornis, Nakahara, 1955b : 15.

DISTRIBUTION: Hokkaido, Honshu, Shikoku, Kyushu; Kuriles; Sachalin.

HOKKAIDO. Teshio, Abeshinai, Sounkyo, Tokachi-mitsumata, Taisho, Sapporo, Jozankei, Hayakita-fumonke, Toya, Onuma. **HONSHU.** AOMORI: Towada; IWATE: Karumai; AKITA: Hachimandaira; TOCHIGI: Nikko; NIIGATA: Mt. Myoko; NAGANO: Kamikochi; TOKYO: Tokyo, Mt. Takao; KYOTO: Kyoto. **Common.**

Season: Mid-June to end August.

Lysmus ogatai (Nakahara)

Neolysmus ogatai Naka., 1955b : 13, pl. 3.—Kuwayama, 1956b : 23; 1957 : 2.—Nakahara, 1960 : 34.

DISTRIBUTION: Honshu, Shikoku.

SHIKOKU. EHIME: Omogokei. **Scarce.**

Season: June.

Genus Spilosmylus Kolbe

Spilosmylus (subg.) Kolbe, 1897 : 34. Type : *Osmylus* (*Spilosmylus*) *africanus* Kolbe; Africa.

Spilosmylus (gen.) Navás, 1912d : 53.—Banks, 1913 : 214.—Krüger, 1913 ; 52; 1914 : 12.—Nakahara, 1914h ; 501.—Navás, 1917 : 20.—Kimmins, 1942 : 853.

Heliosmylus Krüger, 1915 : 80.

Ripidosmylus Kr., 1913 : 61.

1. With ampolla (a brown horny tubercle or bulla with yellow stripes) on hind margin of forewing **tuberculatus**
Without ampolla on hind margin of forewing 2
2. In forewing, with many irregular linear sooty brown spots on medio-cubital area, and clouded with grayish-testaceous on hind margin..... 3
In forewing, without sooty brown spots and not clouded with grayish-testaceous, but some transverse veinlets margined with brown **nipponensis**
3. Thorax yellowish, spotted with black **flavicornis**
Thorax blackish **krügeri**

Spilosmylus tuberculatus (Walker)

Osmylus tuberculatus Walk., 1853 : 255.—Esben-Petersen, 1913a : 227.

Spilosmylus tuberculatus, Krüger, 1913 : 206.—Nakahara, 1914h : 502.—Krüger, 1914 : 57; 1915 : 77.—Tosawa, 1932 : 26.—Nakahara, 1955a : 11.—Kuwayama, 1956b : 22; 1957 :

1.

Osmylus modestus Gerstaecker, 1893 : 169.—van der Weele, 1909b : 50, pl. 4, fig. 16.

Spilosmylus modestus, Krüger, 1913 : 207; 1914 : 63; 1915 : 78.

Osmylus (*Lysmus*) *japonicus* Okamoto, 1914a : 23, fig. 1.

Lysmus ? japonicus, Krüger, 1914: 55, 92.

Osmylus japonicus, Matsumura, 1931: 1167, fig.—Takahashi, 1935: 487.

Spilosmylus japonicus, Banks, 1937: 278.

Spilosmylus conformis Navás, 1912d: 53.—Krüger, 1914: 67.

DISTRIBUTION: Honshu, Shikoku, Kyushu; Taiwan; Philippines; Malay; E. Indies.

HONSHU. TOKYO: Miyake I.; KYOTO: Kyoto; OSAKA: Mt. Minoo. SHIKOKU. EHIME: Satamisaki; KOCHI: Sukumo. KYUSHU. OITA: Beppu; KAGOSHIMA: Kagoshima. Not common.

Season: Mid-July to mid-August.

Spilosmylus nipponensis (Okamoto)

Osmylus (Lysmus) nipponensis Okam., 1914a: 24, fig. 2.

Lysmus ? nipponensis, Krüger, 1914: 56, 92.

Osmylus nipponensis, Matsumura, 1931: 1168, fig.

Spilosmylus nipponensis, Kuwayama, 1953b: 180.—Ishihara *et al.*, 1953: 40.—Kuwayama, 1956b: 23; 1957: 2.—Nakahara, 1960: 34.

Spilosmylus nikkoensis, Nakahara (not Navás), 1914h: 504.—Mitsuhashi, 1936: 366.

Heliosmylus nipponensis, Krüger, 1915: 79, 83.

DISTRIBUTION: Honshu, Shikoku, Kyushu.

HONSHU. KYOTO: Kyoto; OSAKA: Minoo. SHIKOKU. EHIME: Omogokei; KOCHI: Kochi, Honkawa (Mt. Tebako). KYUSHU. FUKUOKA: Miyata, Moji. Not common.

Season: End May to end July.

Spilosmylus flavicornis (MacLachlan) Fig. 10.

Osmylus flavicornis MacL., 1875: 179.—Matsumura, 1900b: 16.—Navás, 1910a: 193.

Osmylus ? ? flavicornis, Krüger, 1913: 204, 271.

Heliosmylus flavicornis, Kr., 1915: 84.—Kuwayama, 1932: 1536, fig. 3034.—Izaki, 1934: 305.—Esaki, Hori & Yasumatsu, 1938: 125, fig. 225, 1.—Kuwayama, 1950: 399, fig. 1089.—Takeuchi, 1955: 70, fig. 391.

Spilosmylus flavicornis, Nakahara, 1914h: 505; 1915d: 333.—Kuwayama, 1954b: 95; 1954a: 745; 1956b: 23; 1957: 2.—Kawashima, 1957: 67, fig., pl. 2.—Asahina, 1958: 81.—Nakahara, 1960: 34.

Osmylus faurinus Navás, 1910a: 191, 194.

Lysmus faurinus, Nav., 1911: 114.

Lysmus ? faurinus, Krüger, 1913: 211; 1914: 90.

Heliosmylus ? faurinus, Kr., 1915: 86.

Lysmus nikkoensis Navás, 1911: 113, fig. 3.

Lysmus ? nikkoensis, Krüger, 1913: 211; 1914: 92; 1915: 79.

DISTRIBUTION: Hokkaido, Honshu, Shikoku, Kyushu.

HOKKAIDO. Hitaka (Mt. Apoi), Sapporo, Jozankei, Hayakita-fumonke, Sounkyo, Ono. HONSHU. AOMORI: Towada; IWATE: Karumai; MIYAGI: Sendai; FUKUSHIMA: Numajiri; TOKYO: Hikawa; NAGANO: Shimauchi; FUKUI: Oniu; KYOTO: Kyoto; WAKAYAMA: Kii. SHIKOKU. EHIME: Matsuyama (Misaka pass).

Season: Early July to mid-September.

Spilosmylus krügeri (Esben-Petersen)

Glenosmylus krügeri Esb.-Pet., 1914: 269, fig. 4.—Esaki, 1937: 23, pl. 3, fig. 1.
Heliosmylus krügeri, Krüger, 1915: 86.

DISTRIBUTION: Kyushu; Taiwan.

KYUSHU. KAGOSHIMA: Amami-Oshima I. After Esaki.

Season: May to July.

I have not yet examined this species personally. Esben-Petersen placed it provisionally in *Glenosmylus* Krüger, but he stated that it would probably be necessary to establish a new genus for it. Krüger created *Heliosmylus* in 1915 designating this species as type. However, Kimmins (1942) held the better course is to consider *Heliosmylus* as synonym of *Spilosmylus*.

Family HEMEROBIIDAE Leach, 1815

Small species, mostly with brown or spotted wings, and often with iridescent color. This family is dominant among Neuroptera in Japan, comprising 25 species. Krüger divided Hemerobiidae into 5 subfamilies, Drepanopteryginae, Megalominæ, Hemerobiinae, Sympherobiinae and Microminæ. However, Sympherobiinae is treated in this paper as a distinct family. It is more convenient to classify Hemerobiidae into 2 subfamilies.

KEY TO SUBFAMILIES

Forewing with a recurrent humeral veinlet Hemerobiinae
 Forewing without a recurrent humeral veinlet Microminæ

Subfamily MICROMINÆ Krüger, 1922⁴

1. Wings elongate and narrow. Forewing with 3 branches to Rs; M_{3+4} in hindwing fused with Cu_1 except at base **Micromus**
 Wings broadly oval. Forewing with 4 or more branches to Rs; M_{3+4} in hindwing not fused with Cu_1 2
2. Several costal cross-veins towards base of forewing connected with each other by transverse veinlets **Paramicromus**
 Costal cross-veins without any connection by transverse veinlets..... **Eumicromus**

Genus **Micromus** Rambur

Micromus Ram., 1842: 416.—Hagen, 1866: 376.—Wallengren, 1871: 47.—Rostock, 1888: 107.—Banks, 1905: 44.—van der Weele, 1909b: 53.—Nakahara, 1915f: 33.—Krüger, 1922b: 172.—Killington, 1936: 250.—Carpenter, 1940: 245. Type: *Hemerobius variegatus* Fabricius; Europe.

Forewing with many distinct dark brownish markings **variegatus**
 Forewing without such markings, but with fuscous spots on venation and grayish tinge in hind marginal area **multipunctatus**

4. Krüger listed *Archaeomicromus japonicus* n. gen. et sp. without description. I omit it as a "nomen nudum."

Micromus variegatus (Fabricius)

Hemerobius variegatus F., 1793: 85.—Stephens, 1836: 113.—Burmeister, 1839: 974.—Wesmael, 1841: 214.

Micromus variegatus, Rambur, 1842: 417.—Wallengren, 1871: 50.—Rostock, 1888: 107.—Krüger, 1922: 172.—Killington, 1936: 252, pl. 12, fig. 1.—Kuwayama, 1954b: 96.—Nakahara, 1960: 33.

Micromus pulchellus Nakahara, 1915f: 33; 1915e: 101; 1919: 136.—Esaki, 1930a: 1.

DISTRIBUTION: Hokkaido, Honshu, Kyushu; Europe.

HOKKAIDO. Mt. Kurodake. HONSHU. YAMANASHI: Kofu. KYUSHU. KUMAMOTO: Kumamoto. Not common.

Season: Mid-July and early October.

Micromus multipunctatus Matsumura Fig. 11.

Micromus multipunctatus Mats., 1907: 171; 1917: 472.—Kurisaki, 1920c: 261, fig.—Shinji, 1928: 124.—Tosawa, 1932: 25.—Kuwayama, 1956b: 25; 1957: 2.

Micromus novitius Navás, 1910c: 397.—Nakahara, 1915f: 35, pl. 1, fig. 4; 1915e: 101; 1919: 136.—Kuwayama, 1924d: 108.—Matsumura, 1931: 1162, fig.—Kuwayama, 1932: 1546, fig. 3054.—Tosawa, 1932: 26.—Hori, 1933: 174.—Banks, 1937: 280.—Esaki, Hori & Yasumatsu, 1938: 121, fig. 218, 2.—Kuwayama, 1950; 392, fig. 1069.—Takeuchi, 1955: 70, fig. 390.—Nakahara, 1955a: 9.

Micromus punctatus Matsumura, 1908: 38.—Tosawa, 1932: 26. No description.

DISTRIBUTION: Hokkaido, Honshu, Shikoku, Kyushu; Sachalin; Taiwan.

HONSHU. KANAGAWA: Misaki; SHIZUOKA: Atsu; KYOTO: Kyoto; HYOGO: Harima. SHIKOKU. EHIME: Mt. Sara, Matsuyama (Dogo), Satamisaki; KOCHI: Nissho. KYUSHU. FUKUOKA: Moji; KUMAMOTO: Kumamoto.

Season: End March to early August.

Genus **Eumicromus** Nakahara

Eumicromus Naka., 1915f: 36.—Killington, 1936: 257.—Tjeder, 1941b: 26. Type: *Micromus numerosus* Navás; Japan.

Stenomicromus Krüger, 1922b: 171.

Pseudomicromus Kr., 1922b: 172.

Paramicromus Kr. (not Nakahara), 1922b: 172.

In 1915 Nakahara established *Eumicromus* designating *Micromus numerosus* as type. Killington accepted the separation of this genus from *Micromus*, and removed well-known species *M. angulatus* and *M. paganus* to *Eumicromus* in his monograph. Tjeder had an opposite opinion and said as follows: "The differences might perhaps be used for the separation of species-groups but they cannot be regarded as generic distinctions.....I have not examined the genotype of *Eumicromus* Naka. It is, to judge from the description, very likely also a *Micromus*. If so the genus *Eumicromus* has to be dealt with as synonymous with *Micromus*." Studying Nearctic species of these groups, Carpenter was also convinced that *Eumicromus* was not a valid genus. More recently, Zimmerman announced that he could find no reason for maintaining the wide-spread *Eumicromus* to separate from *Nesomicromus* which flowered in Hawaii, and both were considered one genus. I cannot

agree with these opinions that it cannot be maintained as a separate genus. Though I have not had an opportunity to examine exotic species of these groups, I believe that Nakahara is right in erecting *Eumicromus* as far as concerns the Japanese species.

1. Forewing yellowish white, subhyaline, with more widely spaced pale brownish gray markings; a distinct streak of grayish brown along 2A and the inner margin; longitudinal veins whitish with few dark interruptions..... **paganus**
Forewing testaceous, or variegated with brown..... 2
2. Tibiae of fore- and midlegs with 3 blackish ringmarks; in forewing outer and hind margins irregularly clouded with brown, gradate series of cross-veins dark brown and margined with same color, and a row of dark brownish spots along Cu_1 ...
..... **maculatipes**
Tibiae of legs without markings; forewing nearly uniform testaceous, closely reticulated with grayish brown 3
3. Forewing with 2 narrow transverse fasciae of brownish gray along the gradate series of cross-veins and 3 shorter longitudinal fasciae of the same color on outer marginal area; 4, or rarely 5, branches to Rs. Smaller species, expanse 12–16 mm..... **angulatus**
Forewing without brownish gray fasciae; 7, or rarely 8, branches to Rs. Larger species, expanse 15–20 mm..... 4
4. Forewing with a short linear brown spot in the distal 1/2 of the narrow medio-cubital cell..... **sauteri**
Forewing without brown spot in the distal 1/2 of medio-cubital cell..... **numerosus**

***Eumicromus numerosus* (Navás)**

Micromus numerosus Nav., 1910c: 396.—Nakahara, 1914f: 493.

Eumicromus numerosus, Nakahara, 1915f: 37, pl. 1, fig. 6; 1915e: 101; 1919: 137.—Matsumura, 1931: 1161, fig.—Kuwayama, 1932: 1546, fig. 3053.—Tosawa, 1932: 26.—Matsumura, 1933: 6 (10), pl. 2, fig. 8.—Izaki, 1934: 305.—Takahashi, 1935: 487.—Mitsuhashi, 1936: 366.—Esaki, Hori & Yasumatsu, 1938: 121, fig. 218, 1.—Kuwayama, 1950: 392, fig. 1070.—Nakahara, 1954: 44, pl. 2, fig. 4, pl. 6, figs. 1–4.—Takeuchi, 1955: 70, fig. 387.—Kuwayama, 1956b: 26; 1957: 2.—Kawashima, 1958: 43, fig., pl. 10.—Nakahara, 1960: 33.

Eumicromus arakawae Nakahara, 1915f: 38; 1915e: 101.

DISTRIBUTION: Honshu, Shikoku, Kyushu; Korea.

HONSHU. TOCHIGI: Kinugawa; GUNMA: Kozuke; TOKYO: Tokyo; NAGANO: Shimauchi; KYOTO: Kyoto; HYOGO: Takasago; WAKAYAMA: Kii; YAMAGUCHI: Hagi, Yamaguchi. SHIKOKU. EHIME: Sasayama, Matsuyama (Dogo), Satamisaki. KYUSHU. FUKUOKA: Moji; KUMAMOTO: Kumamoto. Common.

Season: Mid-May to early October.

***Eumicromus sauteri* (Esben-Petersen)**

Micromus sauteri Esb.-Pet., 1912: 198; 1913a: 228.—Banks, 1937: 280.

Eumicromus sauteri, Takano & Yanagihara, 1939: 140, pl. 6, fig. 5.—Nakahara, 1955a: 9; 1956: 188, pl. 20, fig. 7, text fig. 5.

DISTRIBUTION: Honshu, Kyushu; Ryukyu; Taiwan.

HONSHU. TOKYO: Miyake I., Hachijo I.; SHIZUOKA: Totomi; YAMAGUCHI: Hagi. KYUSHU. KAGOSHIMA: Kagoshima. Uncommon.

Season: End May to mid-August; end October to mid-January.

Eumicromus angulatus (Stephens)

Hemerobius angulatus St., 1836: 106.

Micromus angulatus, Banks, 1905: 45.—Navás, 1912c: 420.—Carpenter, 1940: 247, pl. 2, fig. 19, text fig. 50.

Eumicromus angulatus, Nakahara, 1915f: 42; 1915e: 101; 1919: 137.—Killington, 1936: 259, pl. 12, fig. 3, text fig. 67.—Kuwayama, 1954b: 96.

Pseudomicromus angulatus, Krüger, 1922b: 172.

Micromus aphidivorus Navás (not Schrank), 1925a: 3.

Micromus tendinosus Rambur, 1842: 417.

DISTRIBUTION: Hokkaido, Honshu; Sachalin; Kamchatka; Siberia; Europe; Madeira; N. America.

HOKKAIDO. Kutcharo, Obihiro, Nukabira, Sapporo, Jozankei, Garugawa, Mt. Yokotsu. HONSHU. IWATE: Karumai; HYOGO: Takasago. Scarce in Honshu.

Season: Mid-July to end October.

Eumicromus maculatipes Nakahara Fig. 12.

Eumicromus maculatipes Naka., 1915f: 39, pl. 1, fig. 5; 1915e: 101; 1919: 137.—Kuwayama, 1932: 1545, fig. 3052.—Yasumatsu, 1937: 144.—Esaki, Hori & Yasumatsu, 1938: 122, fig. 219, 2.—Kuwayama, 1950: 393, fig. 1071; 1956b: 26; 1957: 2.

DISTRIBUTION: Hokkaido, Honshu, Shikoku, Kyushu.

HONSHU. KYOTO: Kyoto; HYOGO: Takasago; TOTTORI: Mt. Daisen. SHIKOKU. EHIME: Mt. Sara, Matsuyama (Dogo). KYUSHU. FUKUOKA: Moji, Mt. Hikosan; KAGOSHIMA: Kagoshima. Not common.

Season: Early June to end July; early November to early March.

Eumicromus paganus (Linné)

Hemerobius paganus L., 1767: 912.

Micromus paganus, Brauer, 1857: 58.—Wallengren, 1871: 48.—Rostock, 1888: 107.—Navás, 1925a: 3.

Eumicromus paganus, Killington, 1936: 264, pl. 12, fig. 2, text fig. 68.—Kuwayama, 1956c: 78.

Stenomicromus paganus, Krüger, 1922b: 171.

Eumicromus alpinus Nakahara, 1915f: 41; 1915e: 101; 1919: 137.—Kuwayama, 1936a: 109; 1954b: 96; 1956c: 78. **New Synonymy.**

DISTRIBUTION: Hokkaido, Honshu; Kuriles; Sachalin; Kamchatka; Europe.

HOKKAIDO. Mt. Kurodake, Tokachi-mitsumata. HONSHU. NAGANO: Mt. Ontake. Restricted to mountainous regions; rare.

Season: Early July to early August.

Genus **Paramicromus** Nakahara

Paramicromus Naka., 1919: 137; 1956: 190, pl. 21, fig. 10, text fig. 7. Type: *Eumicromus*

dissimilis Nakahara; Japan.

Phlebiomus Navás, 1923b: 24. **New Synonymy.**

Navás erected *Phlebiomus* designating *P. yunnanus* Navás from China as type. According to his description and figure, I think his *Phlebiomus* should become a synonym of *Paramicromus*.

Paramicromus dissimilis (Nakahara)

Eumicromus dissimilis Naka., 1915f: 43; 1915e: 101.—Baba, 1955: 12.

Paramicromus dissimilis, Naka., 1919: 137; 1956; 190.—Kuwayama, 1956b: 26; 1957: 2.—Nakahara, 1960: 33.

DISTRIBUTION: Hokkaido, Honshu, Shikoku, Kyushu; Sachalin.*

HOKKAIDO. Sapporo. **HONSHU.** AOMORI: Hachinohe; SHIZUOKA: Kanaya. **SHIKOKU.** EHIME: Matsuyama (Dogo). **KYUSHU.** MIYAZAKI: Mt. Kirishima. Not common.

Season: End April to mid-July.

Subfamily **HEMEROBIINAE** Krüger, 1922

1. Forewing with 10 or more branches to Rs; in costal area many of cross-veins connected by a longitudinal series of accessory veinlets; 3 complete series of gradate cross-veins..... 2
- Forewing with less than 10 branches to Rs; costal cross-veins not connected 3
- 2 (1). Wings distinctly falcate. In forewing, 2 outer series of gradate cross-veins converged at apex of fenestella (unpigmented wedge-shaped space running into wing from hind margin)..... **Drepanopteryx**
- Wings not falcate. In forewing, middle one of gradate series of cross-veins remaining within radial and medial areas and not converged; no conspicuous fenestella..... **Oedobius**
- 3 (1). Forewing with 3 complete series of gradate cross-veins; a deltoid fenestella on hind margin **Neuronema**
- Forewing with 2 complete series of gradate cross-veins; without deltoid fenestella ... 4
- 4 (3). Forewing with a conspicuous cross-vein between Ma (apparent branch 1 of Rs) and near base of R_{4+5} ; strongly variegated with distinct fuscous markings ... **Wesmaelius**
- Forewing without such cross-vein..... 5
- 5 (4). Forewing with 1 cross-vein between Ma and upper branch of Mp **Kimminsia**
- Forewing without such cross-vein **Hemerobius**

Genus **Hemerobius** Linné

Hemerobius L., 1758: 549.—Burmeister, 1839: 972.—Wesmael, 1841: 214.—Hagen, 1866: 376.—Wallengren, 1871: 33.—Rostock, 1888: 108.—Banks, 1905: 29.—Nakahara, 1915f: 23.—Krüger, 1922b: 171.—Killington, 1937: 1.—Carpenter, 1940: 198. Type: *Hemerobius humulinus* L.; Europe.

Mucropalpus Rambur, 1842: 420.

Hagenobius Krüger, 1922b: 171.

Reuterobius Kr., 1922b: 171.

Schneiderobius Kr., 1922b: 171.

Brauerobius Kr., 1922b: 171.

1. Forewing with dark spot in basal 1/3 where a cross-vein connects lower branch of M_p and Cu_1 2
Forewing without such spot..... 9
- 2 (1). Costal area of forewing very abruptly broadened basally..... **marginatus**
Costal area of forewing not abruptly broadened basally..... 3
- 3 (2). Forewing with a distinct chain formed of many fuscous spots at posterior border of discal area 4
Forewing without such chain of spots..... 5
- 4 (3). In forewing, conspicuous fuscous spots on R at origin of branches of R_s and of M **radialis**
Forewing without conspicuous fuscous spots on R..... **striatus**
- 5 (3). Antenna fuscous; gradate series of cross-veins in forewing broadly margined with dark gray **nigricornis**
Antenna yellowish; gradate series of cross-veins in forewing not margined..... 6
- 6 (5). Forewing with many wavy fuscous lines running across **shibakawae**
Forewing without such markings, but faintly marmorated with pale gray sagittate markings all over..... 7
- 7 (6). Forewing with a dark fascia extending from Cu_1 to hind margin over intercubital cross-veins **griseus**
Forewing without such conspicuous dark fascia..... 8
- 8 (7). Border of forewing along hind and outer margins with alternate pale and dark spaces..... **humulinus**
Border of forewing along hind and outer margins nearly uniform grayish-testaceous, except the parts of trichosors..... **japonicus**
- 9 (1). Forewing uniformly grayish brown, with narrow basal cubito-median cell and the area behind 2A which are dark brown **kobayashii**
Forewing grayish brown or yellowish brown, with pale or dark streaks 10
- 10 (9). Forewing with a broad ill-defined hyaline streak in discal area; oftenly fuscous cloud exists along anterior border of hyaline streak **harmandinus**
Forewing with 3 broad dark brownish streaks; fore streak runs on posterior area of R, middle one runs from basal 1/3 to apex, and hind one runs along posterior margin..... **tristriatus**

Hemerobius humulinus Linné

Hemerobius humulinus L., 1758: 550.—Killington, 1937: 5.—Carpenter, 1940: 201, fig. 2, pl. 1, fig. 1.—Tjeder, 1941b: 27.—Kuwayama, 1954b: 98; 1956b: 24; 1957: 2.—Nakahara, 1960: 33.

Hemerobius humuli Linné, 1761: 383.—Burmeister, 1839: 974.—Wesmael, 1841: 215.—Wallengren, 1871: 41.—Rostock, 1888: 111, pl. 6, fig. 33b.—MacLachlan, 1899: 130, fig.—Banks, 1905: 32.—Navás, 1912c: 419.—Nakahara, 1915f: 24, fig. 2; 1915e: 100; 1919: 136.—Krüger, 1922b: 171.—Navás, 1925a: 2.—Matsumura, 1931: 1161, fig.—Kuwayama, 1932: 1547, fig. 3056.—Mitsuhashi, 1936: 366.—Kuwayama, 1950: 391, fig. 1067.

Hemerobius micans ? Matsumura (not Oliver), 1900b: 16.—Iguchi, 1908: 252.

Hemerobius obtusus Nakahara, 1954: 42, pl. 2, fig. 2, pl. 4, figs. 1–7.—Baba, 1955: 12.—

Kuwayama, 1956b: 24; 1957: 2.

Mucropalpus lutescens Rambur (not Fabricius), 1842: 420.

DISTRIBUTION: Hokkaido, Honshu, Shikoku, Kyushu; Sachalin; Siberia; Europe; N. America.

HOKKAIDO. Sapporo, Mt. Kurodake, Onuma. HONSHU. AOMORI: Hachinohe; TOKYO: Tokyo; KANAGAWA: Misaki; NIIGATA: Echigo. SHIKOKU. EHIME: Mt. Sara, Matsuyama (Dogo). KYUSHU. FUKUOKA: Moji. Common.

Season: Mid-April to mid-September.

Hemerobius japonicus Nakahara

Hemerobius japonicus Naka., 1915f: 25, figs. 3, 4; 1915e: 100; 1915c: 272; 1919: 136.—Kuwayama, 1932: 1547, fig. 3055.—Tosawa, 1932: 26.—Mitsuhashi, 1936: 366.—Esaki, Hori & Yasumatsu, 1938: 121, fig. 217, 2.—Kuwayama, 1950: 392, fig. 1068; 1953b; 177.—Nakahara, 1954: 41, pl. 2, fig. 1, pl. 3, figs. 1–6.—Baba, 1955: 12.—Kuwayama, 1956c: 77; 1956b: 25; 1957: 2.—Nakahara, 1960: 33.

Hemerobius sp. ? MacLachlan, 1875: 179.

Hemerobius orotypus MacL. (not Wallengren), 1899: 131, fig.

Hemerobius shibakawae, Ishihara *et al.* (not Nakahara), 1953: 39.

DISTRIBUTION: Hokkaido, Honshu, Shikoku, Kyushu.

HOKKAIDO. Engaru, Sapporo, Nopporo, Onuma, Ono. HONSHU. TOCHIGI: Chuzenji; KANAGAWA: Misaki; TOKYO: Tokyo, Miyake I.; SHIZUOKA: Mt. Fuji, Mt. Ogasa; MIYE: Namise; KYOTO: Kyoto; HYOGO: Takasago. SHIKOKU. EHIME: Mt. Sara, Gunchu, Omogokei; KOCHI: Mt. Kotakasaka. KYUSHU. OITA: Yasaka.

Season: Mid-April to mid-October.

Common and wide-spread but frequently confused with *H. humulinus*.

Hemerobius nigricornis Nakahara

Hemerobius nigricornis Naka., 1915d: 333; 1915f: 27; 1915e: 100; 1919: 136.—Mitsuhashi, 1936: 366.—Kuwayama, 1956b: 25; 1957: 2.

DISTRIBUTION: Hokkaido, Honshu, Shikoku.

HONSHU. ISHIKAWA: Kanazawa (Mt. Utatsu). SHIKOKU. EHIME: Omogokei. Less common.

Season: Early March; mid-October.

Hemerobius griseus Nakahara

Hemerobius griseus Naka., 1956: 185, pl. 18, fig. 4, text fig. 3; 1960: 33.

DISTRIBUTION: Honshu.

HONSHU. NAGANO: Shirahone; OSAKA: Ashiya; NIIGATA: Kurokawa. After Nakahara. I have not seen this species.

Season: End April to early May; September.

Hemerobius shibakawae Nakahara

Hemerobius shibakawae Naka., 1915f: 31; 1915e: 100; 1919: 136.—Baba, 1955: 12.—Nakahara, 1960: 33.

DISTRIBUTION: Hokkaido, Honshu.
 HOKKAIDO. Sapporo. Apparently scarce.
 Season: Early June.

Hemerobius striatus Nakahara

Hemerobius striatus Naka., 1915f: 28; 1915e: 100; 1919: 136.
Hemerobius striatalis (!) Tosawa, 1932: 26.

DISTRIBUTION: Honshu.
 HONSHU. GUNMA: Ozegahara. After Nakahara. Rare species.
 Season: August.

Hemerobius radialis Nakahara

Hemerobius radialis Naka., 1956: 187, pl. 19, fig. 6.

DISTRIBUTION: Honshu.
 HONSHU. OSAKA: M. Iwawaki. After Nakahara. Only holotype known.
 Season: Early June.

