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Photographic documentation of an unguarded oviposition in the Large Red Damselfly, *Pyrrhosoma nymphula* (Sulzer, 1776) (Odonata: Coenagrionidae)

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Abstract

This short note photographically documents and discusses an unguarded oviposition of the Large Red Damselfly, *Pyrrhosoma nymphula* (Sulzer, 1776). The observation took place on 29.V.2025 in Lower Austria.

Keywords. Zygoptera, *Pyrrhosoma nymphula*, unguarded oviposition.

Zusammenfassung

In dieser kurzen Notiz wird die unbewachte Eiablage der Frühen Adonislibelle, *Pyrrhosoma nymphula* (Sulzer, 1776) fotografisch dokumentiert und diskutiert. Die Beobachtung fand am 29. Mai 2025 in Niederösterreich statt.

Introduction

The females of the Odonata family Coenagrionidae oviposit in tandem position. This form of guarded oviposition is known as "contact guarding" (Corbet 1999). In Europe, an exception within this family are the females of *Ischnura* species, which consistently lay their eggs unguarded, i.e., without accompaniment by their mating partner (Wildermuth & Martens 2019; see also Martens 2001). Among the members of the other genera within this family, unguarded oviposition occurs only in exceptional cases (Chovanec & Wildermuth 2017). The present note reports on such an instance in *Pyrrhosoma nymphula* (Sulzer, 1776), which could have been documented through photography. Photographs play a major role in odonatology: as evidence for records, as a basis for species identification, and, last but not least, as documentation of behaviour (see also for example Jödicke & Borkenstein 2019, Wildermuth 2019, Chovanec 2020a).

Observation date and site

The observation was conducted at one of three closely adjacent, artificial small water bodies located in the eastern peripheral zone of the Wienerwald Biosphere Reserve in Mödling (Lower Austria), just south of Vienna (48°04′13″N, 16°16′46″E; 273 m a.s.l.). Odonatological studies at these water bodies have been the subject of several publications that provide detailed site descriptions (Chovanec 2024, 2025). *Pyrrhosoma nymphula* is autochthonous at this location and occurs in high abundances.

Figs 1–2: (1) Female of *Pyrrhosoma nymphula* f. *typica* during unguarded oviposition and (2) perching to warm up (oviposition is interrupted), Mödling, Lower Austria, 29.V.2025. © A. Chovanec.

The observation took place on 29.V.2025 between 13:41 and 13:48 CEST. On that day, Mödling experienced rain showers until noon, with a maximum air temperature of 15 °C. Despite periods of heavy cloud cover, short sunny spells occurred. From noon onwards, the temperature rose to 17 °C, precipitation ceased, and sunshine duration increased.

Observation

Upon arrival at the small water body at 13:40 CEST, at the beginning of a sunny spell, no dragonflies were encountered. At 13:41 CEST, a female of *P. nymphula* appeared from the sunlit herbaceous vegetation approximately 2–3 m from the shore and flew to the water, where it began oviposition alone. It approached two adjacent areas at the boundary between the riparian vegetation (*Typha latifolia*, *Leersia oryzoides*) and the open water surface. About a minute later, the female moved to a shoreline section roughly 3 m away, characterised by damp moss and a small stand of *T. latifolia*. Oviposition also took place there at two locations (Fig. 1). After about two minutes, the female paused oviposition to perch on a horizontal, well-sunned part of the leaf for approximately two minutes to warm up (Fig. 2). It then resumed oviposition before flying out of the observation area. At this time, a Downy Emerald, *Cordulia aenea* (Linnaeus, 1758), and a Four-spotted Chaser, *Libellula quadrimaculata* Linnaeus, 1758, were observed patrolling over the water, but no further *P. nymphula* individuals were present.

Discussion

In *P. nymphula*, mating lasts between 10 and 30 minutes. During the subsequent endophytic oviposition, the female is usually accompanied by the male in tandem position. The male remains attached to the female in an upright or inclined position, rarely in a horizontal posture (Sternberg 1999, Mill 2010, Wildermuth & Martens 2019; see also Martens 1993). Solo oviposition in *P. nymphula* has already been documented (Sternberg 1999). The author of the present note personally observed an unguarded oviposition of the species at a very small, artificial water body in a garden centre on 19.V.2018 at 12:30 CEST

(Chovanec 2020b). In contrast to that observation, Sternberg (1999) emphasised that such events predominantly occur late in the afternoon or towards the end of the flight period.

The case of unguarded oviposition described in this article may have been caused by the weather conditions prevailing on that day. It is conceivable that the mating preceding the oviposition took place during a brief period of sunshine. Increasing cloud cover and rain may have been responsible for the male breaking the linkage. That weather conditions can influence the oviposition behaviour of Odonata was mentioned by Koch (2006): Females of *Crocothemis erythraea* (Brullé, 1832) and *Pantala flavescens* (Fabricius, 1798) were seen to oviposit unguarded just before or after rain or thunderstorms.

An additional interpretative approach to unaccompanied oviposition was provided by Hilfert & Rüppell (1997): For females that have already copulated, effective oviposition is more likely to increase fitness than additional copulations would, while males try to mate with as many females as possible in order to maximise fitness. One possible reaction of females to male harassment might be ovipositing unguarded under suboptimal conditions, for example, at low air temperatures (see also Corbet 1999).

The observation described and discussed in this article underlines a plasticity in oviposition behaviour in Odonata (see also Sparrow et al. 2020). Weather conditions, the stress experienced by females in high male densities, as well as altered habitat conditions, can be reasons for deviations from the typically observed patterns of reproductive behaviour (e.g. Waage 1979, Koch 2006, Wünsch & Gospodinova 2014, Chovanec 2017, 2023, Jödicke & Borkenstein 2019).

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