

# Crop Profile for Hay in Illinois

Prepared October, 2000

## General Production Information

Production Facts	
U.S. Rank/Percent:	22 <sup>nd</sup> / 2.2%
Total hay production:	3,354,000 tons <sup>1</sup>
Average tonnage/acre:	3.29 tons/acre
Average price per ton:	\$103
<b>Alfalfa hay:</b>	
Harvested acres:	630,000
Tonnage Produced:	2,457,000 tons
Average tonnage/acre:	3.90 tons per acre <sup>2</sup>
Price per ton:	\$108
Value of production:	\$265,356,000 <sup>3</sup>
<b>Other hay (oats, etc.)</b>	
Tonnage Produced:	897,000 tons <sup>2</sup>
Average tonnage/acre:	2.30 tons per acre
Price per ton:	\$83.50
Value of production:	\$74,900,00 <sup>3</sup>
Total production value:	\$340,256,000 <sup>3</sup>

## Cultural Practices

Alfalfa is the principle legume used for hay in Illinois. Alfalfa is seeded by itself on about 50 to 60 percent of the hay acreage in the state. To increase dry matter production of the stand, forage grasses such as orchardgrass, perennial rye, fescue, and kentucky bluegrass may be sown along with alfalfa. When pure stands of established alfalfa begin to decline, forage grasses may also be overseeded into the legume to boost production and improve the stands' competitive ability with weeds.

In the northern most counties, a companion crop such as oats, is typically seeded with alfalfa in early spring. Two or three cuttings of alfalfa can be harvested the first year in Illinois. The field is first cut, sun-dried, raked into rows, and then chopped for haylage or baled as hay. Alfalfa on average yields about one ton or more per acre per cutting.

The use of pesticide treatments by producers depends mainly upon the final use of the crop. Top quality alfalfa is sold to dairymen and horsemen, each having their own specifications. Some weeds, such as mustards, affect the flavor of milk and must be avoided. Horsemen judge hay quality according to percent of leaves and the absence of toxic weeds and blister beetles (which can be fatal to horses). Beef cattle and other livestock also use alfalfa in their diet, but do not require the highest quality. Therefore, the need for a pesticide is directly correlated with the end use; dairy cattle and horses having the greatest need for high quality hay.

Alfalfa is called a seedling crop if it has been planted within the last twelve months. Older fields are classified as established stands. It is easiest to control weed pests in the seedling year if no grasses have been seeded with the legume. The first cutting, or harvest, occurs in late May to mid-June. With adequate moisture and temperatures, succeeding cuttings occur every 28 to 34 days ending in mid- to late September. A late cutting in October may be taken, but the crop will need extra nutrients in the early spring to overcome winter stress. Alfalfa may grow well for four to seven years before reseeding or rotating to a row crop becomes necessary due to dieback of the stand.

## **Insect Pests**

Major alfalfa insect pests destroy or stunt vegetative growth. These insects eat the leaves delaying photosynthesis which the plant uses to convert water and soil nutrients. The leaves are a major source of digestible nutrients for animals. Some fields will have a gray cast when infestations cause the majority of leaves to be eaten. Other fields may look yellowish due to plant wilting. All insecticide applications approved for Illinois are foliar treatments. Most treatments must occur two to three weeks before a bloom stage (this is essentially the same time before harvest). When treatments occur during bloom stage, bees attracted by the flowers are adversely affected by the insecticides.

Trends for infestations waiver only slightly. Alfalfa weevil populations are declining, while the state is

really focusing on the rise of potato leafhoppers in the last two years.

### Avg. % Crop Loss and Avg. Acres Infested by Arthropod Pests

Common Name	Scientific Name	% Crop Loss	Average US Reported Acres treated
<a href="#">Alfalfa Weevil</a>	<i>Hypera postica</i>	10 %	156,487
<a href="#">Blister Beetle</a>	<i>Melanoplus spp.</i>		
<a href="#">Fall Armyworm</a>	<i>Spodoptera frugiperda</i>		
<a href="#">Grasshoppers</a>	<i>Melanoplus spp.</i>	0.00 %	21,818
<a href="#">Meadow Spittlebugs</a>	<i>Metarhizium anisopliae</i>		
<a href="#">Potato Leafhopper</a>	<i>Empoasca fabae</i>	20 %	342,685
<a href="#">Variegated Cutworm</a>	<i>Peridroma saucia</i>	0.00 %	
<a href="#">Webworm</a>	<i>Loxostege spp</i>		

### Major Arthropod Pests

#### Alfalfa weevil <sup>4</sup>

Adults weevils lie dormant in brushy or wooded borders of alfalfa fields during the summer. Adults lay eggs in fall and spring; after hatching, young larvae crawl to the growing tips of leaves. Late complete four instars while feeding on increasing amounts of leaves. The larvae then spin cocoons and pupate on plants or on the ground. Adults emerge, feed briefly, then leave the alfalfa fields when summer temperature increase.

Extended warm weather, mild winter weather, and a warm, early spring favor increased amounts of egg laying. Hot, dry weather (conditions that are unfavorable for natural enemies and diseases of weevils) favor weevil survival.

Damage: Damage is usually most severe in the southern half of Illinois. Early harvest of the first crop of alfalfa is sometimes effective in preventing severe damage; Insecticides are the only other option. During outbreak years, as much as 50% of alfalfa is treated for this insect. On average, about 10% of fields are treated for alfalfa weevil.

#### Potato Leafhopper

Potato leafhoppers are carried into Illinois by prevailing spring winds off the Gulf Coast. Female leafhoppers lay eggs in stems and large leaf veins. The eggs hatch within one week, and the larvae feed on the plant. The larvae has five larval instars until adulthood. An entire generation can be completed in three weeks; there are several overlapping generations per year.

Damage: The potato leafhopper can cause major damage to alfalfa as it feeds on the undersides of the leaves. The obvious signs of damage include the stunting of the plant height and the yellowing of the leaves. The leafhoppers preferably like to feed on the plants in hot or dry seasons. This damage is becoming more significant as they are on the increase in many Illinois fields. If the winds and storm fronts are not especially B, the prevalence of potato leafhopper in Illinois can be reduced. However, for control, use an effective insecticide.

