



HABITATWAHL, FORTPFLANZUNGSVERHALTEN UND SCHUTZ MITTELEUROPÄISCHER LIBELLEN (ODONATA)

HABITAT SELECTION, REPRODUCTIVE BEHAVIOUR AND CONSERVATION OF CENTRAL-EUROPEAN DRAGONFLIES (ODONATA)



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III. FFH-Richtlinie und Artenschutz

André Bönsel:

First results of mapping and monitoring four dragonfly species of the FFH Directive (Annex II and IV) in Mecklenburg-Vorpommern (Insecta: Odonata)

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Zusammenfassung

Präsent in Mecklenburg-Vorpommern sind *Leucorrhinia pectoralis*, *L. albifrons*, *L. caudalis* und *Aeshna viridis*; *Stylurus flavipes* kommt nur an der Elbe vor. Durch Nachweise von Exuvien wurden im Zeitraum von 2001-2003 zehn Kolonien von *A. viridis*, sechs von *Leucorrhinia albifrons* und drei von *L. caudalis* bekannt. *L. pectoralis* wurde an 51 Standorten beobachtet, an 18 Gewässern die Bodenständigkeit durch Exuvienfunde belegt. Von dieser Art wurden überwiegend individuenschwache Vorkommen entdeckt, die in der Regel im Umkreis einer individuenreichen Kolonie lagen. Es wird vermutet, dass sich diese Art durch eine Metapopulationsstruktur an verändernde Habitatbedingungen in eutrophen und damit relativ schnell verlandenden Gewässern angepasst hat. Um Ergebnisse von Kartierungen zur Artverbreitung und dem Monitoring interpretieren zu können, müssen zukünftig solche Sachverhalte und Habitatansprüche eindeutig geklärt werden. Auch über Pflegemaßnahmen von Habitaten solcher FFH-Arten sollte weiter diskutiert werden, da sich zeigte, dass Habitatschwerpunkte in unterschiedlichen geografischen Landschaftseinheiten variieren. Schutzmaßnahmen dürften dann in Europa nicht einheitlich formuliert werden.

1. Introduction

Apart from numerous FFH habitats and species (BAIER & ZIMMERMANN 1999, WACHLIN & MÜLLER-MOTZFELD 1999, KEIL & SPIESS 2003), in Mecklenburg-Vorpommern occur five species of dragonflies that are to be protected all over Europe according to the annexes II and IV of the FFH Directive. The long-term aim is to check all historical colonies of these species and to find out the actual distribution in Mecklenburg-Vorpommern. Potential FFH habitats and their immediate surroundings were checked for new colonies in 2001-2003. Each Federal Province has to present a report on the situation of the annex II species' colonies of the FFH Directive after six years. Therefore, waters with autochthonous colonies need to be found, therefore particularly exuvia of the species were looked for. The first results of 2001-2003 are presented in this paper.

2. Study area and methods

Up to now, the river valleys of Warnow, Trebel and Peene, being one part of the Lake District near the towns Teterow, Feldberg, Neustrelitz and Gadebusch, as well as some revitalized rain bogs and lowland bog-complexes with peat-diggings were visited as potential FFH habitats. The known colony of *Stylurus flavipes* at the Elbe River in Mecklenburg-Vorpommern was confirmed by findings of exuvia in 2002. Since further colonies are not expected, they were not searched purposefully. Empty quadrants in the figures 1 – 4 do not represent landscape units without the four FFH dragonfly species, but are not mapped yet. In order to know the distribution of the FFH dragonflies, potential breeding waters were sampled two to three times a year.

According to the FFH Directive, exact abundance of colonies are to be registered for monitoring, so that in known habitats sampling took place three to four times a year. Length of sampling transects varied, since different sizes of the waters made impossible transects with a standardized length demanded in some publications (FARTMANN et al. 2001, GNL e.V. 2001). Sampling for exuvia along a minimum transect length of 30 m was aimed at, but was hard to realize in very small waters.

