NC STATE UNIVERSITY

Department of Crop Science
College of Agriculture & Life Sciences

Forage Facts

Common Questions about Spray Fields

This paper summarizes several questions that are asked over and over concerning the management of fields receiving confined animal waste.

1) **Is it satisfactory to mow spray fields for weed control without baling the clippings?**

   a) Clippings that fall back to the soil recycle nutrients, much the same as a grazing animal recycles nutrients through manure and urine. Baling any clipped vegetation and removing it from the site transports nutrients away from the site. Weeds often contain the same concentration of nutrients as forage plants so nutrient transport can be significant.

   b) Leaving heavy windrows of clipped weeds or the target crop in place for more than a week can cause death of the underlying vegetation. The heavy windrow acts like a shield preventing sunlight from reaching the underlying growing plants.

   c) Clipping of weeds may be helpful in situations when the weed is several inches taller than the crop, and the crop is too short to provide a reasonable amount of forage for harvesting. However, evaluate the cost:benefits of the impact of compressed vegetation from tractor wheels as compared to the shading of the unclipped weeds.

   d) Grassy weeds (except for Johnsongrass, vaseygrass, and fall panicum) are not likely to get above bermuda early enough to justify clipping between hay harvests. Other summer grasses may get taller than fescue and prairiegrass (matua) in the summer, but chances are there will not be enough difference to justify trying to clip without harvesting the whole canopy for hay.

2) **Can hay windrows kill bermuda or fescue stands?**

   a) If plants do not receive sunlight for 3-7 days, the leaves and stem bases begin to turn yellow and utilize "reserve energy" carbohydrates for survival. This makes the plant "weak" and if the light and other factors continue to be limiting or stressful, it may result in death. If you have seen fields following hay harvest with streaks of dead or "poor doing" plants, it is often the result of thick windrows remaining in place for several days.

   b) If rainy weather prevents baling of hay for a few days, it is best to leave the cut forage in a wide swath rather than leaving it in a thick windrow. Raking or tedding can help prevent shade damage.

   c) "Bush hogging" often leaves a thick windrow which can cause death of plants beneath it, therefore, raking or tedding may be necessary.

3) **Someone said fescue had to be kept mowed at 2 to 3 inch height.**

a) This is most likely a misunderstanding.... fescue is usually cut to 2-3 inch stubble after it has reached 12 to 20 inches height. One would not want to maintain it at that height, except in a lawn. Fescue will usually be ready to harvest for hay 3 to 4 times per year, and each time it can be cut to the 2 to 3 inch stubble. Cutting to 4 to 5 inch stubble in summer will allow fescue to be much more competitive with summer grassy weeds. Leaving 4 to 5 inch stubble also speeds up the hay curing process because of the high stubble increases the air circulation in the swath and windrow. There is nothing wrong with cutting it at 4 to 5 inches all the time. See the Forage Facts entitled "Grazing Guidance" for suggestions for many forage and pasture plants.

4) **Is it ok to overseed fescue with ryegrass?**

a) If one is reseeding annual ryegrass into fescue every year because the fescue stand is thin, it is reasonable to expect that the RYE estimates for the site should be modified. However, if the fescue makes up more than 50% of the stand, then adding some ryegrass will help maintain RYE levels. Adding more fescue seeds to the mixture may result in thicker stands also.

b) The challenge is to determine why the fescue stand is always weak and in need of overseeding with ryegrass. Is it related to harvest management, waste application management, soil adaptation, or some other agronomic factor?

c) Annual ryegrass grows very well in the spring, but not nearly as well as fescue in the fall and winter. Annual ryegrass dies by late June and provides no growth in summer. When annual ryegrass is planted in the fall it does not accumulate much growth until late November. Established fescue stands provide significant growth in the fall, winter, and spring, and a small amount of growth in the summer.

d) Remember that winter annuals and fescue have basically the same growth requirements, so there is no reason to expect them to germinate and grow better than properly fertilized and grazed established fescue plants. However, if the stand is so thin that there are not enough fescue plants to respond to management, overseeding something will likely provide more growth during the winter and spring.

