BRIEFS

Short reports on current agricultural research

Germination inhibited by

SEED-BORNE CHEMICALS

Certain chemical substances in the seed coat have recently been shown to inhibit germination and development of seeds from various plants. Three groups of these germination inhibitors have been identified, and include various essential oils, certain alkaloids and glucosides, and growth hormones. These inhibitors have many common chemical properties. Most of them are not restricted to particular species, and their inhibition is usually determined by their amount of chemical concentration. Relative activity of these chemicals is influenced by external environmental factors under which germination occurs, the major ones being soil moisture, light intensity, oxygen and carbon dioxide tension, and temperature.

Results of research on seed-borne chemicals are now being applied to improve California's rice crop. Rice seed contains chemicals which delay germination and impair the growth of seedling rice. Identification of these chemicals, along with knowledge of their chemical characteristics and physiological effects on seed, will lead to improved rice crops. Treatment of rice seed to destroy and remove the inhibitors has proved successful.—*Duane S. Mikkelsen, Dept. of Agronomy, Davis.*

Moisture needs of

GRAPEVINES

Vineyard studies were conducted to explain why grapevines, unlike most crops, do not wilt readily and to explore the physiological adjustment of the vines to water shortage which may have a bearing on grape productivity. The experiments aimed at establishing irrigation practices based on plant symptoms.

Measurements were made on the soil moisture suction, the osmotic characteristics of the vines, vine growth, grape size, sugar and acid contents, berry cracking, fruit maturation, total yield and fruit quality. After the responses of the grape vines to varied moisture regimes are established it may be possible to single out plant symptoms that will indicate water needs. The studies also may substantiate the current hypotheses pertaining to the water relations of grapevines.—*Yoash Vaadia, Department of Irrigation, Davis, and Amand Kasimatis, Agricultural Extension, Davis.*

Wet-leaf and dry-leaf

GRASS COVER

Field studies measured interception loss—rainfall retained on plant surfaces and later evaporated to the atmosphere—in perennial ryegrass. Two 6′ diameter floating lysimeters were installed in the field, and the grass cover on and around each lysimeter was alternately wet by sprinkling while the surface at the other was dry. Records obtained of the hourly water use showed no significant differences in water use by the wet-leaf and dry-leaf systems, indicating that a net loss by interception did not occur. Information on interception loss helps establish effective watershed management techniques and efficient sprinkler irrigation.—*W. D. McMillan, Dept. of Irrigation, Davis.*

Problems of

WILDLAND FIRE

An economic analysis of wildland fire protection in the state is now under way. The final objective of this study is to provide guides to the optimum level of protection efforts. The analysis is being developed along two main lines: *1*, the economic values of the lands receiving protection, and *2*, the relationship of alternative levels of protection.

The analysis of economic values began with a critical review of existing practices in fire-damage appraisal. This work is continuing in an effort to develop a basis for improved appraisal procedures. In addition, the possibility of establishing a scale of relative values exposed to fire loss as a basis for classification of areas is being investigated.

The question of the relationship of protection expenditures to damage incurred is being approached through a statistical analysis of the fire experience in a recent ten-year period. A statistical model is being developed which relates area burned to such factors as climatic conditions, fuel types, size of population in the area and the amount of protection expenditures. If the factors analyzed prove to be related to most of the variation in area burned, the equation will provide the basis for isolating the effects of expenditure levels.—*John Zivnuska, School of Forestry, Berkeley.*

Wine flavors from

FUSEL OILS

Investigations have disclosed that fusel oils contain from 5% to 10% of intensely flavored pleasant-smelling esters, whose alcohol components are those commonly found in grapes and wines. These esters may be used to add intense flavors to California wines. The mixture of esters undoubtedly varies with the source of the fusel oil; but in general this variation has only a small effect on the over-all flavor of the mixture, since the flavors of the individual pure esters are similar. The over-all flavor impression of the ester mixture is that of mixed fruits with a wine or brandy-like modification.

The separation of the ester flavor mixture from the fusel oil is best accomplished by fractional distillation under vacuum. A burned flavor is produced by the high temperatures required if the distillation is done at atmospheric pressure. It is necessary to remove most of the water from the fusel oil before the distillation is started, but this may be done by a simple treatment with salt. While some pilot-scale distillations have been made on a continuous basis, batch-type vacuum distillations are much easier to control. The nature of the flavor mixture is influenced by the temperature of distillation, a higher temperature yielding a mixture with more of the baked or brandy-like character.

Taste tests on a red sweet wine to which 15 parts per million of one of the ester flavor mixtures had been added showed that the wine was easily recognized as being more flavorful. Further studies are under way using different ester flavor mixtures, different wines and different amounts of the flavor material.—*A. D. Webb, Dept. of Viticulture and Enology, and R. E. Kepner, Dept. of Chemistry.*