Characteristics of Nainari 60, one of the varieties showing resistance to stripe rust, at a field strip trial conducted by University of California Agricultural Extension Service and the California Crop Improvement Association.

tion by stripe rust on the baking performance of these two varieties. At this time, insufficient testing has been conducted on the flour quality of Pitic 62 to determine its potential as a milling wheat under California conditions.

The performance of the Mexican varieties in tests where stripe rust has not been present or present only at very low levels indicates that these varieties will produce yields equal to established California varieties. This is important since the possibility of a severe outbreak of stripe rust cannot be predicted at planting time.

The varieties all show adequate resistance to shattering under most growing conditions. Awned varieties such as Nainari 60, Lerma Rojo and Pitic 62 may shatter more than non-awned varieties, if left standing too long after maturity in windy districts.

Lodging resistance

Lodging resistance in Nainari 60 and Yaqui 54 appears to be equal to that of Ramona 50. Lerma Rojo and Pitic 62 have shown a tendency to lodge in some trials, but they are not considered to be so weak-strawed that they will cause serious management difficulties. Results from combine-harvested strip trials conducted by farm advisors indicate that there are no harvest problems with these varieties. Lerma Rojo may require minor combine adjustments because of its large seed and because of the fact that the seed is held tightly in the wheat spike.

TABLE 3: WHEAT YIELDS COMPARED TO YAQUI 54

	Trials in stripe rust-infected areas		All trials conducted	
	No. of Comparisons	% of Yaqui 54	No. of Comparisons	% of Yaqui 54
Romana 50	8	85.8	19	92.7
Wh. Fed. 54	7	70.3	16	79.2
Onas 53	6	53.1	13	70.0
Idaed 59	6	75.6	14	83.8
Nainari 60	5	107.0	11	106.4
Lerma Rojo	8	111.2	19	106.9
Pitic 62	3	103.1	6	102.6

Observations show the varieties to be equal to or better than California varieties in resistance to Septoria leaf blotch. Nainari 60 and Pitic 62 have shown a high level of tolerance to the disease. Pitic 62 appears to be more susceptible to root rot than California varieties.

All of the Mexican varieties are susceptible to races of bunt or stinking smut to which California varieties are resistant. Seed treatment with mercury compounds prior to planting prevents this disease. None of the Mexican varieties should be planted without this protection.

Introduction of wheat varieties developed in other areas will continue as a part of the search for high-yielding, well-adapted, stripe rust-resistant varieties which have those quality characteristics desired by the milling industry. Several experimental lines obtained through the Mexican program have shown promise in limited California testing. A breeding program is also underway at Davis to transfer resistance to stripe rust into California varieties acceptable to both growers and the milling industry. In the meantime, growers in areas which have experienced serious stripe rust losses in recent years may wish to consider the use of Nainari 60, Yaqui 54 or Lerma Rojo.

Certified seed of these varieties is not currently available in California. However, a number of California farmers have non-certified seed available for commercial use.

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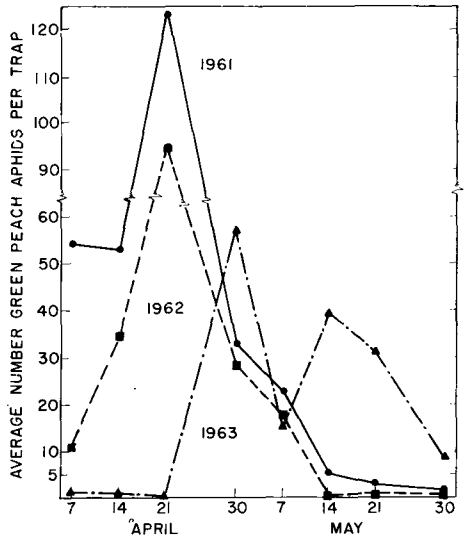
Much of the yield information was obtained from trials conducted in cooperation with farm advisors P. C. Berryman, San Luis Obispo; R. S. Baskett, San Joaquin; L. L. Buschman, C. L. Elmore and J. H. Lindt, Jr., Sutter; B. B. Fischer, Fresno; T. E. Kearney, Yolo; K. H. Ingebretsen, Colusa; T. Lyons, Sacramento; M. D. Morse, Butte; W. E. Pendery, Tulare; and with local growers in each of these counties.

