



SELECTING A PERENNIAL FORAGE

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J.E. Madill, Agronomist, Kemptville College of Agricultural Technology
A.V. Skepasts, Agronomist, New Liskeard College of Agricultural Technology

The selection of a forage species is a personal decision which each farmer must make based on his own circumstances. The choice involves both the adaptability of a species to his specific soil and climatic conditions and the feeding program involved. Factors such as soil drainage, pH, persistence required and primary use will nearly always be the principal criteria in selecting the species.

DRAINAGE

In many cases soil drainage will be the most critical factor especially in fields where poor natural drainage prevails. In this case a bird's-foot trefoil mixture would give higher yield than a mixture of alfalfa and orchard grass regardless of any differences in feeding value. Red clover is better adapted to poor drainage than alfalfa. On wet soils, alsike clover is often included with red clover to improve the stand in lower areas of the field. Recommended grasses, except for orchard grass, are tolerant to poor drainage.

In excessively wet areas such as undrained bottom land, reed canary grass is well adapted. While this species will grow under these conditions, it will require close grazing and early harvesting to achieve palatable forage. On land with very poor drainage or subject to periodic flooding, tile drains or good surface drainage will be needed to maintain legumes, including bird's-foot trefoil. Improved drainage will facilitate the use of legumes and bring into better production the more fertile soils of most farms. Drainage will also greatly improve the ease of harvest and management to ensure harvesting a premium quality forage.

SOIL ACIDITY

At lower, pH, soil reaction becomes important in alfalfa and especially sweet clover production. With these species, liming usually pays if the pH is 6.0 or lower. If the pH is substantially below this level, either lime the field or choose a more acid-tolerant legume. With other legumes, such as trefoil and alsike, which show less response to liming, the cost of liming is seldom warranted. Grasses do not show any significant yield response to pH changes.

PERSISTENCE

Persistence is an evasive quality depending on

species, variety, management and local environmental conditions. Alfalfa may easily last 3 to 4 years in Southern Ontario but it may be marginal after 2 years in most areas of Northern Ontario. On the other hand, red clover persists better in Eastern and especially in Northern Ontario but it is very poor in regions west of Toronto where diseases and winterkill are more prevalent in this crop. Not only do species differ in persistence but also varieties within the same species. Varieties should be carefully chosen where persistence is a problem. After seeding, good management in terms of fertility, weed control and *avoidance of critical harvest periods*, especially with alfalfa, will help to insure a long lasting quality stand of forages.

ADVANTAGES AND USES OF SPECIES

Many species offer special advantages. For example, bird's-foot trefoil has never been known to cause bloat. In addition it persists well under grazing conditions. Alfalfa is an excellent yielder of quality forage, but stands can be greatly reduced by pasturing. Sweet clover fixes large amounts of atmospheric nitrogen. It is our best soil for improving legume particularly when used as green manure following continuous corn. With adequate fertility, white clover will move into and improve the forage quality of many closely grazed permanent pastures.

Orchard grass grows well in cool temperatures, producing abundantly in the early spring. It matures very early and provides the first pastures of the season. With good aftermath production it produces well in the fall, thus supplying late pasture. Bromegrass, while not as early, is also a good aftermath producer and is more palatable than orchard grass. Reed canary grass will tolerate the poorest drainage and is also very drought resistant, making it suitable for fields with highly variable soil conditions. Timothy withstands severe grazing and is easy to establish. Timothy is often used to add insurance to a grass legume stand.

FEEDING VALUE

Most legumes contain about double the protein content of grasses. If a very high protein feed is desired, the proportion of grasses will have to be reduced or eliminated from the stand. The short term

ladino clover will provide about 27% protein, alfalfa and bird's-foot trefoil about 19% protein. In less favored areas for legume production such as Eastern and Northern Ontario, grasses are often used to add a measure of insurance to the stand, but the grass percent is kept low and an excellent protein level can still be produced.

Timothy is lower in protein content and responds less to nitrogen fertilizer than brome, orchard or reed canary grass. Protein level of grasses, particularly in northern regions, will be increased by about 1 to 2% with recommended levels of nitrogen fertilizer.

MIXTURES

The greater the number of species in a mixture the greater the opportunity for competition among species, which results in the dominance of the most competitive species and failure of the weaker ones. Competitive strength is often not related to forage yield. For example, trefoil is a good forage yielder but very weak in the seedling stage. Competition in trefoil must be kept to a minimum by not including other legumes in the mixture and by using a low seeding rate for the grass. Even when species are well matched for competitive ability, yields will be depressed substantially if more than three species are used in the mixture.

Fields which are variable, particularly due to drainage, should be redivided so that species adapted to each soil type may be chosen. This will not only reduce the competition of many species but also make it possible to work each area as the soil type permits.

CHOICE OF VARIETIES

Often the choice of a variety can be as important as the choice of a species. Early and medium maturing alfalfa must be carefully matched with a suitable grass

so that both will compete and mature evenly. Early alfalfa should be grown with orchard or brome grass while medium alfalfa should be grown with brome or timothy. By including some early alfalfa on the farm, the optimum harvesting season may be extended. Especially in Southern Ontario, early alfalfa varieties will provide earlier aftermath and higher yield particularly in the first year or two.