## **Minor Arthropod Pests**

### **Grasshoppers**

Grasshoppers populations usually thrive during hot, dry summers when their naturally-occurring pathogens are suppressed; populations also tend to increase the year after a drought. Grasshoppers occur throughout Illinois and are usually most damaging in the southern half of the state. Grasshoppers are of minor to moderate importance in Illinois, as they usually prefer to feed on weeds but will readily move into crops if weeds are not available. Up to 11% of field margins may be treated during outbreak years.

### **Blister Beetle**

Female beetles lay eggs in clusters of 100-200 in the ground next to the plant. The eggs hatch in about 2 weeks. Depending on the species, it will pass through 5-7 instars before it pupates in the soil. Most overwinter as later instar larvae and pupate until spring. The adult beetle emerges in June or July. The adult beetles are 1/2-1 inch long, usually dark colored and metallic, and can be either striped or solid-colored. They have several distinct larval stages with different appearances for each. The larvae of many species will feed on grasshopper eggs. The adult of some species are occasionally plant pests.

Blister beetles rarely inflict much damage to an alfalfa stand. However, just a couple of blister beetles in the hay can cause fatal injury to the digestive system of horses who consume infested hay. Since the beetles are often crushed and included with baled hay the problem can only be avoided by hay inspection and avoidance of high-risk hay. Because later harvests are more prone to contain beetles, horsemen typically like to buy first crop hay.

### **Fall Armyworm**

Fall Armyworms overwinter in southern states because they cannot overwinter in locations where the ground freezes. Larvae range in color from light tan to black. They have a distinct inverted Y on the front of their head capsule. Fall Armyworms reach lengths of 1-1<sup>1/2</sup> inches.

## Meadow Spittlebug

Nymphs are responsible for the spittle masses found in alfalfa fields. The nymphs are present for 5 to 8 weeks, depending on temperature and moisture. Without moisture, they will not survive. These insects have pierce-sucking mouthparts with which they extract fluids from the plants. There is little economic damage caused by the spittlebugs. However, if their numbers exceed one per plant, which is an exceptionally large population, they can cause yield losses.

## Variegated Cutworm

Full grown caterpillars are about 1.5 to 2 inches long and may be yellow to brown with a row of 4-6 dull yellow or pink diamond-shaped spots down the back. The adult cutworm is a moth with grayish brown wings that expand about 1.5 inches. The females lay their eggs on leaves and stems in the spring.

Damage: During the months of April to June, the variegated cutworm occasionally will cause damage to seedling alfalfa. They can also cause damage on older stands by destroying the foliage. Tilling becomes important when trying to limit the cutworm population. Also keep the field and edges weed-free.

## Webworm

Larvae are gray-brown, with black spots. Full-grown larvae are about 1 inch long. They overwinter in cocoons until the spring and feed until they are full-grown in June. The larvae defoliate plants, feed on leaf margins, cut plants near ground level, or feed just below the soil surface. Feeding on the plant, just below the soil surface, causes the most severe injury. When they are full-grown, pupation occurs. Pupation occurs next to the plant and a short distance underground.

In 1998, insecticide use and insect infestations on Alfalfa in Illinois remains unreported.

### Insecticide Rates, MOA, REI, PHI and Target Insects

Trade Name	Common Name	Rate/Acre		Unit	MOA	REI hrs	PHI days	Target Insects
		low	high					
Ambush	Permethrin	3.2	8	oz		12	14	alfalfa caterpillar, alfalfa weevil larvae, cutworms, meadow spittlebug, plant bugs, potato leafhoppers and webworms

<b>Baythroid 2</b>	Cyfluthrin	.8	2.8	oz		12	7	alfalfa caterpillar, cutworms, grasshoppers, meadow spittlebug, plant bugs, potato leafhoppers and webworms
<b>Dimethoate</b>	Dimethoate	6.4	12.8	fl. oz		48	10	grasshoppers, plant bugs and potato leafhoppers
<b>Furadan 4F</b>	Carbururan	1/2	2	pts	Carb	48	7	alfalfa weevil adults and larvae
<b>Imidan 70W</b>	Phosmet	1/2	1 <sup>1/3</sup>	lbs		24	7	alfalfa weevil larvae and adults, grasshoppers, meadow spittlebug, plant bugs and potato leafhoppers
<b>Lorsban 4E</b>	Chlorpyrifos	1/2	2	pts		24	N/A	alfalfa caterpillar, alfalfa weevil larvae and adults, cutworms, fall armyworm grasshoppers, meadow spittlebug, plant bugs and potato leafhopper
<b>Penncap-M</b>	Methyl Parathion	2	3	pts		5 days	N/A	alfalfa weevil larvae and adults, grasshoppers, meadow spittlebugs, plant bugs and potato leafhoppers
<b>Pounce 3.2EC</b>	Permethrin	2	8	oz		12	14	alfalfa caterpillar, alfalfa weevil larvae, cutworms, fall armyworm, meadow spittlebug, plant bugs, potato leafhoppers and webworms

<b>Sevin XLR Plus</b>	Carbaryl	1	1 1/2	qts	Carb	12	7	alfalfa caterpillar, blister beetles, grasshoppers, plant bugs, potato leafhoppers and webworms
<b>Warrior T</b>	Lambda-cyhalothrin	2	4	oz		24	7	alfalfa caterpillar, alfalfa weevil larvae, blister beetle, cutworms, grasshoppers, meadow spittlebug, plant bugs, potato leafhoppers and webworms

## Diseases

Diseases contribute up to 15 percent of crop loss<sup>5</sup>. Most diseases remain unreported within the state. Many of the control methods employed are the planting of disease resistant seed varieties and rotation with row crops.

