BOTANY

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ABSTRACTS

The Production of Pigments in Flowers of *Impatiens balsamina*. CHARLES W. HAGEN, JR., Indiana University.—In *Impatiens balsamina* the gene H affects in a similar manner the structures of both leucoanthocyanins and anthocyanins, a relationship which indicates a common feature in the synthesis of the two classes of compounds. Three possible relationships are apparent. If leucopelargonidin serves as a direct precursor for pelargonidin then the quantity of leucopigment should decrease as the visible pigments are formed. If the two compounds are formed from a common limited precursor, then the formation of leucopigments should diminish as production of the greater quantity of visible pigment commences. If the common precursor is abundant or if the specific pigment production depends upon modification of the completed structures there should be no interference between the two compounds. Preliminary assays of developing buds of red-flowered plants indicate that leucoanthocyanin synthesis continues until formation of visible pigments begins. Beyond this point the total leucoanthocyanin content remains essentially constant. This would suggest that the second of the three alternatives is correct.

The Use of Tissue Culture for the Study of Anthocyanin Synthesis in the Petals of *Impatiens balsamina*. ATTILA KLEIN, Indiana University.—Young petals of *Impatiens balsamina* were cultured in a simplified White's medium. They were found to be capable of producing their normal spectrum of pigments if light, inorganic salts, vitamins and sucrose were supplied. The method may be adapted to test the degree of participation of possible precursors in the biosynthesis of flavonoid pigments. In preliminary experiments caffeic acid, dihyroxyphenylalanine and ascorbic acid, when added to White's medium, increased the pigment yield by 25 to 50%.

The Flavonols of *Impatiens balsamina L.* SARAH CLEVENGER, Indiana University.—Previous workers have determined the anthocyanidins and leucoanthocyanidins found in the flowers of the various genotypes of *Impatiens balsamina L.* The leucoanthocyanidins present yield pelargonidin, cyanidin, and delphinidin. The flavonols found in the flowers seem to be the analogs of these leucoanthocyanins. Kampherol, which has a hydroxylation pattern like pelargonidin, is found both in the petals and sepals of all genotypes investigated. Quercetin which is analogous to cyanidin is found in the sepals, but is lacking in the petals. A third flavonol, possibly myricetin, is correlated with

the presence of a single gene which also affects the anthocyanin structure. These results indicate that the anthocyanins, the leucoanthocyanins, and the flavonols may have similar or related pathways of biosynthesis in the garden balsams.

A Shoot Elongation Assay for Gibberellic Acid. C. E. HIGGENS and J. M. MCGUIRE, The Lilly Research Laboratories.—A procedure employing the shoot elongation response of dwarf peas to gibberellic acid can be used to determine the potencies of fermentation broths and purified preparations. The emerging leaves of Little Marvel pea plants are treated with standard or sample solutions. A dose-response is obtained 6 days after application. Details of the assay method are described.

The Influence of Age and Maturation Temperature of Wheat Grains on Plant Development. J. A. RIDDELL and GEORGE A. GRIES, Purdue University.—Spring wheat plants grown from seed harvested in different years vary in their rate of development with late maturing varieties showing the greatest variability. A vernalizing treatment overcomes most of the variation and hastens the development of the slower plants. Rate of development is not correlated with age of seed. Plants of the winter wheat variety, Knox, grown from seed matured at 60°F require a shorter vernalization time for maximum rate of development than those grown from seed matured at 80°F. It is suggested that the variations in growth rate of spring wheats from seed of different ages is related to the temperature during maturation rather than age or conditions during storage.

The Geographic Distribution of Ceratopteris pteridoides. CHARLES E. DEVOL, Marion College.—*Ceratopteris pteridoides* was described from plants collected in British Guiana. Hooker placed it in a new genus *Parkeria* because of the absence of an annulus. However, Hieronymus recognized it as a species of *Ceratopteris* and it has been considered by most authors as such since then. This fern which usually is a floating fern has been collected in many parts of South America from Colombia to Argentina. It is also found in the West Indies, Central America and Florida. In 1941 I collected it in the reed marshes along the Yangtze River, near Nanking, China. Many plants found in Eastern Asia have been found in Eastern United States and this is another to be added to that list. It was collected by Balansa in 1891 and Mouret in 1906 in Tonkin, and Mme. Tardieu-Blot shows an illustration of it in the Flora Generale de L'Indo-Chine. However in these cases it was called *C. thalictroides* and Mme. Tardieu-Blot does not distinguish between the two species, although they differ widely in many respects.