Hemerobius marginatus Stephens

Hemerobius marginatus St., 1836: 109.—Wallengren, 1871: 42.—Rostock, 1888: 111.—MacLachlan, 1899: 128, fig.—Banks, 1905: 32.—Nakahara, 1919: 136.—Navás, 1925a: 2.—Killington, 1937: 64, pl. 15, fig. 2, text fig. 79.

Brauerobius marginatus, Krüger, 1922b: 171.

Hemerobius irregularis Nakahara, 1915f: 29; 1915e: 101.

DISTRIBUTION: Hokkaido, Honshu; Europe; ? N. America.
 HOKKAIDO. Sapporo, Mt. Moiwa, Jozankei. Rare.
 Season: End June to end August.

Hemerobius kobayashii Nakahara

Hemerobius kobayashii Naka., 1956: 186, pl. 19, fig. 5, text fig. 4.

DISTRIBUTION: Honshu.
 HONSHU. NAGANO: Shiga-Kogen; GUNMA: Kyu-Kazawa. After Nakahara. I have not seen this species.
 Season: July.

Hemerobius harmandinus Navás

Hemerobius harmandinus Nav., 1909a: 395; 1916: 233.—Nakahara, 1919: 136.—Kuwayama, 1956b: 25; 1957: 2.—Nakahara, 1960: 33.

Hemerobius nitidulus, Nakahara (not Fabricius), 1915f: 32; 1915e: 100.—Yasumatsu, 1937: 144.

Hemerobius nakaharinus Navás, 1916; 235.

DISTRIBUTION: Honshu, Shikoku, Kyushu.
 HONSHU. TOCHIGI: Chuzenji; TOKYO: Tokyo; SHIZUOKA: Shimoda; KYOTO: Kyoto; TOTTORI: Mt. Daisen. KYUSHU. FUKUOKA: Moji, Mt. Hikosan.
 Season: Early March to early July.

Hemerobius tristriatus Kuwayama Fig. 13.*Hemerobius trivittatus* Matsumura, 1908: 38. No description.*Hemerobius tristriatus* Kuwa., 1954b: 97, figs. 1, 2.

DISTRIBUTION: Hokkaido, Honshu; Sachalin.

HOKKAIDO. Sounkyo, Jozankei, Niikappu. Alpine species.

Season: End July to early September.

Genus **Kimminsia** Killington*Kimminsia* Killington, 1937: 254.—Carpenter, 1940: 214.—Tjeder, 1941b: 27.—Parfin, 1956: 203. Type: *Hemerobius betulinus* Ström; Europe.*Boriomyia* Banks, in part, 1905: 36.Forewing pale gray, irregularly covered with grayish sagittate markings..... **ogatai**
Forewing colorless; basal, cubital and gradate cross-veins margined broadly with dark
fuscous color **lateralis****Kimminsia ogatai** Nakahara*Kimminsia ogatai* Naka., 1956: 184, pl. 18, fig. 3, text fig. 2.*Kimminsia subnebulosa* Kuwayama (not Stephens), 1956d: 101. New Synonymy.

DISTRIBUTION: Hokkaido, Honshu.

HOKKAIDO. Shirogane. Rare.

Season: September.

Kimminsia lateralis (Navás)*Boriomyia lateralis* Nav., 1912c: 419, fig. 4.*Kimminsia lateralis*, Nakahara, 1956: 183, pl. 17, fig. 2, text fig. 1.

DISTRIBUTION: Honshu; Siberia.

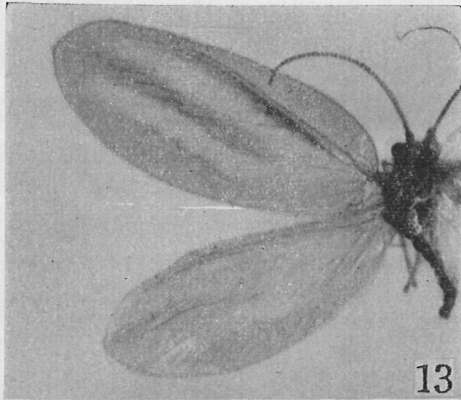
HONSHU. YAMANASHI: Mt. Shirane-kitadake. After Nakahara.

Season: July.

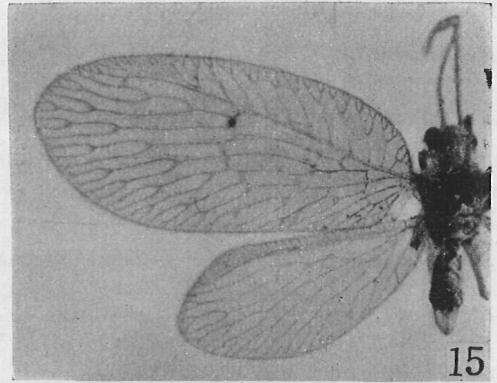
Genus **Wesmaelius** Krüger*Wesmaelius* Kr., 1922b: 170.—Killington, 1937: 97.—Carpenter, 1940: 225.—Tjeder, 1941b: 29. Type: *Hemerobius concinnus* Stephens; Europe.**Wesmaelius quadrifasciatus** (Reuter)*Hemerobius concinnus* var. *quadrifasciatus* Reuter, 1894: 12.*Hemerobius quadrifasciatus* Morton, 1901: 163.*Boriomyia quadrifasciatus*, Banks, 1905: 29.*Wesmaelius quadrifasciatus*, Krüger, 1922b: 170.—Killington, 1937: 104, pl. 19, fig. 5, text fig. 90.—Nakahara, 1956: 182, pl. 17, fig. 1.

DISTRIBUTION: Honshu; Sachalin; Europe.

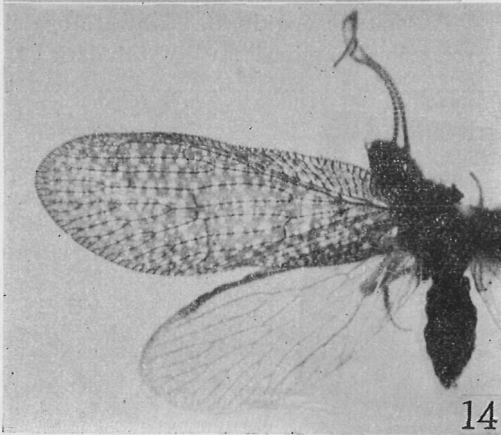
HONSHU. NAGANO: Utsukushigahara. Nakahara tentatively identified a single ♀ with this well-known European species.



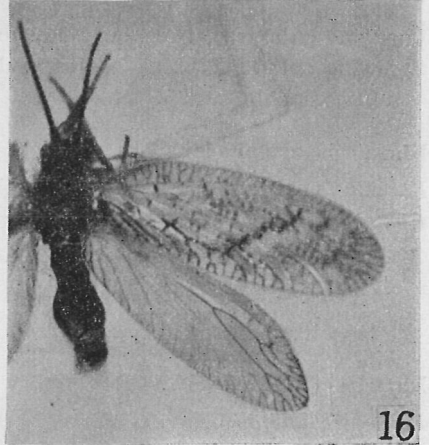
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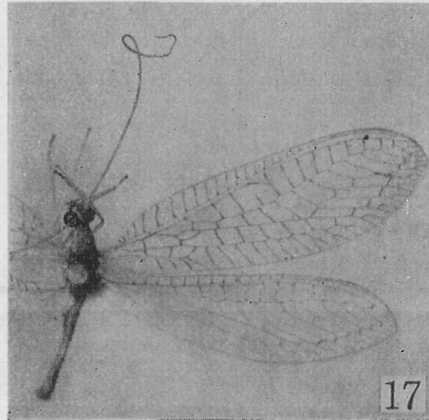
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Figs. 13-17. 13, *Hemerobius tristriatus* Kuwayama ♀, ×6.6; 14, *Sympherobius tessellatus* Nakahara ♀, ×9.8; 15, *Notiobiella subolivacea* Nakahara ♂, ×8.3; 16, *Psectra diptera* (Burmeister) ♂, ×9.5; 17, *Chrysopa albolineata* Killington ♂, ×4.0.

Season: September.

Genus *Neuronema* MacLachlan

Neuronema MacL., 1869b: 27.—Banks, 1913: 218.—Tjeder, 1936b: 10.—Kimmins, 1943: 40.

Type: *Hemerobius decisus* Walker; India.

Ninguta Navás, 1912c: 420.—Nakahara, 1915f: 45. Preoccupied.

Ninga Nav., 1913d: 122.

Neuronema albstigma (Matsumura)

Hemerobius albstigma Matsumura, 1907: 171; Matsumura, 1908: 38.

Megalomus deltooides Navás, 1909a: 396, fig.

Ninguta deltooides, Nav., 1912c: 420.—Nakahara, 1915f: 46; 1915e: 102.

Ninga deltooides, Nav., 1913d: 122.—Nakahara, 1919: 137.—Kuwayama, 1924d: 107.—Matsumura, 1931: 1162, fig.—Kuwayama, 1932: 1545, fig. 3051.—Matsumura, 1933: 7 (11), pl. 2, fig. 11.—Esaki, Hori & Yasumatsu, 1938: 122, fig. 219, 1.—Yasumatsu, 1945: 206, fig. 1b.—Kuwayama, 1950: 393, fig. 1072.—Takeuchi, 1955: 70, fig. 389.

Neuronema deltooides, Krüger, 1922b: 170.—Kimmins, 1943: 47, figs. 5, 6.—Kuwayama, 1953b: 178.—Ishihara *et al.*, 1953: 40.—Baba, 1955: 12.

Ninguta albstigma, Matsumura, 1917: 472.

Ninguta (Hemorobinus) (!) albstigma, Shinji, 1928: 124.

Neuronema albstigma, Kuwayama, 1954b: 99; 1956b: 26; 1957: 2.—Nakahara, 1960: 33.

DISTRIBUTION: Hokkaido, Honshu, Shikoku; ? Sachalin.

HOKKAIDO. Nukabira, Nopporo, Shikotsu, Jozankei, Sapporo, Mt. Moiwa. HONSHU. TOCHIGI: Chuzenji; NIGATA: Akakura; NAGANO: Shiga-Kogen, Iwanadome, Kamikochi; TOTTORI: Mt. Daisen.

Season: Early July to mid-September.

Not rare in Japan. Banks (1937) reported the distribution of this species in Taiwan, but I doubt it. Kimmins (1943) described *Neuronema navási* from Taiwan.

Genus *Oedobius* Nakahara

Oedobius Naka., 1915f: 44. Type: *Megalomus punctatus* Okamoto (= *Oedobius infalcatus* Nakahara); Japan.

Bestreta Navás, 1924b: 222. New Synonymy.

This genus was erected by Nakahara, but I arranged it as a synonym of *Drepanopteryx*. However, my recent examination reveals that the 2 are distinct genera.

Oedobius punctatus (Okamoto)

Megalomus punctatus Okam., 1905: 114.—Matsumura, 1907: 171, fig. 199; 1908: 38.—Iguchi, 1908: 252.—Matsumura, 1917: 471, fig. 246.

Oedobius infalcatus Nakahara, 1915f: 44; 1915e: 102.—Tosawa, 1932: 26.

Drepanopteryx punctata, Kuwayama, 1920b: 86, pl. 1, figs. 2, 3, 8.—Matsumura, 1931: 1161, fig.—Kuwayama, 1932: 1544, fig. 3050; 1950: 393, fig. 1073.

Drepanopteryx infalcatus, Nakahara, 1919: 137.

Bestreta japonica Navás, 1924b: 222. New Synonymy.

DISTRIBUTION: Hokkaido, Honsu, Kyushu; Sachalin.

HOKKAIDO. Tomakomai. Scarce.

Season: August.

Genus *Drepanopteryx* Leach

Drepanopteryx Leach, 1815: 138.—Hagen, 1866: 376.—Wallengren, 1871: 32.—Kuwayama, 1920b: 85.—Krüger, 1922b: 170.—Killington, 1937: 142.—Tjeder, 1941b: 30. Type: *Hemerobius phalaenoides* Linné; Europe.

Drepanopteryx Burmeister, 1839: 975.—Wesmael, 1841: 219.—Rostock, 1888: 107.

Megalomus Rambur, 1842: 418.

Drepanopteryx phalaenoides (Linné)

Hemerobius phalaenoides L., 1758: 550.

Drepanopteryx phalaenoides, Burmeister, 1839: 975.—Wesmael, 1841: 219.—Rostock, 1888: 108.

Drepanopteryx phalaenoides, Leach, 1815: 138.—Wallengren, 1871: 33.—Kuwayama, 1920b: 87, pl. 1, figs. 1, 4-7.—Krüger, 1922b: 170.—Esaki, 1930a: 2.—Matsumura, 1931: 1161, fig.—Kuwayama, 1932: 1544, fig. 3049.—Matsumura, 1933: 8 (12), pl. 2, fig. 16.—Killington, 1937: 143, pl. 17, fig. 2, text figs. 98, 99.—Kuwayama, 1950: 394, fig. 1074.

Megalomus phalaenoides, Rambur, 1842: 418, pl. 9, fig. 6.

DISTRIBUTION: Hokkaido, Honshu, Kyushu; Sachalin; Europe.

HOKKAIDO. Sapporo, Toya. HONSHU. NAGANO: Kamikochi. Apparently rare in Japan.

Season: End May to early August.

Family SYMPHEROBIIDAE Brues and Melander, 1932

Small family closely related to Hemerobiidae, but distinguishable by difference in wing venation. Members of this family apparently have 2 radial sectors in forewing.

1. Forewing with a recurrent humeral veinlet 2
Forewing without a recurrent humeral veinlet. Costal cross-veins mostly simple, not set close together in the pterostigmatic region; 3 to 5 cross-veins between Sc and R; only 1 complete series of gradate cross-veins **Psectra**
2. Forewing with 3 to 4 preapical cross-veins; Sc and R widely separated... **Symphorobius**
Forewing with but 1 preapical cross-vein; subcostal area very narrow, having R run closely with Sc..... **Notiobiella**

Genus *Symphorobius* Banks

Symphorobius Banks, 1904: 209; 1905: 40; 1913: 216.—Nakahara, 1915 f: 21.—Krüger, 1922b: 171.—Killington, 1937: 111.—Carpenter, 1940: 227. Type: *Hemerobius amicus* Fitch; N. America.

Spadobius Needham, 1905: 16.

Palmobius Need., 1905: 17.

Niremberge Navás, 1909f: 377.

Coloma Nav., 1915c: 13.
Nefasitus Nav., 1915c: 15.
Eurobius Krüger, 1922b: 171.
Lachlanus Kr., 1922b: 171.

This genus is distributed throughout Eurasia and also occurs in N. and S. America.

Forewing hyaline, with a large number of brown spots distributed all over, giving a checkered appearance **tessellatus**
 Forewing smoky, with very faint fuscous mottling..... **domesticus**

Sympherobius domesticus Nakahara

Sympherobius domesticus Naka., 1954: 43, pl. 2, fig. 3, pl. 5, figs. 1-9; 1960: 34.

DISTRIBUTION: Hokkaido, Honshu.

HOKKAIDO. Sapporo. HONSHU. AOMORI: Hachinohe; TOKYO: Tokyo.

Season: Early June to early August.

Nakahara studied life-history and habits of this species. According to observation of Toshima in Aomori Prefecture, larvae of this species prey on the elongate cottony scale, *Phenacoccus pergandei* Cockerell, in apple orchards.

Sympherobius tessellatus Nakahara Fig. 14.

Sympherobius tessellatus Naka., 1915f: 22, pl. 1, fig. 2; 1915e: 100; 1919: 136.—Kuwayama, 1956b: 24; 1957: 2.—Nakahara, 1960: 34.

DISTRIBUTION: Honshu, Shikoku.

HONSHU. TOKYO: Tokyo, Miyake I.; KANAGAWA: Yokohama; SHIKOKU. EHIME: Matsuyama (Dogo). Not rare.

Season: End May to mid-August.

According to correspondence from Tachikawa, Kanda observed this species as a predator of *Matsucoccus matsumurae* Kuwana in Yokohama.

Genus **Notiobiella** Banks

Notiobiella Banks, 1909: 80; 1910b: 389; 1913: 216.—Nakahara, 1915f: 20.—Banks, 1932: 103. Type: *Notiobiella unita* Banks; Australia.

Buxtonia Esben-Petersen, 1928: 93.

Just after Needham erected the genus *Annandalia* in 1909 it was considered by Banks as a synonym of this genus. But as Banks discussed in 1932 it is distinct from *Notiobiella*.

Notiobiella subolivacea Nakahara Fig. 15.

Notiobiella subolivacea Naka., 1915f: 20, pl. 1, fig. 3; 1915e: 100; 1919: 136.—Matsumura, 1931: 1162, fig.—Kuwayama, 1932: 1548, fig. 3057.—Tosawa, 1932: 26.—Banks, 1937: 278.—Esaki, Hori & Yasumatsu, 1938: 121, fig. 217, 1.—Tanaka, 1939: 645.—Kuwayama, 1950: 391, fig. 1067.—Takeuchi, 1955: 70, fig. 388.—Kuwayama, 1956b: 24; 1957: 2.

DISTRIBUTION: Honshu, Shikoku, Kyushu; Ryukyu; Taiwan.

HONSHU. KYOTO: Kyoto; HYOGO: Harima, Maiko. SHIKOKU. EHIME: Matsuyama (Dogo), Matsuyama. KYUSHU. NAGASAKI: Tsushima I. (Mt. Ariake); KUMAMOTO: Kumamoto. Not rare in the Kinki district, Honshu.

Season: Mid-January to mid-March; end July; middle to end October.

Genus *Psectra* Hagen

Psectra Hag., 1866: 376.—Wallengren, 1871: 51.—Rostock, 1888: 106.—Banks, 1905: 44; 1913: 216.—Killington, 1936: 245.—Carpenter, 1940: 251. Type: *Hemerobius dipterus* Burmeister; Europe.

Up to present this aberrant genus has been known only from the type species. Recently I found another species in Thailand which should belong to this genus. This is named *Psectra siamica* by Nakahara and me. In the genus *Psectra*, an extraordinary dimorphism in hindwing has been noticed; one form having 4 fully developed wings, the other having the hindwing so vestigial as to resemble small scale-like appendages.

Psectra diptera (Burmeister) Fig. 16.

Hemerobius dipterus Burm., 1839: 973.

Hemerobius (Psectra) dipterus, Hagen, 1886: 21.

Psectra diptera, Hag., 1866: 410.—Wallengren, 1871: 52.—Rostock, 1888: 107.—Banks, 1905: 44.—Mjöberg, 1909: 1, 3 figs.—Killington & Kimmins, 1932: 153, pl. 6.—Killington, 1936: 246, figs. 63, 64.—Tjeder, 1936a: 97, pl.—Carpenter, 1940: 252, fig. 55, pl. 3, fig. 23.

Psectra buenoi Navás, 1909d: 218.

Notiobiella galloisi Nav., 1924b: 221. **New Synonymy.**

Anandalia galloisi, Banks, 1932: 105.

DISTRIBUTION: Hokkaido*, Honshu; Siberia; Europe; N. America.

HOKKAIDO. Sapporo, Hayakita-fumonke. HONSHU. IWATE: Karumai.

Season: Eearly July to end September.

Four specimens from Japan are at my disposal. They agree perfectly with descriptions and figures mentioned above. The most remarkable feature of this species is dimorphism in hindwing development; either fully formed or vestigial. A micropterous form has not yet been discovered in Japan.

Family CHRYSOPIDAE Newman, 1853

Because of the economic importance in destroying various small injurious insects and mites, and because of certain phases of their habits, many papers on the taxonomy, morphology and life-history of this family have been published and have contributed to our knowledge in Japan. Twenty-six species of Chrysopidae have been designated in Japan, but actually they comprise the most homogeneous family in morphology, since the species are closely allied and difficult to distinguish. Up to present only 3 genera are represented in Japan; *Chrysopa*, *Anomalochrysa* and *Nothochrysa*, all belonging to the subfamily Chrysopinae. The Dictyochrysinæ is not represented in Japan.

Subfamily CHRYSOPINAE Esben-Petersen, 1918

1. Intramedian cell 1 of forewing subquadangular or oblong. Body stout and mainly brown or reddish brown in color..... **Nothochrysa**
 Intramedian cell 1 of forewing triangular or ovate. Body more or less slender and mainly green in color..... 2
2. Forewing with 2 series of gradate cross-veins in the discal area **Chrysopa**
 Forewing with 3 or more irregular series of gradate cross-veins in the discal area **Anomalochrysa**

Genus *Chrysopa* Leach

Chrysopa Leach, 1815: 138.—Burmeister, 1839: 976.—Wesmael, 1841: 207.—Schneider, 1851: 38, pls. 1, 2.—Hagen, 1866: 377.—Wallengren, 1871: 13.—Rostock, 1888: 101.—Banks, 1903: 145.—van der Weele, 1909b: 62.—Pongrácz, 1912: 189.—Okamoto, 1914c: 56; 1919a: 34.—Kuwayama, 1924c: 10.—Killington, 1937: 151.—Zimmerman, 1957: 89. Type: *Hemerobius perla* Linné; Europe.

Nineta Navás, 1912a: 98.—Okamoto, 1919a: 29.

Parachrysa Nakahara, 1915h: 121; 1915d: 336.

Chrysotropia Navás, 1911b: 12.

Cintameva Nav., 1914b: 214.—Lacroix, 1925: 436.

1. Segment 2 of antenna marked or annulated with black or blackish brown..... 2
 Segment 2 of antenna concolorous with segment 1..... 7
- 2 (1). Head with a black X-mark between bases of antennae..... 3
 Head without such mark 5
- 3 (2). Head with 4 black spots on occiput **intima**
 Head with a transverse black band across occiput 4
- 4 (3). Inner side of eye black **nigra**
 Inner side of eye ground-color **perla**
- 5 (2). Head with 4 black spots on occiput **lezeyi**
 Head without black spot or with at most 2 black spots on occiput..... 6
- 6 (5). Costal cross-veins of forewing green except their posterior ends which are blackish **phyllochroma**
 Costal cross-veins of forewing black **formosa**
- 7 (1). Head immaculate 8
 Head with some blackish or fuscous markings 11
- 8 (7). Larger species, expanse 40–50 mm. Segment 1 of antenna elongate and cylindrical, about 2× as long as broad..... 9
 Smaller species, expanse 25–35 mm. Segment 1 of antenna broad, scarcely longer than broad 10
- 9 (8). Antenna dark brown; pronotum variably suffused with black around margins and on depression, a pair of kidney-shaped fuscous speckles behind anterior margin **alpicola**
 Antenna yellowish brown; pronotum yellowish without dark markings **vittata**
- 10 (8). Frons and clypeus reddish purple **kintoki**
 Frons and clypeus yellowish green..... **ciliata**
- 11 (7). In forewing, cross-vein 1 from Rs to Psm touches Psm at apex of median

- loop, or beyond median loop 12
- In forewing, cross-vein 1 from Rs to Psm touches Psm before apex of median loop 16
- 12 (11). Vertex with a pair of black stripes joined anteriorly to interantennal X-mark **furcifera**
Vertex unmarked; no black interantennal mark 13
- 13 (12). Gradate series of cross-veins of forewing black..... **nipponensis**
Gradate series of cross-veins of forewing green..... 14
- 14 (13). A black spot on each gena..... **carnea**
A black spot on each gena and a streak on each side of clypeus..... 15
- 15 (14). Palpi all black..... **suzukii**
Maxillary palpus black and labial palpus yellowish brown..... **boninensis**
- 16 (11). Forewing with some fuscous or brownish markings..... 17
Forewing without markings..... 18
- 17 (16). Greater part of cross-veins in forewing brownish or fuscous; greater part of cross-veins and some forks in basal 1/2 of forewing brownish shaded... **decorata**
Greater part of cross-veins in forewing green; 2 fuscous spots, one at fork of Cu₂ and other at base of outer gradate series, in forewing..... **matsumurae**
- 18 (16). Pronotum with a large black triangular patch along front margin and blackish suffusion along hind margin **kichijoi**
Pronotum without blackish markings along front and hind margins 19
- 19 (18). Head with 2 black dashes on occiput **satoruna**
Head without black dashes on occiput..... 20
- 20 (19). Head with only a black spot on each gena..... **formosana**
Head with more than 4 spots or short lines 21
- 21 (20). Head with a rounded black spot on each gena and a short black line or spot on each side of clypeus..... 22
Head with different markings..... 23
- 22 (21). Forewing with a small blackish dot at base of costa; palpi strongly annulated with black, distal segment almost wholly black; sometimes with black spot between bases of antennae..... **prasina**
Forewing without small blackish dot at base of costa; palpi pale greenish, marked externally with fuscous **albolineata**
- 23 (21). Larger species, expanse 35–40 mm. Palpi testaceous or lightly marked with fuscous externally; face with 4 to 7 black spots, of them the 2 just below antennae are crescentic; segments 1 and 2 of antenna unmarked **septempunctata**
Smaller species, expanse 20–30 mm. Palpi fuscous or blackish; face with 4 to 7 black or reddish brown spots, but lacking spots just below antennae; segments 1 and 2 of antenna sometimes with lateral dark stripe **cognatella**

Chrysopa vittata Wesmael

Chrysopa vittata Wes., 1841: 211.—Schneider, 1851: 65, pl. 7.—Wallengren, 1871: 21.—MacLachlan, 1884: 161.—Rostock, 1888: 104.—Pongrácz, 1912: 190, pl. 4, fig. 2.—Okamoto, 1914c: 64.—Nakahara, 1914d: 400; 1915b: 107; 1915h: 119.—Killington, 1937: 163, pl. 23, fig. 2, text fig. 103.—Kuwayama, 1954b: 99; 1956c: 81; 1956b:

27; 1957: 2.

Nineta vittata, Navás, 1915b: 87.—Okamoto, 1919a: 30, pl. 3, figs. 5–8, pl. 5, fig. 2; 1919b: 3.—Kuwayama, 1924d: 109.—Navás, 1925a: 1.—Kuwayama, 1932: 1542, fig. 3046.—Kato, 1933: pl. 47, fig. 4 & text.—Kuwayama, 1936a: 108; 1936b: 813.—Mitsuhashi, 1936: 366.—Yasumatsu, 1945: 207, fig. 1a.—Kuwayama, 1950: 394, fig. 1076.—Takeuchi, 1955: 71, fig. 396.

Chrysocerca vittata, Lacroix, 1924: 571.

Hemerobius albus Fabricius (not Linné), 1775: 309.

Chrysopa alba, Burmeister (not Linné), 1839: 981.

Chrysopa integra Hagen, 1852: 40.

Chrysopa perla Stephens (not Linné), 1836: 105.

Hemerobius proximus, Rambur, 1842: 425.

Nothochrysa olivacea Gerstaecker, 1893: 166.—Matsumura, 1908: 38.—Okamoto, 1913: 58; 1914c: 54.

Parachrysa olivacea, Nakahara, 1915h: 118, pl. 8, figs. 2–4; 1915d: 336.

Chrysopa inornata Matsumura (not Navás), 1911: 14.—Okamoto, 1913: 56; 1914c: 63.—Nakahara, 1914f: 493; 1914d: 398. Preoccupied.

Chrysopa inornatella Nakahara, 1914d: 399.

DISTRIBUTION: Hokkaido, Honshu, Shikoku; Kuriles; Sachalin; Kamchatka; Siberia; Europe.

HOKKAIDO. Mts. Daisetsu, Souunkyo, Tokachi-mitsumata, Mt. Tokachi, Nukabira, Sapporo, Jozankei, Noboribetsu. HONSHU. AOMORI: Towada; KYOTO: Kyoto.

Season: Early July to end September.

Occurs in deciduous woods of Hokkaido and northern part of Honshu. In southern Japan it is extremely rare.

Chrysopa alpicola Kuwayama

Chrysopa alpicola Kuw., 1956a: 21, fig.

DISTRIBUTION: Honshu.

HONSHU. NAGANO: Kamikochi. Rare.

Season: Early August.

One of the largest species of the genus, near *C. vittata*, in Japan.

Chrysopa ciliata Wesmael

Chrysopa ciliata Wes., 1841: 212.—Killington, 1937: 168, pl. 23, fig. 3, text figs. 104B, 105.—Kuwayama, 1960: 30.

Chrysopa alba Stephens (not Linné), 1836: 204.—Schneider, 1851: 77, pl. 13.—Wallengren, 1871: 21.—Rostock, 1888: 104.—Pongrácz, 1912: 210.—Nakahara, 1915h: 120.—Okamoto, 1919a: 54, pl. 4, figs. 15–16, pl. 7, fig. 8; Okamoto, 1919b: 7.

Chrysocerca japonica Nakahara, 1915h: 121, pl. 8, figs. 5–7. **New Synonymy.**

Chrysotropia japonica, Navás, 1916: 235.—Okamoto, 1919a: 33, pl. 3, figs. 9–12, pl. 5, fig. 8; 1919b: 3.—Kuwayama, 1932: 1542, fig. 3045.—Tosawa, 1932: 26.—Izaki, 1934: 305.—Kuwayama, 1936b: 813.—Mitsuhashi, 1936: 367.—Kuwayama, 1950: 395, fig. 1077.

Chrysopa japonica, Kuwayama, 1954b: 100.

Chrysotropia lacroixi Navás, 1911b; 12.

Chrysotropia alba, Lacroix (not Linné), 1924: 573.

DISTRIBUTION: Hokkaido, Honshu; Sachalin; Europe.