Bird's-foot trefoil varieties can be divided into two groups: those withstanding poor drainage and some flooding; and those that require moderately good drainage. Differences in yield potential between varieties are small, except where it is reflected in the ability to tolerate flooding and poor drainage. If drainage is a problem, select a variety which persists under this condition. Where there is a problem establishing trefoil such as in roughland renovation, a variety having higher seedling vigor should be chosen.

Red clover disappears rapidly due to winterkilling and diseases. Recommended varieties will be superior to Canadian double cut in persistence and yield after the first year. When they become available and are recommended, tetraploid varieties of red clover are very much superior in yield to the diploid varieties. Ladino clover is much higher yielding than common white clover, and also will recover more rapidly after cutting or grazing than common white clover.

Recommended grass varieties are superior to non-pedigreed seed in aftermath production, and seedling vigor. Variability in maturity dates between recommended varieties offers greater harvesting flexibility. Other improved characteristics include leafier plants, and greater seed production.

For current varietal recommendations see Ontario Ministry of Agriculture and Food Publication 296, *Field Crop Recommendations*.

SPECIES	pH RANGE OPTIMUM GROWTH	REQUIRED DRAINAGE	PERSISTENCE	PRIMARY USES	ADVANTAGES	CAUTION AREAS	CRUDE* PROTEIN	CULTURAL NOTES
Alfalfa	6.5–8.0	Excellent	3 to 4 years S. Ont. 2 to 3 years N. Ont.	Stored forage	(1) Excellent forage yield (2) High quality forage (3) Excellent aftermath	(1) Requires good drainage (2) Bloat hazard (3) Poor persistence when grazing	19	Usually seeded with brome, timothy or orchard
Trefoil	5.5–7.5	Poor–excellent	Long term	Pasture Stored forage	(1) Excellent persistence (2) No bloat hazard	(1) Difficult to establish under weedy conditions or companion crop (2) Slow aftermath growth	19	Usually seeded with timothy. For pasture renovation, seeded pure
Red Clover	6.0–7.5	Moderately poor–excellent	1 to 2 years S. Ont. 2 to 3 years N. Ont.	Stored forage	(1) Excellent yield first year (2) Easy to establish (3) Tolerates soils wetter, more acid than alfalfa	(1) Stand thins rapidly 2 yr after seeding (2) Bloat hazard	17	Usually seeded with timothy & possibly alsike
Alsike Clover	5.5–7.5	Poor–excellent	2 to 3 years	Stored forage	Tolerant to poor drainage and quite acid soils	(1) Lack of persistence (2) Bloat hazard (3) Low aftermath yield	17	Seeded with red clover to add drainage tolerance
White Clover (wild white type)	6.0–7.5	Moderately good–excellent	Long term	Pasture	Self-maintaining permanent pastures	(1) Lack of yield (2) Dries up in mid-summer	27	Wild in many permanent pastures
White Clover (ladino type)	6.0–7.5	Moderately good–excellent	1 to 2 years	Pasture	(1) Excellent protein content (2) Fast aftermath	(1) Lack of persistence (2) Bloat hazard (3) Requires moisture throughout season	27	Increases protein level & speed of aftermath growth in pasture mixtures
Sweet Clover	6.5–8.0	Moderately poor–excellent	2 years	Green manure Stored forage especially silage Pasture	(1) Excellent soil builder (2) Opens up subsoil	(1) Coumarin content can cause feeding problems (2) Low palatability unless harvested early	15	Usually seeded alone
Brome	Not pH sensitive	Moderately poor–excellent	Excellent	Stored forage & hay pasture mixtures	(1) Excellent early spring growth (2) Holds quality well with maturity	More difficult to establish because of seed characteristics	10	Shallow seeding Responds well to nitrogen in pure stands
Timothy	Not pH sensitive	Poor–excellent	Excellent	Pasture stored forage	(1) Adds stand insurance to legume mixtures (2) Easy to establish (3) Withstands severe grazing	(1) Lower protein than other recommended grasses (2) Slow recovery after cutting	9	Some newer varieties have better aftermath. Responds moderately well to nitrogen in pure stands
Reed Canary	Not pH sensitive	Very poor–excellent	Excellent	Low land hay and pasture	Does well under poor drainage and on dry land	(1) Protein and palatability drop rapidly with maturity (2) Little fall growth	10	Cut early or graze heavily for quality. Responds very well to nitrogen in pure stands
Orchard Grass	Not pH sensitive	Moderately good–excellent	Good	Pasture and early cut stored forage	(1) Early pasture (2) Very good aftermath (3) Drought resistant	(1) Protein & palatability drop rapidly with maturity (2) Less winterhardy than other grasses (3) Very competitive with legumes	11	Responds very well to nitrogen

*Dry matter basis, legumes very first flower, grasses heading.