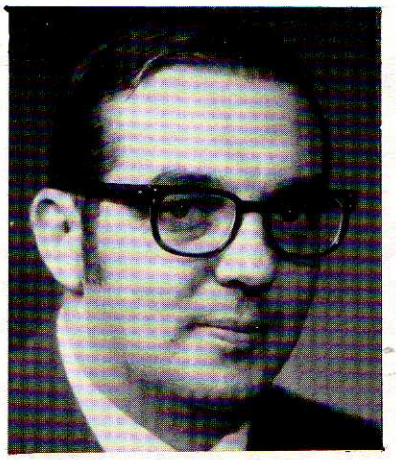

Growing Tips

by

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To Keep You Informed

The Advantages & Disadvantages of Re-Using Spent Compost as a Casing Soil

The re-use of spend compost as casing soil gets more popular from year to year. Few factors are contributing to this con - stant increase in re-using spent compost. High cost of peat moss, difficulties in obtaining good clay loom top soil verses the availability of spent compost as well. The environmental factors are the main object ives.

The handling of spent compost could be very critical if not treated promptly from the first day in the field, and during the pasteurization. This occurance I clearly witness while visiting growers that are re-using spent compost as casing soil. The purpose of this article is to outline all possible do's and don'ts to make the reuse of spent compost worthwhile and successfull.

Special attention should be devoted to the so called reammoniajication, as well as high contents of soluable salts that may occur if spent compost is not treated promptly.

In September-October 1969 issue of Mushroom News, a seven page article entitled "Casing Soil Treatment" by Dr. Schisler, cautions the grower: "When materials high in organic matter (peat, spent compost mixture, chernozem soils of Mid-West) are steam treated ammonia may accumulate in amounts toxic to the mushroom and may remain toxic for up to eight weeks after treatment. An increase in soluble salt and manganese levels may also occur with steam treatment. Mushroom yields may be adversely affected if the increase of either of these factors is great enough."

A new Solu Bridge soil and water tester Model SD-B15, introduced by Beckman Instruments replaced the old model RD-B15 that was described in September 1974 issue of Mushroom News.

The new soil tester has been designed to determine rapidly the total soluble salts content of soils and water.

Determination of the Total Soluble Salts Content of Soil

Representative soil samples should be delivered in appropriate containers properly labeling the field and designating the area of sampling. After receiving a representative soil sample, break up any large clods and spread the entire sample on a clean shallow tray to air dry for at least 12 hours. After drying, pick out any stones or other inert objects, then crush any large lumps using a mortar and pestle. Sieve the sample through a #8 mesh screen. Weigh 70 grams of the screened soil into a 600 ml. beaker and add 350 ml. of distilled water. Stir the entire mixture at least three times over ½ hour period.

With the soluBridge Soil Tester ready for operation, connect the conductivity cell and immerse into the soil solution. Make

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sure the solution covers the conductivity cell at least ½ inch above the air vents. Next take the temperature of the solution with a thermometer. Set the temperature compensator knob on the SoluBridge to correspond to the temperature of the solution.

Place the conductivity cell in the solution and rotate the large dial, (see the picture) so that both almps are ON at reduced intensity. The bridge is now balanced, and the dial may be read.

If tap water was used, subtract the conductivity of the tap water from this reading to determine total soluble salts.

Interpretation of Readings

The chart below gives typical readings using the outer scale (millimhos/cm).

0-10	Very Low
10-25	Low
25-60	Medium
60-80	High
80 plus	Extremely High or Excessive

When several extracts are to be tested be sure conductivity cell is rinsed with water after each test making sure all foreign material has been flushed from the electrode. Usually if reading shows over .80 it is not recommended for use.

The following article was written especially by Dr. Paul Wuest for this issue, devoted especially to the problems related to the reuse of spent compost as casing soil. I wish to extend our sincere thanks to Dr. Wuest for writing this important article.

