

Taxonomic study of Tanypodinae (Chironomidae: Diptera) larvae in Balloran River – Lattakia – Syria

Eva Rajab

Dept. Zoology, Faculty of Sciences, Tishreen University, Lattakia, Syria

Author's Mail Id: evarajab2015@gmail.com, Tel.: +00-963956628229

Available online at: www.isroset.org

Received: 20/Oct/2021, Accepted: 22/Nov/2021, Online: 31/Dec/2021

Abstract— Tanypodinae larvae samples were collected monthly from one fixed site in Balloran river (Lattakia, Syria) for a year, during the period from December 2017 till October 2018. Slides were prepared and morphological characteristics of last-instar larvae (matured) were used to determine the classification of species. As a result, Two species namely (*Ablabesmya malloshi*; *Procladius bellus*) were reported in the station.

Keywords—Tanypodinae—fauna—freshwater—Chironomidae—Syria.

I. INTRODUCTION

Chironomid Larvae (non-biting midges) constitute the most abundant group in most benthic freshwater studies (about one third of the micro-invertebrate fauna of freshwater streams and rivers) because of presence of haemoglobin that stores oxygen which allow them to live in areas that have limited oxygen conditions such as areas of high organic pollution [1], [2], [3].

Chironomids spend the greatest part of their life cycle (egg, larva, pupa and adult) in larval form which are important as indicator organisms and can be used as perfect food for fishes [4], [5], [6].

Tanypodinae is an important subfamily of Chironomidae, which characterized by an absence of ventromental plates and the presence of a large well sclerotized ligula. A mentum is not evident in most genera but in some (*Procladius*) as a comb-like set of dorsomental teeth located anterior to the ligula, The antenna are elongate and retractile within head capsule, Most members of this subfamily are free swimming or crawling predators; some burrow in bottom mud. Larvae are found in a variety of habitats, but the more normal aquatic habitats are streams, rivers, ponds and lakes [7].

In Syria, Identification of larval Tanypodinae is almost missing, except the study which made by [8] on adult Chironomid, and [9] on larval Chironomid which recorded two species (*Ablabesmyia monilis* and *A. flacigera*) in Al Sen Fish Farms for fishes raring, despite of presence of large freshwater bodies, therefore, we opined that this study should be carried out.

II. METHODOLOGY

A. Study Area

One fixed-site on Balloran River located in Mediterranean basin, northern Lattakia (35° 42' 38.3" N, 35° 52' 31.7" E and 21 m sea level) was selected and it's characteristics are as follows: Riverbed has a mud and rocks, width is about 3 m and altitude is about 1 m. Larval and pupal substrates are rocks, plants and fallen tree leaves trailing in the river and there are trees surrounding the area.

B. Collecting samples

Animal samples were collected monthly during December 2017 to October 2018. Larvae were collected by special net consists of a semicircle hank with a winch (1m). The fabric with 0.3 inch holes, or by hand using fine forceps from available substrates, such as fallen leaves, mud or rock surfaces, and trailing grasses. Collected larvae samples were preserved in a 75% alcohol solution till slides were prepared.

C. Slide preparation procedure

Larvae were kept in 10 % sodium hydroxide solution over night at room temperature, which were previously preserved in 75% alcohol (NaOH digests the inner muscle tissue and leaves the sclerotized portion of the larval exoskeleton, including body). Larvae were cleared next morning by keeping them in distilled water for 5-10 minutes. Followed by water bath specimens were placed in (30-50-70-90)% alcohol solution respectively for 5 minutes to each concentration. Specimens were placed in alkzailol solution for 5 minutes. 1-2 drops Of Canada Balsam mountant were placed on clean slide. Specimens were placed in the mountant, lying larvae ventral side up and head pointed up. Coverslip was lowered over the mountant at an angle using forceps. Then slides were placed in drying oven (didn't exceed 550C) for 2 to 4 days. Slides were labelled for site and date of collection.

D. Species identification

Morphological characteristics of Tanypodinae larvae were compiled and compared with the taxonomic keys of [10, 11, 12, 13].

