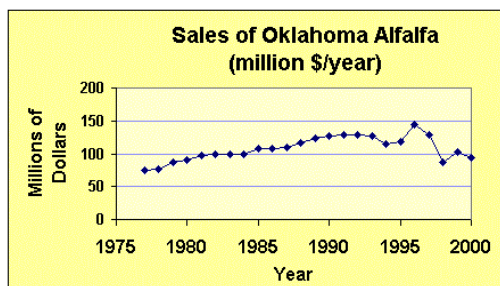


Measuring Adoption of IPM Practices in Oklahoma Alfalfa — Socioeconomic Implications for Growers

Because of its importance among forage crops, alfalfa is referred to as the “*Queen of Forages*.” Alfalfa was first successfully grown in the United States during the mid-1850s.

During the last 25 years in Oklahoma, alfalfa acreage has remained between 350,000 and 600,000 acres and is concentrated in the western half of the state. The cash value to Oklahoma rose from \$74 million in 1977 to a high of \$129 million in 1992. Part of this increase was due to average forage yield increasing from 3.2 to 3.6 tons per acre during this period. Another reason was higher hay prices, ranging from \$60 a ton in the 1970’s to more than \$90 a ton in the 1990’s.



Alfalfa is one of the most important forages for livestock. Because of its high protein, vitamin, energy, and digestibility, alfalfa can be used for a variety of diet types.

Comparison of income potentials.

<i>Crop</i>	<i>Yield</i>	<i>Price</i>	<i>Harvest Cost (\$)</i>	<i>Profit (\$/ac)</i>
Average Rainfall – 25 inches				
Alfalfa	2 ton/ac	\$70/ton	50	90
Wheat	25 bu/ac	\$3.90/bu	15	83
Grain Sorghum	15 cwt/ac	\$4.50/cwt	15	53
Average Rainfall – 30 inches				
Alfalfa	3.5 ton/ac	\$70/ton	60	185
Corn	35 bu/ac	\$3.40/bu	23	96
Soybean	30 bu/ac	\$6.00/bu	20	160
Wheat	28 bu/ac	\$3.90/bu	16	93
Grain Sorghum	28 cwt/ac	\$4.50/cwt	16	97

The Situation and the Survey

Alfalfa is a perennial forage legume that, once established, is typically expected to remain productive for five to seven years. This expectation requires consideration of both short-term and long-term management decisions, especially those related to pest control. Effective pest control is possible only with a comprehensive integrated pest management (IPM) program that targets insect pests, weeds, and plant pathogens.

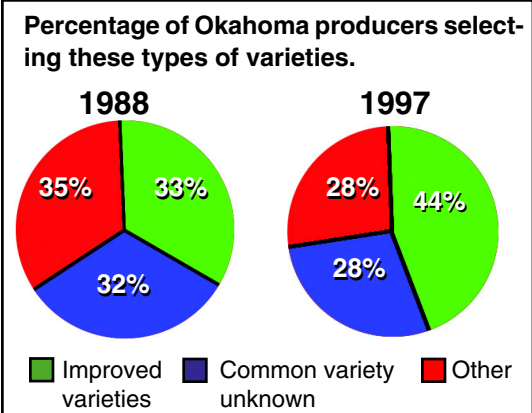
Two similar surveys conducted in 1988 and again in 1997 attempted to determine the impact and adoption of recommended IPM practices on grower decision-making processes. While many of these practices are directly linked to profitability and utility of hay production, some may be connected to societal influences imposed on growers and how these, in turn, can affect economic return.

Varietal Selections in Oklahoma

Alfalfa IPM Components

- Healthy stand, with full cover is critical to pest management
- Multiple-pest resistant varieties
- Timely grazing for insect control
- Early harvesting
- Scouting

Two factors directly linked to socioeconomic influences include varietal selection and treatment timing for insect (alfalfa weevil) damage. Shortly after the advent (1988) of a scouting program, sponsored by the Oklahoma Cooperative Extension Service, over one-third of all growers used a common variety of alfalfa with little to no pest-resistant qualities. This decision was strictly an economic issue compounded by opinions from older, experienced growers that felt the higher cost associated with improved varieties were unnecessary. With recommendations from scouts, Extension specialists, and industry personnel, growers have begun to see the utility of improved varietal selections. Now, nine years later (1997), nearly 50% of all surveyed growers select improved varieties.



