

LOW-INPUT OVERSEEDING



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Cover illustration: Basic low-input overseeding, as illustrated by this fifty-year-old "M" IHC tractor and forty-year-old Model B John Deere drill

LOW-INPUT OVERSEEDING

Most of us picture perennials such as bermudagrass, bahiagrass, "native grass," and Old World bluestems when warm-season grasses come to mind. These forages and others are adapted to all productive acreage of the southeastern United States and other areas. They are fair to good forages but have two major shortcomings. One is that they are generally not high quality, except early in the warm season. There are exceptions: crabgrass, broadleaf signalgrass, Texas panicum, buffelgrass, forage sorghums, millets, and others, which are generally much higher quality and can induce better animal performance than the perennial forages listed above. The second problem is that they are only warm-season grasses, or green during the six-month summer. However, late-summer to winter forage can be prorated far into winter as a dry, stockpiled pasture.

During the six months of winter, dormancy can be a problem or an opportunity. You can use those winter months to overseed certain warm- or cool-season forages into other warm- or cool-season grass residue to add diversity, production, length of green season, and quality. Consider doing so with low-input procedures.

Low Input and Its Advantages

"Low input" in this case means primarily controlling (reducing) equipment and time/labor input and planting management requirements. It does not mean eliminating proper seed kind, variety, and planting rates; adequate fertilization for economical production; or proper rotational stocking management. Low input entails organizing and managing for excellent results, within the context of this approach to grassland farming, without some of the higher input items and excessive time/labor. The techniques involve stepping outside the paradigm of the time.

Producers sometimes do not overseed because of associated equipment and labor costs or disappointments with previous improper overseedings. Low-input procedures can improve economics and reduce overhead costs for equipment, labor, and time without seriously reducing forage yield. Some producers do not own any planting equipment at all, and others do not have row planting equipment (drills) or "high-tech" no-till drills because these tools are expensive. Large operations sometimes can justify spending \$8,000 to over \$20,000 on a special no-till drill. Along with that comes a tractor that adds perhaps \$5,000 (used) to over \$40,000 (new), depending on the operator's choices. Many operators, however, have economical equipment alternatives that,

used with proper agronomic and grazing techniques, produce excellent forage stands and volume.

"Overseeding" in this case is simply planting a forage into another forage stand. Plantings for low-input grass farming can be broadcast or drilled inexpensively. This writing is primarily about overseeding for the winter and spring, but part of the application techniques apply to mixing different warm-season grasses, mixing warm season grasses with cool-season ones, and combining different cool-season grasses.

Overseeding Cool-Season Forages into Warm-Season Forages

An example of this style of overseeding illustrates its success. We have used low-input winter forage overseeding in 'Midland' bermudagrass sods on the controlled-rotation grazing unit of the Noble Foundation's Pasture Demonstration Farm for twelve years (figure 1). Our usual planting technique is simply broadcasting proven rye and ryegrass variety seeds (under the proper residue, timing, and climate) with low-cost fertilizer spreaders. When possible this planting is coordinated with rainfall and tread-in by beef cattle at five- to thirty-six-head stock density. The higher the stock density, the better the tread-in when other conditions are within appropriate bounds. In our research, proper tread-in helps create stands 38 percent better on average than untrodden ones and is part of many low-input plantings, but a good long rain is better. This grass production unit actually could be farmed with minimal input: the family vehicle and a small fertilizer spreader, or just a telephone and a cooperative fertilizer/seed dealer.

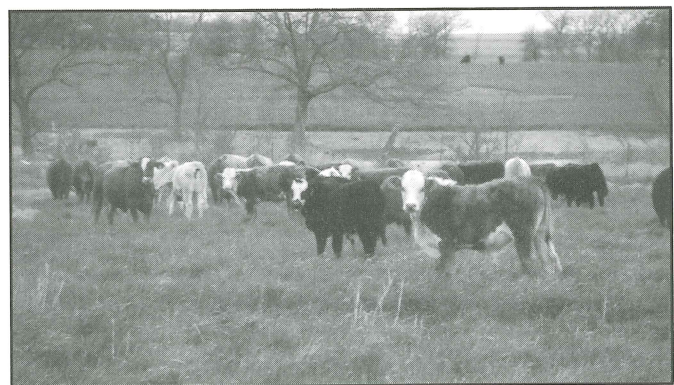


Figure 1. A usual broadcast-overseeded rye and ryegrass mixture in bermudagrass, achieved by broadcast planting and treading in by beef cattle