Cooperators in the milling and baking tests were General Mills, The Pillsbury Company, The California Milling Company, Quaker Oat Company, and USDA Western Wheat Quality Laboratory.

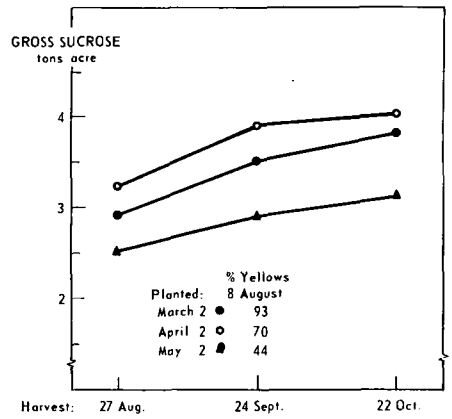
Late-Planted *Production*

THE BEET YELLOWS VIRUS, the beet western yellows virus and the sugar beet mosaic virus are all aphid-borne, and when transmitted to sugar beets at an early stage of growth result in additive damages which can cause production losses of 50% and more. Overwintered sugar beets, harboring all three viruses, are an important source of infection for the spring-planted crop. The green peach aphid, the principal insect transmitting these viruses, reproduces rapidly as tem-

WEEKLY AVERAGES OF GREEN APHIDS TRAPPED DURING APRIL AND MAY, DAVIS, 1963. (AVERAGES BASED ON CATCHES IN EIGHT YELLOW PAN WATER TRAPS)



EFFECT OF PLANTING DATE ON GROSS SUGAR YIELD AT DIFFERENT DATES OF HARVEST, DAVIS, 1963



F. J. HILLS · W. H. LANGE · R. S. LOOMIS · J. L. REED · D. H. HALL

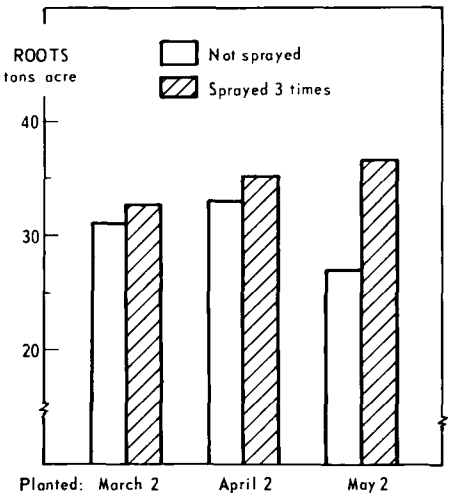
Sugar Beets Damaged by Yellows Viruses; *Improved by Aphid Control*

In contrast to results of previous years, May-planted beets became 44% infected with yellows and did not yield as well as March and April plantings in 1963 tests at Davis. Three sprays, for aphid control, applied to May-planted beets, increased production 9.5 tons of roots per acre, 5.3 more tons of roots per acre than beets planted in March.

peratures warm in the spring and winged forms develop in great numbers. It is estimated that 500,000 or more winged aphids can be produced per acre of overwintered sugar beets in the Davis-Woodland area.

Aphid-trapping studies at Davis indicate that aphid activity usually is highest in the months of March and April. In most years the numbers of winged, green-peach aphids decrease sharply during May to very low levels by June 1 and remain low throughout the summer.

