Comparing Mob Grazing vs. Herbicide as a Sod Suppression Technique on Cover Crops

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Sod-seeding annual forage species into perennial pasture is a common approach to improve pasture production for grazing livestock in mid- to late-summer. Cereal grains and annual ryegrass are the most common species used due to relatively quick germination, competitiveness with perennial grass species, and moderate to high yields. Cost, however, can be an issue with these species (i.e., sod-seeding a half-rate of a cereal grain like oats into perennial pasture can cost as much as $40/ac).

A multitude of research has shown varying rates of success in using this approach; largely due to the type of perennial vegetation currently in the pasture and the sod-suppression technique used prior to seeding. Certain types of perennial grass species, like Kentucky bluegrass and quack grass, are fairly resistant to most suppression techniques and can quickly regrow and outcompete target annual forage species.

Herbicides, such as glyphosate, are excellent sod suppressors at least as far as holding the grass back long enough to get an annual forage species going. However, in most cases, the intent is not to kill the perennial grass species, nor is it to suppress the amount of regrowth available for grazing. Additionally, companion species such as creeping foxtail, timothy, and intermediate wheatgrass are not tolerant of glyphosate.

Furthermore, most literature has reported that grazing generally is not a very effective sod-suppressor, especially when Kentucky bluegrass and quack grass are present. It is not uncommon for both Kentucky bluegrass and quack grass to regrow to 90% cover in a matter of 10 days following an extremely heavy grazing event (>90% of the above ground biomass removed). In contrast, many cereal grain species have a planting to germination rate of 14-25 days. In these situations, the perennial grass species can easily outcompete the newly seeded cereal grain resulting in severely depressed yields and a very expensive lesson-learned.

Cover crop species like turnips, radishes, rapeseed, and kale have a much shorter germination time (<7 days) and generally are very competitive with perennial grass species making them an attractive alternative for sod-seeding perennial pastures. Additionally, these species can produce a lot of high quality tonnage for grazing and they are fairly inexpensive to seed.

Methods

Researchers at the University of Minnesota conducted a trial this summer to compare sod suppression techniques on establishment, cover, and yield of a cover crop mix for grazing. Two, four-acre pastures were divided in half resulting in four, two-acre paddocks. Paddocks were dominated by Kentucky bluegrass, quack grass, and reed canarygrass. Two of the paddocks were mob grazed to suppress the sod. Beginning July 18, 30 cow-calf pairs weighing approximately 1,350 lbs grazed each paddock for five days prior to seeding to a minimum 2" stubble height. The other two paddocks were sprayed with half of the recommended rate (1 pint/ac) of glyphosate on July 23 to suppress the sod prior to seeding. All paddocks were seeded with a mixture of Annual ryegrass and Purple top turnips at a rate of 25 lbs/ac (80% Annual ryegrass, 20% Purple top turnip) using a no-till drill. Soil tests determined no additional applications of fertilizer were needed.

Visual estimates of plant cover were sampled using a 1-m^2 quadrat on August 2 (day 2 post-seeding), August 19 (day 17 post-seeding), and September 23 (day 52 post-seeding). Cover was categorized by cover crop species, perennial and annual grasses, annual broadleaf, litter, and bare ground. Forty randomly selected locations were sampled in each paddock. Total yield estimates were sampled at 40 random locations in each paddock on September 23.

Results

Visual estimates of plant cover two days post-seeding verified little vegetation present at the time of seeding. Although perennial and annual grasses were present in the "Graze" treatment, the majority was bare ground (Table 1). In the "Herbicide" treatment, no residual vegetation was present, although 48% of the plot was covered with litter. Thus, the "Herbicide" treatment had 32% less bare ground than the "Graze" treatment.

At 17 days post-seeding only 12 and 14%, respectively, of the "Graze" and "Herbicide" treatments were covered by the target cover crop species. The "Graze" treatment was becoming dominated by perennial grass regrowth (33.5%) and annual broadleaf weeds (22.5%). Similarly, in the "Herbicide" treatment perennial grass regrowth had increased to 21.5% but encroachment of annual broadleaf weeds had only increased to 7.75%. Therefore, at day 17 post-seeding, the herbicide had delayed perennial grass encroachment by 36% ($P<0.05$). Furthermore, grazing appeared to have stimulated more annual grass and broadleaf weed activity than the herbicide treatment as there were 66% more annual broadleaf weeds in the "Graze" treatment than in the "Herbicide" treatment after 17 days post-seeding.

Cover crop species cover at day 52 post-seeding had increased to 65% in the "Graze" treatment and 75.5% in the "Herbicide" treatment. Perennial grass cover as a percentage of the plot was reduced in both treatments, but still accounted for 15-20% of the plot cover. All other vegetation categories had been reduced to marginal levels at this time.

Total vegetation yield was measured at the conclusion of the study at day 52 post-seeding. Vegetation yield was 40% greater in the "Herbicide" treatment than in the "Graze" treatment.

Table 1. Mean comparison of sod suppression technique on percent cover of cover crop species, perennial grasses, annual grasses, annual broadleaf weeds, litter, and bare ground and total vegetation yield of sod-seeded cover crops into perennial grass pasture.

Sod Suppression Technique	Sample Date	Percent Cover						Total Yield
		Cover Crop Species	Perennial Grass	Annual Grass	Annual Broadleaf	Litter	Bare Ground	
		----------%----------						-kg/ha-
Grazed	8/2/13	0[a]	18[a]	1.5[a]	0[a]	0[a]	76.5[a]	NT
Herbicide	8/2/13	0[b]	0[b]	0[b]	0[a]	48[b]	52[a]	NT
Grazed	8/19/13	12.5[a]	33.5[a]	5.25[a]	22.5[a]	0[a]	26[a]	NT
Herbicide	8/19/13	14.75[a]	21.5[b]	0[b]	7.75[b]	33[a]	23.75[a]	NT
Grazed	9/23/13	65[a]	19[a]	4[a]	5[a]	0[a]	7[a]	1942[a]
Herbicide	9/23/13	75.5[b]	15[a]	7.5[a]	2[a]	0[a]	0[b]	3232[b]

[ab]Means with different letters within column for each sample date are different at (P>0.05).

Management Implications

When sod-seeding cover crops into perennial pasture, using herbicides for sod suppression is a superior technique to grazing. However, grazing is an effective method for production systems committed to the non-use of herbicides such as organic, grass-fed, and all-natural programs.

Using grazing as a sod suppression technique may lead to higher concentrations of weeds due to larger areas left bare following heavy grazing. This may result in unwanted weed infestations over time.

Longer term effects of grazing and herbicide sod suppression on subsequent years' pasture productivity are unknown at this point and will be monitored as this study progresses.