

# Using Fine Fescues to Reduce Roadside Maintenance Costs

LARRY J. KUHN

In Pennsylvania the two predominant roadside vegetative covers have been Kentucky 31 tall fescue and crownvetch. The tall fescue has been planted in areas that can be mowed, and the crownvetch has been planted on slopes and rocky areas. The primary disadvantages of these materials are that the tall fescue requires frequent mowing, and the crownvetch becomes infested with broad-leaved weeds and brush that are difficult to remove. Fine fescues are effective, low-maintenance grasses, but they have been little known and used. They will grow under a wide variety of soil texture, fertility, and moisture conditions. They develop a deep, extensive root system and a dense sod that will provide support for vehicles that leave the road. They tolerate shade and grow well in full sun. They survive and thrive better than any other cool-season grass under low-maintenance conditions, including little or no mowing, irrigation, fertilization, or pesticide use. Once established, they are extremely competitive with weeds and brush species, and they may have allelopathic effects on other vegetation. They also are tolerant of many selective broad-leaved weed killers. This means that brush and weeds of all types can be removed from fine fescue plantings without damaging the fescues. They require little or no mowing. Sheeps and hard fescue grow slowly, and the leaf blades of the taller red and chewings fescue lay over and mat as they grow. The only reason to mow fine fescues along roadsides is to cut weeds or their seedheads, of which hard and red fescues produce few.

In Pennsylvania the two predominant roadside vegetative covers have been Kentucky 31 tall fescue (*Festuca arundinacea* Schreb.) and crownvetch (*Coronilla varia* L.). The tall fescue has been planted in areas that are mowed regularly, and the crownvetch has been planted on slopes, rocky areas, and areas that are mowed infrequently.

Kentucky 31 tall fescue has been widely planted because it forms a dense, deep-rooted turf under a wide range of soil texture and moisture conditions. It holds its quality through many years, tolerating periodic flooding and the salt sprays and runoff that can be quite heavy along Pennsylvania roadsides.

The disadvantages of Kentucky 31 tall fescue are its relatively fast growth rate and heavy production of tall seedheads. Most roadside managers and their constituents have found that it must be mowed frequently. When not mowed, or mowed infrequently, it develops a coarse, unkempt appearance.

Crownvetch has been widely planted because it produces a dense root system and cover of attractive fine-textured foliage and beautiful pink flowers. It grows over a wide range of soil textures and fertility levels and has proven to be especially useful on steep slopes. It does not need to be mowed but tolerates infrequent mowing.

Crownvetch has one major disadvantage. When it is used on areas that cannot be mowed, perennial broad-leaved weeds and brush species eventually invade it. This occurs to a greater extent on high-fertility soils. Although this may not occur until many years after planting, it is difficult to control the weeds and brush once they are established without killing or injuring the crownvetch. A particularly troublesome weed problem in crownvetch in Pennsylvania is Canada thistle (*Cirsium arvense* (L.) Scop.). Legally it has been declared a noxious weed that must be controlled. However, when controlled with herbicides along roadsides, large patches of crownvetch are severely damaged or killed. These patches usually end up filled with weeds, predominantly Canada thistle, a year or so after application.

In 1983 a comprehensive research project was initiated at Pennsylvania State University (Penn State) to evaluate low-maintenance cover crops for use between rows of nursery stock and Christmas trees. On the basis of the results of those studies (1), in 1987 it was decided that fine fescues had considerable potential for use along Pennsylvania roadsides. At this point Pennsylvania's roadsides were observed more carefully and large areas of red fescue were found growing in all parts of the state. Red fescue has been a component of the grass mixtures that were predominantly tall fescue (Table 1, Formula D), and in some areas they developed into the dominant cover. The seeding mixes used by other state departments of transportation were also examined. It was discovered that Rhode Island had been using fine fescues as the dominant component in their seeding operations for more than 20 years (Table 2).

## FINE FESCUES

What are fine fescues? As opposed to tall fescues, which have relatively broad, flat leaves that are as wide as 10 mm, fine fescues have leaves that are tightly folded and about 1 mm wide. The four major fine fescue species are creeping red (*Festuca rubra* L. subsp. *trichophylla* Gaud.), chewings (*F. rubra* L. subsp. *commutata* Gaud.), sheeps (*F. tenifolia* Sibth.), and hard (*F. longifolia* Thuill.). Creeping red fescue has been divided into two separate species, slender creeping fescue and spreading fescue, but they are grouped together here.

