

Selecting the "Right" Legume

**K.D. Johnson, Extension Forage Specialist
Department of Agronomy, Purdue University
Cooperative Extension Service
West Lafayette, IN 47907**

High yield and quality are the goals of anyone growing hay and pasture crops. Research and experience show that one way these goals can be achieved is with the use of nitrogen-producing legumes, either alone or in combination with grasses.

A Minnesota study confirms the yield advantages of legumes and legume mixtures over pure grass stands (Table 1). Produced under the same conditions, alfalfa or alfalfa-grass combination was shown to give the best results. Grass alone did not begin to match the legume or mixture yields unless fertilized with 100-200 pounds of nitrogen per acre. Similar results would be expected under Indiana conditions.

Merely adding a legume to grass does not, however, guarantee better quality and yield. But chances are it will *if* it's the highest producing species capable of thriving in a given field.

Table 1. Comparative Yields of Legume, Legume-grass and Pure Grass Stands (N Fertilized), University of Minnesota Study.

Crop or crop mixture	cent of alfalfa-grass yield
Alfalfa or alfalfa-grass mixture	100%
Red clover or red clover-grass mixture	85-95%
Alsike clover or ladino-grass mixture	60-70%
Birdsfoot trefoil	65-75%
Pure grass, no nitrogen fertilizer	30-40%
Pure grass, 50 lbs. nitrogen/acre/year	40-50%
Pure grass, 100 lbs. nitrogen/acre/year	60-70%
Pure grass, 200 lbs. nitrogen/acre/year	90-100%

Primarily, three soil traits dictate what legume will likely grow best on hay and pasture land in Indiana. They are: drainage, fertility and pH (degree of acidity). Presented here is a procedure for selecting that legume species best suited to a field based on its particular combination of these three soil traits.

Steps in Selecting a Legume Species

1. Take soil samples from the field to be planted, and have them analyzed for fertility and pH levels. See your County Extension Office for soil sampling instructions and needed materials.
2. While taking the samples, inspect the field for its surface and internal drainage conditions. In general, bright red, yellow or brown soils that are uniform in color are well drained; whereas gray or dark soils with a mixture of color are more apt to be poorly drained. Consult County Extension or Soil Conservation Service personnel if you need help in determining the drainage rating.
3. Based on the field survey and soil test results, "read" Table 2 to find what legumes are adapted to your field. Beginning with the "drainage condition" column, select the soil drainage situation (good, moderate or poor) that best describes the field. Next, move to the "fertility level" column, and choose the appropriate soil fertility condition (high, moderate or low) under that , particular drainage category. Then follow on to the pH level" column and find the pH measure (above 6.5 or below 6.5) that describes the field.
4. Finally, from the "adapted legume" column, select the species best suited to your situation. The column shows the three or four legumes that are adapted to the specific combination of soil traits just enumerated *in the order of desirability*--i.e., first species listed is the most desirable, the second is next most desirable. etc.

Normally, you would choose the first one listed; but you may have to b-pass it for some reason, such as seed not available locally, insects being too much of a problem. etc. In that case, the second species listed would be considered, then the third and finally the fourth.

Table 2. Key for Selecting the "Best" Legumes to Plant on Hay and Pasture Lands Differing in Drainage Condition, Fertility Level and pH Level.

Drainage Condition	Fertility Level	pH Level	Adapted Legumes (most to least desirable)
Good Drainage	High Fertility	pH above 6.5	alfalfa, red clover, ladino
		pH below 6.5	red clover, ladino, lespedeza
	Moderate Fertility	pH above 6.5	alfalfa, red clover, ladino
		pH below 6.5	red clover, ladino, birdsfoot trefoil, lespedeza
	Low Fertility	pH above 6.5	red clover, ladino, birdsfoot trefoil, lespedeza
		pH below 6.5	red clover, ladino, birdsfoot trefoil, lespedeza

		pH below 6.5	red clover, ladino, birdsfoot trefoil, lespedeza
Moderate Drainage	High Fertility	pH above 6.5	alfalfa, red clover, ladino, lespedeza
		pH below 6.5	red clover, ladino, lespedeza
	Moderate Fertility	pH above 6.5	alfalfa, red clover, ladino, lespedeza
		pH below 6.5	red clover, ladino, birdsfoot trefoil, lespedeza
	Low Fertility	pH above 6.5	red clover, ladino, birdsfoot trefoil, lespedeza
		pH below 6.5	ladino, birdsfoot trefoil, lespedeza
Poor Drainage	High Fertility	pH above 6.5	red clover, ladino, birdsfoot trefoil, lespedeza
		pH below 6.5	red clover, ladino, birdsfoot trefoil, lespedeza
	Moderate Fertility	pH above 6.5	red clover, ladino, birdsfoot trefoil, lespedeza
		pH below 6.5	ladino, birdsfoot trefoil, lespedeza
	Low Fertility	pH above 6.5	alsike, white dutch, lespedeza
		pH below 6.5	alsike, white dutch, birdsfoot trefoil, lespedeza
Generally in Indiana, birdsfoot trefoil is not planted south of highway U.S. 40, while lespedeza is not planted north of U.S. 40.			

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