Humus, sweet humus

Construct a simple composting system to turn your stall waste into nature's best fertilizer.

On any given day, an average-sized horse on a normal diet produces about 50 pounds of manure. That's more than nine tons of dung over the course of a year. Add to that the soiled bedding you regularly remove from the stable, and in no time you have a veritable mountain of muck. Besides being a visual and olfactory affront, manure piles pose serious health threats to your horses. If they graze near horse manure, they can easily be reinfested by larvae that hatch from the worm eggs. Runoff from soggy manure piles contaminates surface water. Finally, there are the associated fly problems, which, if you live near others, you're liable to share with your neighbors.

Composting is an excellent way for backyard or small-farm owners to manage stall waste. By picking up manure from stalls, paddocks and confinement areas on a regular basis and depositing it in compost bins, you'll be doing your horses, and yourself, a huge favor. Composting
- kills worm eggs and other pathogens, as well as weed seeds,
- checks the fly population by eliminating a prime breeding and egg-hatching ground,
- reduces odor,
- cuts the volume of waste by about 50 percent,
- protects local surface and ground water from manure-contaminated runoff,
- saves you the cost of manure removal by a commercial hauler,
- provides a free, enriching soil amendment for your pasture, garden or yard.

The information that follows explains how to build, maintain and use a composting system for as many as five horses. Such simple tools as a wheelbarrow, manure fork and shovel are all you'll need to manage it. The bins pictured here are constructed of treated landscaping timbers, but any readily obtainable lumber can be used. You can easily tailor the composting system to meet your specific needs, based on the number of horses you have, the amount and type of bedding material you use and what you plan to do with the finished compost.
Building your compost bin

Putting together a compost system is not an exact science: Any structure capable of containing your horse-related wastes, while maintaining an adequate air supply to sustain the composting process, will suffice. After you've decided where to put your compost system and what materials to use, it's time to put your bins together. The photos accompanying this article are of a two-bin system built in King County, Washington.

■ Layout: Assemble all the tools and materials, using the lumber to outline the exact location of your bins. Make sure the side walls are parallel to each other.

■ Postholes: Locate the holes for the vertical supports by measuring in two feet from each end, and dig the holes three feet deep. Place each support in a hole and backfill with about one-third of the dirt. Use the level to make sure the support is vertical, and pack the dirt around the support with a tamping rod. Continue filling, tamping and checking the post's verticality until the hole is filled and the post is immovable in the ground. Do the same for the remaining supports.

■ Sides: Place the first timber on the ground on the inside of and flush against the two supports of the back wall. Use the level to make sure the board is horizontal. Drill a quarter-inch hole through the horizontal timber into each support, keeping it level as you go. Secure the timber to each support with a lag screw. Continue attaching the horizontals until you reach the desired height, leaving spaces approximately one-half-inch wide between them. Erect the remaining sides, butting their timbers snugly up against the back wall.

■ Additional bins: For a two- or three-bin system, you'll save on time and materials by having them share common side walls.

■ Customizing: You may wish to close off the front of your bin as it gets full. Simply nail boards across the front as the mound rises, or build a "channel" on the front, inside of each side wall, to allow you to slide in boards as the bin fills. You may wish to customize your compost bin system further by painting it to match your barn or by building a roof over it.

Alternative #1: The rebar method
Rather than burying support posts, drive eight-foot reinforcing bar ("rebar") into the ground at the corners of the bin, then drill holes near the ends of each horizontal timber/board and thread them onto the rebar. Cut blocks two to three inches thick, and alternate them with the boards to leave space for aeration.

Alternative #2: Passively aerated windrow system (PAWS)
A new twist to an old concept, PAWS requires no lumber at all, just a lot of PVC pipe. Using 10-foot sections of four-inch pipe, drill half-inch-diameter holes at six-inch intervals to increase air flow, then lay them a foot or so apart across a six-inch-deep bed of straw or peat moss. Deposit the daily wastes on top of the pipes until the mound reaches a height of four feet. Cover the finished pile with another six inches of peat moss (or finished compost). Air enters the composting material through the pipes and rises through the pile via convection; no turning is necessary. The top layer traps unpleasant odors as well as moisture.
Making plans

For a composting station to be useful, it needs to be in a convenient, practical and environmentally sound location. Ideally, a compost bin is on a high, level spot; low-lying areas will turn it into a soggy mess. To make your manure-management process more “choke efficient” and less time consuming, choose a location that’s easily accessible to your stall and paddock areas. If your property has serious mud or drainage problems, seek advice from your local extension service before you start building your bins.

Next, decide on the number of bins you need. Our bins were designed in eight-foot-by-eight-foot modules (corresponding to the standard length of landscape timbers we used), each of which yields four cubic yards or so when full. That’s a pretty large pile by most standards; you may choose to scale down the operation based on available space and materials, the amount of manure to be composted and the time you have (or want) to spend on the project. Additional bins can be built so that they share common sides with their neighbors. Just two bins work well enough for one or two horses, but a three-bin system is probably the most useful, providing storage for all three phases: One bin is reserved for the daily wastes, another bin is full and in the composting stage, and a third bin holds the finished compost, which can be taken out and used at your convenience. The entire cycle takes about three months, so plan your bin sizes accordingly.

Now you need to decide what building materials you’ll use. We chose landscape timbers (sometimes called peeler logs) for our bin, but just about any kind of lumber, including large, straight tree limbs, works. What’s important is to leave spaces between the boards—a half-inch or more—as you build the sides so that air can penetrate into the pile and sustain the decomposition process. Each bin cost us about $100; you may spend considerably less, depending on the materials you use. Three bins can be built by one person in a weekend (see sidebar “Building a Compost Bin”).