Facts and Fables Concerning Spent Compost for Casing

by Paul J. Wuest

Extension Mushroom Specialist

Not many years ago using weathered spent compost was a new idea. The innovators who first used it found it was more desirable for casing than peat moss or soil for a number of reasons. Primary among these was the apparent lack of sealing, irrespective of who was watering. These pioneers found a good thing and their success spread by word of mouth through the mushroom industry in Pennsylvania as well as many other growing areas in North America.

This "new idea" occurred when a great number of other new ideas were being tested or developed such as newly designed compost turners, spawning machines and filtered air systems for mushroom growing. As with most of these new technologies, the value of spent compost at different farms ranged from unqualified success to dismal failure. Why should there be this wide range in results? One theory is that some spent compost can contain toxic substances which prevent the spawn from coming into it. But how does one know toxic substances are present? It looks and feels like good casing material, but it sometimes supports little production. Chemical analyses at a soils laboratory will provide measurements of PH, soluble salts, and cation exchange capacity to mention a few factors which can be measured. Do any of these factors relate to the "productiveness" of weathered spent compost for casing? In the years that I have been involved in studying spent compost and what factor or factors affect its capacity to support a good crop, none of the three factors mentioned seem to influence yield. However, irrespective of the casing, it is always desirable to case with material at PH 7.0 or higher elsewise the risk of green mold increases.

O.K., if these traits aren't salient, what should one look for in selecting spent compost? It can be surmized from the kinds of spent compost selected for use by different farmers that compost that has been used to land-fill for the last 10 or 15 years is NOT "choice" material. On the contrary, once compost weathers for more than 3 or 4 years it starts to get somewhat fine in texture, almost like a light sandy soil except for one major difference--it seals readily on watering. Therefore farms on which old land-fill spent compost has been collected and used for casing have had poor results after using such material. A few sentences above I mentioned what happens to the physical nature of spent compost over time. Another VITAL consideration prior to collecting spent compost is its moisture condition. For ease of handling dry material has often been selected, but experience suggests the ideal moisture content at the time of collecting spent compost is a bit higher than what would be desired if plowing was to occur. It seems that the best spent compost, material aged 24 to 36 months, will support more production if it is collected on the moist side rather than the dry side. Perhaps dry mater-

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ial shears more readily and the pore space is decreased merely by breaking the fibers of the spent compost into shorter lengths? Whatever the reason, keep in mind the moisture content and collect only when the moisture meets the specifications outlined.

Another apparently important factor in collecting spent compost is to avoid that which is anaerobic. This is usually found at the interface between the ground and the spent compost. During the last few years farmers desiring to prepare spent compost for casing have laid it out in windows 20 to 30 inches deep and this has greatly reduced, if not eliminated, the occurrence of anaerobic spots. You may want to know how to tell if spent compost is anaerobic and unfortunately, one can usually only tell during the collection process in the field. If you are NOT watching what the man on the front end loader is collecting, you won't be able to identify anaerobic since its dark field color is diluted when mixed during the loading operation or dumping into a storage area, and the same diluting effect occurs with the unpleasant odor--it disappears or gets diluted.

Dumping spent compost in the field can not be a willy-nilly operation, it requires planning and management. Time is spent planning by drawing a sketch of the dumping area, noting both on the map and field the exact location of loads from various months, and organizing a sequence so that when collection begins it can occur with maximum convenience. The management end of the job has a few ramifications. First, dumping should occur during as many months of the year as is possible, probable from March through November of December in the mid-Atlantic states. Not only should dumping occur, but spreading is of the utmost importance since not spreading results in piles as high as the dump truck driver feels like making them--the higher and more dense a pile, the greater the liklihood of anaerobic conditions. Secondly, the spent compost should be disked or roto-tilled once or twice a year to keep the weeds down and to break some of the fibrous material to make spent compost a bit more dense; not a whole lot mind you, but a little. Finally, following stripping, the spent compost must be treated before it is used. If steam is used, not to high a temperature--180 F is the maximum, nor for too long a period--30 minutes once the casing reaches 18 F. IT GOES WITHOUT SAYING THAT TREATMENT AT 140 OR 150 IS QUITE ADEQUATE SO LONG AS ALL OF THE CASING IS PASTEURIZED. OF SPECIAL NOTE IN THIS STEAMING IS THE DEVELOPMENT OF AMMONIA IN SPENT COMPOST, JUST LIKE AMMONIA FORMS DURING COMPOSTING. IF YOU AREN'T SURE IF AMMONIA HAS FORMED OR NOT, GET A SAMPLE TO AN ANALYTICAL LABORATORY TO HAVE IT TESTED. I SUSPECT THAT SOME OF THE FAILURES OF SPENT COMPOST TO PERFORM AS ANTICIPATED HAS TO DO WITH LOCKED-IN AMMONIA; JUST THE SAME AS WHAT HAPPENS TO SPAWN IN COMPOST WITH AMMONIA, THE SPAWN WON'T GROW.

