

NICHE OVERLAP, NICHE SEGREGATION AND HABITAT SELECTION IN *SOMATOCHLORA ARCTICA* (ZETT) AND *S. ALPESTRIS* (SEL.) IN SWITZERLAND (ANISOPTERA: CORDULIIDAE)

In various regions of central Europe the sibling species *S. arctica* (AR) and *S. alpestris* (AL) overlap with respect to their distribution. This raises the question how far the ecological niches overlap or segregate respectively. The problem was investigated in Switzerland by collecting ecological data on the larval habitats, by experiments on habitat selection and by exploiting the corresponding data from the literature available.

AR is recorded at ca 90 localities. 83% of them are situated in the Alps, 6% in the Midlands and 11% in the Jura mountains. AL is found at more than 300 localities which are almost exclusively restricted to the Alps. The larval habitats of AR are situated between TL (thermic levels sensu K.-F. SCHREIBER (1977, *Wärmegliederung auf Grund von phänologischen Geländeaufnahmen in den Jahren 1969 bis 1973*. Eidg. Justiz- und Polizeidepartement, der Delegierte für Raumplanung) 4 and 10 (mainly TL 4-8) and those of AL between 1 and 8 (mainly TL 1-4). With respect to vertical distribution the two species overlap especially at TL 4 and 5 where they inhabit moorland biotopes. AR occurs at 40 localities

alone, AL at 170, whereas the two species coexist at 36 places. Sometimes the larvae of AR and AL even develop successfully in the same miniature water body. At TL 4 and 5 emergence and flying season of AR begin two to four weeks earlier than in AL.

Either species exist exclusively in waters which are free of fish, partly or completely overgrown by aquatic vegetation and covered with peat mud on the ground. The larvae of AR develop on the average in shallower waters than those of AL. In contrast to AR the latter inhabits also the shore of small lakes and little streams as long as their bottom is at least partly covered with organic matter. Concerning the hydrochemical features and the vegetation structure the breeding sites of the species are very similar. Those of AR are characterized by three and those of AL by seven different plant communities. For AR the Caricetum limosae is most important, for AL the Caricetum fuscae, the Caricetum limosae and the Caricetum rostratae. Above the treeline only AL exists. It is eurytopic and breeds in any type of habitat as long as they are equipped with aquatic vegetation and organic mud ground.

The cues which elicit habitat selection of the AR and AL were tested by field experiments with dummies of different materials. Either species react most intensely on dark brown perspex and black plastic foil, whereas aluminium foil is completely avoided. The reactions of both sexes are evoked by reflected polarized light with horizontal e-vector. No differences between AR and AL were found with respect to behavioural aspects of habitat selection. Both species take even very small dummy areas for oviposition sites.

In spite of the similarities there are gradual differences between the ecological niches of the species with respect to several factors, climatic features (heat sum) and size of the larval habitat being the most important. At places where AR and AL occur syntopically competition arises between the two species. It is suggested that the contest is held rather on the imaginal than on the larval level. AL is considered superior.

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