Using Compost in Strawberry Production

It is exciting to see so many conventional strawberry growers consider using compost for the first time in their strawberry rotations. There are several reasons for this heightened interest such as the desire to improve the structure and biology of their soils, but the greatest motivation seems to be the desire to reduce their fertilizer bill due to the high cost of fertilizer. With these objectives in mind, it is worthwhile to consider the following discussion points for best results.

First of all, for those of you that fumigate your soils it is important that you fumigate before applying the compost or you will destroy much of the biology in the compost and lose the benefits that these microbes offer to the food web in your soil.

Secondly, no two composts are alike and it is important that you choose a compost that will provide you with the biology and nutrients you need. Starting with the biology, strawberries evolved in soil types with fungal dominant biology and commercial fields always seem to perform best when they are on land recently converted from woodland which has strong fungal biology. With successive rotations and repeated cultivation, the fungal biology is gradually reduced and performance of the strawberries often seems to parallel this decline. The addition of compost to a strawberry rotation is the opportunity to add back fungal biology to the soil for improved strawberry production. Thus, a desirable compost for strawberries is one that is fungal dominant and efforts should be made to verify this before purchase and application.

Another aspect to ensuring a compost has the right biology is the process by which it is made. Simply stated, well-made compost has good biology and poorly-made compost has poor biology - but what constitutes a well-made compost? There are a lot of important variables to ensuring a good compost, such as the C:N ratio of the starter materials, moisture control, temperature and pH; however, I believe the most important variable to ensuring good compost is the maintenance of adequate aeration throughout the composting process. If a compost pile goes anaerobic during the maturation period, anaerobic organisms will predominate and these organisms are often pathogens. In contrast, beneficial microbes are typically aerobic types, hence the need to maintain an aerobic composting process. Good aeration is ensured by choosing starter materials with good porosity and by the shape and construction of windrows maximizing oxygen infiltration. Turning the pile positively impacts aeration but excessive turning is detrimental to fungal development so less turning is better so long as adequate aeration is maintained. Thus, careful monitoring of internal aeration, temperature and moisture content along with manipulating these variables only when necessary, is essential for the production of a healthy, fungal dominant compost.

The third element that must be considered when selecting a compost is its ability to provide nutrients to your strawberries. Compost can do this in two ways – 1) by accessing an extractable nutrient pool that is otherwise unavailable to the strawberry plants, and 2) by releasing nutrients directly to the crop by its own decomposition and mineralization. The first of these is optimized by having good microbial diversity in the compost, which is probable in well-made compost such as discussed above. Regarding the second way a compost can provide nutrients to the strawberry crop, it is essential that a standard compost analysis be obtained that provides data on C:N ration and the percent (%) content of the compost for the major crop nutrients including

nitrogen, phosphorous and potassium. The C:N ratio is extremely important in providing an indication of the availability of nutrients in the compost to the crop. If the C:N ratio is above 20 there tends to be a short term immobilization of nitrogen which is not conducive to reducing your fertilizer bill, in fact you may need more than normal. If the C:N ratio is between 15 and 20 there is probably a fairly neutral nutrient response which may not help you reduce your fertilizer bill but at least you won't have to add more fertilizer than normal and you will still have all the other benefits that a compost provides. Finally, if the C:N ratio is below 15, the nutrients in the compost are more readily available and can substantially reduce your fertilizer bill.

Evidence to support the use of compost to reduce fertilizer applications can be found in a research trial with a fungal-dominant vermicompost, conducted at a farm in the Annapolis Valley in 2007/2008. The compost was 0.6% nitrogen (N) and was applied at 11.2 t/ha and tilled in prior to planting the strawberries. For comparison, there was a 'check' treatment with no added fertility and no compost, and there was also a standard 'fertility' treatment that did not have compost. The fertility program involved 100 kg N/ha in the planting year and an additional 30 kg N/ha in the spring of the fruiting year for a total of 130 kg/ha of applied inorganic N. The yield and average fruit weight of the three treatments are reported below and clearly show that both the compost treatment and standard fertility treatment both significantly increased yield and fruit size over the check treatment but more importantly that the compost treatment was not significantly different from the standard fertility treatment for yield. This clearly shows the potential for compost to reduce (and in this case directly replace) fertilizer inputs in strawberries.

Table 1: Yield Data for Strawberry Compost Trial in the Annapolis Valley, NS in 2008.

Treatment	Strawberry Yield (t/ha)	Average Berry Weight (g)
Check	25.2 a	12.4
Standard fertility	33.6 b	13.8
Compost @ 11.2 t/ha	32.7 b	13.2

**Means with the same letter are not significantly different.

What is even more exciting about the above research is that if you calculate the total nitrogen in the compost applied, it is only 67 kg and less than 50% of this would likely have been available to the crop in the first year. In contrast, 100 kg N/ha was applied in the planting year of the standard fertility program and yet the compost treatment was able to produce equivalent yields. It is quite possible that the microbial activity of the compost treatment was able to compensate for the lower nutrient contribution from mineralization by making otherwise unavailable nutrients in the soil available to the strawberry crop.

In summary, a good compost has the potential to substantially reduce (or even replace) inorganic fertilizer sources. To do this, it should have a C:N ratio below 15 and should have a fungal dominant biology and good species diversity for optimum nutrient availability to the crop. Finally, it is best applied and incorporated immediately prior to planting the strawberries and following fumigation if this practice is used. Consult your local strawberry or organic specialist for determination of appropriate application rates and fertility program adjustments.

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