### Avg. % Crop Loss and Avg. Acres Infested by Diseases

Common Name	Scientific Name	Crop	Avg. % Crop Loss*	Avg. Acres Infested*
<a href="#">Alfalfa and sweet clover mosaics, clover mosaics, mottling, vein mosaic</a>		Alfalfa		
<a href="#">Anthracnose</a>	<i>Colletotrichum trifolii</i>	Alfalfa	3.3%	532,955
<a href="#">Bacterial leaf spot</a>	<i>Xanthomonas campestris subsp. alfalfae</i>	Alfalfa		

<a href="#">Bacterial wilt</a>	<i>Clavibacter (Corynebacterium) michiganese subsp. insidiosum</i>	Alfalfa	36.7%	42,614
<a href="#">Common leaf spot</a>	<i>Pseudopeziza medicaginis</i>	Alfalfa	2.8%	
<a href="#">Downy mildew</a>	<i>Peronospora trifoliorum</i>	Alfalfa		
<a href="#">Dry root and crown rots, and decline</a>	(species of) <i>Fusarium, Rhizoctonia, Pythium, Phoma, medicaginis, Mycoleptodisus, Terrestris, Stagonospora meliloti and Macrophomina phaseoli</i>	Alfalfa		
<a href="#">Fusarium wilt</a>	<i>Fusarium oxysporum f. sp. medicaginis</i>	Alfalfa	4%	909,090
<a href="#">Lepto, or pepper, leaf spot</a>	<i>Leptosphaerulina (Pseudoplea or Pleosphaerulina) briosiana</i>	Alfalfa	2.2%	852,272
<a href="#">Nematodes (dagger, lesion, and northern root rot)</a>	<i>Xiphinema americanum, Pratylenchus penetrans, and Meloidogyne hapla</i>	Alfalfa		
<a href="#">Northern anthracnose or clover scorch</a>	<i>Kabatiella caulivora</i>	Clover		
<a href="#">Phytophthora root rot</a>	<i>Phytophthora megasperma</i>	Alfalfa	4.8%	409,233
<a href="#">Powdery mildew</a>	<i>Erysiphe polygoni</i>	Red Clover		

<a href="#">Rhizoctonia stem blight, root canker, and crown and bud rot</a>	<i>Rhizoctonia solani</i>	Alfalfa		
<a href="#">Root rot, crown rot, and stolon rot</a>	(Caused by a number of soil-inhabiting fungi)	Clover		
<a href="#">Rust</a>	<i>Uromyces straitus</i>	Alfalfa	7.9%	113,636
<a href="#">Sclerotinia crown and stem rot</a>	<i>Sclerotinia (Whetzelinia) sclerotiorum or trifoliorum</i>	Alfalfa	5.5%	68,409
<a href="#">Seed Rot, damping off and seedling blights</a>	(species of) <i>Pythium, Rhizoctonia, Fusarium, Phytophthora, Phoma (Ascochyta) mycoleptodiscus, sclerotinia</i>	Alfalfa		
<a href="#">Southern anthracnose</a>	<i>Colletotrichum</i>	Clover	0.4%	500,000
<a href="#">Spring black stem and leaf spot</a>	<i>Phoma medicaginis var. medicaginis</i>	Alfalfa	3.3%	573,674
<a href="#">Stagonospora leaf and stem spot</a>	<i>Stagonospora meliloti</i>	Alfalfa	15.7%	981,818
<a href="#">Stemphylium or zonate leaf spot</a>	<i>Stemphylium botryosum</i>	Alfalfa	1.8%	823,863
<a href="#">Summer black stem and leaf spot</a>	<i>Cergospora medicaginis</i>	Alfalfa	2.9%	842,803
<a href="#">Verticillium wilt</a>	<i>Verticillium albo-atrum</i>	Alfalfa	19.2%	475,852
<a href="#">Violet root rot</a>	<i>Rhizoctonia crocorum</i>	Alfalfa		
<a href="#">Yellow leaf blotch</a>	<i>Leptotrochia medicaginis</i>	Alfalfa		

**\*Based on US Averages**

## Summary of Diseases

**Common name(s):**Bacterial wilt

**Aggravating factors:**

- Cool temps. and abundant moisture.
- Worse in poorly drained areas.

**How disease is spread:**

- Water in fields, equipment, animals and infected hay.

**Comments:**

- Once disease is encountered, susceptible plants do not usually recover.
- In advanced stages, bacteria multiply rapidly in crown and stem tissues and are then released into soil water.
- Alfalfa death is due to plugging the vessels by bacteria which can then produce a bacterial toxin (a glycopeptide).

**Loss range:**

30-40 days after late bud to first-flower stage

**Control:**

1. Wilt-resistant varieties
2. Mow when foliage is dry.
3. Plant only in well drained soils.
4. Harvest at the late-bud to first-flower stage and 30-40 days for succeeding harvests.
5. Harvest wilt symptom fields last.
6. Use high fertility-based on soil test.
7. Rotate alfalfa with other crops, only planting once in 2-3 years.
8. Reduce injury (livestock, equipment, etc.).

(RPD : no. 300 )

**Common name(s):** Common (or Pseudopeziza) leaf spot

**Aggravating factors:**

Disease is worse in the spring with cold, wet temps. and frequent rains.

**How disease is spread:**

- When under a thick nurse crop (such as oats).
- Microscopic spores are carried by wind and rainsplash.
- Cool weather.

**Comments:**

- Occurs wherever alfalfa is grown.
- Disease more serious with soils that are acid or low in fertility.
- Weeds around plant contribute to the diseases severity.

**Control:**

1. Grow high-yielding, well-adapted varieties of alfalfa.

2. Sow disease-free seed produced in arid areas.
3. Plant in warm, well-drained soil that is only slightly acid to neutral.
4. Practice balanced soil fertility.
5. Cut heavily infected stands in the mid to late bud stage, before bloom.
6. Cut only when foliage is dry.
7. Cut short, leaving a stubble of 1 ½ to 2 inches.
8. Control weeds.
9. Control insects.
10. Rotate at least two years with corn, soybeans, small grains, or sorghum that are free from forage legumes.

