SELECTED PRODUCERS PERCEPTIONS OF HOW MARKETING AFFECTS THE MANAGEMENT PRACTICES OF OKLAHOMA ALFALFA PRODUCTION

By

KEVIN TRENT SHELTON

Bachelor of Science

Oklahoma State University

Stillwater, Oklahoma

1983

Submitted to the Faculty of the
Graduate College of the
Oklahoma State University
in partial fulfillment of
the requirements for
the Degree of
MASTER OF SCIENCE
May, 1991

SELECTED PRODUCERS PERCEPTIONS OF HOW
MARKETING AFFECTS THE MANAGEMENT
PRACTICES OF OKLAHOMA
ALFALFA PRODUCTION

Thesis Approved:

Thesis Adviser

Dean of the Graduate College

ACKNOWLEDGEMENTS

I wish to express my appreciation to the many Oklahoma alfalfa producers who completed the mail survey and helped to complete this study.

Special thanks go out to Dr. Eddy Finley for his assistance and guidance as the authors major adviser, committee chairman, and for always having a positive attitude and an encouraging word throughout the duration of this study. Sincere appreciation is also given to Drs. Robert Terry and Jack Pritchard as committee members and for their help and guidance during the completion of this study.

I wish to express my gratitude to the faculty, staff, and graduate students of the Agricultural Education Department for their assistance and fellowship.

Thanks are also due to Drs. Loren Rommann and Gerrit Cuperus for their help in selecting a population for this study and providing the necessary information needed for that selection.

Special recognition is given to my parents Dale and Bonnie Shelton for their unending love and support during my educational career.

My most sincere love and devotion is reserved for my wife Connie, for her many sacrifices, help, and inspiration during this endeavor. Without her love and persuasion this project would have never been possible, it is to her that I dedicate this accomplishment.

TABLE OF CONTENTS

Chapter

Page

LIST OF TABLES

CHAPTER I

INTRODUCTION

Alfalfa is second only to wheat in importance to Oklahoma farmers for gross income earned through production. With an average of over 400,000 acres of alfalfa, an average yield of 3.5 tons/acre, approximately 1.5 million tons of forage are harvested annually. Alfalfa has a market value of $65 - $120 / ton that translates into $95.5 - $180 million of possible income (Stark, Cuperus, Ward, Huhnke, Rommann, Mulder, Stritzke, Johnson, Criswell, and Berberet, 1990).

Alfalfa is a perennial legume and with proper care and management, stands may be productive well into their 6th, 7th, and 8th years of age. Economic profitability studies have shown that profit is directly related to stand life. As a result, the longer the stand remains productive, profits will increase (Ward, 1987). The growing season for Oklahoma is quite lengthy, usually allowing from two to four dryland harvests, and with irrigated fields, early and late cuts, or intense management, five to seven harvests may sometimes be accomplished. But, there are numerous insect pests, weeds, diseases, fertility, drought, and other factors making alfalfa hay production very difficult. The basic goal of the alfalfa producer is profit. Profit is defined as total income minus total expenses. Production costs are also figured into total expenses. These costs are affected by management decisions which in turn affect total yields and therefore price. Since alfalfa is

a perennial, these decisions also have an affect over many years.

In years past, most of the alfalfa research dealt with variety selection, proper fertility, use of lime, and insect and weed management. There was no program to combine two or more of these practices together. The first efforts on combining these practices came about in 1982 when an Integrated Pest Management (IPM) Coordinator was hired to initiate an interdisciplinary program for the integration of pest management including Agronomy, Entomology, and Plant Pathology Departments.

Statement of the Problem

Alfalfa has the highest yield potential and one of the highest feed values of all forages. Because of these characteristics, along with high protein content and excellent palatability, alfalfa is the base forage in dairy, horse, beef cattle, and sheep rations.

Producers may significantly regulate the quality of alfalfa by utilizing management practices such as stage of maturity at harvest and foreign material in the hay. The producer needs to decide what protein and quality level will net the largest profit; therefore research needed to be conducted which would provide information necessary from which the producers could be assisted with the management decisions. Traditionally, producers strive for maximum forage production with little thought concerning quality. But with the recent demands for a higher quality alfalfa hay, producers are confronted with the problem of when to harvest for high quality and also good forage yields.

High quality has one major drawback, less than maximum forage production. Most producers accept the compromise for quality and forage

production is to harvest at 10% bloom. But many times, this is no longer acceptable for proteins of 20% or better. Many producers have started harvesting at 50 - 95% bud (late bud) stage of growth to achieve higher protein levels.

