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Effect of rate and seed application technique on performance of imidacloprid on sugar beets in California.

It has been estimated that 12% of the potential sugar yield in the US are lost due to insect pests. Several insects, including wireworms, cut worms, seed corn maggots, beet armyworm, flea beetles, cucumber beetle larvae, and symphylans are pests of seedling sugar beets and make stand establishment difficult. Another important pest group is the sucking insects, such as aphids, leafhoppers, and whiteflies. These pests can reduce yield from direct feeding and from transmission of virus diseases. Yield losses due to insect problems and associated virus diseases can be limiting to sugar beet production in California. The systemic insecticide imidacloprid can be applied as a seed treatment to control soil-borne and sucking insects. The objective of this study was to determine if rates of 30, 60, or 90 g a.i./seed unit can be applied as either a film coat (fc) or a pellet (p) to control aphids and whiteflies without reducing plant stands. Sugar beet seed (USH-11) was treated by Beta Seed (fc), Holly Sugar Co. (fc), Incotec (fc and p), and Seed Systems (fc and p). Seed was planted at 3 field sites in the fall of 1994 in 3 distinct regions of California: Imperial Valley (Brawley), Central Valley (Fresno), and Sacramento Valley (Davis). Plant stands were evaluated at 2 and 3 wk after planting. In the Imperial Valley, whitefly adults, nymphs, and feeding injury were evaluated weekly for the first 4 wk of growth. Both the 60 and 90 g rates significantly reduced feeding injury from whiteflies. The effects of imidacloprid on whitefly populations were variable. Higher rates (60 and 90 g) tended to suppress whitefly nymphs on leaves. At the Davis and Fresno sites, aphid control was measured using a laboratory assay with black bean aphids. In the field, under optimum soil conditions, the 90 g film coat reduced stands by 15-25%. Under poor soil conditions, the 90 g film coat reduced stands by 25-42%. Pelleted seed increased stands as compared with film coated seed under all conditions and rates of imidacloprid. In fall planted sugar beets, where temperatures are mild (40-70 F), laboratory assays indicated that all rates (30, 60, and 90 g) of imidacloprid significantly suppressed aphid colonization four months after planting.