(RPD : no. 301)

**Common name(s):** Spring black stem and leaf spot

**Scientific name(s):** *Phoma medicaginis* var. *medicaginis* (formerly called *Ascochyta imperfecta* and *Phoma herbarum* var. *medicaginis*)

**Aggravating factors:**

-Wet weather and cool temps.

**How disease is spread:**

-By wind, insects and splashing water.

**Comments:**

-When severe, entire stems are blackened and killed.

**Control:**

1. Grow high-yielding, well-adapted varieties of alfalfa.
2. Sow disease-free seed produced in arid areas.
3. Plant in warm, well-drained soil that is only slightly acid to neutral.
4. Practice balanced soil fertility.
5. Cut heavily infected stands in the mid to late bud stage, before bloom.
6. Cut only when foliage is dry.
7. Cut short, leaving a stubble of 1 ½ to 2 inches.
8. Control weeds.
9. Control insects.
10. Rotate at least two years with corn, soybeans, small grains, or sorghum that are free from forage legumes.

(RPD : no. 301)

**Common name(s):** Summer black stem and leaf spot

**Aggravating factors:**

-Warm to hot, moist weather.

**How disease is spread:**

-In warm to hot weather, microscopic conidia are produced and spread by air or rain.

-Can be seedborne.

**Comments:**

-Infection is more severe following feeding injury by pea aphids and their secretion of honeydew. The honeydew stimulates the fungus and produces new infections.

**Control:**

1. Grow high-yielding, well-adapted varieties of alfalfa.
2. Sow disease-free seed produced in arid areas.
3. Plant in warm, well-drained soil that is only slightly acid to neutral.
4. Practice balanced soil fertility.
5. Cut heavily infected stands in the mid to late bud stage, before bloom.
6. Cut only when foliage is dry.
7. Cut short, leaving a stubble of 1 ½ to 2 inches.
8. Control weeds.
9. Control insects.
10. Rotate at least two years with corn, soybeans, small grains, or sorghum that are free from

forage legumes.

(RPD : no. 301)

**Common name(s):** yellow leaf blotch

**Scientific name(s):** *Leptotrochia medicaginis* (formerly named *Pseudopeziza* or *Pyrenopezizamedicaginis*)

**Aggravating factors:**

- Prolonged cool, wet weather.
- Autumn and spring seasons.

**How disease is spread:**

- By planting infected seed and by airborne ascospores.
- When humidity is above 70% and temp. is below 77° (then ascospores can be discharged).

**Control:**

1. Grow high-yielding, well-adapted varieties of alfalfa.
2. Sow disease-free seed produced in arid areas.
3. Plant in warm, well-drained soil that is only slightly acid to neutral.
4. Practice balanced soil fertility.
5. Cut heavily infected stands in the mid to late bud stage, before bloom.
6. Cut only when foliage is dry.
7. Cut short, leaving a stubble of 1 ½ to 2 inches.
8. Control weeds.
9. Control insects.
10. Rotate at least two years with corn, soybeans, small grains, or sorghum that are free from

(RPD : no. 301)

**Common name(s):** lepto, or pepper, leaf spot

**Distribution:** in mid-west

**Aggravating factors:**

- Cool, moist weather.

**How disease is spread:**

-Ascospores are produced by cool, moist weather and are spread by air.

**Comments:**

-The greatest damage occurs to the leaves of young regrowth, following harvest.

**Control:**

1. Grow high-yielding, well-adapted varieties of alfalfa.
2. Sow disease-free seed produced in arid areas.
3. Plant in warm, well-drained soil that is only slightly acid to neutral.
4. Practice balanced soil fertility.
5. Cut heavily infected stands in the mid to late bud stage, before bloom.
6. Cut only when foliage is dry.
7. Cut short, leaving a stubble of 1 ½ to 2 inches.
8. Control weeds.
9. Control insects.
10. Rotate at least two years with corn, soybeans, small grains, or sorghum that are free from forage legumes.

(RPD : no. 301)

**Common name(s):** Stemphylium or zonate leaf spot

**Aggravating factors:**

- Warm, wet weather.
- Summer and fall seasons.

**How disease is spread:**

- Conidia and ascospores formed, are spread airborne and waterborne.
- By sowing infected seed.

**Control:**

1. Grow high-yielding, well-adapted varieties of alfalfa.
2. Sow disease-free seed produced in arid areas.
3. Plant in warm, well-drained soil that is only slightly acid to neutral.
4. Practice balanced soil fertility.
5. Cut heavily infected stands in the mid to late bud stage, before bloom.
6. Cut only when foliage is dry.
7. Cut short, leaving a stubble of 1 ½ to 2 inches.
8. Control weeds.
9. Control insects.
10. Rotate at least two years with corn, soybeans, small grains, or sorghum that are free from forage legumes.

(RPD : no. 301)

**Common name(s):** Stagonospora leaf and stem spot

**Aggravating factors:**

- Warm, moist weather.

**How disease is spread:**

-Conidia and ascospores are formed and spread airborne and waterborne.

**Comments:**

-Disease most severe during prolonged periods of warm, moist weather where crops are not rotated with corn, soybeans, small grains, sorghum or forage grasses.

**Control:**

1. Grow high-yielding, well-adapted varieties of alfalfa.
2. Sow disease-free seed produced in arid areas.
3. Plant in warm, well-drained soil that is only slightly acid to neutral.
4. Practice balanced soil fertility.
5. Cut heavily infected stands in the mid to late bud stage, before bloom.
6. Cut only when foliage is dry.
7. Cut short, leaving a stubble of 1 ½ to 2 inches.
8. Control weeds.
9. Control insects.
10. Rotate at least two years with corn, soybeans, small grains, or sorghum that are free from forage legumes.

(RPD : no. 301)

**Common name(s):** Bacterial leaf spot

**Aggravating factors:**

-Extended periods of hot, rainy, windy weather (82-90°)

**How disease is spread:**

- By wind, rain, insects, equipment, and infected forage.
- The causal bacterium overwinters in crop debris and seed.

