ATIVE EXTENSION WORK IN AGRICULTURE AND HOME ECONOMICS, U.S. Department of Agriculture and University of California Co-operating

Irrigation and Drainage Letter

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CLYDE HOUSTON RETURNS

We are happy to have Clyde Houston, our Extension Irrigation and Drainage Engineer, back on the job after a year of sabbatical leave. Clyde was headquartered with the FAO in Rome, Italy. In addition he made visits to Mexico, Guatemala, Honduras, Nicaragua, Venezuela, Iran, Egypt, Syria, Turkey, Greece, Cyprus, Israel, Holland, France, Spain and the Argentine. He has seen how irrigation and drainage is being practiced in many parts of the World. I am sure that these countries have profited from Clyde's help and that we will benefit from what he has learned.

CARE AND CHECKING OF TENSIOMETERS

Eldon P. (Bud) Rogers of the Department of Irrigation at Davis has prepared a very worthwhile discussion on how to care for and check the accuracy of tensiometers. This is included as a part of this newsletter.

1961 GRAIN SORGHUM IRRIGATION EXPERIMENTS

With this newsletter are the results of three different experiments involving the irrigation of grain sorghums. The first is a study by Dr. Henderson and Dr. Smeltzer on the effect of drought at different stages of growth on seed development and yield. The second, also by Dr. Henderson and Dr. Smeltzer, is a study of the rooting characteristics of a number of different grain sorghum varieties. These were both conducted on the University farm at Davis. The third is yield results of the irrigation-fertility tests conducted at the West Side Field Station in 1961. This test was conducted by Dr. Henderson, Dr. Smeltzer, Dr. Marble and John Prato.

COMING EVENTS

May 23 and 24 - Training Conference for citrus, avocado and subtropical farm advisors on irrigation and other cultural practices, Riverside.

July 17, 18 and 19 - Tentative dates for Irrigation Farm Advisors Tour. More about this later.

August 15, 16 and 17 - Annual Conference, Hydraulics Division, American Society of Civil Engineers, Davis.

August 27, 28, 29 and 30 - Annual Meeting, Western Society of Soil Science, Corvalis, Oregon.

Booher - Houston - Marsh - Werenfels

CARE AND CHECKING OF TENSIOMETERS

Tensiometers, commercial or homemade, need good care and maintenance to insure good results from their use. If the instrument is faulty, the results may be more harmful than useful. It is desirable to check any instrument before it is placed in the field for use.

Checking the Tensiometer before Spring Use

Any tensiometer may be "off calibration" for one reason or another or there may be a leak in the instrument. It is necessary to check for both possibilities before installing in the field.

1. Calibration check - A source of vacuum is necessary for this check. A hand or motor driven vacuum pump can be used. The vacuum source has to have an accurately calibrated gauge.

Fill the tensiometer with salt free water. With the top off, place the porous cup in a bath of salt free water. Let the instrument set about 24 hours in the water.

Refill the instrument and apply the vacuum source to the top. Check the instrument gauge with the source gauge at both ends of the vacuum scale and one point in the middle. If both gauges agree, the instrument is calibrated. Any error should be corrected.

An adjustment is made by removing the glass cover on the gauge and rotating the hand (or pointer) in the opposite direction of the error. The hand will have to be raised over the zero pin so that the hand may be rotated to its limit. After reaching the limit of rotation, continue to apply slight pressure until the hand "slips" on its shaft. Slip the hand only as far as the error. Let the hand return to its original position and again test with the vacuum source. If there is still an error, repeat the above procedure until the gauge of both source and tensiometer agree.

2. Checking for leaks - When the instrument is calibrated it is ready to be checked for leaks or sluggishness. Fill the instrument completely with freshly boiled and cooled water. (If convenient, avoid use of hard water.) Tap the instrument and gauge lightly to help remove air, and if air accumulates at the top, refill with water. Applying vacuum and releasing 2 or 3 times plus tapping gently will eliminate much of the trapped air. Close the top, wipe excess moisture off the outside of the cup, and expose the cup to open air. Water will evaporate from the cup and the vacuum gauge should register 50 (15 on a 0-30 scale) or more without collecting much air at the top of the sight tube after 5 to 8 hours in still air or 1 to 2 hours if a fan is used to blow air past the cup. If the instrument does not pass this test, open the top, remove the air, refill and retest as before. If the tensiometer does not perform properly, look for a leak. Large leaks can be found when applying vacuum since a stream of bubbles will continue to rise. There are generally two places

where tensiometers leak; the top assembly and the cup. By submerging the cup in water when applying vacuum and watching the bubbles it is possible to determine which end is leaking. If the bubbles stop, the leak is in the cup, or if they do not stop, the leak is in the top assembly, usually around the threads of the gauge. Once the leak is located it may be possible to repair. If not, send to the manufacturing company for servicing.

If the tensiometer passes this test, it is probably satisfactory for field use. However, an additional testing step is desirable and may be a continuation of the first step. When the dial is reading in the range from 40 to 70 (15 to 20 on a 0-30 scale) place the cup in a small plastic bag and close around the tubing above the cup with a rubber band to prevent further evaporation, and record the dial reading. If the dial reading the next day is within 5 units of the reading when the plastic bag was put on, the instrument has passed a stiff test, and should function well in the field. If it passes the first step but not the second, a slow leak is indicated unless a lot of air accumulated in which case refill with water and retest as above.

Removing in the Fall

Where severe freezing is anticipated tensiometers should be removed during the winter months since frost or freezing weather will damage the gauge. Also roots tend to accumulate near the porous cup when it is allowed to remain in the soil for long periods of time.

To pull the instrument, twist and pull straight up. Do not pull up on the gauge. It may help to pour some water down along the stem if the soil is dry. Also removing the stopper about an hour before pulling will help to lubricate the soil around the cup for easier pulling.

After pulling the instrument from the ground, remove the stopper or cap from the top. Wash the entire instrument thoroughly immediately after removal. If this is not possible protect the cup from evaporation by covering with a plastic bag until it can be washed. If the ceramic or porous cup is still dirty after washing, use a steel brush or sand paper to clean the cup. It is also a good practice to fill the instrument with salt free water (distilled water) and allow the water to drain through the cup so that some of the salt and soil accumulated in the cup can be rinsed out. If the instrument is to be stored where there is a possibility of frost, be sure the gauge is free of all water. The instrument is now ready for dry storage. Since it is difficult to free the gauge of all water, it is advisable to store the tensiometer where it will not freeze.

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