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New province record of *Rhinagrion* for Thailand and description of the larva of *R. mima* (Odonata: Zygoptera: Philosinidae)

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Abstract

The Oriental damselfly genus *Rhinagrion* includes 10 known species, but the larva of only *R. philippinum* has been described in any detail, while the larva of *R. viridatum* has been well-illustrated and features summarized. The larvae of the other eight species were unknown. Here, the larva of *Rhinagrion mima* is described and illustrated by supposition, based upon an F0 larva collected in Phetchabun Province in Thailand. It is compared with the larvae of *R. philippinum* and *R. viridatum*. This represents the first record of the genus for Phetchabun Province.

Key words: *Rhinagrion*, Philosinidae, Thailand, new record, larval description

บทคัดย่อ

แมลงปอเข็มในทวีปเอเชียตะวันออกในสกุล *Rhinagrion* มีทั้งสิ้น 10 ชนิด ที่ถูกค้นพบแล้ว โดยตัวอ่อน *R. philippinum* ได้ถูกอธิบายลักษณะตัวอ่อนไว้โดยละเอียด และตัวอ่อนแมลงปอเข็มชนิด *R. viridatum* มีการจัดทำภาพประกอบ และบรรยายลักษณะตัวอ่อนไว้เป็นอย่างดี แต่ตัวอ่อนแมลงปอเข็มอีก 8 ชนิดใน สกุลนี้ยังไม่เป็นที่รู้จัก ในที่นี้ตัวอ่อนแมลงปอเข็มชนิด *Rhinagrion mima* ได้ถูกบรรยายลักษณะสำคัญ พร้อมแสดงภาพประกอบโดยอ้างอิงลักษณะของตัวอ่อน F0 ที่เก็บรวบรวมมาจากจังหวัดเพชรบูรณ์ ใน ประเทศไทย ตัวอ่อนแมลงปอเข็มชนิดนี้ได้นำมาถูกเปรียบเทียบกับตัวอ่อนแมลงปอเข็มชนิด *R. philippinum* และ *R. viridatum* ข้อมูลนี้ถือเป็นการรายงานครั้งแรกของแมลงปอเข็มสกุลนี้ของ จังหวัดเพชรบูรณ์.

คำสำคัญ : *Rhinagrion*, Philosinidae, ประเทศไทย, รายงานใหม่, บรรยายลักษณะตัวอ่อน

Introduction

In a recent molecular phylogenetic reconstruction of the suborder Zygoptera, Dijsktra et al. (2014) removed the genus *Rhinagrion* from Megapodagrionidae to include it, together with *Philosina*, in the Oriental family Philosinidae Kennedy 1925. *Rhinagrion* comprises 10 described species (Kalkman & Villanueva 2011), and until now the larva of only *R. philippinum* Selys has been described in any detail (Needham & Gyger 1939), although the gills and gonapophyses were not described or illustrated. A cursory description of the larva of *R. viridatum* Fraser (as *R. mima,* according to Kalkman & Villanueva [2011]) was provided by Lieftinck (1956), in which he summarized in five lines the principal features and provided good illustrations of a full-grown larva, the labium and caudal lamellae. Surprisingly, in neither of the two papers on larvae did the authors describe the male and female gonapophyses, despite Needham's (1911) mention of these structures as “external genitalia of both sexes

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end of the dry season. Lieftinck (1956) mentioned that larvae of *Rhinagrion* "live under varied conditions … one as genuine rheobiont (*R. tricolor* [Krüger]), whereas *R. borneense* (Selys) does in shady forest brooks with a slow current". Orr (2005) recorded larvae of *R. mima* "among accumulated leaf trash".

Discussion

The larva of *Rhinagrion mima* is very similar to those of *R. philippinum* and *R. viridatum*, with the following remarkable differences (those of *R. philippinum* and *R. viridatum* in parentheses): Antennomeres 2–4 of the same length (antennomere 3 longest); left mandible with a well-developed, sclerotized molar crest, *m* teeth present (molar crest represented by 1–2 [*R. viridatum*] or 1–3 teeth [*R. philippinum*]). Unfortunately, the description provided by Needham & Gyger (1939) for *R. philippinum* and Lieftinck's (1956) summary for *R. viridatum* larvae do not permit a more detailed comparison with the larva herein described. We believe their specimens were males, otherwise they should have noticed the remarkably well-developed gonapophyses, and consequently they would have described them.

