



Revision of the Palaearctic brood parasitic genus *Nipponodipogon* Ishikawa, 1965 of spider wasps (Hymenoptera: Pompilidae: Pepsinae)

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Abstract

The systematics and bionomics of the Palaearctic brood parasitic genus *Nipponodipogon* Ishikawa, 1965 are revised. Seven species are listed. A new species *N. sudai* Shimizu, **sp. nov.** (Japan, Honshu) and the hitherto unknown males of *N. iwatai* (Ishikawa, 1965) and *N. nagasei* (Ishikawa, 1965) are described and illustrated. Six species from Japan and the Russian Far East are redescribed. A key to species is provided.

Key words: systematics, *Dipogon* genus-group, Deuterageniini, new species, Japan, Russian Far East

Introduction

Nipponodipogon Ishikawa, 1965 is a pompilid genus belonging to the subfamily Pepsinae, distributed in the Far Eastern part of Eurasia and the Japan Archipelago. Ishikawa (1965) created this taxon as a subgenus of the genus *Dipogon* Fox, 1897, based on the three species, *D. (N.) iwatai* Ishikawa, 1965, *D. (N.) nagasei* Ishikawa, 1965 and *D. (N.) mandibularis* Ishikawa, 1965, the first of which is the type species of the genus. In this paper, he also erected further two new subgenera of *Dipogon*, i.e., *Myrmecodipogon* Ishikawa, 1965 and *Stigmatodipogon* Ishikawa, 1965. These taxa and *Dipogon* and *Deuteragenia* Šusterka, 1912 are closely related each other, forming the ‘*Dipogon* genus-group’ (or tribe Deuterageniini *sensu* Engel & Grimaldi (2006), Lelej & Loktionov (2012b)). Later, Ishikawa (1968) described another new species of *Nipponodipogon*, *D. (N.) hayachinensis* Ishikawa, 1968 from Mt. Hayachine, northeast Honshu, Japan. In his review of *Dipogon* and *Poecilageniella* Ishikawa, 1965 of the Russian Far East, Lelej (1986) described two new species of *Dipogon* (*Nipponodipogon*), *D. (N.) rossicus* Lelej, 1986 and *D. (N.) kurilensis* Lelej, 1986. Currently, only these two species have been known from Russia (Lelej 1995, Lelej 2000, Loktionov & Lelej 2014).

Phylogenetic relationships within the *Dipogon* genus-group were first analyzed using a cladistic method by Lelej and Loktionov (2012b), based on 13 species of seven genera, using 24 morphological characters. They recognized the following relationship among them: *Priocnemis* Schiødte, 1837 (out group) + [*Stigmatodipogon* + {(*Deuteragenia* + *Mesagenia* Haupt, 1959) + [(*Winnemanella* Krombein, 1962 + *Nipponodipogon*) + (*Myrmecodipogon*) + *Dipogon*]}]. Regarding *Mesagenia*, only one species of this genus, *M. antropovi* (Lelej, 1995) was used in their analysis and based on these data it was synonymized with *Deuteragenia bokhaica* (Lelej, 1986). Molecular analyses, however, have not been carried out and further analyses seem to be needed to clarify their phylogeny.

Species of *Nipponodipogon* are brood parasitic wasps. Shimizu and Ishikawa (2002) pointed out the peculiar features in their antennal structure: the antenna is short, stout and thickened toward the middle of the flagellum, and flagellomeres 2–10 are somewhat flattened on the anteroventral side. Because a similar structure is found in the brood parasitic pompilids, *Poecilagenia* Haupt, 1927 (Shimizu 2000) and *Evagetes* Lepageletier de Saint-Fargeau,