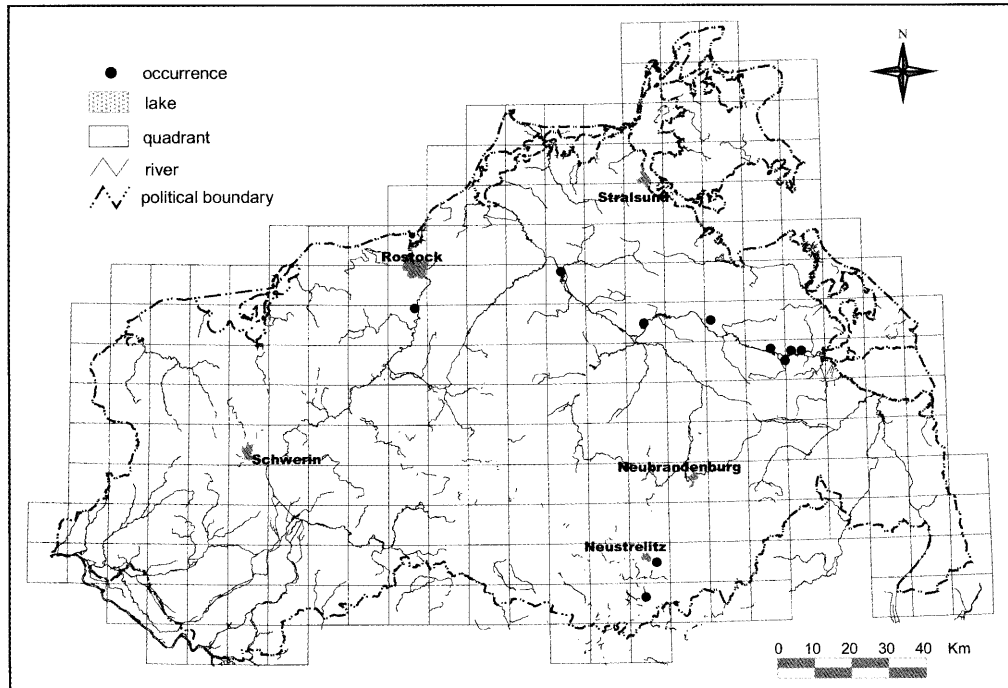


Fig. 1: Occurrences of *Aeshna viridis* in Mecklenburg-Pomerania in the mapping periods of 2001-2003

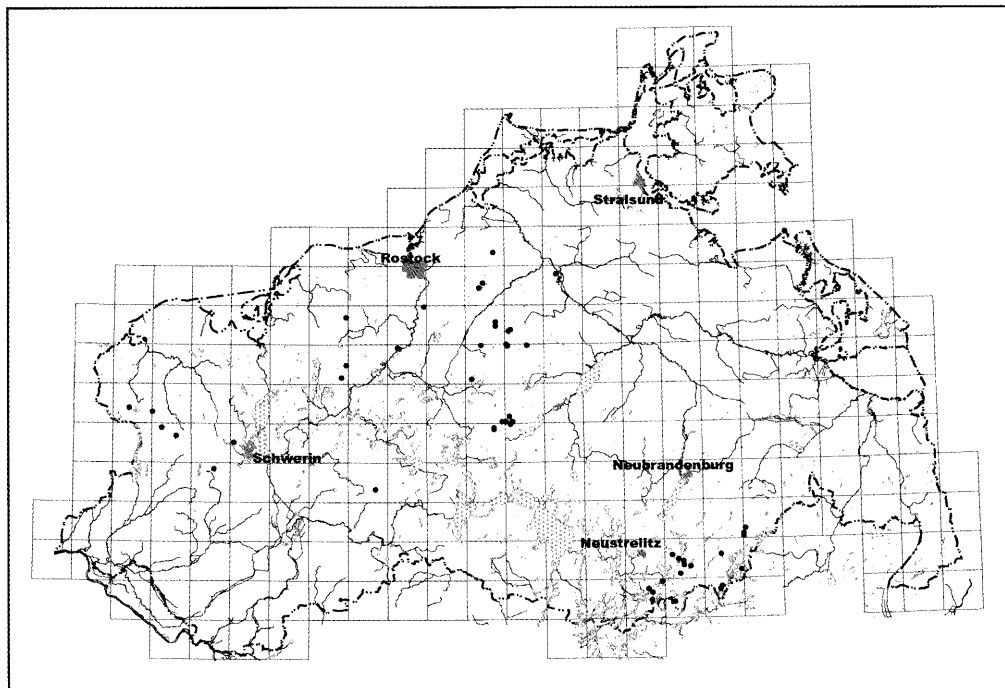


Fig. 2: Occurrences of *Leucorrhinia pectoralis* in Mecklenburg-Pomerania in the mapping periods of 2001-2003

