TREE PLANTING ON LANDFILLS

Trees can enhance aesthetics, help control erosion and minimize leachate production on landfills.

Sean Gordon

THE SCOPE and frequency of landfill revegetation are likely to increase, in part thanks to the trend toward regional siting of landfills involving bargaining and compensation for host towns. While establishing a grass cover is necessary for erosion control, trees can make the difference between a grassy mound and a park or nature area. Trees have even been farmed atop old landfills for a source of revenue (Ettala, 1988b). However, trees are both more expensive to plant and more difficult to maintain than grass.

On landfill sites, water, oxygen, nutrients and physical stability are often inadequate. This can lead to tree mortality, especially when combined with carbon dioxide and methane emitted by decaying garbage. Drought conditions can be caused by increased runoff due to surface compaction and by higher soil temperatures resulting from biological decomposition of trash. The discontinuity of texture between the refuse and cover can also inhibit water being pulled to the surface. Additionally, landfill cover soils may frequently have low nutrient contents and unsatisfactory pH ranges.

The proportions of gases and other properties of landfill soils will change over time as different stages of decomposition occur. Therefore, tree species planted on landfills should be tolerant of a range of poor soil conditions. The best species for a site will of course depend on the local climate as well as soil conditions.

"On the Hartford landfill, we planted about 2,000 each of Forsythia, *Rosa Rugosa,* balled and burlapped Austrian and black pines and bare-rooted Ailanthus (Tree of Heaven)," says John Romano, Operations manager of the Connecticut Resource Recovery Authority. "About 300 to 350 plants died, mostly pines. Although some were obviously in heavy leachate paths, an analysis by the University of Pennsylvania showed that many died from windburn and drying in transport, or due to root balls that weren't loosened or covered well enough in planting. Gases tended to break out at the top or base of the landfills and generally killed patches of vegetation. Planting and watering problems would kill scattered individuals."

Poor planting practices can actually be more hazardous than adverse landfill conditions. A surface planting layer of soil rich in humus is suggested by numerous sources. Minimum recommended depths range from one-fifth of a meter to 1 meters (Ettala, 1988a; Pommel, 1977). Landfill covers of this quality and depth can be prohibitively expensive, although this may change as more municipalities begin to compost wastes. The University of Washington has had success in planting trees in sewage sludge composts and are currently experimenting with MSW composts.

Flower et al. (1981) tested the effectiveness of planting in specially prepared mounds and trenches designed both to provide better soil in target areas and to exclude and/or vent landfill gases. Resulting carbon dioxide and methane levels measured in the mounds and trenches were generally low. Care should be taken, however, not to seriously confine root growth.

Follow up monitoring and maintenance of vegetation on landfills is especially important because of the poor site conditions. Irrigation has been strongly recommended. Effects on leachate production can be minimized by targeting water at confined planting areas. One strategy might be to utilize plantings along swales: tree roots could help maintain the banks and reduce erosion while obtaining a supply of water, thus also reducing infiltration and leachate production. Leachate has even been used for irrigation, with tree biomass production on a former landfill showing one of the highest values measured in Finland (Ettala, 1988b). Because leachate can contain toxic substances, it should be used with caution, especially since newly planted trees are already under stress. ■

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