

Cuba's Composting!

Caught in a vice of economic sanctions, political pressures and faltering production, Cuba has been forced to find alternatives to its reliance on imported fossil fuels, fertilizers, pesticides, animal feed and the like. Agricultural imports have been cut by as much as 80%. Consequently, the Cuban government has established new soil management programs and has made earthworms a key agent in the drive for agricultural sustainability. Cuban scientists are finding that vermicompost performs better than regular compost. With select earthworm species, they have developed a technological package for the production of vermicompost.

Cuba's vermicomposting program started in 1986 with two small boxes of red worms, *Eisenia foetida* and *Lumbricus rubellus*. By 1992, 172 vermicompost centers were producing 93,000 tons of worm humus annually. Several different institutions and companies are involved in vermiculture, but research is primarily conducted by the Institute of Soils and Fertilizers and the National Institute of Agricultural Sciences.

Compost Production

Vermicompost production requires a mixture of worm castings, organic material and bedding in various stages of decomposition. Most vermicomposting operations in Cuba use cow manure as the primary source of organic material. Other sources include pig and sheep manure, filter press cake from sugarcane, coffee pulp, plantains and municipal garbage.

First, manure is aerobically composted for approximately 30 days then transferred to open vermicompost beds. The beds are approximately 1.5m wide and vary in length. The compost is mixed with soil and "seeded" with earthworms. At certain sites, the beds are in the shade of large mango trees that benefit from nutrients leached from the piles.

Vermicompost beds are watered to maintain optimum moisture and temperature levels. The worms feed on the freshly applied compost at the top of the beds and deposit their castings in the lower levels. Compost is continually applied until the beds reach a height of approximately 0.9m, after about 90 days. The worms are concentrated in the top 10cm of the pile and are either scraped off or separated from the vermicompost in a screening process. The humus is sold in bulk or used on-site as a soil amendment and fertilizer.

The Benefits

The humus produced in vermicomposting provides binding sites for plant nutrients, helps control plant diseases and stimulates plant growth. Humus also increases water permeability and water retention, contributing to better plant health and more efficient use of soil moisture. Cuban researchers have found that nitrogen concentrations are higher in vermicompost than in aerobic compost piles. Earthworm castings are 1.5 - 2.2% nitrogen, 1.8 - 2.2% phosphorous and 1.0 - 1.5% potassium, and remain in the soil for up to five years. Worm populations under vermiculture can double in 60-90 days.

Worms not used to seed new compost piles are dried and used as a supplemental protein for animals. Earthworms are high in protein and contain the amino acid methionine (4%), which is absent from feed grains. Cuba's future plans include production of earthworm excrement to be used as substrate for bacteria, which in turn will be used as biofertilizer.

Extension and Expansion

Five experimental stations located in different parts of the country are training worm growers. An annual national conference on vermicomposting provides a forum for growers to acquire and exchange information. National television programs and newspaper articles help educate farmers, school children and the general public about vermiculture.

The Soil Institute is presently spearheading efforts to market and sell worm humus in 40 kg, 1 kg and 1/2 kg bags under the trade name Midas. However, humus production in Cuba has not reached levels that permit significant export. Income generating schemes have focused on joint production ventures and the sale of technical assistance for start-up vermiculture programs outside Cuba. Altogether, Cuban vermiculture is proving to be a promising substitute for imported goods.

Gersper et al., Summer 1993, Agriculture and Human Values, Vol. X, number 3, pp.16-23. Werner, Matthew, Summer 1994, Cuban Agriculture Looks to Vermiculture, The Cultivar, Vol. 12, No. 2.

Matthew Werner

Center for Agroecology and Sustainable Food Systems

University of California

Santa Cruz, CA 95064, USA

E-mail: werner@zzyx.ucsc.edu