

APHIDS ON IMPERIAL VALLEY BEETS



THE ONLY APHID that breeds on sugar beets in the Imperial Valley is the green peach aphid. This pest often builds up to high populations in late winter and early spring and reduces yields by feeding injury and by transmitting yellows viruses.

The green peach aphid seems to die out each summer on the Colorado Desert probably because the heat reduces the rate of reproduction so that it cannot keep ahead of insect predators, or the heat may actually kill the aphids.

This aphid has been found in the Imperial Valley about November 1, and the size of colonies then indicated that the first aphids had arrived about two weeks earlier. Winged aphids are easily blown long distances by the wind, so it is probable that beet fields are seeded by aphids blown over from the coast or mountains to the west. Some may be blown through San Geronio Pass and over the Coachella Valley.

Each winged green peach aphid landing on a beet or other suitable plant will feed for awhile and give birth to one to three young, then fly on to another plant and repeat the process. Most of these young aphids will be wingless when they mature so will stay on the plant and reproduce. A few of the young will grow wings and fly away to start new colonies. A newly mature winged aphid wants to fly for about two hours before settling down, so usually she will be in another field before she stops.

Greatly enlarged photo of green peach aphids feeding on a sugar beet leaf.

Because virus transmission is mostly by the winged forms, there is at least as much interest in the production of these as in the total aphid populations.

Grow wings

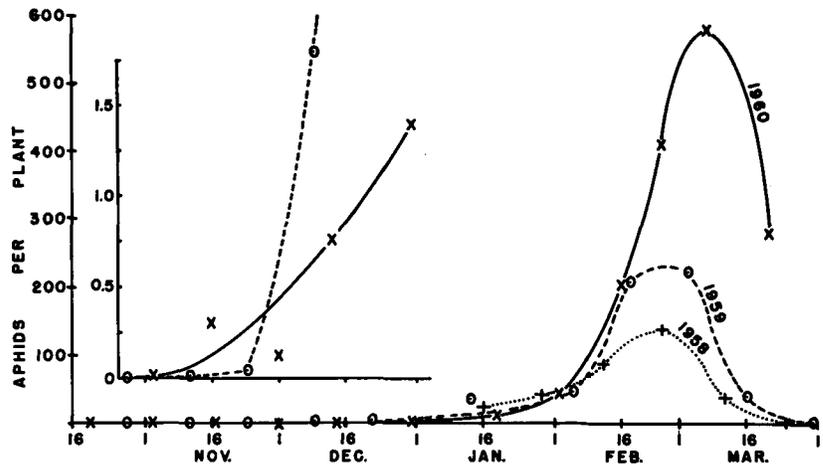
The percentage of aphids that grow wings in a colony is determined by the size of the colony and the resultant crowding of the young aphids. Counts of green peach aphid colonies on sugar beets showed that when there were only one or two young per plant, about 13% of them would grow wings. At the level of 100 per plant, about 35% grew wings, while at 200 per plant, about 65% grew them. At 1,000 aphids per plant, about 85% became winged, while in the largest colonies counted, about 9,000 per plant, a full 99% grew wings.

Wingless adults stay on the plant where they were raised and increase the size of the colony on that plant, or occasionally fall off and walk to a nearby plant. Young winged adults fly away to infest other plants.

Since flying aphids are carried by air drift or light breezes they have little control over where they land. They land at random in the fields, so that early-infested plants may be found anywhere. These early infestations will build up to large colonies, while other plants relatively near by have only small colonies on them, or may still be free from aphids. Half of the plants in a beet field will be infested by the time the average aphid population reaches five per plant. At this same level about one per cent of the plants will have 100 or more aphids on them. Seventy-five per cent infestation will come at an average of about 50 aphids per plant. By this time some plants will have colonies of 2,000 or more. By the time the average is 600 per plant there will still be a few free plants, but more than one-fifth of them will carry 1,000 or more aphids.

WINGED GREEN PEACH APHIDS PRODUCED PER ACRE AT AVERAGE POPULATION LEVELS IN BEET FIELDS IN THE IMPERIAL VALLEY

Generation		Winged aphids per acre	
No.	Date ended	1958-59	1959-60
1	Oct. 26	6	30
2	Nov. 11	62	124
3	Dec. 1	1,250	1,250
4	Dec. 26	15,500	4,650
5	Jan. 25	172,000	42,000
6	Feb. 19	1,000,000	1,600,000
7	Mar. 9	4,700,000	12,600,000
8	Mar. 21	850,000	11,500,000
9	Mar. 31	42,000	1,250,000
Totals for season		6,800,000	27,000,000



Average population of green peach aphids per plant through three seasons in the Imperial Valley. Inset shows detail of early season populations.

Aphid populations

Average aphid populations per plant through three years of recording in Imperial Valley beet fields are shown by the graph. Populations in individual fields were much higher or lower than the averages shown, but the seasonal pattern was always rather similar. Each year the aphids built up rapidly after February 1 to reach a peak about March 1. They dropped off rapidly about mid-March and were practically gone by April 1.

Between mid-October and April 1 there is time for about nine generations of green peach aphids. Production of winged aphids starts very low and builds to a peak in the spring as shown in the table. Indicated production of winged aphids in individual fields varied widely from the averages. The sampled field that had the least aphids in it produced only about 41,000 winged aphids per acre through a whole season, while the field with the highest population produced about 50 million flying aphids per acre one year.

Green lacewings

It was noted that often there were fewer aphids through the season in early-planted fields that had grown well so that the leaves were more than a foot high at the onset of cold weather. Sometimes this seemed to be brought about by green lacewing predators that like to pass the

cold weather in fields of tall beets but are rare in short beets. These predators lay many eggs, and lacewing larvae were seen eating aphids throughout the winter. Green lacewings are more common in certain parts of the valley than in others, since they build up in the fall on aphids on other crops. This means that not all fields of tall beets will attract enough lacewing adults to protect them.

In damper climates, beet aphids are scattered over most of the leaves, but on the desert they are practically confined to the new leaves in the heart of the plant. This crowds them together so that they produce more winged forms than in other places. It also makes them more susceptible to granular insecticides.

The relatively short period of high production of winged aphids reduces their efficiency as vectors of beet yellows viruses, since it takes some time for a newly infected beet plant to become a virus source. The quick peak and drop-off of the aphid population make it usually possible to greatly reduce this aphid peak with a single insecticide application. The very rapid buildup about mid-February also makes it necessary to watch the beets carefully and to get the insecticide applied at the proper date to prevent a run-away.

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