

TITLES AND ABSTRACTS OF PAPERS PRESENTED  
AT THE FIFTEENTH ANNUAL MEETING OF THE  
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THE EFFECT OF TEMPERATURE IN THE PRODUCTION OF CHROMOSOMAL ABERRATIONS IN *TRADESCANTIA* MICROSPORES. Alvin V. Beatty, *Emory University*, Atlanta, Ga. The effect of temperature in the production of chromosomal aberrations was separated from the combined oxygen-temperature effect by maintaining a constant dissolved oxygen percentage at all temperatures used. Previous experiments indicate there is no pressure effect up to three atmospheres. This series of experiments, using 5% oxygen in helium, was carried out with exposures of 400 r of X-radiation at 50 r per minute from 0°C. to 45°C. At each temperature above 0°C., a sufficient positive pressure was added so that the dissolved oxygen, on the basis of its solubility in water, was the same. Under these experimental conditions, the number of chromosomal aberrations recorded at temperatures from 20°C. to 45°C. was approximately 60%, while at 10°C. the number increased to 70% and at 0°C. to 88%.

THE PRIMARY EFFECT OF X-RADIATION ON *TRADESCANTIA* MICROSPORES. Alvin V. Beatty and Jeanne W. Beatty, *Emory University*. The immediate effects of X-radiation on the development and division of microspores of *Tradescantia paludosa* at 30°C. were studied by use of a half-anther technique, an acetocarmine smear preparation being made of one half an anther immediately following radiation and of the other half after a lapse of time ranging from 1-18 hours. Following 400 r of X-radiation, there was an initial 5-hour cessation in development of the microspores prior to the first microspore division, followed by an increased rate of development as compared with controls. The microspores during the first microspore division show the following immediate effects after 200 r and 400 r of X-radiation: a retardation of the rate of division, an increase in the number of cells in very early prophase, an unspiraling and apparent reversion of the early and mid-prophase stages to an earlier stage, a retardation of very early prophases, a clumped effect observed at metaphase and anaphase of chromosomes irradiated in mid- and late prophase, multi-nucleate microspores following division and a decrease in the number of cells in division.

THE EFFECTS OF INQUILINES UPON THE DEVELOPMENT OF SOLIDAGO GALLS CAUSED BY *EUROSTA SOLIDAGINIS*. Edwin G. Beck, *University of Georgia*, Athens, Ga. The larvae of a number of Hymenopterous insects enter and feed upon the galls caused by the larvae of *Eurosta solidaginis* on *Solidago* stems. The typical galls are spherical in shape and from 2 to 3 centimeters in diameter. They may remain reduced in size, elongate into elliptical structures as a result of the influence of their new inhabitants. The most common anatomical variation in these galls is the presence of a greater amount of xylem adjacent to the meristems which always produce parenchyma cells in the normal galls. Cell elongation occurs in the less mature regions of these galls and is responsible for the elliptical distortion of them. There is often some cell division and enlargement in the regions wounded by the guest larvae but it is never sufficient to influence the size or shape of the gall.

THE MAYFLIES OF THE SOUTHEASTERN UNITED STATES. Lewis Berner, *University of Florida*, Gainesville, Fla. With the increasing emphasis that is being placed on studies of streams and lakes in the Southeast as industries move into the region in ever increasing numbers, some interest is being aroused in the organisms inhabiting these waters. A study, supported by a research grant from the National Institutes of Health, is being undertaken to determine the species of mayflies present, to study their geographic distribution, to correlate immature and adult stages, and to evaluate influences of ecological conditions



on the immatures. At present, the mayfly faunas of North Carolina and Florida are best known and those of Mississippi and Louisiana, of the states under consideration, are most poorly known.

**PERSISTENT DIURNAL RHYTHMICITY IN DROSOPHILA EMERGENCE.** William J. Brett, *Millsaps College*, Jackson, Miss. It has been shown that *Drosophila melanogaster*, maintained under normal day-night conditions, has a definite rhythm of pupal emergence with the peak occurring usually between 6 a.m. and 9 a.m. This rhythm was shown to persist under conditions of constant darkness and temperature provided that the animals had previously been subjected to day-night illumination changes at some developmental stage other than prelarval. Subjection of cultures of larval stages to single periods of illumination varying from 1 minute to 12 hours, in cultures otherwise maintained in constant darkness, was adequate to establish a daily rhythm of emergence which persisted thereafter with its phases determined by the time of beginning of the illumination period. The mechanism governing emergence was capable of being reset by a suitable stimulus at any time up to a period 24 hours prior to emergence. Environmental changes (dark to light) were considered to serve only to synchronize the endogenous mechanisms involving the 24-hour rhythm in a population of organisms rather than to establish a 24-hour rhythm.

**A NEW SPECIES OF MYRIOTRICHIA FROM THE COAST OF NORTH CAROLINA.** H. L. Blomquist, *Duke University*, Durham, N. C. This is the first report of the phaeophyceean genus *Myriotrichia* Harvey from the southeastern continental coast of North America, and the species represented is an undescribed one. It is named *M. scutata* n. sp. in allusion to its shield-like prostrate system of branches which is its most distinctive character. This alga grew epiphytically on the leaves of *Diplanthera Wrightii* (Aschers.) Aschers., a tropical-subtropical angiosperm growing in shallow water in a muddy inlet near Davis, Carteret County, North Carolina.

**CERTAIN ANATOMICAL FEATURES OF MULTICEPS PACKI CHRISTENSON, 1929, A CESTODE PARASITE FROM THE DOG.** Elon E. Byrd and Fulton W. Fite, *University of Georgia*, Athens, Ga. Fragments of 5 specimens of *Multiceps packi* from a collie dog recently from South Dakota have been made available for study. Since no complete worm was among the fragments it was impossible to determine the total length of a specimen, although the evidence indicated the worm to be less than two feet long. Of the five specimens (evidenced by the number of scoleces present and the degree of development in the proglottids) at hand three were normal morphologically while the other two were triradiated. The triradiated condition was evident in all parts of the body except for the rostellum. In the normal worm the scolex had four cup-shaped suckers and the rostellum was armed with 26 hooks (arranged in two rows) while the triradiated scolex had six suckers and there were 28 hooks on the rostellum. The "excretory" tubules in the scolex of the triradiated worm differed from that of the normal in that a second, incomplete ring of tubules was present and one extra pair of longitudinal tubules emerged from the scolex. The ovary of the triradiated worm was trilobed and the gravid uterus extended into all rays. The mature segments of both the normal and triradiated worms were almost square, with the normal segments containing about 350 testes each and the triradiated ones almost 600 testes each. Of the material available one of the triradiated segments carried a supernumerary proglottid on one ray. This segment was in a mature stage of development and had a total of 720 testes, 593 in the main body of the proglottid and 127 in the supernumerary segment. Histologically the ovary, testes, genital pore complex and vagina of the supernumerary segment were well developed and functional. The uterus of this segment discharged directly into the uterus of the main segment.

