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"If subscribers scout on their own," says Vorodi, "this information keys them in to the best time to scout for pests; it tells you when they may be emerging."

"If someone in Allentown knows that a pest was sighted some distance to the south, then he can know when it will be time to scout. He'll know he can expect to see *this* pest on *this* plant, *this* week."

Vorodi likes the discipline built into degree-day monitoring. "It forces people to keep records, which they can have for

the following year," he says. However, he further notes that the information should be used only as an estimate, since sightings can change from year to year.

The program does require more scouting time. Each cooperator now spends six hours per week scouting, up from 3.5 hours per week before they began using the degree-day method.

According to the research group, degree-days are not 100 percent reliable. They use only ambient air temperature, and do not take into account the warming

effect of solar radiation on solid surfaces. Also, degree-day information is not yet available for all insect pests, and the ranges for certain pests can be functionally too broad.

But the benefits of growing degree-days—disciplined record-keeping; a more accurate assessment of possible insect populations; and less indiscriminate spraying—at least to Vorodi and his associates in Pennsylvania, far outweigh the limitations.

—Terry McIver

## Important to monitor water in your soil

■ The movement of water in soil significantly influences plant development and demand for irrigation. The following terms are useful in understanding soil and water relationships:

**Gravitational water:** water pulled out of large pores by gravity after rain or irrigation. As the water is pulled out, it pushes out toxic gases and a new oxygen supply moves into the soil.

**Capillary water:** adheres to a soil particle the same way a film of water adheres to any object. This film of water moves, by way of "capillary attraction" from one soil particle to another. The smaller particles, such as clay, have greater, exposed capillary surfaces. As a result, water will rise higher in a one-inch tube containing clay than in a one-inch tube containing sand.

**Hydroscopic water:** a very thin film of moisture that "sticks" to each soil particle. Even in very dry soil, some hydroscopic water is present. The only way to remove all of the hydroscopic water from a soil sample is to bake the sample in an oven for a long time. Hydroscopic water is so tightly bound to the soil that roots cannot absorb it.

**Field capacity:** the maximum amount of water that a particular soil can hold; the amount of water remaining after gravitational water has been pulled out.

For a guide to estimating moisture content of soil, see the accompanying chart.

—Source: "The Virginia Gardener"

### A Guide for Estimating Moisture Content of Soil

% of field capacity	Influence on plant growth	Response to physical manipulation		
		Loamy sand, sandy loam	Silt loam, loam	Silty clay loam
100+	Saturated soil. Too much moisture and too little air in the soil; persistence can damage plants.	Free water appears on soil when squeezed.	Same as sandy loam.	Same as sandy loam.
100	Excess moisture has drained into subsoil after rainfall or irrigation, and optimum amounts are available in rootzone for plant growth.	When squeezed, no free water appears on the surface, but it leaves a wet outline on your hand. Forms weak ball; usually breaks when bounced in hand; will not stick.	Same as sandy loam, but forms a very pliable ball that sticks readily.	Same as sandy loam, but ribbons out (can be formed into thin strand when rolled between thumb and forefinger) and has slick feeling.
75	Adequate moisture for plant growth. Lower moisture is marginal.	Tends to ball under pressure, but breaks easily when bounced in hand.	Forms a ball, somewhat plastic, that sticks slightly with pressure.	Forms a ball, ribbons out between thumb and forefinger; has slick feeling.
50	Inadequate moisture for plant growth.	Appears to dry; will not form a ball with pressure.	Somewhat crumbly, but holds together with pressure.	Somewhat pliable, balls under pressure.
25	Moisture in soil is unavailable for plant growth.	Dry, loose, falls through fingers.	Powdery, sometimes crusty, but easily broken down into a powdery condition.	Hard, cracked, difficult to break down to powdery condition.

Source: C.L. Craig, "Agriculture Canada," 1976

## Water, fertilizer not crucial for some woody plants

■ Research published by the Horticultural Research Institute (HRI) in its June 1992 issue of the *Journal of Environmental Horticulture* (JEH), said frequency of irrigation and fertilization had only "minor impacts" on plant growth and survival of five selected drought-tolerant woody landscape plants.

The results suggest that if the total volume of water is within the tolerances of the species, the frequency and duration (frequent shallow or infrequent deep applications) are "not critical," says researcher

T.D. Payne of the University of California at Riverside, where the study was conducted.

Plant species included:

- the Carmel creeper (*Ceanothus griseus* var. *horizontalis*),
- Santa Ana (*Ceanothus griseus* var. *horizontalis* 'Santa Ana'),
- California coffeeberry (*Rhamnus californica*),
- Eve Case (*Rhamnus californica* 'Eve Case') and
- Fraser photinia (*Photinia fraseri*), the only plant in the study that was not native

to California.

Noting a high mortality rate due to root pathogenic fungi, the researcher also suggested that, in addition to visual appeal, care should be taken to preserve disease and insect resistance when selecting cultivars for propagation and sale.

For a copy of the complete study as it appears in JEH, send \$15 to HRI, 1250 I St., NW, Suite 500, Washington, DC 20005. For more information, phone (202) 789-2900.

—Terry McIver