III. RESULTS AND DISCUSSION

Two species of Tanypodinae larvae were reported in Balloran river site, belonging to two genera (*Ablabesmya* and *Procladius*).

checklist of recorded species during this study

Family Chironomidae

Subfamily Tanypodinae

Genus *Ablabesmya* (Johnson, 1905)

1- *A. malloshi* (Walley, 1925)

Genus *Procladius* (Skuse, 1889)

2- *P. bellus* (Loew, 1866)

SUBFAMILY - TANYPODINAE:

Antenna can retractile within the narrow elongate head capsule which is key characteristic Tanypodinae identification ; a large well sclerotized, hand-shaped ligula present (Fig. 1B); body with well-developed anterior and posterior parapods, with apical claws; the basal segment is longer than the rest of the antennal segments together; first segment with ring organ; lauterborn's organs on apex of second segment; eye spot single, kidney-shaped to semicircular. Mandible hooked to sickle-shaped , usually with 1 inner tooth and 1 accessory tooth. Maxillary palpus elongate; two, occasionally 3 pairs of anal tubules present.

Genus *Ablabesmya* (Johnson, 1905)

Head capsule rounded to oval, antennae retractile within the head capsule. One eyespot on each side of head round or kidney-shaped (Figures 1, A). A large well sclerotized ligula present, with 5 teeth darker than base (Figures 1, C). Procerci long. Body smooth or at most with a lateral setal fringe. Head and body usually pale, ligula teeth black, in contrast to the head colour. dorsomentum distinct and toothed. Maxillary palp with 2-6 segments; pseudoradula not broadened posteriorly, not appearing attached to transverse bar; with granules of pseudoradula often arranged in longitudinal rows. Two dark simple claws on posterior parapods (Figure 1, D), large larvae up to 12mm.

Ablabesmya Malloshi (Walley, 1925)

Maxillary palps with 5 segments; small claw of posterior parapod without an expanded base (Figure 1, D)

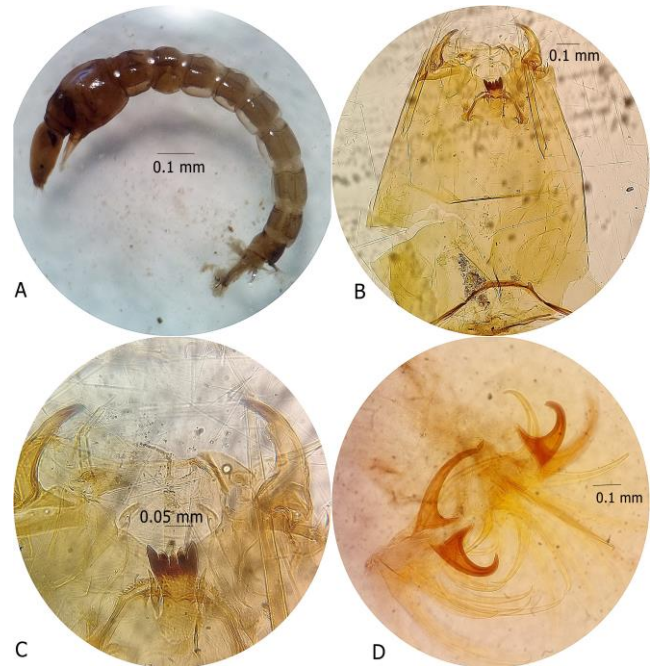


Fig 1: *Ablabesmya malloshi* larva, A. Lateral view of mature larva; B. Ventral view of head capsule; C. Mandible, Ligula and Paraligula; D. Hooks of posterior parapods

Genus *Procladius* (Skuse, 1889)

Head capsule rounded to oval; Antennae retractile within head capsule; one eye spot on each side of head round or kidney-shaped (Fig. 2A); Hypopharynx with distinctive toothed ligula; Procerci long; a large well sclerotized ligula present, with 5 teeth darker than base (Fig. 2B); teeth on dorsomentum arranged in two lines ascending either side of prementum. dorsomenta teeth present in well-developed transverse plates or in longitudinal rows; body with well-developed lateral setal fringe; mandible with basal tooth and 1 or 2 accessory teeth (Fig. 2C); ring organ of maxillary palp located near middle or apex; paraligula with teeth on outer side; paraligula with at least three teeth; antennal blade subequal to length of flagellum.

Procladius bellus (Loew, 1866)

Smallest claws of posterior parapods without large inner teeth, Apices of larger claws of posterior parapod with simple point and smallest claws with expanded bases.