**BOSTRYCHIA RIVULARIS (GMEL.) MONT.** Richard L. Caylor, *Gulf Coast Research Laboratory and Delta State College*, Cleveland, Miss. Fritsch describes *Bostrychia* as being associated with *Caloglossa* on the roots of Mangroves and other plants of salt marshes. Newton describes a species *Scirpioides*, growing in the salt marshes of England and Scotland. Harvey



described a similar species coming from the Atlantic side of the Americas which he called *rivularis*. This species is described by Taylor as: "Frond dull purplish violet, diffuse becoming erect from creeping stolons attached by holdfasts (haptera) tufted to 3 cm. long, repeated pinnately branched, the lower branches spreading forming branchlets bilaterally, the terminal erect with branchlets." The principal branches are ecorticate, with 6-8 pericentral cells which are transversely divided so that the axial cell of a segment is twice as long as the peripheral ones. Strichidia in the middle portion of the ultimate branchlets, swollen with about 15 whorls of tetrasporangia.

DEVELOPMENT OF ISOLATED BLASTOMERES OF *ILYANASSA OBSOLETA*. A. C. Clement, *Emory University*, Atlanta, Ga. The isolated AB blastomere of the *Ilyanassa* egg gives rise to a partial larva with velar cilia, muscle and archenteron, but lacking foot and shell; in general, it resembles the lobeless larva. The isolated CD blastomere gives rise to a larva with velar cilia, muscle, archenteron, foot and shell. The CD larva approximates the whole, but shows certain deficiencies, particularly of the velum. Isolated A, B and C blastomeres of the 4-cell stage produce partial larvae with velar cilia, muscle tissue and some endodermal differentiation, but lacking foot and shell. Isolated D blastomeres are difficult to rear but occasionally produce partial larvae with velar cilia and muscle tissue; in rare instances a rudimentary shell and foot are probably present also. Thus only combinations which include the D quadrant differentiate foot and shell. This finding has been corroborated in other experiments involving the destruction of a single blastomere at the 4-cell stage (ABC, ABD, ACD and BCD combinations).

VARIATIONS IN *HYMENOLEPIS SERRULA* OSWALD, A CESTODE FROM THE SMOKY SHREW, *SOREX FUMEUS* MILLER. Danny Dean Cox, *University of Tennessee*, Knoxville, Tenn. In the past the number of rostellar hooks has been used as an important taxonomic characteristic of many species of armed cestodes. The most outstanding variation shown by this study was in the number of rostellar hooks (7-11). Fifty-one specimens were examined, thirty of which were kindly supplied by the worker who described the species from Ohio and the remainder collected in Tennessee and North Carolina. The data indicate that the description of *Hymenolepis serrula* should be revised and suggest the possibility that more extensive collections may reveal similar variations in other groups.

AQUATIC PLANT COMMUNITIES OF LARGE SPRINGS IN FLORIDA. John H. Davis, *University of Florida*, Gainesville, Fla. The abundant submerged and floating aquatic plant communities of five hard water springs and their rivers are outlined, and some of the relations of these to water qualities and depth are stressed. Estimates of the standing crop and rate of growth of communities in some areas are given. Because these springs and rivers maintain nearly constant water temperature they are microcosm environments in which the effects of variation in one factor can be estimated. The effects of differences in the chloride content of the waters on the plant communities is stressed in this paper.

THE PHYSIOLOGY OF SEX REACTIONS IN CERTAIN CULTURES OF *GLOMERELLA CINGULATA*. Chas. H. Driver and H. E. Wheeler. *Louisiana State University*, Baton Rouge, La. When a wild-type, self-fertile culture of *G. cingulata* was mated by pairing with an almost self-sterile culture of this same fungus it was noted that 30 percent of the perithecia formed at the line of contact yielded, on single perithecia analysis, cultures of only the self-sterile type. This seemed to indicate that the self-sterile cultures were capable of producing fertile perithecia when grown in close association with wild-type cultures. With this in mind experiments with both sterile filtrate and agar block techniques have been performed that demonstrate that wild-type cultures produce a heat labile diffusible substance that is active in increasing self-fertility of nearly self-sterile cultures of this ascomycetous fungus.

TOXICOLOGICAL STUDIES ON SOUTHEASTERN PLANTS. I. LEGUMINOSAE. Wilbur H. Duncan and Paul Piercy, *University of Georgia*, Athens, Ga. A review of literature on poisonous plants indicates that in the Southeastern States there are many species of native vascular plants which are only suspected to be



poisonous, little or no information concerning their effects upon animal life being available. Material of most of these species was obtained and tested by newly developed methods to experimental animals (mice and/or chicks). Toxic effects, internal and external, were studied and described. Of the Leguminosae a species each of *Astragalus*, *Daubentonia*, and *Lupinus* were demonstrated to be poisonous. Leaf material of *Glottidium vesicarium* gave negative results in contrast to previously reported (and confirmed in our studies) poisonous nature of green or mature seeds. Seventeen species gave negative results. Possible sources of medicinally active plant materials suggested by certain toxic effects observed in the study. Potential danger to grazing animals is obvious.

**A GANODERMA AND ITS ASSOCIATION WITH ROOT ROT OF TREES IN LOUISIANA.** C. W. Edgerton, *Louisiana State University, Baton Rouge, La.* Species of *Ganoderma* are usually considered as saprophytes though a few have been associated with root rots and butt rots of trees. In the tropics and subtropics, certain species have been reported as associated with diseases of lime and oil palm in Africa and of queen palm in Florida. In Louisiana, a species identified as *G. curtisii*, occurs commonly on the roots of many trees including, among others, water oak, mimosa, red bud and citrus. Often the leaves wilt and the trees die. The trouble is rarely seen on young trees. Whether the fungus attacks old trees declining in vitality or is the cause of the decline has not been determined. The progress of the disease was followed on mimosa trees in 1952. Fruiting bodies started to emerge through the ground from the roots in June. At that time, the leaves appeared normal. In July, the fruiting bodies were nearly mature and the leaves were wilting. The symptoms were somewhat similar to those caused by the *Fusarium* wilt. On August 11, the leaves were dead and were hanging on the trees and the grass around the trees was brown from the basidiospores which had been shed. The roots at that time were soft and spongy.

**EFFECTS OF LOWERED OXYGEN TENSION ON THE SUSCEPTIBILITY OF DAPHNIA MAGNA TO SODIUM CHLORIDE.** Edward J. Fairchild, II, *Louisiana State University, Baton Rouge, La.* Apparatus was devised whereby dissolved oxygen concentrations could be obtained and maintained without appreciable fluctuation. Experiments were conducted with young *Daphnia magna* cultured in standard media. Each experiment (100 hour duration) employed 10 daphnids in each of 9 concentrations of sodium chloride in a series of dilutions in geometrical progression, and 10 controls in dilution water. Experiments were conducted at dissolved oxygen levels of 1.5, 2.9, 4.3, and 6.4 p.p.m. Median toxicity thresholds were calculated for 25, 50, and 100 hours. Significant changes in thresholds occurred with lowered oxygen tension. In 25 hours, threshold values dropped from 7,200 p.p.m. NaCl at 6.4 p.p.m. dissolved oxygen to 4,100 p.p.m. NaCl at 1.5 p.p.m. dissolved oxygen. Similarly, in 50 and 100 hours the drop was from 6,150 to 3,800, and from 5,100 to 3,170 respectively. These data indicate that toxicity of sodium chloride to *D. magna* varies with dissolved oxygen content with low oxygen being synergistic.