HOKKAIDO. Akan, Mts. Daisetsu, Sounkyo, Biroo, Sapporo, Nopporo, Jozankei, Toya. HONSHU. AOMORI: Mt. Hakkoda; FUKUSHIMA: Mt. Azuma; TOCHIGI: Chuzenji; NIIGATA: Kurokawa, Sado I. (Mt. Donden); TOKYO: Mt. Takao; SHIZUOKA: Misakubo, Kamikawane (Senzu); KYOTO: Kyoto.

Season: End April to early September. In deciduous woods and orchards.

Chrysopa kintoki Okamoto

Chrysopa kintoki Okam., 1919a: 62, pl. 5, fig. 6; 1919b: 9.—Tosawa, 1932: 26.

DISTRIBUTION: Honshu.

HONSHU. OSAKA: Osaka. After Okamoto. Apparently rare. No specimens at my disposal.

Season: September.

Chrysopa kichijoi Kuwayama

Chrysopa kichijoi Kuw., 1936b; 817, 811, figs. 3-4.

DISTRIBUTION: Hokkaido.

HOKKAIDO. Sapporo. Only unique type is known.

Season: July.

Chrysopa formosana Matsumura

Chrysopa vittata var. *formosana* Mats., 1910b: 45, pl. 28, fig. 4; 1910c: 138.

Chrysopa formosana, Matsumura, 1910a: 78, pl. 28, fig. 4.—Okamoto, 1919a: 56, pl. 6, fig. 11; Okamoto, 1919b: 8.—Kuwayama, 1924c: 12.—Banks, 1937: 282.—Kuwayama, 1960: 30.

Chrysopa sauteri Esben-Petersen, 1913a: 258, fig. 8.—Okamoto, 1914c: 68.—Nakahara, 1914d: 400; 1915h: 119.

Chrysopa yamamurae Nakahara, 1915h: 122, pl. 8, figs. 8-9; 1915d: 335.—Okamoto, 1919a: 55, pl. 4, figs. 17-18, pl. 6, fig. 4; 1919b: 7.—Kuwayama, 1936b: 819; 1953b: 180.—Ishihara *et al.*, 1953: 40.—Kuwayama, 1954b: 102; 1956b: 29; 1957: 2. **New Synonymy.**

Chrysopa microcephala ?, Okamoto (not Brauer), 1905: 113.

DISTRIBUTION: Hokkaido, Honshu, Shikoku, Kyushu; Ryukyu; Taiwan.

HOKKAIDO. Mt. Kurodake, Jozankei, Sapporo. HONSHU. FUKUSHIMA: Mt. Azuma; NIIGATA: Kurokawa, Naoetsu, Mt. Amakazari, Mt. Naeba; ISHIKAWA: Suzu (Mt. Yamabushi); FUKUI: Kofunato, Oniu; SHIZUOKA: Misakubo; KYOTO: Kyoto; HYOGO: Takasago. SHIKOKU. KAGAWA: Zentsuji; EHIME: Mt. Ishizuchi (Joju), Omogokei, Matsuyama (Misaka pass); KOCHI: Motoyamacho, Mt. Tebako. KYUSHU. KAGOSHIMA: Amami-Oshima (Koniya).

Season: End June to end August.

Chrysopa albolineata Killington Fig. 17.

Chrysopa tenella Schneider, 1851: 94, pl. 25. Preoccupied.

Chrysopa albolineata Killington, 1935: 87; 1937: 181, pl. 3, fig. 2, pl. 21, fig. 4, pl. 25, fig. 1, pl. 28, fig. 3, text fig. 106.

DISTRIBUTION: Shikoku*; Europe.

SHIKOKU. EHIME: Matsuyama.

Season: July.

Recently Tachikawa observed uncertain larvae of Chrysopidae feeding on the wisteria scale, *Planococcus kraunhiae* Kuwana, and bred them. He kindly sent me one of the adults which emerged July 15, 1960. This specimen agrees with the original description of Schneider and with the precise description of Killington so well that I have no hesitation to identify it with this species.

Chrysopa boninensis Okamoto

Chrysopa boninensis Okam., 1914c: 62.—Nakahara, 1914d: 399.—Okamoto, 1919a: 61, pl. 1, fig. 16, pl. 4, figs. 19–20, pl. 5, fig. 7; 1919b: 9.—Kurisaki, 1920b: 189, fig.—Kuwayama, 1924c: 12.—Esaki, 1930b: 215.—Kinoshita, 1932: 2194, fig. 4307.—Ishii, 1937: 69, fig. 12.—Takano & Yanagihara, 1939: 140, pl. 6, fig. 3.—Kuwayama, 1956b: 29; 1957: 2.—Adams, 1959: 28.

Chrysopa sp. Yoshida, 1917: 104, pl. 3, figs. 5–9.

DISTRIBUTION: Honshu, Shikoku; Bonin Is.; Ryukyu*; Taiwan; Micronesia.

SHIKOKU: EHIME: Suihamine, Matsuyama (Higashino). Not common.

Season: Early February to end April; mid-July to end August.

Banks (1937) wrongly regarded this species as synonymous with *C. anpingensis* Esben-Petersen. *C. anpingensis* is a synonym of *C. carnea* Stephens. Tachikawa observed the larvae of this species preying on the mulberry scale, *Pseudaulacaspis pentagona* Targioni, in Matsuyama, Shikoku. Yoshida stated in 1917 that larvae of this species destroyed the cottony-cushion scale, *Icerya purchasi* Maskell, the citrus mealy bug, *Pseudococcus citri* Risso, and other coccids in Shizuoka Prefecture.

Chrysopa suzukii Okamoto

Chrysopa suzukii Okam., 1919a: 60, pl. 6, fig. 10; 1919b: 8.—Tosawa, 1932: 26.—Kuwayama, 1956b: 29; 1957: 2.

DISTRIBUTION: Honshu, Shikoku.

HONSHU. SHIZUOKA: Totomi; KYOTO: Kyoto. SHIKOKU. EHIME: Matsuyama.

Season: Mid-January to end February.

Chrysopa carnea Stephens

Chrysopa carnea Steph., 1836: 103.—Killington, 1937: 187, pl. 24, figs. 2B, 3, text figs. 107–108.

Hemerobius perla Fabricius (not Linné), 1775: 82.—Rambur, 1842: 424.

Chrysopa perla, Burmeister (not Linné), 1839: 980.—Wesmael, 1841: 207.

Chrysopa vulgaris Schneider, 1851: 68, pl. 8.—Pongrácz, 1912: 208.

Chrysopa vulgaris ?, Nakahara, 1915d: 334.

Chrysopa microcephala Brauer, 1851: 6.—Wallengren, 1871: 24.—Rostock, 1888: 105.—Matsumura, 1908: 37.

Chrysopa microcephala ?, MacLachlan, 1875: 182.—Matsumura, 1900b: 16.

Chrysopa vulgaris var. *microcephala*, Okamoto, 1914c: 63.—Nakahara, 1914d: 399; 1915h: 119.—Okamoto, 1919a: 58; 1919b: 8.—Tosawa, 1932: 26.

Chrysopa anpingensis Esben-Petersen, 1913a: 259, fig. 9.—Okamoto, 1914c: 62.

Chrysopa vulgaris var. *anpingensis*, Okamoto, 1919a: 59; 1919b: 8.—Kuwayama, 1924c: 12.—Matsuda, 1928: 97.

DISTRIBUTION: Honshu; Taiwan; Europe.

HONSHU. TOKYO: Tokyo; KYOTO: Kyoto. After Okamoto.

Season: June.

***Chrysopa nipponensis* Okamoto**

Chrysopa nipponensis Okam., 1914c: 65.—Nakahara, 1914d: 400; 1915h: 119.—Okamoto, 1919a: 50, pl. 7, fig. 7; 1919b: 6.—Tosawa, 1932: 26.—Kuwayama, 1936b: 816; 1956b: 28; 1957: 2; 1960: 29.

Chrysopa kurisakiana Okamoto, 1914c: 71.—Nakahara, 1914d: 401; 1915h: 120; 1915d: 335.—Okamoto, 1919a: 51, pl. 4, figs. 9–10, pl. 7, fig. 6; 1919b: 7.—Kuwayama, 1956b: 28; 1957: 2. **New Synonymy.**

Chrysopa nipponensis f. *kurisakiana*, Kuwayama, 1960: 29.

DISTRIBUTION: Hokkaido, Honshu, Shikoku, Kyushu.

HOKKAIDO. Sapporo, Hayakita, Mukotoya, Ono, Okujiri I. HONSHU. AOMORI: Towada, Hachinohe; IWATE: Karumai; MIYAGI: Sendai; NIIGATA: Murakami, Noo, Kurokawa, Mt. Amakazari, Sado I. (Suizu); GUNMA: Ikaho; TOKYO: Tokyo, Mt. Takao, Hachijo I.; KANAGAWA: Misaki; SHIZUOKA: Gotemba, Mt. Fuji, Shimizu (Nihondaira), Sasamado, Mt. Ogasa, Ashikubo, Kanaya; YAMANASHI: Kofu; NAGANO: Komoro, Mt. Ontake; ISHIKAWA: Suzu (Mt. Yamabushi); FUKUI: Ishitoishi, Oniu; KYOTO: Kyoto; HYOGO: Harima. SHIKOKU. EHIME: Tonaru, Matsuyama, Suihamine; KOCHI: Honkawa (Mt. Tebako). KYUSHU. KUMAMOTO: Kumamoto. Common.

Season: All year round.

As in the case of *C. carnea* mentioned by Killington, body coloration in overwintering adults becomes reddish, although the extent to which this occurs varies somewhat, and it was on this winter form that Okamoto's original description was based. *C. kurisakiana* is a summer form of this species.

***Chrysopa satoruna* Navás**

Chrysopa satoruna Nav., 1922: 54.—Kuwayama, 1936b: 818.

DISTRIBUTION: Hokkaido.

HOKKAIDO. Sapporo. After Navás. Only holotype known.

Season: August.

***Chrysopa cognatella* Okamoto**

Chrysopa cognatella Okam., 1914c: 70.—Nakahara, 1914d: 401; 1915h: 120.—Okamoto, 1919a: 46, pl. 1, fig. 10, pl. 7, fig. 4; 1919b: 5.—Kuwayama, 1932: 1540, fig. 3042.—

Hori, 1933: 174.—Kuwayama, 1936b: 816.—Banks, 1937: 282.—Esaki, Hori & Yasumatsu, 1938: 123, fig. 221, 2.—Kuwayama, 1950: 396, fig. 1080; 1956b: 27; 1957: 2; 1960: 30.

Chrysopa nakaharai Navás, 1915: 196.

Chrysopa hoffmanni Esben-Petersen, 1916: 301.

Chrysopa parabola Okamoto, 1919a: 51, pl. 4, figs. 7–8, pl. 6, fig. 5; 1919b: 6.—Kuwayama, 1936b: 816; 1954b: 101; 1956b: 28; 1957: 2. **New Synonymy.**

DISTRIBUTION: Hokkaido, Honshu, Shikoku, Kyushu; Sachalin; Ryukyu; Taiwan; China.

HOKKAIDO: Teshio, Biroo, Shikaribetsu, Sounkyo, Hitaka (Mt. Apoi), Nopporo, Sapporo, Jozankei, Kaminokuni. **HONSHU.** AOMORI: Mt. Hakkoda, Towada; YAMAGATA: Mt. Chokai; FUKUSHIMA: Mt. Bandai; TOCHIGI: Kinugawa, Shiobara; TOKYO: Tokyo, Okutama, Miyake I.; SHIZUOKA: Yoshinaga, Kanaya, Kamikawane (Senzu); NIIGATA: Kurokawa, Mts. Asahi (Mt. Dorokujin), Mt. Amakazari, Renge; ISHIKAWA: Suzu (Mt. Yamabushi); FUKUI: Ishitoishi, Oniu; MIYE: Toba; NARA: Yoshino; KYOTO: Kyoto; HYOGO: Suma, Harima. **SHIKOKU.** EHIME: Iyo, Matsuyama (Dogo). **KYUSHU.** KAGOSHIMA: Kagoshima.

Season: Mid-May to end September; early November to mid-December.

Chrysopa septempunctata Wesmael

Chrysopa septempunctata Wes., 1841: 210.—Schneider, 1851: 101, pl. 30.—Wallengren, 1871: 19.—MacLachlan, 1886: 36.—Rostock, 1888: 103.—Okamoto, 1905: 113.—Matsumura, 1907: 170; 1908: 37.—Pongrácz, 1912: 193, pl. 5, fig. 6.—Kuwayama, 1924d: 111, fig. 3.—Izaki, 1934: 305.—Kuwayama, 1936b: 817.—Killington, 1937: 194, pl. 21, fig. 1, pl. 26, fig. 1, text fig. 109.—Principi, 1949: 316, figs. 1–28.—Kuwayama, 1950: 396, fig. 1082; 1954b: 101.—Takeuchi, 1955: 71, fig. 394.—Kuwayama, 1956b: 28; 1957: 2.—Ishihara, 1957: 191, fig. 93.—Kuwayama, 1960: 29.

Chrysopa cognata MacLachlan, 1867: 249; 1875: 182.—Matsumura, 1900b: 16.—Navás, 1912c: 419.—Okamoto, 1913: 53; 1914c: 67.—Nakahara, 1914d: 400; 1915h: 119; 1915d: 336.—Matsumura, 1917: 471.—Okazaki, 1918: 54, pl. 8, fig. 2.—Okamoto, 1919a: 53, pl. 4, figs. 11–14, pl. 5, fig. 5; 1919b: 7.—Kurisaki, 1920a: 115, fig.—Okamoto, 1924: 69.—Marumo, 1927: 717, fig. 1389.—Matsumura, 1931: 1164, fig.—Tosawa, 1932: 26.—Takagi, 1932: 477, fig.—Matsumura, 1933: 6 (9), pl. 2, fig. 6.—Banks, 1937: 285.—Kimmins, 1940: 446.

Chrysopa septempunctata cognata, Kuwayama, 1924d: 114; 1924c: 11.—Matsuda, 1929a: 317; 1929b: 49.—Kuwayama, 1932: 1539, fig. 3040, pls. 20, 23.—Kikuchi, 1933: 480.—Hirayama, 1933: pl. 79, fig. 2 & text.—Takahashi, 1935: 487.—Ueda, 1935: 49, 90.—Esaki, Hori & Yasumatsu, 1938: 123, fig. 222.—Tanaka, 1939: 525.—Izaki, 1940: 120.—Kobayashi, 1942: 221.—Iida, 1942: 463.

Chrysopa septempunctata f. *cognata*, Kuwayama, 1936b: 818; 1960: 29.

Cintameva cognata, Navás, 1925b: 23.

Cintameva 7-punctata var. *cognata*, Nav., 1928a: 121.

Hemerobius pallens Rambur, 1842: 425.

Hemerobius mauricianus Ramb., 1842: 425.

Chrysopa pallens Schneider, 1851: 104, pl. 32.

Chrysopa nobilis Brauer (not Heyden), 1851: 7.

Nothochrysa robusta Gerstaecker, 1893: 165.—Matsumura, 1908: 38.

Chrysopa ricciana Navás, 1910b: 193.

Chrysopa bipunctata Burmeister, 1839: 982.—Schneider, 1851: 103, pl. 31; Hagen, 1866: 390.—MacLachlan, 1875: 182.—Matsumura, 1900b: 16; 1900a: 77.—Okamoto, 1905: 113.—Matsumura, 1907: 170; 1908: 37.—Iguchi, 1908: 252.—Okamoto, 1913: 54; 1914c: 66.—Nakahara, 1914d: 400; 1915h: 119.—Esben-Petersen, 1916: 302.—Okamoto, 1919a: 52, pl. 1, fig. 14, pl. 5, fig. 4; 1919b: 7.—Shinji, 1928: 124.

DISTRIBUTION: Hokkaido, Honshu, Shikoku, Kyushu; Sachalin; Siberia; Korea; Taiwan; China; Cambodia; Europe.

HOKKAIDO. Nukabira, Sapporo, Jozankei. HONSHU. AOMORI: Towada; IWATE: Karumai; GUNMA: Ikaho; TOKYO: Tokyo, Mt. Takao, Hikawa, Miyake I.; NAGANO: Shimauchi; NIIGATA: Kurokawa, Kamo, Mt. Naeba, Mt. Amakazari, Sado I. (Iwakubi); TOYAMA: Toyama; GIFU: Gifu; SHIZUOKA: Misakubo, Kanaya; FUKUI: Kofunato, Ishitoishi; KYOTO: Kyoto; HYOGO: Harima; OKAYAMA: Kurashiki; YAMAGUCHI: Hagi. SHIKOKU. KAGAWA: Zentsuji, Mikicho; EHIME: Tonaru, Iyo, Satamisaki; KOCHI: Nissho. KYUSHU. NAGASAKI: Nagasaki; KUMAMOTO: Kumamoto.

Season: Mid-April to end September.

Larvae and adults prey on the woolly apple aphid, *Eriosoma lanigera* Hausmann, mealy plum aphid, *Hyalopterus arundinis* Fabricius, and other aphids. A large number of varietal names have been applied to this species. *C. bipunctata* and *C. cognata* are forms of this species.

***Chrysopa prasina* Burmeister**

Chrysopa prasina Burm., 1839: 981.—Wesmael, 1841: 212.—Schneider, 1851: 110, pl. 36.—Rostock, 1888: 103.—Pongrácz, 1912: 197.—Principi, 1956: 359, figs. 21–23.

Hemerobius prasinus, Rambur, 1842: 424.

Chrysopa ventralis prasina, Killington, 1937: 205.

Chrysopa aspersa Wesmael, 1841: 210.—Schneider, 1851: 112, pl. 37.—Wallengren, 1871: 18.—Pongrácz, 1912: 195, pl. 5, figs. 5, 10, 15.

Chrysopa abdominalis Brauer, 1855: 705.

Chrysopa zelleri Schneider, 1851: 114, pl. 38.

Chrysopa sachalinensis Matsumura, 1911: 14.—Okamoto, 1913: 57; 1914c: 69.—Nakahara, 1914d: 401; 1914f: 493.—Okamoto, 1914d: 488.—Nakahara, 1915h: 119; 1915d: 335.—Okamoto, 1919a: 49, pl. 1, fig. 13, pl. 4, figs. 5–6, pl. 7, fig. 2; 1919b: 5.—Kuwayama, 1924d: 111; 1936b: 816.—Mitsuhashi, 1936: 367.—Kuwayama, 1956c: 82. **New Synonymy.**

Chrysopa nikkoënsis Okamoto, 1914c: 69; 1914d: 488. **New Synonymy.**

DISTRIBUTION: Hokkaido, Honshu; Kuriles; Sachalin; Turkestan; Europe; Algeria; Morocco.

HOKKAIDO. Kenebetsu, Taisho, Sapporo, Jozankei. HONSHU. FUKUSHIMA: Mt. Azuma (Goshiki); TOCHIGI: Nikko; NAGANO: Sugadaira, Komoro. Local and uncommon.

Season: Mid-June to early September.

***Chrysopa decorata* Esben-Petersen**

Chrysopa decorata Esb.-Pet., 1913a: 260, fig. 10.—Okamoto, 1914c: 68.—Nakahara, 1914d: 400; 1915h: 119.—Okamoto, 1919a: 47, pl. 1, fig. 11; 1919b: 5.—Kuwayama, 1924c:

11.—Banks, 1937: 282.

DISTRIBUTION: Honshu; Ryukyu; Taiwan.

HONSHU. HYOGO: Harima. After Okamoto. Rare.

Season: September.

***Chrysopa matsumurae* Okamoto**

Chrysopa matsumurae Okam., 1914c: 68.—Nakahara, 1914d: 400; 1915h: 119.—Yoshida, 1917: 106, pl. 3, figs. 10–11.—Okamoto, 1919a: 48, pl. 1, fig. 12, pl. 4, figs. 3–4, pl. 7, fig. 3; 1919b: 5.—Kuwayama, 1932: 1540, fig. 3041.—Tosawa, 1932: 26.—Esaki, Hori & Yasumatsu, 1938: 123, fig. 221, 1.—Kuwayama, 1950: 396, fig. 1081.—Kimmins, 1953: 246.—Kuwayama, 1956b: 28; 1957: 2.

DISTRIBUTION: Honshu, Shikoku, Kyushu; New Hebrides.

HONSHU. TOKYO: Miyake I. SHIKOKU. EHIME: Matsuyama (Dogo). KYUSHU. FUKUOKA: Moji.

Season: Mid-June to end August.

Yoshida observed larvae of this species feeding on cottony-cushion scale, *Icerya purchasi* Maskell, in Shizuoka Prefecture.

***Chrysopa furcifera* Okamoto**

Chrysopa furcifera Okam., 1914c: 61.—Nakahara, 1914d: 399; 1915h: 119.—Okamoto, 1919a: 56, pl. 1, fig. 15, pl. 7, fig. 5; 1919b: 8.—Kuwayama, 1924c: 12; 1932: 1539, fig. 3039.—Tosawa, 1932: 27.—Banks, 1937: 285.—Tanaka, 1939: 645.—Iida, 1942: 463.—Kuwayama, 1950: 397, fig. 1083.—Takeuchi, 1955: 71, fig. 395.—Kuwayama, 1956b: 29; 1957: 2.—Adams, 1959: 30, fig. 10.—Kuwayama, 1960: 30.

DISTRIBUTION: Honshu, Shikoku, Kyushu; Bonin Is.; Ryukyu; Taiwan; Micronesia; Philippines.

HONSHU. NIIGATA: Kurokawa; ISHIKAWA: Suzu (Mt. Yamabushi); SHIZUOKA: Shimoda, Kanaya; KYOTO: Kyoto. SHIKOKU. EHIME: Matsuyama (Minatoyama). KYUSHU. KAGOSHIMA: Amami-Oshima I.

Season: Early March to end October; January.

***Chrysopa formosa* Brauer**

Chrysopa formosa Br., 1851: 8 pl. 2, fig. 3.—Rostock, 1888: 103.—Pongrácz, 1912: 200, pl. 5, figs. 7–8.—Principi, 1947: 134, fig. 1; 1949: 316, figs. 29–30.

Chrysopa burmeisteri Schneider, 1851: 123, pl. 42.

Chrysopa japana Okamoto, 1919a: 42, pl. 1, fig. 9, pl. 3, figs. 17–18, pl. 7, fig. 10; 1919b: 4.—Matsumura, 1931: 1164, fig.—Kuwayama, 1932: 1541, fig. 3043.—Tosawa, 1932: 26.—Hori, 1933: 174.—Kikuchi, 1933: 481.—Kuwayama, 1936b: 814.—Esaki, Hori & Yasumatsu, 1938: 122, fig. 220, 2.—Nawa, 1939: 270.—Izaki, 1940: 120.—Kuwayama, 1950: 395, fig. 1079; 1956b: 27; 1957: 2; 1960: 30. **New Synonymy.**

DISTRIBUTION: Hokkaido, Honshu, Shikoku; Korea; China; Siberia; Europe.

HOKKAIDO. Sapporo. HONSHU. NIIGATA: Kurokawa, Senami, Naoetsu, Sado I. (Matsugasaki, Awabi, Sukunagi); TOKYO: Tokyo; SHIZUOKA: Sagara; Gifu: Gifu; HYOGO: Takasago; TOTTORI: Tottori. SHIKOKU. KAGAWA: Zentsuji, Takamatsu; EHIME: Matsuyama (Dogo).

Season: Mid-April to early October.

Wild-spread in Japan, and common, sometimes abundant, in Hokkaido and northern Honshu, but in the south it is by no means common, although it cannot be considered rare. *C. formosa* frequents gardens, but it is also not uncommon in orchards. Okamoto recorded his experiments in Sapporo in which the larvae ate an average of over 2000 cabbage aphids, *Brevicoryne brassicae* Linné.

***Chrysopa phyllochroma* Wesmael**

Chrysopa phyllochroma Wes., 1841: 209.—Wallengren, 1871: 16.—Rostock, 1888: 104.—Pongrácz, 1912: 201, pl. 5, fig. 8.—Killington, 1937: 214, pl. 27, fig. 1, text figs. 111B, 112A.

Chrysopa abbreviata Schneider, in part, 1851: 119, pl. 41.

Chrysopa pusilla Brauer, 1851: 7.

Chrysopa tenella Br., 1851: 5.

Chrysopa sapporensis Okamoto, 1914c: 60.—Nakahara, 1914d: 399.—Okamoto, 1919a: 44, pl. 3, figs. 19–20, pl. 7, fig. 1; 1919b: 5.—Kuwayama, 1936b: 815, figs. 1–2; 1954b: 101; 1956c: 81. **New Synonymy.**

Chrysopa formosa, Nakahara (not Brauer), 1915h: 118; 1915d: 334.

Chrysopa intima, Okamoto (not MacLachlan), 1905: 113.

DISTRIBUTION: Hokkaido, Honshu; Kuriles; Korea; China; Siberia; Europe.

HOKKAIDO: Teshio, Mt. Kurodake, Mts. Daisetsu, Hamakoshimizu, Obihiro, Taisho, Nakasatsunai, Sapporo, Hayakita, Toya. **HONSHU.** IWATE: Karumai. Common in Hokkaido; rare in Honshu.

Season: Mid-May to mid-September.

***Chrysopa lezeyi* Navás**

Chrysopa (!) lezeyi Nav., 1910c: 42.

Chrysopa lezeyi Okamoto, 1913: 55; 1914c: 60.—Nakahara, 1914d: 399; 1915h: 118.—Okamoto, 1919a: 41, pl. 1, fig. 8, pl. 7, fig. 9; 1919b: 4.—Kuwayama, 1936b: 814.

DISTRIBUTION: Hokkaido, Honshu.

HOKKAIDO. Obihiro. Rare.

Season: July.

Near *C. abbreviata* Curtis of Europe.

***Chrysopa intima* MacLachlan**

Chrysopa intima MacL., 1893: 230.—Matsumura, 1900b: 16; 1908: 37.—Okamoto, 1913: 50; 1914c: 58.—Matsumura, 1917: 471, fig. 250.—Okamoto, 1919a: 36, pl. 1, fig. 5, pl. 3, figs. 13–16, pl. 6, fig. 1; 1919b: 3.—Kuwayama, 1924d: 110.—Marumo, 1927: 717, fig. 1388.—Shinji, 1928: 123, fig. 83.—Matsumura, 1931: 1164, fig.—Kuwayama, 1932: 1541, fig. 3044.—Tosawa, 1932: 26.—Matsumura, 1933: 6 (10), pl. 2, fig. 7.—Kikuchi, 1933: 481.—Kinoshita, Yagi & Kawada, 1933: pls. 42, 46 & texts.—Kato, 1933: pl. 47, fig. 3 & text.—Kuwayama, 1936a: 108; 1936b: 814.—Yamakoshi, 1936: 166.—Kimmins, 1940: 447.—Izaki, 1940: 120.—Kuwayama, 1950: 395, fig. 1078; 1954b: 100; 1956c: 81; 1960: 29.

Chrysopa perla, Matsumura (not Linné), 1900a: 77, fig. 47; Matsumura, 1904: 179, pl. 13,

fig. 9.—Okamoto, 1905: 112.—Nawa, 1905: 496.—Matsumura, 1907: 169, fig. 205; Matsumura, 1908: 37.—Iguchi, 1908: 251.—Matsumura, 1911: 14.

Chrysopa perla var. *fracta* Navás, 1910c: 39; 1912c: 419.

Chrysopa perla intima Nakahara, 1914f: 493; 1914d: 399; 1915h: 118; 1915d: 334.

Chrysopa cognata, Izaki (not MacLachlan), 1934: 305.

DISTRIBUTION: Hokkaido, Honshu; Kuriles; Sachalin; Korea; China.

HOKKAIDO. Nakashibetsu, Shibetsu-Bekkai, Kenebetsu, Akan, Shari, Nishiokkope, Onneyu, Teshio, Uriu, Obihiro, Biroo, Taisho, Nakasatsunai, Shintoku, Nukabira, Tomuraushi, Upepesanke, Mts. Daisetsu (Mt. Koizumi), Sapporo, Mt. Moiwa, Ishiyama, Jozankei, Yubari, Hayakita, Fumonke, Hitaka (Mt. Apoi). HONSHU. AOMORI: Asamushi, Towada; IWATE: Karumai; FUKUSHIMA: Mt. Bandai; TOCHIGI: Shiobara; NIGATA: Mt. Amakazari; NAGANO: Mt. Yatsugatake; SHIZUOKA: Mt. Fuji (Subashiri). Yamakoshi reported this species from Kyushu, but it is doubtful.

Season: End May to end August.

Chrysopa perla (Linné)

Hemerobius Perla L., 1758: 549.

Hemerobius chrysopa Fabricius (not Linné), 1775: 309.—Rambur, 1842: 427.

Hemerobius cancellatus Schrank, 1802: 189.

Chrysopa perla, Wesmael, 1841: 207.—Schneider, 1851: 136, pl. 49.—Wallengren, 1871: 15.—Rostock, 1888: 103, pl. 7, fig. 34a.—MacLachlan 1893: 230.—Matsumura, 1900b: 16.—Pongrácz, 1912: 204, pl. 4, fig. 5.—Okamoto, 1913: 51; 1914c: 59.—Nakahara, 1914d: 398; 1915h: 118.—Okamoto, 1919a: 37, pl. 1, fig. 7, pl. 6, fig. 6; 1919b: 3.—Killington, 1937: 221, pl. 21, fig. 3, pl. 25, fig. 2.

Cintameva perla, Navás, 1915b: 10; 1925a: 1.