Results of surveys obtained from Oklahoma alfalfa producers in 1988 and 1997.

General Data	Results	
	1988	1997
Number of surveys mailed	4,000	4,887
Number of usable surveys returned (%)	520 (7.7%)	827 (16.9%)
Total acres of alfalfa accounted	70,006	53,948

Weevils, Weeds, and Wilts...Oh my!

Insects

Common Insect Pests

- Alfalfa Weevil
- Alfalfa Aphids
- Blister Beetles
- Potato Leafhopper
- Foliage-Feeding Caterpillars
- Lygus bugs



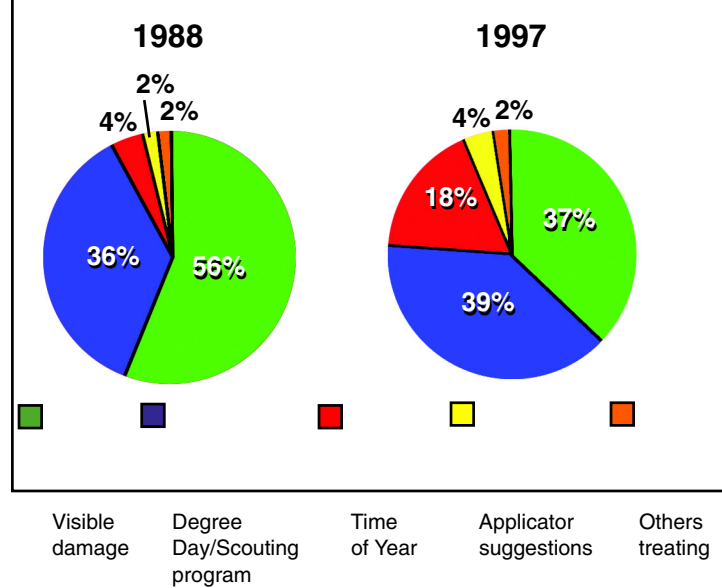
From a pest management perspective, early (1988) surveys indicated that nearly 56% of all growers chose "visible damage" as the first determinate on when to treat for alfalfa weevils. This decision can often result in poorly-timed applications of insecticides that are directed at sub-economic populations of insects or treatments

in advance of economic thresholds. After nine years, and much educational effort by the Oklahoma Cooperative Extension Service, growers have discovered the benefits of timely treatments based on scouting and a degree-day based program that monitors how rapidly the insects develop. While the percentage of growers using a program of this sort increased only slightly (2.4%), today only about one-third (37.2%) rely on "visible damage" as their primary determinate on when to make an insecticide application.

Factors reducing alfalfa weevil numbers, Oklahoma, 1997.

Factor	Number of Producers	
	Total	Percent of total respondents
Insecticides	633	3.23
Grazing	351	18.0
Early 1 st Harvest	305	15.6
Variety	195	9.9
Predators	184	9.4
Fall Harvest	140	7.2
Parasites	133	6.8
Fungus	17	0.9

Percentage of producers ranking these factors as their first method for choosing when to treat for alfalfa weevils.



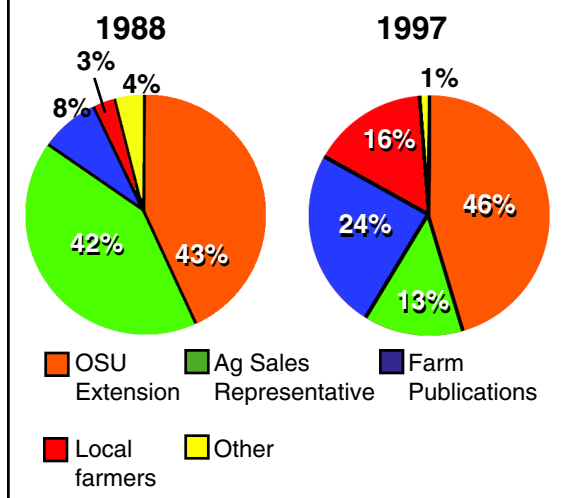
In a 1997 survey of alfalfa growers, 87% of producers stated they scout their fields and 55% use grazing for weevil control.