Purpose of the Study

The purpose of this study was to obtain selected producers perceptions of how marketing affects the management practices of Oklahoma alfalfa production.

Objectives of the Study

The following objectives were established to accomplish the purpose of the study.

1. To determine whether or not management practices are affected by market price and decisions.
2. To determine whether or not demands for higher forage quality affect harvest intervals and harvest dates.
3. To determine whether or not market value affects harvest intervals.
4. To determine the types of marketing information which are utilized by producers.
5. To determine the number of acres of alfalfa, both irrigated and dryland producers currently possess.
6. To determine what alfalfa varieties producers grow, how they perform, and what producers desire in a variety.
7. To determine what problems, both in marketing and in production producers perceive themselves to have.

Assumptions of the Study

1. The instrument (questionnaire) elicited accurate responses from the selected alfalfa producers.

2. The selected alfalfa producers provided an open, honest perception of what they perceived to be major problems in alfalfa production.

3. The selected alfalfa producers understood and/or accurately comprehended the questions asked on the instrument.

Scope of the Study

The scope of this study included 143 selected Oklahoma alfalfa producers, who had advertized alfalfa hay on HAYMARKET from 1982 - 1990.

Definition of Terms

The following definitions are presented as they apply to this study.

AIM - Alfalfa Integrated Management, an interdisciplinary extension and research working group dealing with all aspects of alfalfa.

Bloom - Mature stage of plant growth when flowers begin to appear.

Bud - Immature stage of growth, after prebud and before bloom.

CP - Crude protein, all nitrogenous substances contained in feedstuffs.

HAYMARKET - A computer-assisted marketing program for alfalfa hay, designed to assist growers in marketing their alfalfa more effectively.

IPM - Integrated Pest Management, an integrated approach of controlling pests only when their numbers or damage become economically important.

Prebud - Immature stage of growth, before formation of buds in terminal.

Regrowth - Elongation of stems from the crown, either before or after harvesting.

TDN - Total digestible nutrients, sum total of all digestible organic nutrients, including proteins, nitrogen-free extract, fiber, and fat.

Variety - A term denoting a collection of cultivated plants that is clearly distinguishable by any characteristics, and retains these characteristics when reproduced.

CHAPTER II

REVIEW OF LITERATURE

The purpose of this chapter is to present a review of literature which the author deemed relevant to this study. This review of literature is divided into the following sections: (1) History of Alfalfa; (2) Factors that Regulate Quality in Alfalfa Hay; (3) Economics of Producing Alfalfa Hay; (4) Related Research; (5) HAYMARKET; (6) Alfalfa Integrated Management; (7) Summary.

History of Alfalfa

Alfalfa, Medicago sativa L. is agreed to have originated in Asia Minor, Transcaucasia, Iran, and Turkey. The geographic center most often mentioned as the home of alfalfa is Iran (Bolton, 1962). The oldest known reference to alfalfa is from Turkey (1300 B.C.) and Babylonia (700 B.C.). It is believed, however that the Sumerian merchants from river villages of Mesopotamia had ships engaged in maritime trade in the Mediterranean as early as 4,00 B.C. (Hendry, 1923).

During the 4th century B.C., alfalfa was brought to greece by invading Median (Persian) armies to feed chariot horses and other animals. Soon after, alfalfa gained importance in Greek agriculture (Hendry, 1923). The Romans acquired alfalfa from the Greek civilization, and it spread throughout Italy (Bolton, Goplen, and

Baenziger, 1972). The Romans understood the importance of alfalfa as a fodder for horses and other animals. They were well aware of the necessity for curing hay properly and their advanced knowledge in crop husbandry suggests that they be credited with being the fathers of forage culture (Ahlgren, 1949).

During the same time frame that alfalfa arrived in Italy, it also began its eastward movement. In 126 B.C. the Chinese Emperor Wu initiated an expedition into Russian Turkestan area to procure breeding stock of the highly prized Iranian horses. During the expedition, alfalfa seed was collected and returned to China (Hendry, 1923).

In the time of the Roman Empire (27 B.C. - 395 A.D.) alfalfa was established in their newly acquired provinces. Throughout the 1st century its culture became evident in southern Spain, the Lucerne Lake region in central Switzerland, and southern France (Hendry, 1923). Hendry (1923) also notes a separate Moslem introduction into Spain. In the 8th century, Mohammedanism carried the armies of Islam across west Africa and into Spain. The Spanish acceptance of the Arabic word alfalfa over the Roman words, medica or lucerne yields significance to this alternate route.

