

BOTANY

Chairman: DANIEL DEN UYL, Purdue University
RICHARD STARR, Indiana University, was elected chairman for 1954

ABSTRACTS

Notes on the vascular flora of Fountain County, Indiana. FRANKLIN B. BUSER, University of Illinois.—Specimens of 261 species of vascular plants, previously unrecorded for Fountain County, have been deposited in the University of Illinois Herbarium. These, plus six specimens of other collectors deposited in the same herbarium, bring this county's total of vascular plant species to 942. Tabulation and nomenclature is based, mainly, on that of Deam's *Flora of Indiana*. Three adventive species have been recorded as first state reports in Indiana Plant Distribution Records.

Responses of *Marsilea mucronata* to nutrient concentrations. WILLIAM W. BLOOM, Valparaiso University.—Sporocarps of *Marsilea mucronata* were germinated in various concentrations of a balanced nutrient solution and the effect upon gametophyte and sporophyte development noted. The best early development occurred in solutions weaker than the usual greenhouse nutrient solutions but very weak solutions were detrimental to good development.

Experiments on the relative production of fertile achenes by ray and disc florets in some Astereae. ALBERT L. DELISLE, Notre Dame University.—In the Aster species studied, although there are more disk than ray florets, the ray florets produce the greater number of fertile achenes (2 to 1). Controlled pollination of several species also indicates a higher production of fertile achenes by the ray florets than by the disc florets in the same capitulum. Similar results obtain in the open pollination of these same species. The fertile ray florets make up 59.0% of the total fertile flowers per capitulum. The stigmas of the ray florets are receptive over a longer period of time than those of the disc florets. In controlled pollination, it is suggested that solely the ray florets be utilized as the female parent. This method is rapid, dependable and seems to assure the largest number of achenes. For this purpose, a cloth-covered wire, pollen applicator, circular in form and of a diameter slightly larger than the area covered by the disc florets, has proved very successful for mass pollination in these asters.

The use of an easel and colored chalk in teaching. S. N. POSTLETHWAIT, Purdue University.—Prof. Eric Sharvelle has used colored chalk and easel to present experiment station information to various types of audiences and has found this technique to be an effective teaching aid. The same technique has been used by the author in the classroom with favorable results. The idea is to prepare drawings and cartoons with colored chalk which will specifically illustrate the point the instructor desires to present and these illustrations are then brought to the classroom

to be used in conjunction with the lecture. This permits the instructor to make carefully the drawings which he would normally do on the black-board during the lecture. Some advantages of the technique are that the illustrations will be of better quality, more accurate, and they can be stored for future use.

The Pasteur effect in corn. MARY JANE NEAL and RAYMOND E. GIRTON, Purdue University.—Oxygen uptake, carbohydrate loss, alcohol and carbon dioxide production were measured in corn root tips respiring under aerobic and anaerobic conditions. An attempt was made to balance the substrate carbon loss with the carbon in the end products of respiration and fermentation, and to compare the rates of carbohydrate loss in air and in nitrogen.

The respiratory quotient of the root tips respiring in air was approximately 0.86. This together with the fact that slightly more carbon dioxide was produced than was necessary to balance the carbohydrate loss indicates the utilization of some compounds other than carbohydrates as respiratory substrates.

The carbohydrate loss of roots in nitrogen for a four hour period was about 35 per cent greater than that of roots in air for the same period. This increased sugar loss under anaerobic conditions is evidence for the existence of the Pasteur effect, which may be defined as the action of oxygen in diminishing carbohydrate destruction.

The ratio of alcohol to carbon dioxide (expressed as milligrams) produced in nitrogen ranged from 0.64 to 0.96, indicating that some carbon dioxide was produced in excess of that from alcoholic fermentation. A part of this excess carbon dioxide is from the fermentation of substrates other than carbohydrates. Only approximately 88 per cent of the anaerobic carbohydrate loss may be accounted for by alcoholic fermentation. This is indicative of the existence of one or more other anaerobic pathways of sugar breakdown in corn root tissue.

New Indian Species of *Synchytrium*. B. T. LINGAPPA, Purdue University.—Thirteen new species from India are described as follows:

1. *Synchytrium launeae* on *Launea asplenifolia* Hook. f.
2. *S. phyllanthi* on *Phyllanthus simplex* Retz and *P. urinaria* Linn.
3. *S. thirumalachari* on *Atylosia scarabeoides* Bth.
4. *S. crustatum* on *Indigofera enneaphylla* Linn. and *I. liniola* Retz.
5. *S. viticola* on *Vitis trifolia* Linn.
6. *S. zorniae* on *Zornia diphylla* Pers.
7. *S. oroxyli* on *Oroxylon indicum* Linn.
8. *S. trichodesmatis* on *Trichodesma indicum* R. Br.
9. *S. maculans* on *Sida rhombifolia* Linn.
10. *S. cassiae* on *Cassia pumila* Lam.
11. *S. oldenlandiae* on *Oldenlandia corymbosa* Linn.
12. *S. biophyti* on *Biophytum reinwardtii* Edg. & Hook. f.
13. *S. rhynchosiae* on *Rhynchosia aurea* DC.

A short diagnosis of each species is given and selected photographs of macroscopic and microscopic characters are provided. Out of 13 new species 10 have long cycle of development comprising of Prosori, sporangia

and hypnospores and the other three have only hypnospores being short-cycled.

The evolution of certain segments of the North American *Euoenothena* population. RALPH E. CLELAND, Indiana University.—In the course of its evolution, *Oenothera* has experienced many interchanges of segments between non-homologous chromosomes. It is possible, by analyzing the interchanges which have occurred in the evolution of individual races, to trace the phylogenetic pathways which have led to the various races now found in nature. The present paper describes the way in which the *biennis* and *strigosa* populations have come into existence. These groups arose as a result of crossing between overlapping populations which had arisen at different times and which had experienced radically different histories of interchange. These crosses produced plants with large circles of chromosomes, a condition which has survived to the present day. The presence of large circles gave survival value to the presence of lethals and to the self-pollinating habit which are characteristic of present-day forms, and which together are the cause of the peculiar genetical behavior and the unique type of population structure for which *Oenothera* is noted.

***Palmoxylon* from Eden Valley, Wyoming.** MARGRET SCHNAITMAN, University of Cincinnati.—Silicified specimens of monocotyledonous woods from an upper Lower Eocene formation are referred to the genus *Palmoxylon* Schenk. The following species are recognized: *Palmoxylon texense* Stenzel, *P. parvifasciculosum* Vater, *P. astron* var. *verum* Stenzel, *P. Rutoti* Stockmans and Williere, and *P. cellulosum* Knowlton. One new species, *P. elongatum*, is described. All species are new reports from Eocene formations: two, *P. parvifasciculosum* and *P. Rutoti*, are new reports from North America. *Palmoxylon* is an unnatural genus including species which have been referred to the Palmae and Cyclanthaceae, while other species may belong to additional families. Both specific identification and family reference are extremely difficult due to the absence of adequate knowledge of comparative anatomy of extant monocotyledons.