

fecundity, cannibalistic action on pupae, and the speed of development of their offspring.

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MORTONAGRION HIROSEI, THE LAST NEW DRAGONFLY SPECIES FROM JAPAN ?

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Synopsis. A newly found damselfly from the mainland of Japan is described, being compared with the congeners in the world. Brief notes of its peculiar habitat, distribution and larval form

are given.

It was quite astonishing to find an entirely unknown dragonfly species from Japan. This was taken by Messrs. M. Hirose and T. Kosuge in 1971 from a seaside lagoon, Hinuma near Mito, Ibaraki Prefecture, only 100 km northeast of Tokyo. It was also quite unexpected to hear that the same species was independently discovered by Mr. J. Goto almost at the same time from Miyagi Prefecture at two habitats near Iwanuma about 200 km north of Mito.

Through the kind guidance of the discoverers, Dr. Eda and I were fortunate enough to visit the two separated localities on July 17 and August 4, respectively, and to obtain sufficient material for description. A description of the adult damselfly as well as that of the immature stage will be given hereafter. The specific name is dedicated to one of the discoverers, Mr. Makoto Hirose, who has paid continual attention more than twenty



Fig. 1. *Mortonagrion hirosei*, ♂ × 5.

years to the dragonfly fauna of Ibaraki Prefecture.

Mortonagrion Hirosei sp. nov. [Japanese name: Hinuma-ito-tombo]

♂ ad.: Abdomen 23–24 mm, hindwing 13–14 mm. Ground colour pale greenish blue with predominant black markings on the dorsum (Fig. 1).

Head black, labium whitish, anterior half of labrum, base of mandible, genal portion and ante- and postclypeus greenish blue; two pairs of post-ocular spots greenish, occiput entirely black, only the lower marginal area of postocciput, on the back of head, pale yellowish.

Prothorax black dorsally, the anterior lobe and lateral sides of tergite pale bluish, the posterior lobe differentiated into three lobes of which the median one extended as that of a male *Ischnura elegans* with the tip palely edged (Fig. 2).

Pterothorax black frontally, with two conspicuous pairs of pale spots which are rather shifted to the middorsal carina, *i.e.*, these spots are not the separated vestiges of antehumeral stripes. Sides entirely pale bluish green, a spot near the top of second lateral suture black, there are in aged individuals dark tints on the metinfraepisternum; ventral side of pterothorax pale whitish.

Legs dull whitish, dorsal side of femora dark striped, tibiae and tarsi palely browned, spines black.

Wings hyaline, veins and pterostigma pale brown, arcus well beyond the level of the second antenodals. Eight postnodals present in the forewing, six in the hind; ptero-