## Common Characteristics

Several characteristics, common to all fine fescues, make them well suited for roadside use.

TABLE 1 SEED MIXTURES USED ALONG ROADSIDES IN PENNSYLVANIA (9)

Mixture	Percent
Formula B (for high visibility, use, and maintenance areas)	
Perennial ryegrass mixture (a combination of improved certified varieties with no one variety exceeding 50% of the total)	20
Creeping red fescue or chewings fescue	30
Kentucky bluegrass (a combination of improved certified varieties with no one variety exceeding 25% of the total)	50
Seeded at about 100 lb/acre	
Formula C (for slopes or infrequently mowed areas)	
Crownvetch	45
Annual ryegrass	55
Seeded at about 45 lb/acre	
Formula D (for mowed roadsides)	
Tall fescue 'Kentucky 31'	70
Creeping red fescue or chewings fescue	30
Seeded at about 100 lb/acre	
Formula E (for temporary soil stabilization)	
Annual ryegrass	100
Seeded at about 50 lb/acre	
Formula L (for low maintenance)	
Hard fescue (a combination of improved certified varieties with no one variety exceeding 50% of the total)	60
Creeping red fescue	40
Seeded at about 100 lb/acre	
Formula W (for wet areas)	
Tall fescue 'Kentucky 31'	70
Birdsfoot trefoil (a mixture of 50% Viking and 50% Empire, Leo, or Noreen)	20
Redtop	10
Seeded at about 50 lb/acre	

NOTE: Percentages are based on weight.

1. They will grow under a wide variety of soil texture, fertility, and moisture conditions. They are drought tolerant; well adapted to acidic, infertile soils; and will grow in clay soils or soils with a high sand content. They grow from coast to coast in the temperate regions of the United States and Canada.

2. They develop a deep, extensive root system and a dense sod that will prevent erosion and provide support for vehicles that leave the road.

3. They tolerate shade and grow well in full sun.

4. They survive and thrive better than any other cool-season grass under low-maintenance conditions, which include little or no mowing, irrigation, fertilization, or pesticide use (2). The following ranking of persistence of turfgrass species under

low maintenance is based on observations in areas of the United States where cool-season species are well adapted (2):

- Hard fescue,
- Sheep fescue,
- Chewings fescue,
- Creeping red fescue,
- Tall fescue,
- Common Kentucky bluegrass,
- Improved Kentucky bluegrass, and
- Perennial ryegrass.

5. Once established, they are extremely competitive with weeds and brush (3). They may have allelopathic effects on other vegetation, totally excluding it or severely stunting it. They are tolerant of many selective broad-leaved weed killers and are even resistant to Fusilade (fluazifop-p-butyl) and Poast (sethoxydim), two selective grass killers (4,5). This means that brush and weeds of all types can selectively be removed from fine fescue plantings without damaging the fescues.

6. They require little or no mowing. Sheeps and hard fescue grow slowly, and the leaf blades of the taller red and chewings fescue lay over and mat as they grow. The only reason to mow fine fescues along roadsides is to cut weeds or their seedheads, of which hard and red fescues produce few.

### Distinctions Among Species

There are some distinctions among the fine fescue species.

Creeping red fescue is distinct from the other fine fescues in that it spreads by small, short rhizomes. Improved varieties develop a stronger rhizome system and can spread faster. It has a medium establishment rate and will provide a cover faster than hard or sheeps fescue. However, it does not compete excessively with them during establishment. Although leaf blade lengths of 20 in. are common for many of the turf varieties of red fescue, canopy height of an unmowed area will be considerably less because the leaves lay over. Other varieties have been developed that produce leaf blades of only 12 to 14 in. It typically produces few seedheads and would not require mowing for seedhead control. Red fescue is not as tolerant of wet soils and salt as hard fescue.

Chewings fescue is similar to creeping red fescue except that it lacks rhizomes. It is a bunch-type grass with a rate of establishment and vertical shoot growth comparable with that of red fescue. As with red fescue, shorter varieties are available. The climatic adaptations of chewings fescue are similar to those of red fescue. However, it does produce more seedheads, and they would need to be mowed once a year to maintain a neat appearance.

