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## Lupines, A New Crop

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Lupines are relatively new in the United States but are an ancient cultivated legume grain in other parts of the world. Lupines have been cultivated for over 3,000 years in the Mediterranean and in the highland regions of South America.

The most important lupine species include both white and blue lupines. For many years, most varieties of these species were "bitter lupines" which contained alkaloids toxic to livestock. In 1935, German plant breeders developed varieties which were low in alkaloid content and are referred to as "sweet lupines".

Early introduction of this crop was into the Southeastern United States in the 1930s. The crop has spread to northern regions of the United States and currently is of some interest in Minnesota, where some recent research in sweet lupines has been done by the University of Minnesota. In many regions of the world "Lupines" are referred to as "Lupins".

**Use:** White sweet lupines are presently being looked at as a supplemental protein source in livestock rations. Reports indicate sweet lupine may be used as a ration supplement but not as a full ration itself. Producers are encouraged to contact their local Extension office for lupine ration information.

**Adaptation:** The white sweet lupine is a cool-season annual legume.

It is somewhat tolerant of frost. It appears to be adapted to mildly acidic to slightly calcareous loamy sand and loam soils. White lupines do not tolerate water-logged or poorly drained soils. Some research indicates it is not tolerant of severe moisture stress. Last year the white lupine variety "Ultra" seeded at Brookings on May 17 was mature 90 days later in mid-August. White lupines appear to do best when the average temperatures ranges between 60 to 80°F.

The area of adaptation in South Dakota is not known; however, other studies indicate that it does not tolerate prolonged high temperatures, moisture stress, or water-logging. Under these conditions it is questionable whether the crop could be grown in the western and central regions of the state unless it is irrigated.

**Characteristics:** White lupines are an annual crop that must be seeded each year. This cold tolerant legume will fix nitrogen when inoculated. The inoculant is specific for lupines -- don't attempt to use alfalfa or soybean inoculant.

White lupine seeds tend to be square in shape and are slightly larger than corn seed. The seed is hard but may crack or chip easily.

The plant itself stands quite erect and pods are set high enough on the stem so they are easily harvested. Generally when lupines are seeded early their

Pods tend to be lower on the stem than when seeded late.

White lupines grown in demonstration plots at Brookings have not produced as much foliage or leaf growth as soybeans or edible beans.

Protein: Lupines are of interest because of their relatively high protein content.

An advantage of lupines over soybeans as a supplemental protein source is that lupines, once harvested, can be ground for feed without having to be heated to denature any anti-growth components like trypsin inhibitors. Minnesota studies indicate white lupines range in percent protein from about 30 to 35%.

#### MANAGEMENT CONSIDERATIONS

Planting Time: Since white lupines are cold tolerant, they can be seeded before other types of row crops. No date of planting studies have been done in South Dakota, but research studies would indicate that planting May 1 through May 15 would be best. In most cases planting should probably not be delayed beyond June 1.

Planting Method and Rates: Seed with either a drill or row crop planter. Regardless of planting equipment (seeding plates, seeding cups, or finger-pickup units), the planter must be able to handle a relatively large, square shaped seed.

On 30-inch row spacing, a seeding rate of about 70 pounds or around 100,000 seeds per acre is suggested. On 8 to 10-inch row spacings, a rate of about 150 pounds or 225,000 seeds per acre is suggested.

Prior to planting, inoculate the seed with the specific Rhizobia bacteria needed for white lupines. In most

cases such inoculant can be obtained from the seed dealer when the seed is purchased.

Soil Fertility: Soil fertility recommendations for white lupines are not known for South Dakota. However, they would likely be the same as for soybeans.

Weed Control: Cultivation may be used for weed control on wide row spacing. Presently there are no herbicides labeled for use on lupines in the United States.

Harvesting and Storage: White lupines are a relatively erect, bushy plant and can be direct combined. Some varieties may shatter while others can be harvested when dry. If the crop shows a potential for shattering it can be direct combined at 15-18% moisture. For safe storage, however, the crop must be dried down to 12% or less moisture.

Characteristics and Performance: Minnesota tests (1981-84) indicate white lupine yielded an average of 1,340 and 633 lb/A at Becker and Grand Rapids, respectively. Other averages were about 1,700 seeds per pound, 57 days from planting to flowering, 117 days from planting to maturity, and 29 inches in height.

#### References

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