

## **Simple low cost aerated static composting systems for equine operations**

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Many horse owners do not have access to sufficient land to make good use of manure by spreading. Traditionally horse owners collect manure and soiled bedding and pile them on unused land on their property. Runoff from soggy manure piles can cause serious surface and ground water contamination problems. Moreover, odor and fly associated with manure piles can also threaten animals and neighbors health.

An average size horse produces roughly 50 pounds of manure and 10 pounds of urine per day. Also horses that are housed in stalls may generate an additional 20 pounds or more soiled bedding. In many stables woody materials such as saw dust, wood shavings or wood chips are used as bedding. Although these materials are excellent in terms of absorbency, they are rich in carbon with low or no nitrogen. In other words these materials have a C:N ratio of 500:1. Horse waste that includes manure and bedding often possess a C:N ratio of 75:1 depending on the amount and frequency of bedding replacement. Microbes that are responsible for turning animals waste into compost require a C:N of 25:1 or lower. This explains why a pile of stable waste cannot noticeably decompose over time. Other than proper C:N ratio, successful composting requires adequate moisture and oxygen needed for optimum microbial activity. Oxygen is often provided by turning compost piles as often as possible. If the compost pile lacks enough oxygen it may take several months or years to finish and also it will cause bad odor. Many horse owners find turning composting pile a tough and time consuming task. A simple 3-bins composting system fact sheet for small horse operation can be found on UMass Extension Crops, Dairy, Livestock, Equine team:

<http://ag.umass.edu/sites/ag.umass.edu/files/fact-sheets/pdf/CompostingHorseManure08-46.pdf>

### **Aerated Static Pile Composting:**

An alternative to frequent turning of composting pile is supplying air to the pile through perforated pipes. Moreover the aerated pile is covered therefore it imposed minimum risks to the environment. The composting materials can be finished much faster (4 weeks for composting and another 4 weeks for curing and finishing).

Through a project funded by the Massachusetts Department of Environmental Protection, UMass Extension with collaboration from Paul Moshimer (Blue Star Equiculture) and Atakan Kadi (A Harvard extension school student and systems engineer at Adobe) have demonstrated two simple low cost aerated static composting systems for typical small acreage horse and/or livestock operations at UMass Hadley Farm in Hadley and Blue Star Equiculture in Palmer.

The first system consists of two or more plastic trash bins; each holds roughly 750 lbs. of waste (Figures 1-4). The bins are connected to an air compressor/blower that automatically turns on for one minute every one to two hours. Finished compost can be ready in 7-8 weeks including curing time.

The second system consists of one or two composting piles about 25-35 ft long (Figures 5-6). Each pile is subdivided into two-three 10 ft. sections for frequent addition of fresh materials and removing finished compost. The composting materials are piled on a woodchips base with perforated PVC pipe running through the base and a 1 HP air pump that works for 1-2 minutes every hour. The pile is covered with a fabric that is impermeable to water. The compost in each subdivision is finished in 8-10 weeks including curing and finishing time.

(Figures 1-4)



Figure: 1



Figure: 2



Figure: 3



Figure: 4



Figure: 5



Figure: 6

This factsheet has been funded by the Massachusetts Department of Environmental Protection.