

removal does not significantly reduce sod strength since the strength of a sod section is primarily due to the interlocking system of roots or rhizomes that remains with the washed sod. Another potential advantage of soil-less sod is the avoidance of an interface effect due to differences between soil types occurring at the sod production and transplant sites. One obvious concern with soil-less sod is the higher desiccation potential after planting, especially during stress conditions. Also, the nutrient requirement of soil-less soil that has been planted on very sandy media are higher than for conventional sod since little or no nutrients are carried with the sod after soil removal.

PROCESSED TURFGRASS CLIPPINGS

Mowing is one of the primary cultural practices necessary for sustaining turf. Clippings resulting from regular mowing are either picked up and discarded, or returned to the turf where they decompose. In view of the traditional use of grasses for forage, it is likely that turfgrass clippings could be successfully employed for feeding livestock and other animals. As turfgrass cultivars and cultural practices are substantially different from those employed in forage production, investigations were initiated this year to determine the relationship of turfgrass species, cultivars, mowing and fertilization to the nutritive value of clippings from these turfs. Lutein, a non-epoxide xanthophyll important as a pigmenting agent in poultry feeds, was found to occur in large quantities in Kentucky bluegrass clippings from sod farms in California. Clippings were collected from 20 Kentucky bluegrasses, four perennial ryegrasses and K-31 tall fescue in May and analyzed for lutein using an acetone extraction and thin-layer chromatographic separation of the pigments. Colorimetric determination of lutein was made from extracts from the TLC plates. Lutein levels ranged from a low of 72 mg/kg fr. wt. in Vantage Kentucky bluegrass to a high of 358 mg/kg in Adelphi Kentucky bluegrass (Table 3). Thus, selection of a particular turfgrass cultivar substantially affects the lutein yield from the clippings. Clippings were also collected from Kentucky bluegrass fertilized with 0, 0.25, 0.5 or 1.0 kg N/are/mo. Results showed that lutein increases significantly from increasing nitrogen fertilization, but the increases were of a relatively low magnitude.

Turfgrass clippings offer a potentially important source of protein in animal feeds, especially for ruminants (sheep, cattle, etc.) which can digest the cellulose within the plant tissue. Crude protein levels were determined in dried clippings by Kjeldahl analysis for total nitrogen (X 6.25) in 53 Kentucky bluegrasses and 8 perennial ryegrasses. Within the Kentucky bluegrasses, crude protein levels ranged from 22 to nearly 33 percent depending upon cultivar (Table 4). The perennial ryegrasses ranged from 26.3 to 30.2 percent crude protein.

The dynamic nature of turfgrass technology and sod marketing conditions requires that sod growers keep abreast of new information from on-going research. Expanded results from scientific investigations provide important guides for selecting varieties and blends at planting, incorporating pesticides and other materials into production techniques, and modifying sod handling methods. The sod grower can no longer assume that what is considered satisfactory today will be adequate for tomorrow. At the same time, the challenges and opportunities that exist today can yield substantial gains for the sod grower who makes wise choices in light of new technical developments.

Nugget + Adelphi	4.3	1.7	1.3	1.0	1.27	4.3	2.7	3.3
Victa + Vantage	3.7	2.7	1.7	1.0	1.40	3.3	3.0	3.3
P-59 + Brunswick	2.3	2.7	3.3	1.0	1.41	3.3	4.3	5.3
Blend 38	3.3	3.0	1.7	1.0	1.51	3.3	3.0	3.3
.....Mixtures.....								
Fylking + Jamestown (RF)	4.0	2.3	5.0	1.0	1.36	4.7	4.3	6.0
Fylking + Pennlawn (RF)	3.3	2.3	5.3	1.0	1.24	3.7	5.7	6.0
Fylking + C-26 (HF)	3.7	2.0	3.3	1.3	1.31	3.7	4.3	5.7
Fylking + Pennfine (PR)	1.0	2.0	1.0	1.3	0.72	2.7	3.3	2.7

¹ Spring green-up and quality ratings were made using a scale of 1 through 9 with 1 representing best quality and 9 representing poorest quality.

² Disease ratings were made using a scale of 1 through 9 with 1 representing no disease and 9 representing complete blighting of the turf.

Table 3. Lutein content in fresh clippings of various turfgrasses.

Lutein	Cultivars
mg/kg fr wt	
360-300	Adelphi, A-34, Pennfine PR
299-250	Baron, Majestic, Pennstar, Merion Fylking, Kenblue, Sydsport, Brunswick, Common PR, Manhattan PR, K-31 TF
249-200	Park, Windsor, A-20, Victa, Parade, Glade, Bonnieblue, NK-200 PR
199-150	Nugget, Touchdown
99-50	Vantage

Table 4. Crude protein content in dried clippings of various turfgrasses.

Protein	Cultivars
%	
35-30	Campina, Windsor, Majestic, Sodco, NK-101 PR
29-25	A-20, Parade, Adelphi, Bonnieblue, Brunswick, Merion, Plush, Vantage, Sydsport, Galaxy, Delft, Baron, Kenblue, Park, A-34, Nugget, Glade, Pennstar, Victa, Monopoly, NK-200 PR, Manhattan PR, NK-100 PR, Pennfine PR, Common PR
24-20	Fylking, Geronimo, Touchdown