

5. A. G. Winter, Fr. Schonbeck: Zum Wirkstoffkreislauf Pflanze-Tier-Boden (Recirculation of Active Ingredients Plant-Animal-Plant). Zeitschrift für Pflanzenernährung, Düngung u. Bodenkunde 84. (129) 1-3. 1959, p. 11-14.
6. A. G. Winter: Analysis and Synthesis in Soil Biology. Special issue "Landwirtschaftliche Forschung", VI, 1949 (with many references).

THE SUMMER CONFERENCE

The annual conference of the Bio-Dynamic Farming and Gardening Association, Inc., will be held this year on SATURDAY AND SUNDAY, AUGUST TWELFTH AND THIRTEENTH.

As in previous years, it will take place at Threefold Farm, Hungry Hollow Road, Spring Valley, N. Y. Details of the program will be announced later, but there will be lectures by Dr. Pfeiffer and others, discussion periods and an opportunity to go into questions and problems of the garden and farm.

Anyone planning definitely to attend, and wishing accommodations at the Guest House, would be well advised to apply early to Mrs. Bettina Kroth, at Threefold Farm, for reservations (enclosing \$5.00 deposit). Usually these are all taken up long before conference time, and while every effort is made to find nearby rooms for late-comers, this is always an uncertain matter.

F. H.

INSTRUCTIONS FOR BUILDING A COMPOST PILE WITH THE B. D. COMPOST STARTER

It is a rewarding experience to build a compost heap for one's garden, which breaks down quickly, turns out to have a fine texture and to contain all the things necessary to the health and well-being of the soil and all the plants growing there. It can also be a frustrating and discouraging experience the first time round as many of us well know. The Secretary of our Association has asked us to print the following material which is a somewhat expanded version of a leaflet sent out by the Bio-chemical Research Laboratory to first users of the Starter. She feels that it will be of help to all of our readers who are about to make their first compost piles. The Editors cannot but agree with her when they look back to their first attempts some twenty-five years ago.

These instructions will be part of a pamphlet on composting, to be issued soon.

Generally the materials for "small" compost piles are not put through a grinder or otherwise macerated as in the case of large composting operations. If no grinding is possible, compost piles can be built by hand in *thin* layers, alternating the materials in each layer. However, the smaller the particles, the faster the fermentation. Grinding the materials will definitely shorten the period of fermentation, while the unground materials will take a longer time, depending upon the size of the particles and the thickness of the layers, as it will take the Starter solution more time to penetrate. The following steps should be observed in building compost piles.

MATERIALS

Any organic materials, such as kitchen garbage, lawn cuttings, garden refuse, manure (any kind), leaves, weeds, etc., can be used. When pulling weeds for a compost pile it is well not to shake the soil from the roots as some soil is necessary in the pile. Paper can also be used. While paper does not add to the *quality* of the compost, it does improve the *structure*. The paper should be shredded or crumpled, not laid on in sheets. Materials of any length or thickness, such as straw, hay stalks, tall weeds, corn cobs, corn stalks, etc., should be chopped or shredded if fast fermentation is desired.

LOCATION OF PILE

It is advisable to build the pile in the shade or semi-shade so that the direct sunlight will not dry it out. If a shaded spot is not available, the pile should be protected from the sunlight by covering it with a layer of soil, hay, straw, or leaves. In any case it is well to cover the pile. Plastic materials can also be used for covering. If piles are too wet they should steam out a bit before being covered. On the other hand, however, protection against excessive rains is also very important.

More important still is to take care that the pile does not stand on wet ground where it will soak up water from underneath. "Wet feet" delay good compost fermentation. A practical place for the location of the heap is near the edge of the garden where the finished product will be readily available. There should be no obnoxious odors if the pile is properly handled.

PREPARATION FOR BUILDING THE PILE

The pile should be built on bare soil, not on vegetation. All

sod and vegetation should be removed, together with the top foot of soil in order to make a shallow pit. This soil can be used later for covering the finished pile or for interlayering or mixing with the compost materials while the pile is being built. In warm, dry climates the pit can be deeper than 1 foot to help preserve moisture.

BUILDING THE PILE

Either of two methods can be used in building the pile as follows: 1. In Layers: Each layer in this method should be *thin, not more than 2 inches thick*. This is important in order that the B. D. Compost Starter solution can penetrate all of the material in each layer. The first layer may be garbage, spread over the prepared soil in a 2 inch (or less) layer. If there is not enough garbage, other materials can be added to complete the layer. Each layer should be sprinkled lightly with soil (any kind). The B. D. Compost Starter solution should then be sprayed over the entire surface of the layer. The pile can be built in this way, alternating the materials in each layer, sprinkling with soil and spraying with the Starter solution. If a layer is to be of soil only, it should not exceed 1 inch in thickness; leaves and grass cuttings should be less than 2 inches as they tend to cake.

