Irrigation and Drainage Letter

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NEW SOIL MOISTURE TERMS GAIN ACCEPTANCE

At the recent meetings of the Western Society of Soil Science held in conjunction with the American Institute of Biological Sciences at Stanford University, an evening discussion session was held, unofficially, to discuss some recent viewpoints in the physics of soil moisture. Among the points discussed were several new terms relating to soil moisture. General, although not unanimous, acceptance of the following terms indicates that they will appear more and more frequently in our literature and talking.

The "bar" is a unit being used to replace the "atmosphere" as a term for expressing soil moisture tension, the condition of soil moisture measured by a tensiometer. The bar has a more precise and basic definition than the atmosphere but is almost equal to it numerically so that no confusion should arise from its adoption.

The term "Millibar" will be used to express fractions of a bar and will replace the term "centimeters of water" with which it is almost equal numerically.

The soil moisture condition commonly called "soil moisture tension" will, in the future, more often be called "soil suction." The word suction based on its dictionary definition more aptly fits and describes the physical process by which moisture is held to soil particles. It was while "soil moisture tension" was the accepted term that the measuring instrument called tensionmeter was devised and named. It is not likely that the name tensiometer will be changed.

PROPER USE OF THE TERM "ACRE-INCH"

Probably the most common error found in publications dealing with irrigation (University circulars not excepted) is the use of the term "acre-inch" to express a depth of water. An acre-inch of water is a volume of water. It cannot be used to show depth unless the area to which this volume of water is applied is also shown. The term "acre-inches per acre" is, therefore, a proper term to use in expressing a depth of water. For example, one might say that grapes use 30 acre-inches per acre of water each season.

If one applies a 10 inch depth of water to 1/10 acre, the volume applied is 1 acre-inch, but the depth of water applied is 10 acre-inches per acre. It is much simpler to cross out "acre" in the numerator and denominator of the expression "acre-inches per acre" and just say "inches" to express a depth of water. For instance, you can say that grapes use 30 inches depth of water each season.

Booher - Houston - Marsh

HEXADECANOL FOR REDUCING EVAPORATION LOSSES FROM RESERVOIRS

The use of fatty alcohols to form a monomolecular film over water surfaces to reduce evaporation losses from reservoirs has received considerable publicity in recent months. In 1917 it was determined that evaporation could be reduced by such a film. Laboratory studies in 1927 further confirmed these findings. Large scale field studies on the use of these materials were begun by the Australian government in 1950. Studies of the efficiency of this process and determination of the fact that it is harmless to humans, livestock, fish and plant life have been made by the Southwest Research Institute, San Antonio, Texas and by the Bureau of Reclamation, Denver, Colorado. Research in this field is currently underway at Colorado A & M and Oklahoma A & M Colleges.

Fatty alcohols are long carbon chain organic compounds derived from animal, vegetable and marine oils. They are solid, white, waxy substances which resemble paraffin. They form a film on a water surface which is one molecule thick. Because of the peculiar structure, these molecules stand on end in the water instead of lying flat on the surface. Viewed under a microscope, they resemble the bristles of a brush. When the molecules are tightly packed they form an effective barrier to the release of water vapor into the air, while permitting the free passage of oxygen and carbon dioxide between the water and air. Under ideal laboratory conditions, evaporation has been retarded by as much as 70 per cent. On farm and ranch ponds, the water saving may be between 35 and 60 per cent.

The best known of these fatty alcohols is hexadecanol, or cetyl alcohol. Research has shown that a combination of alcohols blended in proper proportion is more effective than hexadecanol alone. This blend has better dispersion properties which speeds the formation of a film over the water surface and increases the efficiency and stability of the film.

The hexadecanol is applied by floating gauze baskets containing the material on the water surface. The suggested practice is to use hexadecanol in the form of beads about one-eighth inch in diameter. A thin invisible film spreads from the beads over the surface of the water. Wind or wave action will break this film which is healed by the additional supply from the basket. The thin film of hexadecanol slowly disappears, but is continually being replenished.

On large stretches of water wave action can rapidly dissipate the charge of hexadecanol. For this reason the method cannot be recommended for water surface areas greater than two acres. One to six rafts containing the reserve supply of the material are needed for each acre of water surface. The rafts are anchored at selected locations.

Under normal conditions about six pounds of fatty alcohol would be consumed during the summer season on each acre of area. The price is somewhere around $1.00 to $1.50 a pound for the material. Supplies can probably be obtained from most chemical houses. The Archer-Daniels-Midland Company, Minneapolis 2, Minnesota, is one source.