In a 1997 survey, Alfalfa weevils infested 68% of the total statewide alfalfa acreage, while alfalfa aphids infested 57%. All other insects combined reported only 12%.

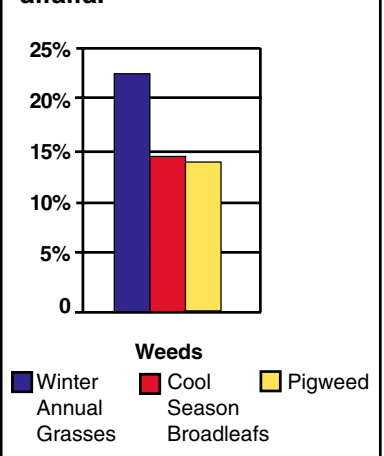
Weed Pests

Shortly after the scouting program first began (1988) growers relied heavily on recommendations from agriculture sales representatives (42%) for information about weed management practices. By (1997) this percentage dropped dramatically (13%) and the use of recommendations from the Oklahoma Cooperative Extension Service had increased to 46%.

Percentage of Oklahoma growers surveyed ranking these factors as the first choice for sources of information on weed management.



Top three weed problems associated with established alfalfa.



Disease Considerations

- *Phytophthora* root rot
- *Fusarium* root and crown rot
- *Verticillium* wilt
- *Aphanomyces* root rot
- Nematodes
- Damping off
- Sclerotinia
- Texas root rot

Root and crown rots are caused by a number of soil borne fungi. They weaken infected plants and reduce yield and longevity.

IPM Benefits to Oklahoma Alfalfa Production

Growers are reaping the rewards of adoption of IPM practices. In addition, rural Oklahoma has benefited also from the use of these practices. Here are some ways that both growers and the public have experienced socio-economic growth from adoption of IPM practices.

- Nearly 40% of growers are routinely scouting for pests.
- Treatment decisions are now more closely linked to economic thresholds, thereby, reducing the number of applications for insects 1.8 treatments per farm (1988) before the first harvest to 1.2 treatments per farm (1997).
- Growers using IPM report 50% reduction in overall pesticide use primarily due to more precise timing and better advice.
- A shift toward using reduced-risk pesticides is evident in Oklahoma, with more growers turning to the least expensive and newer synthetic pyrethroids.
- New scouting programs have replaced Extension-sponsored programs and many counties have witnessed an increase in the number and influence of grower associations that sponsor educational programs conducted by the Cooperative Extension Service.

Marketing – Makes the Bale Sell

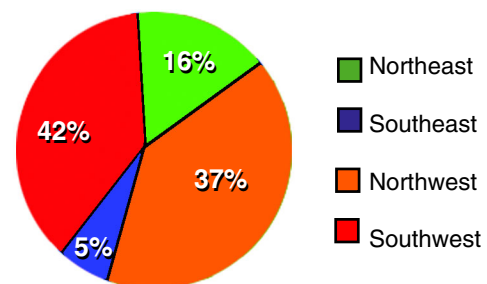
Consumer oriented. It means listening to buyers and understanding their wants and needs. Alfalfa quality is essentially the feed value of alfalfa. Different animals and feed rations can utilize different levels or quality attributes in alfalfa. The quality of alfalfa affects the target market for hay produced and the price received for the hay.



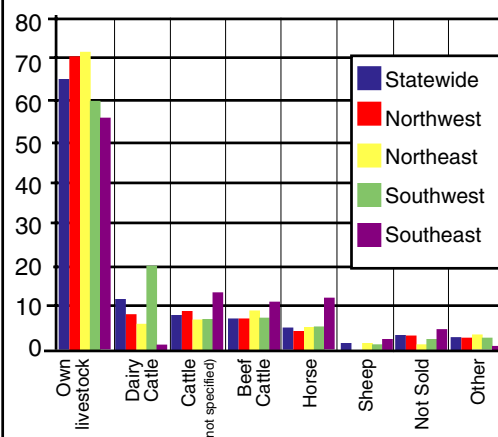
Small swarm of striped blister beetles

For example, dairymen usually want alfalfa with a relatively high feed value, while horse owners want alfalfa free of blister beetles.

