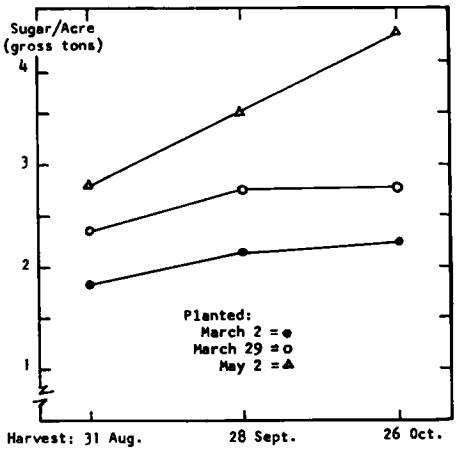
Sugar yields from sugar beets planted at Davis on May 2 last year averaged 50 to 90 per cent higher than yields from plantings made in March. The date of planting study linked the yield differences with unusually heavy aphid flights resulting in high levels of infection by a complex of viruses in the early planted beets. By mid-May, aphid flights had dropped to low levels and the later planted beets were relatively free of viruses.

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



Later Planting Dates in Northern California

Save Sugar Beets from Yellows Virus Damage

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

In the date-of-planting study conducted at Davis, an attempt was made to maintain sugar beet plants free of yellows viruses at each of three planting dates and to compare these with plants that had been inoculated with the beet yellows virus. However, unusually heavy aphid flights made it impossible to maintain yellows-free plants of early and late March plantings. Aphid flights dropped to low levels by mid-May, however, and non-inoculated plants of that planting date were relatively yellows-free. The yield of roots of beets planted May 2 exceeded the yield from beets planted March 2 by 5.4 tons/acre when harvested August 31, 10.1 tons/acre harvested September 28 and 15.7 tons/acre on October 26 (see table).

The reduced yields were associated with high levels of infection by yellows viruses. Sugar beets of the March 2 and 29 plantings made little or no root growth from August 31 to October 26, while those planted May 2 increased in root yield at the rate of 1.3 tons/acre per week. Sugar beets in this trial had low sucrose contents due to a high rate of nitrogen fertilization, which was used to keep all the plants well supplied with nitrogen throughout the season. Thus, a better measure of the effect of the viruses on sugar concentration was obtained.

The results of this experiment represent an extremely severe disease situation brought about by unusually large numbers of winged green peach aphids, the insect that transmits the yellows viruses. How often this situation will occur is difficult to predict. Also, planting late in other areas of the state may result in damage from other diseases, such as curly top, or may not avoid beet yellows because aphid population peaks may follow a different pattern. Research is continuing on the effect of planting dates, and information concerning the build-up and decline of aphid populations in other sugar beet growing areas is being collected.

In northern California where aphid flights do tend to drop to low levels after May 1, and late planting may be one way to achieve a degree of control, several factors should be kept in mind regarding this practice: (1) Greater difficulties may be encountered in getting a stand. Irrigation for germination will usually be required, and seedling diseases may be more severe. (2) If sugar beet and/or root knot nematodes are present, they will be more damaging. Soil temperatures in the late spring favor rapid development of these pests. (3) Certain insects, such as the sugar beet armyworm, may cause more damage to stands of late planted beets. (4) Hot weather in early summer may be more damaging. Late planted sugar beets wilt more frequently in hot weather, necessitating more frequent (though lighter) irrigations. (5) Less nitrogen fertilizer should be used than would be required for a disease-free earlier planted crop, so that the beets will be nitrogen deficient at harvest and thus have a higher sucrose concentration.

Root and sucrose production and sucrose concentration at three plant and harvest dates at Davis, California in 1961. Values are means of five replications of plots naturally infected with yellows viruses

Date planted	Yellows (%)	Roots (T/acre)	Sucrose (%)	Gross sugar (T/acre)	Gross sugar % of March 2
HARVEST: AUGUST 31					
March 2	100	19.4	9.5	1.84	100
March 29	79	23.1	10.2	2.36	128
May 2	6	24.8	11.3	2.80	152
LSD, 5% ..		2.8	1.4		
HARVEST: SEPTEMBER 28					
March 2.....	100	20.6	10.4	2.14	100
March 29	79	25.8	10.7	2.76	129
May 2	6	30.7	11.4	3.50	164
LSD, 5% ..		2.8	1.4		
HARVEST: OCTOBER 26					
March 2	100	19.7	11.4	2.25	100
March 27 ...	79	24.6	11.3	2.78	124
May 2	6	35.4	12.1	4.28	190
LSD, 5% ..		2.8	1.4		

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