Hard fescue has a bunch-type growth habit, excellent drought and heat tolerance, and will survive higher soil moisture and salt levels than red fescue. Its germination and establishment rate is distinctly slower than that of red and chewings fescues. It produces few seedheads and would not need to be mowed for seedhead removal. Hard fescues have reasonably good winter color, but they are slower to become green in the spring than some chewings and red fescue varieties, especially under low fertility.

Sheeps fescue is a bunch-type grass that germinates and establishes at about the same rate as hard fescue, but grows slower and remains lower. It is extremely drought resistant,

TABLE 2 SEED MIXTURES USED ALONG ROADSIDES IN RHODE ISLAND (10)

Species	Mowed Areas (%)	Unmowed Areas (%)
Red fescue	75	75
Kentucky bluegrass	15	—
Colonial bentgrass Exeter	5	5
Perennial ryegrass	5	5
Birdsfoot trefoil Empire	—	15

NOTE: Seeding rate of 100 lb per acre is recommended.

but its heat tolerance is lower than the other fine fescues. It produces more seedheads than hard fescue and would need to be mowed.

Although they are well adapted for roadside use, the fine fescues have several limitations. They are usually weedy during establishment because they have a slow (hard and sheeps) to medium (red and chewings) germination and establishment rate (5). Establishment is especially poor during hot summer months. Also, their lateral spread is slow, even for creeping red fescue. This could be a problem on unevenly prepared sites or areas in which the seeding pattern was not uniform.

## HISTORY AND RECOMMENDATIONS FOR USE

If fine fescues are so good, why have they not been used more along roadsides? Until the mid-1900s, lawns were seldom irrigated or fertilized (6). Under these conditions the fine fescues were the prevalent species in turf stands in many areas of the United States, particularly in the temperate regions and where the soil was acidic, infertile, or light textured. With the increase of fertilization and irrigation, these grasses decreased in popularity and ceased to be a major component of turf stands. Improved Kentucky bluegrasses, perennial ryegrasses, and tall fescue have dominated the turf market since then, and fine fescues have been used primarily for their shade tolerance. They have been a small part of the market because few were aware of their desirable characteristics. Most people were totally unfamiliar with any fine fescue except red fescue.

However, researchers in the turfgrass industry rediscovered the fine fescues. In an article summarizing a presentation at the TRB Annual Meeting in January 1989, Robert Duell of Rutgers University described why he thought grasses made the best vegetative covers along highways (7). He also discussed the grasses being used at that time and the potential for selecting grasses that would be better suited for roadside use.

The brightest development presently available for roadside mixtures is that of the hard fescues. . . . Of all the cool-season grasses, the hard fescues are the densest growing and have the best summer green color, particularly under low maintenance. Their dense turf effectively excludes most weeds once the turf is established. The weed-free aspect, low growth, plus rich green summer color, provides quality roadside turf. They also require minimum mowing and tolerate low fertility and low soil moisture.

Research is continuing on fine fescues, and industry and university personnel are conducting active selection and breeding programs to develop new varieties. The improved varieties are not only extremely adaptable to a variety of sites, but they receive turf quality ratings as high or higher than those of Kentucky bluegrass and perennial ryegrass (6,8). At this time many varieties of the fine fescue species are available and more are being developed, tested, and introduced. This creates a major problem for anyone writing specifications for seed mixes, especially because almost all the testing is done under more typical turf conditions—annual fertilizer applications and close mowing. Differences between varieties include texture, growth rate, color, seedhead development, disease and insect resistance, and the presence of endophyte (a

beneficial fungus associated with the grass that makes it resistant to some common insect problems). To further complicate the issue, the relative performance of two particular varieties may be reversed in different parts of the country. Improved varieties should be specified, however, because they are superior to the common, old varieties.

Other grasses may be combined with fine fescues to aid in establishment or provide some other characteristics that may be important in the long term.

Colonial bentgrass (*Agrostis tenuis* Sibth.) is a fine-textured, sod-forming grass that is adapted to northern, humid climates and will tolerate acid, infertile, and droughty soils. This grass has fine seeds and should not exceed 5 percent by weight in a seed mixture. The improved variety Exeter is recommended.

Kentucky bluegrass (*Poa pratensis* L.) is a sod-forming grass that is adapted to northern climates and better soils in the roadside environment or areas that receive some fertilizer, such as urban zones.

Perennial ryegrass (*Lolium perenne* L.) is a bunchgrass that establishes rapidly and is useful for initial stabilization. It is short-lived under roadside conditions and, because it is highly competitive during establishment, should be a minor component of roadside seed mixes. No more than 15 lb per acre should be included in a mix with fine fescues.

