

Deciduous Orchard Diseases—Thresholds, Monitoring and Sampling

Demonstration of the Metos® Electronic Weather Station and Pest Forecasting System

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In cooperation with several research groups throughout the US, Pest Management Supply Inc. has completed two years of evaluation and development of the Metos® (Models D, DL, Gottfried Pessl, Wienz, Austria) electronic weather station and pest forecasting system. The Metos was developed in Austria by fruit growers and an agricultural engineer to assist in controlling apple scab. The Metos precisely monitors leaf wetness, temperature, humidity, day length and rainfall, and processes these data with an internal computer, presenting danger of scab infection as well as other weather statistics in a readily interpreted format (Fig. 1).

The Metos sensor unit includes 2 leaf-wetness sensors, a photocell, an air temperature probe (-20 to 60°C range) and capacitive RH sensor mounted in a radiation shield, and a tipping bucket rain gauge (0.2 mm sensitivity). This unit can accommodate up to 3 additional temperature probes (i.e., soil, air), and one analog and one counter device (i.e., wind speed and direction, solar radiation). The leaf wetness sensors are ceramic mounted, gold-plated electrodes that can be placed one in the interior tree canopy and one in the exterior canopy to measure the entire range of the wetting period, from first wetting to last drying.

The recording unit is available in two configurations: 1) a full-function, stand-alone model with internal processor, expandable 7-day memory, numeric keypad, printer, and 4-line LCD display, and 2) a data-logger model with 4-week memory and RS-232 port for downloading data to a PC for interpretation. Both units record weather parameters every 12 minutes, interface with PCs via direct cable, RAM card or modem, and are powered by battery, solar panel, or AC current. Software for both models is updated annually. Models are now available for grape and turf diseases, and fire blight in tree fruit by special order.

The Metos is now used in over 30 research institutions worldwide, in the US by D. Gubler, University of California, Davis; W. MacHardy, University of New Hampshire, Durham; and P. Steiner, University of Maryland, College Park, for two seasons, and by D. Polk, Rutgers University, Cream Ridge, NJ, and D. Gadoury, Cornell University, Geneva, NY, for one season. These researchers have found good correspondence between measurements by the Metos and actual conditions. Seven U.S. commercial growers used the Metos during the 1991 season, including one grower who was alerted by the Metos to an infection period he would have otherwise missed. Fruit injury due to scab was heavy in neighboring orchards that received no treatment for this infection period. A 7-year study (Funt et al. 1990) using similar technology with comparable cost reported annual savings of \$62 to \$84 per hectare through elimination of unnecessary treatments and improved scab control.

Reference

Funt, R.C., M.A. Ellis, and L.V. Madden. 1990. Economic analysis of protectant and disease-forecast-based fungicide spray programs for control of apple scab and grape black rot in Ohio. *Plant Disease* 74:638-642.

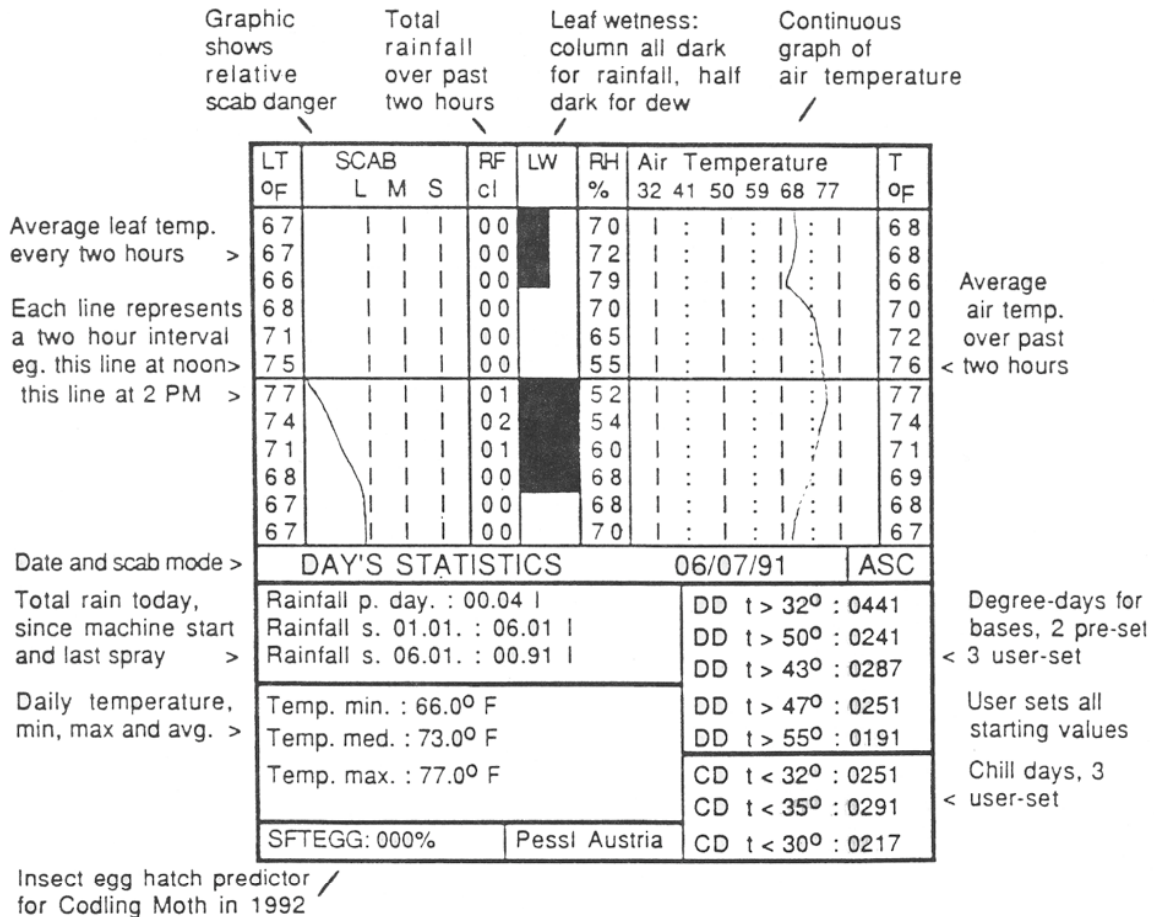


Fig. 1. Sample daily printout from Metos Model D for Tree Fruit