**ON FRESHWATER RED ALGAE IN LOUISIANA.** Lewis H. Flint, *Louisiana State University, Baton Rouge, La.* In general the typical habitat of these plants has been described as cold mountain streams, and these are non-existent in Louisiana. Increasing attention to these plants in this area, however, has revealed a flora of unusual richness. The climatic conditions are such as to permit favorable year-round habitats and a seasonal succession of dominant forms has been noted. Disregarding several as yet unidentified or unnamed plants the list of freshwater red algae in the state now stands as follows: *Batrachospermum*, 12 species; *Sirodotia*, 6 species. *Compsopogon*, 3 types; *Nemalionopsis*, 1 species; *Porphyridium*, 1 species. The distribution of the different species with respect to geologic backgrounds and soil patterns has been indicated as of interest and a challenge.

**A PROBLEM OF DISTINCTION, DRAPARNALDIA AND DRAPARNALDIOPSIS.** Herman Silva Forest, *Knoxville, Tenn.* *Draparnaldia* Bory, 1808, has been long recognized as a distinct, widespread, and not uncommon genus.



*Draparnaldiopsis* Smith & Klyver, 1939, is the only similar genus described, being known at the time only from its type locality in California. The new genus was separated from *Draparnaldia* because of its main axis being composed of regularly alternating short and longer cells, and its branchlet bundles borne only on the short cells. The basal cell of the branchlet bundle was described as cuniform and the branching di- to tetra-chotomous. Since 1929, a second species has been described from India and reported as well from China, while similar material has been observed in a European collection. All of these reports indicate irregular rather than regular alternation of short cells bearing the branchlet bundles, and observation of some forms of *Draparnaldia mutabilis* (Roth) Ceder. reveals branchlet bundle structure similar to that of *Draparnaldiopsis*. Therefore, the question is raised as to whether the distinctiveness of *Draparnaldiopsis* is of generic value. Jao's distinction based on intercalary growth requires further investigation.

AN ECOLOGICAL LIFE HISTORY STUDY OF SPANISH MOSS (*TILLANDSIA USNEOIDES* L.) Richard E. Garth, *Emory University*, Atlanta, Ga. Experiments were designed and carried out to test the effects of solar radiation, temperature, rainfall, and relative humidity on Spanish moss. The plant distribution was mapped by counties in the U. S. and in detail within a portion of Baker County, Georgia, and the distribution within these areas was correlated with climatic and physiographical factors. A transect was made near a pond comparing climatic data with plant response in terms of growth rate. The growth pattern, reproductive methods, and dissemination were investigated. Spanish moss in the U. S. lies within an area having 63% relative humidity or higher. The plant within the Baker County area is associated with ponds due to the mechanical action of fire and lumbering, and not because of a climatic influence. Atmospheric moisture must be supplemented by rainfall for the survival of the plant, while shading in excess of 60% of summer solar radiation by trees etc. does not allow optimal growth.

NITROGEN METABOLISM OF WHOLE AND FRAGMENTS OF THE SLIME MOLD, *DICTYOSTELIUM DISCOIDEUM*, DURING GROWTH AND MORPHOGENESIS. James H. Gregg, Alice L. Hackney and Jerome O. Krivanek, *University of Florida*, Gainesville, Fla. Equipment and procedures incidental to determining the nitrogen metabolism of the vegetative amoebae, whole pseudoplasmodia, and fragments of the pseudoplasmodia of the slime mold, *Dictyostelium discoideum*, during growth and morphogenesis have been described. Analyses of total nitrogen (TN) have shown that the mature sorocarps exhibit a 14.6% decrease relative to the migrating pseudoplasmodia. This decrease is attributed to the 49.5% loss from the stalk cells since no decrease occurred in the spore cells. The nitrogenous components, total extractable nitrogen (TEN), total extractable protein nitrogen (TEPN), total non-protein nitrogen (TNP), and total unextractable nitrogen (TUN) were obtained and analyzed to determine which components were being metabolized. Some of the non-protein nitrogen given off by the slime mold was shown to be ammonia. The spores were found to have utilized 53.5% of their TEPN relative to the migrating pseudoplasmodia while the stalks utilized 82.5% of the initial amount of TEPN and 46.9% of the initial quantity of TUN in the migrating pseudoplasmodia. The breakdown of the TEPN+TUN component was correlated with the TNP produced. The possibility of the nitrogen metabolism contributing materials for the synthesis of cellulose is discussed.

A SEARCH FOR ANTAGONISTS OF MALEIC HYDRAZIDE. Victor A. Greulach, *University of North Carolina*, Chapel Hill, N. C. The discovery of antagonists of maleic hydrazide should provide clues as to the mechanism by which it inhibits plant growth. Under the conditions of these experiments the following substances failed to counteract growth inhibition of tomato, sunflower or bean plants by maleic hydrazide: indole butyric acid, alpha naphthaleneacetic acid, alpha naphthaleneacetamide, 2,4-dichlorophenoxyacetic acid, 2,4-dichloroanisole, triiodobenzoic acid, thiourea, thiamin, nicotinic acid, succinic acid, fumaric acid, fructose-1-6-diphosphate, various amino acids, coconut milk, FeCl<sub>3</sub>, CoCl<sub>2</sub>, and CuCl<sub>2</sub>. However a complete mineral nutrient solution sprayed on



the leaves of treated plants at intervals at least partially counteracted the growth inhibition by maleic hydrazide in all three species used. In sunflowers,  $\text{KH}_2\text{PO}_4$ ,  $\text{MnCl}_2$ ,  $(\text{NH}_4)_6\text{MO}_7$ ,  $\text{MgSO}_4$ ,  $\text{Ca}(\text{NO}_3)_2$ ,  $\text{ZnCl}_2$ , and  $\text{H}_3\text{BO}_3$  also partially overcame maleic hydrazide growth inhibition to varying degrees. As indicated by qualitative spectrographic analysis maleic hydrazide retarded the absorption of  $\text{LiCl}$  by tomato plants.

THE ONTOGENY OF TRANSFUSION TISSUE IN THE LEAF OF *PODOCARPUS*. Mildred M. Griffith, *University of Florida, Gainesville, Fla.* The foliar organs of *Podocarpus macrophylla* Don. and *Podocarpus nagi* R. Br. are initiated by the elongation and division of subsurface cells at the sides of the shoot apex. Procambium is detectable from the time of initiation. The first phloem elements are differentiated in advance of the xylem cells. The procambial strand is augmented laterally by divisions in the cells of the ground meristem. Adjacent to the xylem and phloem these cells develop into additional vascular elements. Laterally, these elongated fusiform cells divide transversely, enlarge and mature into the cells of the transfusion tissue. The differentiation of transfusion cells proceeds in the main in a basipetal course. It is concluded that in the two species of *Podocarpus* under investigation the transfusion tissue is of procambial origin.