EFFECT OF DATE OF PLANTING AND LIMITED APHID CONTROL ON BEET ROOT PRODUCTION ON OCTOBER 22, 1963



In 1961 and 1962, date-of-planting studies at Davis showed that beets planted in early May escaped virus infection and yielded more sugar than beets planted earlier (*California Agriculture*, March, 1962, and April, 1963). In 1963, however, unusually late aphid flights (see graphs) resulted in 44% yellows in May-planted beets. With this level of yellows infection, the May-planted beets produced 18% and 23% less sugar at the October harvest than beets planted in March and April, respectively. This occurred despite the fact that the earlier plantings became more extensively diseased.

Encouragement for a practical use of chemical in the control of aphids was seen in the effect of three spray applications of Metasystox-R to May-planted beets. By May 13 most of the seedlings of this planting date had emerged. On May 19, May 29, and June 8 the plants were sprayed with 12 ounces active ingredient of Metasystox-R in 40 gallons of water per acre, using a back-pack sprayer. As a result, root production was increased 9.5 tons per acre for the October harvest and was 5.3 tons per acre better than non-sprayed beets of the March planting date. The application of these sprays to beets planted in March and April had little effect on beet root production. Although Metasystox-R has been widely used in Europe, experience here has not been sufficient to recommend its commercial use. The material is not currently registered for use on sugar beets in the United States.

Another striking effect observed in this trial was the large increase in beet root production obtained when beets of the March or April plantings were sprayed ten and seven times respectively. For each planting date, spray treatment was started soon after emergence and continued at 10-day intervals until all aphid activity had ceased. These repeated sprays resulted in increases over non-sprayed plots of 12.0 and 7.3 tons per acre respectively for March and April plantings harvested in October. While it may not be possible to obtain such increases by commercial spray applications, these results indicate the considerable improvement in sugar beet production that might be obtained if the damage from these viruses could be eliminated or substantially reduced.

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EFFECT OF DATES OF PLANTING AND SPRAYS FOR APHID CONTROL ON INCIDENCE OF VIRUS DISEASES, BEET GROWTH AND SUGAR PRODUCTION OF THREE DATES OF HARVEST, DAVIS, 1963. (VALUES ARE MEANS OF FOUR REPLICATIONS.)

Sprays*		Per cent disease, Aug. 8		Roots, tons/acre			Per cent sucrose			Gross sucrose, tons/acre		
No.	First date	yellows	mosaic	Aug. 27	Sept. 24	Oct. 22	Aug. 27	Sept. 24	Oct. 22	Aug. 27	Sept. 24	Oct. 22
						PLANTED MARCH 2						
0	——	93	100	24.2	29.1	31.2	12.0	12.2	12.3	2.91	3.54	3.81
3	Apr. 9	90	100	26.6	30.5	32.7	12.4	11.8	12.2	3.30	3.59	3.98
10	Apr. 2	86	100	30.4	36.0	43.2	12.7	12.6	12.8	3.86	4.54	5.52
						PLANTED APRIL 2						
0	——	67	99	26.2	32.0	33.0	12.3	12.1	12.4	3.24	3.87	4.06
3	Apr. 29	72	98	27.7	33.0	35.1	12.8	12.8	12.5	3.58	4.23	4.39
7	Apr. 23	51	99	32.3	34.0	40.6	12.4	12.4	12.7	3.96	4.22	5.16
						PLANTED MAY 2						
0	——	44	79	22.4	25.2	27.0	11.3	11.4	11.6	2.52	2.88	3.12
3	May 19	25	76	23.7	30.6	36.5	11.7	11.8	12.4	2.77	3.59	4.51
LSD, 5%†		—,	11, 8		3.1,	3.2, 4.0		0.6,	0.7, 0.7		0.43,	0.44, 0.56

* Metasystox-R, 12 oz/acre in 40 gal H_2O, applied by back-sprayer at 10-day intervals.

† In the order given, LSD's are for differences between: harvest-date means for the same plant date and spray treatment; spray-treatment means for the same harvest and plant date; spray-treatment means for different plant dates and the same or different harvest dates.