

**NEHALENNIA SPECIOSA (CHARPENTIER, 1840)  
IN EUROPE: A CASE OF A VANISHING RELICT  
(ZYGOPTERA: COENAGRIONIDAE)**

R. BERNARD<sup>1</sup> and H. WILDERMUTH<sup>2</sup>

<sup>1</sup>Department of General Zoology, Adam Mickiewicz University, Umultowska 89,  
PO-61-614 Poznań, Poland; – rbernard@amu.edu.pl

<sup>2</sup>Institute of Zoology, University of Zürich, Switzerland. Correspondence address:  
Haltbergstrasse 43, CH-8630 Rüti, Switzerland; – hansruedi@wilderdmuth.ch

*Received January 21, 2005 / Reviewed and Accepted March 3, 2005*

Based on all available data, the former and present distribution in Europe is presented and critically analysed. The sp. is extinct or has only survived at single or small clustered and isolated localities in many parts of the western borderlands of its former Eurasian area that extended from Belgium to Japan. It is continuously declining, especially W and S of the line running through the Baltic States, N and E Poland and S Belarus. The attached basic data from Asia reveal incomplete knowledge, but probably indicate a better situation in the eastern part of the range. The main aspects of the ecology and biology are outlined and discussed. Special attention is paid to the elements helpful in understanding the deep regress of the sp., i.e. to its habitat on a macro- and microscale as well as to its life-strategy. The high level of stenotopy and the highly specialized habitat-related behaviour, resulting in successful use of a narrow niche, are emphasized. These aspects make the sp. vulnerable in the face of high anthropogenic pressure in Europe. Limited dispersal abilities augment the danger of local extinction. The main threats are presented and some essential conservation measures are proposed.

**MALE BEHAVIOUR IN THE MALE DIMORPHIC  
DAMSELFLY *PARAPHLEBIA QUINTA* CALVERT  
(ZYGOPTERA: MEGAPODAGRIONIDAE)**

E. GONZÁLEZ-SORIANO<sup>1</sup> and A. CÓRDOBA-AGUILAR<sup>2</sup>

<sup>1</sup> Departamento de Zoología, Instituto de Biología, Universidad Nacional Autónoma de México, Apdo. Postal 70-153, MX-04510 México, D.F., Mexico

esoriano@mail.ibiologia.unam.mx

<sup>2</sup> Instituto de Ecología, Universidad Nacional Autónoma de México, Apdo. Postal 70-275, Circuito exterior, Ciudad Universitaria, MX-04510 México, D.F., Mexico

acordoba@ecologia.unam.mx

*Received March 19, 2004 / Revised and Accepted March 8, 2005*

*P. quinta* is a tropical sp. with 2 ♂ morphs: the black-winged (BW) ♂ and the hyaline-winged (HW) ♂; here their sexual behaviour is described. In general, ♂♂ seem to spend relatively little time in flying activities. This may be explained either by the inability to recognise conspecifics and, hence, engage in social interactions, or by the reduced energetic reserves that prevent them from engaging in expensive activities. BW ♂♂ were more aggressive and site-faithful than HW ♂♂. BW defended spaces containing debris (plant and wood) against conspecifics while HW did not. BW-BW, BW-HW and HW-HW aggressive encounters were common. Despite their non-aggressive nature toward BW ♂♂, HW ♂♂ behaved aggressively when faced by HW ♂♂. The distance flown by each morph from ♂ grasping of the ♀ until she started oviposition was measured: HW flew longer distances than BW. These differences between ♂ morphs are compared to those found in *Mnais p. pruinosa*, another ♂ dimorphic zygopteran. Similar to what happens in that sp., both tactics in *P. quinta* are possibly maintained due to the similar reproductive and energetic costs accrued by and benefits paid to each morph.

**POSTCOPULATORY GUARDING BEHAVIOUR  
IN A TERRITORIAL DAMSELFLY,  
*PSEUDAGRION P. PILIDORSUM* (BRAUER),  
FOR SUBMERGED OVIPOSITING FEMALES  
(ZYGOPTERA: COENAGRIONIDAE)**

K. MATSUBARA<sup>1</sup>\* and M. HIRONAKA<sup>2</sup>

<sup>1</sup> Department of Applied Biological Sciences, Faculty of Agriculture, Saga University,  
Honjo 1, Saga, 840-8502, Japan

<sup>2</sup> Department of Biology, Faculty of Medicine, Hamamatsu University School of Medicine,  
Handayama 1-20-1, Hamamatsu, Shizuoka, 431-3192, Japan

