Vermiculture: An Ecologically Friendly Alternative to Waste Management and Fertilizer Needs

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Waste management is becoming a huge problem that is threatening to grow out of control in this country. Society has considered many different ideas about what the solution to the waste management problem would be; yet, there has not been one definitive answer to the crisis. It is unlikely that there is just one answer to solving the waste problem in this country. However, some solutions have more than one benefit. Vermiculture is one of these solutions. Vermiculture is the recycling of organic waste using earthworms. The byproduct of vermiculture is a highly potent fertilizer. In light of the rapidly decreasing size and availability of landfills, vermiculture is an alternative that ought to be considered by everyone.

Why Vermiculture?

A waste disposal alternative needs to be employed in this country. William Rathje and Cullen Murphy tell us that two facts were discovered by the Garbage Project in the late 1980's: "Accelerating rates of garbage generation are responsible for the rapid depletion and present shortage of landfills. [Also,] nationwide, there are few good places left to put new landfills" (93).

Worms eat half their weight in food each day.

An average American landfill.

Can worms save us from overloading our landfills?

Vermiculture can be done on an individual basis as well as a commercial basis. Vermiculture is a rapid process; whereas waiting on trash in a landfill to decompose could take anywhere from 50 to hundreds of years. Vermiculture also results in a useful byproduct: fertilizer. There is no shortage of materials for vermiculture. D. Brian Paley states "Approximately 70% of all the material currently entering our landfills, as well as all the farmyard manure in North America, and immeasurable amounts of yard wastes on top of that, are perfectly suitable as feed for worms."

The Benefits of Vermiculture

It is difficult to find a landfill or recycling center that is earth-friendly as vermiculture. Earthworms are capable of converting massive quantities of organic waste into a useful soil additive. Earthworms do not produce harmful chemicals that will be deposited into the soil nor do they produce noxious emissions that will pollute the air. Earthworms help to stabilize the soil to a pH of seven and have a symbiotic relationship with plants (Darnall 1). Earthworm castings are a great source of fertilizer. The *Gardenline* website on the University of Saskatchewan website says: "Castings have a nutrient level and organic matter level much higher than that of the

surrounding soil. Each day they produce nitrogen, phosphorous, potassium and many micronutrients in a form that all plants can use." Furthermore, Gardenline says: "For example, a 200 sq. ft garden with a low worm population of only 5 worms/cubic foot will be provided with over 35 lbs. (about 1/3 lb. per worm) of top-grade fertilizer by the worms, each garden year."

The Art of Vermiculture

Vermiculture involves adding worms to a compost pile. There are two species of red worms that work best for vermiculture: *eisenia foetida* and *lumbriscus rubellus* (Sherman). Sherman says "Worms eat half their weight in food each day, so one pound of worms will eat half a pound of food scraps daily."

The worms will decompose the organic materials in the compost into dark humus that is rich in nutrients. The humus can then be used to fertilize houseplants and gardens. It is easy to see how vermiculture helps to reduce the amount of garbage a family produces in a week. Vermiculture can be done anywhere: indoors or outdoors (Darnall *Vermiculture at Home*). Vermiculture on an individual or family basis does not require much space. It can be done in the basement of a home or out in the backyard.

The worms prefer a dark and moist area to live and work. Many people build a vermiculture barn, which is nothing more than a large box with a lid and some holes drilled into the bottom for drainage and aeration. One only needs to put in some soil and trash; such shredded newspapers, cardboard and add water to begin the barn. Worms can be fed fruit, vegetables, crushed eggshells, tea bags, and coffee grounds.

A home vermiculture barn.

The eisenia foetida.

The lumbriscus rubellus.

Commercial Vermiculture

Commercial vermiculture can be a lucrative business. According to Darnall, in Ontario, CA, nine tons of mixed municipal waste was placed into a worm bed. Within 68 days, the decomposition of the material was 90% complete. The resulting soil was packaged and sold to a local nursery. Compare this to tales of 30-year old carrots found in landfills (Clarke 106). It is easy to see that vermiculture is much more effective at decomposition than landfill decomposition. There are several commercial worm compost-

A 200-foot garden with only five worms in it can produce 35 pounds of top-grade fertilizer each garden year.

ing sites in this country as well in foreign countries. Unfortunately, vermiculture is significantly more expensive than conventional methods of disposing of trash, so there are not many places that use vermiculture as a method of recycling their trash.

There are a few drawbacks to commercial vermiculture. Runoff can result at large vermiculture plants since so much moisture is required to maintain the vermiculture beds. Care must be taken on what is fed to the worms since they will eat anything. Metals and harmful chemicals can accumulate in the worms' bodies. Birds tend to flock to large vermiculture sites in order to eat the worms. If worms are fed harmful chemicals and then are eaten by birds, a vicious cycle of poisoning could occur. However, if these drawbacks are addressed in the planning stages of a large vermiculture site, these potential problems can be avoided.

Within 68 days, the decomposition of the material was 90% complete.

Conclusion

Various groups over the past several years have come up with alternative ideas to landfills. Until technology evolves to a state where there can be one efficient disposal system that does not adversely effect the environment, society must take steps to dispose of its waste in safer methods than simply dumping refuse into a landfill. Although commercial vermiculture is currently cost prohibitive in most areas, individual vermiculture is a plausible solution. Vermiculture is an eco-friendly method of disposing of organic waste that provides a usable end product. Although vermiculture cannot dispose of plastics and toxic waste, it can cope with a large portion of the trash that America produces. Vermiculture may not be the only answer to America's trash problem, but is a step in the right direction.

Works Cited

Clarke, Chris. "The Thirty-Year-Old Carrot". Ed. Carol J. Verburg. *The Environmental Predicament*. Boston: St. Martin's Press. 1995. 106-108.

College of Agriculture, University of Saskatchewan. 1996. *Earthworms: Friend or Foe?*. Gardenline: University of Saskatchewan. 25 Mar. 2001. <http://www.ag.usask.ca/cofa/departments/ hort/hortinfo/yards/earthwor.html>.

Darnall, Alyssa. 1996. *Vermiculture at Home*. Home Page for ENH 1. 24 Mar. 2001. < http://telework.ucdavis.edu/enh1/darnall/vermic.htm>.

---. 1996. *Worm Composting*. Home Page for ENH 1. 24 Mar. 2001. < http://telework.ucdavis.edu/enh1/darnall/Index.htm>.

Paley, D. Brian. 1996. *Facts 1*. Worm World Inc. 24 Mar. 2001. < http://gnv.fdt.net/~windle/ facts1.htm>.

Rathje, William and Cullen Murphy. "What's in a Landfill?". Ed. Carol J. Verburg. *The Environmental Predicament*. Boston: St. Martin's Press. 1995. 93-105.

Sherman, Rhonda. Unknown Date. Worm Away Your Cafeteria Food Scraps. NC State University-Department of Biological & Agricultural Engineering. 25 Mar. 2001. <http://www.bae.ncsu.edu/people/faculty/sherman/worms.html>.

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