depths was less and the wilting point was not reached by the end of the experiment.

Rainfall of 1.85″ in May resulted in: *1*, reduced suction at all depths on the nitrogen-phosphorus plot; *2*, reduced suction at the 6″ depth only, on the nitrogen plot; *3*, reduced suction at the 6″ and 12″ depths on the phosphorus plot, but only a slowing of the rate of moisture removal at the 20″ and 36″ depths; and *4*, reduced suction at the 6″ depth on the non-fertilized plot but only a slight retardation of the rate of moisture extraction at the other depths.

A late rain, on May 20, was not used by the plants on the nitrogen-phosphorus plots because they were completely matured and dry. A slight increase in suction at the 6″ depth near the first of June probably resulted from evaporation at the soil surface. When this particular soil dries, fissures are opened and evaporation can occur within the soil profile. On the nitrogen plots, the June rain was used by the plants in the final stages of maturity, and only a slight amount of depletion could be related to evaporation. The plants on the phosphorus and non-fertilized plots were not so mature as those on the nitrogen plots and continued to deplete the soil moisture until matured. The continuing rate of depletion of soil moisture on these plots appeared to be caused by the undesirable, late-maturing medusahead and summer-growing annual weeds.

Fertilization of annual range plants with nitrogen resulted in a greater forage production and earlier maturity than occurred on the plots with phosphorus only and on the check plots. Combination of nitrogen and phosphorus resulted in a significant interaction that gave increased yield of forage.

Abundant plant growth and more uniform early plant maturity, due to the application of nitrogen, removed more soil moisture than was removed from the soil in which plants did not receive nitrogen. Also, growth of summer-growing annual weeds was retarded considerably by depletion of soil moisture at all depths of the soil in plots where nitrogen fertilizer was applied.

**Growth of forage in response to various fertilizers. *Left*—nitrogen, 150 pounds per acre; *center*—nitrogen, 150 pounds, plus phosphorus, 200 pounds per acre; *right*—no fertilizer.**

*Cyrus M. McKell is Plant Physiologist, Crops Research Division, A.R.S., U.S.D.A., and Associate in Agronomy, University of California, Davis.*

*Jack Major is Assistant Professor, Department of Botany, University of California, Davis.*

*Eugene R. Perrier is Laboratory Technician, Department of Irrigation, University of California, Davis.*

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# California Mastitis Test

## for dairy herd improvement

**O. W. SCHALM**

About 30,000 cows in California are being screened every month by the California Mastitis Test—CMT—applied to milk samples collected for butterfat determination. Owners of dairy herds which show a high level of CMT-positive cows are receiving advice on management. Where indicated, medical treatment is given during the 2–3 months when the milk producing glands are in the resting or dry state.

The CMT is a chemical test for the immediate detection of high leucocyte—white cell—count, and it can be applied to milk samples on the farm. The discovery was reported in 1957 by the School of Veterinary Medicine at Davis. Because the leucocyte content of milk is increased in all conditions which lead to irritation of tissues within the mammary gland, the CMT is a quick and inexpensive way to check all the cows in a herd for detection of udder abnormalities.

Part of the program of the Dairy Herd Improvement Association is a monthly analysis of udder health by CMT. By demonstrating the extreme importance of proper functioning and use of the milking machine in mastitis prevention, the program is leading to improved design of milking machine auxiliaries by manufacturers. Also, the local representatives of milking machine companies have improved the services rendered to dairymen, to maintain milking machines at peak efficiency.

In some herds, milk production has increased as much as 20% from one year to the next. The need for antibiotic treatment of clinical mastitis has been markedly reduced in herds which follow the recommended program.

Continuing research on bovine mastitis at Davis is a dual program involving large-scale herd trials as well as investigations on fundamental aspects of the problem. The nature of the chemical reaction which leads to a visual change in a high leucocyte milk sample is an interesting aspect. Other investigations are under way on the factors involved in development of bacterial infection within the mammary gland, so as to learn more about preventing such infection.

*O. W. Schalm is Professor of Veterinary Science, University of California, Davis.*

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