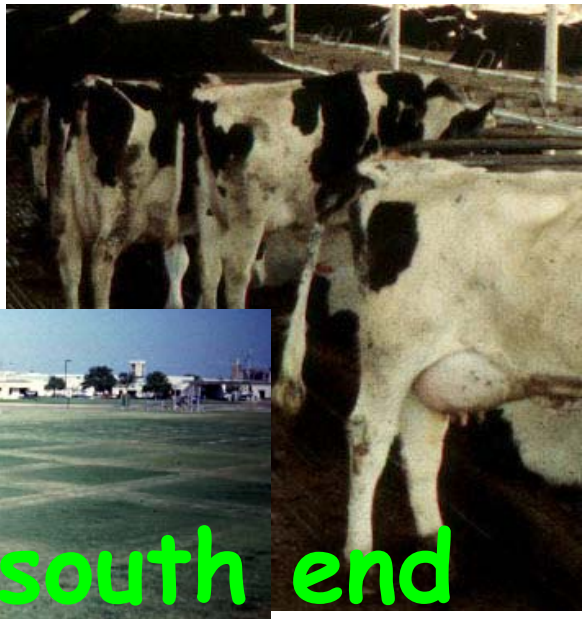
Appendix Q

Green Turf: From the South end of a North facing cow

GREEN TURF



From the south end of a north-facing cow

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Benefits of compost, including composted manures, have been evaluated and documented in relation to soil properties and turfgrass establishment, maintenance, and quality over the past two decades. Yet, assessments of turfgrass benefits in relation to composting and livestock industries are new. Recent research and collaborations among turfgrass, livestock, and composting industries demonstrated turfgrass sod offered both environmental and economic advantages over other crops. First, removal of a thin soil layer and associated nutrients with each sod harvest can export more of the nitrogen and phosphorus applied as composted manure than annual harvests of any other crop. Up to 77% of phosphorus applied in manure was exported through harvest of perennial bluegrass sod produced in Erath county (Vietor et al., 2002). In addition, the phosphorus, potassium, and other manure nutrients transplanted with sod will reduce or eliminate applications of fertilizer forms of the respective nutrients during establishment and maintenance of transplanted sod. The export of excess manure nutrients from impaired watersheds through sod and the reduced imports of soluble inorganic fertilizers on urban landscapes receiving sod are win-win opportunities for environmental improvement.

Turfgrass production on agricultural lands within the Upper North Bosque watershed offers the economic advantage of proximity to both compost manure sources and to sod markets in the Dallas-Ft. Worth Metroplex. Hauling distances between composted manure sources and sod fields need to be minimized to limit compost-associated costs. Fortunately, maps developed through geographic information systems indicate large land areas suitable for sod production are located proximate to dairies on the Upper North Bosque watershed (Hanzlik et al., 2004). Sod production on lands proximate to other

agricultural operations on the watershed offers yet another economic advantage. Sod production enterprises can time- and cost-share equipment and labor with existing crop and livestock enterprises. Collaboration and cost and profit-sharing among dairy, composting, and sod operations is another advantage of their proximity. Discounts on manure or compost prices and land costs could encourage application and export of relatively large compost amounts per acre in harvested sod. The collaborative efforts to export manure nutrients will enable compliance with TMDL implementation plans for soluble reactive P on the Upper North Bosque watershed.

Although Metroplex sod markets are up to 100 miles away, hauling distances from sod production sites on the Upper North Bosque are less than those required for more than one half of the sod delivered in the Dallas-Ft. Worth area (Munster et al., 2004). A 50% reduction of sod hauling costs enables compost-grown sod from the Bosque watershed to compete with sod produced and hauled 200 or more miles from the Texas Gulf Coast.

Figure 1. Topdressing of dairy manure before regrowth of Tifway Bermuda

Figure 2. Composted dairy manure produces high-quality sod for harvest through commercial practices.

In addition to quantifying export of manure nutrients through sod, plot- and field-scale studies of turfgrass and environmental responses have yielded recommendations for compost and fertilizer management (Vietor et al., 2002, Vietor, 2004). Composting of dairy manure and screening to exclude pebbles enables topdressing through soil and sand spreaders designed for turfgrass (Fig. 1). Although composted dairy manure can supply the seasonal phosphorus, potassium, and micronutrient requirements for sod production, supplemental nitrogen fertilizer is required to achieve rapid sod regrowth. Turf quality during production and at harvest are comparable between compost-grown sod supplemented with fertilizer N and sod grown with recommended rates of inorganic fertilizer (Fig. 2). Despite the large N requirements of turfgrass, rates of composted manure are phosphorus-based to prevent excessive phosphorus runoff loss during sod production and after transplanting of manure-grown sod. Yet, up to 180 pounds per acre of manure phosphorus can be top-dressed on a sod crop without increasing mass loss of runoff phosphorus above that of sod top-dressed with fertilizer P during production and after transplanting (Vietor et al., 2004). A field-scale assessment revealed only 3.5% of the total phosphorus applied in composted manure was lost as dissolved and sediment-bound P in runoff during production of a Tifway Bermudagrass sod crop (Choi, 2005).

In summary, the mutual benefits of compost and turfgrass contribute to the environmental and economic feasibility of exporting manure nutrients from the Upper North Bosque watershed through sod. Educational programs are needed to inform livestock, compost, and turfgrass producers about opportunities for collaborations that make both business and environmental cents.

References

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