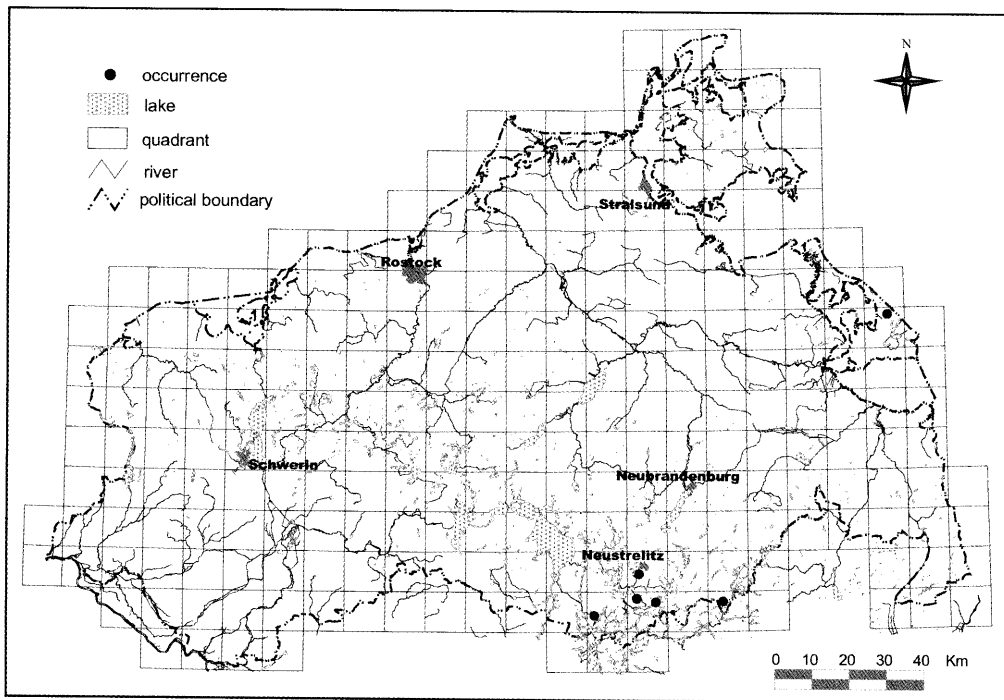


Fig. 3: Occurrences of *Leucorrhinia albifrons* in Mecklenburg-Pomerania in the mapping periods of 2001-2003