5) **What about planting sudangrass or millet into fescue to increase summer production?** Some farmers have planted summer annuals on fescue to increase the summer production. The crops most often planted are millets or sudangrass, but crabgrass, broadleaf signalgrass and other panicums may be used to do the same thing.

a) What to expect from the summer crop planted into fescue will depend on the following:

i) on summer rainfall
ii) density of fescue
iii) density of sudan or millet
iv) density of other warm season grasses

b) The overall summer yield ***could be*** very good if summer moisture is good, but it could be very bad under severe moisture stress.

c) Will the fescue survive? It's certainly possible if the summer crop is thin, or there is plenty of moisture, or the overseeded crop is not allowed to provide more than 50 to 75% shade to the fescue. The harvesting or grazing schedule of the tall growing summer annual will control the

shading of the fescue and therefore the survival of the fescue. It is impossible to predict the subsequent fescue yield.

d) When could this practice be an acceptable alternative? This is not advisable unless the stand of fescue is less than 50% and one plans to reseeded (or overseed) the fescue the subsequent fall. The reseeding of the fescue could be no-till planted sometime in September or October with a reasonably good chance of getting a stand, assuming that all of the summer vegetation is harvested or grazed to about 2-3 inch stubble just prior to the no-till planting. This practice should not be encouraged, however with some planned management; it's possible that nutrient uptake level from the site could be acceptable.

e) From a biology standpoint, this type of problem could be corrected with little or no loss of nutrients, but it would mean making some changes in the paper work and the application windows and RYE estimates. In other words, transition from fescue to warm season grasses and back, may not decrease nutrient uptake for the year, but it would alter when those nutrients would be taken up, therefore alter when they should be applied.

5. How do I know if weed control is needed and what can be done?

a. Weeds are often a concern, and it is not always crystal clear when control is actually necessary. The intent of the rules is to utilize the nutrients that are applied to a site. If the ground is covered with growing plants and the production is remaining high, then the types of herbaceous plants may not be so important. However, the RYE is set based on a target crop, and when the mixture of plants gets “too far” out of range it can cause some concern about what to do. Weeds take up nutrients in much the same way and concentrations as all other plants (Table 1). Weeds may actually contain similar levels of Nutrients as forage crops and they may produce as much dry matter per acre as the target crop for a portion of the year. If the crop/weed mix is being harvested and removed from the site, then nutrient removal may be acceptable. If the mixture can be used in some way, then having some weeds may not be such a bad thing. Weed growth and yields are unpredictable and undocumented therefore managers have to be aware of how to control them.

Table 1. N content of several weeds and crops at three stages of growth.

Crop or Weed	Stage of Growth		
	Veg	Boot	Mature
	N, % in tissue DM		
Sickle Pod	3.5	2.2	2.7
Prickly Sida	2.7	2.8	1.9
Redroot Pigweed	3.8	2.7	1.7
Jimson weed	4.0	3.3	2.7
Fall panicum	3.0	1.4	1.1
Yellow foxtail	2.9	1.9	2.2
Crabgrass	2.2	1.3	1.0
Crowfoot grass	2.5	1.3	1.4
Millet	2.7	1.0	1.2
Bermuda	2.5	1.1	1.2

b. **Some aspects of weed management to consider**:

i. Weeds often make a site "look bad" long before they actually cause any significant reduction in overall dry matter production. As long as the weed density has not caused significant "thinning" or death of the target stands, they may not actually reduce the overall uptake of nutrients and water. Death of the crop usually happens when the density of the weeds "overshadow" the crop for long periods. It is virtually impossible to know what impact weeds have had on a stand of forage until after the fact. However, if one can determine that the crop is still dense and actively growing, and harvest frequency is optimum for the crop, then weed composition is of less concern.

ii. broadleaf weeds such as pigweed, lambsquarter, thistle, horsenettle, mare's tail, plantain, dock, and milkweed generally cause more shading to the desired crop than grassy type weeds such as crabgrass, goosegrass, barnyard grass, foxtails, and panicums.

iii. prevent seed formation in weeds by clipping, harvesting, or herbicides and minimize the long-term effects of weed seeds in a pasture or hayland. Clipping or harvesting the crop at its optimum stage of growth for good quality feed will be sufficient to control many weeds. However, during stress growing conditions many weeds tend to grow better and reproduce seeds better than the forage crop. Under such conditions, additional clipping, harvesting or herbicide applications may be necessary.