The colonization of the Americas by the Spaniards and Portuguese in the 16th century introduced alfalfa into Mexico and Peru. Alfalfa thrived in the new environment and spread from Peru to Chile, Argentina, and Uruguay by 1775 (Klinkowski, 1933).

Alfalfa was most likely brought from Mexico to Texas, Arizona, New Mexico, and California by early missionaries. The introduction of "Chilean clover" to California was probably the most important (Stewart, 1926). Hendry (1923) indicates that the first seed arrived between 1847

and 1850 and became very popular with the California stockmen.

Alfalfa was well suited to the sunny dry climate of the Southwestern USA. During the late 1800's more alfalfa was brought into Colorado from Mexico and soon spread to Utah, Kansas, Montana, Iowa, Missouri, and Ohio. The Chilean sources of alfalfa were well adapted to western states but lacked winter hardiness for success in northern and eastern states.

While spanish sources were being introduced into the Southwest, New England colonists and immigrants from Europe had already brought the plant under the name Lucerne to eastern North America (Scofield, 1908). The earliest recordings of the crop were in Georgia (1736), North Carolina (1739), and New York (1791). Bolton (1962) suggests that the acid soils and humid climate are responsible for the lack of success in that area.

The successful cultivation of alfalfa in the northern states was not until the late 1800's when varieties such as Grimm, Baltic, and Cossack were introduced to the United States from colder areas of Europe (Stewart, 1926).

Alfalfa production in Oklahoma began around 1900 and was one of the first crops planted by the pioneers. Seed brought in mainly from Kansas and Colorado was of Chilean Strains introduced from Mexico. During the 1920's, 250,000 acres of Alfalfa were grown in Oklahoma. This number increased to 400,000 acres in the 1940's and 500,000 in the mid 1960's. Alfalfa reached a high of 600,000 acres in 1971 and between 400,000 and 500,000 acres are maintained in Oklahoma (Sholar et al., 1982).

Factors that Regulate Quality in Alfalfa Hay

The most important factor for high quality forage is cutting at early stages of maturity. Alfalfa that is harvested at prebud stage has higher protein and nutrient levels. But, with alfalfa harvested during early stages of maturity, yields are lower than when harvested at later stages of maturity.

The best compromise of yield and quality is usually between one and ten percent bloom. Although total yield increases between early bloom and full bloom, according to Fuess and Tesar (1968), yields of total digestible nutrients may actually decrease after early bloom because of loss of lower leaves due to age, lodging, diseases, and other factors. Therefore, saving leaves is of prime importance in producing high quality hay. Alfalfa leaves contain higher quantities of digestible nutrients than do stems of the same plant (Smith, 1969).

Another factor in producing higher quality hay is to harvest when the elongation of new shoots from the crown begin to appear (regrowth). This method may not always be a satisfactory indicator for harvesting, as regrowth does not appear regularly. Regrowth may appear after a period of draught is broken by rain or after periods of stress brought on by insect infestations of weevils or aphids.

The ideal harvest period would be when the regrowth was below the height of the swather or mower to avoid cutting the next flush of growth. According to Nelson and Smith (1968), the most rapid period of growth is from beginning of regrowth to just before the appearance of first flowers.

Economics of Producing Quality Alfalfa Hay

One question many producers are concerned with is how much more is higher quality alfalfa hay worth, both to the seller and the buyer. Tables I - IV show the value of alfalfa in a dairy ration for four different qualities of hay. Alfalfa is compared in each table with alternative combinations of soybean meal prices and corn prices. Table I is for low quality alfalfa with crude protein (CP) equal to 12 percent and total digestible nutrients (TDN) equal to 50 percent. Table II is for higher quality alfalfa, with CP equal to 16 percent and TDN equal to 55 percent. Table III is for alfalfa with CP equal to 20 percent and TDN equal to 60 percent. Table IV is for very high quality alfalfa hay, with 24 percent CP and 65 percent TDN (Ward, 1986).

In determining the value of alfalfa according to quality, use of Tables I - IV should be as follows. If a producer would like to sell alfalfa with 12 percent CP, its estimated TDN is 50 percent. Assuming the current price for corn is $2.50/bu., and $10.00/cwt. for soybean meal, the estimated alfalfa value is $76.86/ton. Move across the row to where the corn is 2.50 and then the column where soybean meal is 10. Values from tables II, III, and IV are for alfalfa with 16, 20, and 24 percent protein. Total worth of the alfalfa would be $93.92/ton, $110.96/ton, and $127.97 respectively.