During the first few seasons, we used primarily adapted annual ryegrasses. We experimented with different small grains, legumes, and a few other forages, and found that a mixture of a proven forage-type cereal

rye at 100 to 120 pounds of pure live seed per acre and a proven annual ryegrass at 20 to 25 pounds of pure live seed per acre was the best for this style of low-input planting. Barley established nearly as well as rye. Several other forages produced acceptable stands. The winter crop averaged about 3,000 pounds of forage per acre and about 300 pounds of stocker beef per acre when treated with 100 pounds of actual nitrogen plus P (phosphorus), K (potassium), and lime as necessary, according to soil test results and proper rotational grazing practices. The usual ebb and flow of year-to-year production is evident, but there has never been a total stand failure, nor have we used a drill or tractor.

Some years more production is from cereal rye than annual ryegrass, which is one reason we use mixtures. This bermudagrass-based unit was also planted via low input to other warm-season forages to create a warm-season mixture (figure 2). More detail on this research and demonstration work is available (Dalrymple, 1988, 1991).

Proper Use of Overseeded Forages

We graziers must understand that the winter forages grown in warm-season grass residue are premium quality and somewhat expensive, costing about \$40 per ton for seed, fertilizer, and low-input planting technique. The cost is low for purchased feed, but not for some livestock pasture. To be economically justified, these forages must be used by livestock requiring high nutrition: retained-ownership weaned calves, stocker cattle, lactating dairy cows, replacement heifers, first-calf heifers, and brood mares, for example. If commercial beef cows under maintenance nutrition graze the forages, they usually must do so in a limited grazing syndrome for winter/spring protein supplementation, or as gleaners of leftover stubble at the end of the season, for the forage to be economical. There are exceptions, such as grazing volunteer annual ryegrass, "cheatgrasses," or rescuegrass in warm-season grass residues, which is the cheapest of



Figure 2. A bermudagrass, crabgrass, and johnsongrass warm-season mixture created by broadcast planting and tread-in by cattle



Figure 3. Broadcasting seed and fertilizer with an ATV that can plant 12 to 15 acres an hour with travel, loading, and other management time included. Similar spreaders that cover twice the application width are available and can double the coverage and planting rate.

the grass-only low-input methods of overseeding.

Regions of Use

In the United States, some proper adaptation of these techniques works in zones with 25 inches of precipitation or more.

Low-Input Planting Techniques and Equipment

Two ways of planting seeds in grass residues include broadcasting and low-input drilling.

Any broadcasting tool from a hand-carried or powered seeder-fertilizer spreader to an airplane works. The result is much the same. Most operators use a common fertilizer spreader, and any good one performs satisfactorily. Drill-box, spinner, and airflow spreaders all work well, but drill-box and airflow spreaders provide the most uniform stands. Fertilizer may be blended with the seed to provide better flow characteristics, some plant nutrition, and low-level starter (pop-up) fertilizer. Blending something with the seed is essential to successfully distribute some bulky seeds. The width of the swath must be controlled so the seed patterns join and fertilizer patterns are as uniform as possible. Power may be a draft animal, ATV (all terrain vehicle), pickup truck, tractor, or self-powered fertilizer spreader (figure 3).

Low-input economical drilling is more involved. The drilling must be inexpensive for the equipment and the power to pull it, and used equipment such as no-till drills, stubble mulch drills, and fluted-feed common grain drills is ideal. Older-model no-till drills occasionally are sold for less than \$1,000 but usually start around \$5,000. You can pay from \$1,000 to over \$10,000 for a used tractor to pull the drill, depending on your power requirement. Stubble mulch drills can be purchased in

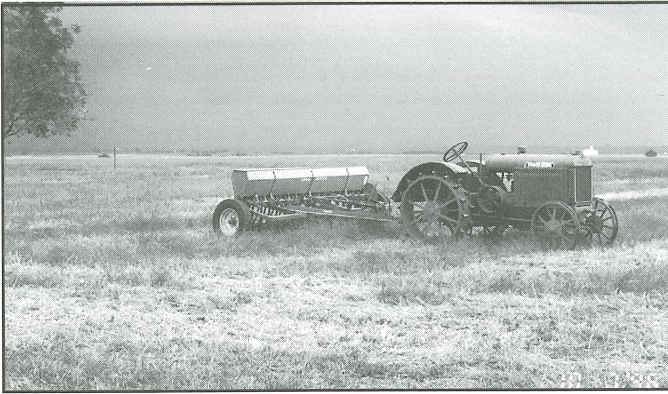


Figure 4. No-till overseeding with relatively inexpensive equipment. This twenty-horsepower, sixty-eight-year-old "fun" tractor and \$300 forty-year-old drill were used to plant a rye and fertilizer mixture from the grain box into crabgrass stubble.