EACH LAYER SHOULD BE SPRAYED WITH THE B. D. COMPOST STARTER SOLUTION.

(For further information about the B. D. Starter, and the Starter itself, address The Pfeiffer Foundation, Inc., c/o Threefold Farm, Spring Valley, N. Y.)

Several layers can be built at one time or a layer added each day. If there is an interval of more than one day between the building of the layers, *fresh Starter solution should be used*. Once the B. D. Compost Starter is re-activated, it should not be held over for more than one day. Therefore, prepare only as much Starter solution as is needed each time. Don't use up the whole package at once. When the pile is completed, vertical holes can be made with a crowbar, or similar instrument, into the pile at varying depths, about 1 foot apart in checkerboard fashion, and each hole filled to the brim with the Starter solution. In this way the bacterial solution will seep into the pile in all directions, insuring thorough inoculation of the bacteria. (It must be emphasized here though, that the process works a little more slowly when the solution is injected in holes, than when it is sprayed over each thin layer or when thoroughly mixed with

chopped or ground material. This is because it takes longer for the whole mass to be penetrated.) The completed pile can then be covered with a layer of straw, hay, leaves, etc., 2. Building the Pile by Mixing the Materials: If a stockpile of leaves, lawn cuttings, weeds, manure, etc., is available for composting, the materials should be mixed together thoroughly, 15% to 20% soil (by height) added, and sprayed with the Starter solution while the materials are being mixed. If a cement mixer is available it will serve the purpose very nicely, or any other similar equipment. Mixing the materials on the ground with a shovel, shoveling back and forth (or with a hoe) until they are well mixed will also do the trick. *The idea is to see that the materials are well mixed, soil added during the mixing, and the B. D. Compost Starter solution sprayed into the mixture.* The materials are then ready to be built into the pile.

SIZE OF PILE

The "critical maximum" size for a compost pile is 5 feet high and 12 feet wide, since aerobic conditions are considerably reduced in the core of a pile larger than this. The pile can be as long as desired. Dry, loose materials may be piled up to the upper limit of 5 feet in height, but wet, sticky materials should be kept to the lower level of 3 feet in height, here also a 9 foot width is preferable.

Small piles 3 to 4 foot square at the base usually do not heat up as well as larger piles. They dry out easily, freeze more quickly, and in general do not always work successfully, especially in regard to the time of fermentation. Small piles need more attention in connection with moisture control and they should be well covered. They are not representative of the type of fermentation which goes on in the larger piles. Summing up, the minimum favorable height of a pile is 2 to 3 feet, maximum height 5 feet, and the maximum width at the base 12 feet, with slanting sides. Within these proportions proper fermentation can take place.

DILUTING THE B. D. COMPOST STARTER

The water for diluting the re-activated (moistened) Starter is used primarily for the dispersion of the bacteria in the suspension as well as for moistening the materials to be composted. In general, 2 to 5 gallons of water are sufficient for diluting one unit of Starter for 1 ton ($11\frac{1}{2}$ cubic yards) of compost material. However, more water can be used if the material is especially

dry. The important thing is to see that all the compost material is thoroughly penetrated by the solution. Each layer of the pile, if it is being built in layers, should be well saturated. If the pile is being built by mixing the materials, enough water should be used to saturate all of the materials as they are being mixed. The solution should be constantly stirred or agitated during the spraying to assure an even distribution of the Starter bacteria. The amount of water to be used does not depend on the quantity of Starter, but on the rate of delivery of the spraying equipment used. A sprinkling can may be used, a knapsack sprayer, or whatever sort of rig is available.

MOISTURE CONTENT OF PILE

Moisture is very important for proper fermentation. The ideal moisture content for the pile is between 40% and 50%. The pile should not be allowed to dry out below 30%. Water should be added if it becomes too dry. On the other hand, the pile should not be soaking wet. If a handful of the fermenting material has the feel of a wrung out sponge which is still moist but not dripping you can be pretty sure it is just right.

If dry materials, such as corn cobs, weeds, straw, hay, sawdust, etc., are used, these materials should be well moistened before being placed on the pile. Soaking the pile with water until it runs off does not necessarily mean that the water has penetrated such dry materials. Such materials should be well moistened *before* the pile is built or while it is being built. This can be done by soaking them in a pit until they are well moistened.