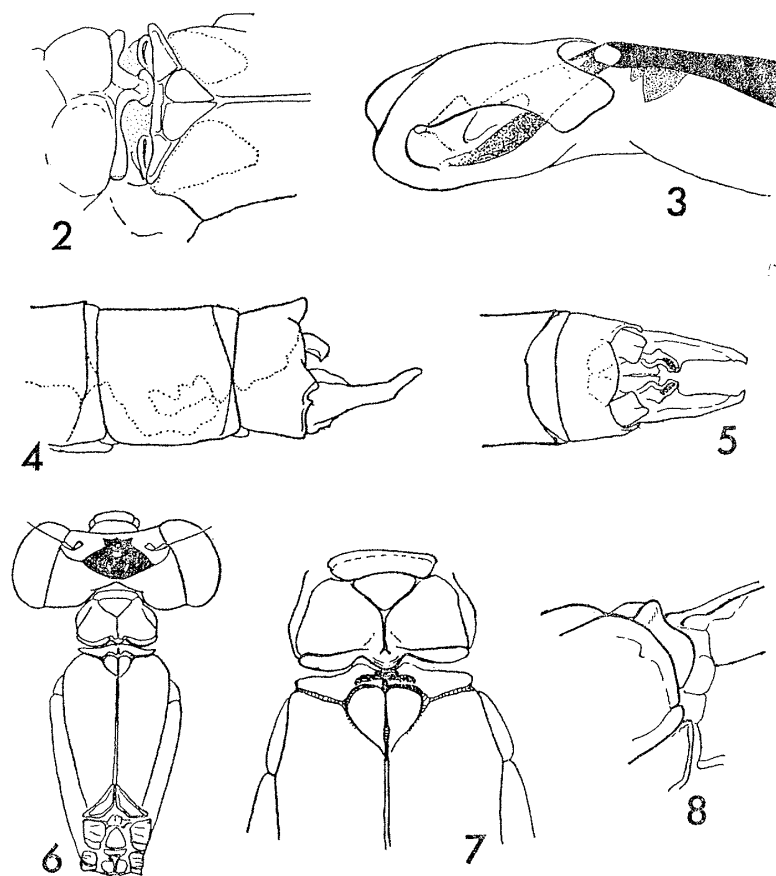


Fig. 2. *Mortonagrion Hirosei*, ♂ Prothorax and mesostigmal plates, dorsal. Fig. 3. ♂ Penile organ. Figs. 4, 5. ♂ Caudal appendages. Fig. 6. ♀ Head and thorax. Fig. 7. ♀ Prothorax and mesostigmal plates, dorsal. Fig. 8. ♀ The same, oblique left view.

stigma in the forewing distinctly smaller than that of the hindwing.

Abdomen long and slender, dorsal side darkened, paler on 3-6, darker on 1 and 2, and 7-10; the end-ring and the sides of 1 bluish, extreme base and sides of 2 pale bluish leaving a black wineglass-shaped marking on the dorsum; extreme base of 3-7 pale, basal 1/6 of 8 greenish, otherwise the dorsum of 7-10 entirely black excepting fine pale end-rings on 8 and 9; sides of each abdominal segment dull yellowish, but much darkened on 9. The paired middorsal end-processes of the last abdominal segment somewhat produced but not elevated.

Caudal appendages (Fig. 4, 5) pale brownish, the superiors are very short, only half the length of 10, apices turned ventrally; the inferiors are long and very conspicuous, with a length of about 1.5 times of the 10th segment, the apices abruptly tapered ending in a small hook directed inwards.

Penile organs are not of elaborated structure, with simply divided terminal lobes (Fig. 3).

♀ juv.: Abdomen 24-25 mm, hindwing 15-16 mm. Ground colour dull orange yellow with the dorsum of abdomen darkened.

Ground colour of the head pale orange with isolated rather rhombic black marking on the postfrons (fig. 6), labium pale brownish, labrum pale orange narrowly darkened on the basal margin, anteclypeus whitish, the black of the postfrons covers three ocelli, the front-occipital suture very finely black.

Prothorax entirely orange, the posterior lobe is divided into three lobes of which the median one prominent but not produced as that of the male. Pterothorax entirely orange coloured, the mesostigmal plates and the mesothoracic acrotergite are illustrated in Fig. 7 and 8. Top of middorsal carina and the margin of humeral plate darkened.

Legs pale yellowish, only the spines, excepting the protibial combs, black.

Abdomen entirely dull orange, the entire dorsal side very palely enfumed with brown. This brown changes darker with age particularly on distal segments.

♀ ad.: The ground colour of the body changes into dull greenish brown as the cases of some other *Mortonagrion* species. On the head the orange changes into pale brownish leaving the postfrontal rhombic spot always black. Postocular lobe entirely dull greenish. Prothorax and pterothorax also dark greenish, sides paler. Legs entirely pale brown

excepting the spines. Abdomen 1-3 dull greenish on the sides, but distally more darkened with a brownish tint, dorsal side of 1-5 segments pale brownish, 6-10 deeply brown including the cerci; gonapophyses pale brownish.