the southern wheat belt for less than \$1,000. They do an excellent job of overseeding short residue that has not lodged or areas without rocks, stumps, or other large physical obstacles. Fluted-feed common grain drills (wheat drills) can be purchased for \$500 or less. They are the real bargain. A pickup or a twenty-horsepower tractor can pull them over most field/pasture terrain, especially if you use a low-power tractor or a pickup truck with mud chains on the drive tires (figures 4 and 5). These drills are best used where there are no large rocks, stumps, or other physical obstacles.

In the early days of low-input overseedings, we did much of it in bermudagrass residue with a disk, homemade iron drag, and old grain drill in a tandem operation (figure 6). Results were very good. The disk scuffed the litter or lightly tilled the soil surface and suppressed the bermudagrass slightly, the drag smoothed the pasture surface somewhat, and the drill placed the seed and fertilizer in a band on and slightly beneath the soil surface. In bermudagrass, bahiagrass, and fescue, this method works well for low-input overseeding with low-cost used equipment.



Figure 5. Rye hay production at about 4,500 pounds per acre in the same crabgrass stubble shown in figure 4

The disking technique is especially applicable to the perennial bermudagrass, bahiagrass, and fescue sod stands because they can tolerate and recover from it, unlike bunchgrass pastures such as Old World bluestems, weeping lovegrass, kleingrass, and native range grasses.

Disking is also ideal in warm-season annual forage stubble residue of crabgrass (figure 7), cupgrass, broadleaf signalgrass, forage sorghum (sudangrass), millets, warm-season legumes, old field native grass, other annual forages, and carryover winter crop residue such as wheat stubble. This pasture produced 626 pounds of beef per acre from cereal rye planted by disking, rolling, and drilling in tandem, following and preceding a 'Red River' crabgrass pasture double crop. Low-input equipment techniques were used for all forage production.



Figure 6. Single-trip tractor, disk, railroad iron drag, and drill in tandem with a broadcast planter on the back. Excellent stands can be achieved by using this method in bermudagrass residue.

When a properly managed low-input drilling technique, including banded starter fertilizer, can be used, it sometimes produces earlier, more uniform stands than broadcast planting. However, proper broadcast planting can also provide excellent results, as we have shown, and has many cost and time advantages, especially on areas where surface soil fertility is medium to high.

Fertilizer is important: not just any fertilizer, but the proper one that is banded with the seed to produce a good economical starter-fertilizer response, which is very important on low-phosphorus and acidic soils. We use an 18-46-0 or other primarily nitrogen-phosphorus or complete nitrogen-phosphorus-potassium blend.

When you use a fluted feed drill, it is not imperative to have a special fertilizer box. Simply mix the seed and fertilizer and drill it from the grain box, or put in a layer of seed, a layer of fertilizer, and so on, and



Figure 7. Tractor, disk, iron drag, and drill tandem technique to produce rye pasture in warm-season annual grass residue, which is crabgrass in this case

they will mix automatically as they flow out of the drill. Empty, clean, wash, and oil the seed box and spouts thoroughly after drilling. More detailed information on using common drills for this planting technique is available (Dalrymple, R. L. and C. Coffey, 1999).

Overseeded winter grasses in southern Oklahoma also need about 100 pounds or more of actual nitrogen as a topdressing to produce well and perform more efficiently.

We have also done much overseeding into bermudagrass and other grass stubble by using only a common grain drill (figure 8). These stands produced 75 percent to over 90 percent that of stands from a high-tech no-till drill if the drilling was properly done.

Successful Low-Input Overseeding

There are some things to consider to make low-input overseeding with a common drill successful.

When you use low-input drilling techniques, operate the drill slower than usual (2 to 3 mph rather than 4 to 6 mph). Set the springs on the furrow openers with more tension. Drill when the soil can be penetrated slightly with the row openers, which may be immediately after a rain.

Overseeding small grains by using common drills has been very successful in standing erect bermudagrass residue up to 8 inches tall. A range of 2 to 5 inches is excellent. Annual ryegrass, rescuegrass, and legumes require residue heights of 1 to 3 inches.