Quite a bit has been said about spent compost so far, but if you want more technical information look at articles which appeared in Mushroom News in September and November, 1974. D r. Schisler wrote a nice article on casing soil treatment in the September/October, 1969 issue of Mushroom News in which he described both the use of steam and fumigants for treating soil.

Some people have fumigated spent compost before casing rather than using steam. One grower told me: "It works great so long as Benlate controls verticillium." How applicable his comment is to all fumigation of spent compost I don't know. However, it is rather well known that as the organic matter in a soil goes up, the amount of fumigant needed to get a good "kill" also increases. UNFORTUNATELY, ORGANIC SOILS ABSORB FUMIGANTS AND AT TIMES DO NOT RELEASE THEM SO FUMIGATING SPENT COMPOST BEFORE USE IS A BIT RISKY FROM MY VANTAGE.

Another trend in using spent compost is the mixing of peat with the spent compost. Who originated this idea is a mystery, but experience suggests such a blend worked better at some farms when compared with using 100% spent compost. One reason peat may be added is to diminish the frequency of watering spent compost which generally dries more quickly than either peat or soil. Be assured that there are farms where spent compost is used exclusively as there are farms where peat is mixed in. Could it be that farms where peat is mixed in are collecting spent compost that has weathered 4 or more years? Or, where the spent compost has been handled such that the fibers are almost totally shattered and, as such, they can't hold as much water? If answers to these questions were available, the questions would not have been posed.

Even though you have read this far, you still haven't been told how to tell if your spent compost is ready for use. Well, the only way to find out is to try it on some squares or trays; not an entire room, only selected locations. It would be wonderful if there was a test to run that would answer the

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question in a short period of time, but as of this writing such a test is not available. On the other hand, what better test is there than testing the material right on the spawned beds? If the spent compost is "ready," the spawn almost jumps from the compost into the casing with surface mycelium in just a few days. Actually, because of this tremendous growth both watering and ventilation procedures usually have to be changed to take maximum advantage of this kind of spawn activity in the casing. When evaluating the acceptability of spent compost keep in mind the major emphasis of this article: 1) Anaerobic vs aerobic; 2) Aged long enough but not too long; 3) Collected when the moisture content is a bit on the wet side if compared to soil; 4) Production of ammonia during steam treatment or the lack of release of fumigant if "gased" 5) Watered correctly once on the bed and air introduced earlier than "normal" if compared to soil or peat.

Keeping these major factors in mind when using spent compost for the first time may help you interpret the results you get. Unfortunately, a great number of mushroom growers have selected and/or handled spent compost poorly and have categorized it as "no-good"; give it a try again, but keep in mind what you have just read.

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ing information and action in Washington.

The new dues system has made all of this possible, AMI has already been the beneficiary of a great deal of this year's dues, and Growers nationwide have expressed their confidence in AMI by committing themselves and their standing square footage to AMI. So far we have surpassed the 50% mark in participation in registered square footage, and as a result, our income level is ahead of our record year under the old system last year.

Most of the results which have already been accrued were made possible because many growers have made it their business to get directly involved in AMI. AMI has a still developing, but greatly improved committee system which is making the decisions necessary to make AMI function more effectively for all growers. Much of what has already been described was recommended to the Executive Committee and the Board of Directors by specialty committees dealing with specific issues.