

Ruelene 8R (DD). The Neguvon group had such high fly counts 16 days later that a methoxychlor dust was applied, resulting in horn fly control to the end of the study.

### Grub control

Weaner bulls and heifers were practically grub free after treatment with either Neguvon, Ruelene 8R, or with the split dose of Ruelene 8R. Better than 99% control resulted from both Neguvon and the split Ruelene 8R treatments, while the single Ruelene 8R treatment provided 96% control. The majority of animals were examined on January 17, and the remainder (some that had been sold and moved to other locations) were examined during the following four weeks.

Another examination was made on the Crowe Ranch March 7 to check for the emergence of the northern cattle grub. No grubs were detected on the 21 treated weaner bulls. Of the 43 treated heifers, all were negative except two that had one grub each. At this date, 15 untreated weaners had from 0 to 11 grubs per head.

Both species of cattle grubs were recovered from the animals under study. Grub identification from the February inspection showed a ratio of seven common grubs, *Hypoderma lineatum*, to one northern grub, *H. bovis*. In March, this ratio changed to 1:15 for the two species.

Grub counts (made December 28) on the yearling heifers showed very low grub populations after Ruelene 25E and Co-Ral treatments, although there were no untreated animals with which to compare the percentage of grub reduction. Fewer grubs were found, and fewer animals were found infested with grubs following the Ruelene 25E treatment, as compared with the Co-Ral treatment.

### Costs

Chemical costs for the full season of fly and grub control were estimated to range from 35 to 80 cents per head depending on the type of chemical used. The least-cost treatment was with a Co-Ral fly spray in June, followed by two half doses of Ruelene 8R pour-on for fly and grub control six weeks apart, in August and September. Chemical costs for grub treatment alone were less variable, ranging from 28 to 32 cents per head for the weaners, and from 32 to 38 cents for the yearlings.

Walter H. Johnson is Farm Advisor, Shasta County; and Edmond C. Loomis is Extension Parasitologist, University of California, Davis.

# EARLY APHID INCREASES BEET

Sugar yield was increased 30% in 1965 and 20% in 1966 by aphicide applications to protect young plants from virus-carrying aphids.

**T**HE LARGE ACREAGE of overwintered sugar beets in California's north central valley is considered the primary source of virus inoculum for the spring-planted crop. Yellows and sugar beet mosaic viruses are carried from the old to the new crop by winged forms of the green peach aphid. Flights of this aphid usually occur in March and April but decrease to low levels by mid-May. Beets planted in early May usually escape infection despite overwintered fields; and in most years, yield as well or better than earlier planted crops which become extensively infected with the viruses. Because of this danger to early plantings, a large proportion of the crop is now planted in May and later. Without virus infection, March and April plantings can produce from 5 to 10 more tons of roots per acre than crops planted in May. If young plants can be protected from early infection, improvement in root yield can be expected from a longer growing season.

In these experiments the use of an aphicide was evaluated on a late-March planting only. Earlier experiments showed

control to be less effective on earlier plantings.

Sugar beet seed of the variety US H6 was planted March 23 in 1965 and March 25 in 1966 and irrigated for germination. Seedlings emerged to good stands by April 15. To determine the effects of maximum control, certain plots were sprayed 8 times in 1965 and 6 times in 1966 at weekly intervals from mid-April through late May or early June. Other plots were sprayed 2, 3, or 4 times as indicated in the schedule of the table. The spray material was Meta-systox R (oxydemetonmethyl) used at the rate of 12 ounces of toxicant in 50 gallons of water per acre and was applied by back-pack equipment.

### Aphid flights

Aphid flight patterns are indicated in the graph as the number of winged insects caught in yellow-pan water traps. Flights began earlier in 1965 and extended later than in 1966; virus diseases were more severe and the maximum spray treatment (eight times) improved sugar yields to a greater extent as shown in the table.

EFFECT OF META-SYSTOX SPRAYS ON NATURAL INFECTION BY APHID-BORNE VIRUSES, AND ON SUGAR BEET PRODUCTION, DAVIS 1965 AND 1966

Year	Number of applications	Dates of application	Disease, July 1		Root yield	Sucrose	
			Yellows	Mosaic		tons/acre	% increase*
1965†	0		83	86	29.9	14.3	4.27
	2	4/21 5/5	72	78	33.1	14.3	4.73
	4	4/21 5/5 5/19 6/2	81	80	35.4	14.3	5.06
	8	4/21 4/28 5/5 5/12 5/19 5/26 6/2 6/9	51	73	38.8	14.4	5.58
LSD, 5%					2.4	n.s.	0.36
1966‡	0		76	52	33.7	14.2	4.75
	2	4/18 5/9	74	43	38.7	14.4	5.57
	3	4/18 4/25 5/2	64	42	38.1	14.5	5.52
	6	4/18 4/25 5/2 5/9 5/16 5/23	56	33	39.3	14.9	5.84
LSD, 5%					1.9	n.s.	0.46

\* Percent increase over production of non-sprayed plots of the respective years.

† Planted March 23, harvested October 12.

