BOTANY

Chairman: R. E. GIRTON, Purdue University

Professor J. E. Potzger, Butler University, was elected chairman of the section for 1946.

The growth of Oenothera plants from embryos cultured in vitro. RALPH E. CLELAND and MARGARET NEWCOMB, Indiana University.—Notable progress has been made in recent years in the cytogenetic analysis of Oenothera and in the application of cytogenetic methods in the study of phylogenetic relationships. This work has been largely confined, however, to the subgenus *Onagra (Euoenothera)*. It is highly desirable to analyze other subgenera and to bring them into the same system with *Onagra*, thus gaining an understanding of the larger relationships existent in the genus.

This has hitherto proved impossible, however, because of the extreme difficulty encountered in hybridizing races from different subgenera or from different species of the same subgenus. There is evidence that this difficulty is the result, in some cases at least, of arrested development of the hybrid embryos. We have attempted to overcome this difficulty by excising hybrid embryos before they have become arrested and growing them in vitro. While the work is still in its infancy, some success has been obtained in that a number of interspecific hybrids otherwise unobtainable have been brought through to advanced stages of development. In one case, a hybrid has been brought through to flowering and its chromosome configuration has been obtained.

A brief description of the methods of excision and culture was given.

Planting forest trees in Indiana. DANIEL DENUYL, Purdue University.—There have been used for reforestation in Indiana 46 different species of trees; 23 hardwoods and 23 conifers, including cypress and larch. The most important factor that has influenced reforestation is the selection of species to be planted. The results of studies to determine what species of trees are best suited for reforstation show that for open field planting red pine, white pine, jack pine, virginia pine, shortleaf pine and black locust are most desirable.

Red pine *(Pinus resinosa)*. This species is adapted to a wide range of planting sites and can be planted on nearly any site except badly eroded areas, extremely dry sites and poorly drained areas. It appears to be the best tree to use if a good stand of pine is desired.

White pine *(Pinus strobus)*. It will grow on most sites except those that are poorly drained, extremely dry or badly gullied. It grows best in moist, protected locations.

Jack pine *(Pinus banksiana)*. It will grow on nearly every site. It grows rapidly and provides a quick effective tree cover.

Virginia pine *(Pinus Virginiana)*, short leaf pine *(Pinus echinata)*. Both species are adapted for planting on worn-out, eroded lands of Southern Indiana, where they provide very quickly a dense cover for protecting the soil.

Black locust *(Robinia pseudoacacia)*. It attains its best development on well drained sites and is not adapted for planting on all eroded and depleted soils.

The planting of conifers on non-agricultural soil in Indiana appears to be the best and quickest way to eventually secure through natural succession a stand of native hardwood trees.

Plants of Cabin Creek bog, Randolph county, Indiana. RAY C. FRIESNER and JOHN E. POTZGER, Butler University.—This bog, located at the junction of Cabin Creek and state road 1, about one mile south of Farmland, is outstanding in that it is of the "raised" type. The highest elevation of the deposit, near the center of the bog, is ten feet above the margins. The elevation is associated with numerous artesian wells which flow off in three continuously flowing streams. The deepest peat and marl deposit is 33 feet. The bog is also significant from the standpoint of its vegetation, having a large number of species with disjunct distribution. Among these are: *Chara brittoni*, known elsewhere only in La Porte county Indiana and from the type locality in New Jersey; *Melica nitens, Panicum implicatum, P. albemarlense, Hierochloe odorata, Muhlenbergia setosa, Triglochin palustris, Rhyncospora capillacea, Eleocharis rostellatus, Salix lucida, Tofieldia glutinosa, Melanthium virginicum, Gerardia paupercula, Chelone glabra* var. *linifolia* forma *velutina, Lobelia kalmii,* and *Solidago ohioensis. Viburnum dentatum* var. *deamii* reaches its northernmost limits here.

Some trace element deficiencies in rice. NOE HIGINBOTHAM, University of Notre Dame.—Nutrient solution experiments with rice indicate that it may be added to the growing list of plants requiring boron, manganese, and copper. Boron deficiency symptoms are distinctive but resemble calcium deficiency in the appearance of chlorotic spotting of the leaves as they emerge at the tip. Manganese deficiency first appears as a chlorosis of the midvein leaf areas thus resulting in a striping of the young leaves. The minus copper plants showed no characteristic symptoms but they showed a lower dry weight than control plants. Additional experiments with boron indicate that it is essential for normal grain production and that its utilization in the plant is related to calcium supply.

The use of embryological formulas in plant taxonomy. THEODOR JUST, University of Notre Dame.—Significant stages and types of gametophyte development and embryology in flowering plants can be indicated by various symbols which in turn are grouped together as "embryological formulas." These express the available embryological data concerning any group as effectively as floral formulas convey the structure of flowers. Both types of formulas are valuable aids in the study of plant relationships.

Ecological study of the Kleine Woods, Jennings County, Indiana (Illinoian till plain). CARL O. KELLERT, Indianapolis Lutheran Schools.—The Kleine Woods is an area comprising 120 acres, located in the north central part of Jennings County. It is a remnant of the forest primeval which once covered the southeastern section of the state. Its composition is similar to that of other Illinoian till plain areas which have been studied, being a type of the mesophytic climax forest of Indiana.

In this survey, 30 different woody species were found. Of these, 14 are tall trees, 6 small trees, 3 shrubs, and 7 lianas. The dominant tall tree species in decreasing order of importance, as shown by basal area, are: *Quercus palustris*, 27.05 per cent; *Quercus alba*, 21.69 per cent; *Fagus grandifolia*, 21.61 per cent; *Liquidambar styraciflua*, 9.5 per cent; *Nyssa sylvatica*, 6.58 per cent; and *Acer rubrum*, 6.24 per cent.

Sassafras variifolium is the most important species among the small trees, and *Lindera benzoin* leads in the shrub layer.

This study is based on 50 100-square-meter quadrats. Ecological factors considered are frequency, abundance, and basal area.

A revision of the "punch-card" method for the identification of gilled mushrooms. C. L. PORTER, Purdue University.—The punch card method of mushroom identification was reported previously to the Academy. The punch cards and the arrangement of characters were demonstrated at the earlier meeting. Since that time, use of the card has suggested improvements in the method. The improvements include a change in the nature of the card; a rearrangement of characters; the elimination of some characters and the addition of others. The changes and the reasons for them are explained in this revision.

A primitive characteristic in corn from Peru. PAUL WEATHERWAX, Indiana University.—Three varieties of corn grown on the Peruvian plateau show peculiar orientations of the grains, due to the full development of the normally aborted lower flower of the spikelet.

These are described, and their theoretical significance is discussed.

Some agricultural problems of the high Andes. PAUL WEATHERWAX, Indiana University.—Many of the modern economic staples of the Andes were grown there by the Indians in pre-columbian times, and practices as to their cultivation and use have changed very little.

A brief account will be given of recent studies there with a statement as to the present status of the question of the origin of the Indian corn plant.