

ASPECTS OF HABITAT SELECTION BY ADULT DRAGONFLIES AT A NEWLY CREATED POND IN VIENNA, AUSTRIA

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Investigations of the perching site selection by adult dragonflies were carried out at the "Tritonwasser", on the "Donauinsel". Special attention is drawn to the perching behaviour of *Orthetrum cancellatum* and *Crocothemis erythraea*. Both spp. select a great variety of structures and preferably perch in heights between ground level and 70 cm. *Crocothemis* showed a stronger preference for perching sites over the water surface. Other spp. observed were *Coenagrion puella*, *Erythromma viridulum* and *Ischnura elegans*.

INTRODUCTION

The conservation of primary aquatic ecosystems as well as the restoration or construction of habitats are the most important elements of sound dragonfly protection (e.g. MARTENS, 1991; MOORE, 1991). Conservation depends to a large extent upon understanding the factors which determine the composition of the dragonfly fauna. Therefore appropriate research is the key for success of management practices; in this connection aspects of habitat selection (e.g. BUCHWALD, 1992; CHOVANEC, 1993; WILDERMUTH, 1994) and colonization are of major interest (see also WILDERMUTH, 1991).

This paper deals with the selection of perching sites by the following odonate species occurring at a newly created pond in Vienna (Austria), the "Tritonwasser": *Coenagrion puella*, *Erythromma viridulum*, *Ischnura elegans*, *Orthetrum cancellatum* and *Crocothemis erythraea*. Within the investigation period 23 species were recorded, those 5 were the most abundant.

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STUDY AREA

The Tritonwasser is an artificial wetland, about 2 ha in size, situated on the "Donauinsel" ("Danube Island") in Vienna. The water body was constructed in 1989/90 as compensation for the loss of aquatic ecosystems in the Vienna Danube area. The Donauinsel, with a length of about 21 km, represents the major element of flood protection in Vienna, it is a highly frequented recreational area, where also ecologically precious zones occur. The initial plantings of terrestrial vegetation as well as of emergent and submerged macrophytes, made in the summer of 1990, favoured the development of a dense belt of vegetation which prevents visitors from reaching the water and creates a habitat rich in structural diversity. The study area has been described by CHOVANEC et al. (1993), GOLDSCHMID & GRÖTZER (1993) and CHOVANEC (1994).

Biotope parameters of the Tritonwasser: the water body and the littoral areas are totally exposed to the sun; a high degree of shoreline diversification was reached by the construction of beaches and two islands; the maximum depth is about 2.50 m. About 80% of the shoreline is dominated by dense reed stands (*Schoenoplectus lacustris*, *Typha angustifolia*, *Phragmites australis* in equal shares) and to a minor degree by *Carex* spp., *Juncus* spp., *Sparganium erectum*, *Iris pseudacorus*, *Butomus umbellatus* and *Alisma gramineum*; *Myriophyllum spicatum* is the highly abundant submerged macrophyte species which occurs over the whole area as floating mats.

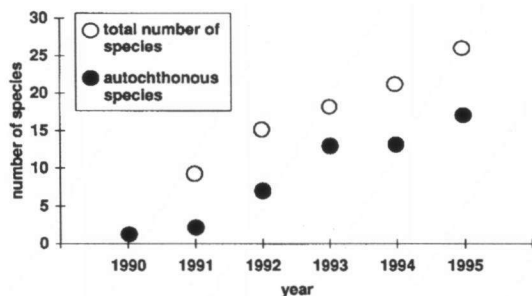


Fig. 1. Development of dragonfly population at the "Tritonwasser" during the first six years subsequent the construction of the habitat.

Recordings of dragonflies colonizing the Tritonwasser have been carried out since 1990, as a long-term monitoring program (CHOVANEK, 1994). As shown in Figure 1, the total number of species increased from 1 in 1990 to 26 in 1995 and the number of autochthonous species (records of adults; observations of reproduction/breeding behaviour and/or records of larvae, freshly emerged imagines or exuviae) from 1 to 17. During these six years, about 80 visits were made to the area.

METHODS

Observations were performed in the second half of July 1994 and July 1995. A total of 12 visits was made, 6 between 14th and 28th July 1994, 6 between 17th July and 1st of August 1995. Each visit was made during sunny weather, air temperatures were between 20 and 35°C. The 8 morning visits usually lasted from about 9.00 to 12.00 h, the 4 visits in the afternoon lasted from 12.00 to 15.00 h Central European time. During each visit, the various littoral zones of the Tritonwasser were visited, at every homogeneous vegetation patch the dragonfly perching sites were recorded. Therefore, the numbers given below refer to the observations rather than to the exact number of individuals.