‡ Planted March 25, harvested October 12.

# CONTROL PRODUCTION

W. H. LANGE · F. J. HILLS  
R. S. LOOMIS · J. KISHIYAMA

Two and four biweekly applications increased root yield, but not as much as the eight weekly applications. Judging from winged aphid catches, it is possible that four or five applications at weekly intervals could have produced the same result (30% increase in sugar production) achieved by the eight applications because the last three or four applications were applied after aphid flight activity had decreased to a low level.

## Applications

In 1966, two and three applications improved production about as much as the maximum treatment. It is quite possible that the first application (on April 18) was the most effective as additional treatments failed to increase root yield and aphid flights terminated in early May.

On the basis of experiments at Davis since 1962, it appears that effective suppression of aphid-borne virus diseases through the use of aphicides depends on: 1) A delay in planting to late March. Earlier planting results in excessive exposure of young plants to viruliferous winged aphids and makes control more difficult. 2) Starting aphicide treatment

as soon as plant rows are visible. 3) The use of a high volume application, at least 25 gallons of solution per acre and preferably more, applied by ground equipment. 4) From three to five applications of an effective aphicide, such as Meta-systox R, at weekly to 10-day intervals. However, Meta-systox R is registered for use on sugar beets for only two applications per season at 8 ounces of actual toxicant per acre. Therefore, more than two applications of Meta-systox R cannot be recommended at this time for use on sugar beets to control aphid-borne virus diseases.

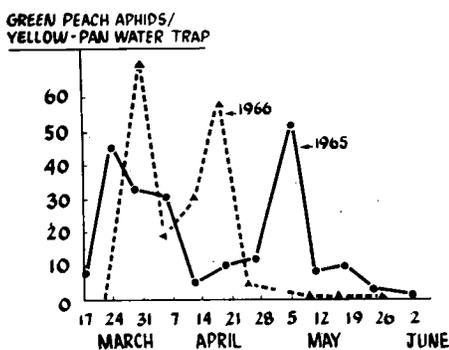
Yellow-pan water traps have been effective in evaluating winged aphid activity and can be used to indicate when protection against aphids is no longer necessary.

*W. H. Lange is Professor, Department of Entomology; F. J. Hills is Extension Agronomist; R. S. Loomis is Associate Professor, Department of Agronomy; and J. Kishiyama is Laboratory Technician II, Department of Entomology, University of California, Davis. H. Michalk, formerly Laboratory Technician III, Department of Entomology, assisted with the 1965 experiment.*

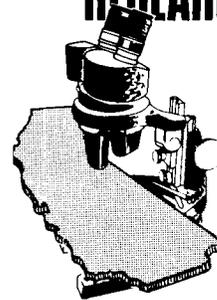
## CORRECTION: BED MULCHES FOR STRAWBERRIES

In the article, "Bed Mulches for Strawberries," *California Agriculture*, September, 1967, the last sentence should read, "However, clear poly was superior (to gray-smoked polyethylene mulch) in stimulating desirable performance responses, but neither of the two inhibited weed seed germination or growth." The authors point out that while the clear polyethylene proved superior in these tests as a mulching material (to stimulate earliness of production in winter-planted strawberries) in comparisons with colored polyethylene and petroleum mulch, only the black polyethylene mulch resulted in weed control.

WEEKLY CATCHES OF GREEN PEACH APHIDS AT DAVIS IN EIGHT YELLOW-PAN WATER TRAPS



## RESEARCH PREVIEWS



A continuing program of research in many aspects of agriculture is carried on at University campuses, field stations, leased areas, and many temporary plots loaned by cooperating landowners throughout the state. Listed below are some of the projects currently under way, but on which no formal progress reports can yet be made.

### SOIL PROPERTY STUDIES

The departments of Agricultural Engineering and Soils and Plant Nutrition at Davis are cooperating in studies for understanding the basic qualities of soil that give it mechanical strength and resistance to tillage and plant growth. Preliminary findings are encouraging and it is felt that future information may even aid in the design of tillage equipment that will be more efficient in breaking up the soil and exert less compressive influence.

### LEARNED COCKROACHES

UCLA entomologists working on the development of household pest control measures have found that German cockroaches can "learn" to avoid insecticides and inert powders that are repellent to them—even when they are applied in dark areas where the insects normally hide and in which they initially make some contact with the deposits.

### CONTROLLED DORMANCY

Basic studies by pomologists at Davis indicate that dormancy is controlled in buds and seeds of fruit trees with one and the same substance. It is hoped that further knowledge of this compound may lead to an ability to break the rest in tree buds and seeds artificially, and to prolong it and thereby reduce the hazard from frost injury.

### INSECT CONTROL BY SOUND

Several species of insects were exposed to high frequency sound waves (up to 40,000 cps) in an effort to develop a method of control without use of chemicals. Results to date have been negative.

### GROUND SQUIRREL CONTROL

A highly potent steroid compound that inhibits reproduction in rodents has been found to work well in laboratory experiments with ground squirrels. Field tests of the material are planned.