According to our observations, water sprinkled over the surface of a pile will penetrate only about 1 foot beneath the surface. When the pile dries out the surface becomes caked, thus excluding the air. Therefore we recommend attaching a 1/2 or 1 inch pipe to a hose, then thrust this pipe down into the pile and fill with water so that it can penetrate and filter into the pile in all directions. These holes can be made in an overall checkerboard fashion 1 to 2 feet apart according to the size of the pile to be watered.

HEATING UP OF PILES

Temperatures between 120° and 140° F. are easily reached in a large well built and covered pile amply provided with moisture and air, provided the pile is *large enough to generate a temperature*. In small piles of only 1 or 2 cubic yards the conditions

are not favorable for heating, especially at low outside temperatures or when the material is too wet. A pile needs a certain body or mass in order to heat up. Soaking wet piles do not provide the inner "atmosphere" to make a pile "sweat". This sweating atmosphere is essential in piles containing straw, sawdust, dry weeds, i.e., materials high in cellulose and lignin content in general. Loosely piled materials with air spaces between the particles will provide the best breeding conditions for soil organisms which break down the raw materials under heat development. There is also another type of fermentation which goes on at lower temperatures between 56° and 120° F. This fermentation is somewhat slower but leads to an excellent product. This is the kind which usually takes place in a garden and farm compost pile containing a large percentage of soil. One should not be disturbed if the home garden pile does not heat up so much. The cold fermentation is slower but safer. The hot fermentation is fast but requires careful observation and closer control. A "hot" pile runs the danger of burning up organic matter and losing nitrogen. Therefore it needs to be turned in order to avoid overheating. When it is dry, dousing it with water is advisable.

LIMING

If lime is to be added to the compost pile, which is not always necessary, we recommend the use of dolomitic lime. If this is not available locally, a good agricultural lime will do. Very little, if any, will be necessary, and *under no conditions more than 100 lbs. per ton of raw material*. The lime can be sprinkled on the layers or mixed with the materials. If the compost is to be used for rhododendrons, azaleas, or other acid loving plants, no lime should be added.

LENGTH OF FERMENTATION PERIOD

The fermentation period will depend more or less upon the type of materials used, the size of the particles, moisture content, size of pile, climate, season (Summer or Winter), etc. Some materials decompose more slowly than others. If the materials are ground up and thoroughly mixed, the fermentation process should be complete within 3 to 8 weeks. Otherwise, it will take longer. The pile can be turned after a few weeks and sprayed again with the B. D. Starter solution. Shredded or ground up materials will not need turning. During extreme cold and freez-

ing temperatures the action is slowed down somewhat but not otherwise impaired.

THE FINISHED PRODUCT

We are frequently asked when the compost is ready for use and what it is like. The following can be a guide. The odor should be one of freshly plowed soil, or soil found in the woods beneath trees. A slightly musty odor is not objectionable. Old leafmold has a very characteristic odor, indicating a good fermentation, which is similar. There should be no putrid odor.

The structure of the original materials should have disappeared. Sometimes straw, wood, fibre or other particles may still remain but can easily be broken between the fingers. In this condition they will fall apart quickly in the soil. Any large pieces which have not completely decomposed can be added to the next pile for further decomposition. Summing up, the finished product should be dark brown to black in color, crumbly in texture, and have a so-called "woody" odor. Finished piles will keep a long time provided the moisture content is very low and they are well covered.

SEVEN YEARS OF B. D. GARDENING

ARNOLD C. BRUGGER

The writer, an architect now living near Spring Valley, N. Y., did his gardening stint near Jamestown in Chataqua County, New York. When he gets permanently located here he will be gardening again. The Editors hope to have something more from him before another seven years go by.

The garden that I want to tell you about was of a heavy clay soil and it sloped gently to the North. The hay had been cut each year by a farmer and nothing returned to the land. As a result, not much was growing on the land except goldenrod and other weeds. But this was the land I had and I wanted a garden. An acre was selected nearest to the house and I decided to build up half of it for a garden and allow the other half to more or less shift for itself. The only thing that I did to the other plot was to mow the weeds and let them lie on the ground; thus, slowly building up the soil.

The first Fall I had $\frac{1}{2}$ acre plowed for a garden. It was a bit discouraging to see all the yellow clay that the plow turned up. Also a lot of surface water was coming down over this area and so a ditch was planned across the top of the whole plot