

Using Municipal Organic Wastes at Lincoln-Oakes Nurseries¹

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Abstract - discusses the use of municipal organic waste in the forms of leaves, thatch, and grass clippings which are stockpiled and spread onto seedling production fields during the soil improvement rotation at the nursery.

INTRODUCTION

Towns and cities across the country generate sizable amounts of organic materials in seasonal care of lawns and gardens. These materials include grass clippings, leaves, garden refuse, and lawn thatch. The bulk of these materials have ended up in landfills despite their recyclable potential. The City of Bismarck, ND estimates that during summer months, as high as forty percent of the refuse volume going into the city landfill is grass clippings.

During this period of landfill closures it is becoming necessary to limit materials going into landfills to conserve space and therefore increase the life span of the landfill. Lincoln-Oakes Nurseries, Bismarck, North Dakota, has begun a program in cooperation with the City of Bismarck to utilize these materials in soil improvement rotations at the nursery.

Seedling nursery production returns little organic matter to the soil due to harvest of nearly the entire plant. Green manure crops and organic amendments such as peat moss or aged sawdust are typically used in field rotations to maintain desired soil organic matter levels. The availability of organic amendments in the plains states is limited and often the hauling distance makes their use nearly impossible. The use of locally available organic yard wastes would be of benefit both to the nursery and the city.

MATERIAL COLLECTION AND STOCKPILING

Collection of non-woody lawn refuse began in the spring of 1989 when local lawn care firms were allowed to dump clippings in a specified area at the nursery. In the fall of 1990 the nursery began accepting leaves from the City of Bismarck and in 1991 materials throughout the seasons were accepted from the city, homeowners, and lawn care firms. These materials are stockpiled for spreading, no composting of stockpiled materials takes place. (fig. 1)



Figure 1

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Signs at the designated collection area were erected to specify types of materials wanted, types of materials not wanted, and what the organic materials were to be used for.

The city of Bismarck has placed collections bins throughout the city for homeowner use. These bins are emptied by the city several times weekly and materials are brought to the stockpile area at the nursery. The city has also fenced and asphalt capped the surface of the stockpile area to prevent materials from blowing and to provide a hard surface for trucks and the loader to operate on.

SPREADING AND INCORPORATION

The need to spread accumulated organic materials on a regular basis to minimize odor and to have the proper equipment to do it efficiently is essential.

Material should be spread onto fields every several weeks to prevent severe odor problems

from developing. Materials are loaded into manure spreaders mounted on two ton single axle trucks (fig. 2) The nursery provides two of these trucks and the city provides one truck and the loader and operator. Materials are spread evenly by three to four passes over the entire field (fig. 3). Fields vary from approximately two to five acres in size and are in the first year of their soil building rotation.

After spreading, the materials are mixed into the soil with a heavy offset disc. A chisel plow and tiller have also been used for incorporation but the offset disc has been found to work best in the varying types of materials placed on the fields. Physical breakdown of the green grass clippings is rapid, dry thatch and leaves somewhat slower. Irrigation may be required to hasten breakdown.

Several additional passes with materials are made two to four weeks after the initial application and once again mixed into the soil. Further mixing is done periodically with the disc as

needed to promote a fairly even breakdown. No nitrogen fertilizer applications have been necessary due to the high N content of the grass clippings. Fields need to be walked by summer crew members to remove trash and debris that was present in the materials when spread. All organic materials are retained in the upper twelve inches of the soil, this is the area of greatest root development of the seedlings.

COVER AND GREEN MANURE CROPS

Organic materials are applied to fields the first season of a two year soil building rotation. During the second season a cover crop is grown for at least part, if not all, of the growing season. These crops are allowed to grow to a desired height and then are mowed or disced down to further add organic matter content during the field rotation and to recycle nutrients. To date, no nitrogen inputs have been required to produce these crops.

Crops used

- A Sudan grass - Spring planted on previously summer and fall applied fields, mowed several times during the growing season. Disced down in September.
- B Oats - Summer planted as a winter cover on fields where organic materials were applied the previous spring. Winter kills.
- C Rye - Fall planted on spring and summer



Figure 2



Figure 3

The operation has obvious positive benefits for the nursery and the city but has resulted in complaints about odor from neighboring landowners. The amount of trash, i.e. plastic, metal, limbs, etc...being placed in the stockpile has been greater than expected and will need to be reduced to continue the program in the future. Many citizens of the city of Bismarck support this concept of recycling organic waste materials to aid in the production of woody plants for conservation purposes. It is the beginning of a long term process to realize future sustainable levels of nursery soil organic matter levels.

applied fields, over winters and is disced down at heading out stage the next spring.

All cover crops are incorporated into the top twelve inches of soil and allowed to breakdown before seeding tree and shrub crops in spring, summer, or fall. Fertilizer additions are as needed based on soil tests.

ADVANTAGES AND DISADVANTAGES OF ORGANIC WASTE APPLICATIONS

As with any new operation added to the nursery production schedule, there are pros and cons.

Advantages of organic material applications

- 1 Soil organic matter increase and associated benefits i.e. Water holding capacity, increased CEC

- 2 Recycling of organic materials otherwise disposed of in city landfill
- 3 Possible reduction in use of nitrogen fertilizers on cover crops following organic material applications
- 4 PR benefit with city and local citizens

Disadvantages of organic materials applications

- 1 Increased land requirements for the stockpile area and the increased length of field rotations by one year
- 2 Equipment requirements for loading and spreading
- 3 Odor problem from stockpiled and spread materials
- 4 Trash accumulation in fields and labor to remove it