*Received September 29, 2004 / Revised and Accepted April 22, 2005*

The postcopulatory mate guarding behaviours by territorial and non-territorial ♂♂ for submerged ovipositing ♀♀ were investigated in the field. After copulations, ♀♀ in tandem began to oviposit at the water surface and thereafter they usually submerged completely underwater. The ♀ often repeated the submergence and emergence at several oviposition sites. When the ♀ submerged completely, the ♂ released her without submergence and rested above the water surface during oviposition (non-submerged guarding), or the ♂ submerged completely and remained in tandem, whether only at first or for the duration of the oviposition (submerged guarding). Territorial ♂♂ always performed non-submerged guarding when the ♀ oviposited inside their territories. The non-submerged guarding inside the territory might allow the territorial ♂ both to guard the ovipositing ♀ and to maintain his territory. On the other hand, when the ♀ oviposited inside another ♂'s territories, territorial and non-territorial ♂♂ exhibited both non-submerged guarding and submerged guarding. Thus, *P. p. pilidorsum* ♂♂ may adopt either submerged guarding or non-submerged guarding in response to change in the probability of a takeover of the emerged ♀ by rival ♂♂ inside another ♂'s territory.

**POSSIBLE SETTLEMENT BENEFITS RELATED  
TO SITE FIDELITY FOR THE TERRITORIAL DRAGONFLY,  
*PERITHEMIS TENERA* (SAY)  
(ANISOPTERA: LIBELLULIDAE)**

P.V. SWITZER

Department of Biological Sciences, Eastern Illinois University, Charleston, IL 61920,  
United States; – Phone 217-581-6951; – Fax 217-581-7141; – e-mail cfpvs@eiu.edu

*Received January 8, 2005 / Reviewed and Accepted March 23, 2005*

Site fidelity, the tendency to return to a previously occupied breeding location, is commonly observed in animals and yet often the benefit to such behavior is unclear. In this study, possible settlement benefits to site fidelity for *P. tenera* are examined. ♂♂ defend small mating territories on ponds and lakes to which they typically, but not always, return the following day. In an observational study, it was found that ♂♂ did not become territorial earlier in the day when site-faithful than when switching territories. However, ♂♂ switching territories were more likely to be seen examining oviposition sites (other than the site they ultimately defended) prior to becoming territorial than site-faithful ♂♂. In an experimental study, it was controlled for differences in territory and oviposition site structure, time of day, evictions and disturbance, and found that site-faithful ♂♂ spent significantly less time settling on a territory prior to defending that territory than ♂♂ settling at a site for the first time. Because ♂♂ examining sites are probably more at risk from predators, this study suggests that site-faithful ♂♂ may experience lowered settlement costs than males returning to their original territory.

**MALE HARASSMENT ON FEMALE COLOUR MORPHS  
IN *ISCHNURA ELEGANS* (VANDER LINDEN):  
TESTING TWO FREQUENCY-DEPENDENT HYPOTHESES  
(ZYGOPTERA: COENAGRIONIDAE)**

H. VAN GOSSUM<sup>1,\*</sup>, L. DE BRUYN<sup>1,2</sup> and R. STOKS<sup>3</sup>

<sup>1</sup> Evolutionary Biology Group, University of Antwerp, Groenenborgerlaan 171, B-2020 Antwerp, Belgium; – Fax: +32 (0)32653474; – Phone: +32 (0)32653282; – e-mail: Hans.VanGossum@ua.ac.be

<sup>2</sup> Institute of Nature Conservation, Kliniekstraat 25, B-1070 Brussel, Belgium

<sup>3</sup> Laboratory of Aquatic Ecology, University of Leuven (KULeuven), De Bériotstraat 32, B-3000 Leuven, Belgium

*Received February 14, 2005 / Revised and Accepted March 23, 2005*

In many Zygoptera spp. ♀♀ occur in different colour morphs, with one morph coloured like the ♂ (andromorph), while the others are not (gynomorph). Two hypotheses have been proposed to explain frequency-dependent harassment of ♀ morphs. According to the first, ♂♂ should prefer the more frequent of the 2 ♀ morphs (learned-mate recognition hypothesis). According to the second, ♂♂ should prefer andromorphs more if their frequency relative to ♂♂ increases, but not so for gynomorphs which always should be attempted to mate with on encounter (mimicry hypothesis). Here, it is reported on a re-analysis of earlier published data on morph-specific harassment for *I. elegans*, which allows examination of the 2 proposed hypotheses. The data were collected in 8 insectaries with different ratios of ♂♂ and ♀ morphs. As reported earlier, ♂ harassment is highest on the most common ♀ morph supporting the learned-mate recognition hypothesis. The ratio of andromorphs to ♂♂ had no morph-specific effects in amounts of ♂ harassment, wherefore the data suggest rejection of the mimicry hypothesis.

\* Corresponding author