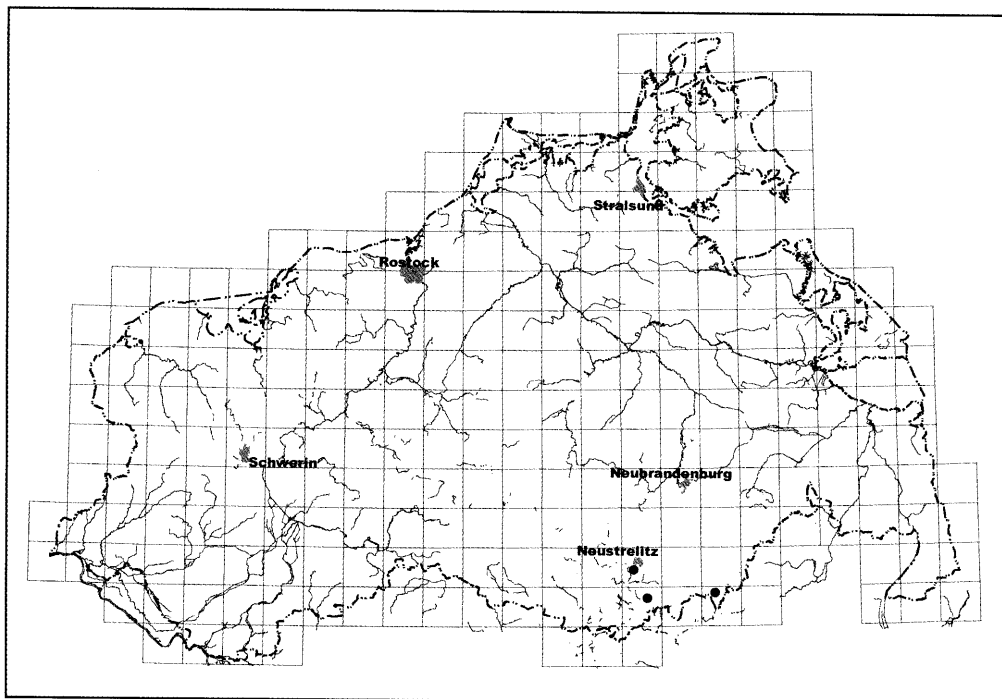


Fig. 4: Occurrences of *Leucorrhinia caudalis* in Mecklenburg-Pomerania in the mapping periods of 2001-2003

3. Results

Leucorrhinia pectoralis, *L. albifrons*, *L. caudalis*, *Aeshna viridis* occur in Mecklenburg-Vorpommern, whereas *Stylurus flavipes* was found only at the Elbe River (BÖNSEL 2002). In 2001-2003 we regarded ten colonies of *Aeshna viridis* (fig. 1), six of *Leucorrhinia albifrons* (fig. 3) and three of *L. caudalis* (fig. 4) as autochthonous by finding exuvia. The presence of *A. viridis* in Middle Europe is limited to the distribution area of *Stratiotes aloides* (PETERS 1987). This aquatic plant tends to basiphilous, boggy and shallow waters, according to its ecological requirements (ELLENBERG et al. 1991). Such environmental factors are limited to young moraine areas and valley edges of end moraines. Therefore, *A. viridis* will be found only along rivers and at small lakes (fig. 1), even if mapping area is expanded. In three waters inhabited by *A. viridis*, *Leucorrhinia pectoralis* was found, confirming observations from the Netherlands (DIJKSTRA et al. 2002). I hypothesize that *L. pectoralis* occurs in all waters inhabited by *A. viridis*, but their exuvia have been missed by some co-workers up to now.

According to the actual Red List of Mecklenburg-Vorpommern (ZESSIN & KÖNIGSTEDT 1992), *L. caudalis* is considered extinct. After MAUERSBERGER's (1999) rediscovery of this species at a small lake, two more findings were made (fig. 5) up to now. All findings were made at oligotrophic until mesotrophic lakes, which contained colonies or remnants of *Characeae*. The Red List status has to be revised now, since the assumption that MAUERSBERGER's (1999) findings will be followed by further ones (BÖNSEL 2002) has come true, and surely there will be even more colonies to be found.

From the actual observations of *L. pectoralis* (fig. 2) in 51 waters, 18 are proven autochthonous by findings of exuvia. Regarding these 51 waters, small ponds of glacial or anthropogenous origin are preferred (fig. 5).

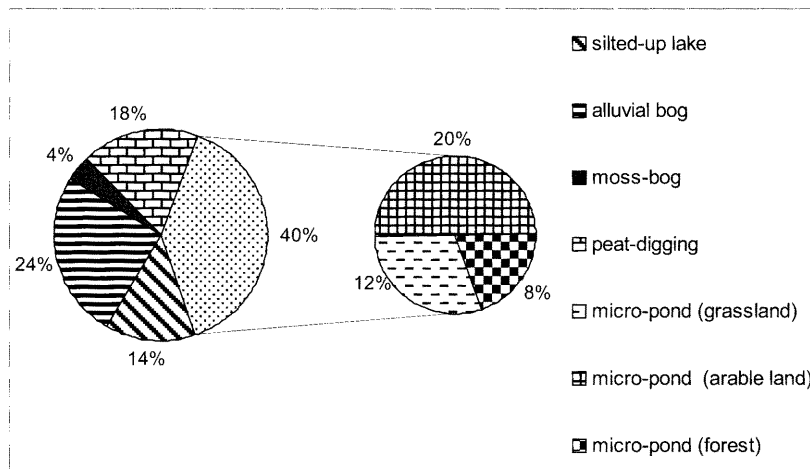


Fig. 5: Water types colonized by *Leucorrhinia pectoralis* (in %).

