

Postembryonic Development of *Zorotypus caudelli* Karny (Insecta, Zoraptera, Zorotypidae)*

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Zoraptera (ground lice, angel insects) are small, cryptic neopteran group living subcortically in decaying logs throughout the tropical and subtropical zones. Forty extant and nine fossil species are described, but their diversity remains underexplored (Yin *et al.*, 2015). The systematic position of Zoraptera is one of the most controversial problems in insect phylogeny since the group was discovered 100 years ago (Mashimo *et al.*, 2014c).

Even though investigation of Zoraptera has markedly intensified in the last decade (*cf.* Mashimo *et al.*, 2014c), the biology is still very insufficiently known. Several studies on the life history (*e.g.* Riegel & Eytalis, 1974; Shetlar, 1974) are available. However, the descriptions are fragmentary and the documentation of details insufficient. Embryonic development was recently described (Mashimo *et al.*, 2014a). However, as the number of nymphal instars has only been suggested to be four or five (Riegel & Eytalis, 1974; Shetlar, 1974), the postembryonic stages remain insufficiently known. Here we described the postembryonic development in detail using *Zorotypus caudelli* Karny, 1927 (Zoraptera, Zorotypidae) (Mashimo *et al.*, 2014b).

Based on captive breeding, the postembryonic development of *Z. caudelli* was investigated. The number of nymphal instars in *Z. caudelli* is five. Apterous and winged forms differentiate in the 4th nymphal instar. In the 4th instar of the winged form, small wing pads and small ocular spots appear. In the 5th instar, the wing pads elongate and the ocular spots are widened, and three ocelli are differentiated. The two sexes closely resemble each other as in other zorapteran

species, and sexual dimorphism does not appear until the final (5th) nymphal instar: in the 5th instar of males, setae increase in number on the 9th and 10 + 11th abdominal terga, and a small posteromedial swelling related to mating hook appears on the 10 + 11th abdominal tergum.

References

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