RESULTS AND DISCUSSION

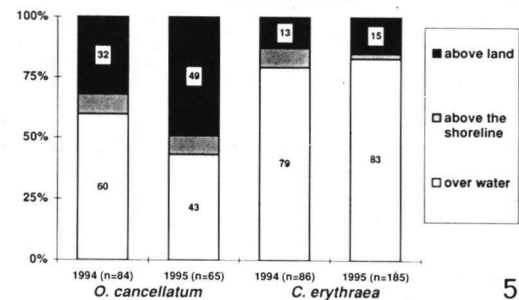
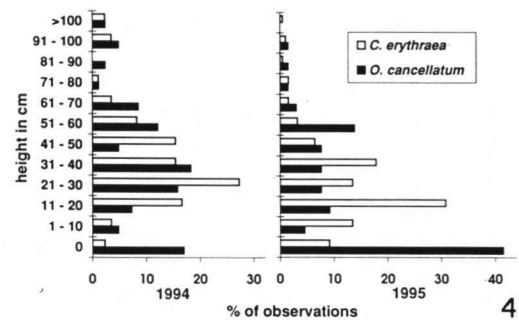
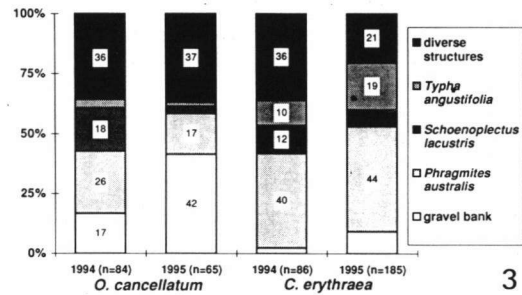
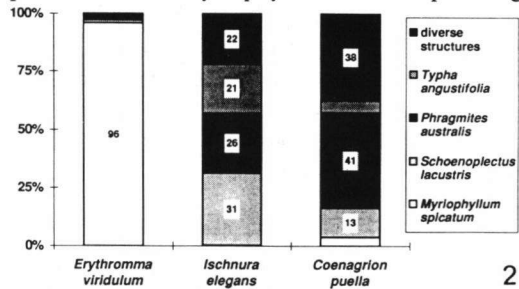
PERCHING SITES OF *COENAGRION PUELLA*, *ERYTHROMMA VIRIDULUM*
AND *ISCHNURA ELEGANS*

In 1994 and 1995, *Erythromma viridulum*, *Ischnura elegans* and *Coenagrion*

puella were the most abundant zygopteran species at the Tritonwasser. Highest number of *E. viridulum* individuals (males and females) recorded during one visit – 1994: about 425, 1995: about 1,770; *I. elegans* – 1994: 135, 1995: 108; *C. puella* – 1994: 34, 1995: 26. Apparent preferences for *Myriophyllum* mats as perching sites were shown by *E. viridulum*. Dense reed stands consisting of *Schoenoplectus lacustris*, *Phragmites australis* and *Typha angustifolia* were frequented by *I. elegans*. *C. puella* preferably perched on *P. australis* stems and on diverse structures, such as elements of the terrestrial vegetation near the shoreline or *Juncus* sp. stems (Fig. 2).

PERCHING SITES OF MALE
ORTHETRUM CANCELLATUM
AND *CROCOTHEMIS*
ERYTHRAEA

The highest number per visit of male *Orthetrum cancellatum* was estimated at 24 for 1994, and at 15 for 1995; *Crocothemis erythraea*: 21 (1994) and 42 (1995). *O. cancellatum* preferably perched on gravel



Figs 2-5. Perching sites of various species [n = number of observations]: (2) aggregated 1994 and 1995 data for both sexes of *Erythromma viridulum* (n=7291), *Ischnura elegans* (n=946) and *Coenagrion puella* (n=237); – (3) male *Orthetrum cancellatum* and *Crocothemis erythraea*; – (4) heights of perching sites of male *C. erythraea* (1994 n=86, 1995 n=185) and *O. cancellatum* (1994 n=84, 1995 n=65); – (5) perching sites of male *O. cancellatum* and *C. erythraea* above land, above the shoreline and over water.

banks (especially in 1995) and on *Phragmites* stems; in both years *C. erythraea* individuals were mostly perched on *Phragmites* stems (Fig. 3). In the two afternoons of 1994, gravel banks were avoided as resting place by both species because of high air temperatures (about 35°C) heating up the stones, a phenomenon also described by ASKEW (1988). The high proportion of selected "diverse structures" indicates the great variety of perching sites of these two species. "Diverse structures" comprise for example terrestrial vegetation, *Juncus*, *Butomus*, or *Carex* stands, or a piece of wire sticking in the sediment. A high proportion of *O. cancellatum* perching sites were at ground level because of the strong selection of gravel banks and between 10 and 70 cm; males of *C. erythraea* preferably rested in similar places (Fig. 4).

A clearer aspect of the spatial segregation of both species is depicted in Figure 5. In both years, *Crocothemis* showed a stronger preference for perching sites over the water surface. In the case of *Orthetrum*, the ratio was more balanced, not least because of the high number of perching sites on the gravel banks. In 1995 nearly 50% of the perchings were above land.

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