Growing Alfalfa in Indiana

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Alfalfa, oftentimes called “queen of the forages”, has long been considered an excellent protein feed. But it should be recognized as an energy source as well. For example, 100 pounds of average quality, early bloom alfalfa hay has the same nutrient content as 22 pounds of soybean oil meal plus 33 pounds of shelled corn.

Alfalfa-grass mixtures, of course, make excellent pasture for cattle, and can significantly lower feed costs for growing cattle because of their fairly high levels of protein. Sheep, horses and dairy cattle also thrive on alfalfa-grass pastures.

In the 5 years following initial invasion of the alfalfa weevil, average alfalfa yields in Indiana increased from 2.25 to 3.1 tons per acre. In fact, during this period, many farmers reported yields of from 6 up to 10 tons hay equivalent.

Actually, it was the weevil invasion itself that brought renewed attention to the advantages of good management in alfalfa production. In attempting to control the weevil, growers succeeded in controlling other insects as well. At the same time, they became more sensitive to improved liming, fertilizing and harvesting practices. The result was record high yields from this high-quality protein source.

The purpose of this publication is to present the current suggestions and recommendations relative to growing alfalfa in Indiana. Included are considerations in variety selection, seeding mixtures and rates, seedbed preparation, planting, harvesting, fertilizing, and insect, disease and weed control. Numbers in ( ) refer to a list of related materials appearing at the end of this publication.

CHOOSING A VARIETY

Yield capacity and resistance or tolerance to insects and diseases are the primary considerations when selecting an alfalfa variety.

Most of the varieties commercially available to Indiana farmers have relatively good yield potential. Three-year Purdue tests of 35 such varieties show an average yield range of from 4.5 to 5.5 tons dry matter per acre (1). When it comes to disease and insect resistance, however, the differences among varieties are more pronounced. And generally, the disease tolerance factor becomes more important as the alfalfa stand ages.

Wilt resistance. A number of varieties now possess a high level of resistance to bacterial wilt. Table 1, adapted from recent University of Minnesota studies, evaluates wilt resistance in 39 alfalfa varieties, using the highly resistant Vernal as a standard. Those varieties scoring above 100% are considered superior to Vernal.

Phytophthora resistance. Alfalfa is not recommended on wet, poorly-drained soils because of its inability to grow with “wet feet.” Research now shows that the disease Phytophthora root rot is a major contributor to stand loss on such soils. And once established, this disease remains in the soil for many years and may affect future alfalfa seedings. Present varieties have little resistance to Phytophthora, but some in the near future will possess very good resistance. Until then, infected fields should not be reseeded to alfalfa.

Weevil resistance. The alfalfa weevil is a serious pest in many parts of Indiana. Two relatively new varieties — Team and Weevilchek — are purported to exhibit moderate or low resistance to larval feeding damage. Tests at the Field-Purdue Agricultural Center near Bedford, however, have not fully substantiated this. Therefore, it is still felt that, at present, Indiana farmers will benefit most by selecting high-yielding varieties adapted to their areas, and controlling the weevil chemically when necessary.
Table 1. Wilt Resistance as a Percent of Vernal*

