BOTANY

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ABSTRACTS

Meiosis in Variegated and Anthocyaninless Varieties of *Rhoeo*. THOMAS R. MERTENS and ROBERT F. BAKER, Department of Biology, Ball State University, Muncie, Indiana 47306.——A report by D. E. Wimber (1968) of two bivalent-forming clones of the anthocyaninless *Rhoeo spathacea* var. *concolor* coupled with the publication of a number of more recent studies of the typical form of *Rhoeo* spurred an investigation of seven clones of the ornamental *R. spathacea* var. *variegata* and four clones of *R. spathacea* var. *concolor.* All plants of both the variegated and the anthocyaninless varieties were found to possess the diploid number of twelve chromosomes and the structural hybridity characteristic of the common, uniformly green *Rhoeo* that possesses anthocyanin on the underside of its leaves. A number of previously unreported prophase I and anaphase I chromosome configurations were observed among the total of 5362 pollen mother cells scored for aberrant chromosome behavior. All plants were found to produce pollen with reduced viability, which was attributed to abnormal chromosome segregation during meiosis I.

Evolution of Laticifer Systems and Phylogenetic Trends in the Apocynaceae. LARRY R. YODER, The Ohio State University, Marion.——Laticifers are specialized secretory cells which produce the milky exudate found in plants such as milkweed, poinsettia and periwinkle. Laticifers occur either in articulated or non-articulated systems, and they may be branched or unbranched. Proposed theories of laticifer evolution cite examples from disjunct families with little regard for the systematic relationships of the plants involved. This is largely due to the apparent morphological stages in laticifer evolution whereas the systematic distribution of laticifer-bearing plants shows little evidence of laticifer evolution along any phylogenetic lines.

Two evolutionary theories have been proposed for non-articulated systems. One suggests that laticifers arose first as latex sacs restricted to mature tissues, and that they then appeared progressively earlier in development until their origins were restricted to the cotyledonary node of the embryo from which they branched during subsequent stem and root growth. An alternative theory proposes that laticifers first occurred in the embryo, and that laticifer systems of post-embryonic origin represent a secondary reduction characteristic of an advanced system.

Distribution of laticifer-bearing plants based on current phylogenetic schemes suggests polyphyletic origins for the various laticifer

systems. However, within the Apocynaceae, my study of laticifer initiation in *Vinca rosea* and comparison of initiation patterns and phylogeny in other members of the family indicate that in the Apocynaceae, laticifers evolved from a branched system initiated in the embryo to an unbranched system of embryonic and post-embryonic origins, and finally to an unbranched system of post-embryonic origins in the most advanced genera.

The Role of Computers in Teaching Synecology. GARY E. DOLPH, Department of Natural and Physical Sciences, Indiana University at Kokomo, Kokomo, Indiana 46901.——The type of experiment carried out in a synecology laboratory is strongly influenced by the amount of time and effort required to convert the raw data into an ecologically useful form. Experiments requiring complicated calculations are either avoided or illustrated using reduced data sets. The use of digital computers allows more complicated experiments to be carried out by reducing computational burdens to a minimum. In this presentation, two computer programs useful in teaching synecology are outlined. The first program calculates 7 parameters for each tree species in a sample stand. These parameters are: absolute density, dominance, and frequency; relative density, dominance, and frequency; and importance value. Input is in the form of unorganized raw data obtained by the point-centered quarter method. Any one of the 7 parameters calculated can be used to compare species composition in different communities. The second program uses the concept of Wisconsin comparative ordination to calculate the position of a series of sample stands in two-dimensional space. Input data can include any of the 7 parameters calculated using the first program. If environmental measurements are plotted at the sample points, the relationship between the sample stands and the environment can be studied. Copies of either program are available upon request.

Growth Response of *Cladophora* to a Thermal Effluent. ROBERT S. BENDA, Natural Science Division, Aquinas College, Grand Rapids, Michigan 49506.——*Cladophora*, especially *Cladophora glomerata*, is a green algae commonly found attached to rocks and other submerged firm substrata in the Great Lakes. It is considered a nuisance algae because its filaments of up to 60 cm in length are torn loose by wind and wave action and blown onshore where the algae accumulates in large mats.

During a two-year period (summers of 1972-73) of once through cooling (prior to installation of cooling towers in 1974) the seasonal growth patterns of *Cladophora* were observed in the thermal discharge area of the Palisades Nuclear Power Plant located on the shores of Lake Michigan, near South Haven, Michigan.

Cladophora was present in the area earlier in the spring and later in the fall months on the discharge structure than on surrounding substrates (at temperatures of 10 to 11°C). This growth pattern continued until mid-summer when the discharge temperature exceeded 26°C and *Cladophora* growth on the discharge structure ceased and died back although adjoining substrates supported fairly luxurient growth of the algae.

Cladophora showed definite growth responses (both positive and negative) to the increased temperature of the thermal effluent which lengthened its growing season by several months in spring and fall, but which diminished its growth during the summer months. This agrees with laboratory documentation (1).

Literature Cited

1. STORR, J. F., and A. A. SWEENEY. 1971. Development of a theoretical seasonal growth response curve of *Cladophora glomerata* to temperature and photoperiod. Proc. 14th Conf. Great Lakes Res. Internat. Assoc. Great Lakes Res. p. 119-127.