In comparison to members of the only other genus in Philosinidae, the larva of *R. mima* appears more similar to the larva of *Philosina alba* Wilson than to *P. buchi* Ris, which was recently described by Zhang et al. (2011). Features more in common with *P. alba* include the body's total length, the proportion of antennomeres, the surface of head and pronotum mostly smooth, the width to length ratio of the ligula and median cleft, the female gonapophyses almost twice as long as S9+10, and the pale tips of lateral caudal lamellae. Zhang et al. (2011) stated as one of the differences between the larvae of *Rhinagrion* and *Philosina* the absence of spines along the eye-margin, however, these spines are indeed present in *R. philippinum*, as described by Needham & Gyger (1939), as well as in *R. mima*.

All these features, but especially the remarkable long gonapophyses of female larvae, provide additional support for the recent reclassification of *Philosina* and *Rhinagrion* into the family Philosinidae (Dijkstra et al. 2014). In summary, the following combination of features should characterize larvae of Philosinidae: Antennae filiform; stout, sharp, spines present on inferior margin of compound eyes, ventral margin of the lateral surface of mandible, and lateral margins of prementum; prementum broad and flat; ligula strongly convex with a closed median cleft; 1–3 palpal setae; female gonapophyses long, at least as long as S9+10; caudal lamellae arranged vertically, broad, largely dark with or without marginal fine setae and pale spots, and dendritic tracheation; epiproct shorter and thinner than paraprocts, paraprocts fleshy and undulating forming a "tube" when alive (*Rhinagrion*) (Lieftinck 1956; Kalkman et al. 2010; Zhang et al. 2011).

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References

Calvert, P.P. (1913) The fossil odonate *Phenacolesles*, with a discussion of the venation of the legion Podagrion Selys. *Proceedings of the Academy of Natural Sciences of Philadelphia,* 65, 225–272, pl 14.

Corbet, P.S. (1953) A terminology for the labium of larval Odonata. *The Entomologist*, 86, 191−196.

Dijkstra, K-D.B., Kalkman, V.J., Dow, R.A., Stokvis, F.R., & Van Tol, J. (2014) Redefining the damselfly families: a comprehensive molecular phylogeny of Zygoptera (Odonata). *Systematic Entomology*, 39, 68–96. http://dx.doi.org/10.1111/syen.12035

Hämäläinen, M. & Pinratana, A. (1999) *Atlas of the dragonflies of Thailand. Distribution maps by provinces*. Brothers of St. Gabriel in Thailand, Bangkok, 176 pp.

Kalkman, V.J., Choong, C.Y., Orr, A.G. & Schütte, K. (2010) Remarks on the taxonomy of Megapodagrionidae with emphasis in larval gills (Odonata). *International Journal of Odonatology*, 13 (1), 119–135.

http://dx.doi.org/10.1080/13887890.2010.9748366
Kalkman, V.J. & Villanueva, R.J.T. (2011) A synopsis of the genus *Rhinagrion* with description of two new species from the Philippines (Odonata: Megapodagrionidae). *International Journal of Odonatology*, 14 (1), 11–31. http://dx.doi.org/10.1080/13887890.2011.568193
Karsch, F. (1891) Sumatranische Odonaten, gesammelt von Herrn Hofrath Dr. med. L. Martin in Bindjei (Deli). *Entomologische Nachrichten,* 17 (16), 241–247.
Lieftinck, M.A. (1956) Revision of the genus *Argiolestes* Selys (Odonata) in New Guinea and the Moluccas, with notes on the larval forms of the family Megapodagrionidae. *Nova Guinea (N.S.),* 7, 59–121.
Needham, J.G. (1911) Notes on a few nymphs of Agrionidae (Order Odonata) of the Hagen Collection. *Entomological News,* 8 (22), 342–345.
Needham, J.G. & Gyger, M.K. (1939) The Odonata of the Philippines. *The Philippine Journal of Science,* 70, 239–314.
Orr, A.G. (2003) *A guide to the dragonflies of Borneo. Their identification and biology*. Natural History Publications, Borneo, 195 pp.
Orr, A.G. (2005) *Dragonflies of Peninsular Malaysia and Singapore*. Natural History Publications, Borneo, 138 pp.
Watson, M.C. (1956) The utilization of mandibular armature in taxonomic studies of anisopterous nymphs. *Transactions of the American Entomological Society,* 81, 155−205.
Zhang, H., Kalkman, V.J. & Tong, X. (2011) A synopsis of the genus *Philosina* with descriptions of the larvae of *P. alba* and *P. buchi* (Odonata: Megapodagrionidae). *International Journal of Odonatology*, 14 (1), 55–68. http://dx.doi.org/10.1080/13887890.2011.568189