Chrysopa reticulata Curtis, 1834: pl. 520.

Chrysopa maculata Stephens, 1836: 102.

DISTRIBUTION: Honshu; Siberia; Europe.

HONSHU. TOCHIGI: Ozegahara. After Okamoto.

Season: July.

Rare species in Japan, known only from Ozegahara. Kuwana and Murata reported in 1909 the biology of a green lacewing under the name *Chrysopa perla*. According to their description and figures, it is not *C. perla*.

Chrysopa nigra Okamoto

Chrysopa nigriceps Okam. (not MacLachlan), 1914c: 58. Preoccupied.

Chrysopa nigra Okam., 1919a: 39, pl. 1, fig. 6, pl. 6, fig. 8; 1919b: 4.—Kuwayama, 1954a: 744.

Chrysopa perla, Matsumura (not Linné), 1900b: 16.—Nakahara, 1914d: 398; 1915d: 334.

Chrysopa perla var. ? Nakahara, 1914f: 493.

DISTRIBUTION: Honshu.

HONSHU. TOCHIGI: Chuzenji; TOKYO: Miyake I.; NAGANO: Kamikochi, Mt. Tsubakuro, Oiwake, Shimajima, Mt. Ontake, Mt. Yatsugatake; SHIZUOKA: Nikenkoya; NARA: Nara. Local; uncommon.

Season: End June to mid-August.

Genus *Anomalochrysa* MacLachlan

Anomalochrysa MacL., 1883b: 298.—Esben-Petersen, 1918a: 27.—Zimmerman, 1957: 95.

Type: *Anomalochrysa hepatica* MacL.; Hawaii.

Chrysopidia Navás, 1910c: 54. **New Synonymy.**

Bornia Nav., 1928a: 123. **New Synonymy.**

Navás erected *Chrysopidia* and *Bornia*, designating *C. nigrata* from Himalaya and *B. winkleri* from Borneo respectively as types of the genera. According to him, the 3 series of gradate cross-veins between the radial sector and media in forewing are chief characteristics to separate these genera from *Chrysopa*. I cannot find reason for maintaining *Chrysopidia* and *Bornia* separate from *Anomalochrysa*. It has been considered that *Anomalochrysa* is endemic to the Hawaiian Islands, where 19 species are known to occur. In this paper I am describing a new species from Japan. So, the members of *Anomalochrysa* are widely distributed not only in the Hawaiian Islands but also in Japan, India and Borneo.

Anomalochrysa babai Kuwayama, n. sp. Figs. 18, 19.

A mediocre greenish yellow species. Head greenish yellow, with a large angulated black spot on gena. Palpi yellowish, slightly tinged with grayish brown at distal segments. Antenna reaching apex of forewing; basal segment swollen and, with segment 2, greenish yellow; flagellum pale brownish white becoming slightly darker distally. Vertex raised and flattened.

Prothorax slightly transverse, gradually narrowed anteriorly and anterior angles oblique, marked with fuscous. Pronotum with a transverse depression behind middle and before this a transverse ridge; towards sides clothed with brownish white hairs. Otherwise thorax immaculate. Legs greenish yellow, except tarsi pale brown; claws brownish, strongly curved and dilated at base.

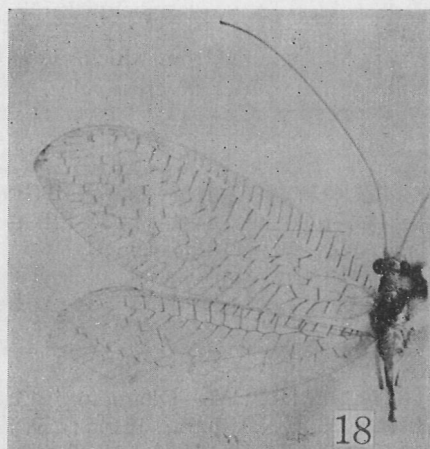
Forewing elongate oval, apex subacute, costal margin slightly convex. Pterostigma very indistinct. About 25 costal cross-veins before pterostigma, and 8 cross-veins in outer, 7 in middle, and 8 in inner gradate series; 14 cross-veins between R_1 and R_s . Intermedian cell 1 elongate ovate, cross-vein 1 from R_s to Psm touches Psm far before apex of median loop. Hairs on venation nearly same or shorter than 1/2 width of cell. Longitudinal veins mainly pale green, but almost all cross-veins black. Gradate cross-veins slightly shaded with brown. Hairs fuscous or blackish. Hindwing similar in form to forewing, but noticeably shorter and narrower. About 20 costal cross-veins before pterostigma; 7-8 cross-veins in outer gradate series, irregular in middle and inner gradate series; 12 cross-veins between R_1 and R_s . Longitudinal veins pale green and majority of cross-veins blackish; hairs blackish or fuscous.

Abdomen yellowish green, immaculate; clothed with brownish hairs. Apex of abdomen of ♀ shown in text-figure.

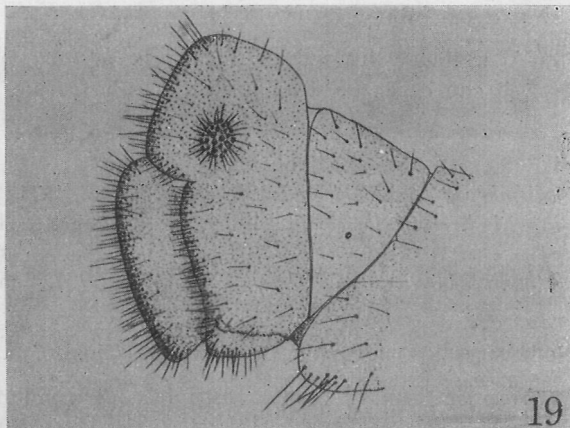
Body length 9 mm; antenna 15 mm; forewing 15 mm; hindwing 12 mm.

DISTRIBUTION: Honshu*.

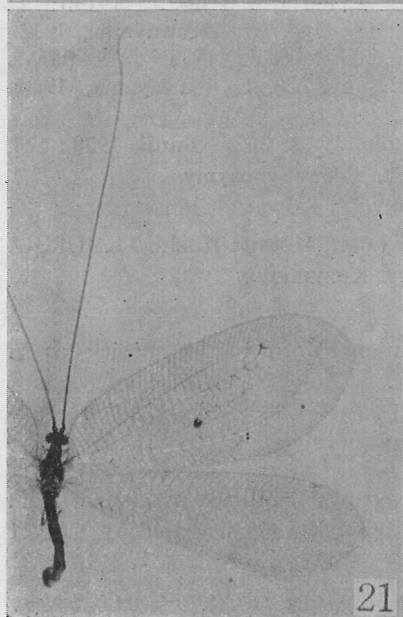
Kurokawa, Niigata Prefecture (1♀, Holotype, collected by Kintaro Baba, 10. VII. 1954). Type deposited in collection of Hokkaido National Agricultural Experiment Station. I name this species in honor of its collector.



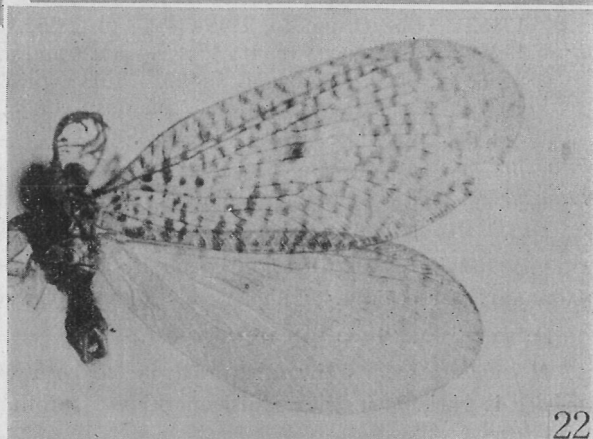
18



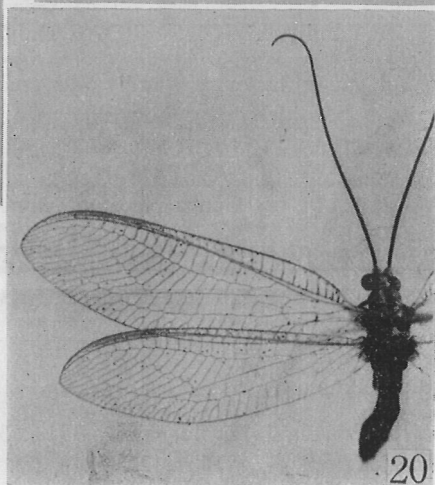
19



21



22



20

Figs. 18-22. 18, *Anomalochrysa babai* n. sp. ♀, $\times 3.4$; 19, same, apex of abdomen (lateral view); 20, *Nothochrysa japonica* MacLachlan ♂, $\times 2.3$; 21, *Nacaura matsumurae* (Okamoto) ♂, $\times 1.8$; 22, *Dilar japonica* var. *gracilis* Kuwayama ♂, $\times 5.6$.

Season: July.

At a glance this species resembles *Chrysopa formosana* Matsumura, from which, however, it can easily be distinguished by the features of the gradate series of cross-veins.

Genus *Nothochrysa* MacLachlan

Nothochrysa MacL., 1868: 195.—Wallengren, 1871: 12.—Rostock, 1888: 105.—Banks, 1903: 142.—van der Weele, 1909b: 75.—Pongrácz, 1912: 186.—Okamoto, 1914c: 53; 1919a: 26.—Kuwayama, 1924c: 8. Type: *Chrysopa fulviceps* Stephens; Europe.

Nathanica Navás, 1913: 180.—Killington, 1937: 235.—Tjeder, 1941b: 30.

Nothochrysa japonica MacLachlan Fig. 20.

Nothochrysa japonica MacL., 1875: 182.—Matsumura, 1900b: 16; 1908: 37.—Okamoto, 1913: 57.—Esben-Petersen, 1913a: 257.—Okamoto, 1914c: 53.—Nakahara, 1914d: 398; 1915h: 118.—Okamoto, 1919a: 26, pl. 2, fig. 8, pl. 5, fig. 9, text fig. 3; 1919b: 2; 1924: 70.—Kuwayama, 1924c: 9.—Matsumura, 1931: 1164, fig.—Kuwayama, 1932: 1543, fig. 3047.—Matsumura, 1933: 7(11), pl. 2, fig. 10.—Kikuchi, 1933: 481.—Banks, 1937: 280.—Esaki, Hori & Yasumatsu, 1938: 122, fig. 220, 1.—Kuwayama, 1950: 394, fig. 1075; 1956b: 27; 1957: 2.

Nothochrysa (!) japonica, Matsumura, 1907: 170.—Iguchi, 1908: 252.—Shinji, 1928: 124.

Nothochrysa modesta Nakahara, 1955d: 146, pl. 23, fig. 6. **New Synonymy.**

DISTRIBUTION: Honshu, Shikoku, Kyushu; Ryukyu*; Taiwan; China.

HONSHU. GIFU: Gifu. **SHIKOKU.** EHIME: Sasayama; KOCHI: Kochi. **KYUSHU.** NAGASAKI: Tsushima I. (Izuhara), Yukiura; KUMAMOTO: Kumamoto.

Season: End June to early August.

N. modesta from Taiwan seems to me to be a variational form of this species, as *N. japonica* is variable in the reddish marking of prothorax.

Family APOCHRYSIDAE Handlirsch, 1908

This delicate and gauzy lacewing family was erected by Handlirsch as distinct from Chrysopidae, but it is considered by Kimmins as a subfamily of Chrysopidae. Only 1 species occurs in Japan.

Genus *Nacaura* Navás

Nacaura Nav., 1913c: 280; 1916: 236.—Okamoto, 1919a: 24.—Kimmins, 1952: 930. Type: *Apochrysa matsumurae* Okamoto; Japan.

Nacaura Okamoto, 1914c: 53.

Nacaura matsumurae (Okamoto) Fig. 21.

Apochrysa matsumurae Okam., 1912: 13, fig. 1; 1913: 58.—Nakahara, 1915h: 118.

Apochrysa minomoana Nakahara, 1915h: 120, pl. 8, fig. 1.

Apochrysa (!) minomoana, Tosawa, 1932: 26.

Nacaura matsumurae, Navás, 1913c: 280.—Nakahara, 1914d: 398.—Navás, 1916: 237.—Okamoto, 1919a: 25, pl. 3, figs. 1-4, pl. 5, fig. 1; 1919b: 2.—Ue, 1923: 24.—Esaki,

1930a : 3.—Matsumura, 1931 : 1165, fig.—Kuwayama, 1932 : 1538, fig. 3038.—Tosawa, 1932 : 26.—Banks, 1937 : 280.—Esaki, Hori & Yasumatsu, 1938 : 124, fig. 223.—Yasumatsu, 1945 : 207, fig. 1b.—Kuwayama, 1950 : 397, fig. 1084.—Kimmins, 1952 : 944.—Kuwayama, 1956b : 29 ; 1957 : 2.

Nacaura minomoana, Navás, 1916 : 237.—Kimmins, 1952 : 944.

Nakaura matsumurae, Okamoto, 1914c : 53.

DISTRIBUTION: Honshu, Shikoku, Kyushu (incl. Tsushima I.); Taiwan.

HONSHU. OSAKA : Minoo. SHIKOKU. KOCHI : Kochi, Kakumodani. KYUSHU. KAGOSHIMA : Kagoshima. Rare and restricted in distribution.

Season : Mid-June to end October.

Family BERTHIDAE Handlirsch, 1908

This small family has an extensive distribution throughout the world. In Japan, however, it is represented by a single genus, *Acroberotha*, of which only 1 rare species is known.

Subfamily BERTHINAE Krüger, 1922

Genus *Acroberotha* Krüger

Acroberotha Kr., 1922a : 65, 85.—Navás, 1929 : 53.—Tjeder, 1959 : 293. Type: *Acroberotha tonkinensis* Krüger; China.

Acroberotha okamotonis (Nakahara)

Berotha (Isoscelipteron) okamotonis Naka., 1914h : 498.

Berotha okamotonis, Naka., 1915e : 99 ; 1920 : 164.—Esaki, 1930a : 2.—Tosawa, 1932 : 26.

Acroberotha (?) okamotonis, Krüger, 1922a : 67, 85.

Acroberotha okamotoi, Navás, 1929 : 56.

Acroberotha okamotonis, Matsumura, 1931 : 1166, fig.—Kuwayama, 1932 : 1549, fig. 3060.—Esaki, Hori & Yasumatsu, 1938 : 120, fig. 216, 2.—Kuwayama, 1950 : 390, fig. 1063.—Takeuchi, 1955 : 70, fig. 384.—Nakahara, 1960 : 34.

Carotha okamotonis, Tosawa, 1932 : 26.

DISTRIBUTION: Honshu, Kyushu.

HONSHU. TOKYO : Tokyo; KYOTO : Kyoto. KYUSHU. FUKUOKA : Moji. Rare.

Season : End June to end July.

Family DILARIDAE Handlirsch, 1906

This family has a wide distribution, the representatives of which are found chiefly in the Old World. Only 2 species belonging to 1 genus occur in Japan. The insects of this family are specialized such as the antennae of the ♂ being pectinate and the ♀ being furnished with an exserted ovipositor. Takahashi (1942) described and figured the larva supposed as belonging to this family.

Genus *Dilar* Rambur

Dilar Ram., 1842 : 445.—Hagen, 1866 : 375.—Banks, 1905 : 24.—Navás, 1909c : 628 ; 1914a : 6.—Kuwayama, 1921 : 66.—Navás, 1923a : 194.—Nakahara, 1955c : 134. Type: *Dilar nevadensis* Rambur; Europe.

Lider Navás, 1909c: 650; 1914a: 8.

Rexavius Nav., 1909c: 664; 1914a: 10.

1. Anterior tubercle of head round. Forewing closely speckled with grayish brown spots, forming many more or less interrupted transverse streaks all over... **hikosanus**
Anterior tubercle of head not round, nearly fan-shaped. Forewing speckled with pale grayish spots, arranged in many transverse series except the discal area where the markings are inconspicuous.....2
2. Body larger, the wings somewhat broad. Length of body 7.5–10 mm; of forewing 11.5–14 mm..... **japonicus japonicus**
Body smaller, the wings somewhat narrow. Length of body 4–4.5 mm; of forewing 9–10.5 mm..... **japonicus gracilis**

Dilar japonicus MacLachlan

Dilar japonicus MacL., 1883a: 220.—Kuwayama, 1921: 67, 79, pl. 3, figs. 1, 2, 7; 1932: 1550, fig. 3062.—Esaki, Hori & Yasumatsu, 1938: 120, fig. 215, 1, 2.—Yasumatsu, 1945: 206, fig. 1a.—Kuwayama, 1950: 390, fig. 1062; 1953b: 177.—Ishihara *et al.*, 1953: 39.—Takeuchi, 1955: 69.—Nakahara, 1955c: 134, figs. 1, 2, pl. 19, fig. 1.—Kuwayama, 1956b: 21; 1957: 1.—Asahina, 1958: 81.

Rexavius japonicus, Navás, 1909c: 665; 1914a: 10.—Nakahara, 1914a: 61; 1914g: 298.—Comstock, 1918: 185.—Yamakoshi, 1936: 167.

Rexavius (Dilar) japonicus, Matsumura, 1931: 1163, fig.

Dilar (Chauliodes) japonicus, Mats., 1908: 36.

Dilar ———, n. sp. Nakahara, 1914a: 61.

Dilar nohirae Naka., 1914g: 297.—Comstock, 1918: 185, fig. 179.

DISTRIBUTION: Honshu, Shikoku.

HONSHU. AOMORI: Tsuta; TOCHIGI: Chuzenji; NARA: Mt. Odaigahara. Rare.

Season: August.

Dilar japonicus MacLachlan var. **gracilis** Kuwayama Fig. 22.

Dilar japonicus var. *gracilis* Kuw., 1921: 71, 79, pl. 3, figs. 3, 4, 10–12, 16–17.—Esaki, 1931: 89.—Kuwayama, 1932: 1550; 1950: 390; 1953b: 177.—Ishihara *et al.*, 1953: 39.—Takeuchi, 1955: 69, fig. 383.—Kuwayama, 1956b: 21; 1957: 1.

DISTRIBUTION: Honshu, Shikoku, Kyushu.

HONSHU. NARA: Yoshino, Mt. Sanjogadake. SHIKOKU. EHIME: Mt. Sara.

Season: Early July to early August.

Nakahara stated in 1955 that the dimensional individual variation is very great in this species and it does not seem worthwhile to retain the variety name for the smaller individuals. However, as I already discussed in 1956, this variety can easily be distinguished from the type species not only by the smaller size, but also by narrower shapes of both wings and well developed markings of forewing. I regard these differences in shape and in other respects as stationary, rather than as individual variation.

Dilar hikosanus Nakahara

Dilar hikosanus Naka., 1955c: 137, fig. 3, pl. 19, fig. 2.

DISTRIBUTION: Kyushu.

KYUSHU. FUKUOKA: Mt. Hikosan. After Nakahara. Only holotype known.

Season: Early August.

Family MANTISPIDAE Westwood, 1840

This family superficially resembles the Mantidae of Orthoptera, with which they agree in the elongate prothorax and peculiar raptorial forelegs, but wing venation comes close to that of Chrysopidae. Hitherto many species have been described from our faunal region, but, as I stated before, this family is among the most variable of insect groups, the individuals of a species differing widely in dimension, venation, and coloration, and some of the species must be treated as synonym. I recognize 3 genera and 5 species as occurring in Japan. Enderlein (1910) divided this family into 2 subfamilies, Mantispinae and Anisopterinae, in his excellent classification of Mantispidae, but Anisopterinae is not represented in Japan.

Subfamily MANTISPINAE Enderlein, 1910

1. Radial cells of both wings long and narrow; cubitus in hindwing not bending down towards anal, both being connected with a cross-vein; prothorax short and stout..... **Climaciella**
Radial cells of both wings wide and somewhat angulated; prothorax slender.....2
2. Radial areas of both wings usually divided into 5 to 7 radial cells on account of the several cross-veins; cubitus in hindwing not perceptibly bending down towards anal, and a cross-vein connecting both..... **Eumantispa**
Radial areas of both wings having only 2 cross-veins which form 3 radial cells; cubitus in hindwing bending down towards anal, touching anal or connected with it by a very short cross-vein..... **Mantispa**

Genus *Mantispa* Illiger

Mantispa Ill., 1798: 499.—Burmeister, 1839: 965.—Hagen, 1866: 375.—Rostock, 1888: 115.—van der Weele, 1909b: 87.—Enderlein, 1910: 344 (subgen. *Mantispa* and *Mantispa* *pilla*, *ibid.*: 355, 346).—Okamoto, 1910d: 534.—Nakahara, 1912c: 559; 1913e: 351; 1913j: 230.—Banks, in part, 1913: 206.—Kuwayama, 1925a: 252.—Handschin, 1959a: 105; 1959b: 198. Type: *Mantispa styriaca* Poda (= *M. pagana* Fabricius); Europe.

Pronotum dark brown, with a blackish brown marginal band and a yellowish transverse band on the dilated anterior portion, the latter band being nearly broken at middle by an extension of the former **japonica japonica**
Pronotum mostly brown or dark brown; dilated anterior portion being margined with ground color, and lacking or slightly showing a yellowish transverse band on that portion **japonica diminuta**

Mantispa japonica MacLachlan

Mantispa japonica MacL., 1875: 178.—Matsumura, 1907: 168, fig. 204; 1908: 36.—Miyake, 1910: 220, pl. 12, figs. 5, 5a-b.—Okamoto, 1910d: 535, fig. 1, pl. 17, fig. 3; 1911:

296.—Nakahara, 1912a : 14; 1912c : 560; 1913j : 231.—Matsumura, 1917 : 470, fig. 249.—Okazaki, 1918 : 64.—Kuwayama, 1925a : 253, pl. 16, figs. 2, 13, 14; 1925b : 467.—Shinji, 1928 : 123.—Esaki, 1930a : 3; 1931 : 89.—Matsumura, 1931 : 1154, fig.—Okamoto, 1932 : 1533, fig. 3028.—Tosawa, 1932 : 27.—Matsumura, 1933 : 11 (16), pl. 3, fig. 5.—Hirayama, 1933 : pl. 80, fig. 5 & text.—Kato, 1933 : pl. 42, fig. 4 & text.—Izaki, 1934 : 305.—Yamakoshi, 1936 : 166.—Esaki, Hori & Yasumatsu, 1938 : 126, fig. 227, 1.—Otsuka, 1938 : 550.—Tanaka, 1939 : 645.—Kobayashi, 1940 : 458.—Okamoto & Kuwayama, 1950 : 397, fig. 1085.—Takeuchi, 1955 : 69, fig. 381.—Kuwayama, 1956b : 20; 1957 : 1.—Ishihara, 1957; 191.—Kuwayama, 1960 : 30.

Mantispa sp. Matsumura, 1900a : 78, fig. 48.—Iguchi, 1908 : 251, fig.

Mantispa sp.? Anonymous, 1902b : 301, pl. 7, fig. 7.

DISTRIBUTION : Hokkaido*, Honshu, Shikoku, Kyushu; Korea.

HOKKAIDO. Kaminokuni. HONSHU. AOMORI : Aomori; NIIGATA : Kurokawa; TOCHIGI : Kinugawa; TOKYO : Hikawa, Akabane; NAGANO : Shimauchi; GIFU : Gifu; OSAKA : Minoo, Mt. Iwawaki; TOTTORI : Mt. Daisen. SHIKOKU : EHIME : Iyo.

Season : Mid-July to mid-August.

***Mantispa japonica* MacLachlan var. *diminuta* Matsumura**

Mantispa diminuta Mats., 1907 : 169.—Miyake, 1910 : 220.

Mantispa (*Mantispilla*) *diminuta*, Okamoto, 1910d : 536, pl. 17, fig. 6; 1911 : 296.—Nakahara, 1912a : 14.

Mantispa dimidiata, (!) Matsumura, 1908 : 36.

Mantispa japonica var. *diminuta*, Kuwayama, 1925a : 254, pl. 16, fig. 15; 1925b : 467.—Okamoto, 1932 : 1533.—Kikuchi, 1933 : 480.—Kobayashi, 1942 : 221.—Okamoto & Kuwayama, 1950 : 397.

DISTRIBUTION : Honshu; Korea; China.

HONSHU. TOKYO : Nakano; GIFU : Gifu; SHIGA : Mt. Ibuki. Not common.

Season : Mid-July to mid-September.

Genus *Eumantispa* Okamoto

Eumantispa Okam., 1910d : 538; 1911 : 294.—Nakahara, 1912c : 558; 1913j : 229.—Kuwayama 1925a : 257. Type : *Mantispa harmandi* Navás (= *Eumantispa suzukii* Okamoto); Japan.

***Eumantispa harmandi* (Navás) Fig. 23.**

Mantispa harmandi Nav., 1909b : 480.

Eumantispa harmandi, Nakahara, 1912a : 51; 1912b : 335, figs. 1–5; 1912c : 558; 1913j : 230; 1915d : 336.—Kuwayama, 1925a : 257, pl. 16, figs. 3, 17, 18; 1925b : 468.—Marumo, 1927 : 715, fig. 1385.—Matsumura, 1931 : 1154, fig.—Okamoto, 1932 : 1534, fig. 3029.—Kinoshita, 1932 : 2193, fig. 4306.—Tosawa, 1932 : 27.—Matsumura, 1933 : 12 (18), pl. 3, fig. 12.—Hirayama, 1933 : pl. 80, fig. 6 & text.—Izaki, 1934 : 306.—Mitsuhashi, 1936 : 367.—Esaki, Hori & Yasumatsu, 1938 : 126, fig. 227, 2.—Tanaka, 1939 : 645.—Kobayashi, 1940 : 458.—Okamoto & Kuwayama, 1950 : 398, fig. 1086.—Kuwayama, 1953b : 180.—Ishihara *et al.*, 1953 : 40.—Takeuchi, 1955 : 69, fig. 382.—Kuwayama, 1956b : 20; 1957 : 1; 1960 : 30.

Mantispa nawae Miyake, 1910: 216, pl. 12, figs. 4, 4a-b.

Eumantispa nawae, Okamoto, 1910d: 539.—Nakahara, 1912a: 14; 1912c: 558; 1913j: 230.

Mantispa sasakii Miyake, 1910: 217, pl. 12, figs. 2, 2a-b.

Eumantispa sasakii, Okamoto, 1910d: 539.—Nakahara, 1912a: 14.

Eumantispa suzukii Okam., 1910d: 538, fig. 2, pl. 17, fig. 1; 1911: 295, fig. 1.—Nakahara, 1912a: 14.—Kato, 1933: pl. 43, fig. 1 & text.

Mantispa sp. ? Anonymous, 1902b: 301, pl. 7, fig. 8.—Nawa, 1905: 495.

DISTRIBUTION: Honshu, Shikoku, Kyushu; Korea.

HONSHU. AOMORI: Towada; IWATE: Morioka (Koiwai); FUKUSHIMA: Hobara; NIIGATA: Shibata, Mts. Asahi (Mt. Dorokujin), Sado I. (Mt. Donden); NAGANO: Kuzu; TOCHIGI: Kinugawa; SAITAMA: Chichibu; SHIZUOKA: Kanaya; KYOTO: Kyoto; OSAKA: Minoo; TOTTORI: Mt. Daisen. SHIKOKU. EHIME: Mt. Sara.

Season: Mid-July to mid-September.

Stitz recorded this species in Taiwan, and also described 2 varieties from New Guinea and Celebes, but these are doubtful.

Genus *Climaciella* Enderlein

Climaciella End., 1910: 360.—Okamoto, 1910d: 539.—Nakahara, 1912c: 561; 1913j: 232.—Banks, 1913: 206.—Kuwayama, 1925a: 259. Type: *Mantispa brunnea* Say; N. America.

1. Suffused with pale fulvous brown on costal, subcostal and radial areas of both wings and also at base of forewing; no fulvous band on apical areas of wings **magna**
Suffused with pale brownish or amber color on costal, subcostal and radial areas of both wings and also at base of forewing; a conspicuous fulvous band on apical areas of both wings 2
2. Narrowly suffused with pale brown along branches of radial sector **subfusca**
Not suffused along branches of radial sector **quadrituberculata**

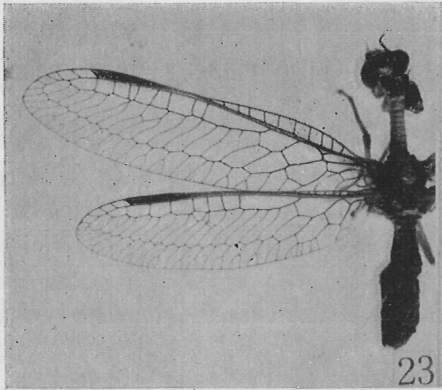
Climaciella quadrituberculata (Westwood)

Mantispa quadrituberculata Westw., 1852: 264, pl. 18, fig. 1.—van der Weele, 1909b: 93, pl. 5, fig. 40.—Needham, 1909: 195.—Miyake, 1910: 218, pl. 12, figs. 1, 1a-b.

