Odonatologica 39(2): 97-106 *June 1, 2010*

EMERGENCE PATTERNS AND LATITUDINAL ADAPTATIONS IN DEVELOPMENT TIME OF ODONATA IN NORTH SWEDEN AND POLAND

F. JOHANSSON[1], S. ŚNIEGULA[2] and T. BRODIN[1]

[1] Department of Ecology and Environmental Science, Umeå University, SE-90187 Umeå, Sweden
[2] Department of Ecosystem Conservation, Institute of Nature Conservation, Polish Academy of Sciences, Mickiewicza 33, PO-31-120 Kraków, Poland

Received December 17, 2009 / Revised and Accepted January 26, 2010

Using exuviae, data are presented on emergence dates of dragonflies from northern Sweden and northwestern Poland. The 17 spp. sampled in Sweden showed considerable overlap in emergence periods. In Sweden, *Leucorrhinia rubicunda* was the first sp. to emerge (May 31) and *Sympetrum danae* the last (July 19). A comparison of first dates of emergence of spp. in Sweden and Poland showed a difference between 9 and 30 days, with all Polish spp. emerging first. Compared to spring species, summer species and obligate univoltine summer species showed less difference in first date of emergence between Swedish and Polish populations. In a laboratory experiment *Leucorrhinia dubia* was reared from both regions from the egg to final instar larva under northern Swedish and northwestern Polish photoperiods. Swedish larvae developed faster under a northern Swedish photoperiod compared to a northwestern Polish photoperiod. However, no such difference in development was found for northwestern Polish larvae. This suggests that there are genetic differences between both populations in response to photoperiod. The results are discussed in the context of compensation of larval development of northern populations in relation to photoperiod.

Odonatologica 39(2): 107-119 *June 1, 2010*

CONTINUOUS AND STEPWISE OOCYTE PRODUCTION IN LIBELLULIDAE (ANISOPTERA)

M. KARLSSON[1,2], G. SAHLÉN[1] and K. KOCH[3]
[1] Ecology and Environmental Sciences, Halmstad University, P.O. Box 823, S-30118 Halmstad, Sweden
[2] Department of Animal Ecology, Ecology building, Lund University, S-22362 Lund, Sweden
[3] Department of Ecology, University of Mainz, Becherweg 13, D-55128 Mainz, Germany

Received July 5, 2009 / Revised and Accepted February 18, 2010

Compared to other insect groups, libellulids have a rather high mean number of ovarioles. In addition, the mean ovariole diameter differs greatly between and within species. In general, 2 different types of ovariole arrangement exist: (1) all developing oocytes mature and equal in size; in some species without, and in others with, surrounding connective tissue and (2) oocytes displaying gradual maturation, with only the outermost ovarioles mature. These differences have ecological consequences: the first arrangement occurs in spp. that have stepwise egg production. These spp. will lay one or more clutches, after which an interclutch interval of ovariole regrowth follows. Spp. with the second arrangement have continuous egg production and are able to lay at least some eggs all the time, reducing the length of interclutch intervals. However, no direct connection between mate-guarding strategies and ovariole arrangements can be seen. Nevertheless, it is believed that the process of ovariole maturation differs between these groups. It is concluded that ovary morphology in libellulids may exhibit evolutionary fixed traits, although the whole picture still remains complex. The ovariole arrangement may have a crucial impact on the reproductive ecology of the species.

Odonatologica 39(2): 121-131 *June 1, 2010*

TWO NEW ANDEAN SPECIES OF THE GENUS *ISCHNURA* CHARPENTIER FROM COLOMBIA, WITH A KEY TO THE REGIONAL SPECIES (ZYGOPTERA: COENAGRIONIDAE)

E. REALPE
Laboratorio de Zoología y Ecología Acuática, Departamento de Ciencias Biológicas, Universidad de Los Andes, Carrera 1 N° 18A 10 Bloque J, Bogotá, Colombia
erealpe@uniandes.edu.co

Received March 30, 2009 / Revised and Accepted December 18, 2009

I. chingaza sp. n. (holotype ♂: Cundinamarca Dept, Parque Nacional Natural Chingaza, Quebrada La Playa, alt. 3164 m a.s.l., 10-V-2005) and *I. cyane* sp. n. (holotype ♂: Cundinamarca Dept, Francisco de Sales, Vereda San Miguel, alt. 1984 m a.s.l., 1-XII-2004) are described and illustrated. The types are deposited at Mus. Hist. Nat., Univ. Andes, Bogotá. A key to the regional spp. is appended.

Odonatologica 39(2): 133-140 *June 1, 2010*

ADULT ODONATA COMMUNITY IN DINAGAT ISLAND, THE PHILIPPINES: IMPACT OF CHROMIUM ORE MINING ON DENSITY AND SPECIES COMPOSITION

R.J.T. VILLANUEVA
D3C Gahol Apartment, Lopez Jaena St., PH-8000 Davao, Philippines
rjtvillanueva@gmail.com

Received December 4, 2009 / Revised and Accepted December 14, 2009

Mining modifies the surrounding environment and causes habitat deterioration along river systems receiving mine tailings. Here it is assessed whether chromium ore mining affects the odon. abundance and diversity. Line transect surveys were conducted during 4 months at the Henry river (along a pristine section and a previously mined section), and at the Lecing river, which is currently receiving tailings from chromium ore mines. The density of adult odon. was 10 times higher in the pristine than in the mined river. Species richness was reduced in both the currently and in the previously mined sections (5 spp.) as compared to that of the pristine river (12 spp.), showing a detrimental effect of chromium mining on dragonfly diversity and abundance.

