HYBRIDISATION IN A WILD POPULATION OF ELEOCHARIS PALUSTRIS

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With 21 Figures in the Text

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A. Introduction

Six species are usually referred to the genus *Eleocharis* in British Floras (CLAPHAM, TUTIN and WARBURG 1952). Two of these, *E. palustris* (L.) R. BR. em. ROEM. and SCHULT and *E. uniglumis* (LINK) SCHULT, are very closely related and are placed together in the series *Palustriformes*, sub-series *Palustres* (WALTERS 1949). The two species are usually separable on a few morphological character-differences but intermediate types do occur. In Britain, these are found in the coastal habitats of the west and north.

*E. palustris* is, itself, divided into two so-called subspecies: *E. palustris vulgaris* (= *palustris*) and *E. palustris microcarpa* (CLAPHAM, TUTIN and WARBURG 1952; WALTERS 1949). The former is common throughout Britain and is widespread in Europe except in the south and southeast. It would appear that plants from these regions, generally called *E. palustris*, belong to the sub-species *E. palustris microcarpa*. The distribution of this type is imperfectly known but it is apparently absent from the western and northern parts of Britain and rare in Scandinavia. However, it appears to be the only form present in Greenland (SAUNTE 1957).

Various chromosome numbers have been given for these species. In their Chromosome Atlas, DARLINGTON and WYLIE (1956) list the following:

- *E. palustris* $2n = 10, 16, 36, 38$.
- *E. uniglumis* $2n = 16, 32, 46, 69, 92$.

It is probable that $2n = 16$ corresponds with *E. p. microcarpa*, $2n = 38$ with *E. p. vulgaris* and $2n = 46$ with *E. uniglumis* (LINK) SCHULT. SAUNTE (1957) is of the opinion that the $2n = 10$ type of Russian origin belongs to a different species.

In a study of Scandinavian plants in the *palustris-uniglumis* complex, SAUNTE (1957) found chromosome numbers of $2n = 16, 38-40, 42, 44, 46-49$, and $51$. Plants with $2n = 38-46$ or $46+$ chromosomes were
intermediate in morphology between *palustris* and *uniglumis*. Numbers between $2n = 16$ and 38 were not obtained and consequently Saunte concluded that the form with 16 chromosomes is "probably completely isolated from the 38- and 46-chromosome types". Walters (1949) has expressed the same opinion pointing out that the few attempts at hybridisation between the two sub-species of *E. palustris* have proved unsuccessful and that no putative hybrids between them have been found in the wild. What we consider to be a natural sub-specific hybrid is described in this paper.

**B. Material and Technique**

A random sample of flowering-heads of *E. palustris* was collected from a small area, approximately 200 sq. yards, in the south-eastern corner of Port Meadow, Oxford. The plants have a far-creeping rhizome and consequently the limits of an individual are difficult to define. The material was collected to enable students to study the unusual type of pollen development characteristic of the family and consequently, the sample was small and a detailed examination of the morphology of the plants was not made at the time of collection.

The heads were fixed in 1:3 acetic-alcohol and subsequent squash preparations of the anthers were made in acetocarmine.

**C. Observations**

**I. Pollen development**

The main features of pollen development in the *Cyperaceae* have been known for a long time (Juel 1900). The pollen mother cells form a single layer in each pollen-sac which they fill completely. In transverse section the pollen-sac resembles a similar section of an orange, each pollen mother cell being wedge-shaped.

Pollen development resembles embryo-sac formation of the *Fritillaria*-type in so far as the four meiotic products become separated into two groups containing one and three nuclei. The group of three occupies the apex of the wedge in all species except *Rhynchospora japonica* (Tanaka 1941) where they move to the wall adjacent to the tapetum. Our unpublished observations on *Scirpus tabernaemontani* show that the spindles of the second division of meiosis may be variously oriented relative to one another and the cell. Yet a 3:1 separation occurs in nearly all the cells (meiosis is normal) and exceptions are very rare.

From this stage the sequence differs from the *Fritillaria*-type of embryo-sac development and resembles the more common *Polygonum*-type in that the group of three nuclei do not function. The central nucleus alone completes pollen grain mitosis except in rare atypical cells in otherwise normal individuals. The spindle of the first pollen grain mitosis lies in the long axis of the cell and, again with the exception of *Rhynchospora japonica*, the generative nucleus is organised between the vegetative nucleus and the group of three non-functional nuclei.