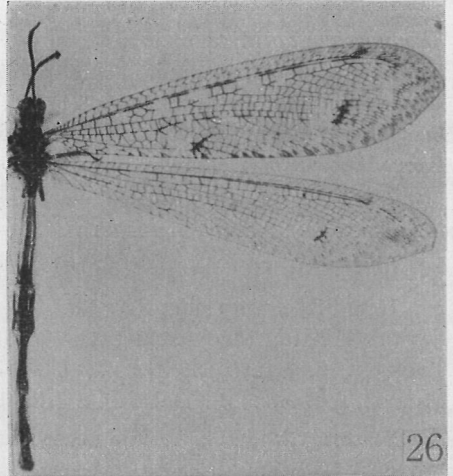
Climaciella 4-tuberculata, Enderlein, 1910: 361.—Okamoto, 1910d: 540, fig. 3, pl. 17, fig. 2; 1911: 298.—Nakahara, 1912a: 15; 1912c: 563; 1913j: 234.—Esben-Petersen, 1913a: 262.—Stitz, 1913: 32.—Kuwayama, 1925a: 260, pl. 16, fig. 4; 1925b: 469.—Okamoto, 1932: 1534, fig. 3030.—Kato, 1933: pl. 43, fig. 2 & text.—Hirayama, 1937: 172, pl. 75, fig. 12.

Climaciella miyakei Okamoto, 1910d: 541; 1911: 299.—Nakahara, 1912a: 15; 1912c: 563; 1913j: 235.—Kuwayama, 1925a: 261, pl. 16, fig. 8; 1925b: 469.—Marumo, 1927: 716, fig. 1386.—Okamoto, 1932: 1535, fig. 3031.—Esaki, Hori & Yasumatsu, 1938: 125, fig. 226, 1.—Kuwayama, 1950: 398. **New Synonymy.**

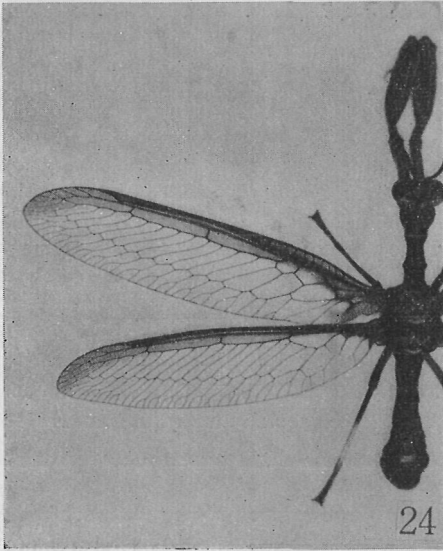
Climaciella habutsuella Okamoto, 1910d: 542; 1911: 300.—Nakahara, 1912a: 15; 1912c: 563; 1913j: 234.—Stitz, 1913: 32.—Horikawa, 1913: 421.—Kuwayama, 1925a: 261, pl. 16, fig. 5; 1925b: 469.—Matsumura, 1931: 1154, fig.—Okamoto, 1932: 1535, fig. 3032.—Kuji, 1937: 104.—Kuwayama, 1950: 398, fig. 1087.—Takeya & Hirashima,



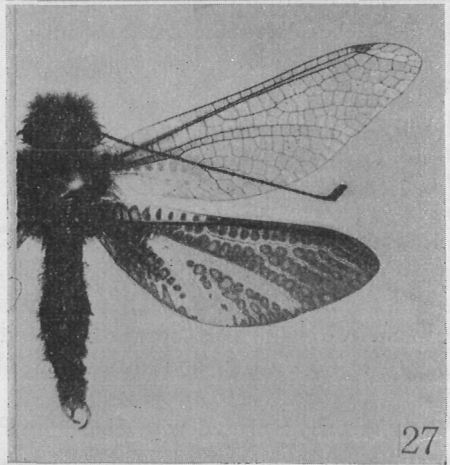
23



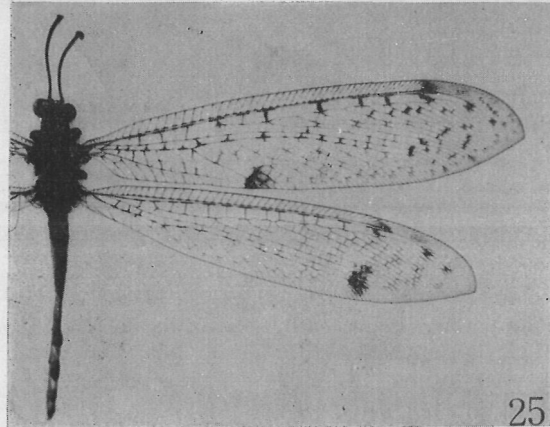
26



24



27



25

Figs. 23-27. 23, *Eumantispa harmandi* (Navás) ♀, ×2.1; 24, *Climaciella magna* (Miyake) ♀, ×1.9; 25, *Distoleon nigricans* (Okamoto) ♀, ×1.3; 26, *Epacanthaclisis moiwana* (Okamoto) ♂, ×1.3; 27, *Ascalaphus ramburi* MacLachlan ♂, ×2.0.

1953: 22.—Horikawa, 1954: 37.—Kuwayama, 1956b: 21; 1957: 1. **New Synonymy.**
Climaciella satsumensis Yazaki, 1927: 361, figs. 1–6. **New Synonymy.**
Climaciella tanegashimensis Yaz., 1927: 363, figs. 7–14. **New Synonymy.**
Ditaxis 4-tuberculata Navás, 1909b: 474.
Mantispa sp. ? Anonymous, 1902b: 301, pl. 7, fig. 6.

DISTRIBUTION: Honshu, Shikoku, Kyushu; Taiwan; Philippines; Viet-Nam; Java; N. India.

HONSHU. KYOTO: Kyoto; HYOGO: Harima. **KYUSHU.** FUKUOKA: Fukuoka; NAGASAKI: Nagasaki; KAGOSHIMA: Yakushima I.

Season: End May to mid-September.

Okamoto described *C. habutsuella* and *C. miyakei* and Yazaki described *C. satsumensis* and *C. tanegashimensis* as related species of *C. quadrituberculata* which is widely distributed in Asiatic Tropics. According to both authors, differences between *C. quadrituberculata* and these species are number of antennal segments, coloration of head, ground color of prothorax, number of branches given off opposite radial cell 1, number of teeth of tarsal claw, dimensions of body and so on. But these are all variable. As I pointed out in 1925, length of body and wings are most variable. For example, maximum and minimum lengths of body and forewing in *C. magna* at my disposal are 27 and 19 mm, 30 and 21 mm respectively; Nakahara stated in 1913 that he had found a Tanegashima specimen of *C. habutsuella* which had prothorax not black but brownish, and also a specimen of *C. miyakei* which had a deep blackish prothorax. It is noteworthy that this color variation occurs in *Climaciella*. The number of veins arising from radial cell 1 and the number of teeth on the claws are variable according to the individuals. From this point of view I examined material at my disposal, and came to the conclusion that all species of *Climaciella* described by Okamoto and Yazaki are identical. So I relegate them to synonyms of *quadrituberculata*.

***Climaciella subfusca* Nakahara**

Climaciella subflava Naka., 1912a: 15. No description.

Climaciella subfusca Naka., 1912c: 562, figs. 1–2; 1913j: 232, fig. 1.—Kuwayama, 1925a: 262; 1925b: 469.

DISTRIBUTION: Honshu.

HONSHU. Hyogo: Harima. After Nakahara. Only the type is known.

***Climaciella magna* (Miyake) Fig. 24.**

Mantispa magna Miy., 1910: 214, pl. 12, figs. 3, 3a–c.

Climaciella magna Okamoto, 1910d: 542; 1911: 294.—Nakahara, 1912a: 15; 1913j: 235.—Marumo, 1927: 716, fig. 1387.—Esaki, Hori & Yasumatsu, 1938: 125, fig. 226, 2.—Yasumatsu, 1945: 207, fig. 2.—Kuwayama, 1950: 398, fig. 1088, pl. 15, fig. 7.—Horikawa, 1954: 37.—Kuroko, 1955: 80.—Kuwayama, 1956b: 21; 1957: 1.—Kuroko, 1958: 12, fig. 2.

Climaciella ? *magna*, Nakahara, 1912c: 564.—Kuwayama, 1925a: 262; 1925b: 469.

Mantispa sp. ? Anonymous, 1902b: 301, pl. 7, fig. 5.

DISTRIBUTION: Shikoku, Kyushu.

SHIKOKU. KOCHI: Kochi (Godo). KYUSHU. FUKUOKA: Mt. Hikosan; NAGASAKI: Yukiura.

Season: Early August to end September.

Family MYRMELEONTIDAE Burmeister, 1839

Myrmeleontidae is one of the predominant families of the order in Japan next to Chrysopidae and Hemerobiidae. Baba published in 1953 a book on the ecology of antlions based on his observations in Niigata Prefecture. There are 9 genera in Japan. Some of them are delicate and beautiful species with speckled wings, but others are not striking in appearance.

KEY TO SUBFAMILIES

In radial area of hindwing only 1 cross-vein present before origin of Rs... Dendroleontinae
 In radial area of hindwing 2 or more cross-veins present before origin of Rs.....
 Myrmeleontinae

Subfamily DENDROLEONTINAE Banks, 1899

1. In forewing Rs arises before level of fork of Cu_1 . Free and basal part of Cu_2 in forewing sigmoidal; 2 or 3, rarely 1, cross-veins present between this part and Cu_1 **Dendroleon**
 In forewing Rs arises further out than level of fork of Cu_1 . Free and basal part of Cu_2 in forewing curved at right angle; at most 1 cross-vein between this part and Cu_1 present 2
2. Cu_{1p} and Cu_2 in forewing parallel to each other, to Cu_{1a} and to hind margin of wing..... **Pseudoformicaleo**
 Cu_{1p} and Cu_2 not parallel to Cu_{1a} and to hind margin of wing..... 3
3. Antenna slender, longer than head and thorax combined; tibial spurs not longer than basal segment of tarsus which is longer than segment 2 **Glenuroides**
 Antenna shorter than head and thorax combined; tibial spurs longer than basal segment of tarsus which is short, or as long as first 3 or 4 segments together...
 **Distoleon**

Genus **Dendroleon** Brauer

Dendroleon Br., 1866: 42.—MacLachlan, 1867: 246.—Rostock, 1888: 99.—Banks, 1899: 69.—Okamoto, 1910c: 278.—Esben-Petersen, 1915: 70.—Tillyard, 1916: 52.—Esben-Petersen, 1918b: 107; 1923: 86. Type: *Myrmeleon pantherinum* Fabricius; Europe.

Larger species, expanse 60–70 mm. Hindwing with a fuscous transverse band, constituting 3 round speckles, from pterostigmatal region to hind margin **pupillaris**
 Smaller species, expanse 50–55 mm. Hindwing without such a transverse band, but with a fuscous round speckle along hind margin **jezoensis**

Dendroleon pupillaris (Gerstaecker)

Glenurus (Dendroleon) pupillaris Gerst., 1893: 120.

Glenurus pupillaris, Matsumura, 1900b: 17.

Dendroleon pupillaris, Okamoto, 1914b: 249.—Matsumura, 1917: 474, fig. 253.—Esben-Petersen, 1923: 90, fig. 2.—Marumo, 1927: 715, fig. 1384.—Shinji, 1928: 125.—Matsumura, 1931: 1155, fig.—Okamoto, 1932: 1527, fig. 3016.—Tosawa, 1932: 27.—Hirayama, 1933: pl. 79, fig. 3 & text.—Kato, 1933: pl. 44, fig. 2 & text.—Kikuchi, 1933: 479.—Izaki, 1934: 306.—Esaki, Hori & Yasumatsu, 1938: 128, fig. 232.—Tanaka, 1939: 525.—Izaki, 1940: 120.—Kobayashi, 1942: 221.—Okamoto & Kuwayama, 1950: 403, fig. 1103.—Baba, 1953: fig. 9C.—Takeuchi, 1955: 71, fig. 399.—Kuwayama, 1956b: 30; 1957: 2; 1960: 31.

Distoleon pupillaris, Kobayashi, 1940: 458.

Glenurus japonicus Matsumura (not MacLachlan), 1904: 174, pl. 11, fig. 8.—Nawa, 1905: 446.—Matsumura, 1907: 177, fig. 211; 1908: 41.

Dendroleon japonicus, Okamoto (not MacLachlan), 1910c: 279.—Nakahara, 1913b: 95; 1913k: 301.

Gen. ? sp. ? Anonymous, 1902a: 253, pl. 6, fig. 4.

DISTRIBUTION: Hokkaido*, Honshu, Shikoku, Kyushu; China.

HOKKAIDO. Sapporo (Maruyama). HONSHU. IWATE: Karumai; NIIGATA: Kurokawa, Niitsu, Sugatani, Sado I. (Matsugasaki); TOKYO: Tokyo; SHIZUOKA: Misakubo; Gifu: Gifu. SHIKOKU. EHIME: Iyo. Uncommon.

Season: Early July to end August.

Dendroleon jezoensis Okamoto

Dendroleon jezoensis Okam., 1910c: 280, fig. 5.—Nakahara, 1913b: 95; 1913k: 301.—Okamoto, 1914b: 249.—Esben-Petersen, 1923: 91, fig. 3.—Okamoto, 1926: 18.—Matsumura, 1931: 1155, fig.—Okamoto, 1932: 1528, fig. 3017.—Tosawa, 1932: 27.—Matsumura, 1933: 10 (16), pl. 3, fig. 4.—Izaki, 1934: 306.—Mitsuhashi, 1936: 367.—Esaki, Hori & Yasumatsu, 1938: 128, fig. 231, 1.—Asahina, 1947: 35.—Okamoto & Kuwayama, 1950: 403.—Baba, 1953: 18.—Baba & Edashige, 1954: 51, figs. 1-3.—Takeuchi, 1955: 71, fig. 400.—Kuwayama, 1956b: 30; 1957: 2; 1960: 31.

Glenurus jezoensis, Matsumura, 1908: 41.—Tosawa, 1932: 26. No description.

Distoleon jezoensis, Kikuchi, 1933: 479.

DISTRIBUTION: Hokkaido, Honshu, Shikoku, Kyushu; Korea; China.

HOKKAIDO. Sapporo, Jozankei. HONSHU. YAMAGATA: Katamagawa; NIIGATA: Kurokawa; TOCHIGI: Nikko; TOKYO: Hikawa; TOTTORI: Mt. Daisen. SHIKOKU. EHIME: Tonaru, Matsuyama (Sugitate); KOCHI: Mt. Tebako. Local and uncommon.

Season: Early July to mid-September.

Genus *Glenuroides* Okamoto

Glenuroides Okam., 1910c: 294. Type: *Glenurus japonicus* MacLachlan (= *Glenuroides communis* Okam.); Japan.

Glenuroides japonicus (MacLachlan)

Glenurus (?) *japonicus* MacL., 1867: 248.

Glenurus japonicus, MacL., 1875: 176.—Matsumura, 1900b: 17.

Glenuroides communis Okamoto, 1910c: 295, figs. 4, 4a.—Nakahara, 1913b: 96; 1913k: 301.—Esben-Petersen, 1913a: 223.—Nakahara, 1913f: 527.

Glenurus pupillaris, Matsumura (not Gerstaecker), 1900a: 78; Matsumura, 1904: 175, pl. 13, fig. 2.—Okamoto, 1905: 116.—Nawa, 1905: 445.—Matsumura, 1907: 176; 1908: 41.—Iguchi, 1908: 252.

Glenuroides japonicus, Okamoto, 1914b: 249.—Nakahara, 1915d: 333.—Okazaki, 1918: 56, fig. 20.—Navás, 1926: 112.—Okamoto, 1926: 18.—Marumo, 1927: 713, fig. 1381.—Matsumura, 1931: 1157, fig.—Okamoto, 1932: 1528, fig. 3018.—Kinoshita, 1932: 2193, fig. 4305.—Tosawa, 1932: 27.—Matsumura, 1933: 11 (17), pl. 3, fig. 10.—Hirayama, 1933: pl. 79, fig. 4 & text.—Kinoshita, Yagi & Kawada, 1933: pl. 173 & text.—Kato, 1933: pl. 44, fig. 3 & text.—Izaki, 1934: 306.—Takahashi, 1935: 487.—Yamakoshi, 1936: 166.—Esaki, Hori & Yasumatsu, 1938: 128, fig. 231, 2.—Tanaka, 1939: 525.—Izaki, 1940: 120.—Kobayashi, 1940: 458; 1942: 221.—Yasumatsu, 1945: 215, fig. 3.—Okamoto & Kuwayama, 1950: 403, fig. 1102.—Baba, 1953: 13, figs. 4A, 5, 9D.—Takeuchi, 1955: 71, fig. 398.—Kuwayama, 1956b: 31; 1957: 3.—Asahina, 1958: 81.—Kuwayama, 1960: 31.

Gen. ? sp. ? Anonymous, 1902a: 253, pl. 6, fig. 3.

DISTRIBUTION: Hokkaido, Honshu, Shikoku, Kyushu; Taiwan.

HOKKAIDO. Jozankei, Mt. Moiwa, Sapporo, Toya. HONSHU. AOMORI: Towada; IWATE: Karumai; FUKUSHIMA: Mt. Azuma; TOCHIGI: Kinugawa, Nikko; GUNMA: Mt. Haruna; TOKYO: Tokyo, Nakano, Kunitachi, Miyake I., Hachijo I.; NIIGATA: Kurokawa, Kamo, Noo, Sugatani, Awajima I.; NAGANO: Shimauchi; TOYAMA: Hamakazumi; ISHIKAWA: Yamanaka; KYOTO: Kyoto, Mt. Atago; HYOGO: Takasago; HIROSHIMA: Kure; TOTTORI: Daisenji; YAMAGUCHI: Yamaguchi. SHIKOKU. EHIME: Matsuyama (Dogo), Mt. Takanawa, Unomachi; KAGAWA: Ikenobe; KOCHI: Mt. Tebako. Common.

Season: End June to mid-September.

Genus *Pseudoformicaleo* van der Weele

Pseudoformicaleo v. d. W., 1909b: 25.—Esben-Petersen, 1915: 67. Type: *Myrmeleon gracilis* Klug; Asia and Africa.

Tahulus Navás, 1912b: 112.

Gama Nav., 1912e: 57.

The genera *Tahulus* and *Gama* are undoubtedly synonymous with *Pseudoformicaleo*. In Japan only 1 species is known.

Pseudoformicaleo jacobsoni van der Weele

Pseudoformicaleo jacobsoni v. d. W., 1909b: 25, fig. 11, pl. 2, fig. 8.—Esben-Petersen, 1913c: 229, fig. 2.—Navás, 1924a: 214.—Banks, 1931: 389.—Adams, 1959: 15.

Pseudoformicaleo nubecula Esben-Petersen, in part (not Gerstaecker), 1915: 67, pl. 10, fig. 16; Esben-Petersen, 1917: 204.

Creagris matsuoakae Okamoto, 1910c: 282, fig. 3.—Nakahara, 1913b: 95; 1913k: 301.—Okamoto, 1914b: 249; 1932: 1529, fig. 3019.—Tosawa, 1932: 27.—Okamoto, 1950: 403, fig. 1101.

Gama matsuoakae, Banks, 1937: 287.—Kuwayama, 1956b: 30; 1957: 3.

Creagris horikawae Nakahara, 1913f: 527. **New Synonymy.**

Tahulus caligatus Navás, 1912b: 113.

Gen. ? sp. ? Anonymous, 1902a: 254, pl. 6, fig. 8.

DISTRIBUTION: Honshu (SW districts), Shikoku, Kyushu; Ryukyu (Ishigaki I.);

Taiwan; China; Micronesia (Carolines); Malaya; Java; Ceylon.

KYUSHU. NAGASAKI: Nagasaki; OITA: Beppu. Uncommon.

Season: Mid-July to end August.

Esben-Petersen, 1915, regarded this species as a synonym of *Creagris nubecula* Gerstaecker and *Protoplectron costatus* Banks both from Australia and used the name *Pseudoformicaleo nubecula* by the rule of priority. However, Banks, 1931, protested against Esben-Petersen's opinion and pointed out the difference between *costatus* and *jacobsoni*. Hand-schin (1935—p. 711) also considered *P. jacobsoni* and *P. nubeculus* as different species. I carefully observed the specimens from Kyushu, Ryukyu and Taiwan, and found that the description of the Australian species did not agree with these specimens especially on the markings of wings. As Adams treated it recently, *Gama matsukae* may be identical with this species. The species is wide-spread throughout the Pacific.

Genus *Distoleon* Banks

Distoleon Banks, 1910a: 42.—Esben-Petersen, 1915: 68.—Banks, 1916: 210. Type: *Distoleon verticalis* Banks; Australia.

Formicaleo Brauer (not Leach), 1855: 719.—Hagen, 1866: 372.—van der Weele, 1909b: 19.—Okamoto, 1910c: 287.—Esben-Petersen, 1918b: 109.

Formicaleon Banks, 1911: 16.—Esben-Petersen, 1915: 69.

Eidoleon Esben-Petersen, 1918a: 15.

1. Larger, expanse 80–90 mm. Forewing marked with brown spots or streaks; hindwing with distinct fuscous spot in apical 1/3..... **nigricans**
Smaller, expanse less than 70 mm. Wings without such distinct markings..... 2
2. Expanse 65–70 mm. Cross-veins in apical 1/3 of forewing brownish shaded; hindwing without markings **contubernalis**
Expanse 45 mm. Forewing with many small brownish spots on Cu; hindwing with chain of brownish spots, not lineate, along apical 1/2 of hind margin **parvulus**

Distoleon nigricans (Okamoto) Fig. 25.

Formicaleo nigricans Okam., 1910c: 288, fig. 2.—Nakahara, 1913b: 95; 1913f: 527; 1913k: 301.

Formicaleon nigricans, Okam., 1914b: 249.

Formicaleo tetragramicus, Esben-Petersen, in part, 1918b: 110.

Distoleon tetragramicus, Okamoto (not Fabricius), 1926: 19; 1932: 1529, fig. 3020.—Hirayama, 1937: 172, pl. 75, fig. 9.—Tanaka, 1939: 525.—Okamoto & Kuwayama, 1950: 402, fig. 1100.—Takeuchi, 1955: 72, fig. 401.

Distoleon nigricans, Kuwayama, 1956b: 30; 1957: 3; 1960: 31.

Gen. ? sp. ? Anonymous, 1902a: 253, pl. 6, fig. 5.

Myrmeleon obsletus ?, Nawa, 1905: 446.

DISTRIBUTION: Hokkaido, Honshu, Shikoku; Korea.

HOKKAIDO. Sapporo, Jozankei, Kaminokuni, Gamushi. HONSHU. TOKYO: Tokyo, Hikawa; TOCHIGI: Kinugawa; NIIGATA: Noo, Sado I. (Tassha); TOYAMA: Toyama; KYOTO: Kyoto. SHIKOKU. KOCHI: Mt. Tebako.

Season: End June to mid-September.

Distoleon contubernalis (MacLachlan)

Formicaleo contubernalis MacL., 1875: 175.—Matsumura, 1900b: 17; 1908: 40.—Okamoto, 1910c: 289.—Nakahara, 1913b: 95; 1913k: 301.

Formicaleon contubernalis, Okamoto, 1914b: 250.

Myrmeleon contubernalis, Matsumura, 1904: 174, pl. 11, fig. 9.—Nawa, 1905: 447.—Matsumura, 1907: 178.

Distoleon contubernalis, Okamoto, 1926: 19.—Matsumura, 1931: 1156, fig.—Okamoto, 1932: 1530, fig. 3022.—Baba, 1953: 17, figs. 7, 9E.—Kuwayama, 1960: 31.

Formicaleo abdominalis Nakahara, 1913f: 527. **New Synonymy.**

Formicaleo esakii Naka., 1913b: 96; 1913k: 298, 301. **New Synonymy.**

Formicaleon esakii, Okamoto, 1914b: 250.

Gen. ? sp. ? Anonymous, 1902a: 254, pl. 6, fig. 7.

DISTRIBUTION: Honshu; Ryukyu*.

HONSHU. NIIGATA: Kurokawa, Kinoto; TOKYO: Miyake I.; HYOGO: Maiko. Local; uncommon.

Season: Early July to mid-August.

D. boninensis Adams from Bonin Is. is very similar to this species.

Distoleon parvulus (Okamoto)

Myrmeleon parvulus Matsumura, 1908: 41. No description.

Myrmecaelurus parvulus, Okam., 1910c: 293, fig. 7.—Nakahara, 1913b: 96; 1913k: 301.—Horikawa, 1913: 421.—Okamoto, 1914b: 250.

Distoleon parvulus, Banks, 1937: 287.

DISTRIBUTION: Kyushu; Ryukyu; Bonin Is.

KYUSHU. NAGASAKI: Nagasaki. After Horikawa.

Season: July.

Type locality is Okinawa, Ryukyu, but Horikawa afterward recorded it from Nagasaki, Kyushu. Nakahara added Bonin Islands. However, I have only seen specimens from Ryukyu.

Subfamily MYRMELEONTINAE Banks, 1899

1. In forewing, costal veinlets simple 2
In forewing, costal veinlets connected by cross-veins, forming 2 series of cells..... 4
2. Wings broad at pterostigma. In forewing, radial sector arises at same level of cubital fork; short series of costal veinlets before pterostigma connected by row of cross-veins..... **Hagenomyia**
Wings more slender. In forewing, radial sector arises beyond cubital fork; costal veinlets mostly simple and not connected by cross-veins 3
3. In forewing, veins in trigonal brace connected with cross-veins to some extent; anal areas between $Cu_1 + 1st A$ and anal wing-margin possess gradate series of cross-veins extended for a distance. In hindwing of ♂ no pilula **Myrmeleon**
In forewing, no cross-veins connecting veins in trigonal brace, or abnormally only 1 or 2 cross-veins; no gradate series of cross-veins in anal area. In hindwing of ♂, a conspicuous pilula projecting at hind margin of fibula **Grocus**

4. In radial area of hindwing 5 or more cross-veins present before origin of Rs.
 Body and legs very stout and very hairy **Heoclisis**
 In radial area of hindwing only 2 cross-veins present before origin of Rs. Body
 and legs slender and less hairy **Epacanthaclisis**

Genus **Hagenomyia** Banks

Hagenomyia Banks, 1911: 8.—Kimmins, 1938: 366. Type: *Myrmeleon tristis* Hagen; Africa.
Nelees Navás, 1911c: 244.

Baliga Nav., 1912b: 110.

Balaga Nav., 1912b: 111.

Hagenomyia micans (MacLachlan)

Myrmeleon micans MacL., 1875: 176.—Matsumura, 1900a: 78; 1900b: 17; 1904: 173, pl. 13, fig. 1.—Nawa, 1905: 444.—Matsumura, 1907: 178, fig. 213; 1908: 41.—Iguchi, 1908: 252.—Okamoto, 1910c: 299.—Nakahara, 1913b: 97; 1913k: 301.—Matsumura, 1917: 474.—Shinji, 1928: 125, fig. 84.—Tosawa, 1932: 27.

Myrmeleon (Myrmeleon) micans, Nakahara, 1913f: 528.

Hagenomyia micans, Okamoto, 1914b: 250.—Nakahara, 1915d: 333.—Okazaki, 1918: 55, pl. 8, fig. 1, fig. 19.—Okamoto, 1926: 20.—Marumo, 1927: 714, fig. 1382.—Matsumura, 1931: 1158, fig.—Okamoto, 1932: 1531, fig. 3023.—Matsumura, 1933: 11 (17), pl. 3, fig. 7.—Kikuchi, 1933: 479.—Hirayama, 1933: pl. 79, fig. 1 & text.—Kinoshita, Yagi & Kawada, 1933: pls. 3, 92 & text.—Kato, 1933: pl. 43, fig. 3 & text.—Izaki, 1934: 306.—Yamakoshi, 1936: 166.—Esaki, Hori & Yasumatsu, 1938: 127, fig. 230.—Tanaka, 1939: 525.—Izaki, 1940: 120.—Kobayashi, 1940: 458; 1942: 221.—Yasumatsu, 1945: 215, fig. 2.—Okamoto & Kuwayama, 1950: 402, fig. 1099.—Ishihara *et al.*, 1953: 40.—Baba, 1953: 11, figs. 3, 4A.—Takeuchi, 1955: 72, fig. 402.—Kuwayama, 1956b: 31; 1957: 3.—Ishihara, 1957: 192, fig. 95.—Kuwayama, 1960: 30.

Balaga micans, Navás, 1912b: 111, fig. 1a, c; 1924b: 219.

Gen. ? sp. ? Anonymous, 1902a: 253, pl. 6, fig. 1.

DISTRIBUTION: Hokkaido, Honshu, Shikoku, Kyushu; Ryukyu; Taiwan; Korea; China.

HOKKAIDO. Jozankei, Usubetsu, Sapporo (Hiragishi), Hitaka (Mt. Apoi), Toya.
 HONSHU. AOMORI: Towada; IWATE: Karumai; YAMAGATA: Yonezawa; TOCHIGI: Kinugawa, Shiobara; GUNMA: Mt. Haruna; TOKYO: Tokyo, Nakano, Kunitachi, Hikawa, Mt. Takao; NIIGATA: Kurokawa, Kamo, Kanno, Niitsu, Noo, Akakura, Sado I. (Matsugasaki, Iwakubi, Hatano); NAGANO: Kamikochi, Kita-saku, Shimauchi; SHIZUOKA: Mt. Ashigara, Misakubo; GIFU: Gifu; HYOGO: Takasago; HIROSHIMA: Kure. SHIKOKU. EHIME: Matsuyama (Misaka pass), Mt. Takanawa, Sasayama; TOKUSHIMA: Tsurugi; KOCHI: Okawa-Nagano. KYUSHU. KUMAMOTO: Kumamoto, Mt. Aso; OITA: Beppu. Common.

Season: Early June to early October.