Livestock, including those with low nutrient requirements at grazing, can be used to control residue heights and litter accumulation. We have used primarily beef cows or steers as second grazers to facilitate successful low-input overseeding (figure 9). These

cattle then are part of the low-input process. After use as second grazers, these livestock (especially steers) can be converted to first grazers for better performance on a higher nutritional plane.

Ground litter (thatch) must be considered separately from standing residue, especially in broadcast plantings. Small grains can establish in ground litter up to 1 inch thick, but 1/2 inch or thinner is better. Ground litter for annual ryegrass and rescuegrass needs to be near 1/2 inch or thinner; that of legumes, near zero. If ground litter is too thick for the crop, then it must be opened with a disk, a low-cost drill, or other tool to expose soil for an immediate planting, especially in bermudagrass stands and absolutely in bahiagrass sods. As many seeds as possible need to be near the soil, touch it, or be placed at the proper depth in the soil. Another method of reducing litter is to graze more intensively to reduce future litter, but this method requires more time and several grazing cycles.

The importance of acceptable standing residue and surface litter must, from the viewpoint of good stand establishment, be considered. The proper residue heights and volumes create a better microclimate for moisture than bare soil or excessively short residue, holding much more moisture for a much longer time after rains. This characteristic affords the seed a better, longer opportunity to germinate and establish a well-rooted seedling.

Kind and variety of forages must be considered. All of the small grains work in this syndrome, but cereal rye establishes the best stands and earliest production by far. Barley establishes well, but may not be as productive or winter hardy in northern areas. Wheat and triticale establish almost as well as barley. Oats establishment is the poorest, but it can be satisfactory. An-



Figure 8. Rye stands in bermudagrass sod, achieved with a common grain drill. The taller, thicker strips received the essential banded nitrogen-phosphorus fertilizer with seed, while the thin, short rye received none.

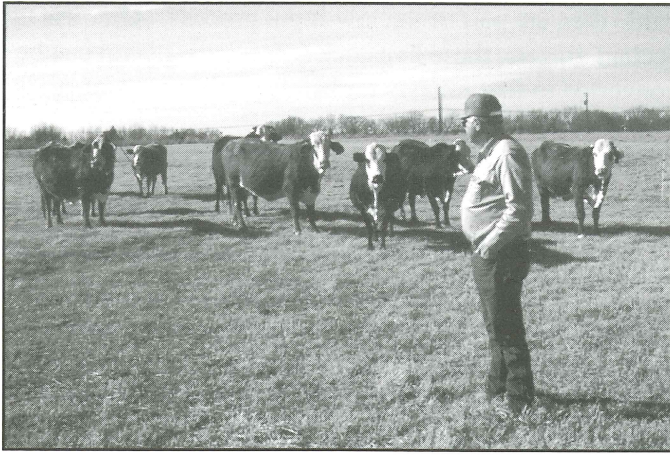


Figure 9. Second grazer cattle, with a lower plane of nutrition, being used to graze 8-inch-tall bermudagrass residue to a 3-inch residue and tread in seed after broadcast planting for low-input overseeding

nual ryegrass and 'Stocker' and 'Matua' bromegrass (rescuegrasses) do well in short residue, as do legumes where well adapted.

Proven varieties planted on clean seedbeds generally work well, but there is a possibility that certain varieties might perform better. The better forage varieties for any given area should be used. Successful rye varieties include Maton, Oklan, Bonel, Elbon, and Wrens Abruzzi. A wide range of the wheats is expected to do well, but beardless late-maturing wheats perform well in southern Oklahoma. Choices of oat and barley seeds are limited in our region, and use is relative to seed availability. There are many good annual ryegrass varieties, including Marshall, Jackson, TAM 90, and Ribeye.

Legumes also need to be chosen by their success within a region. In southern Oklahoma, hairy vetch, crimson clover, singleterry pea, Austrian winter peas, and arrowleaf clover have done well in low-input overseedings; red, white, and rose clover have not.

Date of planting, with other conditions satisfactory, can be as early as four to eight weeks before average fall frost date and as soon as feasible thereafter or simply when the summer forages cease active fall growth in the far southern and southeastern United States. In general, the earlier the planting within the range, the better the production. Grass plantings can continue up to about four to six weeks before the last spring frost date. Barley, oats, annual ryegrass, and 'Stocker' and 'Matua' bromegrass are some of the choices for late-winter plantings in February to very early March.

