

LONG TERM CHANGES IN THE AUCHENORRHYNCHA FAUNA POPULATING NATURAL AND MANAGED FEN GRASSLANDS

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The extensive fenlands of the Biebrza Valley are diverse in terms of the origin of their peaty soils (and thus in their chemical and physical properties), their water relations and the rate of mineralisation of organic matter. In addition, the managed areas also differ in the degree to which they have been, or are being, dried out, as well as in the measures applied in the management, cultivation and use of the hay crop.

Among marshland communities, large areas on submerged organic soils are taken by *Caricetum elatae* (Koch 1926) sedgeland with tufted sedge, and by eutrophic sedgeland with lesser tussock sedge (*Caricetum diandrae typicum* Oswit 1973). In turn, mineral-muck soils in marshy habitats have *Molinietum coeruleae* (Koch 1926), with undergrowth in which willows of low habit (*Salix rosmarinifolia* and *S. cinerea*), and downy birch (*Betula pubescens*), are well represented.

Intensive drainage work began in the late 1950s, with a consequent increase in the area of cultivated meadows. Areas of drained peat were prepared for cultivation and sown with several species of grass (*Poa pratense*, *Festuca rubra*, *Alopecurus pratensis* and *Dactylis glomerata*) in a similar way, but the subsequent development of the vegetation differed in relation to the different methods by which the hay crop was managed and used (frequency of mowing and grazing). In turn, the changes occurring in the years following the draining and management of meadows were associated with changes in the Auchenorrhyncha assemblages inhabiting them.

The Auchenorrhyncha faunas inhabiting the 3 aforementioned types of natural environment were found to differ in their species composition, and in the abundances and dominance structure of those species. However, the dominant species were the same in each case, being *Neophilaenus lineatus* and *Cicadella viridis*, while *Philaenus spumarius*, *Sorhoanus assimilis* and *Ommatidiotus dissimilis* were always common. The greater part of the auchenorrhynchan assemblages in question are formed from one-generation species whose period of development coincides with Summer (July and August). In contrast, very low densities are typical for those species which also develop in Spring and late Summer (*Macrosteles laevis*, *M. 6-notatus*, *Arthaldeus pascuellus*, *Javesella pellucida* and *Deltocephalus pulicaris*) - outside the summer assemblage, on natural meadows.

The Auchenorrhyncha assemblages of natural marshy meadows do differ in the number (29-44) and diversity of species, but nevertheless display a relatively high degree of similarity with one another where species composition is concerned (63-66% on the basis of Sørensen's Index), as well as a certain similarity in dominance structure (42-45% on the basis of the index devised by Marczewski and Steinhaus).

Meadows established in the period on drained peats were colonised - in the initial phase of vegetative development - by several species of Auchenorrhyncha, namely *J. pellucida*, *M. laevis*, *A. pascuellus* and *Psammotettix confinis*. An abundant and diverse assemblage developed relatively quickly (after only several growing seasons) on these "artificial" meadows, with a large proportion of the species being ones that develop 2 generations. The high densities of these species (from outside the "summer" assemblage) in both Spring (*J. pellucida*) and Autumn (*D. pulicaris* and *A. pascuellus*) attest to the fact that changes in abundance in the growing season are characterised by three peaks: in Spring (May and June), Summer (July and August) and late Summer (September).

In the initial period of management of marshes (in the 1950s), there is relatively great (51-75%) similarity in the species compositions of the summer Auchenorrhyncha assemblages of meadows cultivated for several years and natural marshy meadows. However there is a much lower degree of similarity (of 5-24%) where dominance structure is concerned, because there are different dominants in the successive assemblages through the growing season. In May the species is *J. pellucida*, followed by *M. laevis* and *P. alienus*. In Summer the assemblage is dominated by several species: *M. laevis*, *J. pellucida* - still at the beginning of July, *Ph. spumarius*, *N. lineatus*, *E. sulphurella* and *A. pascuellus*. Common at the end of Summer are members of the second generations of *M. laevis*, *A. pascuellus*, *D. pulicaris* and *Forcipata citrinella*.

As the years pass, the "ageing" cultivated meadows are renewed by repeat ploughing and sowing. However, ongoing mineralisation of the peat gives ever-weaker development of the sown grasses (gradual disappearance, weed infestation and a limited crop). Auchenorrhynchan assemblages also undergo a change in species structure. There is a decrease in the number of species and an exchange of dominants. Most abundant is *Errastunus ocellaris*, which was only represented by single individuals until about 40 years ago. The species dominant on natural meadows are not abundant on cultivated meadows and hence the index of species similarity of the assemblages is much lower than it once was (at 17-22%). The index for similarity of the dominance structure is also lower (at 3-11%).

The assemblages of Auchenorrhyncha inhabiting cultivated meadows on drained peaty soils undergo directional changes, increasing the number and abundance of species with several generations in the course of the growing season (which are included among pioneer species). There is a permanent reconstruction of the species structure, which departs to an ever greater degree from that of the auchenorrhynchan assemblages inhabiting the natural environment.

In contrast, the Auchenorrhyncha assemblages of natural meadows are more stable, with *C. viridis*, *N. lineatus* or *S. assimilis* still being dominant.

PROGRAM & ABSTRACT BOOK



9th International Auchenorrhyncha Congress

17-21 FEBRUARY 1997

Supported by

The Australian Academy of Science
Australian Entomological Society
and Industry



SYDNEY AUSTRALIA