These figures are only an estimate. Alfalfa prices are determined by supply and demand, but some dairymen pay more for each 1 percent increase in crude protein.

TABLE I

ALFALFA HAY VALUE ASSUMING CP=12% AND TDN=50%

Corn prices ($/bu.)	Soybean mean prices ($/cwt.) 8.00	9.00	10.00	11.00	12.00	13.00	14.00	15.00
1.25	49.24	52.85	56.45	60.06	63.66	67.27	70.87	74.48
1.50	53.32	56.93	60.53	64.14	67.74	71.35	74.95	78.56
1.75	57.41	61.01	64.62	68.22	71.82	75.42	79.02	82.62
2.00	61.49	65.09	68.70	72.30	75.90	79.50	83.10	86.70
2.25	65.57	69.17	72.78	76.38	79.98	83.58	87.18	90.78
2.50	69.65	73.25	76.86	80.46	84.06	87.66	91.26	94.86
2.75	73.73	77.33	80.94	84.54	88.14	91.74	95.34	98.94
3.00	77.81	81.41	85.02	88.62	92.22	95.82	99.42	103.02

Source. Ward, C. E. (1986). Economics of alfalfa hay in dairy rations. Proceedings of the Alfalfa Management Satellite Teleconference I. Cooperative Extension Service, Oklahoma State University, Stillwater, (Circular E - 859), pp. 16-21.

TABLE II

ALFALFA HAY VALUE ASSUMING CP=16% AND TDN=55%

Corn prices ($/bu.)	Soybean mean prices ($/cwt.) 8.00	9.00	10.00	11.00	12.00	13.00	14.00	15.00
1.25	63.50	69.02	74.54	80.05	85.57	91.09	96.61	102.12
1.50	67.38	72.89	78.41	83.93	89.44	94.96	100.48	106.00
1.75	71.25	76.77	82.28	87.80	93.32	98.84	104.36	109.88
2.00	75.12	80.64	86.16	91.68	97.20	102.72	108.24	113.76
2.25	79.00	84.51	90.04	95.56	101.08	106.60	112.12	117.64
2.50	82.87	88.39	93.92	99.44	104.96	110.48	116.00	121.52
2.75	86.74	92.26	97.80	103.32	108.84	114.36	119.88	125.40
3.00	90.61	96.13	101.68	107.20	112.72	118.24	123.76	129.28

Source. Ward, C. E. (1986). Economics of alfalfa hay in dairy rations. Proceedings of the Alfalfa Management Satellite Teleconference I. Cooperative Extension Service, Oklahoma State University, Stillwater, (Circular E - 859), pp. 16-21.

TABLE III

ALFALFA HAY VALUE ASSUMING CP=20% AND TDN=60%

Corn prices ($/bu.)	Soybean mean prices ($/cwt.) 8.00	9.00	10.00	11.00	12.00	13.00	14.00	15.00
1.25	77.76	85.19	92.62	100.05	107.48	114.91	122.34	129.77
1.50	81.43	88.86	96.29	103.72	111.14	118.57	126.00	133.43
1.75	85.09	92.52	99.95	107.38	114.81	122.24	129.67	137.10
2.00	88.76	96.19	103.62	111.05	118.48	125.91	133.34	140.77
2.25	92.42	99.85	107.29	114.72	122.15	129.58	137.01	144.44
2.50	96.09	103.52	110.96	118.39	125.82	133.25	140.68	148.11
2.75	99.75	107.18	114.63	122.06	129.49	136.92	144.35	151.78
3.00	103.42	110.85	118.30	125.73	133.16	140.59	148.02	155.45

Source. Ward, C. E. (1986). Economics of alfalfa hay in dairy rations. Proceedings of the Alfalfa Management Satellite Teleconference I. Cooperative Extension Service, Oklahoma State University, Stillwater, (Circular E - 859), pp. 16-21.