Genus **Myrmeleon** Linné

Myrmeleon L., 1767: 913.—Fabricius, 1793: 92.—Rambur, 1842: 382.—Walker, 1853: 300.—Hagen, 1866: 372.—Wellengren, 1871: 6.—Rostock, 1888: 99.—van der Weele, 1909b: 32.—Okamoto, 1910c: 297.—Banks, 1911: 9.—Esbén-Petersen, 1918b: 124.—Kuwa-

yama, 1959: 66. Type: *Hemerobius formicaleo* Linné; Europe.
Myrmecoleon Burmeister, 1839: 989.

Myrmeleon formicarius Linné

Hemerobius formicaleo L., 1758: 550.

Myrmeleon formicarius L., 1767: 914.—Burmeister, 1839: 996.—Wallengren, 1871: 7.—MacLachlan, 1875: 176.—Rostock, 1888: 99.—Matsumura, 1900b: 17.—Nawa, 1905: 445.—Krüger, 1916: 158.—Esben-Petersen, 1918b: 124, pl. 8, fig. 25.—Navás, 1923b: 18; 1926: 112.—Kôno & Tamanuki, 1928: 129.—Shinji, 1928: 125.—Navás, 1928b: 3.—Tosawa, 1932: 27.—Matsumura, 1933: 10 (15), pl. 3, fig. 2.—Kikuchi, 1933: 480.—Kato, 1933: pl. 43, fig. 4 & text.—Izaki, 1934: 306.—Mitsubishi, 1936: 367.—Tanaka, 1939: 525.—Izaki, 1940: 120.—Tjeder, 1944: 9; 1954a: 59.—Kuwayama, 1954b: 102.—Takeuchi, 1955: 71, fig. 397.—Asahina, 1958: 81.—Kuwayama, 1959: 67, pl. 5, figs. A1-4; 1960: 31.

Myrmeleon formicarius, Okamoto, in part, 1910c: 298.—Nakahara, 1913b: 97; 1913k: 301.—Okamoto, 1914b: 250; 1926: 21; 1932: 1532, fig. 3025.—Okam. & Kuwayama, 1950: 402, fig. 1098.—Kuwayama, 1956b: 31; 1957: 3.

Myrmeleon formicalynx Linné, 1767: 914.—Burmeister, 1839: 994.

Myrmeleon nigrivenosus Okamoto, 1905: 116.—Matsumura, 1908: 41.

Myrmeleon innotatus Rambur, 1842: 406.

Gen. ? sp. ? Anonymous, 1902a: 253, pl. 6, fig. 2.

DISTRIBUTION: Hokkaido, Honshu, Shikoku, Kyushu; Sachalin; Siberia; Caucasus; Europe. Recorded from Korea; but I could not verify this.

HOKKAIDO. Sapporo, Jozankei, Usubetsu, Mts. Daisetsu, Sounkyo, Kanayama, Toya, Otaru. HONSHU. AOMORI: Aomori; NIIGATA: Niitsu, Kurokawa, Sado I. (Matsugasaki); KANAGAWA: Jinbayama; NAGANO: Getsumei-Onsen; OSAKA: Mt. Iwawaki. SHIKOKU. EHIME: Tonaru; KOCHI: Mt. Tebako. KYUSHU. FUKUOKA: Mt. Hikosan, Kuboteyama. Common.

Season: Early July to end August.

Genus *Grocus* Navás

Grocus Nav., 1925c: 185.—Kuwayama, 1959: 66. Type: *Grocus gerstaeckeri* Nav.; Australia.

Antenna short and weakly clubbed. Pterostigma of both wings grayish and indistinct **solers**
 Antenna slender and enlarged or flattened towards the end. Pterostigma of both wings yellowish white, large and distinct..... **bore**

Grocus bore Tjeder

Grocus bore Tj., 1941a: 74; 1944: 9; 1954a: 60.—Kuwayama, 1959: 67, pl. 5, figs. B1-4; 1960: 31.

Myrmeleon formicarius, Matsumura (not Linné), 1904: 173, pl. 13, fig. 3.—Okamoto, 1905: 116.—Matsumura, 1907: 177, fig. 212; 1908: 41; 1931: 1158, fig.—Kuwayama, 1936a: 107.—Esaki, Hori & Yasumatsu, 1938: 127, fig. 229, 2.—Kuwayama, 1956c: 82.

Myrmeleon formicarius, Okamoto, in part, 1910c: 298; 1932: 1532, fig. 3025.—Okam. &

Kuwayama, 1950: 402, fig. 1098.—Baba, 1953: 6, figs. 1, 9A.—Kuwayama, 1956b: 31; 1957: 3.

DISTRIBUTION: Hokkaido, Honshu, Shikoku, Kyushu; Taiwan; Korea; Kuriles; Siberia; Europe.

HOKKAIDO. Sapporo, Jozankei, Shari, Taisho, Toya, Otaru, Gamushi, Okushiri I. **HONSHU.** YAMAGATA: Sakata; NIIGATA: Niigata, Kurokawa, Mt. Takamori, Kinoto, Sado I. (Kanazawa, Kawaharado); TOCHIGI: Nikko, Kinugawa; TOKYO: Hikawa; NAGANO: Kamikochi; HYOGO: Takasago, Maiko. **SHIKOKU.** EHIME: Matsuyama (Dogo). **KYUSHU.** FUKUOKA: Kashii; OITA: Mt. Sobosan. Common.

Season: Early July to end September.

Grocus solers (Walker)

Myrmeleon solers W., 1853: 367.—Esben-Petersen, 1926: 22.

Myrmeleon acer solers, van der Weele, 1909b: 46.

Myrmeleon acer, Adams, in part, 1959: 18.

Myrmeleon celebensis, Kuwayama (not MacLachlan), 1953a: 39, fig.—Baba, 1953: 9, figs. 2, 9B.—Fukumoto, 1954: 50.

Grocus solers, Kuwayama, 1959: 68, pl. 5, figs. C1–4; 1960: 31.

DISTRIBUTION: Honshu; China.

HONSHU. NIIGATA: Kurokawa, Kakuda.

Season: August.

Adams considers that *Myrmeleon acer*, *M. solers* and *M. celebensis* are same species and adopts *M. acer* by rule of priority. I feel, however, that *M. acer* and *M. solers* are at least specifically different, and they may be transferred to the genus *Grocus*.

Doubtful species.

Enza otiosus Navás

Enza otiosus Nav., 1912b: 114, fig. 2.—Nakahara, 1913b: 97.

Myrmeleon otiosus, Naka., 1913k: 301.

Myrmeleon (?) *otiosus*, Okamoto, 1914b: 250.

Navás described the genus *Enza* from Japan, with *E. otiosus* as type, in 1912. Diagnoses of the genus and species described by him are insufficient and they are quite difficult to identify unless the type specimen is examined. However, *E. otiosus* resembles *G. bore*.

Genus Epacanthaclisis Okamoto

Epacanthaclisis Okam., 1910c: 285.—Esben-Petersen, 1935: 234. Type: *Acanthaclisis moiwanus* Okamoto; Japan.

This genus seems to be restricted in distribution, containing only 2 species *E. moiwana* from Japan and *E. continentalis* of Esben-Petersen from Karakorum.

Epacanthaclisis moiwana (Okamoto) Fig. 26.

Acanthaclisis moiwanus Okam., 1905: 115.

Acanthaclisis moiwasanus, Matsumura, 1908: 40.

Epacanthaclisis moiwasana, Okamoto, 1910c: 286, fig. 1.—Nakahara, 1913b: 95; 1913k: 301; 1913f: 528.—Okamoto, 1914b: 250.—Matsumura, 1931: 1156, fig.—Okamoto, 1932: 1533, fig. 3027.—Matsumura, 1933: 11 (16), pl. 2, fig. 6.—Sawada, 1933: 660.—Izaki, 1934: 307.—Kobayashi, 1940: 458.—Kuwayama, 1950: 401, fig. 1096; 1956b: 31; 1957: 3.

Epacanthaclisis moiwana, Kuw., 1960: 30.

Distoleon tetragramicus, Esaki, Hori & Yasumatsu (not Fabricius), 1938: 127, fig. 229, 1.

DISTRIBUTION: Hokkaido, Honshu, Shikoku.

HOKKAIDO. Sapporo (Mt. Moiwa), Jozankei. HONSHU. FUKUSHIMA: Mt. Bandai, Mt. Azuma; TOCHIGI: Shiobara; NAGANO: Shinano; NIIGATA: Noo; SHIZUOKA: Misakubo; KYOTO: Kyoto. SHIKOKU. EHIME: Shirainotaki. Not common.

Season: End July to mid-October.

Genus *Heoclis* Navás

Heoclis Nav., 1923c: 12. Type: *Myrmeleon fundatus* Walker; Australia.

Heoclis japonica (MacLachlan)

Acanthaclisis japonica Hagen, 1866: 289, 378. No description.

Acanthaclisis japonica MacL., 1875: 174.—Matsumura, 1900b: 17; 1904: 176, pl. 13, fig. 4.—Nawa, 1905: 447.—Matsumura, 1907: 176, fig. 210; 1908: 40.—Okamoto, 1910c: 284.—Nakahara, 1913b: 95; 1913k: 301.—Okamoto, 1914b: 250.—Matsumura, 1917: 474.—Okazaki, 1918: 57, fig. 21.—Okamoto, 1926: 21.—Marumo, 1927: 714, fig. 1383.—Shinji, 1928: 125.—Matsumura, 1931: 1155, fig.—Okamoto, 1932: 1532, fig. 3026.—Tosawa, 1932: 27.—Matsumura, 1933: 10 (15), pl. 3, fig. 1.—Kikuchi, 1933: 479.—Hirayama, 1933: pl. 79, fig. 5 & text.—Kato, 1933: pl. 44, fig. 1 & text.—Izaki, 1934: 307.—Takahashi, 1935: 487.—Yamakoshi, 1936: 166.—Esaki, Hori & Yasumatsu, 1938: 126, fig. 228.—Tanaka, 1939: 525.—Izaki, 1940: 120.—Kobayashi, 1942: 221.—Yasumatsu, 1945: 214, fig. 2.—Okamoto & Kuwayama, 1950: 401, fig. 1097.—Baba, 1953: 15, fig. 6.—Kuwayama, 1956b: 31; 1957: 3.

Heoclis japonica, Navás, 1923c: 13; 1924b: 218; 1927: 3; 1928b: 2; 1930: 420.—Kuwayama, 1960: 30.

Gen. ? sp. ? Anonymous, 1902a: 253, pl. 6, fig. 6.

DISTRIBUTION: Hokkaido, Honshu, Shikoku, Kyushu; Korea; China.

HOKKAIDO. Sapporo, Oshoro, Gorinzawa. HONSHU. AKITA: Akita; TOCHIGI: Chuzenji, Kinugawa; GUNMA: Ikaho; NIIGATA: Kurokawa; ISHIKAWA; Kanazawa; GIFU: Japan Alps; HYOGO: Befu.

Season: End July to mid-September.

Family ASCALAPHIDAE Schneider, 1845

The adults of this family are larger dragonfly-like insects, some species having beautiful wing coloration. This family is perhaps the most highly developed of all Neuroptera.

KEY TO SUBFAMILIES

Eye entire and simple..... Holophthalminae
 Eye divided by a groove into 2 portions Schizophthalminae

Subfamily HOLOPHTHALMINAE van der Weele, 1908

Genus *Protidricerus* van der Weele

Protidricerus v. d. W., 1908: 61. Type: *Idricerus exilis* MacLachlan; W. China.

Protidricerus japonicus (MacLachlan)

Idricerus japonicus MacL., 1891: 513.—Matsumura, 1900a: 79; 1904: 178, pl. 13, fig. 7; 1907: 175; 1908: 40.—Okamoto, 1909: 501, pl. 11, figs. 2, 5; 1910a: 58.—Shinji, 1928: 126, fig. 86.

Ascalaphus (Idricerus) japonicus, Matsumura, 1900b: 17.

Protidricerus japonicus, van der Weele, 1908: 63, fig. 35.—Navás, 1924b: 220.—Matsumura, 1931: 1160, fig.—Okamoto, 1932: 1525, fig. 3011.—Hirayama, 1933: pl. 80, fig. 3 & text.—Kato, 1933: pl. 45, fig. 3 & text.—Izaki, 1934: 307.—Kobayashi, 1936: pl. 158.—Esaki, Hori & Yasumatsu, 1938: 129, fig. 233, 1.—Kobayashi, 1940: 457, fig.—Fukuda, 1943: 191.—Yasumatsu, 1945: 215, fig. 1.—Okamoto & Kuwayama, 1950: 404, fig. 1106.—Takeuchi, 1955: 72, fig. 404.—Kuwayama, 1956b: 32; 1957: 3.—Asahina, 1958: 81.—Kuwayama, 1960: 32.

Protidricerus (Idricerus) japonicus, Matsumura, 1933: 12 (18), pl. 3, fig. 11.

Ascalaphus sp. ? Anonymous, 1902b: 301, pl. 7, figs. 3–4.

DISTRIBUTION: Honshu, Shikoku, Kyushu.

HONSHU. AKITA: Akita; TOKYO: Tokyo, Haijima; NIIGATA: Niitsu, Senami, Kurokawa; SHIZUOKA: Misakubo, Kanaya; FUKUI: Oniu. SHIKOKU. KOCHI: Makiyama. KYUSHU. KUMAMOTO: Mt. Aso.

Season: End June to end August.

Subfamily SCHIZOPHTHALMINAE van der Weele, 1908

Wings short, subtriangular decorated with yellow, brown or blackish color *Ascalaphus*
Wings elongate, without any conspicuous markings..... *Hybris*

Genus *Hybris* Lefèbvre

Hybris Lef., 1842: 6, pl. 92.—Hagen, 1866: 373.—MacLachlan, 1871: 266.—van der Weele, 1908: 230.—Okamoto, 1909: 503; 1910a: 60. Type: *Ascalaphus javanus* Burmeister; Java.

Bubo Rambur, in part, 1842: 353.

Ogcogaster Westwood, in part, 1848: t. 34.

Hybris subjacens (Walker)

Ascalaphus subjacens Walk., 1853: 431.—Matsumura, 1900a: 79, fig. 49.—Anonymous, 1902b: 301, pl. 7, fig. 2.

Ascalaphus (Hybris) subjacens, Matsumura, 1900b: 17.

Hybris subjacens, MacLachlan, 1871: 267; 1875: 178.—Matsumura, 1904: 177, pl. 13, fig. 6.—Nawa, 1905: 448.—Matsumura, 1907: 175, fig. 209.—van der Weele, 1908: 234, figs. 188, 189.—Matsumura, 1908: 40.—Iguchi, 1908: 252.—Okamoto, 1909: 504, pl.

11, figs. 8-9; 1910a: 60.—Matsumura, 1917: 473.—Okazaki, 1918: 58, pl. 8, fig. 4.—Okamoto, 1924: 71.—Navás, 1924b: 221; 1926: 111.—Okamoto, 1926: 21.—Navás, 1927: 2.—Marumo, 1927: 713, fig. 1380.—Shinji, 1928: 127.—Matsumura, 1931: 1159, fig.—Okamoto, 1932: 1526, fig. 3014.—Kinoshita, 1932: 2192, fig. 4304, pl. 22.—Tosawa, 1932: 27.—Matsumura, 1933: 12 (18), pl. 3, fig. 13.—Kikuchi, 1933: 478.—Hirayama, 1933: pl. 80, fig. 1 & text.—Kato, 1933: pl. 45, fig. 2, pl. 44, fig. 4 & text.—Izaki, 1934: 307.—Takahashi, 1935: 487.—Yamakoshi, 1936: 166.—Sonan, 1938: 272, 5 figs.—Esaki, Hori & Yasumatsu, 1938: 129, fig. 234.—Uyemura, 1938: 161.—Tanaka, 1939: 525.—Izaki, 1940: 120.—Kobayashi, 1942: 220.—Okamoto & Kuwayama, 1950: 404, fig. 1104.—Takeuchi, 1955: 72, fig. 403.—Kuwayama, 1956b: 32; 1957: 3; 1960: 32.

Ascalaphus remotus Walker, 1853: 447.

Bubo javanus Rambur (not Burmeister), 1842: 355.

DISTRIBUTION: Honshu, Shikoku, Kyushu; Korea; Taiwan; China.

HONSHU. NIGATA: Sado I. (Futami); IBARAKI: Mt. Tsukuba; TOKYO: Miyake I., Hachijo I.; GIFU: Gifu; MIYE: Yokkaichi; WAKAYAMA: Dorohaccho; HYOGO: Maiko, Takasago; TOTTORI: Tottori. SHIKOKU. KOCHI: Nissho, Eboshi, Ino, Sukumo. KYUSHU. NAGASAKI: Nagasaki, Yukiura; FUKUOKA: Buzen; OITA: Beppu; KAGOSHIMA: Kawabe. Common.

Season: Mid-May to end September.

Genus *Ascalaphus* Fabricius

Ascalaphus F., 1775: 313.—Burmeister, 1839: 999.—Lefèbvre, 1842: 7, pl. 92.—Rambur, 1842: 343.—Hagen, 1866: 373.—MacLachlan, 1871: 273.—Rostock 1888: 101.—van der Weele, 1908: 288.—Okamoto, 1909: 502; 1910a: 59. Type: *Ascalaphus macaronius* Scopoli (= *Myrmeleon barbarum* Fabr., not Linné); Europe.

Ascalaphus ramburi MacLachlan Fig. 27.

Ascalaphus ramburi MacL., 1875: 177.—Matsumura, 1900b: 17; 1904: 176, pl. 13, fig. 5.—Nawa, 1905: 448.—Matsumura, 1907: 174, fig. 208.—van der Weele, 1908: 295, pl. 2.—Matsumura, 1908: 39.—Iguchi, 1908: 252.—Okamoto, 1909: 502, pl. 11, fig. 3; 1910a: 59.—Nakahara, 1915d: 333.—Matsumura, 1917: 473, fig. 252.—Okazaki, 1918: 58.—Navás, 1924b: 221; 1926: 111.—Marumo, 1927: 712, fig. 1379, pl. Ins. 2.—Shinji, 1928: 127.—Matsumura, 1931: 1159, fig.—Okamoto, 1932: 1525, fig. 3012.—Matsumura, 1933: 10 (15), pl. 3, fig. 3.—Hirayama, 1933: pl. 80, fig. 2 & text.—Kato, 1933, pl. 45, fig. 1 & text.—Izaki, 1934: 307.—Esaki, Hori & Yasumatsu, 1938: 129, fig. 233, 2.—Yamamoto, 1938: pl. 243.—Izaki, 1940: 120.—Okamoto & Kuwayama, 1950: 404, fig. 1105, pl. 15, fig. 2.—Takeuchi, 1955: 72, fig. 405.—Kuwayama, 1960: 32.

Ascalaphus kheili Navás, 1905: 49, pl. 2, fig. 1a.

Ascalaphus japonicus Anonymous, 1902b: 301, pl. 7, fig. 1. **New Synonymy.**

DISTRIBUTION: Honshu, Kyushu.

HONSHU: IWATE: Karumai; YAMAGATA: Shonai; TOKYO: Inokashira; NAGANO: Omachi; NIGATA: Kurokawa; KYOTO: Kyoto. Uncommon.

Season: End May to end June.

SUMMARY

More than 170 species of Neuroptera have been described from Japan. However, the material at hand reveals not only some reduction of number of species on account of synonyms, but addition of 1 genus and 1 species new to science and 2 species unrecorded from our fauna. I enumerate 112 species and 2 varieties, excluding 2 doubtful species, in our faunal region. Newly added genus and species are as follows:

Nipponosialis n. gen. for *Sialis jezoensis* Okamoto

Anomalochrysa babai n. sp.

Conwentzia psociformis (Curtis)

Chrysopa albolineata Killington

The Neuroptera in Japan belongs to 16 families of 3 suborders. Of them, Raphidiidae, Inocelliidae, Apochrysidae, Berothidae, Dilaridae and Ascalaphidae are unrecorded from Hokkaido, and also Sialidae, Raphidiidae and Berothidae from Shikoku, Sialidae and Raphidiidae from Kyushu.

Tabular analysis of Japanese Neuroptera.

| Families and genera | Number of genera | | | | | Number of species | | | | |
|------------------------|------------------|--------|---------|--------|-------|-------------------|--------|---------|--------|---------|
| | Hokkaido | Honshu | Shikoku | Kyushu | Total | Hokkaido | Honshu | Shikoku | Kyushu | Total |
| Neuroptera | 32 | 49 | 37 | 39 | 50 | 56 | 102 | 57 | 56 | 112(51) |
| I. Sialodea | 3 | 3 | 2 | 2 | 4 | 3 | 8 | 3 | 3 | 10(6) |
| 1. Corydalidae | 1 | 2 | 2 | 2 | 2 | 1 | 3 | 3 | 3 | 3 |
| <i>Protohermes</i> | | | | | | 1 | 1 | 1 | 1 | 1 |
| <i>Parachauliodes</i> | | | | | | 0 | 2 | 2 | 2 | 2 |
| 2. Sialidae | 2 | 1 | 0 | 0 | 2 | 2 | 5 | 0 | 0 | 7(6) |
| * <i>Nipponosialis</i> | | | | | | 1 | 0 | 0 | 0 | 1(1) |
| <i>Sialis</i> | | | | | | 1 | 5 | 0 | 0 | 6(5) |
| II. Raphidiodea | 0 | 2 | 1 | 1 | 2 | 0 | 2 | 1 | 1 | 2(2) |
| 3. Raphidiidae | 0 | 1 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 1(1) |
| <i>Raphidia</i> | | | | | | 0 | 1 | 0 | 0 | 1(1) |
| 4. Inocelliidae | 0 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 1 | 1(1) |
| <i>Inocellia</i> | | | | | | 0 | 1 | 1 | 1 | 1(1) |
| III. Planipennia | 29 | 44 | 34 | 36 | 44 | 53 | 92 | 53 | 52 | 100(43) |
| 5. Coniopterygidae | 3 | 5 | 3 | 4 | 5 | 3 | 5 | 3 | 4 | 5(1) |

| Families and genera | Number of genera | | | | | Number of species | | | | |
|---------------------------|------------------|--------|---------|--------|-------|-------------------|--------|---------|--------|--------|
| | Hokkaido | Honshu | Shikoku | Kyushu | Total | Hokkaido | Honshu | Shikoku | Kyushu | Total |
| <i>Conwentzia</i> | | | | | | 1 | 1 | 0 | 0 | 1 |
| <i>Coniopteryx</i> | | | | | | 1 | 1 | 1 | 1 | 1 |
| <i>Semidalis</i> | | | | | | 1 | 1 | 1 | 1 | 1 |
| <i>Spiloconis</i> | | | | | | 0 | 1 | 0 | 1 | 1 |
| <i>Coniocompsa</i> | | | | | | 0 | 1 | 1 | 1 | 1(1) |
| 6. Sisyridae | 2 | 2 | 2 | 2 | 2 | 3 | 4 | 1 | 3 | 5(5) |
| * <i>Nipponneurorthus</i> | | | | | | 2 | 3 | 0 | 3 | 4(4) |
| <i>Sisyra</i> | | | | | | 1 | 1 | 1 | 1 | 1(1) |
| 7. Osmylidae | 4 | 4 | 4 | 4 | 4 | 6 | 9 | 8 | 7 | 10(6) |
| <i>Osmylus</i> | | | | | | 2 | 2 | 2 | 1 | 2(1) |
| <i>Plethosmylus</i> | | | | | | 2 | 2 | 1 | 1 | 2(1) |
| <i>Lysmus</i> | | | | | | 1 | 2 | 2 | 1 | 2(1) |
| <i>Spilosmylus</i> | | | | | | 1 | 3 | 3 | 4 | 4(3) |
| 8. Hemerobiidae | 8 | 9 | 5 | 6 | 9 | 16 | 25 | 9 | 11 | 25(11) |
| <i>Micromus</i> | | | | | | 2 | 2 | 1 | 2 | 2 |
| <i>Eumicromus</i> | | | | | | 3 | 5 | 2 | 3 | 5(1) |
| <i>Paramicromus</i> | | | | | | 1 | 1 | 1 | 1 | 1 |
| <i>Hemerobius</i> | | | | | | 6 | 11 | 4 | 3 | 11(8) |
| <i>Kimminsia</i> | | | | | | 1 | 2 | 0 | 0 | 2(1) |
| <i>Wesmaelius</i> | | | | | | 0 | 1 | 0 | 0 | 1 |
| <i>Neuronema</i> | | | | | | 1 | 1 | 1 | 0 | 1(1) |
| <i>Oedobius</i> | | | | | | 1 | 1 | 0 | 1 | 1 |
| <i>Drepanopteryx</i> | | | | | | 1 | 1 | 0 | 1 | 1 |
| 9. Sympherobiidae | 2 | 3 | 2 | 1 | 3 | 2 | 4 | 2 | 1 | 4(2) |
| <i>Sympherobius</i> | | | | | | 1 | 2 | 1 | 0 | 2(2) |
| <i>Notiobiella</i> | | | | | | 0 | 1 | 1 | 1 | 1 |
| <i>Psectra</i> | | | | | | 1 | 1 | 0 | 0 | 1 |
| 10. Chrysopidae | 1 | 3 | 2 | 2 | 3 | 13 | 23 | 12 | 7 | 26(9) |
| <i>Chrysopa</i> | | | | | | 13 | 21 | 11 | 6 | 24(8) |
| <i>Anomalochrysa</i> | | | | | | 0 | 1 | 0 | 0 | 1(1) |
| <i>Nothochrysa</i> | | | | | | 0 | 1 | 1 | 1 | 1 |
| 11. Apochrysidae | 0 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 1 | 1(1) |
| * <i>Nacaura</i> | | | | | | 0 | 1 | 1 | 1 | 1(1) |
| 12. Berothidae | 0 | 1 | 0 | 1 | 1 | 0 | 1 | 0 | 1 | 1(1) |
| <i>Acroberotha</i> | | | | | | 0 | 1 | 0 | 1 | 1(1) |
| 13. Dilaridae | 0 | 1 | 1 | 1 | 1 | 0 | 1+1 | 1+1 | 1+1 | 2+1(2) |

| | | | | | | | | | | |
|-------------------------|---|---|---|---|---|---|-----|-----|-----|--------|
| <i>Dilar</i> | | | | | | 0 | 1+1 | 1+1 | 1+1 | 2+1(2) |
| 14. Mantispidae | 1 | 3 | 3 | 3 | 3 | 1 | 4+1 | 4 | 4 | 5+1(2) |
| <i>Mantispa</i> | | | | | | 1 | 1+1 | 1 | 1 | 1+1 |
| <i>Eumantispa</i> | | | | | | 0 | 1 | 1 | 1 | 1 |
| <i>Climaciella</i> | | | | | | 0 | 2 | 2 | 2 | 3(2) |
| 15. Myrmeleontidae | 8 | 9 | 9 | 8 | 9 | 9 | 12 | 10 | 9 | 13(1) |
| <i>Dendroleon</i> | | | | | | 2 | 2 | 2 | 2 | 2 |
| <i>Glenuroides</i> | | | | | | 1 | 1 | 1 | 1 | 1 |
| <i>Pseudoformicaleo</i> | | | | | | 0 | 1 | 1 | 1 | 1 |
| <i>Distoleon</i> | | | | | | 1 | 2 | 1 | 1 | 3 |
| <i>Hagenomyia</i> | | | | | | 1 | 1 | 1 | 1 | 1 |
| <i>Myrmeleon</i> | | | | | | 1 | 1 | 1 | 1 | 1 |
| <i>Grocus</i> | | | | | | 1 | 2 | 1 | 1 | 2 |
| <i>Epacanthaclisis</i> | | | | | | 1 | 1 | 1 | 0 | 1(1) |
| <i>Heoclisis</i> | | | | | | 1 | 1 | 1 | 1 | 1 |
| 16. Ascalaphidae | 0 | 3 | 2 | 3 | 3 | 0 | 3 | 2 | 3 | 3(2) |
| <i>Protidricerus</i> | | | | | | 0 | 1 | 1 | 1 | 1(1) |
| <i>Hybris</i> | | | | | | 0 | 1 | 1 | 1 | 1 |
| <i>Ascalaphus</i> | | | | | | 0 | 1 | 0 | 1 | 1(1) |

Notes 1. Two doubtful species are omitted in this table.

2. The number of varieties is shown by "+".

3. Asterisk* indicates endemic genus.

4. The figure within parenthesis in the column of "Number of species" means the number of species indigenous to Japan.

As shown in the foregoing table, Chrysopidae and Hemerobiidae are predominant; especially the genus *Chrysopa* which consists of 24 species. Among 50 genera found in Japan only 3, *Nipponosialis*, *Nipponeurorthus* and *Nacaura*, are endemic. The species known only from our fauna at present number 51, or 45.5% of the total number of species recorded from Japan. The other species are distributed to the Eurasian region or to the Palaetropics and the South Pacific Islands. Thus, endemism of the neuropterous fauna in Japan is not high.

BIBLIOGRAPHY

Asterisk* indicates a paper or book written in Japanese.

Mark† indicates a paper or book that I have not seen.

Anonymous. 1902a. *Myrmeleontidae. *Ins. World* 6: 253-54.

———. 1902b. *Ascalaphidae and Mantispidae. *Ibid.*: 301.

Adams, P. A. 1959. Neuroptera: Myrmeleontidae and Chrysopidae. *Ins. Micronesia* 8(2): 13-33.

Asahina, S. 1947. *An antlion living on lichen. *Zool. Mag.* 57: 35.

———. 1958. *Notes on the insect-fauna of Shimokita Peninsula, Aomori Prefecture. *Sci. Inst. Nat. Res., Bull.* 46/47: 78-83.