SOME ASPECTS OF HORMONE RESPONSE AND HORMONE PRODUCTION IN RATS. Clara E. Hamilton, *University of Georgia, Athens, Georgia.* The estrous cycle, the state of activity of the ovary and adrenal cortex, and the blood electrolytes have been studied in normal rats and in rats whose accessory reproductive tract had been removed. Varying doses of estrogen and testosterone, alone or together, have been administered to normal rats, to those whose accessory tract had been removed, to ovariectomized rats, and to rats ovariectomized and minus their accessory tract to compare the responses. Our results indicate that the accessory reproductive tract modifies the response of the organism to its own endogenous hormones or to injected hormones, resulting in an enhanced effect of endogenous estrogen and an increased response to exogenous hormones.

ECOLOGICAL OBSERVATIONS ON BRYOZOANS IN NEW ORLEANS. E. S. Hathaway, *Tulane University, New Orleans, La.* This study, made largely in Audubon Park lagoon, has continued for 15 months. Four species, one entoproct and three ectoprocts, have been found. The entoproct, *Urnatella gracilis*, occurred in only four months' collections, July-October, with large populations in September. *Plumatella emarginata*, though abundant all summer, was not found in November or December. Like *Urnatella*, its largest concentrations were on fallen branches. *Plumatella repens*, the least abundant species, occurred in scattered collections throughout most of the year, being common in April and November. *Fredericella sultana*, abundant in spring and rare throughout the summer, was not found in October-December. Like *P. repens*, it was most abundant on aquatic roots of willows. Two species often form interlacing masses. All three of the ectoprocts produce sessile statoblasts which become intermingled when two species simultaneously or in quick succession, overgrow the same substrate.

THE INTERACTION IN VITRO OF 2,4-D WITH AUXIN (IAA) IN DICOT AND MONOCOT TISSUES. James H. M. Henderson, Isaac H. Miller, and Dawson C. Deese, *Carver Foundation, Tuskegee Institute*; and *North Carolina A. & T. College*. The outstanding fact that certain plant growth regulators, called "Weed Killers," inhibit or cause the death of some broad-leaf plants, while being innocuous to the grass-like plants, has posed many puzzling queries for plant physiologists. The best known of these, 2, 4-D, offers the most interest because of its universal use and wide range effect. In this research it has been ascertained that one of the previously unknown influences of 2, 4-D on monocots (Oat coleoptiles) is the sparing action on the plant auxin (IAA). When IAA is added to buffer containing sections of oat coleoptile, the IAA disappears in several hours; when 2, 4-D is added, the disappearance is either retarded or prevented. The opposite effect has been previously reported for dicots.



STUDIES ON THE GEOGRAPHIC DISTRIBUTION OF THE CRAYFISHES OF THE GENUS *PROCAMBARUS*. Horton H. Hobbs, Jr., *University of Virginia*, Charlottesville, Va. The genus *Procambarus*, which comprises some 90 species and subspecies, is represented in an area, excluding mountainous regions, from the Great Lakes to Florida and Cuba, and from New England to British Honduras. More than one-half of these are found in Alabama, Georgia, Florida and South Carolina, and as the distance increases to the north and west from this region there is a somewhat gradual diminution in the number of recognized forms. In southeastern Mexico, where there is a secondary concentration of 15 species, the number of species also diminishes, but more rapidly, as the distance from this area increases. A brief summary of the ranges of several species groups of this genus is presented together with certain hypotheses relative to evolutionary trends in the genus.

A PAPER CHROMATOGRAPHIC STUDY OF SOME BIOLOGICALLY IMPORTANT FORMS OF PHOSPHORUS IN *COLEUS BLUMEI* BENTHAM. Golden Leon Howell, *University of Alabama*, Tuscaloosa, Ala. This study was conducted to determine the influence of light on the presence of the biologically important phosphate esters: glucose-1-phosphate, glucose-6-phosphate, fructose-6-phosphate, and fructose-1,6-diphosphate, in green and white tissues of *Coleus* plants. The phosphate esters were separated and identified by means of paper chromatograms and by radioactivity counts of phosphorus 32, with which they were labeled. Both green and white tissues of the plant kept in continuous light were more radioactive than were similar tissues of the plant kept in darkness. Of the tissues of a given plant, the green tissue had a much higher radioactivity count than did the white. Inorganic phosphate in the plant kept in the light and also in the plant kept in the dark was found to give a much higher radioactivity count than did any of the phosphate esters. Results indicate that phosphorus compounds occur in greater amounts in tissues containing chlorophyll than in tissues which do not contain chlorophyll. Phosphorus compounds also appear to occur in greater concentrations in plants kept in continuous light, indicating that light and photosynthesis may be factors involved in their accumulation.

PHOTOPERIODISM IN MARINE ANIMALS. Charles E. Jenner, *University of North Carolina*, Chapel Hill, N. C. Although photoperiodism, the response of an organism to seasonal day-length changes, is known to have a widespread occurrence among both plants and animals, this subject has never been studied in marine organisms. For this reason the present study was carried out using the mud snail, *Nassa obsoleta*. Thirty snails of unknown sex, collected November 8, were placed in each of two light-proof day-length chambers equipped with fluorescent lights. One chamber was set for a long day (16 hours light); the other for a short day (10 hours). Light intensity at the surface of the water was approximately 45 f. c.; the temperature was essentially constant at 20° C. By dissection at the end of nine weeks the long-day snails produced 22 females. During the nine weeks these 22 snails produced over 3,000 egg cases; the control group produced none. Preliminary experiments on photoperiodism have also been conducted on the fiddler crab, *Uca pugilator*, and the marine shrimp, *Palaemonetes vulgaris*.

MORPHOLOGICAL OBSERVATIONS ON *CAMBARINCOLA* SP. (GILENSIS, N. SP.), BRANCHIOBELLELLIDAE, (ANNELIDA, OLIGOCHAETA). Benjamin Irving Johns, *University of Virginia*, Charlottesville, Va. Since the published keys to genus *Cambarincola* cannot be used to separate the many and varied forms found in the southeast, this morphological survey of a new species should be of taxonomic value. The emphasis has been placed on describing each system separately, and charts have been made to show the comparative differences of the members of the Subgenus *Coronata* already studied. This species of branchiobdellids has only been reported from the crayfish, *Cambarus sciotoensis*, in Sinking Creek, Giles County, Virginia. The new species differs from other species of the subgenus in dental formula, body size and shape of the ejaculatory bursa. Many other morphological and histological differences are noted.



