

POPULATIONAL VARIATION AND SPECIATION IN AUSTRAL MOSSES

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Variability at the populational level and on a regional basis has been little studied in bryophytes. Clinal variation has been demonstrated in *Polytrichum alpestre* Hopp. by Longton (1974) and in *Muelleriella* by Vitt (1976). Horton (1981) has discussed the variation present in Northern Hemisphere populations of the *Encalypta rhaptocarpa* - *E. vulgaris* complex, and suggested that the taxa are not uniformly variable over their entire range. A species complex may be extremely variable in one portion of its range and the taxa difficult to define, whereas in other regions the taxa may be stenotypic and totally (or nearly) distinct. Horton and Vitt (1976) showed that interpopulational variation was insignificant in *Climacium americanum* Brid. and *C. dendroides* (Hedw.) Web. & Mohr, except in the area of overlap between the two species, suggesting limited interbreeding and gene flow. It is important then to determine the pattern of variation within a species complex. This is particularly true in bryophytes in that many widespread taxa of mosses occur as discrete, local populations discontinuously distributed over a wide geographical area. Each of the local populations is affected by the local edaphic conditions, and, if selective forces are strong enough, each local population may be slightly differentiated from populations in other areas.

The study of seemingly cosmopolitan or widespread disjunctive species has suggested that some of these should, in reality, be defined more sharply and are distributed in narrower patterns. For example, *Acrocladium auriculatum* (Mont.) Mitt. was treated by many authors (e.g. Sainsbury 1955) as a species disjunct between South America and Australasia; however, Karczmarz (1966) discussed why the South American *A. auriculatum* should be segregated from the New Zealand-Australian *A. chlamydophyllum* (Hook. f. & Wils.) C. Müll. & Broth. Schuster (1979) has described similar species distinctions in South American-Australasian hepatics. Many seemingly widespread or cosmopolitan taxa should be reconsidered by careful morphological analyses. For example, a recent study of the almost cosmopolitan *Campylopus introflexus* (Hedw.) Brid. sensu lato by Gradstein and Sipman (1978) revealed that this taxon was comprised of two widespread, closely related species - *C. pilifer* Brid., which is tropical and warm temperate in distribution, and *C. introflexus* (Hedw.) Brid., which is temperate Southern Hemisphere and recently introduced into Europe.

Likewise, a study (Vitt 1980c) using quantitative techniques and careful comparison of morphological attributes has shown that *Andreaea rupestris* Hedw., is, in fact, not a cosmopolitan species as previously considered, and has been largely misin-

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