Research Note

WEED INCIDENCE AFTER APPLICATION OF SEWAGE SLUDGE COMPOST[1]

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Use of sewage sludge compost (SSC) on agricultural soils has been proposed to alleviate problems associated with disposal of this material. Research has demonstrated that the above practice influences weed population on crops (Niggli et al., 1990; Ozores-Hampton et al., 1996). Ozores-Hampton (1998) indicated that using immature compost reduced weed seed germination and weed growth; these reductions were attributed to both the physical effect of the mulch and the presence of phytotoxic compounds. Roe et al. (1993) observed that mature municipal solid waste compost reduced weed growth in alleyways of bell pepper, but herbicides were still more effective. In Puerto Rico there are ongoing efforts to develop appropriate methods to dispose of SSC in agricultural soils (Martínez et al., 1999). Therefore, possible effects of SSC on weeds should be evaluated in agricultural systems. Data on the determination of the effect of SSC on weeds are limited. The objective of this study was to evaluate the effect of SSC application on weed density under field conditions.

Field experiments with cassava were established at the Agricultural Experiment Stations in Corozal and Juana Díaz in 1996, 1997 and 1998 to study the effect of SSC on weed density. A crop simulation study was also conducted at Juana Díaz in 1999. The Corozal site is located 195 m above sea level and has an Ultisol soil (Corozal clay-Aquic Haplohumults). The site at Juana Díaz is 30 m above sea level and has a Mollisol soil (San Antón loam-Cumulic Haplustolls). The experimental plots were 8.5 by 9.1 m with 1.5 m between rows. Five experimental treatments were evaluated by using a randomized complete block design (RCBD) with four replications. Treatments were rates of compost (SSC): 0, 37, 74, and 148 t/ha. These compost rates were applied annually for a three-year period. In addition, a treatment consisting of a single application of 445 t/ha of SSC (applied in 1996) was included to evaluate the effect of single versus continuous application of compost. Results of the cassava experiments here presented pertain to the second and third years after the initial application.

The sewage sludge compost used was obtained from the Solid Waste Management Authority compost facility in Arecibo. Compost was applied uniformly to the experimental plots with a front load tractor; then it was incorporated in the first 15 cm of soil. During the three-year period at Corozal, ametryn at 4.48 kg ai/ha was applied three days

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after crop planting and before weed emergence; in Juana Díaz, ametryn was applied during the first year. Cassava (*Manihot esculenta*), PI 12902, was planted in all plots a month after the treatments' incorporation. One weed density determination was conducted three weeks after crop planting. Since weed species were different at the two locations, data were not combined over locations.

A second trial was established in Juana Díaz in January 1999 for the crop simulation study. The same compost rates were evaluated in plots of 3.05 by 0.91 m with 1.8 m between plots. The rates of SSC were the same as those used in the previous trials. Four replications were used. No crop was planted, but plots were irrigated, thus simulating a crop growing system. Three weed counts were made to determine weed density, and then weeds were removed. Since weed species were the same, data were combined over weed counts. Data from both the weed density and crop simulation experiments were analyzed by ANOVA and means were separated by LSD (0.05) test.

The most common weeds found in the cassava experiment at Juana Díaz were horse purslane (*Thrianthema portulacastrum*), pigweed (*Amaranthus dubius*), common purslane (*Portulaca oleracea*), and junglerice (*Echinochloa colona*). Total grasses, broadleaves and *Cyperus* spp. averaged (over the years) 15, 91 and 32 plants per m^2, respectively. No differences were detected among treatments for weed species or weed densities.

At Corozal, the common weeds were purple nutsedge (*Cyperus rotundus*), guineagrass (*Panicum maximum*), morningglory (*Ipomoea* spp.), and wood sorrell (*Oxalis* spp.). Total grasses, broadleaves and *Cyperus* spp. averaged (over the years) 7, 11 and 7 plants per m^2, respectively. No differences among treatments for weed species or weed densities were detected.

The crop simulation trial conducted in 1999 at Juana Díaz did not result in differences among the rates of SSC for weed density categories. The grasses, broadleaves and *Cyperus* spp. averaged 26, 39 and 126 plants per m^2, respectively. Results indicate that the use of SSC at rates similar to those used in this study has no effect on weed density.

LITERATURE CITED

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