AN INDUCED MUTATION OF *SAPROLEGNIA MIXTA*. T. W. Johnson, Jr., University of Mississippi, Oxford, Miss. Two single spore isolates of *Saprolegnia mixta* deBary were subjected to ultraviolet irradiation. From one isolate, a mutant was obtained which, in water culture, possesses papillate oögonia. Additionally, the mutant colonies form fewer antheridia than the parent strain. Encysted spores from discharged zoösporangia of *S. mixta* were irradiated for periods ranging from 1 to 12 minutes, in continuously agitated distilled water in quartz tubes. The irradiated spores were plated, and the resulting colonies transferred to hempseed. *Saprolegnia* M-7A, the mutant strain, resulted from a spore irradiated with UV of 2537 Å for two minutes. The resulting mutant seemingly breeds true, since it has remained unchanged in culture through several generations. This is apparently the first report of an irradiation-induced water mold mutant.

THE SYNONYMY OF *ISOACHLYA ITOANA* AND *ISOACHLYA SUBTERRANEA*. T. W. Johnson, Jr., University of Mississippi, Oxford, Miss. *Isoachlya itoana* Nagai and *Isoachlya subterranea* Richter, were described in 1931 from Japan and Germany, respectively. Both species were collected in northern Mississippi, and are characterized in culture on hempseed by the possession of a single oöspores (rarely 2) of a centric or subcentric nature, variable antheridial branch origin, variable wall pitting, short, bent or curved oögonial stalks, and extremely near origin of the monoclinal antheridial branches. A comparative study of eight isolates from soils, together with several isolates of *I. unisporea*, the nearest related taxon, shows these two species to be the same. *Isoachlya itoana* and *I. subterranea* are therefore considered synonymous, and by reason of prior publication date, *Isoachlya subterranea* is the valid binomial. The Mississippi collections represent the first report of this taxon in the United States.

CHROMOSOMES OF A TRYPANORHYNCHID CESTODE, *LACISTORHYNCHUS TENUIS* BENEDEN 1858. Arthur W. Jones, The University of Tennessee, Knoxville, Tenn. The author's first opportunity to examine the chromosomes of a member of the order Trypanorhyncha, cestode parasites of sharks and rays, was afforded by a collection made by Howard Winter in Los Angeles Harbor. The chromosomes number sixteen, diploid, there being one pair of large, two pairs of moderately large, three pairs of moderately small, and two pairs of small chromosomes. Apparently all chromosomes have median or submedian centromeres. Spermatogenesis seems not unusual. The present collection extends the range of this cestode, which has not previously been reported from *Triakis henlei* Gill 1862 (the "Brown Smoothhound") or from the Pacific Ocean.

FLAGELLAR STRUCTURE IN CHYTRIDIAL FUNGI AS REVEALED BY THE ELECTRON MICROSCOPE. William J. Koch, University of North Carolina, Chapel Hill, N. C. Studies of the planospores of *Rhizophidium* and *Chytridium* (?) show that the flagellum is composed of eleven fibrils, a central pair surrounded by a cylinder of nine fibrils. Each fibril is in turn composed of three or more sub-fibrils, which have a diameter approximating the diameter of bacterial "flagella." The tapering tip, the "whip-lash," results from the unequal lengths of the nine peripheral fibrils, with the central pair of fibrils extending all the way to the tip. In *Rhizophidium* structural detail is seen within the basal granule. There is evidence of a rhizoplast composed of fibrils and sub-fibrils. A compound structure lateral to and apparently connected with the basal granule is interpreted as the vestige of a second flagellum. Observations on the swimming cells of fungi and bacteria and on disintegrating flagella with the darkfield and electron microscope are helping us to discover details of structure and to visualize the organization of the structural components of active flagella, and are leading to a comparative interpretation of the flagella of fungi and bacteria.

A REPORT ON A STUDY OF PONCHATOU LA CREEK, LIVINGSTON PARISH, LOUISIANA. Robert A. Lafleur, Louisiana State University and Louisiana Wild Life and Fisheries, Baton Rouge, La. The study was made to determine effects of a creosote waste discharge upon the ecology of the water body. Control

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points were selected above the site of entrance of the waste; frequent sampling points were selected above, at, and below the waste discharge. Dissolved oxygen determinations, biochemical oxygen demand, pH and temperature were recorded along with aquatic fauna observations. Data gathered at control points indicated an abundance of aquatic life, negligible biochemical oxygen demand, and dissolved oxygen approaching saturation. The study also revealed an absence of all aquatic fauna except chironomids, annelids, and sewage fungus from the point of discharge and extending down stream for some three miles. The first signs of recovery from the pollutant was the presence of snails and clams, the disappearance of sewage fungus along with significant drop off of biochemical oxygen demand and some increase of dissolved oxygen. Some two or three miles further downstream and near the stream's mouth, complete stream recovery or at least stabilization of the waste has occurred.

ILLUSTRATIONS AND KEYS TO THE TREMELLACEOUS FUNGI OF LOUISIANA. Bernard Lowry, *Louisiana State University*, Baton Rouge, La. The interesting group of fungi generally included in the Tremellales are well represented in Louisiana although relatively little attention has been given them until lately. It is the purpose of this paper to record the species now known to occur in the state and to show something of their diversity by including illustrations of representative genera. By use of the appropriate keys, it should be possible to identify all the species which have thus far been reported from Louisiana.

CHROMOSOME TRANSLOCATIONS IN GOSSYPIUM. Margaret Y. Menzel and Meta S. Brown, *Texas Agricultural Experiment Station*, College Station, Texas. A previously reported translocation in *G. hirsutum* (designated 2B-1) was noteworthy for the inequality of the interchanged arms, making possible cytological identification of the chromosomes involved, and for the wide array of deficiency-duplication types derived from it. Chromosome 1 of the 2B-1 translocation has been shown to belong to the D<sub>5</sub> and chromosome 2 to the A<sub>h</sub> subgenome. Chromosome 1 of *G. raimondii* (D<sub>5</sub> genome) shows reduced pairing with one arm of its *hirsutum* homologue but not with the other arm. From 25 X-rayed parents of *G. hirsutum*, 15 new translocation lines, representing about 32 individual chromosome changes, were recovered. Genetic evidence indicated that 6 of the breaks occurred between the centromere and a marker gene. At least eight lines gave cytological or genetic evidence, or both, of the recovery of one or more deficiency-duplication types.

OBSERVATIONS ON THE FEEDING AND LARVAL ATTACHMENT OF TWO SPECIES OF OYSTERS IN TEXAS. R. W. Menzel, A. and M. College of Texas, College Station, Texas. Extensive observations on the feeding and larval attachment of *Crassostrea virginica* and *Ostrea equestris* were made. It was found that in areas of high salinity, *C. virginica* attaches near the surface, or intertidally, whereas *O. equestris* attaches most abundantly on or near the bottom subtidally. Past investigators have stated that oysters are not selective in their feeding except as to particle size, and that oysters are very selective and will reject particles smaller than those they accept. It was found that *O. equestris* conforms to the first statement and *C. virginica* to the second. In both attachment and feeding, these two species appear to be representative of their respective genera. *Ostrea* is a genus of clear oceanic areas of high salinity, whereas *Crassostrea* is better adapted to the more turbid, brackish estuarine waters. The differences in selectivity and attachment are correlated with the different habitats of the two genera.

