Zootaxa 3470: 1–71 (2012)
www.mapress.com/zootaxa/

Monograph

ISSN 1175-5326 (print edition)
ZOOTAXA
ISSN 1175-5334 (online edition)

urn:lsid:zoobank.org:pub:509C0114-8FD0-42DD-B0EB-29B81145C22B

ZOOTAXA

3470

Comparative analysis and taxonomic use of the morphology of immature stages and natural history traits in European species of *Pyrgus* Hübner (Lepidoptera: Hesperiidae, Pyrginae)

JUAN L. HERNÁNDEZ-ROLDÁN[1, 3], MIGUEL L. MUNGUIRA[1], WOLFGANG WAGNER[2] & ROGER VILA[3]

[1] *Departamento de Biología (Zoología), Facultad de Ciencias, Universidad Autónoma de Madrid, C/ Darwin, 2, ES-28049 Madrid, Spain; hernandez.roldan@gmail.com; munguira@uam.es*

[2] *Am Schönblick, 30, D-73527 Schwäbisch Gmünd, Germany; wolfgang@pyrgus.de*

[3] *Institut de Biologia Evolutiva (CSIC-UPF), Passeig Marítim de la Barceloneta, 37-49, E-08003 Barcelona, Spain; roger.vila@csic.es*

Magnolia Press
Auckland, New Zealand

Accepted by C. Prieto: 11 May 2012; published: 7 Sept. 2012

JUAN L. HERNÁNDEZ-ROLDÁN, MIGUEL L. MUNGUIRA, WOLFGANG WAGNER & ROGER VILA
Comparative analysis and taxonomic use of the morphology of immature stages and natural history traits in European species of *Pyrgus* Hübner (Lepidoptera: Hesperiidae, Pyrginae)
(*Zootaxa* 3470)

71 pp.; 30 cm.

7 Sept. 2012

ISBN 978-1-86977-973-3 (paperback)

ISBN 978-1-86977-974-0 (Online edition)

FIRST PUBLISHED IN 2012 BY

Magnolia Press

P.O. Box 41-383

Auckland 1346

New Zealand

e-mail: zootaxa@mapress.com

http://www.mapress.com/zootaxa/

ISSN 1175-5326 (Print edition)

ISSN 1175-5334 (Online edition)

Table of contents

Abstract

The biology and ecology of the European species of the genus *Pyrgus* Hübner are revised and novel records on their foodplants, parasitoids and immature stages are provided. The DNA barcoding technique was used in some cases for the identification of eggs or larvae, showing the effective use of this tool for a species level characterization within the genus. We thoroughly describe morphological details from the eggs, last instar larvae and pupae using scanning electron microscope images. With the studied morphological and ecological characters we performed a cladistic analysis whose results are highly coincident with classifications based on adult morphology. Therefore, the characters of immature stages prove to be valuable for the taxonomical study of the genus. Our results point out the possibility of combining the studied characters, not only among them, but also with other datasets (adult morphology, molecular characters) in order to infer phylogenetic relationships within the genus *Pyrgus*.

Key words: Lepidoptera, Hesperiidae, *Pyrgus*, cladistic analysis, immature stages, morphology, parasitoids, foodplants, taxonomy, Europe

Introduction

Among the butterfly family Hesperiidae, the genus *Pyrgus* Hübner is the most diverse in the Palaearctic area with 27 described species (De Jong 1972). These include semispecies with a different degree of speciation according to the species concept from Guillaumin & Descimon (1976). In total, there are 16 confirmed species of the genus in Europe. All these species can be found in temperate Europe except *P. centaureae* (Rambur), whose distribution is exclusively Boreal (De Jong 1972, Van Swaay *et al.* 2010, Henriksen & Kreutzer 1982) and was not included in our study. The main character used in the classification of Palaearctic species is the development of the lateral apophysis in the male genitalia (Warren 1926, De Jong 1972). The adults of *Pyrgus* are small butterflies, of scarcely showy colours, with very similar adults and difficult to identify when only adult morphology is used. In addition, preparing Hesperiidae for collections is not easy, due to their large thorax and strong flight muscles (Warren 2006). Besides, their flight is quick and unstable, making their observation difficult. All these characters make their attractiveness low for collectors, resulting in less studies being devoted by entomologists to the genus *Pyrgus* (Wagner 2006, Warren 2006). As a consequence, a large number of species' identifications are erroneous and their geographical distribution is far from being well known (Kudrna *et al.* 2011). A result of this situation is that only a few countries have published detailed distribution maps containing species of the genus *Pyrgus* (e.g. LSPN 1999, Abadjiev 2001, Garcia-Barros *et al.* 2004, Székely 2008, Pamperis 2009).

The genus has a Palaearctic origin (Evans 1953) and, as it is described at present, has an unusual Holarctic and Neotropical distribution (Warren 1926, De Jong 1972, Warren 2006). Nevertheless, the taxonomic position and