<table>
<thead>
<tr>
<th>Variety</th>
<th>Percent of Vernal</th>
<th>Variety</th>
<th>Percent of Vernal</th>
</tr>
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<tbody>
<tr>
<td>Alfa</td>
<td>0.0</td>
<td>Ranger</td>
<td>35.0</td>
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<tr>
<td>Anchor</td>
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<td>Apex</td>
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<td>Atlantic</td>
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<td>Socheville</td>
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<tr>
<td>Bonanza</td>
<td>7.4</td>
<td>Superstan</td>
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<td>Buffalo</td>
<td>65.5</td>
<td>Team</td>
<td>1.1</td>
</tr>
<tr>
<td>Cayuga</td>
<td>44.8</td>
<td>Tempo</td>
<td>61.1</td>
</tr>
<tr>
<td>Cody</td>
<td>52.4</td>
<td>Titan</td>
<td>128.8</td>
</tr>
<tr>
<td>Culver</td>
<td>63.1</td>
<td>Vernal</td>
<td>100.0</td>
</tr>
<tr>
<td>Dawson</td>
<td>34.3</td>
<td>Victoria</td>
<td>11.4</td>
</tr>
<tr>
<td>Dominator</td>
<td>48.4</td>
<td>Warrior</td>
<td>23.6</td>
</tr>
<tr>
<td>DuPuits</td>
<td>0.3</td>
<td>Weevleck</td>
<td>142.7</td>
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<tr>
<td>F. D. 100</td>
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<td>123</td>
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<tr>
<td>Glacier</td>
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<td>3.8</td>
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<tr>
<td>Iroquois</td>
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<td>520</td>
<td>93.0</td>
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<tr>
<td>Kanza</td>
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<td>530</td>
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<td>MX 82</td>
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<td>Orchies</td>
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<td>TX 202</td>
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</tr>
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<td>Progress</td>
<td>61.6</td>
<td>TX 805</td>
<td>19.3</td>
</tr>
<tr>
<td>Promor</td>
<td>91.9</td>
<td></td>
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</tr>
</tbody>
</table>

*Vernal is considered to have a high level of resistance; any variety with a percent above 100 is considered superior to Vernal.

Heaving resistance. "Heaving", caused by alternate freezing and thawing of the soil surface, may completely destroy an alfalfa stand. Heaving problems are especially common on large areas of fragipan soils in southern Indiana. Thirteen alfalfa varieties and synthetics recently tested at Feldun-Purdue differed little in resistance to heaving, although Vernal was slightly superior. The long-run solution to the problem may lie with development of the new "lateral-rooted" types of alfalfa. On the heaving-prone fragipans of southern Indiana, red clover may be used in place of alfalfa, although stands are of short duration.

TESTING THE SOIL

Before committing a field to alfalfa production, first obtain a soil test. (See your local County Extension Office for instructions and materials needed for taking soil samples.) The soil-water pH of the soil should fall between 6.6 and 7.0. If 4 tons or more of limestone are needed to raise the pH, apply half before plowing and the balance after plowing but before disking. If possible, apply limestone 6 months before seeding. Plow down or disc in any fertilizer called for by the soil test report before seeding.

Soil tests and plant tissue analyses should also be made periodically in established alfalfa-grass stands. They provide an "X-ray" of the crop's nutritional condition and pinpoint specific deficiencies. Take soil samples every 3 or 4 years and at the same time of the year. Use second or third cuttings for plant analyses.

SEEDBED PREPARATION

A firm seedbed is essential for establishing an alfalfa-grass seeding. A loose seedbed dries out too rapidly, and the branch roots, when they reach air pockets, will die. Firmness is especially important on sandy soils. The test of a firm seedbed is when an evening footprint shows moisture the next morning.

To obtain desired firmness, plow non-erodible soils about 5 inches deep for fall seeding or plow to only shallow depth for spring seeding. The corrugated roller helps firm the surface without packing the lower layers. Don't cultipack heavy soils in the spring when wet.

A certain amount of clodliness on the soil surface is desirable on all but sandy soils. Many small clods tend to prevent crusting or baking of a heavy soil, whereas overworking can destroy its structure.

INOCULATION

Inoculate alfalfa seed with a fresh inoculant before seeding. Follow directions on the inoculant container. If the seed is pre-inoculated, read the directions attached to the seed container.

SEEDING MIXTURES, RATES AND METHODS

For successful alfalfa-grass stands, seed 8-10 pounds of wilt-resistant certified alfalfa per acre with 4-6 pounds of a late-maturing orchardgrass or 2-4 pounds of timothy (Clair in the southern third of the state) in late August or early spring (2). Band seeding followed by packer wheels does a precision job.

If smooth bromegrass is preferred, seed 5-7 pounds of a southern type, using an endgate seeder, lime spreader or any implement that will place the seed evenly on the soil surface.