EFFECTS OF COLCHICINE AND X-RADIATION UPON THE PRODUCTION OF TETRAPLOID CELLS IN ROOT TIPS OF TRADESCANTIA PALUDOSA. May Louise Mooney and Charles Ray, Jr., *Emory University*, Atlanta, Ga. Comparative cytological studies of root tips obtained from *Tradescantia paludosa* cuttings were compared: (1) untreated; (2) treated with 0.001%, 0.01%, and 0.1% colchicine for times ranging from fifteen minutes to seventy-two hours, each followed by water post-treatments from zero to seventy-two hours; (3) irradiation with 200 and 100 roentgen units; (4) irradiation with 200 and 100 roentgen units followed by twenty-four-hour treatment in 0.01% colchicine. The mitotic frequency for untreated root



tips was 11.4%; there was no periodicity. No effect was observed after all the treatments in the 0.001% colchicine. Twenty-four-hour treatment in 0.01% colchicine was optimum for production of tetraploid cells. Irradiation produced chromosome fragments, delayed division, and failed to induce a flux of mitoses. Irradiation followed by optimum colchicine treatment gave 16.4% tetraploid cells as compared with 45% after optimum colchicine treatment alone.

**A TEN YEAR HISTORY OF A SIGMODON POPULATION.** Eugene P. Odum, *University of Georgia, Athens, Ga.* A population of cotton rats, *Sigmodon hispidus*, in a stable *Andropogon-Rubus* field has been sampled each spring and fall since 1944 by means of a double snap-trap line and a live trapping program carried out for one annual cycle. Peaks in abundance occurred in 1946, 1948 and 1952-53, the ratio of "lows" to "highs" being approximately 1 to 6. Periodicity has thus not been so regular or so pronounced as is the case in northern rodent cycles. The percentage of small immatures was greater in large populations (75%) as compared with small populations (55%), thus, biomass density varied less from year to year than individual density.

**TIME'S SPEED REGULATOR; THE OPTIMUM EFFICIENCY FOR MAXIMUM POWER OUTPUT IN PHYSICAL AND BIOLOGICAL SYSTEMS.** Howard T. Odum and Richard C. Pinkerton, *University of Florida, Gainesville, Fla.* By means of concepts of steady state thermodynamics an expression has been derived which relates power output and efficiency for a wide range of physical and biological systems. Evidence is presented that in many kinds of systems the rate of entropy increase corresponds to maximum power and a moderately low efficiency. Thermodynamic forces and fluxes are assigned to 10 types of systems as an application of the general case as follows: Atwood's machine, water wheel turning a grindstone, one battery charging another battery, thermocouple running an electric motor, thermal diffusion engine, metabolism of an organism, community, growth and maintenance of a civilization. Important results suggested by this derivation are as follows: (a) photosynthesis as well as the other systems can never be profitably run at high efficiencies without slowing the process down to impractically low rates; (b) the maintenance requirements of a self repairing system like a climax community in steady state are 50% of the useful input power.

**OCCURRENCE OF ANTIMICROBIAL SUBSTANCES IN CHLOROPHYLLOSE PLANTS GROWING IN FLORIDA. II.** Anne L. Pates and Grace C. Madsen, *Florida State University, Tallahassee, Fla.* A continuation of the results of a survey for antimicrobial substances occurring in green plants growing in Florida is reported. The tests were made for inhibitory activity against *Staphylococcus aureus* P 209, *Pseudomonas aeruginosa* and *Candida albicans*. Of the 251 species tested 61 proved inhibitory. These included 1 of 4 algae and 60 of 245 Tracheophyta. High antimicrobial activity was found in various members of Rosaceae and Ranunculaceae.

**THE EFFECT OF INDOLE-3-ACETIC ACID AND FURFURAL ON THE GERMINATION OF MOSS SPORES.** Paul M. Patterson, *Hollins College, Virginia.* The concentrations of IAA used were 1, 5, and 10 p.p.m.; all greater concentrations were inhibitory. The effects may be summarized as follows: (a) All concentrations inhibitory with 1 p.p.m. only slightly so: *Diphyscium foliosum*, *Homomallium adnatum*, and *Sphagnum imbricatum*; (b) 1 p.p.m. not inhibitory but higher concentrations progressively so: *Nowellia curvifolia* and *Polytrichum juniperinum*; (c) miscellaneous types of accelerations initially, but these advantages over the controls were rapidly lost: *Ulota americana*, *Tetraphis pellucida*, and *Polytrichum ohioensis*; (d) in *Polytrichum commune* there was a 50% germination and conspicuous protonemal development in half of the time that the spores in the control and on the 1 and 5 p.p.m. had commenced a 1% germination. The optimum concentration of furfural for *Dicranum scoparium* and *D. rugosum* was found to be  $2 \times 10^{-5}$  M or about 20 p.p.m. After 40 days, the main protonemal axes of *D. scoparium* in furfural agar were three times as long as the control, and in *D. rugosum*, five times as long.

**A MULTIPLE FACTOR ENVIRONMENTAL GRADIENT CONTROL CHAMBER FOR MOSQUITO BEHAVIOR REACTIONS.** Robert B. Platt, *Emory University, Atlanta,*



Ga. The basic unit of this device is a clear plastic tube  $4\frac{1}{2}$  feet long and 6 inches in diameter, with separate water baths lengthwise and at either end. A relative humidity control box is located on the bottom near each end, an entrance door is at the top center and 6 smaller openings are distributed along the top for insertion of appropriate sensing elements. The tube is in a light tight box in which suitable light fixtures are installed overhead and at each end. Techniques have been developed and tested for simultaneous production of controlled gradients of temperature, humidity, and wave length, color temperature and intensity of light. The overall ranges utilized are 15-33.5°C. temperature, 20-95% relative humidity, 0-1500 f. c. light intensity, 4000-7000 angstroms units wave length, and 1100-26,000°K. color temperature. By utilizing only ten steps each for four of these factors, 10,000 combinations of environmental gradients may be set up.

THE SITE OF ACTION OF STREPTOMYCIN; AUTOLYTIC ENZYME STUDIES ON MYCOBACTERIUM TUBERCULOSIS. W. B. Redmond, *Atlanta Veterans Hospital, Atlanta, Ga.* The concentration of ammonium chloride determines the extent of growth of *Mycobacterium tuberculosis* when grown on a semi-synthetic medium containing glucose as carbon source and ammonium chloride as nitrogen source. The bacteria grow as long as the supply of N lasts then autolysis begins. Streptomycin, in growth inhibiting amounts, prevents the synthesis of the lytic enzymes if added before multiplication ceases, but does not inhibit the enzyme action when added after lysis has been initiated. In a strain made resistant to streptomycin the synthesis of the lytic enzymes is resistant also. Likewise, in a strain that is dependent on streptomycin for growth, no autolysis takes place in the absence of streptomycin. These observations indicate that the point of attack of streptomycin on the tubercle bacillus is at the source of energy necessary for enzyme synthesis, and that this energy source is common to both the enzymes responsible for autolysis and those responsible for growth.