**Control:**

**No control measures necessary**

(RPD : no. 301)

**Common name(s):** Downy mildew

**Aggravating factors:**

-Uncommonly cool, wet or humid late springs.

**How disease is spread:**

- Seedborne by wind and rain splash.
- Weather-resistant spores are formed in old dead leaves, where they remain dormant over the winter and germinate in the spring.

**Comments:**

- Disease is most severe during the first year following seeding.
- Mildew disappears during warm, dry weather but may reappear during cool, wet periods in autumn.
- If disease is severe, leaflets will roll and twist downward.
- The youngest leaves are most susceptible to infection.

**Control:**

**No control measures necessary**

(RPD : no. 301)

**Common name(s):** Rust

**Aggravating factors:**

- Hot or warm temps. and damp weather.
- Rank, lush growth.

**How disease is spread:**

The fungus overwinters in the southern states and the infective spores spread into Illinois in the summer on southerly winds.

**Comments:**

- It is generally not damaging because it occurs late in the season.
- It forms mostly on the underside of leaves, but can also appear on the petioles and stem.

**Control :**

**No control measures necessary**

(RPD : no. 301)

**Common name(s):** Dry root and crown rots, and decline

**Aggravating factors:**

- Cold or winter injury, including frost and heaving injury and ice sheets.
- Low fertility fields and poor drainage.

**How disease is spread:**

- Soilborne and spread by water or equipment.
- By sowing infected seed or moving infected hay, or soil.

**Comments:**

-Damage is most severe after winter injury, summer drought, mechanical injury to the crown, or root damage by insects.

**Control:**

1. Grow only well-adapted, high-yielding, winter-hardy varieties.
2. Maintain a high, well-balanced fertility level.
3. Sow clean, disease-free soil.
4. Plant only in warm, well-drained soil.
5. Control insects.
6. Maintain proper cutting schedule.
7. Clean all harvesting equipment.
8. Rotate with corn, sorghum, small grains, or forage grasses if desired.
9. Avoid mechanical injury.

(RPD : no. 302 )

**Common name(s):** Phytophthora root rot

**Aggravating factors:**

- Excess soil moisture/bad irrigation-standing water
- Cool, wet weather (76-86°)

**How disease is spread:**

- Soilborne and spread by flowing water.
- By infected soil and crop debris.

**Comments:**

- Regrowth of diseased plant is slow after cutting.

**Control:**

1. Grow only well-adapted, high-yielding, winter-hardy varieties.
2. Use effective seed treatment.
3. Maintain a high, well-balanced fertility level.
4. Sow clean, disease-free soil.
5. Plant only in warm, well-drained soil.
6. Control insects.
7. Maintain proper cutting schedule.
8. Clean all harvesting equipment.
9. Rotate with corn, sorghum, small grains, or forage grasses if desired.
10. Avoid mechanical injury.

(RPD : no. 302)

**Common name(s):** Anthracnose

**Aggravating factors:**

- Hot, wet weather.

**How disease is spread:**

- Fungus is carried on the surfaces of harvesting equipment.
- Waterborne.

**Control:**

1. Grow only well-adapted, high-yielding, winter-hardy varieties.
2. Maintain a high, well-balanced fertility level.
3. Sow clean, disease-free soil.
4. Plant only in warm, well-drained soil.
5. Control insects.
6. Maintain proper cutting schedule.
7. Clean all harvesting equipment.
8. Rotate with corn, sorghum, small grains, or forage grasses if desired.
9. Avoid mechanical injury.

(RPD : no. 302 )

**Common name(s):**Sclerotinia crown and stem rot

**Aggravating factors:**

- Cool, wet weather
- Prolonged snow cover
- Rank foliar growth

**How disease is spread:**

- Apothica is produced when infected and are spread by air currents.
- By moving infested soil and diseased crop refuse.

**Control:**

1. Grow only well-adapted, high-yielding, winter-hardy varieties.
2. Maintain a high, well-balanced fertility level.
3. Sow clean, disease-free soil.
4. Plant only in warm, well-drained soil.
5. Control insects.
6. Maintain proper cutting schedule.
7. Clean all harvesting equipment.
8. Rotate with corn, sorghum, small grains, or forage grasses if desired.
9. Avoid mechanical injury.

(RPD : no. 302 )

**Common name(s):** Fusarium wilt

**Aggravating factors:**

- High soil temps. and moist weather.
- Lack of crop rotation.

**How disease is spread:**

- By soil water, equipment and infected hay.

**Comments:**

- The only practical control is to grow resistant varieties.

**Control:**

1. Grow only well-adapted, high-yielding, winter-hardy varieties.
2. Maintain a high, well-balanced fertility level.
3. Sow clean, disease-free soil.
4. Plant only in warm, well-drained soil.
5. Control insects.
6. Maintain proper cutting schedule.
7. Clean all harvesting equipment.
8. Rotate with corn, sorghum, small grains, or forage grasses if desired.
9. Avoid mechanical injury.

(RPD : no. 302)

**Common name(s):** Stagonospora leaf spot and root rot

**Aggravating factors:**

- Prolonged periods of warm, moist weather.
- Lack of crop rotation.

**How disease is spread:**

- By air and waterborne spores.
- Crop debris.

**Comments:**

- The root rot phase develops from stem and crown infections and proceeds for 2-3 years.

**Control:**

1. Grow only well-adapted, high-yielding, winter-hardy varieties.

2. Maintain a high, well-balanced fertility level.
3. Sow clean, disease-free soil.
4. Plant only in warm, well-drained soil.
5. Control insects.
6. Maintain proper cutting schedule.
7. Clean all harvesting equipment.
8. Rotate with corn, sorghum, small grains, or forage grasses if desired.
9. Avoid mechanical injury.

(RPD : no. 302)

**Common name(s):** Rhizoctonia stem blight, root canker, and crown and bud rot

**Distribution:** throughout the world

**Aggravating factors:**

-Prolonged periods of wet, hot, and humid weather.