iv. Most weeds are easier to control when treated in young stages of growth as compared to when they have matured and become reproductive.

v. Clipping, harvesting or grazing **height…..** since the regrowth rate of many plants is related to the stubble height of the plant following harvesting, this aspect can impact competition between crops and weeds. The mowing height can be controlled much easier than the grazing height, but it is important that one knows "ideal" target heights for various crops. If the crop is 12 or more inches high then you may choose to bale this clipping. However, clipping above six (6) inches can have significant negative effect on the amount of weed growth in the subsequent hay crop and the amount of shading of the desired bermuda or fescue. Extending the amount of time (rest period) between harvests can sometimes counter adverse effects of short stubble. Exposing the soil by close or frequent harvesting can allow more "weeds" to germinate and develop, in addition to depleting soil moisture and increasing soil temperature.

vi. Clipping, harvesting or grazing **frequency.**...since plants grow at different rates depending on many factors, a mixture of diverse species will have some plants "ready" to harvest earlier than others. The harvest frequency that favors hay quality generally provides some control of many weeds, with the exception of "hot spots" in a field. Those spots may be treated separately and may, in fact, be clipped short and often to control dense stands of weeds. It's probably not necessary to bale such areas. When clipping above the crop there will not likely be enough mass to bale, but driving a tractor through the field may be more damaging than the unclipped weeds.

d. Determining thresholds for weeds.. there are few, if any, guidelines on how many weeds are "too many" for waste application sites. To determine the actual composition of the mixture one would have to do one or more of the following things:

i. clip sample areas and hand separate the weeds from the crop and weigh the respective plants to get an estimate of the botanical composition by weight.

ii. draw a line across the field in several places and record the number of plants that are in contact with a predetermined point on the line. This is called a line transect method of determining botanical composition. The results of this evaluation would still have to be related to dry weight estimates of the mixtures and pure stands to determine if the weeds were actually causing any reduction in dry matter yields or crop uptake.

iii. a modified "line-transect" is to walk in a predetermined way across a field and count the types and

number of plants that one steps on every step. One then could determine botanical composition on a percentage basis. The results would have to be related to yields and nutrient uptake to be of much use.

6. **Herbicides:** there are not many herbicides labeled for use in pasture or hayland, especially for "grassy type" weeds. There are many herbicides that have labels for use on grasses grown for turf or non cropland use, but they do not have a label for the same crop used as a forage. It is strongly advised that one not use any pesticide that does not have a specific label for a crop.

    a. Use caution and read labels for grazing restrictions and potential drift problems.

    b. MSMA may be used on turf, but should not be used on forage crops. Dr. Cecil Brownie at the NCSU Veterinary School has documented several animal deaths from MSMA poisoning.

    c. NC Agricultural Chemical Manual or one of the following web sites: http://ipmwww.ncsu.edu/ http://www.greenbook.net/free.asp

7. **What is causing many bermudagrass fields to thin and be overtaken by summer annual grasses or common bermuda or broadleaf weeds?** It is difficult to know exactly without detailed records of how the fields have been managed and the timing of nutrient applications, rates, mowing frequency etc, but consider the following aspects that can affect bermudagrass survival.

    a. Saturating soils with effluent or rain for several days and repeating this several times per year can favor many other species over the bermuda; Bermuda is not well adapted to wet soil conditions or soils that are fine textured and receiving excessive moisture from rainfall or irrigation.
    b. Bermudagrass entering into the fall months with too much N and too little K in the soil can create potential problems. See figure 1 below for general responses of bermuda receiving various amounts of N and K. Use frequent soil testing to keep a check soil K levels and minimize the amount of N that is available to the bermuda during the autumn months. Applying N to overseeds when the overseeded crop does not grow for some reason can result an extended late season growth of bermuda when it should be "hardening" and preparing for winter.
    c. The number one management problem causing bermuda decline on overseeded waste application sites is related to the late harvesting of the winter cover in March-April. Allowing the winter cover crops to shade the newly emerging bermuda plants in March and April can easily result in weakened and death of emerging bermudagrass plants.
        i. Bermuda does not tolerate shading well; that is why it is not used under trees in a home lawn. One method of controlling bermuda in row crops fields to plant a "smother crop" on it and allow the shading to kill the bermuda.
        ii. Ryegrass is much more competitive in spring than the cereals and requires very controlled grazing and/or haying to minimize the impact on the bermuda.
        iii. It is best to not let overseeded crops get tall enough to shade the soil surface during the critical weeks when bermuda is breaking dormancy and trying to emerge.