- Baba, K. 1953. *The biology of antlions. Essa Ent. Ass., Niigata. 107 pp.
- 1955. Records on some neuropterous insects. *Kontyû* **23**: 12.
- and T. Edashige. 1954. *Morphological and ecological notes on *Dendroleon jezoensis* Okamoto (Neuroptera: Myrmeleonidae). *Ibid.* **21**: 51-59.
- Banks, N. 1899. A classification of the North American Myrmeleonidae. *Canad. Ent.* **1899**: 67-71.
- 1903. A revision of the Nearctic Chrysopidae. *Amer. Ent. Soc., Trans.* **29**: 137-62.
- 1904. †A List of neuropteroid insects, exclusive of Odonata, from the vicinity of Washington, D. C. *Ent. Soc. Wash., Proc.* **6**: 201-17.
- 1905. A revision of the Nearctic Hemerobiidae. *Amer. Ent. Soc., Trans.* **32**: 21-51.
- 1908. †On the classification of the Corydalinae, with description of a new species. *Ent. Soc. Wash., Proc.* **10**: 27-30.
- 1909. Hemerobiidae from Queensland, Australia. *Ibid.* **11**: 76-82.
- 1910a. Myrmeleonidae from Australia. *Ent. Soc. Amer., Ann.* **3**: 40-44.
- 1910b. Synonymical notes on Neuroptera. *Ent. News* **21**: 389-90.
- 1911. Notes on African Myrmeleonidae. *Ent. Soc. Amer., Ann.* **4**: 1-31.
- 1913. Synopses and descriptions of exotic Neuroptera. *Amer. Ent. Soc., Trans.* **39**: 201-42.
- 1916. Neuropteroid insects of the Philippine Islands. *Phil. Jour. Sci.* **11** (D): 195-217.
- 1922. Venational variation in *Raphidia*. *Canad. Ent.* **54**: 114-16.
- 1931. Neuropteroid insects from the Malay Peninsula. *Fed. Malay Mus., Jour.* **16**: 377-404.
- 1932. Concerning the genus *Notiobiella* (Neuropt.-Hemerobiidae). *Psyche* **39**: 103-6.
- 1937. Neuropteroid insects from Formosa. *Phil. Jour. Sci.* **62**: 255-91.
- Brauer, F. 1851. †Beschreibung und Beobachtung der österreichischen Arten der Gattung *Chrysopa*. *Haid. Nat. Abh.* **4** (4): 1-12.
- 1855. †Beiträge zur Kenntniss des inneren Baues und der Verwandlung der Neuropteren. *Zool.-bot. Ges. Wien, Verh.* **5**: 701-26.
- 1857. †Neuroptera austriaca. Gerold, Wien. 23+80 pp.
- 1866. †Neuropteren der Reise der österreichischen Fregatte Novara um die Erde, &c. *Zool. 2. Wien.* 104 pp.
- Brues, C. T. & A. L. Melander. 1932. Classification of insects. *Mus. Comp. Zool., Harvard Coll., Bull.* **73**: 1-672.
- , ————— & F. M. Carpenter. 1954. Classification of insects. Revised Edition. *Ibid.* **108**: 1-917.
- Burmeister, H. 1839. Neuroptera. *Handbuch der Entomologie* **2** (2): 757-1050. T. C. F. Enslin, Berlin.
- Carpenter, F. M. 1940. A revision of the Nearctic Hemerobiidae, Berothidae, Sisyridae, Polystoechotidae and Dilaridae (Neuroptera). *Amer. Acad. Arts Sci., Proc.* **74**: 193-280.
- 1955. Redescription of *Spiloconis picticornis* Banks (Neuroptera: Coniopterygidae). *Psyche* **62**: 69-74.

- Comstock, J. H. 1918. The wings of insects. Comstock Publ. Co., Ithaca, New York. 430 pp.
- 1924. An introduction to entomology. *Ibid.* 1044 pp.
- 1950. An introduction to entomology. Ninth edition, revised. *Ibid.* 1064 pp.
- Curtis, J. 1834. †British entomology. **11**: pls. 482–529. Autor, London.
- Davis, K. C. 1903. Sialididae of North and South America. N. Y. State Mus., Bull. **68**: 442–87.
- Enderlein, G. 1905a. †*Conwentzia pineticola* nov. gen. nov. spec. Eine neue Neuroptere aus Westpreussen. Westpreuss. Bot.-zool. Ver., Ber. **26/27**: 10–12.
- 1905b. Ein neuer zu den Coniopterygiden gehöriger Neuropteren-Typus aus der Umgebung von Berlin. Wien. Ent. Ztg. **24**: 197–98.
- 1905c. Klassifikation der Neuropteren-Familie Coniopterygidae. Zool. Anz. **29**: 225–27.
- 1906. Monographie der Coniopterygiden. Zool. Jahrb., Abt. Syst. **23**: 173–242.
- 1907. Die Coniopterygidenfauna Japans. Stett. Ent. Ztg. **68**: 3–9.
- 1908. Neuroptera. Fam. Coniopterygidae. Gen. Ins. **67**: 1–18.
- 1910. Klassifikation der Mantispiden nach dem Material des Stettiner Zoologischen Museums. Stett. Ent. Ztg. **71**: 341–79.
- 1929. Die Klassifikation der Coniopterygiden auf Grund der recenten und fossilen Gattungen. Klass. Phyl. Ent., Arch. **1**: 98–114.
- Esaki, T. 1930a. *Some Neuroptera and Trichoptera new to the fauna of N. Kyushu. Mushi **3**: 1–5.
- 1930b. Uebersicht über die Insektenfauna der Bonin (Ogasawara)=Inseln, unter besonderer Berücksichtigung der zoogeographischen Faunencharaktere. Biogeogr. Soc. Jap., Bull. **1**: 206–26.
- 1931. *Miscellaneous notes on the insects of Kyushu. Mushi **4**: 89–91.
- 1933. *Thunberg's zoological contributions. Bot. Zool. **1**: 691–96.
- 1937. *Some note-worthy insects hitherto unrecorded from the Island Amami-Oshima. Akitsu **1**: 23–25.
- , H. Hori & K. Yasumatsu. 1938. *Insectorum Japonicorum Illustratio Iconographica Coloribus ad Naturam Depicta. Sanseido Co., Tokyo. 426 pp.
- Esben-Petersen, P. 1912. H. Sauter's Formosa-Ausbeute. Neuroptera Planipennia. Ent. Mitt. **1**: 197–98.
- 1913a. H. Sauter's Formosa-Ausbeute. Planipennia II, Megaloptera and Mecoptera. *Ibid.* **2**: 222–28, 257–65.
- 1913b. Megaloptera. Fam. Raphididae. Gen. Ins. **154**: 1–12.
- 1913c. Mecoptera and Planipennia collected in Java by Edward Jacobson. Leyden Mus., Notes **35**: 225–36.
- 1914. Descriptions of a new genus and some new or interesting species of Planipennia. *Ibid.* **36**: 263–70.
- 1915. Australian Neuroptera. Part II. Linn. Soc. N. S. Wales, Proc. **40**: 56–74.
- 1916. Einige Neuropteren des Deutschen Entomologischen Museums. Ent. Mitt. **5**: 300–3.
- 1917. Australian Neuroptera. Part III. Linn. Soc. N. S. Wales, Proc. **42**:

- 203-19.
- Esben-Petersen, P. 1918a. Results of Dr. E. Mjöberg's Swedish Scientific Expeditions to Australia 1910-1913. 18. Neuroptera and Mecoptera. *Ark. Zool.* **11** (26): 1-37.
- 1918b. Help-notes towards the determination and the classification of the European Myrmeleonidae. *Ent. Medd.* **12**: 97-127.
- 1923. Über das Genus *Dendroleon* Brauer. *Konowia* **2**: 86-92.
- 1926. Fauna sumatrensis (Beitrag Nr. 14). Neuroptera & Megaloptera. *Ent. Mitt.* **15**: 21-29.
- 1928. Neuroptera. *Ins. Samoa* **7**: 89-108.
- 1935. Myrmeleonidae and Chrysopidae. *Wiss. Ergebn. Niederl. Exped. Karakorum, Zool.*: 233-35.
- Essig, E. O. 1942. *College entomology*. MacMillan Co., New York, 900 pp.
- Fabricius, J. C. 1775. †*Systema Entomologiae*. Korte, Flensburgi et Lipsiae. 832 pp.
- 1793. †*Entomologica Systematica*. 2. Proft, Hafniae. 519 pp.
- Fukuda, S. 1943. *Northern limit of the distribution of *Protidricerus japonicus*. *Ins. World* **47**: 191.
- Fukumoto, N. 1954. *New locality of *Myrmeleon celebensis*. *Shin-Konchu* **7** (2): 50.
- Gerstaecker, A. 1893. Ueber neue und weniger gekannte Neuropteren aus der Familie Megaloptera Burm. *Naturwiss. Ver. Neu-Vorpom. u. Rügen, Mitt.* **25**: 93-173.
- Hagen, H. A. 1852. †Rezension von Schneiders Monographie der Chrysopen. *Stett. Ent. Ztg.* **13**: 30-31, 35-45.
- 1866. Hemerobidarum Synopsis synonymica. *Ibid.* **27**: 369-462.
- 1886. On *Hemerobius (Psectra) dipterus* Burm. and *H. delicatulus* A. Fitch. *Ent. Amer.* **2**: 21-24.
- Handlirsch, A. 1925. *Geschichte, Literatur, Technik, Paläontologie, Systematik*. Handb. Ent., Schröder, 3. Gustav Fischer, Jena. 1201 pp.
- Handschin, E. 1935. Indo-australische Neuropteren und Mecopteren. *Rev. Suisse Zool.* **42**: 683-714.
- 1959a. *Mantispa styriaca* (Poda 1761). *Vierteljahrssch. Naturforsch. Gesel. Zürich* **104**: 105-14.
- 1959b. Beiträge zu einer Revision der Mantispiden (Neuroptera). I. Teil. Mantispiden des Musée Royal du Congo Belge, Tervuren. *Rev. Zool. Bot. Afr.* **59**: 185-227.
- Hirayama, S. 1933. *Illustrations of 1000 insects. Sanseido Co., Tokyo. 104 pls. with text.
- 1937. *Illustrations of 1000 insects. Supplement. *Ibid.* 194 pp.
- Hori, H. 1933. *Insects of the Okinoshima Island. *Soc. Hist.-Nat. Fukuok., Ann.* **1**: 170-76.
- Horikawa, Y. 1913. *Miscellaneous notes on insects. II. *Ins. World* **17**: 420-21.
- 1954. *On the Mantispidae from Nagasaki Prefecture. *Shin-Konchu* **7** (1): 37.
- Iguchi, S. 1908. *A list of insects from Sayo County, Hyogo Prefecture. *Ins. World* **12**: 251-52.
- Iida, N. 1942. *Insects collected by light trap at Mt. Funaoka near Kyoto. *Ent. World* **10**: 457-65.
- Illiger, J. C. W. 1798. †*Kugelann, Verzeichniss der Käfer Preussens*. Gebauer, Halle. 510 pp.
- Imms, A. D. 1925. *A general textbook of entomology*. Methuen & Co., London. 698 pp.

- Ishihara, T. 1957. *Taxono-agronomic entomology of Japan. Yokendo Co., Tokyo. 480 pp.
- , M. Miyatake, S. Hisamatsu, T. Edashige & K. Sasaki. 1953. *The insect fauna of Mt. Ishizuchi and Omogo Valley, Iyo, Japan. Shikoku Ent. Soc., Trans. 3 (Suppl.): 5-129.
- Ishii, T. 1937. *On the natural enemies of arrowhead scale. Agr. Hort. 12: 60-70.
- Izaki, I. 1934. *A list of insects in Fukui Prefecture. 2. Ent. World 2: 303-7.
- 1940. *A list of insects from Takashima County, Shiga Prefecture. V. *Ibid.* 8: 114-22.
- Kato, Masayo. 1933. *Three colour illustrated insects of Japan. 5. Koseikaku Co., Tokyo. 50 pls. with text.
- Kato, Mitsujiro. 1934. *On *Sisyra*. Zool. Mag. 46: 4-5.
- Kawamura, T. 1932. *Aquatic larvae of Neuroptera. Icon. Ins. Japon., Ed. Prim.: 2224-25. Hokuryukan Co., Tokyo.
- Kawashima, K. 1957. Bionomics and earlier stages of some Japanese Neuroptera. (1) *Spilosmylus flavicornis* (MacLachlan) (Osmylidae). Mushi 30: 67-70.
- 1958. Bionomics and earlier stages of some Japanese Neuroptera. (2) *Eumicromus numerosus* (Navás) (Hemerobiidae). *Ibid.* 32: 43-46.
- Kikuchi, T. 1933. *Notes on South Manchurian Trichoptera, Mecoptera and Neuroptera. Ent. World 1: 474-81.
- Killington, F. J. 1935. †*Chrysopa albolineata* nom. nov. for *Chrysopa tenella* Schneid. (Neur.). Soc. Brit. Ent., Jour. 1: 87.
- 1936-'37. A monograph of the British Neuroptera 1-2. Ray Society, London. 269+306 pp.
- & D. E. Kimmins. 1932. On the male genital structure of *Psectra diptera* Burm. (Neur.), with some remarks on the wing venation. Ent. Mon. Mag. 68: 153-56.
- Kimmins, D. E. 1938. *Nelees* Navás 1912, a preoccupied name in the Myrmeleonidae (Neuroptera). Ann. Mag. Nat. Hist. ser. 11, 2: 366.
- 1940. Notes on some types of Chrysopidae (Neuroptera) in the British Museum collections. *Ibid.* 5: 442-49.
- 1942. The genus *Thyridosmylus* Krüger, with notes on the subfamily Spilosmylinae (Neuroptera, Osmylidae). *Ibid.* 9: 848-55.
- 1943. New species of the genus *Neuronema* Mcl. (Neuroptera, Hemerobiidae). *Ibid.* 10: 40-53.
- 1949. Notes on the genus *Protohermes* Weele (Megaloptera), with descriptions of two new species. Ann. Mag. Nat. Hist. ser. 12, 1: 765-81.
- 1952. A revision of the genera of the Apochrysinæ (Fam. Chrysopidae). *Ibid.* 5: 929-44.
- 1953. Miss L. E. Cheesman's expedition to New Caledonia, 1949 - orders Odonata, Ephemeroptera, Neuroptera and Trichoptera. *Ibid.* 6: 241-57.
- 1954. A new genus and some new species of the Chauliodini (Megaloptera). Brit. Mus. (Nat. Hist.), Ent. Bull. 3: 417-44.
- Kinoshita, S. 1932. *Terrestrial larvae of Neuroptera. Icon. Ins. Japon., Ed. Prim.: 2192-94. Hokuryukan Co., Tokyo.
- , N. Yagi & A. Kawada. 1933. *Biographia Insectorum. 1-2. Nishigahara-Kankokai, Tokyo. 245 pls. with text.

- Kirby, W. F. 1892. Elementary textbook of entomology. Swan Sonnenschein & Co., London. 281 pp.
- Kobayashi, H. 1936. **Protidricerus japonicus*. Ent. World 4: pl. 158.
- 1940. *A list of insects from Minakami-mura. (8) Trichoptera, Mecoptera, Neuroptera, Hemiptera, Odonata and Plecoptera. *Ibid.* 8: 456–66.
- Kobayashi, K. 1931. *On the entomological collection of Shikotan Island, Kuriles. Kansai Ent. Soc., Trans. 2: 59–66.
- Kobayashi, T. 1942. *Survey on the insect-fauna of the vicinity of Tokyo. IX. Trichoptera, Neuroptera and Mecoptera. *Ins. World* 46: 219–22.
- Kolbe, H. 1897. Neuropteren. Die Netzflügler Deutsch-Ost-Afrikas. Dietrich Reimer, Berlin. 42 pp.
- Kôno, H. & K. Tamanuki. 1928. Insekten-Ausbeute aus Nord-Sachalin. *Ins. Mats.* 2: 128–29.
- Krüger, L. 1912–'15. Osmylidae. Beiträge zu einer Monographie der Neuropteren-Familie der Osmyliden. *Stett. Ent. Ztg.* 73: 319–73; 74: 3–123, 193–294; 75: 9–130; 76: 60–87.
- 1915, '17. Neuroptera. Eine historisch-systematische Übersicht. *Ibid.* 76: 3–51; 78: 116–37.
- 1916. Myrmeleonidae. Beiträge zur Kenntnis der Neuropteren-Familie der Myrmeleoniden. *Ibid.* 77: 158–62.
- 1922a. Berothidae. Beiträge zu einer Monographie der Neuropteren-Familie der Berothiden. *Ibid.* 83: 49–88.
- 1922b. Hemerobiidae. Beiträge zu einer Monographie der Neuropteren-Familie der Hemerobiiden. *Ibid.*: 138–72.
- 1923. Sisyridae. Beiträge zu einer Monographie der Neuropteren-Familie der Sisyriden. *Ibid.* 84: 25–66.
- Kuji, M. 1937. *Occurrence of *Climaciella habutsuella* in Amakusa. *Ins. World* 41: 104.
- Kurisaki, M. 1920a. *On the life-history of *Chrysopa cognata* Okamoto. *Ibid.* 24: 115–21.
- 1920b. *On the life-history of *Chrysopa boninensis* Okamoto. *Ibid.*: 189–94.
- 1920c. *On the life-history of *Micromus multipunctata* Mats. *Ibid.*: 261–63.
- Kuroko, H. 1955. *Some observations on *Climaciella magna* Miyake. *Kontyû* 22: 80.
- 1958. *Notes from the Hikosan Biological Laboratory, Kyushu University. *Shin-Konchu* 11 (5): 12–16.
- Kuwana, S. I. 1930. *Insects. *Illus. Encycl. Econ. Anim.*: 460–545. Hokuryukan Co., Tokyo.
- Kuwana, S. I. & T. Murata. 1909. *The green lacewing, *Chrysopa perla* L. *Imp. Cent. Agr. Exp. Sta. Japan, Rep.* 36: 128–35.
- Kuwayama, S. 1920a. *On *Ascalaphus sibiricus* Eversmann. *Ins. World* 24: 82–85.
- 1920b. *On the genus *Drepanopteryx* in Japan. *Zool. Mag.* 32: 85–90.
- 1920c. *Navás' recent contribution on Raphididae and the Japanese species of the family. *Ins. World* 24: 373–77.
- 1921. *Studies on the Dilaridae of Japan. *Sapporo Nat. Hist. Soc., Trans.* 8: 51–83.
- 1924a. *A myrmeleonid hitherto unrecorded from Korea. *Ins. World* 28: 82–88.
- 1924b. *Morphological and ecological studies on the eggs of Chrysopidae. *Zool. Mag.* 36: 1–30.

- Kuwayama, S. 1924c. *Formosan Chrysopidae and notes on the wing venation of the family. Nat. Hist. Soc. Formosa, Trans. **13**: 1-15.
- 1924d. *A contribution to the knowledge of the neuropterous insects of South Saghalien. Sapporo Nat. Hist. Soc., Trans. **9**: 93-140.
- 1925a. Notes on the Japanese Mantispidae, with special reference to the morphological characters. Coll. Agr., Hokkaido Imp. Univ., Jour. **15**: 237-67.
- 1925b. *A contribution to our knowledge of Japanese Mantispidae. Zool. Mag. **37**: 467-78.
- 1927a. Ueber eine neue *Nothochrysa*-Art aus Formosa. Ins. Mats. **1**: 120-22.
- 1927b. On a new species of Psychopsidae from Formosa. *Ibid.*: 123-26.
- 1933. Notes on two species of the family Myrmeleontidae. Imp. Acad., Proc. **9**: 446-49.
- 1936a. Materials for the study of the neuropteroid fauna of the Kurile Islands. I. Ins. Mats. **10**: 107-10.
- 1936b. *The Chrysopidae of the northern Nippon. Zool. Mag. **48**: 811-20.
- 1953a. *A myrmeleontid-species new to Japan. Essa Ent. Ass., Jour. **7**: 39-41.
- 1953b. Insect fauna of Mt. Ishizuchi and Omogo Valley, Iyo, Japan: the Neuroptera. Shikoku Ent. Soc., Trans. **3**: 177-80.
- 1954a. *Notes on the Neuroptera from Ozegahara. Ozegahara: 744-45.
- 1954b. Neuroptera-Planipennia from the Daisetsuzan National Park, Hokkaido, Japan. Ins. Mats. **18**: 94-102.
- 1956a. A new species of Chrysopidae from Japan. *Ibid.* **20**: 21-22.
- 1956b. An annotated list of the Neuroptera-Planipennia from Shikoku, Japan. Shikoku Ent. Soc., Trans. **5**: 19-32.
- 1956c. Further studies on the Neuroptera-Planipennia of the Kurile Islands. Ins. Mats. **20**: 77-82.
- 1956d. **Kimminsia subnebulosa* Stephens, an unrecorded Hemerobiidae from Japan. Kontyû **24**: 101.
- 1957. *Notes on the Neuroptera-Planipennia from Shikoku. Gensei **5** (2): 1-3.
- 1959. On the genera *Myrmeleon* and *Grocus* in Japan and adjacent territories. Kontyû **27**: 66-69.
- 1960. *Corydalidae, Chrysopidae, Mantispidae, Myrmeleontidae and Ascalaphidae of Niigata Prefecture (Neuroptera). Ins. Niigata Pref. **4**: 29-32.
- & H. Okamoto. 1950. *Neuroptera. Icon. Ins. Japon., Ed. Sec.: 385-404. Hokuryukan Co., Tokyo.
- Lacroix, J. L. 1924. Note sur les genres *Chrysocerca*, *Weele* et *Chrysotropia*, Navás (Ins., Planipennes Chrysopides). Assoc. Franç. Avanc. Sci., C. R. **47**: 571-74.
- 1925. Reflexions sur le genre *Cintameva*, Navás (ins. nevr.). *Ibid.* **49**: 436-38.
- Latreille, P. A. 1802. †Histoire naturelle, générale et particulière, des Crustacés et des Insectes. 3. F. Dufart, Paris. 467 pp.
- Leach, W. E. 1815. †Artikel entomology. Brewster, Edinburgh Encyclopaedia **9** (1): 57-172. Edinburgh.

- Lefèbvre, A. 1842. †Le genre *Ascalaphus*. Guérin, Mag. Zool., Ins.: 1-10.
- Lefroy, H. M. 1923. Manual of entomology. Edward Arnold & Co., London. 541 pp.
- Linné, C. von 1758. Systema Naturae. 1. Ed. 10. Laur. Salvii, Holmiae. 824 pp.
- 1761. †Fauna Suecica. Ed. alt. auct. Laur. Salvii, Stockholmiae. 578 pp.
- 1767. Systema Naturae. I (2): 533-1327. Ed. 12. Laur. Salvii, Holmiae.
- MacLachlan, R. 1867. New genera and species, etc. of neuropterous insects; and a revision of Mr. F. Walker's British-Museum catalogue of Neuroptera, part II (1853), as far as the end of the genus *Myrmeleon*. Linn. Soc., Zool., Jour. 9: 230-81.
- 1868. A monograph of the British Neuroptera-Planipennia. Ent. Soc. Lond., Trans. 1868: 145-224.
- 1869a. Considerations on the neuropterous genus *Chauliodes* and its allies; with notes and descriptions. Ann. Mag. Nat. Hist. ser. 4, 4: 35-46.
- 1869b. †New species &c. of Hemerobiina, with synonymic notes. (First series). Ent. Mon. Mag. 6: 21-27.
- 1870a. †New species &c. of Hemerobiina. Second series (Osmyliidae). *Ibid.*: 195-201.
- 1870b. †On the occurrence of the neuropterous genus *Sialis* in Chile. *Ibid.* 7: 145-46.
- 1871. An attempt towards a systematic classification of the family Ascalaphidae. Linn. Soc. Zool., Jour. 11: 219-76.
- 1875. A sketch of our present knowledge of the neuropterous fauna of Japan (excluding Odonata and Trichoptera). Ent. Soc. Lond., Trans. 1875: 167-90.
- 1883a. *Dilar japonicus* n. sp. Ent. Mon. Mag. 19: 220-21.
- 1883b. Neuroptera of the Hawaiian Islands. Part II. Planipennia, with general summary. Ann. Mag. Nat. Hist. ser. 5, 12: 298-303.
- 1884. The distinctive and sexual characters of *Chrysopa flava*, Scopoli, and *Ch. vittata*, Wesmael. Ent. Mon. Mag. 20: 161-63.
- 1886. On some points of variation in *Chrysopa septempunctata*, Wesm. *Ibid.* 23: 36-38.
- 1891. Descriptions of new species of holophthalmous Ascalaphidae. Ent. Soc. Lond., Trans. 1891: 509-15.
- 1893. On species of *Chrysopa* observed in the Eastern Pyrenees; together with descriptions of, and notes on, new or little known Palaeartic forms of the genus. *Ibid.* 1893: 227-34.
- 1899. Notes on certain Palaeartic species of the genus *Hemerobius*. No. 2-*H. marginatus*, *H. lutescens*, *H. humuli*, and *H. orotypus*. Ent. Mon. Mag. 35: 127-33.
- Marumo, N. 1927. *Neuroptera and Megaloptera. Figuraro de Japanaj Bestoj: 712-20. Hokuryukan Co., Tokyo.
- Matsuda, M. 1928. *Observations on *Chrysopa vulgaris* var. *anpingensis*. Nat. Hist. Soc. Formosa, Trans. 18: 97-114.
- 1929a. *Observations on *Chrysopa septempunctata cognata*. Agr. Hort. 4: 317-21.
- 1929b. *Observations on *Chrysopa septempunctata cognata*. Zool. Mag. 41: 49-77.

- Matsumura, S. 1900a. *Japanese entomology. Revised Edition. Shokabo Co., Tokyo. 263 pp.
- 1900b. *On the Japanese Neuroptera. Zool. Mag. 12: 15-17.
- 1904. *Thousand insects of Japan. I. Keiseisha Co., Tokyo. 213 pp.
- 1907. *Systematic entomology. I. *Ibid.* 336 pp.
- 1908. *Catalogue of the beneficial insects of Japan. Rokumeikan Co., Tokyo. 174 pp.
- 1910a. *Injurious and beneficial insects of sugarcane in Formosa. Keiseisha Co., Tokyo. 86 pp.
- 1910b. Die schädlichen und nützlichen Insekten vom Zuckerrohr Formosas. *Ibid.* 52 pp.
- 1910c. Die schädlichen und nützlichen Insekten vom Zuckerrohr Formosas. Zeits. Wiss. Ins.-biol. 6: 101-4, 136-39.
- 1911. Erster Beitrag zur Insekten-Fauna von Sachalin. Coll. Agr., Tohoku Imp. Univ., Jour. 4: 1-144.
- 1917. *Applied entomology. I. Keiseisha Co., Tokyo. 731 pp.
- 1931. *6000 illustrated insects of Japan-Empire. Tokoshoin Co., Tokyo. 1497 pp.
- 1933. *Illustrated common insects of Japan. V. Neuroptera, Orthoptera, Odonata. Shunyodo Co., Tokyo. 67 (100) pp.
- Mitsuhashi, S. 1936. *Insects of Nikko. Plants and Animals of Nikko: 355-476.
- Miyake, T. 1910. The Mantispidae of Japan. Coll. Agr., Imp. Univ. Tokyo, Jour. 2: 213-21.
- 1911. *Review and criticism on "The Mantispidae of Japan" by Mr. Okamoto. Zool. Mag. 23: 17-19.
- Mjöberg, E. 1909. Über *Psectra diptera* Burm. Ark. Zool. 6 (5): 1-15.
- Morton, K. J. 1901. †Notes on certain Palaearctic species of the genus *Hemerobius*: *H. concinnus*, and its var. *quadrifasciatus*. Ent. Mon. Mag. 37: 163-65.
- Nakahara, W. 1912a. *On the Japanese Mantispidae. Ins. World 16: 12-15, 51.
- 1912b. *On the scientific name of *Eumantissa sasaki* and its synonymy. Zool. Mag. 24: 332-36.
- 1912c. *Studies on the Mantispidae of Japan. *Ibid.*: 558-66.
- 1913a. *On the scientific name of *Sialis*. Ins. World 17: 52-56.
- 1913b. *A list of the Japanese Myrmeleontidae and the distribution of Mantispidae in Japan. *Ibid.*: 94-99.
- 1913c. *On the distribution of insects. *Ibid.*: 361-63.
- 1913d. *Studies on the Japanese Coniopterygidae. Zool. Mag. 25: 195-201.
- 1913e. **Mantissa* and *Mantispilla*. *Ibid.*: 351-52.
- 1913f. *On the Japanese Myrmeleontidae. *Ibid.*: 527-28.
- 1913g. *On the family Myrmeleontidae. *Ibid.*: 619-20.
- 1913h. *On the family Mantispidae. *Ibid.*: 620-21.
- 1913i. *Scientific name of Osmylidae referred to in the Japanese literatures. *Ibid.*: 625-26.
- 1913j. A revision of the Mantispidae of Japan. Zool. Jap., Ann. 8: 229-37.
- 1913k. On three new species of Myrmeleontidae from Japan and Formosa (Neur. Planip.). Ent. News 24: 297-301.

