

GET DOWN AND DIRTY

with composting

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In the Winter 2009 issue of Big Sky Small Acres Magazine, I discussed equipment used for spreading manure on small acreages as well as some other ideas for manure management. One of the options was composting, and this seems to have a fair amount of public interest. Composting relies on oxygen, moisture and nitrogen to microbially break down carbon material into a homogenous product through an exothermic process. This means heat is generated by microscopic “bugs” breaking down the large particles. The final product will include organic carbon, nitrogen, phosphorus and micronutrients.

Benefits of properly managed compost include reduction or elimination of odors, pathogens and viable weed seeds, as well as a reduction in the overall amount of material to be dealt with. Compost added to soils has also been shown to increase biological activity in the soil, improve soil tilth, and increase the availability of certain plant nutrients already in the soil. Furthermore, the composting process can turn materials such as manure, grass clippings, leaves, yard debris, and other organic materials—frequently considered nuisance items—into a valuable resource. This

resource can be sold and is easier to export from your small farm or ranch.

Several conditions are important for proper composting to take place:

1. The materials to be composted should have an appropriate carbon-to-nitrogen (C:N) ratio, from 20:1 to 30:1. It should be noted that horse manure with bedding may have C:N ratios in the 100s:1. With a higher ratio (more carbon), the composting process takes place more slowly. In practice, this means using a blend of high-carbon materials such as leaves, straw,



or yard residue and high-nitrogen materials such as livestock manure or fresh grass clippings.

2. Moisture content between 40 and 60% should be maintained. If the material is too dry, the lack of moisture will slow microbiological activity, and the compost pile will not heat up properly. A compost pile with too high a moisture content will not stack properly and will have insufficient oxygen for the microbes. In addition, too much water in the pile may cause soluble forms of nitrogen or other nutrients to leach from the compost. A simple test for measuring moisture content is to take a handful of the composting materials and squeeze them into a tight ball in your fist. The material should feel wet, like moist potting soil, but should not drip or express free water.
3. The microbes, which break down the organic materials in the composting process, require oxygen; so, proper aeration is critical. If the compost pile has insufficient air, anaerobic organisms are favored, and the benefits of composting are lost. Aeration of compost is usually achieved by physically stirring or turning the pile periodically or through aeration pipes placed under the windrows or compost piles.
4. Compost must be able to achieve and maintain sufficient heat to speed biological activity and to help kill weed seeds and plant pathogens. Although the



composting process produces heat, often in excess of 150° Fahrenheit, retaining it can be difficult during cold weather. Building the pile large enough, with each of the three dimensions at least 4 feet, decreases the surface-to-volume ratio and helps to keep the center of the pile warm. A covering of straw will provide some insulation to help retain heat. To ensure effective pathogen reduction, all materials in the compost pile must be exposed to the high temperature for at least three consecutive days.

During Montana winters, many small compost piles (garden scale, less than a cubic yard in volume) go completely dormant in our climate. However, once spring comes, turning the pile every couple weeks will produce a finished product by late summer or early fall. A compost pile in the size described above will require small power equipment to efficiently turn. It can be done with shovel and pitchfork, but it will be a good “workout!”

In managed pasture systems some use of herbicide is often necessary to maintain favorable forage and to prevent noxious weeds. Common herbicides, such as Picloram, Clopyralid and Aminopyralid, can persist through the grazing animal’s digestive tract and the composting process. This is also true of purchased hay that was treated with these products. If such compost is used back on pasture and hay, then there may be residual benefit. However, many garden plants can be sensitive, especially peas, beans, lettuce, spinach, tomatoes and potatoes. The last thing you want to do is damage your coveted Montana tomato harvest! In all seriousness, check with your hay supplier regarding herbicide treatment and if you sell or giveaway compost and manure, disclose all known use of ag chemicals to the recipient.

Special thank you to Mark Rice, Animal Waste Specialist, North Carolina State University, for additional content . ■

TOMMY BASS AND JULIA DAFOE TAKING SAMPLES OF GOAT MANURE AND BEDDING COMPOST AT AMALTHEIA ORGANIC DAIRY, BELGRADE. PHOTO BY KELLY GORHAM