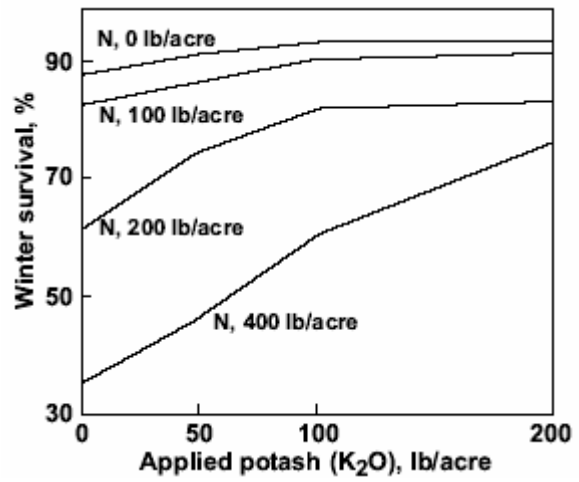
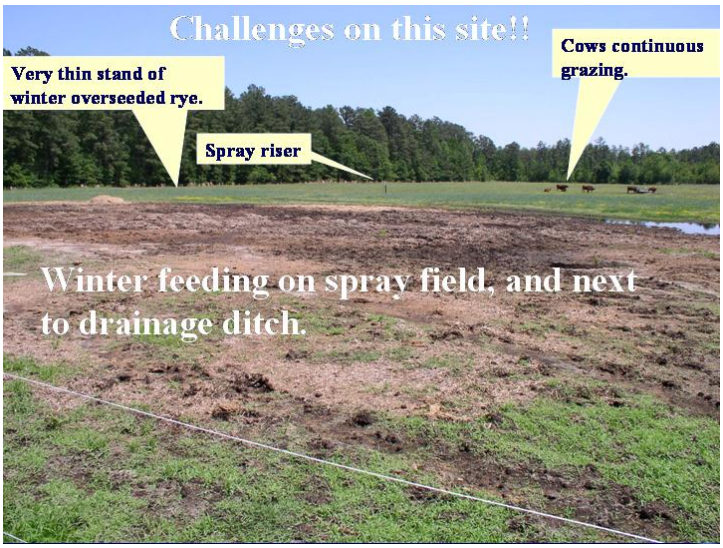


Figure 1. Winter survival of Coastal bermudagrass is decreased with increasing levels of applied N at any given level of potassium (K_2O) fertilizer, but is survival is improved with high rates of K_2O, especially at high N rates. Adapted from Adams and Twersky. 1960)

8. What about feeding hay on waste application sites:
   a. Nutrient management plans should include all sources of nutrients being used on a farm. This would include confinement animal waste, commercial fertilizer and imported feed such as hay that is being fed on the sites.
   b. It is best not to feed on waste application sites because of the nutrient recycling that takes place.
   c. Some feeding is taking place on the edges of application sites and this can pose a problem from runoff and erosion into nearby ditches and streams.


Challenges on this site!!
Very thin stand of winter overseeded rye.
Spray riser
Cows continuous grazing.
Winter feeding on spray field, and next to drainage ditch.

9. What about the seeded bermudagrasses?

   a. The seeded bermudagrasses may be planted just like any other seed; the seeds are small and should not be planted more than ¼ inch deep.
   b. They are not common types, however, many seed sources are likely to contain common types which can cause real challenge in controlling stand productivity and spread around the farm.
   c. Planting times are in April and May.
   d. Expect quicker cover than from hybrids
   e. Yields may be similar or less than hybrids.
   f. They will spread by seeds over the farm and they will be more difficult to control than the hybrids.

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