BOTANY

Chairperson: PHILLIP E. POPE
Department of Forestry, Purdue University
West Lafayette, Indiana 47907 (317)494-3590

Chairperson-Elect: AUSTIN E. BROOKS
Department of Biology
Wabash College, Crawfordsville, Indiana 47933 (317) 362-1400 ext. 350

ABSTRACTS

Effect of Cytokinins on Erythritol Permeability to Phosphatidylcholine Bilayers. BLAIR BRENGLE and WILLIAM STILLWELL, Department of Biology, Indiana University-Purdue University at Indianapolis, Indianapolis, Indiana 46223.——Previously, we demonstrated that the plant hormone kinetin enhances water permeability to several natural and synthetic phosphatidylcholine bilayers. This enhancement was noted only with bilayers in the liquid crystalline state. Here we report the effect of kinetin, benzyladenine, *cis*-zeatin and *trans*-zeatin on the permeability of erythritol to bilayers composed of natural and synthetic phosphatidylcholines. Mixed isomer zeatin (75% *trans*, 25% *cis*), kinetin and to a much lesser extent benzyladenine are shown to enhance erythritol permeability at concentrations from 0 to 1.16 mM with egg lecithin liposomes. *Trans*-zeatin and adenine have no effect on permeability over the same concentrations. *Cis*-zeatin greatly enhances erythritol permeability to synthetic dimyristoylphosphatidylcholine and dipalmitoylphosphatidylcholine bilayers only when the lipids are in the liquid crystalline state (above the phase transition temperature). *Trans*-zeatin is totally ineffective at altering permeability whether the synthetic bilayers are in the liquid crystalline or gel states. These results clearly demonstrate for the first time a substantial difference between *cis* and *trans*-zeatin on affecting membrane permeability.

Nonspecificity with Varied Effectivity in Mycorrhizal Associations. RITA DE CASSIA, G. BORGES, WILLIAM R. CHANEY and PHILLIP E. POPE, Department of Forestry and Natural Resources, Purdue University, West Lafayette, Indiana 47907.——A common and widespread symbiosis in plants is the mycorrhizal association between roots and colonizing fungi. Mycorrhiza are not restricted to specific groups of plants, but occur in practically all families of angiosperms, gymnosperms, and many lower plants. Most commercial fruit, nut, and forest trees as well as agronomic grain and forage crops normally form mycorrhiza. Mycorrhizal associations are so common under natural conditions that a nonmycorrhizal plant is the exception. There is little evidence of host specificity for mycorrhizal formation. The same fungal species or isolate can colonize numerous host species belonging to several different families, although there is some evidence that particular fungi are preferentially associated with particular host species. However, the effectivity or the degree of nutritional or other advantage resulting from the symbiotic association can vary widely among fungal and host combinations. Nonspecificity for fungal colonization of five angiosperm tree species (*Fraxinus pennsylvanica* Marsh., *Liriodendron tulipfera* L., *Liquidambar styraciflua* L., *Plantanus occidentalis* L., and *Acacia scleroxyla* Tuss.) and six species of vesicular-arbuscular mycorrhizal fungi (*Glomus mosseae, G. fasciculatum, G. stunicatum, G. macrocarpum, G. epigaeum,* and *Gigaspora margarita*) was shown in greenhouse studies. However, the effectivity of the various fungal host combinations as determined by growth of the seedlings was different. A review of literature shows nonspecificity with varied effectivity to be a common occurrence in mycorrhizal associations.

Insect Pest Control in the Greenhouse: Alternatives to Commercial Toxins. VONDA FRANTZ, Department of Biology, Indiana University-Purdue University at Indianapolis, Indianapolis, Indiana 46205.——Treatments for control of mealybug on *Coleus* were tested over a period of several months. Plants were sprayed approximately weekly with a mixture of garlic, cayenne pepper, mineral oil, and liquid soap, or with Safer's Insecticidal Soap. Three different concentrations of the first mixture were tested and two concentrations of Safer's. One set of controls was sprayed with water and another was given no treatment. During the first half of the study mealybug adults, young, and egg masses, were counted before each treatment. During the last half, photogenic evidence was obtained to document the general effectiveness of each treatment. Photographic evidence demonstrates that these treatments are effective in total greenhouse control. All treatments result in fewer mealybugs than when water or no treatment is applied. Safer's Insecticidal Soap is the most effective even when sprayed less frequently than the mixture.

Oak "Leaf Tatters": A Malady of Unknown Cause in Indiana. RALPH J. GREEN, JR., Department of Biology and Plant Pathology, Purdue University, West Lafayette, Indiana 47907 and PHILIP T. MARSHALL, Forest Pest Specialist, Division of Forestry, Indiana Department of Natural Resources, Indianapolis, Indiana 46204.——In 1983, a previously unreported malady of oaks, primarily white oak, *Quercus alba*, was found in a number of counties in northcentral Indiana. The symptoms include a marked reduction in the interveinal leaf blade tissue followed by a partial or complete necrosis of affected leaves. If a second growth flush occurs, these leaves are usually normal, but reduced in size. The name of oak "leaf tatters" has been used to describe the symptom complex. Symptoms begin in the lower part of the crown and are progressive the following season. More than 50% of the trees marked with total crown involvement in 1983 failed to leaf out in 1984. No trees under observation have recovered, to date. Although symptoms have been observed primarily on white oak, other oak species, especially black oak, *Q. velutina*, are also affected. Attempts to associate a specific causal agent with the symptom complex through field observations, laboratory isolations, electron micrographs of affected tissues and grafting have, to date, been inconclusive. However, the progressive nature of the symptoms, both on affected trees and within stands, suggests an infectious agent of some type.

G-banding in Lens culinaris and Vicia faba. ROMESH C. MEHRA and E. BOYTS, Department of Biology, Indiana University at South Bend, South Bend, Indiana 46634.——In the last decade and a half, several banding techniques for linear differentiation of chromosomes have been developed. Some of these are C, G, N, Q and R banding procedures. Since the discovery of these techniques, revolutionary advances have been made in mammalia cytogenetics. However, such has not been the case in plants. Where, of 231,413 plant species, only 90 have been studied by banding techniques. The technique that has provided maximum differentiation of mammalian chromosomes is G-banding. It is generally agreed that G-banding is produced because of the enhancement of chromomeric organization of mammalian chromosomes. In plants on the other hand, G-banding has had the least amount of success. It has been suggested that this is because chromomeres in plant mitotic chromosomes are too close together and banding procedures cannot reveal such bands. We have attempted G-banding on two legumes, *Lens culinaris* and *Vicia faba*, and have obtained some measure of success. Additionally, we have been able to reveal chromomeric organization of mitotic chromosomes in several plants and found that indeed there appears to be a relationship of G-bands and chromomeric organization. Evidence for the same will be presented.