Odonatologica 39(2): 141-148 *June 1, 2010*

SHORT COMMUNICATIONS

THE PROCESS OF MOULTING DURING FINAL EMERGENCE OF THE DRAGONFLY *PANTALA FLAVESCENS* (FABRICIUS) (ANISOPTERA: LIBELLULIDAE)

R.J. ANDREW and N. PATANKAR
Department of Zoology, Hislop College, Civil lines, Nagpur-440 001, India
rajuandrew@yahoo.com

Received August 6, 2009 / Revised and Accepted February 1, 2010

The chain of events occurring during emergence in *P. flavescens* is described in detail. The moulting process is divided into 3 stages. The larva climbs out of the water a few hours after sunset. If disturbed while climbing, it exhibits thanatosis i.e. death feigning and crab-like side-ways crawling. It stops at a suitable vertical emergent support. Manipulation from vertical to horizontal of this support stops commencement of ecdysis. – Stage I starts from the moment the larva finds a suitable site for moulting. Soon, it starts shuddering, quivering and shaking its body in a synchronized pattern. The imago inside the exuviae exerts pressure on the thoracic tergites until the cuticle splits. This stage varies from 8 to 20 min and occupies 16% of the moulting period. – During stage II, the head and thorax of the imago emerge out of the split thoracic cuticle. The imago exhibits an antero-posterior humping movement and the body hangs out downwards with folded legs. The half suspended, upturned imago starts 'breathing' heavily. Unfolding of the legs and movements of the packed wings takes place in a characteristic manner. The imago turns upwards, grips the head of the exuviae and jerks out the remaining terminal portion of the abdomen from the exuviae. This stage takes 18 to 35 min and occupies 31% of the moulting time. Pigmentation of the head region is completed during this stage. – In stage III, the imago is released from the exuviae, it starts hardening its cuticle and extending the wings. The imago moves a few inches above the exuviae. The abdomen is pale green and curved upwards. The wings expand but are opaque. Simultaneously, pigmentation of the body starts around the thoracic region and the terminal tip of the abdomen. Within 10-14 min the whole body of the imago develops a species-specific teneral pattern of colouration. Meanwhile, the expanding wings unfold and separate out and the teneral adult is ready for flight. This stage takes 40-55 min and occupies 53% of the total moulting period. Observations on incomplete metamorphosis indicate that gravitational force is responsible for uniform wing expansion.

Odonatologica 39(2): 149-152 *June 1, 2010*

PHILOGENIA MARINASILVA SPEC. NOV. FROM THE STATE OF ACRE, BRAZIL (ZYGOPTERA: MEGAPODAGRIONIDAE)

A.B.M. MACHADO
Departamento de Zoologia, Instituto de Ciências Biológicas,
Universidade Federal de Minas Gerais, Avenida Antonio Carlos, 6627, Caixa Postal 486,
BR 31270-901, Belo Horizonte, Minas Gerais, Brasil; − angelo@icb.ufmg.br

Received September 18, 2009 / Reviewed and Accepted December 18, 2009

The new sp. is described and illustrated from a single specimen, representing the second unquestionable *Philogenia* record from Brazil. Holotype ♂: Brazil, state of Acre, Mancio Lima, 11/15-VII-1996; deposited in author's collection. It is close to *P. schmidti*.

Odonatologica 39(2): 153-157 *June 1, 2010*

DESCRIPTION OF THE LARVA OF *PROTONEURA ROMANAE* MEURGEY FROM THE WEST INDIES (ZYGOPTERA: PROTONEURIDAE)

F. MEURGEY
Muséum d'Histoire Naturelle, 12 rue Voltaire, F-44000 Nantes, France
francois.meurgey@mairie-nantes.fr

Received March 23, 2009 / Revised and Accepted December 16, 2009

The larva from Guadeloupe is described, illustrated for the first time, and compared to the other described larvae. Additional notes on ecology are also given.

Odonatologica 39(2): 159-162 *June 1, 2010*

DIURNAL CHANGES IN MALE MATE PREFERENCE TO FEMALE DIMORPHISM IN *ISCHNURA SENEGALENSIS* (RAMBUR) (ZYGOPTERA: COENAGRIONIDAE)

Y. TAKAHASHI and M. WATANABE*
Graduate School of Life and Environmental Sciences, University of Tsukuba, Tsukuba, Ibaraki, 305-8572 Japan; – yuyuyuyu@ies.life.tsukuba.ac.jp

Received October 29, 2009 / Reviewed and Accepted November 18, 2009

I. senegalensis ♀♀ exhibit colour dimorphism as andromorphs and gynomorphs, to which males seem to switch their mate preference according to prior copulation experience. In the field where andromorphs were dominant, the binary choice experiments were conducted both in the early morning, which marks the onset of daily copulation activity, and in the afternoon, which marks the end of the copulation activity. During the former period, ♂♂ showed fair selectivity, while they preferred the andromorphs in the afternoon, suggesting that ♂ mate preference to each ♀ morph switched in relation to copulation experience; i.e. the mating attempts of ♂♂ were biased to the dominant ♀ morph. Mating attempts in the afternoon were considered to inhibit ♀ oviposition behaviour, resulting in a decrease of her reproductive success. Therefore, biased ♂ mate choice toward the dominant morph in the afternoon might be a selective force to maintain the ♀ colour dimorphism.