Annual ryegrass broadcast planted may succeed better if planted after winter begins. We sometimes plant it separately, after cereal rye planting, in January to very early March. This split planting-date technique seems more necessary in broadcast rather than drilled plantings.

Seeding rates should be at the upper limit for the forage and area of use.

Use rain as a planting tool with broadcasting or low-input drilling with grain drills. If the forecast calls for rain and you are ready, plant, or actually plant during the rain. We have done so and it does improve stands (figure 10) compared with planting in dry weather.

Lowest Cost, Low Input by Managing for Volunteer

Among the lowest-input overseeding is planned, volunteer ryegrass, 'Stocker' or 'Matua' bromegrass, and naturalized "cheatgrasses." This type of production comes after initial seedings. These volunteer grasses develop properly grazeable early production later than cereal rye, especially if banded starter fertilizer is used at planting. The same low-cost syndrome is evident in managed volunteer crabgrass, signalgrass, and other volunteering warm-season annuals.

Overseeding in Other Grass Residues

Much of this publication is about overseedings in bermudagrass, bahiagrass, and other perennial sods because they can tolerate the grassland farming procedure, associated competition, and extra grazing impact. Overseeding winter forages into residue of crabgrass, broadleaf signalgrass, sudangrass, and other warm-season annual residue is also excellent and produces better winter pasture than overseeding in permanent grass sods. In the latter, the winter pasture develops relatively quickly and there is no need to preserve the life of the summer forage because it is dead or soon will be.

Many other perennial summer forages can be used in low-input overseedings and include tall native prairie grass, weeping lovegrass (figure 11), and Old World bluestems. Be extremely cautious, however, when



Figure 10. Seed being broadcast in the rain to ensure a higher rate of success



Figure 11. Overseeding into proper weeping lovegrass stubble by using minimal equipment: a grain drill with a fertilizer box and a low-power tractor. The technique is also applicable to bermudagrass and some Old World bluestem, kleingrass, and native grasses.

overseeding in the perennial bunchgrass pastures mentioned because they are easily thinned by the procedure, the added competition, the grazing technique, or added spring trample damage.

Overseeding Cool-Season Forages into Cool-Season Perennials

The same techniques used to overseed cool-season forages into warm-season grass residues can be used to overseed some cool-season forages into others.

White clover, red clover, and other legumes can be added to fescue, orchardgrass, and other cool-season perennial sods. If cool-season perennial sods are naturally thin (6 to 12 inches between clumps) or are mechanically thinned to about a 30 to 50 percent stand, cool-season annuals such as legumes, cereal rye, and annual ryegrass can be incorporated into the stand via low-input procedures.

Overseeding Warm-Season Forage into Warm-Season Forage or Cool-Season Residues

I have written mostly about overseeding winter forages in warm-season grass residues. Warm-season forages also can be overseeded into other warm-season forages for increased diversity, quality, green-season length, and production. Some successes include 'Marion' lespedeza, crabgrass, and johnsongrass. Cool- and warm-season forages can be added to an alfalfa stand. In all cases, there must be an ecological space for any of these additions to be successful. The ranges of possible mixtures are too numerous to outline.

We frequently have applied these low-input techniques to planting cool-season annuals in residues of crabgrass (figure 7). Another successful example is broadcasting sudangrass or crabgrass into residue of

grazed-out cool-season annual winter pasture (figure 12).

The Importance of Properly Integrated Practices

All of the parts of low-input overseeding must be in place to assure the planting's success, including preparation of the residue before planting. Proper fertilization practices are also essential. In a recent grass farmers' meeting, a survey indicated that only 3 percent of the producers used some form of starter fertilizer (broadcast or banded) when overseeding plantings. The other 97 percent were assured of partial or complete failure because an essential part was missing. To coin a phrase, "All the marbles must be lined up correctly to win the game."

Low-input overseeding can work well if all the procedures are in order. This addition to a summer forage pasture can add about 3,000 pounds per acre to forage yield, which means more product yield on the same acreage with essentially the same overhead costs. All aspects must be correct, including the choice of the livestock enterprise to graze the pasture.



Figure 12. A stand of broadcast-planted and trodden-in seed for crabgrass (top) or sudangrass (bottom) summer pasture in grazed out cool-season annual winter pasture double crop (sudangrass photograph courtesy of Harold Shappell)

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