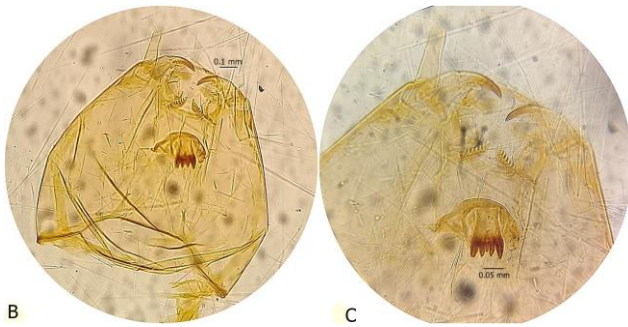


Fig 2: *Procladius bellus* larva, A. Lateral view of mature larva; B. Ventral view of head capsule ; C. Mandible, Ligula and Paraligula.

IV. CONCLUSION AND FUTURE SCOPE

The most important taxonomic keys were used to identify species after slide preparation of Tanypodinae last instar larvae. Two species of Tanypodinae larvae belonging to two genera (*Ablabesmya* and *Procladius*) were reported from a station on Balloran river during this study namely: *Ablabesmya mallosi* & *Procladius bellus*.

By noticing presence and multitude of large freshwater bodies in Syria, we suggest taxonomic studies of Tanypodinae larvae should be continue.

ACKNOWLEDGMENT

Author is grateful to Dr. Adib Zeini & Dr. Ekbal Fadel in Tishreen University-Syria for support during the study.

REFERENCES

- [1] J. H. Epler, "Identification manual for the larval chironomidae (diptera) of north and south Carolina," p 526.2001.
- [2] E. R. Jacobsen, "Key to the Pupal Exuviae of the Midges (Diptera: Chironomidae) of Everglades National Park, Florida," U.S. Geological Survey, Reston, Virginia, p 119. 2008.
- [3] A. M. Gaikwad, "Biosystematic study of Chironomid midges (Diptera: Chironomidae) from balaghats of Marathwada region, (M. S.) India. For the award of degree of doctor of philosophy in zoology. p 145. 2013.
- [4] P. R. Bhosale, "Ecological studies on chironomids (insecta: diptera) in urban aquatic ecosystems in and around aurangabad. maharashtra, india," for the degree of doctor of philosophy in zoology. p 245. 2012.
- [5] A. E. Hershey, A. G. Lamberti, T. D. Chaloner, M. R. Northington, "Ecology and Classification of North American Freshwater Invertebrates," Aquatic Insect Ecology. pp 659-694. 2010.
- [6] M. Nyman, A. Korhola, S. J. Brooks, "The distribution and diversity of Chironomidae (Insecta: Diptera) in western Finnish Lapland, with special emphasis on shallow lakes . Global Ecology and Biogeography, " Biogeography. p 137. 2005.
- [7] M. J. Bolton, "Ohio EPA Supplemental Keys to the Larval Chironomidae (Diptera) of Ohio and Ohio Chironomidae Checklist," Ohio EPA. p 111. 2012.
- [8] F. REISS, "Ein Beitrag zur Chironomiden fauna Syriens (Diptera, Chironomidae)," Entomofauna. p 14. 1986.
- [9] M. M. Batal, A. Zeini, M. Galiya, J. Hadad, "A contribution to study of Chironomidae in Al Sen Fish Farms for fishes raring," p10 . 1997.
- [10] T. William, J. Mason, "An introduction to the identification of chironomid larvae," National Environmental Research Center. U. S. Environmental Protection Agency. Cincinnati, Ohio 45268. P 90. 1973.
- [11] P. L. Stewart, J. S. Loch, A Guide for the Identification of Two Subfamilies of Larval Chironomidae, "The Chironominae and Tanypodinae Found in Benthic Studies in the Winnipeg River in the Vicinity of Pine Falls, Manitoba in 1971 and 1972," Technical Report Series No. CEN/T-73-12. Resource Management Branch. Central Region. p 54. 1973.
- [12] P. C. Madden, "Key to genera of larvae of Australian Chironomidae (Diptera)," Museum Victoria Science Reports 12: pp 1-31. 2010.
- [13] A. Leung, A. Pinder, E. Donald, "Photographic guide and keys to the larvae of Chironomidae (Diptera) of south-west Western Australia," Part I. Key to subfamilies and Tanypodinae. p 29. 2011.

AUTHORS PROFILE

Eva Rajab Ph. D. Dep. Of Zoology, Tishreen University, Lattakia, Syria.
Activities and interests: Invertebrates, Insects, Mollusks, biodiversity and ecology.