CHEMICAL PROTECTION AGAINST THE LETHAL EFFECTS OF ULTRAVIOLET RADIATION. Henry W. Schoenborn, *University of Georgia, Athens, Ga.* A series of experiments were carried out in which various chemical compounds were tested for their ability to protect *Astasia longa*, a protozoan, against the lethal effects of ultraviolet light (mainly 2537 Å). The compounds tested included 22 amino acids, 11 B-vitamins, 4 nucleic acid derivatives, glutathione, potassium cyanide, sodium hydrosulfite, and sodium pyruvate. Of these compounds, the following provided protection when present at the time of irradiation: the amino acids cystine, phenylalanine, tryptophane, and tyrosine; the nucleic acid derivatives adenine, cytidylic acid, guanylic acid, and uracil; and sodium pyruvate. None of the compounds just listed provided protection when added subsequent to irradiation of the cells. Solutions of all these compounds, except phenylalanine, served to protect when used as a filter between the radiation source and the cells being irradiated.

THE DISTRIBUTION OF AQUATIC INSECTS IN FLORIDA SPRINGS. William C. Sloan, *University of Florida, Gainesville, Fla.* The patterns of distribution of aquatic insects in two Florida springs have been studied and attempts have been made to correlate these distribution patterns with measured chemical and physical environmental gradients. The major gradients studied are those of dissolved oxygen and chlorides. Possible species and population limiting factors are discussed.

EFFECT OF X RAYS ON NUCLEIC ACID SYNTHESIS IN EMBRYOS OF THE GRASSHOPPER, *CHORTOPHAGA VIRIDIFASCIATA*. Georgia S. St. Amand, Mary Esther Gaulden, and John R. Totter. *Biology Division, Oak Ridge National Laboratory, Oak Ridge, Tennessee.* The present investigation was initiated to determine whether synthesis of nucleic acids is altered by X rays, and if so, the effect of various doses. The incorporation of formate labeled with C<sup>14</sup> in nucleic acids of the embryos has been used to determine the effect of X rays. Fourteen-day grasshopper embryos separated from yolk were placed in a modified Tyrode's solution and treated with from 64 to 20,000 r of X rays. One hour later, when the mitotic activity had reached zero, the treated and control



embryos were incubated at 38°C. for 30 minutes in a formate solution containing 3:8  $\mu\text{C}$  of  $\text{C}^{14}$  per ml. Embryos were fractionated by a modified Schmidt-Thannhauser method. At higher doses (above 1000 r for DNA, and above 2,000 r for RNA), the response to treatment was much more uniform than at lower doses. The results indicate that DNA synthesis is more sensitive to X rays than RNA synthesis. The specific activity of DNA after 12,500 r was about 5% that of the control, while the RNA specific activity at the same dose was about 70% that of the control. After 20,000 r, the RNA value had dropped to 44% of the control. In addition, the activity of the protein fraction dropped below control values after doses greater than 4000 r, and decreased to less than 10% of the control activity at 12,500 r.

THE RELATIVE RADIOSENSITIVITY OF GRASSHOPPER NEUROBLAST CHROMOSOMES X-IRRADIATED AT KNOWN MITOTIC STAGES. W. St. Amand, *University of Tennessee*, Knoxville, Tenn. The breakage frequency of neuroblast chromosomes in each of the stages of mitosis was determined in hanging-drop preparations of grasshopper embryos (*Chortophaga viridifasciata*), at  $38^\circ \pm 0.5^\circ\text{C}$ . Cells were mapped and identified as to stage of mitosis before treatment with 32 r of X-rays. The mapped cells were examined immediately after treatment and re-examined at short intervals for eight hours or longer. Breakage frequencies have been determined from acentric fragments detected as cells progressed through anaphase. The sensitivities reported here are based on the combined breakage frequencies found at the first and second anaphases following treatment. The curve of chromosome breakage frequency shows two maxima and two minima. The maximum frequency is found in cells irradiated in middle telophase; a smaller peak occurs in middle prophase. Cells in interphase and in very late prophase at the time of treatment show minimum sensitivities. Middle telophase (most sensitive) is about twice as sensitive as very late prophase (least sensitive).

MAXIMUM TEMPERATURE TOLERANCES OF LOBLOLLY PINE AND SWEET GUM SEEDLINGS UNDER VARYING SOIL, MOISTURE, AND LIGHT CONDITIONS. Jane Thomas and Robert B. Platt, *Emory University*, Atlanta, Ga. Maximum temperature tolerances of seedlings of two important southeastern forest trees were determined under varying conditions of soil texture, soil moisture, and light intensity similar to those found in nature. Loblolly pine (*Pinus taeda* L.) and sweet gum seedlings (*Liquidambar styraciflua* L.) were grown in sun and shade habitats and in light and heavy soils. Plant and weather conditions were recorded daily. At nine weeks seedlings were exposed to radiant energy emitted by infrared lamps in a manner which simulated temperature gradients obtained under natural isolation. Significant differences were found between the tolerances of pine and sweet gum seedlings both with respect to excessive heat and to the preconditioning effects of sun and shade. Differences in tolerance were demonstrated between the various tissues of both species, as well as for particular tissues between species.

THE INFECTIVITY OF IRRADIATED PARAMPHISTOMUM MICROBOTHRIOIDES MIRACIDIA IN THE INTERMEDIATE HOST, STAGNICOLA CUBENSIS. T. B. Weber, *Louisiana State University*, Baton Rouge, La. Miracidia were allowed to develop in an unirradiated medium and  $\text{P}^{32}$  media with activities of 0.625, 1.25, 2.5, 5.5, 6.25, 7.5, and 10.0  $\mu\text{C}/\text{ml}$ . Snails were exposed to individual and to large numbers of these miracidia removed to Standard Reference Water. In single exposures 7.3% of the control group was infected. In irradiated groups the infections were 11.1%, 4.8%, 3.5%, 6.7%, 0.0%, 0.0%, and 0.0%, respectively. In multiple exposures 29.7% of the control group was infected. The irradiated groups showed the following infections: 31.6%, 16.1%, 17.1%, 5.9%, 4.8%, 0.7%, and 0.0%, respectively. In general, the number of snails infected decreased as the activity increased and no infections were found in activities above 7.5  $\mu\text{C}/\text{ml}$ . The number and rate of development of the rediae was observed.

THE MORPHOLOGICAL EFFECTS OF  $\text{P}^{32}$  ON THE MIRACIDIA OF PARAMPHISTOMUM MICROBOTHRIOIDES. T. B. Weber, *Louisiana State University*, Baton Rouge, La. Miracidia developed in activities of  $\text{P}^{32}$  ranging from 0.625



to 25  $\mu\text{c}/\text{ml}$  were measured and observed for abnormalities. Measurements were made on the miracidia and their contained larvae. Lower activities produced slight increase in growth rate and body size, and variations in the size and shape of the developing larvae. Intermediate activities caused little variation. Higher activities brought about an increasing inhibition of growth in both. Variations were noted in the body shape, position of the subepithelial nuclei, and the relative size of the apical papilla and of the primitive gut. Abnormalities included vacuolation of the miracidia, development of pyknotic nuclei, and reduction of the larval generation in the high activities.