Distribution of alfalfa acreage, Oklahoma 1997.



Average percentages of alfalfa production sold to each market in Oklahoma, 1996.



Have a plan. Know your market. The target market depends on quality of hay, bale size, and type. Beef cattle and sheep raisers may be willing to use lower quality hay. Bale size needs also vary from operation to operation.

Contributions from the Research and Extension Alfalfa Integrated Management (AIM) Team at Oklahoma State University

- Provided educational programming and scout-training for hundreds of growers and scouts throughout Oklahoma.
- Provided timely data on pesticide management of insects and weeds.
- Developed early warning systems for anticipating the impact of alfalfa weevil infestations each spring. This system monitors for egg populations before hatch and sends out electronic (e-mail) alerts concerning state-wide potential for infestations of this pest. Currently, the e-mail list consists of nearly 300 Extension Educators, consultants, and growers.
- Developed a premier, internet site (<http://alfalfa.okstate.edu/alfa-cal.htm>) that encompasses every aspect of alfalfa production, establishment, and management. This system also provides real-time alerts and an alfalfa production calendar covering everything from pest management to marketing.
- Provided data and alerts on timing of pesticide applications to gain optimum efficacy while conserving natural enemies.
- Provided informational fact sheets, bulletins, circulars, and newsletter contributions each year. In particular, the team developed two major circulars on alfalfa stand establishment and alfalfa harvest management.
- In 2001, the AIM team developed the Extension Circular E-826, "Alfalfa Production Guide for the Southern Great Plains."

The Future – Looking green

Research

On-going research is vital in maintaining up-to-date information on fertilization, grazing, harvest, improved cultivars, biological and cultural pest control, storage, and marketing.

Due to the serious losses in production, which may result from alfalfa weevil infestations, researchers in several states have worked together to provide information to assist growers in deciding when it is profitable to apply insecticides against this pest. These guidelines help to determine the need for insecticide use and proper timing for applications to avoid serious weevil damage.

Alfalfa in Oklahoma has made great progress in the last several years and has a bright future. Hay producers, seed companies, chemical firms, equipment businesses, and financial institutions are to thank for recent accomplishments, along with the Oklahoma Alfalfa Hay and Seed Association that pulls all these elements together.

Much of the progress to date on alfalfa integrated management has occurred as a result of federal expenditures supporting comprehensive research and Extension programs. University and Extension field staff has consistently been among the first to develop and integrate multi-disciplinary approaches for suppression of crop pests and to integrate these approaches with sustainable production practices.

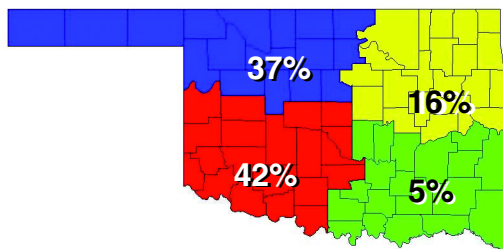
The AIM team, with the help of producers and the field staff is providing new up-to-date information on fertilization, grazing, harvest, improved cultivars, biological and cultural pest control, storage, and marketing.

In addition to traditional agriculture practices, alfalfa is being utilized as an environmental aide to help protect surface and ground water. Alfalfa is being used to act as a recycler, to help cleanup excess nitrate in water. Research is continuing on how alfalfa can rid other contaminants in the soil as well (National Alfalfa Information System, (NAIS), 2003).

The use of alfalfa as a food source is expected to increase in the future. In addition, developments of many types of vitamins are produced from alfalfa. Researchers are also addressing continued health food and pharmaceutical uses.

The Research Team at Oklahoma State University

- Oklahoma Agricultural Experiment Station
- Oklahoma Cooperative Extension Service
- Department of Entomology and Plant Pathology
- Department of Plant and Soil Sciences
- Department of Agricultural Economics
- Department of Animal Science
- Department of Biosystems and Agricultural Engineering



Oklahoma districts and percent hay from each.



L-315



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