Sidney collected it in Bengal, India, in 1944 (in the part of India now known as Eastern Pakistan). In the Herbarium of the Chicago Natural History Museum is a specimen from Madagascar, which bears no data except the word "Madagascar," which came from Herbier Jeanpert.

Thus this fern which has been considered an American fern is found from Eastern China to Eastern India and in Madagascar. Most collectors

report it as *C. thalictroides* and since both species are found in the same area it is likely that it is much more widely distributed than the present records show.

A Unique Color Reaction of a *Penicillium* Sector. JOSEPH M. RIEDHART and C. L. PORTER, Purdue University.—Preliminary investigations were carried out to characterize a color change induced by the action of light on a *Penicillium* sector. The sector, isolated from a *Penicillium* species tentatively identified as *Penicillium herquei*, changes from a yellow to a green color upon exposure to light. A similar change occurs when the organism is exposed to the vapor of ammonium hydroxide.

Oak Wilt in Southern Indiana. FOREST STEARNS and HAROLD CROWDER, Purdue University and Indiana Department of Conservation.—Investigation of the distribution and rate of spread of oak wilt, was carried out in 1956 under a cooperative arrangement between Purdue University and the Indiana Department of Conservation. Distribution of the disease in northern Indiana has been studied in detail in past years and field work during 1956 was concentrated in southern Indiana.

Cultures of the causal fungus, *Endoconidiophora fagacearum* Bretz, were obtained from dying oaks in Crawford, Jefferson, Spencer, and Washington counties. Positive identification had previously been obtained from other locations in Brown, Crawford, Dubois, Greene, Marion, and Washington counties in the years 1951 through 1954. Suspected areas from which cultures of the organism could not be secured exist in Clark, Dearborn, Dubois, Franklin, Jackson, Jennings, Martin, Monroe, Owen, Ripley, Scott, Switzerland, and Vigo counties. Surveillance of these areas will continue.

On the basis of the current limited field work, oak wilt does not yet appear to be a common disease in southern Indiana. However, pockets of infection are scattered throughout the entire oak area.

A Film Impression Method for the Observation of Minute Features of Wood Anatomy. H. O. BEALS, Purdue University.—Cellulose acetate ribbon in combination with a solvent of cellulose acetate in acetone can be used to obtain accurate surface impressions of wood specimens for microscopic study. Impressions may be made of many woods without surface treatment with some loss of detail, however, a simple pretreatment will improve the replica. Such features as simple and bordered pits, perforation plates, and ray crossings can be observed at magnifications of 400x.

The time required to make such an impression on untreated wood specimens is approximately 90 seconds. This method can be used to verify identification of wood specimens without the preparation of freehand sections.

Wood Anatomy of the *Canellaceae*. THOMAS K. WILSON, Indiana University.—The *Canellaceae* consists of five arborescent genera which are distributed throughout the subtropical and tropical regions of the Western Hemisphere, Africa, and Madagascar. The natural affinities of this family are much in doubt, having been placed at one time or another by various authors in different orders. Quite recently the

Canellaceae has been made the sole family of a new order, the *Canellales*. In view of the conflicting opinions concerning the phylogeny of this family, a comprehensive investigation of its vegetative and floral morphology has been initiated.

Preliminary investigations of the wood anatomy in nine species reveal that the *Canellaceae* appears to be a natural grouping. The wood shows a fairly low level of specialization, a condition which is not in accord with the high rank given this family in most systems of classification. After comparing the wood anatomy of the *Canellaceae* with that of various putatively related families, it became apparent that the greatest number of similar anatomical characters exists between the *Canellaceae* and certain families in the woody *Ranales*.

Failure of Metaxylem Development as a Cause of Wilting in a Corn Plant. S. N. POSTLETHWAIT and O. E. NELSON, Purdue University.—Maize plants which are homozygous for a single recessive factor, wilted, are chronically wilted from shortly after the seedling stage through to maturity regardless of the water supply available. This chronic wilting, which is most marked in the younger leaves, results in pronounced dwarfing of the plants. Wilted plants are able to shed pollen but set ears only under exceptionally favorable conditions. As growth progresses, the older leaves regain turgidity and are apparently receiving a normal supply of water. Examination of sections of stem from normal and wilted plants have shown that the basis for the wilted phenotype is a significant delay in the formation of metaxylem vessels in the vascular bundles. Vascular bundles in the younger sections of the stem are poorly supplied with metaxylem vessels although protoxylem vessels are present as in normal plants. Vascular bundles in the older sections of the stem are nearly, if not entirely, normal, accounting for the normal appearance of the lower leaves as the plant matures.