TABLE IV

ALFALFA HAY VALUE ASSUMING CP=24% AND TDN=65%

Corn prices ($/bu.)	Soybean mean prices ($/cwt.) 8.00	9.00	10.00	11.00	12.00	13.00	14.00	15.00
1.25	92.02	101.36	110.70	120.05	129.39	138.73	148.07	157.41
1.50	95.48	104.82	114.16	123.50	132.84	142.19	151.53	160.87
1.75	98.48	108.28	117.62	126.96	136.30	145.64	154.98	164.32
2.00	102.39	111.74	121.07	130.41	139.75	149.09	158.43	167.77
2.25	105.85	115.19	124.52	133.86	143.20	152.54	161.88	171.22
2.50	109.31	118.65	127.97	137.31	146.65	155.99	165.33	174.67
2.75	112.77	122.11	131.42	140.76	150.10	159.44	168.78	178.12
3.00	116.22	125.57	134.87	144.21	153.55	162.89	172.23	181.57

Source. Ward, C. E. (1986). Economics of alfalfa hay in dairy rations. Proceedings of the Alfalfa Management Satellite Teleconference I. Cooperative Extension Service, Oklahoma State University, Stillwater, (Circular E - 859), pp. 16-21.

Related Research

Alfalfa is the most important cultivated forage crop in the world (Bolton, 1962). It is a highly prized fodder for most types of livestock. Alfalfa is a high quality feed for horses, complete source of nutrients for the production of milk and meat, a soil improving crop, and a nitrogen source for other rotational crops (Marble, 1989).

Legalized betting on horse racing in Oklahoma has opened up a new and potential area for the alfalfa industry. Many horsemen have frowned on alfalfa in a ration for race horses. But many horse owners are now including alfalfa hay and/or alfalfa cubes in their feeding programs (Crawford, 1976).

Alfalfa has an advantage over other types of hay commonly fed to horses because of its nutrient density. This gives the horse owner more freedom in selection of grains to supplement the hay ration. Alfalfa is a good fodder to feed in combination with oats, as most horse farms use this grain. Alfalfa also helps meet the nutrient needs of lactating mares and young growing horses (Freeman, 1986).

Alfalfa is a excellent feed additive for the dairy cow. But dairymen are more aware of higher quality (protein) than most. Row (1976) indicates that the dairymen are looking for second and third cutting alfalfa with 55 percent or higher TDN. TDN is also tied directly to price, the lower the TDN the lower the price the dairymen are willing to pay.

Alfalfa is also the preferred roughage for beef cattle. Alfalfa delivers high yields and is highly palatable and nutritious. Alfalfa is unsurpassed as a feed ingredient, the protein is of high quality and readily available to the animal. Cattlemen who utilize alfalfa in their

rations significantly reduce the need for additional protein supplements (Arnold, 1976).

Alfalfa has been recognized as a soil building crop. Bartholomew, Shrader, and Endlehorn (1957) indicate that by including alfalfa in a long - term three year rotation of corn, oats, and alfalfa, soil nitrogen was not only maintained under cultivation, but actually increased. Barnes and Smith (1976) reported that they found from 85 to 102 pounds of N were removed in the alfalfa in a seedling year and that a sorghum - sudan crop grown in the field the following year recovered form 36 to 41 percent of the total N available as estimated from that in the harvested alfalfa.

Although alfalfa is a excellent soil building crop, fertility is a major management decision which could determine quality of hay, total tonnage produced, and stand persistence. Recommended soil Ph for alfalfa is 6.6 - 7.5 (Woodruff, 1967). Soils that are below 6.6 are considered too acidic for good alfalfa growth and an application of the recommended rate of lime is encouraged. Pearson and Hoveland (1974) state that the benefits of liming are: (1) decreased solubility of toxic elements, (2) increased availability of essential nutrients, and (3) increased soil microorganism activity. Lime should be applied prior to stand establishment and it is recognized that lime should be applied at least six months before seeding (Barber, 1968).

Alfalfa, when properly inoculated with Rhizobium meliloti fixes large amounts of atmospheric nitrogen (N) by symbiotic N_2 fixation. A light application of nitrogen fertilizer at seeding time to aid in seedling establishment prior to the development of nodulation may give seedling alfalfa a much needed boost (Hojjati, S.M., W.C. Templeton,

Jr., and J.H. Taylor, 1978).

Phosphorus is essential for the establishment and development of strong root systems (Tesar, 1954). Most applications of Phosphorus (P) are made prior to seeding, and top dressing of phosphorus is applied as needed throughout the stands production life. Most phosphorus is applied as ordinary (OSP) or triple superphosphate (TSP).

The potassium (K) requirements of a producing alfalfa field is greater than for any other nutrient. In a high - yield, high management, production system, alfalfa is subject to frequent cuttings at immature growth stages and large amounts of potassium are applied yearly (Tesar, Lawton, and Kawin, 1954). If available, alfalfa will consume greater amounts of K than is necessary for the tonnage of hay produced, this is known as luxury consumption. Invasions of grassy weeds and reduced longevity have been linked with insufficient potassium levels in the soil (Blaser and Kimbrough, 1968). The most common sources of potassium are KCl and K_2SO_4 and the easiest and most efficient method of application is to top dress the fertilizer.