**How disease is spread:**

-Soilborne by equipment and spread to crop debris.

-Infected hay.

**Control:**

1. Grow only well-adapted, high-yielding, winter-hardy varieties.
2. Maintain a high, well-balanced fertility level.
3. Sow clean, disease-free soil.
4. Plant only in warm, well-drained soil.
5. Control insects.
6. Maintain proper cutting schedule.
7. Clean all harvesting equipment.
8. Rotate with corn, sorghum, small grains, or forage grasses if desired.
9. Avoid mechanical injury.

(RPD : no. 302)

**Common name(s):** Violet root rot

**Aggravating factors:**

-Temp. of 77°

**How disease is spread:**

-Soilborne

**Comments:**

-Common after midsummer

-Fungus may persist in soil and plant debris for 3-20 years.

**Control:**

1. Grow only well-adapted, high-yielding, winter-hardy varieties.
2. Maintain a high, well-balanced fertility level.
3. Sow clean, disease-free soil.
4. Plant only in warm, well-drained soil.
5. Control insects.

6. Maintain proper cutting schedule.
7. Clean all harvesting equipment.
8. Rotate with corn, sorghum, small grains, or forage grasses if desired.
9. Avoid mechanical injury.

(RPD : no. 302)

**Common name(s):** Verticillium wilt

**Distribution:** Cool temp. regions throughout world

**Aggravating factors:**

- Cool, wet weather.
- Optimum temp. 68-73°

**How disease is spread:**

- Soilborne
- Conidia are produced and are spread by air currents.

**Control:**

1. Plant resistant varieties.
2. Grow only well-adapted, high-yielding, winter-hardy varieties.
3. Maintain a high, well-balanced fertility level.
4. Sow clean, disease-free soil.
5. Plant only in warm, well-drained soil.
6. Control insects.
7. Maintain proper cutting schedule.
8. Clean all harvesting equipment.
9. Rotate with corn, sorghum, small grains, or forage grasses if desired.
10. Avoid mechanical injury.

(RPD : no. 302)

**Common name(s):** nematodes (dagger, lesion, and northern root rot)

**Comments:**

- Nematodes can only be diagnosed by submitting soil and root samples for analysis.

**Control:**

1. Grow only well-adapted, high-yielding, winter-hardy varieties.
2. Maintain a high, well-balanced fertility level.
3. Sow clean, disease-free soil.
4. Plant only in warm, well-drained soil.
5. Control insects.
6. Maintain proper cutting schedule.
7. Clean all harvesting equipment.
8. Rotate with corn, sorghum, small grains, or forage grasses if desired.
9. Avoid mechanical injury.

(RPD : no. 302)

**Common name(s):** Northern anthracnose or clover scorch

**Aggravating factors:**

- Cool, damp weather (68-77°).
- Spring and early summer months.

**How disease is spread:**

- By air currents, splashing rains, animals, insects, and equipment.

**Comments:**

- Does not attack the crown and taproot.
- Affected plants are not killed, but causes considerable loss of leaves.

**Control:**

1. Grow well-adapted, high-yielding varieties.
2. Mow following a recommended schedule and plant at a good rate.
3. Clean all equipment before and during growing season.
4. Use clean, certified seed from disease-free fields.

(RPD : no. 303)

**Common name(s):** southern anthracnose

**Aggravating factors:**

- Warm, wet weather (82°)

**How disease is spread:**

- By rain splash, equipment, and wind.

**Comments:**

- Unlike the northern anthracnose, the southern fungi attacks the taproot and crown, resulting in the death of the plant.

**Control:**

1. Grow well-adapted, high-yielding varieties.
2. Mow following a recommended schedule and plant at a good rate.
3. Clean all equipment before and during growing season.
4. Use clean, certified seed from disease-free fields.

(RPD : no. 303)

**Common name(s):** root rot, crown rot, and stolon rot

**Scientific name(s):** Caused by a number of soil-inhabiting fungi:

(*Fusarium spp.*, *Rhizoctonia spp.*, *Pythium spp.*, *Sclerotinia trifoliorum*, *Colletotrichum spp.*, *macrophomina phaseolina*, *mycoleptodiscus terrestris*)

**Aggravating factors:**

- Heaving, caused by freezing and thawing.
- Late applications of fertilizer.
- Cold, open winters, where there are ice sheets, and frost injury.
- Low, poorly drained soil.

**How disease is spread:**

- Waterborne fungus, spreading in low, poorly drained areas.
- Spreads rapidly with a prolonged drought or severe winter.

**Comments:**

- These rots are responsible for the eventual death of red clover plants in IL.
- The relativeness and severity of these fungi vary greatly with the type, variety and age of clover, season of year, locality, soil type, and management practices.

**Control:**

1. Lime acid soils attain a pH of 6.2 to 7 (slightly acid to neutral).
2. Balance soil fertility.
3. Sow high-quality, certified, disease-free seed. (Avoid seed grown in southern states or foreign)
4. Keep heavily infected fields out of legumes for 3 years or more.
5. Control root-and crown-feeding insects.
6. Don't leave straw from companion crop above clover plants.
7. Avoid overgrazing, especially late in the growing season.

(RPD : no. 304)

**Common name(s):** powdery mildew

**Aggravating factors:**

- Late summer, early fall nights that are damp and cool and where days are warm and dry.

**How disease is spread:**

- Prolonged period of dry summer weather.
- By air currents.

**Comments:**

- Frequent rains discourage spreading.

**Control:**

1. Plant adapted red clover varieties.
2. Practice balanced fertility.
3. Harvest on a timely schedule.
4. Clean all harvesting equipment.
5. Control weeds and insects.

(RPD : no. 305)

**Common name(s):** seed rot, damping off and seedling blights

**Aggravating factors:**

- Poorly-drained soils with a high content of organic matter.
- Prolonged, wet weather, following planting.

