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APOMIXIS AND TAXONOMY: AN INTRODUCTION

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Modern biosystematics mediate between the two-dimensional lattice construct of Linnaean binomials and the multidimensionality of genetical distances between organisms. As role models, taxonomic philosophies utilise genera with the most widespread mode of reproduction, panmictic sex through outcrossing. It follows that plant genera which taxonomists have traditionally termed "critical" almost invariably possess quite different modes of reproduction from that of outcrossing sex. Non-panmictic reproduction leads to patterns of genetic variability between organisms in time and space quite different from those of panmixis. Consequently, taxonomic philosophies which rely on panmixis fail spectacularly when they attempt to treat non-panmictic plants.

Familiar examples of non-panmictic reproduction include apomixis by seed (agamospermy) as in *Taraxacum*, *Hieracium*, *Rubus* and many other genera; apomixis by vegetative reproduction (*Potamogeton*, *Mentha*, *Ulmus*, etc.); and high levels of selfing (autogamy), as in *Capsella*, *Erophila*, *Epipactis*, *Euphrasia* and others. The Conference "Apomixis and Taxonomy", held in August 1995 in Průhonice, Czech Republic, concentrated chiefly on the first of these conditions. The current issue contains some contributions presented at this meeting.

It is a feature of the taxonomy of many apomicts that very many taxa have been described (more than 15,000, it is said, within *Rubus*). Also, the cytology, embryology, reproductive strategies and populational structure of some of these genera can be remarkably complex and difficult to unravel. Not only is it unusual for a specialist in one apomictic genus to gain any deep understanding of another such genus, but also embryologists or geneticists rarely gain much insight into the taxonomic peculiarities of their chosen genus, and vice versa. Průhonice provided a unique opportunity for such specialists to compare notes.

Certain principles, or perhaps merely "agreements to disagree", became clear during formal and informal discussions, and some of these are explored in the following published contributions. Notably, no apomictic genus closely resembles any other in its overall mode of reproduction or patterns of morphological and genetic variation. Even within some genera (*Hieracium, Antennaria, Sorbus*) reproductive strategies and taxonomic problems differ markedly between subgeneric groups and/or geographical regions. In the present volume Kirschner & Štěpánek clearly show that different modes of origin of apomictic *Taraxacum* may lead to different taxonomic philosophies. In other genera, for instance *Hypericum* (Mártonfi et al.); *Chondrilla* (Kościńska-Pająk); or *Potentilla* (Eriksen) a combination of history and pragmatism has lead to the description of very few apomictic taxa.

Indeed, it is clear that the treatment of apomictic groups depends greatly on their taxonomic history, and that such histories have a geographical bias. In general, even within a single genus such as *Taraxacum*, Eurasiatic workers have tended to "split" apomictic groups into many "agamospecies", but North Americans have rarely adopted this strategy. The Průhonice meeting provided an excellent opportunity for each "side" to understand the position taken by the other. If Europeans think that Americans are thereby losing information, Americans may consider that no-one will use an information system which contains thousands of taxa!

We can conclude that there can be no overall prescriptive solution to the taxonomic problems posed by any apomictic group; neither can these problems be solved by following the types of solution used for sexual plants. For each group, workers have to construct pragmatic classifications which fully reflect their understanding of the reproductive behaviour of the group. Only when specialists for a particular genus working in different countries communicate regularly with each other and travel to inspect their collaborators' problems "on the ground" will the best taxonomic solutions be arrived at.

These solutions may involve a degree of pragmatism which would alarm "conventional" taxonomists. Although there seems to be a tacit agreement that apomictic taxonomies should follow basic nomenclatural rules as set down in the Code, after that, anything goes! Weber shows how an informal code of conduct in *Rubus* operates which dictates criteria for the description of new taxa. In *Taraxacum*, large areas of Europe are informally considered taxonomically "offlimits" because of the prevalence of sexual reproduction there. Some groups such as *Nigritella* (Teppner) present such remarkable variation patterns as a consequence of their reproduction that their taxonomies demand unique solutions which may not yet have been fully realised.

Above all else, apomictic taxonomies should depend heavily on our knowledge of their reproduction, and of their genetics. In the present volume papers by Nybom and Shi et al. show how a knowledge of the DNA can not only provide taxonomic information in *Rubus* and *Hieracium* respectively, but has also given us new insights into variation patterns which are bound to influence future ideas.

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