In general, eutrophic waters with abundant submerged and emerged vegetation were colonized. In contrast, acid, nutrient-deficient waters were colonized less often. There were no preferences for particular plant species or plant communities; therefore the main requirement seems to be the presence of abundant submerged and emerged vegetation. Imagoes, but never exuvia were also observed in polytrophic waters with thick algal mats. It is probable that eggs are laid in these waters, but development

does not or only rarely occur. Several waters were either surrounded by forest or rather trees and most micro-ponds were located in open areas, but this should not be of importance for the habitat. The two colonies of *L. pectoralis* richest in individuals were found in small eutrophic waters. One is located in a field, with abundant colonies of *Ceratophyllum spec.*, where 112 exuvia were found along a transect of 50 m. The second water is located at a forest edge; a quagmire developed by silting-up, extends far onto the water surface and is adjoined by dense stands of *Utricularia vulgaris*. Here, 135 exuvia were found along a transect of 10 m. Not taking into account these two big colonies, there was a mean of seven individuals, that is in average one individual per transect length of 50 m.

Considering the fact that exuvia were found in less than half of the 51 waters and normally few individuals it becomes clear that *L. pectoralis* is possibly widespread but autochthonous colonies in rich individuals are rare. Thus, this species can be merely survive in metapopulations, in keeping with the axiom that eutrophic waters will fast silt up. Such strategies of adaptation to dynamic habitats are known in numerous species (COCKBURN 1995, LEVINS 1970, RICKLEFS & MILLER 2000).

4. Outlook

The FFH Directive demands a report on the situation of FFH species after six years. In order to follow article 18 of the FFH Directive, different aspects of the autecology especially of annex II species, such as *Leucorrhinia pectoralis*, must be studied in great detail. Otherwise, data from monitoring, mapping and the distribution status, respectively, will be hard to interpret. Fluctuations in number of individuals at the respective waters in the observation intervals will hardly be explained exclusively by the influence of weather conditions. In the two years' observation the number of individuals of all species fluctuated considerably under similar weather conditions in the same landscape unit. Therefore, other parameters are needed to explain these phenomena, such as habitat parameters and the development of subpopulations. Typical habitat parameters and the development of colonies need to be known, just as possible differences between Southern to Northern and Eastern to Western Europe.

For the protection of *L. pectoralis* habitats, as the main measure of maintenance was proposed to clear the waters of submerged and emerged vegetation (WILDERMUTH & SCHIESS 1983, SCHIEL & BUCHWALD 2001, WILDERMUTH 2001), this contradicting the species' preference for eutrophic waters observed in Mecklenburg-Vorpommern. Silting-up seems to be compensated by a metapopulation structure, therefore development of new waters and support of natural processes by revitalization (see BÖNSEL & HÖNIG 2001) in the surroundings of autochthonous colonies rich in individuals should be the most important measure for protection. Independently whether the species normally occurs in metapopulations or not, it should be clarified which waters are to be monitored for the FFH report – either only main habitats or also accessory and latent habitats (see in this context FAHRIG & MERRIAM 1994, KINDVALL 1995a, b, 1999, STERNBERG 1995).

The habitat descriptions of *L. pectoralis* in Middle Europe show significant differences between those described in some publications (WILDERMUTH 1992, SCHORR 1996) and those preferred in Mecklenburg-Vorpommern. Which are the exact requirements (ultimate and proximate factors) of the species with regard to water types, and which water types are therefore to be provided for the effective conservation of the species? Are there differences in Federal Provinces and countries?

It is of international interest that the species is considered relatively rare in the most neighbouring Federal Provinces and countries (BROCK et al. 1997, BUCZYNSKI & ZAWAL 2004, KARJALAINEN 2002, NIELSEN 1998, SANDHALL 2000, WILDERMUTH 1994). This phenomenon of few colonies in the neighbourhood deserves wider recognition for further investigations. Then, Mecklenburg-Vorpommern should be current remain a country with the most colonies of *L. pectoralis* in Middle Europe that has implications for adequate conservation here.

5. Acknowledgements

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