Material examined: 4 ♂ 3 ♀ Hinuma near Mito, Ibaraki Prefecture, 7. VII. 1971, leg. M. Hirose; 142 ♂ (1 ♂ Holotype, 125 ♂ Paratypes), 79 ♀ (1 ♀ Allotype, 79 ♀ Paratypes) Hinuma, Ibaraki Pref.; 17. VII. 1971, leg. S. Asahina; 5 ♂ 3 ♀ Akai-e, near Iwanuma, Miyagi Prefecture, 1 ♀ Ainokama near Iwanuma, Miyagi Pref., 4. VIII. 1971, leg. Asahina.

All the material here studied is preserved in my collection in Tokyo.

Diagnosis from allied species. Regarding the genus *Mortonagrion*, excepting

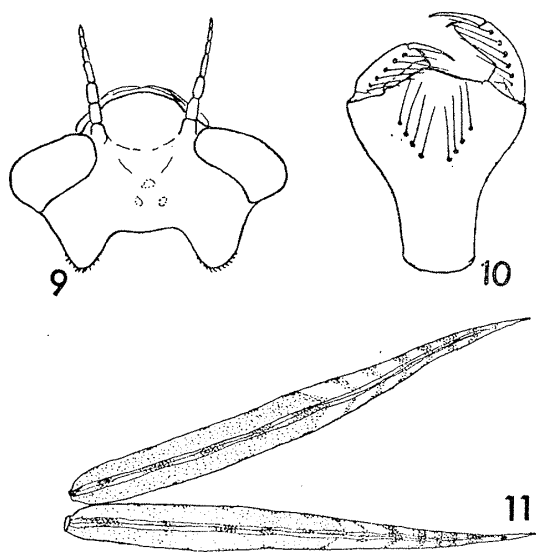


Fig. 9. *Mortonagrion hirosei*, ultimate instar larva, head. Fig. 10. Labium. Fig. 11. Caudal gills.

one unnamed species from Ceylon, eleven species have hitherto been known as shown by the following list:

<i>M. amoenum</i> (Ris 1914)	Simalur, Java, Sumatra, Borneo
<i>M. appendiculatum</i> Lieftinck 1937	Billiton
<i>M. arthuri</i> Fraser 1942	Malaya, Malcolm Is. (Lower Burma)
<i>M. falcatum</i> Lieftinck 1934	Malaya, Sumatra, Billiton, Java, Kalimondjawa, Borneo, Tenasserim, C. Thailand
<i>M. forficulatum</i> Lieftinck 1953	Borneo
<i>M. gautama</i> (Fraser 1922)	Assam (♀)
<i>M. martini</i> (Bis 1900)	Bismark Arch., Admiralty Is.
<i>M. selenion</i> (Ris 1916)	Japan, China, Taiwan, N. Korea, Primorye
<i>M. simile</i> Ris 1930	Sumatra, Borneo
<i>M. stygium</i> (Fraser 1954)	Belg. Congo, West Africa
<i>M. varralli</i> Fraser 1920	West India

Excepting *M. stygium* from Belgian Congo and West Africa, all the species are generally from South Asia. The present new species is somewhat allied to *M. appendiculatum* and less so to *M. forficulatum* in the structure of male caudal appendages and prothoracic feature, but decidedly different from both in the detail of these parts, the body size is, in