- Nakahara, W. 1914a. *Uncommon Neuroptera. *Ins. World* **18**: 59-62.
- 1914b. *On the Megaloptera. *Ibid.*: 271-74.
- 1914c. *On the genus *Sialis* of Japan. *Ibid.*: 314-21.
- 1914d. *On the Japanese Chrysopidae. *Ibid.*: 397-401.
- 1914e. *Two species of Coniopterygidae. *Zool. Mag.* **26**: 457.
- 1914f. *Neuroptera collected in Nikko. *Ibid.*: 492-93.
- 1914g. A new *Dilar* species from Japan (Neur. Plan.). *Ent. News* **25**: 297-98.
- 1914h. On the Osmylinae of Japan. *Zool. Jap., Ann.* **8**: 489-518.
- 1915a. *Answer to the opinion of Mr. H. Okamoto. *Ins. World* **19**: 62-65.
- 1915b. *On *Chrysopa vittata* Wesm. *Ibid.*: 107-10.
- 1915c. *On the family Hemerobiidae. *Ibid.*: 271-73.
- 1915d. *Neuropterous insects of Shinshu, collected by Mr. Mitsushige Chino. *Zool. Mag.* **27**: 333-36.
- 1915e. *Catalogus Hemerobidarum Japonicum. *Ent. Mag.* **1**: 97-102.
- 1915f. On the Hemerobiinae of Japan. *Zool. Jap., Ann.* **9**: 11-48.
- 1915g. Three new species of Japanese orl flies (Neur., Megal.). *Ent. News* **26**: 157-60.
- 1915h. A synonymic list of Japanese Chrysopidae, with descriptions of one new genus and three new species. *Ent. Soc. Amer., Ann.* **8**: 117-22.
- 1919. *Revisional notes on the Japanese Hemerobiidae. *Ins. World* **23**: 135-37.
- 1920. *A revision of the Japanese Sisyridae and Berothidae. *Ibid.* **24**: 162-64.
- 1954. Early stages of some Japanese Hemerobiidae including two new species. *Kontyû* **21**: 41-46.
- 1955a. Formosan Neuroptera collected by the Late Dr. T. Kano. *Ibid.* **23**: 6-12.
- 1955b. Description of *Neolysmus ogatai* gen. et sp. nov., with remarks on the genus *Lysmus* Navás (Neuroptera: Osmylidae). *Ibid.*: 13-15.
- 1955c. The Dilaridae of Japan and Formosa (Neuroptera). *Ibid.*: 133-42.
- 1955d. New Chrysopidae from Formosa. *Ibid.*: 143-47.
- 1956. New or little known Hemerobiidae from Japan and adjacent territories (Neuroptera). *Ibid.* **24**: 182-91.
- 1958. The Neurorthinae, a new subfamily of the Sisyridae. *Mushi* **32**: 19-32.
- 1960. *Hemerobiidae, Sisyridae, Berothidae and Osmylidae of Niigata Prefecture, Japan, collected by Dr. Kintaro Baba. *Ins. Niigata Pref.* **4**: 33-34.
- Navás, L. 1905. †Notas Zoológicas. VII. Insectos orientales nuevos ó poco Conocidos. *Soc. Aragon. Cien. Nat., Bol.* **4**: 49-55.
- 1909a. Hémérobides nouveaux du Japon (Neuroptera). *Rev. Russe d'Ent.* **9**: 395-98.
- 1909b. Mantispidos nuevos. *R. Acad. Cien. Art. Barcel., Mem.* **7**: 473-85.
- 1909c. Monografía de la familia de los Dilaridos. (Ins. Neur.). *Ibid.*: 619-71.
- 1909d. †Deux Hémérobides nouveaux. *Soc. Sci. Ent. Brux., Ann.* **33**: 213-

20.

- Navás, L. 1909e. †Les Raphidides du Musée de Paris. Soc. Sci. Brux., Ann., Sec. 3, **1909**: 143-47.
- 1909f. †Neurópteros de los alrededores de Madrid. Suplemento 1. R. Acad. Cien. Exact. Fis. Nat. Madrid, Rev. **7**: 370-80.
- 1910a. Osmylides exotiques (insectes névroptères) nouveaux. Soc. Sci. Brux., Ann. **1910**: 188-95.
- 1910b. Névroptères nouveaux de l'Orient. Rev. Russe d'Ent. **10**: 190-94.
- 1910c. Crisópidos nuevos. Brotéria, Ser. Zool. **9**: 38-59.
- 1910d. Hémérobides nouveaux du Japon (Neuroptera). Rev. Russe d'Ent. **9**: 395-98.
- 1911a. Névroptères nouveaux de l'extrême Orient. *Ibid.* **11**: 111-17.
- 1911b. †Nouvelles formes de Chrysopides (Ins. Névr.) de France. Ass. Nat. Lev. Perret, Ann. **17**: 12-14.
- 1911c. †Notes sur quelques Névroptères. Insecta Rennes **1**: 239-46, 264-66.
- 1912a. Crisópidos y Hemeróbidos (Ins. Neur.) nuevos ó Criticos. Brotéria, Ser. Zool. **10**: 98-113.
- 1912b. Myrméleonides nouveaux de l'extrême Orient (Neuroptera). Rev. Russe d'Ent. **12**: 110-14.
- 1912c. Quelques Névroptères de la Sibérie méridionale-orientale. *Ibid.*: 414-22.
- 1912d. †Insectos Neurópteros nuevos ó poco Conocidos. R. Acad. Cien. Art. Barcel., Mem., ser. 3, **10** (9): 1-70.
- 1912e. †Notas sobre Mirmeleonidos (Ins. Neuroptera). Brotéria, ser. Zool. **10**: 29-75, 85-97.
- 1913a. Algunos Órganos de las Alas de los Insectos. 2nd. Int. Cong. Ent., Trans. **2**: 178-86.
- 1913b. †Névroptères du Japon recueillès par M. Edme Gallois. Mus. Hist. Nat., Bull. **7**: 441.
- 1913c. Neuroptera asiatica. 1 serie. Rev. Russe. d'Ent. **13**: 271-84.
- 1913d. †Notas entomologicas. Soc. Aragon. Cien. Nat., Bol. **12**: 61-69, 75-91, 98-101, 122.
- 1914a. Neuroptera. Fam. Dilaridae. Gen. Ins. **156**: 1-14.
- 1914b. Quelques Névroptères recueillès par le Dr. Malcolm Burr en Transcaucasie. Rev. Russe d'Ent. **14**: 211-16.
- 1915a. Neue Neuropteren. Zweite Serie. Ent. Mitt. **4**: 194-202.
- 1915b. Crisòpids d'Europa (Ins. Neur.). Inst. Cien., Barcel., Arx. **3** (2): 1-99.
- 1915c. †Neurópteros nuevos ó poco Conocidos. Cuarta & Quinta Ser. R. Acad. Cien. Art. Barcel., Mem. **11** (23), (27).
- 1915d. †Neurópteros nuevos ó poco Conocidos. Sexta Ser. *Ibid.* **12** (7): 1-20.
- 1916. Neurópteros nuevos ó poco Conocidos. Séptima Ser. *Ibid.* **12**: 219-43.
- 1917. Notes sobre la familie de los Osmilidos (Ins. Neur.). Mus. Barcel. Sci. Nat. Opera, Ser. Zool. **11**: 5-22.

- Navás, L. 1918. Monografía de l'ordre dels Rafidiòpters (Ins.). Inst. Cien., Barcel., Publ. : 1-93.
- 1920. Neurópteros (Ins.) del Japon. Acad. Cien. Exact. Fis. Nat. Madrid, Rev. **18**: 157-64.
- 1922. Insectos exóticos. Brotéria, Ser. Zool. **20**: 49-63.
- 1923a. Estudi sobre Neurópters (Insectes). Inst. Cien., Barcel., Arx. **7**: 179-203.
- 1923b. Algunos insectos del Museo de Paris. Acad. Cien. Zaragoza, Rev. **7**: 15-51.
- 1923c. Insecta nova. IX Series. Pont. Accad. Rom. Nuovi Lincei, Mem., ser. 2, **6**: 9-18.
- 1923d. Insecta orientalia. I Series. *Ibid.*: 29-41.
- 1924a. Insecta orientalia. II Series. *Ibid.* **7**: 211-16.
- 1924b. Insecta orientalia. III Series. *Ibid.*: 217-28.
- 1925a. Entomologische Ergebnisse der schwedischen Kamtchatka-Expedition 1920-1922. 6. Neuroptera et Mecoptera. Ark. Zool. **18** (B, 2): 1-4.
- 1925b. Neurópteros del Museo de Berlin. Acad. Cien. Zaragoza, Rev. **9**: 20-34.
- 1925c. Insectos exóticos nuevos ó poco Conocidos. R. Acad. Cien. Art. Barcel., Mem. **19**: 181-200.
- 1926. Insecta orientalia. IV Series. Pont. Accad. Sci., Nuovi Lincei, Mem. **9**: 111-20.
- 1927. Névroptères de la Chine. Ark. Zool. **19** (A, 18): 1-5.
- 1928a. Insectos del Museo de Hamburgo. Soc. Ent. Esp., Bol. **1928**: 59-138.
- 1928b. Insectos del Museo de Estocolmo. R. Acad. Cien. Exact. Fis. Nat. Madrid, Rev. **24**: 1-12.
- 1929. Monografía de la familia de los Berótidos (Insectos Neurópteros). Acad. Cien. Exact. Fis.-Quím. Nat. Zaragoza, Mem. **2**: 1-106.
- 1930. Insecta orientalia. VIII Series. Pont. Accad. Sci., Nuovi Lincei, Mem., ser. 2, **14**: 419-34.
- 1935. Monografía de la familia de los Sisiridos (Insectos Neurópteros). Acad. Cien. Exact. Fis.-Quím. Nat. Zaragoza, Mem. **4**: 5-86.
- Nawa, T. 1905. *First Survey on the insect-fauna of Gifu Prefecture. Ins. World **9**: 444-49, 494-99.
- Nawa, U. 1939. *Record on *Chrysopa japana*. *Ibid.* **43**: 270-71.
- Needham, J. G. 1905. †Systematic notes on Hemerobiidae. N. Y. State Mus., Bull. **86**: 15-17.
- 1909. Notes on the Neuroptera in the collection of the Indian Museum. Ind. Mus., Rec. **3**: 185-210.
- and C. Betten. 1901. Aquatic insects in the Adirondacks. N. Y. State Mus., Bull. **47**: 383-612.
- Okamoto, H. 1905. *Neuropterous insects of Hokkaido. Sapporo Nat. Hist. Soc., Trans. **1**: 111-17.
- 1909. *On the Japanese Ascalaphidae. Zool. Mag. **21**: 499-508.
- 1910a. Die Ascalaphiden Japans. Wien. Ent. Ztg. **29**: 57-63.
- 1910b. Die Sialiden Japans. *Ibid.*: 255-63.

- Okamoto, H. 1910c. Die Myrmeleoniden Japans. *Ibid.*: 275-300.
- 1910d. *The Mantispidae of Japan. *Zool. Mag.* **22**: 533-44.
- 1911. Beitrag zur Mantispiden-Fauna Japans. *Zool. Anz.* **37**: 293-302.
- 1912. Ein neue Chrysopiden-art Japans. *Sapporo Nat. Hist. Soc., Trans.* **4**: 13-14.
- 1913. *Ueber die bekannten Arten der japanischen Chrysopiden. *Ibid.* **5**: 49-60.
- 1914a. Zwei neue Arten der japanischen Osmyliden (Megal.). *Ent. Mitt.* **3**: 23-25.
- 1914b. *Verzeichnis der japanischen Myrmeleoniden. *Zool. Mag.* **26**: 249-50.
- 1914c. Ueber die Chrysopiden-fauna Japans. *Coll. Agr., Tohoku Imp. Univ., Jour.* **6**: 51-74.
- 1914d. *On *Chrysopa sachalinensis* Mats. and *Ch. nikkoensis* Okam. *Ins. World* **18**: 488-89.
- 1917. *Studies on the Japanese Raphididae. *Collect. Essays for Mr. Y. Nawa, written in Comm. 60th Birth.*: 143-62.
- 1919a. *Studies on the Japanese Chrysopidae. *Hokkaido Agr. Exp. Sta., Rep.* **9**: 1-76.
- 1919b. Die synonymische Liste der japanischen Chrysopiden mit der Beschreibung der neuen Arten. *Ent. Mag.* **4**: 1-10.
- 1924. The insect-fauna of Quelpart Island (Saishiu-to). *Gov.-Gen. Chosen, Agr. Exp. Sta., Bull.* **1**: 47-233.
- 1926. Some Myrmeleonidae and Ascalaphidae from Corea. *Ins. Mats.* **1**: 18-22.
- & S. Kuwayama. 1920. **Lidar formosanus* sp. nov., the first species to the extreme Oriental fauna of the genus. *Zool. Mag.* **32**: 341-45.
- & —————. 1932. *Neuroptera. *Icon. Ins. Japon., Ed. Prim.*: 1524-55. Hokuryukan Co., Tokyo.
- Okazaki, T. 1918. *Illustrations of common neuropteroid insects. *Matsumura-Sanshodo Co., Tokyo.* 100 pp.
- Otsuka, S. 1938. *Insect fauna of Midagahara, Mt. Tateyama. *Ent. World* **6**: 545-51.
- Packard, A. S. 1869. *Guide to the study of insects.* (Ninth edition: 1889) *Henry Holt & Co., New York.* 715 pp.
- 1883. On the classification of the orders of Orthoptera and Neuroptera. *Ann. Mag. Nat. Hist. ser. 5,* **12**: 145-53.
- Parfin, S. 1956. Taxonomic notes on *Kimminsia*. (Neuroptera; Hemerobiidae). *Ent. Soc. Wash., Proc.* **58**: 203-9.
- & A. B. Gurney. 1956. The spongilla-flies, with special reference to those of the Western Hemisphere (Sisyridae, Neuroptera). *U. S. Nat. Mus., Proc.* **105**: 421-529.
- Pongrácz, S. 1912. Magyarország Chrysopai, Alak-és Rendszertani Tekintetben. *Állattani Közlemények* **12**: 161-261.
- Principi, M. M. 1947. Contributi allo studio dei "Neurotteri" Italiani. V. Ricerche su *Chrysopa formosa* Brauer e su Alcuni suoi Parassiti. *Istit. Ent., Univ. Bologna, Bol.* **16**: 134-75.

- Principi, M. M. 1949. Contributi allo studio dei Neurotteri Italiani. VIII. Morfologia, anatomia e funzionamento degli apparati genitali nel gen. *Chrysopa* Leach (*Chrysopa septempunctata* Wesm. e *C. formosa* Brauer). *Ibid.* 17: 316-62.
- 1956. Contributi allo studio dei Neurotteri Italiani. XIII. Studio morfologico, etologico e sistematico di un gruppo omogeneo di specie del gen. *Chrysopa* Leach (*C. flavifrons* Brauer, *prasina* Burm. e *clathrata* Schn.). *Ibid.* 21: 319-410.
- Rambur, M. P. 1842. Histoire naturelle des Insectes. Névroptères. Roret, Paris. 534 pp.
- Reuter, O. M. 1894. †Neuroptera Fennica. Förteckning och Beskrifning öfer Finlands Neuropterer. Soc. pro Fauna et Flora Fennica, Acta 9 (8): 1-36.
- Ross, H. H. 1937. Studies of Nearctic aquatic insects. I. Nearctic alder flies of the genus *Sialis* (Megaloptera, Sialidae). III. Nat. Hist. Surv., Bull. 21: 57-78.
- Rostock, M. 1888. Neuroptera germanica. Ver. Naturk. Zwickau, Jahresb. 1887: 7-198.
- Sasaki, C. 1915. *Stories on "Magotaro-mushi". Orient. Sci., Mag. 32: 74-77.
- Sawada, H. 1933. **Epacanthaclisis moiwasanus* occurs at Mt. Odaigahara. Ent. World 1: 660.
- Schneider, G. T. 1843. Monographia generis Rhapsidiæ Linnaei. Typis Officinæ Grassii, Barthii et Socii, Vratislaviæ. 96 pp.
- 1851. Symbolæ ad Monographiam Generis Chrysopæ, Leach. Apud Ferdinandum Hirt, Vratislaviæ. 178 pp.
- Schrank, F. von P. 1802. †Fauna Boica. 2 (2). Nürnberg, Ingolstadt, Landshut. 412 pp.
- Selys-Longchamps, E. & R. MacLachlan. 1872. †Matériaux pour servir à une faune névroptérologique de l'Asie septentrionale. II. Non Odonates. Soc. Ent. Belg., Ann. 15: 47-77.
- Sharp, D. 1910. Insects. I. MacMillan & Co., London. 504 pp.
- Shinji, O. 1928. *Lectures on entomology. II. Yokendo Co., Tokyo. 381 pp.
- Shiraki, T. 1954. *Classification of insects. Hokuryukan Co., Tokyo. 961 pp.
- Sonan, J. 1938. *On the life-history of *Hybris subjacens* Walker (Neuroptera, Ascalaphidae). Nat. Hist. Soc. Formosa, Trans. 28: 272-74.
- Stephens, J. F. 1836. †Illustrations of British entomology. Mandibulata. 6. Baldwin & Cradock, London. 240 pp.
- Stitz, H. 1913. Mantispiden der Sammlung des Berliner Museums. Zool. Mus. Berlin, Mitt. 7: 1-49.
- 1914. Sialiden der Sammlung des Berliner Museums. Ges. naturf. Freunde Berlin, Sitzungsber. 1914: 191-205.
- 1927. Ordnung: Netzflügler, Neuroptera. Tierwelt Mitteleur. 6: 1-24.
- Takagi, G. 1932. *On the feeding habits of the adult of *Chrysopa cognata* (Preliminary Report). Zool. Mag. 44: 477-79.
- Takahashi, N. 1935. *Insect fauna of the lower reaches area of the Yoshino River, Shikoku. (II). Ent. World 3: 485-91.
- Takahashi, R. 1942. *Uncommon neuropterous larva. Zool. Mag. 54: 439-41.
- Takano, H. & M. Yanagihara. 1939. *Injurious and beneficial insects of sugar-cane in Formosa. Sugar-cane Planters' Ass., Formosa. 311 pp.
- Takeuchi, K. 1955. *Coloured illustrations of the insects of Japan. II. Hoikusha Co., Osaka. 190 pp.
- Takeya, N. & Y. Hirashima. 1953. *On the insects of Yakushima Island. Shin-Konchu 6 (3): 20-23.

- Tanaka, C. 1939. *A List of Insects from the valley of the Kurobe. (5) Trichoptera, etc. (6) Supplement. Ent. World 7: 524-30, 639-47.
- Thunberg, C. P. 1781. †Dissertatio Entomologica novae insectorum species sistens. 1. Upsala.
- Tillyard, R. J. 1916. †Studies in Australian Neuroptera. ii. Descriptions of new genera and species of the families Osmylidae, Myrmeleontidae and Ascalaphidae. Linn. Soc. N. S. Wales, Proc. 41: 41-70.
- 1918. Studies in Australian Neuroptera. No. 5. The structure of the cubitus in the wings of the Myrmeleontidae. *Ibid.* 43: 116-22.
- 1926. The insects of Australia and New Zealand. Angus & Robertson, Sydney. 560 pp.
- Tjeder, Bo. 1936a. Studies on *Psectra diptera* Burm. (Neuroptera, Hemerobiidae). Not. Ent. 16: 97-101.
- 1936b. Schwedisch-Chinesische wissenschaftliche Expedition nach den nord-westlichen Provinzen Chinas unter Leitung von Dr. Sven Hedin und Prof. Sü Ping-Chang. Insekten gesammelt vom schwedischen Arzt der Expedition Dr. David Hummel 1927-1930. 62. Neuroptera. Ark. Zool. 29 (A, 8): 1-36.
- 1937. Geographical and synonymical notes on some Raphididae and Sialidae. Opus. Ent. 3: 118-24.
- 1941a. A new species of Myrmeleontidae from Scandinavia. Preliminary description. *Ibid.* 6: 73-74.
- 1941b. Some remarks on "The generic names of the British Neuroptera". Ent. Tidsk. 1941: 24-31.
- 1944. Norwegian Neuroptera and Mecoptera in the Bergen Museum, with a note on *Forcipomyia eques* Joh. (Dipt. Ceratopogonidae). Berg. Mus. Årbok, 1944, Nat. rekke 1: 1-12.
- 1954a. *Myrmeleon formicarius* s. l. in the Helsingfors Museum. Not. Ent. 34: 59-60.
- 1954b. Genital structure and terminology in the order Neuroptera. Ent. Medd. 27: 23-40.
- 1957a. Neuroptera-Planipennia. The lace-wings of Southern Africa. 1. Introduction and families Coniopterygidae, Sisyridae, and Osmylidae. S. Afr. Anim. Life 4: 95-188.
- 1957b. Neuroptera from the Cape Verde Island. 1. Fam. Coniopterygidae. Soc. Sci. Fenn., Com. Biol. 16 (8): 1-11.
- 1959. Neuroptera-Planipennia. The lace-wings of Southern Africa. 2. Family Berothidae. S. Afr. Anim. Life 6: 256-314.
- Tosawa, N. 1932. *List of insects of Minoo Park, Osaka, Japan. Author's publ., Osaka. 114 pp.
- Tsuda, M. 1944. *On two species of larvae belonging to Corydalinae. Nat. Sci. & Mus. 15: 87-89.
- Tullgren, A. 1906. Zur Kenntnis schwedischer Coniopterygiden. Ark. Zool. 3 (5): 1-15.
- Uchida, H. 1934. *A list of insects collected in the Oze District. Kontyû 8: 237-41.
- Ue, T. 1923. *On a species of Chrysopidae from Kyushu. Mon. Com. Ins. Mag. 1 (3): 24-25.
- Ueda, Y. 1935. *On the life-history and food of *Chrysopa septempunctata cognata* Mac-

- Lachlan. *Ins. World* **39**: 45-49, 90-95.
- Ueno, M. 1929. *The larva of *Sisyra* living on fresh-water sponge. *Zool. Mag.* **41**: 139-41.
- 1959. *Neuropterous larvae. *Illus. Ins. Larv. Jap.*: 121-22. Hokuryukan Co., Tokyo.
- Umawatari, T. 1925. *Supplementary notes on the insects from Saga Prefecture. *Ins. World* **29**: 10-11.
- Uyemura, T. 1938. *Insects from Awaji Island and Naruto Park. *Ent. World* **6**: 159-63.
- van der Weele, H. W. 1907. Notizen ueber Sialiden und Beschreibung einiger neuen Arten. *Leyden Mus., Notes* **28**: 227-64.
- 1908. *Ascalaphiden: Monographisch Bearbeitet.* *Coll. Zool. Edm. Selys Longc.* **8**: 1-326.
- 1909a. New genera and species of Megaloptera Latr. *Leyden Mus., Notes* **30**: 249-64.
- 1909b. Mecoptera and Planipennia of Insulinde. *Ibid.* **31**: 1-100.
- 1910. Megaloptera (Latreille). Monographic revision. *Coll. Zool. Edm. Selys Longc.* **5** (1): 1-93.
- Walker, F. 1853. †Sialides-Nemopterides. Catalogue of the specimens of neuropterous insects in the collection of the British Museum. **2**: 193-476. By order of the Trustees, London.
- Wallengren, H. D. J. 1871. Skandinaviens Neuroptera. *Neuroptera-Planipennia.* *Kongl. Svensk. Vetens.-Akad. Handl.* **9** (8): 3-76.
- Wesmael, M. 1836. Description d'un nouveau genre Névroptères, famille des Planipennes, tribu des Hémérobis. *Acad. Roy. Brux., Bull.* **3**: 166-68.
- 1841. Notice sur les Hémérobides de Belgique. *Ibid.* **8**: 203-21.
- Westwood, J. O. 1848. †The cabinet of oriental Entomology. Smith, London. 88 pp.
- 1852. †On the genus *Mantispa* with description of various new species. *Ent. Soc. Lond., Trans. n. s.* **1**: 252-70.
- Withycombe, C. L. 1925a. Some aspects of the biology and morphology of the Neuroptera, with special reference to the immature stages and their possible phylogenetic significance. *Ibid.* **1924**: 303-411.
- 1925b. A contribution towards a monograph of the Indian Coniopterygidae (Neuroptera). *Dept. Agr. India, Ent. Ser., Mem.* **9**: 1-22.
- Yamakoshi, H. 1936. *Insects of the Amakusa Island. *Ent. World* **4**: 157-69.
- Yamamoto, T. 1938. *Hatching of *Ascalaphus ramburi*. *Ibid.* **6**: pl. 263.
- Yasumatsu, K. 1937. *Two species of Hemerobiidae unrecorded from Kyushu. *Mushi* **9**: 144.
- 1945. *Antlions and lacewings. *Insects* **2**: 205-34. Kenkyusha Co., Tokyo.
- Yazaki, M. 1927. On two new species of Mantispidae from Japan. *Tohoku Imp. Univ., Sci. Rep.*, 4th ser. **2**: 361-66.
- Yoshida, K. 1917. *Studies on *Vedalia*-ladybird and *Icerya*-scales. *Dis. & Ins.-pests, Res. Bull.* **3**: 1-107.
- Zimmerman, E. C. 1957. Insects of Hawaii. VI. Ephemeroptera-Neuroptera-Trichoptera and supplement to volumes 1-5. Univ. Hawaii Press, Honolulu. 209 pp.

POSTSCRIPT

After the completion of the manuscript, 3 important papers regarding Japanese Neuroptera were published. Two are the papers of Dr. W. Nakahara entitled "Systematic studies on the Hemerobiidae (Neuroptera)" [Mushi, 1960: 34 (1)] and "A new species of the Mantispidae from Japan" [*Ibid.*, 1961: 35 (7)]. He recognized the following 36 species as occurring in Japan.

Hemerobiidae

Notiobiellinae Nakahara (n. subfam.)

Notiobiella subolivacea Nakahara

Hemerobiinae Westwood

Psectra galloisi (Navás)

Symphorobius tessellatus Naka.

S. domesticus Naka.

S. dilutus Naka.*

Eumicromus numerosus (Navás)

E. sauteri (Esben-Petersen)

Micromus variegatus (Fabricius)

M. multipunctatus Matsumura

Spilomicromus maculatipes (Naka.) (n. gen.)

Pseudomicromus angulatus (Stephens)

Paramicromus dissimilis (Naka.)

Hemerobius humulinus Linné

H. japonicus Naka.

H. fujimotoi Naka.*

H. nigricornis Naka.

H. griseus Naka.

H. atrifrons MacLachlan

H. tateyamai Naka.*

H. striatus Naka.

H. radialis Naka.

H. kobayashii Naka.

H. shibakawae Naka.

H. harmandinus Navás

H. subfalcatus Naka.*

Brauerobius marginatus (Stephens)

B. tristriatus (Kuwayama)

Kimminsia lateralis (Navás)

K. cinerea Naka.*

Wesmaelius quadrifasciatus (Reuter)

Drepanopteryx phalaenoides (Linné)

D. punctatus (Matsumura)

D. fuscatus Naka.*

Neuronema albstigma (Matsumura)

N. kuwayamai Naka.*

Mantispidae

Cercomantispa shirozui Naka*.

Of these, 8 new species (astrisked) and *Hemerobius atrifrons* are not treated in my paper. While Nakahara does not recognize *Eumicromus paganus* and *Kimminsia ogatai*, both were recognized by him in other papers and also by me. His classification based on male genitalic characters differs considerably from my treatment. I will treat this matter in a separate discussion sometime in the future.

The other is Dr. Bo Tjeder's "Neuroptera from Newfoundland, Miquelon, and Labrador" [Opusc. Ent., 1960, 25 (1/2)]. Dr. Tjeder recorded the following species as being present in Japan:

Hemerobius humuli Linné

H. stigma Stephens

Micromus angulatus St.

Chrysopa carnea St.

Of these species I have not touched on *H. stigma*.

 RECENT LITERATURE ON PACIFIC INSECTS

LEPIDOPTERA

(Continued from page 324)

- Yang, V. L., G. F. Yao, T. W. Chang & Z. Wan. 1959. Studies on *Parnara guttata* Bremer et Grey. I. Testing the number of generations of *Parnara guttata* B. et G. by the method of "thermal sums." Acta Ent. Sin. 9 (2): 137-48 (English summary).
- Yano, K. 1960. A revision of the species of the genus *Zenodoxus* Grote et Robinson from Japan, with descriptions of two new species from Formosa (Lepidoptera, Aegeriidae). Kontyû 28 (4): 230-38, 4 figs.
- 1961. A new genus of Pterophoridae from Japan (Lepidoptera). Mushi 35 (12): 87-90, 2 figs.
- 1961. On the species of the genus *Nippoptilia* Matsumura from Japan, with description of a new species (Lepidoptera, Pterophoridae). Ent. Lab., Univ. Osaka Pref., Pub. 6: 71-78.
- 1961. Studies on six species of the genera *Paranthrene* Hübner and *Conopia* Hübner from Japan (Lepidoptera, Aegeriidae). Fac. Agric., Kyushu Univ., Jour. 11 (3): 209-36, 11 pls.
- Yasuda, T. 1961. Some important species of the genus *Archips* Hübner (1822) from Japan, with descriptions of four new species (Lepidoptera: Tortricidae). Ent. Lab., Univ. Osaka Pref., Pub. 6: 57-69.
- Zagulyaev, A. K. & Din-si Liao. 1959. A new genus and species of predacious moth, *Lacciferophaga yunnanica* Zagulajev, gen. et sp. n. (Lepidoptera, Momphidae) attacking the lac insect (*Laccifer lacca* (Kerr)) in southern China. Acta Ent. Sin. 9 (4): 306-15, 5 figs. (in Chinese and Russian).