Annual (Italian) Ryegrass Frost Seeding Trial

Michael Casler and Bob Rand
University of Wisconsin-Madison
Department of Agronomy
Spooner Agricultural Research Station

First some background. All the ryegrasses are higher in nutritional value than all of the traditional cool-season grasses at comparable stages of maturity. Some of the testimonials that I have received from local farmers indicate that where they have frost seeded ryegrass into a pasture, they see an increase in milk production of 5 lb/cow/day! This fits with the scientific literature also.

There are lots of different types of ryegrasses. Here is a brief summary:

Annual: Annuals are more properly called Italian, because they are not a true annual. Early types are not good for grazing because of head production. Annuals have better heat tolerance than perennials; therefore, better summer production.

Perennial: Perennials go dormant in mid-summer if the weather is too hot. They don't head out during year of planting and are more persistent than Italian types.

Hybrid (intermediate type): They are intermediate in traits between above types.

Festulolium: Festulolium is a hybrid developed between meadow fescue and either perennial or Italian ryegrass. It has moderate persistence and excellent summer productivity. Seed costs may be higher due to lower seed production. Except for possibly higher seed costs, this one appears to be the best. Work with a farmer is being done to develop a new variety.

Within each type there are diploids and tetraploids. We don't know much about the differences between the two ploidy types under our conditions. In Europe, tetraploids are higher yielding, but diploids are more persistent. Then within each ploidy type, there is a range of maturity from very early (lots of heads before you know it) to very late (you'll never see a head) and everything in between. Because many graziers don't want to see grass heads in their pastures, we need to recommend medium-late to late maturing varieties (Concord, Gordo, Sikem, or Tirna of the diploids or any of the tetraploids, excluding Comet, Magnum, or Urbana). These all had good ground cover even with 4 lb/acre of seed. If people can't find specific varieties at their seed dealer, then they should ask for a late-maturity annual ryegrass. Most of these seemed to do well last year.

The concept of frost seeding appears to be viable. Seed is cheap, mostly less than $1/lb. This gives a seed cost of less than $4/acre. It might have to be done once per year to maintain the stand at adequate levels because one doesn't know in March/April whether one has had winterkill. It might be best to reseed every winter regardless.

The objective of the trial at Spooner was to evaluate 30 Italian ryegrass varieties for establishment and yield following frost seeding. Dr. Michael Casler was the principle investigator.

Frost seeding involves broadcast seeding onto frozen soil shortly after snowmelt. The freezing/thawing action of the soil gradually works seeds into the soil during the spring. It is a very common technique among pasture farmers, although there is virtually no scientific literature on the subject. There is a narrow window of opportunity for frost seeding on sandy soil in northwest Wisconsin. Ground frost dissipates shortly after snowmelt and the soil firms up. Freezing and thawing of the soil surface occurs only to a limited degree. Equipment and seed must be "at the ready" to successfully frost seed.

This trial at Spooner was seeded on April 4, 1994. The air temperature was 36˚ F, and soil temperature at four inches was 34˚ F. There was no evidence of frost on the soil surface. The site at Spooner was an old alfalfa field with abundant white clover and Kentucky bluegrass. Soil type was cress sandy loam. There was no tillage or chemical weed control applied to this study.

Most of the ryegrass trials germinated and became well established. The trial was harvested four times during the summer. Ground cover attributed to ryegrass varied from 5% to 81% as noted on October 10. Winter survival, as determined by estimating percent of ground cover attributed to ryegrass, taken in June of 1995, varied from 5% to 90%, with the average being about 35%. There were several varieties in the 60-80% range.

Yield determinations were taken four times during the summer of 1994. Some varieties yielded slightly over three tons, with the mean yield being 2.8 tons/acre.

Some of the more promising varieties were frost seeded into a trial in 1995. Yield and stand observation are being taken. So far, the stand is not nearly as good as was the 1994 planting.

Annual ryegrass shows real promise as a pasture forage in northern Wisconsin. It yields well, has high quality forage, and seed costs are low. Frost seeding reliability and winter hardiness are two problems that need more work.