Fact Sheet

United States Department of Agriculture

Natural Resources Conservation Service

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Forage Species on Sprayfields

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In Florida, increased numbers of municipalities are disposing of secondary municipal wastewater by land application (referred to as sprayfields). The primary goal of a sprayfield is to recycle large volumes of wastewater and associated nutrients without negatively impacting the environment. Although effluent water generally has been purified until it contains only low levels of nutrients necessary for plant growth, minerals such as sodium, boron and magnesium are also present. These minerals can build up to toxic levels or leach into the groundwater if not removed by living filters.

For plant materials to effectively filter effluent water they need to: establish quickly, be able to tolerate excessive irrigation, and low fertility, and be competitive with invading weeds. The plants must also provide maximum uptake of the nutrients and be commercially marketable.

The Brooksville, Florida Plant Materials Center has been conducting studies at the Belleview -Perry Sprayfield where the City of Ocala disburses their treated secondary wastewater. Due to the climate and predominate livestock-base of the local agriculture economy, only forage grasses and legumes are being used in this study.

Establishment

Between April 1996 and July 1996 eight grass species and one legume were planted in 34' x 34' plots, in a randomized block design with four reps per treatment. Prior to planting a soil analysis was performed. All species were pre-established in containers at the PMC prior to being transplanted in the study site. This allowed all species to be placed in the field at the same stage of growth, thus uniform stands could be established.

Species established included: 'Coastal' bermudagrass (*Cynodon dactylon*); 'Pensacola' bahiagrass (*Paspalum notatum)*;Eastern gamagrass (*Tripsacum dactyloides*) 'Alamo' switchgrass (*Panicum virgatum)*; 'Defuniak Source' switchgrass *(Panicum virgatum)*; 'Floralta' hermarthria *(Hermarthria altissima)*; 'Mott' dwarf elephantgrass (*Pennisetum purpureum*); 'Sharp' marshhay cordgrass (*Spartina patens*); and the legume 'Florigraze' perennial peanut (*Arachis glabrata*), included because of its ability to fix nitrogen. Bermudagrass and bahiagrass were included as standards since they are widely used in Florida.

The plants were clipped and tissue samples taken on the average of every 45 days. Tissue samples were weighed wet, a grab sample taken, and weighed again, dried, and ground before being sent for analysis. Clipping heights were 2-4 inches for peanut, bahiagrass and bermudagrass ; 6 inches for hermarthria and marshhay cordgrass; 8 inches for eastern gamagrass, switchgrass, and dwarf elephantgrass. Switchgrass clipping heights increased with the extension of the growing point to 14 inches.

Results

All grass species except 'Sharp' marshhay cordgrass established well in 1996. 'Sharp' did not respond well to clipping either. The perennial peanut was slower to establish and did not provide complete canopy cover in the plots until the 1997 growing season. Weed competition was fairly severe, but by 1997 most species, except 'Sharp', were established well enough to suppress weeds, requiring less herbicide applications. However, the bunch-type growth habit of the switchgrass and gamagrass allowed weeds to grow between plants, even after they were well established. 'Mott' dwarf elephantgrass had developed such a dense canopy by the 1997 growing season that all weed competition was suppressed.

Preliminary Conclusions

Several preliminary conclusions can be drawn from the 1997 research results. 'Mott' dwarf elephantgrass had the highest dry matter production of the nine species tested, including the standard Coastal bermudagrass (see table below). 'Mott' also had the highest N, P and K uptake. Perennial peanut had the highest calcium, magnesium, and boron uptake. Eastern gamagrass took up the greatest amount of sodium, and bermudagrass took up the greatest amount of aluminum. Once established, 'Mott' required virtually no weed control where others required some form of either mechanical or chemical weed control.

Table 1. Total dry matter, N, P and K in pounds per acre harvested in nine species grown at the Belleview sprayfield in 1997.

Species	Total DM	Total N	P	K
	lbs/ac			
Bermuda	8785	219	28	168
Mott	10489	270	52	495
Hermarthria	7812	187	27	176
Bahia	5356	134	18	106
Gama	5356	135	17	95
Peanut	5072	125	19	120
Alamo	2492	68	9	61
Defuniak	2144	59	9	44
Sharp	786	19	2	12

The study will continue for two more years, to study persistence of stand and consistency of performance.

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