**How disease is spread:**

- Seedborne

**Control:**

1. Sow high-quality, certified, fully-mature seed produced in arid areas.
2. Plant in fertile soil, where drainage is good.
3. treat seed with a seed-protecting fungicide or mixture.

(RPD : no. 306)

**Common name(s):** alfalfa and sweet clover mosaics, clover mosaics, mottling, vein mosaic

**Aggravating factors:**

- Root and crown rots.
- Winter injury.
- Cool temps.

**How disease is spread:**

- By mowing machines.
- By feeding of virus-carrying insects.
- Planting infected seed.

**Comments:**

- The virus is known to persist in alfalfa seed for 5 years or more.
- Develop varieties that are resistant to the most prevalent and injurious diseases.

**Control:**

1. Unproductive fields should be plowed down and planted in corn, sorghum, or a small grain field or in forage grass.
2. Plant virus-free seed that is certified.
3. Don't grow close to legumes-especially garden peas and beans.
4. Keep down weeds in drainage ditches and fence rows.

(RPD : no. 307)

### SUMMARY OF ALFALFA DISEASES

**Common name(s):** all alfalfa diseases

**\*excluding:** bacterial blight or leaf spot, bacterial stem blight, downy mildew and rust, which have no necessary means of control.

**Loss range:**

-yields up to 30% per year

**Control:**

Losses can be minimized by a disease-management program

1. Grow winter-hardy, disease-resistant varieties.
2. Plant top quality, disease-free seed grown in an arid area.
3. Provide a well-drained, well-prepared seed bed.
4. Use a crop rotation of several years or longer with a non-legume crop.
5. Do timely cutting to max high-quality forage.
6. Create a balanced soil fertility-perform soil test.
7. Avoid cutting during last five or six weeks of growing season.
8. Control insects and weeds.
9. Plow down unproductive stands.
10. Cut only when foliage is dry.
11. Follow other suggested cultural practices.

(RPD : no. 308)

### Fungicide Rates, MOA, REI, PHI and Target Diseases

Common Name	Trade Name	Rate	Units	MOA	REI (hrs)	PHI (days)	Target Diseases
<b>Captan</b>	many				4 days		Seed rots and seedling blights
<b>Copper Hydroxide</b>	Kocide	2	lbs		24	10-14	Leaf spots, spring blackstem, and anthracnose
<b>Metalaxyl</b>	Allegiance FL, Apron FL						Seed rots and seedling blights
<b>Mefenoxam</b>	Ridomil Gold EC	1/2 to 1/4	pts		12	60	Seed rots and seedling blights
<b>Thiram</b>	many						Seed rots and seedling blights

## Weeds

Seedling stands of alfalfa are very sensitive to competition with weeds. Weeds will grow faster than alfalfa and will shade out young alfalfa seedlings. A cover crop of oats, wheat, or rye has often been used to stabilize the soil and help establish a legume stand. This may help reduce weed competition, but may also compete with and shade out young legume seedlings if the grass companion crop is not harvested early. In the year of establishment weeds will commonly reduce dry matter production by 25% and protein production by 50%.

After the first cutting in established stands, broadleaf weeds do not usually regrow and will no longer compete for nutrients. Grasses, on the other hand, continue growth after every cutting. For this reason grass herbicides are more commonly used than broadleaf herbicides, if the crop is pure alfalfa and not mixed with forage grasses such as orchardgrass or Kentucky bluegrass. It has been suggested that some weeds offer protein to the harvested crop. While this may be true for pure grass hays, in almost all cases of healthy legume stands weeds will reduce the total amount of protein harvested. Hay palatability and digestibility can also decrease with the presence of weeds.

Although winter annual weeds are rarely treated in Illinois, such treatments could increase the productivity of many stands. When treatments do occur, mustards that would flavor milk products are usually targeted. Summer annual weeds, including many grasses, lambsquarters, pigweeds, and ragweeds, are the major targets of most herbicide treatments. Perennials, because of the difficulty and expense of treatment, usually remain untreated, unless they are unpalatable or can be treated in spot

applications.

### Avg. % Crop Loss and Avg. Illinois Acres Infested by Weeds

Common Name	Scientific Name	Avg. % Crop Loss	Avg. Acres Infested
<a href="#">Common Chickweed</a>	<i>Stellaria Media</i>	3.9%	90,909
<a href="#">Common Lambsquarters</a>	<i>Chenopodium Album</i>	1.9%	45,454
<a href="#">Dandelion</a>	<i>Taraxacum Officinale</i>	3.9%	90,909
<a href="#">Eastern Black Nightshade</a>	<i>Solanum Ptycanthum</i>	7.7%	45,454
<a href="#">Giant Foxtail</a>	<i>Setaria Faberi</i>	3.9%	90,909
<a href="#">Henbit</a>	<i>Lamium Amplexicaule</i>	1.9%	90,909
<a href="#">Pigweed</a>	<i>Amaranthus spp.</i>	1.9%	45,454
<a href="#">Quackgrass</a>	<i>Agropyron Repens</i>	7.7%	90,909
<a href="#">Thistles</a>	<i>Cirsium spp.</i>	2%	10,000

#### Common Chickweed

Winter annual. Often very robust and dense in growth and becoming a serious competitor with alfalfa for light, water, and nutrients.

#### Common Lambsquarters

Common lambsquarters produce numerous small seeds with germinate after an overwintering process. Optimal temperature for germination is 70F, but can germinate between 40 to 94, which suggests early germination capabilities. Survival is favored by rains which dilute or leach herbicides from the soil surface.

#### Dandelion

Perennial. Low growing plant typically found in low to moderate populations. Can compete for soil moisture and result in poor stands.

#### Eastern Black Nightshade

This summer annual can produce thousands of berries; each berry contains up to 50 seeds. While

nightshade is generally not considered a serious pest in Illinois, severe infestations in individual fields do occur. This weed is poisonous when consumed by livestock and should therefore be eliminated from fields wherever possible. Herbicides can control it but are usually quite expensive. Where large infestations of this weed occurs the hay may have to be destroyed.

