In vitro hybridisation of *Isoetes*

W. Carl Taylor and **Phyllis G. Reimer**

Milwaukee Public Museum, Milwaukee, Wisconsin 53233, U.S.A.

Species of *Isoetes* from northeastern North America are sometimes difficult to identify because their diagnostic characters intergrade. It is hypothesised that interspecific hybridisation, which obscures species distinctions, is responsible for this intergradation. To test this hypothesis, experimental crosses were made with spores in culture.

Results indicate that spores of aquatic species of *Isoetes* in northeastern North America are easily germinated in sterile, demineralised water and crosses are readily made. Large, easily removable microsporangia and megasporangia facilitate the segregation of male and female gametes. It was also found that vernalisation of spores is important for spore germination or sporophyte formation in some species. Further, among the various taxa cultured, megagametophytes differ in archegonium and rhizoid development.

Suspected hybrid taxa produce polymorphic megaspores that vary in size, shape, and surface ornamentation. Less than 1% of these polymorphic megaspores germinate in culture, while normal-looking, uniform megaspores from most species approach 100% germination within 50 days. Megagametophytes which do develop from polymorphic spores bear abnormal archegonia or no archegonia.

Species of *Isoetes* can be crossed in the laboratory, but it appears that hybrid sterility, indicated by the production of polymorphic, non-viable spores, isolates species in nature.

Phloem transport in *Equisetum*

C. J. Tuckey

Department of Botany, University of Aberdeen, Aberdeen, U.K.

The mechanism of phloem transport has for years been a subject of much controversy. While a great deal of work has been carried out on Angiosperms, other plant groups have been almost totally ignored. In the Angiosperms, pressure flow as proposed by Münch (1930) is currently thought to be the likely mechanism for the transport. In this system, sugars are loaded at the source causing osmotic influx of water and a higher turgor. At the sink, the reverse occurs; sugars are unloaded and the turgor of the sieve elements is reduced.

The aim of this research project is to determine whether Münch pressure flow could occur in *Equisetum*, where the conducting pathway—the sieve cells—would appear to offer a greater resistance to mass flow than that of Angiosperms.

In order to make this assessment three parameters of transport are being investigated: (1) the velocity of translocation—using radiotracer techniques; (2) the dimensions of the sieve cells—using a variety of microscopical techniques; (3) the