Immatures of Palaearctic species of the weevil genus *Tychius* (Coleoptera, Curculionidae): new descriptions and new bionomic data with an evaluation of their value in a phylogenetic reconstruction of the genus

JÍŘÍ SKUHROVEC¹, RAFAŁ GOSIK² & ROBERTO CALDARA³

¹ Group Function of Invertebrate and Plant Biodiversity in Agro-ecosystems, Crop Research Institute, Prague 6 – Ruzyně, Czech Republic; Corresponding author: E-mail: jirislavskuhrovec@gmail.com

² Department of Zoology, Maria Curie-Skłodowska University, Akademicka 19, 20-033 Lublin, Poland, E-mail: cossonus@gmail.com

³ via Lorenteggio 37, 20146 Milan, Italy; E-mail: roberto.caldara@gmail.com
JIRI SKUHROVEC, RAFAL GOSIK & ROBERTO CALDARA

Immatures of Palearctic species of the weevil genus Tychius (Coleoptera, Curculionidae): new descriptions and new bionomic data with an evaluation of their value in a phylogenetic reconstruction of the genus

(Zootaxa 3839)

83 pp.; 30 cm.

23 Jul. 2014


FIRST PUBLISHED IN 2014 BY

Magnolia Press
P.O. Box 41-383
Auckland 1346
New Zealand

E-mail: zootaxa@mapress.com
http://www.mapress.com/zootaxa/

© 2014 Magnolia Press

All rights reserved.

No part of this publication may be reproduced, stored, transmitted or disseminated, in any form, or by any means, without prior written permission from the publisher, to whom all requests to reproduce copyright material should be directed in writing.

This authorization does not extend to any other kind of copying, by any means, in any form, and for any purpose other than private research use.

ISSN 1175-5326 (Print edition)
ISSN 1175-5334 (Online edition)
ABSTRACT

Larvae of 14 species and pupae of 12 species of Palaearctic Tychius Germar, 1817 are described for the first time. Larvae and pupae of T. meliloti Stephens, 1831, T. squamulatus Gyllenhal, 1835 and T. quinquepunctatus (Linnaeus, 1758), are redescribed with addition of new characters. They belong to 10 of 22 groups of species assembled through adult morphological characters in this region and, like all other Tychius with known biology, the studied species live on Leguminosae Papilionoideae, belonging to the tribes Genistae, Loteae, Galegeae, Trifolieae and Vicieae. Generally larvae, but not pupae, show a few characters useful to support some groupings previously postulated on adult morphology, and also suggest some phylogenetic relationships among groups although these are partly weak because of several clear parallelisms or convergences. One of the most numerous and better known group of species, the T. stephensi group living on Trifolieae, is supported by two distinctive larval character states, whereas all the other groups seem to be distinguishable from each other at least by a unique larval character state. New bionomic data concerning larval and pupal development and adult emergence are reported for all the described species. These data confirm that this genus is highly homogeneous in habits and times of development, with unique adaptive differences in adult emergence and overwintering according to the single or double seasonal flowering of the host plant. On the basis of morphological characters of immatures and adults, a possible concordance between the evolution of Tychius and that of their host plants is discussed.

Key words: Coleoptera, Curculionidae
identifying immatures in these species, as has been done in other groups (Hyperini: Skuhrovec 2006, 2007, Bagous: Gosik 2008; Ceutorhynchinae: Gosik 2010; Lixinae: Gosik & Skuhrovec 2011, Gosik & Wanat 2014, Stejskal et al. 2014; Entiminae: Gosik & Sprick 2012a, b, 2013). In practice, species identification of larvae with chaetotaxy is relatively easy, and it is generally much cheaper than identification by molecular methods (Hirsch et al. 2010). Unfortunately, the current problem in the taxonomic use of the immature stages is the relatively low number of available descriptions in comparison to the great number of known adult weevil species. The same problem exists also in many other groups outside Curculionidae.

With regard to life histories and habits of Tychius immatures Clark & Burke (1977) published a careful review of all available data based on about 20 species. We can now add new bionomic data for another 12 species. All the immatures which we studied in laboratory showed habits in prepupal activity, pupation and adult emergence uniform and similar to most species treated by Clark & Burke (1977), and the few differences observed between species consist only in the time of these processes. The observation common to all our immatures can be summarized as follows: larvae emerged from the pods after feeding on seeds and moved almost constantly. When placed on a loose sand-peat moss substrate, they began immediately to burrow under the surface and to tunnel through this material also for several hours. Then they began to form a pupal cell with viscid secretion produced by the anal lobes. The prepupal period and the pupal stage show lack of particular characteristics except for a slight variable duration. Finally, upon emerging from the pupal integument the adult may remain in the pupal cell, possibly until the following season or it may leave the cell after a few days. We have never studied larvae feeding on pods or leaf galls, another type of development reported for a few Tychius species like T. medicaginis C. Brisout de Barneville, 1863 (D’Aguillar & Perrier 1974), T. longiclava Hustache, 1937 (Hoffmann et al. 1963), T. crassirostris (Mik 1885) and doubtfully T. polylineatus (Germar, 1824) (Hoffmann 1954). Finally we can confirm two categories of species in adult emergences and overwintering patterns as observed by Clark & Burke (1977), but we consider this behaviour only due to a single (Galegeae) or double (Trifolieae) annual blooming.

When reviewing the poor and confused literature on the immature stages, Clark et al. (1978) expressed the hope that data on the morphology of immatures might be of much value in determination of phylogenetic relationships in Tychius, when more data would have been available. Our new data seem to support this opinion, despite high similarity of several species and clear convergence in several character states, and encourage us to actively collect immatures of other species. It is therefore probable that the morphological characters of immatures might support other good phylogenetic indicators such as adult morphology, host plant relationships and incoming molecular studies.

ACKNOWLEDGEMENTS

We are very grateful to A. J. Velázquez de Castro (Madrid, Spain) for having sent us larvae of T. parallelus in study and C.W. O’Brien (Green Valley, AZ USA) for useful comments and language corrections to our paper before submission. The study of the senior author (JS) was supported by a grant from the Czech Ministry of Agriculture (Mze ČR) RO0414.

REFERENCES

http://dx.doi.org/10.1139/z84-085


http://dx.doi.org/10.1163/187631277x00396


http://dx.doi.org/10.1002/mmnd.200800026


http://dx.doi.org/10.1002/mmnd.201000017


http://dx.doi.org/10.11646/zootaxa.3731.4.2


http://dx.doi.org/10.11646/zootaxa.3754.2.5


http://dx.doi.org/10.1603/eco9381


http://dx.doi.org/10.3732/ajb.91.11.1846