Key to species

Females

1. Outer apicoventral corner of hind femur produced triangularly (Fig. 7E); T1 petiolate basally, i.e., T1 narrowed behind articulation with propodeum (Figs 3D, 8E) 2
- Outer apicoventral corner of hind femur rounded (Fig. 2D); T1 not petiolate basally (Fig. 6E, 8C–D) 3
2. Vertex between eye tops slightly convex (Fig. 7A); ocelli usually forming acute-angled triangle; mesoscutum not raised along midline. 7. *N. sudai* Shimizu, **sp. nov.**
- Vertex between eye tops strongly convex (Fig. 3A); ocelli forming right-angled triangle; mesoscutum distinctly raised along midline 3. *N. kurilensis* (Lelej)
3. Transverse groove on S2 nearly straight (Fig. 2E, arrow); T1 with long parallel-sided portion basally (Fig. 8C). (Ocelli forming acute-angled triangle) 2. *N. iwatai* (Ishikawa)
- Transverse groove on S2 subangulate (Fig. 6F) or arcuate; T1 without parallel-sided portion basally (Fig. 8D). 4
4. Mandible short, its apex and two additional teeth rounded, basal tooth vestigial (Fig. 8A). (Ocelli forming right-angled triangle). 4. *N. mandibularis* (Ishikawa)
- Mandible normal-sized, its apex and two additional teeth pointed, basal tooth distinct (Fig. 8B). 5
5. Vertex strongly convex between eye tops; hence head in frontal view nearly circular in outline (Fig. 1A); posterior margin of vertex remarkably concave in dorsal view (Fig. 1B); gena strongly developed, ratio of OOcD/POD = 1.6–1.7; F1 2.7–2.9 × as long as thick; propodeum gently convex (Fig. 1C); S6 not carinate along midline; fore wing inner fascia along crossvein *cu-a* broad and distinct (Fig. 9A). (Ocelli forming acute-angled triangle) 1. *N. hayachinensis* (Ishikawa)
- Vertex not very strongly convex between eye tops; hence head in frontal view not circular in outline (Figs 5A, 6A); posterior margin of vertex not remarkably concave in dorsal view (Figs 5B, 6C); gena not strongly developed, ratio of OOcD/POD = 1.1–1.4; F1 short, 2.1–2.4 × as long as thick; propodeum strongly convex in profile (Figs 5C, 6D); S6 carinate along midline; fore wing inner fascia along crossvein *cu-a* indistinct (Fig. 9F, H) 6
6. Ocelli forming right- or obtuse-angled triangle; gena strongly receding posteriorly (Fig. 5B) 5. *N. nagasei* (Ishikawa)
- Ocelli usually forming acute-angled triangle; gena roundly receding posteriorly (Fig. 6C) 6. *N. rossicus* (Lelej)

Males (unknown for *N. kurilensis*, *N. mandibularis* and *N. hayachinensis*)

1. T1 petiolate basally; lateral hook on S6 strongly compressed laterally and thin, subtriangular in profile (Fig. 7H); exposed portion of subgenital plate in profile semicircular, i.e., arcuately convex ventrally and flattened dorsally (Fig. 7I) 7. *N. sudai* Shimizu, **sp. nov.**
- T1 not petiolate basally; lateral hook on S6 not compressed laterally with small claw-like projection apically (Figs 2F, 5E, 6H); exposed portion of subgenital plate in profile not semicircular but blade-like (Figs 2G, 5F, 6I) 2
2. Ocellar triangle acute- to right-angled; mid and hind tibial spurs dark brown; exposed portion of subgenital plate compressed laterally with ventral face flattened and polished, broad basally, tapering apically (Figs 2F, 8F) 2. *N. iwatai* (Ishikawa)
- Ocellar triangle obtuse-angled; or if right-angled, mid and hind tibial spurs stramineous; exposed portion of subgenital plate completely compressed laterally and very thin, its ventral face linear (Figs 5E, 8G–H) 3
3. Genitalia with long setae on anterior margin of paramere (Fig. 5G) 5. *N. nagasei* (Ishikawa)
- Genitalia with short setae on anterior margin of paramere (Fig. 6J) 6. *N. rossicus* (Lelej)

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