Effect of Soil Furrow Opener and Date of Seeding on Establishment of Forage Grasses

Neal Holt , Sylvio Tessier and Ben Dyck
Agriculture Canada Swift Current

Summary
In field tests at Swift Current from 1988 to 1992, a double-disc opener with depth bands produced better stands of perennial grasses in tilled fallow than a hoe opener. A lister plus double disc which formed a 'trench' and cleared surface residue and dry soil before the opener was generally superior in untilled stubble. The hoe opener was adequate in dense surface residue or compacted soil. Water applied in the furrow did not improve establishment in the years of this test.
Seeding perennial grasses in April or early May usually resulted in complete stands more often than 'dormant' seeding in October. Grasses were established in early September in two of three years when soil moisture was adequate.

Field tests and Results
Introduction. Weather is the most important factor determining the success of establishing perennial seeded forages. However, the risks can be reduced by judicious choice of equipment and seeding date. Seeding equipment should place seed in moist soil at the correct depth with a cover of packed soil. The seeding date of a perennial forage should coincide with adequate soil water content and a high probability of favorable weather for seed germination. Most workers in the semiarid prairies recommend one of three dates of seeding: early fall for establishment before freeze-up; late fall (dormant seeding) for germination the following spring; of early spring seeding for immediate development. Dates of seeding in the spring may extend from April to June, depending on site condition, weed control and weather prospects.

Soil Furrow Openers and Packers. The field trials examined the effect of soil openers, furrow packer assemblies and in-furrow applied water on the establishment of perennial forage grasses, Altai wildrye, Russian wildrye and intermediate wheatgrass. The seeder was designed to carry interchangeable openers: a double disc with depth control bands or a narrow hoe (5/8 inch width). In addition, a 'lister' could be added to the seeder to remove loose, dry soil and surface trash in front of the disc or hoe opener. The lister created a trench four inches wide at the soil surface and two inches deep for 'trench' seeding. Further, water could be added to the furrow just behind each opener prior to packing. The seeder was fitted with an interchangeable single wheel or double wheel packer system.

In the first experiment, soil furrow opener, trench seeding or in-furrow water had no effect on soil bulk density, soil water or soil water loss of tilled fallow. In the untilled chemical stubble, the hoe opener reduced soil bulk density and increased soil water loss. Speed of emergence, stand count and first-crop yield of the grasses were greater for the disc opener and disc-lister when compared to the hoe or lister-hoe opener in tilled fallow. The results were attributes to better depth control in the double disc opener as no differences were noted for the firmer, untilled treatment. Better depth control of the hoe

opener should make an adequate seeder for forage seeds. In-furrow water had no effect on stand count or initial yields bur soil water was near field capacity for this first trial.

In two subsequent experiments, stand counts and first-crop yields were generally higher for the disc opener than for the hoe opener and for tilled fallow compared to untilled stubble. No differences were noted in the second-year forage yield providing fertility and soil water were similar. Packer assemblies or in-furrow water did not have and effect on the results. If residue amounts were significant, the hoe opener or lister-hoe were better than the disc opener in the untilled stubble. It appeared that the key to improve the performance of the hoe opener was seeding depth control.

Seeding Date. The seeding equipment was compared at dates in early September, October, April, May and early June to seed Altai wildrye, Russian wildrye and intermediate wheatgrass into tilled fallow and untilled stubble. Soil and weather conditions had an important impact on the establishment of the forages.

In two of three years, the grasses were established in September. The opportunity for successful establishment in the fall was associated with moist soil and above-normal soil and air temperatures. In the second year, the soil was too dry for seed germination and seedlings were not established until the following April. "Dormant' seeding was successful in two of three years although stands were generally less uniform than from spring plantings. Often the soil fractured along the furrow opener disturbing emergence of fall-sown crops. All dates of seeding from early April to mid May resulted in adequate stands. Successful establishment of forages in later May and June was associated with adequate soil moisture and cool air temperatures providing time for the seeds to germinate and established a root system before the heat of summer. Emergence of the seedling was much quicker in late May compared to April of September. For instance, the grass seedling would emerge in ten days from time of seeding in late May compared to 26 days in April or 17 days in September. A shorter time to emergence provides the grower with better control of the environment, including weeds and insects.