

FACT SHEET

The Use of Companion Crops to establish Forages in Western Canada

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The Canadian prairies have a summer water deficiency to a greater or lesser extent depending on the location and year. Experiments over the last 100 years have made one thing abundantly clear. Climate and weather play a major role in the success or failure of forage establishment with a companion crop, and in some locations and some years even without a companion crop.

In the subhumid climate of the black and grey-wooded soil zones, forages seeded with a companion crop will normally establish. Precipitation and evapotranspiration come nearest into balance on average. There is good spring moisture from snowmelt, and rainfall peaks in late June, just before the hottest time of the summer. There is also some rain in early fall so the forage can develop to a limited amount after the companion crop has been removed. The influence of the companion crop is on forage seedling size, with smaller plants unable to produce maximum yields the following spring. Because of this, forage yields after establishing with a companion crop are often less for the first production year than when established alone. Thereafter, weather and soil fertility are the controlling agents. The economic value of seeding forages with or without a companion crop in the black soil zone depends on the relative prices of forage, grain, and cereal hay, in part because forage yield depends on spring moisture which can be very variable. Wheat, barley, oats, canola (both types), flax, and peas have been used successfully to establish forages. Except sometimes for sweetclover with broadleaf annual crops, underseeded forages appear to have no deleterious effects on the companion crop. In rotations, wheat following forages that contained a legume component had higher yields or higher protein content.

In the dark brown soil zone, evapotranspiration is greater and precipitation less on average than in the black soil zone. There is usually adequate moisture in the soil from snowmelt in spring for seed germination. Because evapotranspiration normally exceeds summer rainfall, plants come under stress and forage establishment using a companion crop is more uncertain. It is best to seed forages with a companion crop on land fallowed the previous year. Wheat is the best companion crop to use. Barley, oats, and flax have also been used. On stubble, better forage establishment will be gained by seeding alone. In the dark brown soil zone, rotations including underseeded alfalfa are usually not economic in part because of forage yield variability caused by spring weather variation.

The brown soil zone has high evapotranspiration in summer and brisk winds. Average precipitation is less than in the dark brown soil zone. Snowfall is less certain so soil moisture in spring may be insufficient for germination. It is not advisable to use a companion crop to establish forages. Seeded alone, forages usually give an adequate establishment. It usually takes two years before maximum possible yields are attained, and amounts and timing of rainfall has a large effect on production.

A fourth “climate zone” is the result of irrigation. Provided there is water available when required, establishing forages with a companion crop is not a problem. Even if irrigation water is available to the plants, high temperatures and wind speed make the water less effective for growth. The economic value of seeding forages with or without a companion crop, and which companion crop to use, as in the black soil zone, depends on the relative prices of forage, grain, and cereal hay.

In all situations, it is best to sow on land with few weeds. The combination of a grass and a broadleaf plant, be they annual or perennial, puts severe limitations on the choice of herbicide. As well, herbicides which are usable as far as forage tolerance is concerned may not be registered for that use. Often, herbicides that are registered for annual crops have nothing on their label about forages, or about residues that may remain in the hay or pasture. If tillage is used to control the first flush of weeds in spring, soil moisture will be lost, and the soil will be too loose for seeding forages.

Two requirements when seeding forages apply everywhere. First, the soil should not be loose. Packing is needed so that one’s foot makes at most only a slight dent in the soil surface. The seed should go in no more than an inch. Provided weeds are not a problem, forages will establish when seeded into standing stubble. Second, if using a companion crop, cross-seeding the forage in a separate operation will usually result in a better stand.