NEW PRODUCTS FOR NEMATODE MANAGEMENT ON ANNUAL CROPS IN CALIFORNIA

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Root-knot nematodes (*Meloidogyne* sp., RKN) and sugarbeet cyst nematode (*Heterodera schachtii*, SBCN) are widely distributed in California. RKN are the most important nematode pest of carrot (*Dacus carotae*), tomatoes (*Lycopersicon esculentum), and cucurbits (*Cucumus *sp, Cucurbita sp.)*.* SBCN is the most important nematode pest of broccoli (*Brassica oleracea*) and sugarbeets (*Beta vulgaris*). Current control methodology relies on the use of Metam sodium, 1,3-dichloropropene (Telone II, 1,3-D), and for tomatoes nematode resistant varieties. In 2012, five field trials, were conducted to evaluate the effectiveness of several new products for management of RKN on carrot, tomato, and cantaloupe; and of SBCN on broccoli and sugarbeets.

Materials and Methods: All trials were conducted at UC South Coast Research and Extension Center. The soil type was a sandy loam. Each treatment consisted of 5 replicates in a randomized complete block design. Single row plots were 4 meters long plus a 1-meter buffer on either end. Trials were sampled for nematodes pre-plant to establish the level of the population, and at harvest. In addition, root-gall ratings with 0 = no galling, and 10 = heavily galled were conducted for tomato and cantaloupe trials. At harvest, 0.91 meter of row of carrots from each replicate was harvested and number of marketable carrots determined. For tomatoes at harvest, plant weight, total fruit weight, and weight of red and green fruit was obtained from 5 plants per replicate. All ripe cantaloupes were picked at harvest, a total weight per replicate was obtained, and melons were graded and counted. For broccoli at harvest, the number of plants and the number of crowns was counted in each replicate, and the diameter of each crown was measured. From these measurements, the average crown size, and the number of marketable crowns were determined. Data were analyzed with Analysis of Variance (ANOVA) followed by Fisher's Least Significant Difference Test. Treatments were evaluated and compared to an untreated control (UC).

Treatments in addition to an UC and a standard chemical, included various combinations of five products from Stoller (Seed Power, More Power, Bioforge, Root Power, and Force), Dazitol from Engage Agro, and DiTera from Valent. The Stoller products contain various combinations of plant nutrients, anti-oxidants, and growth hormones. Dazitol contains capsaicin and allyl isothiocyanate. DiTera is a toxin produced by the fungus *Myrothecium verrucaria*. 1,3-D was injected

preplant on June 5. All other treatments were applied following seeding on June 19, or at intervals following emergence, and incorporated with irrigation. Trials were harvested at maturity.

Results: For carrots, Seed Power ($p = 0.10$), Bioforge ($p = 0.05$), and Dazitol ($p = 0.05$) had a greater number of marketable carrots than UC. At $p = 0.05$, Bioforge and Dazitol had a greater weight of marketable carrots than UC. Bioforge ($p = 0.05$), Root Power + Ditera ($p = 0.10$), and Dazitol ($p = 0.05$) had a greater percentage of marketable carrots based on number of carrots than did the UC. Bioforge ($p = 0.10$) and Dazitol ($p = 0.05$) had a greater percentage of marketable carrots based on weight of carrots than did the UC. For tomatoes, 1,3-D had a greater total weight ($p = 0.10$) and a greater total fruit weight ($p = 0.05$) than UC. At $p = 0.10$, Root Power and 1,3-D had a greater weight of green fruit than UC. At harvest, Root Power + More Power had a lower root gall rating than UC ($p = 0.10$). At harvest, Seed Power ($p = 0.05$), Bioforge ($p = 0.10$), and Ditera ($p = 0.05$) had fewer RKN in soil than UC. For cantaloupe at $p = 0.05$, Seed Power + More Power, and 1,3-D had a lower root gall rating than UC. For broccoli, at $p = 0.10$, Bioforge and Root Power had a lower level of SBCN at harvest than UC. On sugarbeets, at $p = 0.05$, Root Power + Ditera had a greater number of SBCN than UC. Based on results of these trials, several new products shows promise for use in IPM programs for managing RKN and SBCN on a variety of crops.