Sowing a companion small grain crop with an alfalfa-grass mixture is satisfactory provided the seed is not covered deeper than 1/4 inch (or 1 inch in sandy soils). Many bromegrass seedings fail or produce only poor stands the first year because they are covered too deep. In fact, if the companion crop planted is not in lieu of chemical weed control, seed the bromegrass through the grain compartment of the drill, but drop the seed on top of the ground. Airplane seeding of alfalfa in small grains in the spring has been successful when the land was too wet to seed with a drill.
Fertilize with 15 pounds of nitrogen per acre plus 40 pounds of phosphorus (P<sub>2</sub>O<sub>5</sub>) when seeding alfalfa-grass mixtures on light-colored soils (e.g., Crosby, Miami or Tracy); or apply just 40 pounds of phosphorus when seeding on dark-colored soils (e.g., Brookston, Chalmers or Pewamo). Also, consider chemical weed control for spring seedings to insure good stand establishment and maximum yields the first year (3). Fall seedings before September 1 do not usually require chemical weed controls.

FERTILIZING AFTER ESTABLISHMENT

After alfalfa-grass mixtures are established, fertilizer application should at least be equal to the amounts removed. Each ton of alfalfa-grass hay removes 5-10 pounds of P<sub>2</sub>O<sub>5</sub> and 40-60 pounds of K<sub>2</sub>O. When grown under conditions where potential production is 8-10 tons per acre, mixtures should be fertilized annually with 150 pounds P<sub>2</sub>O<sub>5</sub> and 600 pounds of K<sub>2</sub>O per acre. This fertilization level will be adequate to maintain the alfalfa in a 50-50 mixture for 5 years or more and keep it from being replaced by grass or weeds. The fertilizer can be applied at one time or in split applications, whichever is most convenient and economical to the grower.

The micronutrient boron, required by alfalfa, is deficient in the soils in certain areas of Indiana (4). Where needed, apply 20-30 pounds of borax, either as a separate application or mixed with other fertilizer.

INSECT AND DISEASE CONTROL

The alfalfa weevil, potato leafhopper and meadow spittlebug all can seriously reduce yield and quality of alfalfa in Indiana and should be controlled when serious damage begins to occur (5, 6, 7, 8). In 1973, chemical control of the weevil was necessary south of U.S. 50 and in an area adjacent to Lake Michigan. The situation around the lake will vary from year to year depending on snow cover.

Alfalfa is also subject to bacterial, fungus and virus diseases that affect foliage, roots and stems (5, 9). Severity depends on environmental conditions and, to some extent, on varietal susceptibility.

Maintaining alfalfa in a healthy growing condition is still one of the best ways to reduce losses from most diseases.

HARVESTING

Harvest the first crop of alfalfa-orchardgrass in the late bud stage of the alfalfa and then each 30-35 days thereafter. Orchardgrass thrives under this harvest schedule.

Alfalfa-brome grass and alfalfa-timothy mixtures require 6 weeks between harvests, resulting in three cuttings per year instead of four. Make the first harvest of alfalfa-brome when the leaves of the grass are fully expanded and new white shoots are seen on the base of the plant. Make first harvest of alfalfa-timothy when the timothy is in early heading and new shoots are evident on the bulb. Take second harvests of both mixtures about 6 weeks later or when new shoots are evident at the base of the brome grass or on the bulb of timothy.

Graze rather than cut the pasture after a hard freeze in early November. This leaves stubble that will accumulate and hold snow for root protection.

RELATED PUBLICATIONS

Single copies of the following Purdue University publications are available free (with one exception as noted) to Indiana residents from their County Extension Office or by writing the Agricultural Publications Office, AGAD Building, Purdue University, West Lafayette, Indiana 47907. Order by title and number.

2. "Forage Mixtures for Indiana Soils" (AY-182)
3. "Weeding with Chemicals" (ID-1)
4. "Boron Deficiency in Indiana Soils" (AY-165)
5. "The Alfalfa Analyst" (Unnumbered) (25¢ each)
6. "Alfalfa Weevil" (E-38)
7. "Leafhopper Control on Alfalfa" (E-36)
8. "Spittlebug and Clover Leaf Weevil" (E-28)
9. "Common Alfalfa Leafspot" (BP-6-5)