GODFREY, LARRY D.[1]* and PEGGY A. MAUK[2], [1]Dept. of Entomology, Univ. of California, Davis, CA 95616 and [2]Cooperative Extension, Univ. of California, Sacramento, CA 95827. - Interaction of black bean aphids and beet yellows virus on sugarbeet development and yield at several intervals following plant emergence.

The individual and combined effects of black bean aphid (Aphis fabae) infestation and beet yellows virus infection on sugarbeet growth, development, and yield were examined in a 2-year field study near Davis, CA. Stresses from aphids and virus disease were initiated at three plant growth stages (3, 6, and 9 weeks after seedling emergence) within a spring plant (late April) / fall harvest (October) field. Either viruliferous or nonviruliferous aphids, as appropriate for the treatment, were transferred from laboratory colonies to plots (1 row x 25 feet) delineated with floating row cover. Aphid density per plant, virus incidence, plant leaf area, leaf, petiole, and root dry weights and photosynthetic rate were quantified about every 3 weeks. Beet yield and sucrose content were determined at harvest. Black bean aphid densities peaked at >7000 per plant in infested plots compared with ~100 aphids per plant in uninfested plots. Virus incidence averaged more than 80% in plots infested with viruliferous aphids and <15% in "nonvirus" plots. A low background level of aphids and virus occurred in all plots. Leaf area was significantly reduced by all treatments by up to 83.3%; the most severe reductions were in the aphids and aphids + virus treatments at the 3-week timing. Beet yield was reduced by an average of 44% by aphids, virus, or both stresses at the 3-week timing in 1993; yield losses were 3-10% within the 6 and 9-week timings. In 1994, significant yield losses occurred from both pests in the 3- and 6-week timings; however, in the 9-week timing, yield losses were noted in only the aphids + virus treatment. Percentage sucrose values were not affected by any treatment during either year.