THE MECHANISM OF ACTION OF THE FUNGICIDE, 2-HEPTADECYL-2-IMIDAZOLINE. Billy West and Frederick T. Wolf, *Vanderbilt University*, Nashville, Tenn. Because of the structural resemblance of the fungicide 2-heptadecyl-2-imidazoline to purines and histidine, experiments with *Sclerotinia fructicola* were performed testing these substances for reversal of fungicidal action. At a fungicide concentration of 1:200,000, growth inhibition by 2-heptadecyl-2-imidazoline was unaffected by 1 mgm./ml. of histidine, allantoin, adenine, 2,6-diaminopurine, caffeine, theobromine, inosine, guanosine, guanylic acid, adenosine or adenylic acid, and was only slightly affected by hypoxanthine, uric acid or theophylline. Significant reversal was, however, brought about by guanine, xanthine or xanthosine. Experiments in which the concentrations of purine and fungicide were varied while keeping the purine/fungicide ratio constant indicated that reversal by either guanine or xanthine is of the competitive type. The inhibition indices are 0.000794 for guanine and 0.000581 for xanthine. The activity of the fungicide is therefore considered to be due to interference with the synthesis of these essential metabolites by the fungus.

A METHOD OF MASS SCREENING FOR USEFUL MUTATIONS IN OATS. H. E. Wheeler, H. H. Luke, and C. H. Driver. *Louisiana State University*, Baton Rouge, La. The development of methods for screening large populations of microorganisms for a few spontaneous or induced mutants has led to attempts to obtain useful mutations from higher plants by similar means. If such attempts are to succeed, two requirements must be met: (1) very large numbers, millions or billions, of individuals must be examined, and (2) a screening agent which will eliminate all but the few desired mutant types must be available. In the present work, a toxin produced by the fungus *Helminthosporium victoriae* has been used as a screening agent. This fungus specifically attacks certain varieties of oats, causing a highly destructive disease known as *Helminthosporium* blight. In culture, it produces a toxic agent which induces the same disease symptoms and shows the same host specificity as the pathogen itself. Culture filtrates containing this toxic agent have been used to treat 100 bushels (approximately 40 million grains) of oats susceptible to the *Helminthosporium* disease. An average of 50 seedlings per bushel survived this treatment. These were inoculated with the pathogen and about one-half proved to be completely resistant. The resistant plants are being tested to determine their origin.

EFFECTS OF HYPOTHALAMIC LESIONS ON THE MATING BEHAVIOR OF THE GOLDEN HAMSTER. George V. S. White, *Louisiana State University*, Baton Rouge, La. The influence of electrolytically induced hypothalamic lesions on the mating behavior of 100 adult female golden hamsters is reported. Unipolar lesions were placed bilaterally in various areas of the hypothalamus utilizing the Horsley-Clarke stereotaxic instrument modified for use on this animal. Twenty-two animals with symmetrically bilateral lesions situated between the nucleus ventromedialis pars lateralis and the nucleus lateralis failed to exhibit lordosis or willingness to mate when paired with normal males on at least three successive occasions when vaginal smears indicative of estrus were obtained. Lesions placed asymmetrically in the two sides of the hypothalamus, or symmetrically bilateral lesions in other areas failed to inhibit psychic estrus. Lesions as small as 0.1 mm.<sup>3</sup> were effective in inhibiting lordosis when critically placed.

RESPONSES OF FEMALES OF ANOPHELES QUADRIMACULATUS SAY TO CONTROLLED GRADIENTS OF LIGHT, TEMPERATURE, AND HUMIDITY. John



Witherspoon and Robert B. Platt, *Emory University, Atlanta, Ga.* Female mosquitoes of a laboratory bred strain were subjected to various combinations of simultaneously controlled gradients of temperature, humidity, and wave length, color temperature and intensity of light, as set up in an experimental chamber. Results are based on the use of negative, positive, and indifferent reactions of 110 population samples, each sample consisting of 3 lots of 30 mosquitoes per lot. A distribution pattern under constant conditions was established on the basis of 150 mosquitoes introduced individually within the chamber. Humidity responses followed a sigmoid pattern, with response predominating positively below 83% RH and negatively above 83% RH. Only a small percentage of the population was reactive. This pattern was not significantly affected by temperatures ranging from 16-32°C. or by wave length or color temperature of light at intensities above 30 f.c. of light.

PRODUCTION OF REPEATED GONADAL, FAT, AND MOLT CYCLES WITHIN ONE YEAR IN THE JUNCO AND WHITE-CROWNED SPARROW BY MANIPULATION OF PHOTOPERIOD. Albert Wolfson, *Northwestern University, Evanston, Ill.* Slate-colored juncos and white-crowned sparrows were subjected to 8 alternate periods of long days and short days for about a year beginning in April. Observations were made on reproductive activity, fat deposition, body weight, and molt. In nature these species show only one period of spring fat deposition, reproductive activity, and molt per year. The three juncos which lived for the duration of the experiment showed 5 periods of fat deposition, 5 periods of reproductive activity and two molts within 369 days. The white-crowned sparrow which lived for the duration of the experiment showed 4 periods of reproductive activity and two molts within 343 days. Reproductive activity, fat deposition, and increase in body weight were correlated with long days. Regression of reproductive activity, loss of fat deposits, and decrease in body weight were correlated with short days. The relationship between molt and day length was not clear. It is concluded that the entire annual cycle in these species is regulated by day length. Whether the effective environmental stimulus is the daily dose or the total amount of light or darkness, or a relation between them remains to be determined for each phase of the cycle.

A NEW HYBRID SUNDEW AND ITS FERTILE COUNTERPART. Carroll E. Wood, *University of North Carolina, Chapel Hill, N. C.* *Drosera linearis* and *D. rotundifolia*, which differ strikingly in a number of characteristics, produce occasional hybrids in northern Michigan where their habitats come together. Although the hybrid fails to produce seeds, in some areas it is relatively abundant through vegetative reproduction. In contrast with the diploid parental species ( $n=10$ ), chromosomal behavior at meiosis is very irregular in the hybrid, resulting in almost complete sterility. One small colony of exceptional fertile plants has been found producing seeds which are identical in appearance with those of *Drosera anglica*, a wide-ranging tetraploid species ( $n=20$ ). Guard-cell volume measurements and the production of seeds indicate that the fertile hybrid is also tetraploid. Morphological comparisons and chromosomal behavior previously reported in a triploid European hybrid (*D. anglica* x *D. rotundifolia*) suggest that *D. anglica* may be a segmental allopolyploid derived from *D. linearis* x *D. rotundifolia*.

## SOME STUDIES OF TENNESSEE FERNS

JESSE M. SHAVER

*George Peabody College for Teachers, Nashville, Tennessee*

FERN DISTRIBUTION IN TENNESSEE

NETVEIN CHAINFERN

*Lorinseria areolata* (L.) Presl

(Continued from the April number)

(1937); FENTRESS Co.: near Allardt, A. J. S. and J. K. U. no. 2056; FRANKLIN Co.: marsh at hospital, Sewanee, no. 4144; GREENE Co.: Horse Cr.