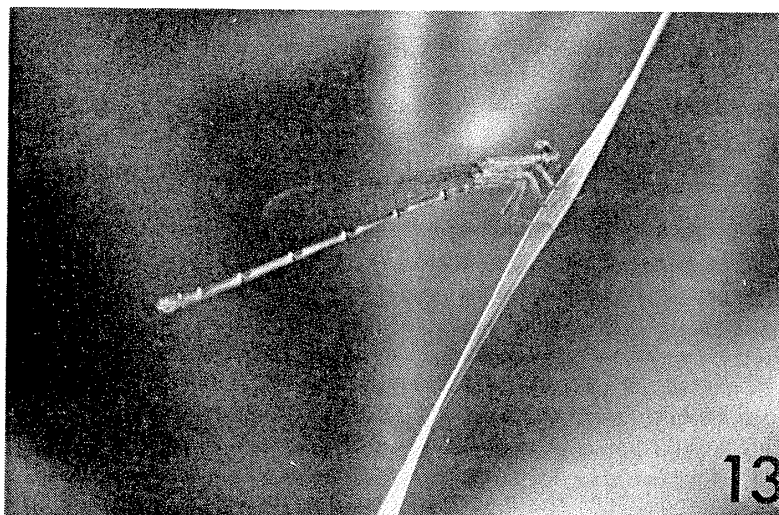
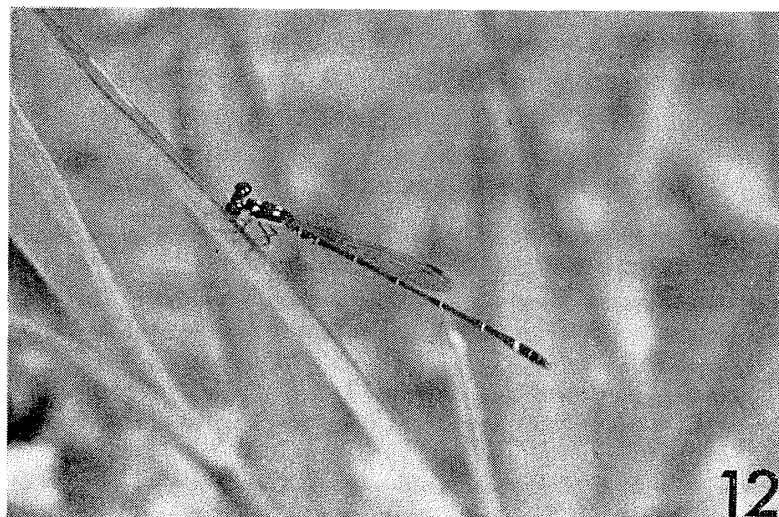


Fig. 12. *Mortonagrion Hirosei*, ♂; 13. ♀. Photos by S. Eda, 17. VII. 1971, Hinuma, Ibaraki Prefecture.

addition, much larger in ours. From other seven species, *amoenum*, *arthuri*, *falcatum*, *selenion*, *simile*, *stygium* and *verralli* this new species is readily separated by the shape of male caudal appendages, from *gautama* (♀) by the body colouration, and from *martini* by the smaller body size.

Habitats and distribution. The two localities of *M. hirosei*, Hinuma in Ibaraki Prefecture and the two ponds in Iwanuma of Miyagi Prefecture, are extremely similar to each other. They are seaside marshy swamps and the damselfly species is always strictly confined in the densely grown reed bushes. Such habitats and habit must have concealed damselflies from collectors' eyes and hence delayed the discovery of this species. There is possibility that this species would be found from the neighbouring sites along the Pacific coast of the mainland of Japan. Furthermore, the northernmost representative of the genus *Mortonagrion* is *M. selenion* (Ris) which ranges from Taiwan to the south of Hokkaido, and from Central China to Korea and Primorye of Far Eastern URSS.

Description of the immature stage. One female ultimate-instar larva and three exuviae were obtained at Hinuma, 17. VII. 1971, by the endeavour of Mr. Kosuge.

Body length *ca.* 10–12 mm, caudal gill length 4 mm. Head with laterally produced eyes, occiput conspicuously protruded posteriorly and rather pointed bearing several setae (Fig. 9). Labium short, mentum with four pairs of mental setae; lateral lobe with six lateral setae, the distal end of lateral lobe with usual one inner hook and five minute spines; movable hook strong (Fig. 10). Abdomen cylindrical, without any particular armature. The gills (Fig. 11) are very slender and pointed, of which the basal half is pale brown with the midrib dark spotted, the distal half of the gill is striped with about seven brownish bands.

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