Managing the compost process

The actual work in a compost bin is carried out by microorganisms, mainly aerobic bacteria and fungi, but you’ll need to monitor the piles to make sure that conditions are optimal for decomposition. Those microscopic workhorses need air and water; too much or too little of el-
To keep the compost pile moist, hose down your stall waste before adding it to the pile.

Cover the bin with a tarp to protect your pile from the elements.

The finished product should be dark and crumbly.

Spread a half-inch layer of compost during the growing season.

What you’ll need

This list of building supplies and equipment is for two composting bins, each eight feet square and four feet deep. Your materials list will vary if you use different dimensions or the alternative methods mentioned on page 39.

supplies
- 70 landscape timbers (8’ long)
- 140 lag screws (5/16” diameter, 5 1/2” long)
- 4 PVC pipes, 8’ by 4” diameter, perforated
- plastic sheet/tarp to cover top

equipment
- posthole digger
- drill and bit (1/4” diameter, 5” long)
- ratchet-and-socket set
- carpenter’s level
- power or handsaw
- tamping rod or similar tool

Other causes problems. Let’s look at ways to regulate the amount of air and water in your manure-composting bins.

- Covering your bins with a hinged roof, tarp or plastic sheet is essential for moisture management throughout the variable seasons. The ideal moisture content ranges between 40 and 60 percent, the approximate consistency of a damp sponge. A dried-out pile won’t decompose, while a waterlogged pile quickly becomes anaerobic, killing the beneficial bacteria and fungi. Cover the pile initially, and check it often: It’s a lot easier to add moisture to a compost pile than to remove it.

- Turning the pile allows oxygen to get to the bacteria and other microorganisms. It also ensures that the contents of your compost bin break down uniformly. Turning a compost heap entails taking the material on the periphery and working it in close to the center, where the microbial action is. How often you need to turn your pile depends on how well ventilated it is to begin with. If you leave ample space between wall timbers, air can pass through the sides and permeate into
the pile to a depth of three feet. Our design also incorporates perforated PVC pipes that act as ventilation stacks for the compost heap. A rule of thumb among composting experts is to turn a pile every six weeks to three months. If it smells bad, it means that anaerobic bacteria are taking over and short-circuiting the composting process. On the other hand, overzealous turning prevents the microorganisms from doing their work. Serious composters recommend monitoring the core conditions with a soil thermometer. A core temperature of 120 to 140 degrees Fahrenheit is optimal.

**Watering** is essential to maintaining a healthy compost pile, particularly in dry times. The simplest method may be to water down each wheelbarrow load before you dump it into the bin. Or you could water the pile with a garden hose when you turn the compost. Or you could use the PVC pipes to deliver water into the center of the pile. Whatever method you choose, be vigilant, because once the composting process stops due to too little or too much water, it can be difficult to restart.

**Adding other stuff** to your pile is okay, so long as it's compatible with the composting process and doesn't attract pests. Garden waste, lawn clippings, leaves and other plant material all decompose eventually, but don't let the foliage clump together, because air can't get through the clump. Kitchen scraps compost also, but they may attract rats, mice and other unwanted foragers. Also, use only herbivore manure in your composting system:

- **Carnivores**—your dogs and cats—may share pathogens with us, so their manure needs to be disposed of differently. Other biodegradable materials include hay, oats, sawdust, peanut shells, feathers and hair. Don't compost cat litter, fish, newspapers or dairy products.

Once the composting process is in full swing, your pile should smell earthy but not unpleasant. Odors and flies are associated with fresh manure, but once the dung begins to break down, there shouldn't be an odor problem. If it's not heating up or if it has a bad odor, something is not being managed properly (see troubleshooting chart).

**Compost happens**

Depending on the size of your pile and how well you've maintained it, you may have usable compost in a month's time. But more likely it will take a couple months in the summer and three to five months in the winter, when cold temperatures slow microbial activity. You'll know your compost is ready when it has reduced in volume about 50 percent and the material looks evenly textured and crumbly, like soil, and no longer resembles the original material.

Compost is a rich soil enhancement that improves soil fertility and consequently the health of your plants. Spread it in a thin layer on your lawn or use it as a mulch to control weeds and retain moisture in the garden, flower areas or shrubs. You may even have a good supply of horseless neighbors who would love to have some composted horse manure for their own horticultural projects.

Spread compost on pastures during the growing season only. If you apply it when plants are dormant, the compost and nutrients may get washed off the field and into the surface or ground.
For more information

The Natural Resource Conservation Service works with farmers and ranchers on the wise use of natural resources and environmentally sound farm-management practices. The telephone number for your NRCS office is in the United States government listings under Agriculture Department.

Conservation districts also work with smaller, noncommercial farmers and livestock owners. For information on contacting your local conservation district, call the NRCS office.

Your county cooperative extension service can provide you with information on pasture and manure management as well as composting. Look in the county-government listings of your phone book or under your state land-grant university (if you have trouble locating them, ask for help from your public library reference librarian).

Your county solid-waste department may also be able to help you with more information on composting or other ideas for manure management. Many counties (or city solid-waste departments) offer classes to provide you with more information about and understanding of the composting process.

The Rodale Institute, a nonprofit organization based in Kutztown, Pennsylvania, is an excellent resource for backyard composters and large-scale farmers alike. Call (610) 683-1400.

water. Spread a half-inch layer at a time, totaling about three to four inches per year. You can spread the compost by hand, with a shovel or, for large areas, with a manure spreader.

Composting is a cheap, efficient and eco-friendly way to manage horse manure and attendant stall wastes. It returns key nutrients to the soil, enhancing your garden, pasture or lawn naturally, without commercial fertilizer. Best of all, it promotes a cleaner, more sanitary environment for you and your horse.