### **Giant Foxtail**

The three species of foxtails in Illinois are giant foxtail (*Setaria faberi*), green foxtail (*S. viridis*) and yellow foxtail (*S. glauca*). Giant foxtail is the most competitive of the three species. Foxtails are considered the most important weeds species in Illinois. One plant may produce several heads with 500-1000 seeds per head that can germinate in one to several years after production. These plants are adapted to most Illinois conditions, tend to grow in clumps that compete with crops and make cultivation and plowing difficult. All foxtails are more serious in reduced and no-till fields. While yellow foxtail is not generally a serious competitor in row crops it tends to be the predominant foxtail in perennial hay fields.

### **Henbit Annual**

Appears in early spring. Low growing but aggressive plant often crowding out seedling stands of alfalfa and grasses.

### **Pigweed**

Pigweeds are prolific seed producers, and one female can produce over 100,000 seeds in one growing season. The seeds of this plant may remain viable for years. Pigweeds are a problem in alfalfa because undisturbed soils favor germination of the minuscule seeds, and the debris and standing crop keeps the field moist and allows for extended germination.

### **Quackgrass**

Quackgrass is a cool season perennial that reproduces by rhizomes, and to a lesser amount by seeds. New plants sprout at axillary buds, and rhizomes may remain viable for years. Quackgrass is most often a problem in the northern part of the state where much of the alfalfa is grown. The only effective control of Quackgrass in alfalfa is a herbicide application.

### **Thistles**

Biennial and perennial thistles can be serious problems in hay and alfalfa fields. Musk thistle, bull thistle, sow thistle, and Canada thistle are all seen from time to time in hay fields. Thistles decrease the palatability of hay and, when infestations are severe, may require that the hay be destroyed. Spot treatment is the only economical treatment for thistles in alfalfa.

## **Herbicide Rates, MOA, REI, PHI and Target Weeds**

<b>Trade Name</b>	<b>Rate/Acre</b> <b>Low High</b>		<b>Unit</b>	<b>MOA*</b>	<b>REI</b> <b>hrs</b>	<b>PHI</b> <b>days</b>	<b>Treatment</b> <b>Interval</b>	<b>Primary Target</b>
<b>Seedling Year</b>								
<b>Balan 60DF</b>	2	2.5	lb		12	21	PPI	Grass/BL
<b>Buctril 2E</b>	1	1.5	pt		12	5-7	Post fall/spring	BL
<b>Butyrac 200 or Butoxone 200</b>	1	3	qt		N/A	N/A	Post	
<b>Eptam 7E</b>	3.5	4.5	pt		12	14	PPI	Grass/BL
<b>Eptam 20G</b>	0	15	lb		12	14	PPI	Grass/BL
<b>Gramoxone Extra</b>	0	12.8	fl oz		12	70	Between cuttings	most annual grasses and BL
<b>Poast Plus</b>	1.125	2.25	pt		12	60	Post	Grasses
<b>Pursuit 2AS</b>	3	6	fl oz		N/A	N/A	Post	kochia,nightshade, pigweed,wild mustard
<b>Pursuit 70DG</b>	1.08	2.16	oz		12	N/A	Post	kochia,nightshade, pigweed,wild mustard
<b>Select 2EC</b>	6	8	fl oz		24	15	Post	
<b>treflan HFP</b>	1	1.5	pt		12	21	PPI	Grasses/BL
<b>treflan tr-10</b>	5	7.5	lb		12	N/A	PPI	Grasses/BL
<b>Established stands</b>								
<b>Butyrac 200 or Butoxone 200</b>	1	3	qt		N/A	N/A	Growing	
<b>Gramoxone Extra</b>	0	12.8	fl oz		12	30	Between cuttings	most annual grasses and BL
<b>Gramoxone Extra (dormant)</b>	1.5	2.5	PTS		12	60	Dormant	most annual grasses and BL
<b>Poast Plus 1E</b>	1.125	3.75	pt		12	60	Post	Grasses
<b>Pursuit 2AS</b>	3	6	fl oz		N/A	N/A	Post	kochia,nightshade, pigweed,wild mustard
<b>Pursuit 70DG</b>	1.08	2.16	oz		12	N/A	Post	kochia,nightshade, pigweed,wild mustard

<b>Roundup</b>	1	2	% solu		12		Post	kochia,nightshade, pigweed,wild mustard
<b>Roundup</b>	1	2	pt		12		Last Cutting	kochia,nightshade, pigweed,wild mustard
<b>Select 2EC</b>	0	8	fl oz		24	15	Post	
<b>Sencor 75DF (dormant)</b>	0.5	1.3	lb		N/A	N/A	Dormant	
<b>Sencor 75DF</b>	1	1.3	lb		N/A	N/A	PosTDormant	
<b>Sinbar 80W</b>	0.5	1.5	lb		12		Dormant	Grasses/BL
<b>triflan tr-10</b>	0	20	lb		12	N/A	Dormant or after cutting	Grasses/BL
<b>triflan 4EC</b>	0	4	pt		N/A	N/A	Dormant or after cutting	Grasses/BL
<b>Velpar L</b>	1	3	qt		24	N/A	Dormant	

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## References

1. Illinois Department of Agriculture, Agriculture Statistics. Overview of Illinois Agriculture 1997

2. United States Department of Agriculture, National Agriculture Statistics Service. Crop Production 1997 Summary, Cr Pr 2-1(98)
3. United States Department of Agriculture, National Agricultural Statistics Service. Crop Values 1997 Summary, Cr Pr2-1(98)
4. Pike, D.R., W.H. Kuhlman, W.H. Luckmann, M.C. Shurtleff, K.L Steffey. 1992. Illinois Pest Profiles. Illinois Natural History Survey, Urbana, IL. 95 pages.
5. Alfalfa Diseases in the Midwest North Central Regional Extension Publication 184 (Revised November 1984), William G. Willis, KSU Extension Plant Pathology, Donald L. Stuteville, KSU Forage Crop Pathologist

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