Establishing and maintaining a low-maintenance fine fescue turf is no more difficult than for any other turf. However, a few more steps can be added to speed the establishment of a weed-free stand.

1. Select a seed mix. Formula L in Table 1 was designed for Pennsylvania roadsides. The textures of the hard fescues and red fescues are compatible. Both are well adapted to a variety of roadside conditions, and neither produces enough seedheads to require mowing. If immediate soil stabilization is needed, add 5 to 10 percent improved perennial ryegrass. However, in preliminary trials on Pennsylvania roadsides, red fescue germination and establishment was not far behind that of perennial ryegrass.

2. Eliminate all weeds from the area. If the site is new construction, the soil will be bare after grading. If the site is being renovated or converted from a high-maintenance cover, spray the area with a translocated, postemergence, nonselective, nonresidual herbicide such as Roundup (glyphosate) to kill all perennial weeds and grasses.

3. Run over the soil with a disk to form shallow (1 in. or less) grooves. This should be done on bare ground or after sprayed vegetation has had time to absorb and translocate the herbicide to its roots.

4. The seed can be broadcast, dropped, or hydroseeded. Research conducted at Penn State showed that rolling or dragging following seeding was not necessary (5). Steps 3 and 4 can be combined with seeding equipment that is currently available.

5. Apply 40 lb of nitrogen per acre to increase the rate of growth during establishment.

6. When the grass reaches a height of 2 in., apply selective herbicides to control competing vegetation. Mowing will also work, but will not be quite as effective.

7. A broadcast application of selective herbicides every 2 to 5 years should be sufficient to prevent the establishment

of perennial broad-leaved weeds or brush species. Little or no mowing should be needed. If mowed, the grass should not be cut closer than 4 in.; there is really no need to cut lower than 6 in. because it does not regrow quickly.

Although a well-established fine-fescue planting would present a neat and attractive appearance along a roadside, it could become monotonous. Some of the money saved on maintenance costs should be spent on landscape plantings. These plantings should be groups of trees and shrubs instead of individual plants. The growth and development of individual trees and shrubs surrounded by fine fescue will be stunted by their competitive and allelopathic nature. The trunks of trees planted individually are also often damaged by mowers. By planting the trees and shrubs in groups they can provide a canopy dense enough to keep the grass and mowers away from them.

## REFERENCES

1. L. J. Kuhns. Cover Crops in Nursery and Christmas Tree Plantations. In *Proc., Northeastern Weed Science Society*, Vol. 39, 1985, p. 230, abstract.
2. W. A. Meyer. Breeding Disease-Resistant, Persistent Low-Maintenance Turf. *Grounds Maintenance*, April 1989, pp. 68,70,74,139.
3. L. J. Kuhns. Solid Fine Fescue Sod Vs. Strip Culture for Nursery Stock. In *Proc., Northeastern Weed Science Society*, Vol. 41, 1987, p. 193, abstract.
4. S. D. Guiser and L. J. Kuhns. Controlling Grass Cover Crops with Herbicides. In *Proc., Northeastern Weed Science Society*, Vol. 42, 1988, pp. 129–133, abstract.
5. S. D. Guiser and L. J. Kuhns. 1988. Managing Weeds During Cover Crop Establishment. In *Proc., Northeastern Weed Science Society*, Vol. 42, 1988, pp. 126–127, abstract.
6. C. R. Skoagley. 1988. Why Fine Fescues? *Landscape Management*, July 1988, pp. 24–28.
7. R. W. Duell. Vegetation Enhancement via Species and Cultivar Selection: A Perspective. In *Transportation Research Record 1246*, TRB, National Research Council, Washington, D.C., 1989, pp. 49–53.
8. *National Turfgrass Evaluation Program Reports*. Beltsville Agricultural Research Center, U.S. Department of Agriculture, Beltsville, Md., 1988.
9. *Specifications for Seeds, Grass, Forbs, and Wildflowers*. Department of General Services, Commonwealth of Pennsylvania, Harrisburg, 1990.
10. R. C. Wakefield and C. D. Sawyer. Roadside Vegetation Management. *University of Rhode Island Ag. Expt. Sta. Bulletin 432*, 1982.

---

*Publication of this paper sponsored by Committee on Roadside Maintenance.*