HAYMARKET

HAYMARKET is a computer-assisted marketing program for alfalfa hay, it was initiated in January 1983 and provided alfalfa growers an opportunity to have their hay quality tested and evaluated by a third party grader. The information about sale lots of alfalfa is entered into a microcomputer and made available to potential buyers in several states (Ward, Cuperus, and Rommann, 1988). HAYMARKET was the first program of its kind for alfalfa in the United States. The volume of hay marketed through HAYMARKET has been small, but it has had a large

influence on alfalfa growers in Oklahoma and throughout the United States.

Alfalfa Integrated Management

The involvement of agricultural economics' in extension programming with alfalfa was limited to marketing from 1982 - 1985. During 1985, the marketing specialist, encouraged by the IPM Coordinator, began to work with the dairy specialist in animal science in determining alfalfas' value in a dairy ration. Dairymen needed to know what alfalfa was worth in relation to other sources of protein, and growers needed to know how much their alfalfa was worth when selling. The Equine Specialist and Extension Dairy Specialist's involvement with HAYMARKET resulted in a better understanding of feed value of alfalfa and its marketing potential (Stark et al. 1990).

Competitiveness and profitability of American agriculture has been a major concern and a target for national initiatives. The Extension Committee on Organization and Policy (ECOP) recommended one of the keys to the success of the Cooperative Extension Service (CES) is the integration of production, financial management, and marketing to help agricultural producers achieve long term, sustainable economic returns (Lipke et al. 1987).

The Oklahoma alfalfa extension program was delivered to producers during the period 1987 - 1989 through scouting programs, newsletters, educational meetings, HAYMARKET, personal contact, progress reports, Current Reports, Fact Sheets, press releases, field demonstrations, field tours, area and county extension meetings (Stark et al. 1990).

Prior to 1982, most research and extension activities related to

alfalfa were focused individually on alfalfa variety improvement for disease and insect resistance, forage quality, fertility requirements, hay storage, plant pathology, insect management, and weed control. There was little to no economics programming, management, or marketing.

The AIM group was and is interested in learning what management practices were being used by Oklahoma alfalfa producers, where they were obtaining information about different management decisions, and where future efforts should be directed.

Oklahoma State University was commissioned by USDA/ES to develop, implement, and evaluate an interdisciplinary extension program in alfalfa. This program indicates the formation, evolution, and current status of the Alfalfa Integrated Management (AIM) Program, producer attitudes and practices, and educational areas. The AIM effort was one of the first times that specialists at Oklahoma State University worked together as an organization to deal with economics, production, and marketing as a system.

The AIM project deals with its evolution, its implementation with producers, products resulting from that implementation, and an evaluation of those projects. During 1987 - 1989, the AIM program was delivered to producers by (1) a satellite videoconference on marketing, (2) development of a comprehensive expert system attempting to incorporate short and long term economics, (3) intensive crop management scouting programs, (4) producer meetings, (5) literature, (6) economic evaluation of demonstrations, and a short course for extension employees (Stark et al. 1990).

According to Stark et al. (1990), a three-part questionnaire was mailed to 4,000 Oklahoma alfalfa growers during the summer and fall of

1988. The emphasis of this approach was to evaluate the Alfalfa Integrated Management (AIM) objectives, quantify areas of accomplishment, and examine needed areas of future development. Results of that survey concluded that OSU Cooperative Extension educational programs have impacted procedures resulting in changes in variety selection, insect management, soil fertility, weed management, and marketing. Reasons for the changes that occurred were: understanding of the production, economics and marketing system; producer input and ownership; and direct input and ownership by county extension staff of programs.

Sholar (1982) stated that alfalfa quality is influenced by stage of plant growth at harvest. Percent protein and total digestible nutrients (TDN) will be higher when the alfalfa growth is young and lowest when it is mature.

Contrary to popular belief, research in Oklahoma has proven that harvesting established stands (three to five years old) of alfalfa at any fall date has little or no effect on spring forage yields and stand persistence (Dowdy, 1988).

According to Stark et al. (1990), the number one alfalfa problem identified by state - wide board of directors of the Oklahoma Alfalfa Hay and Seed Association and county hay associations was alfalfa marketing. This was made very obvious at a meeting of county alfalfa association members with a group of Texas dairymen. The Oklahoma growers were surprised at the high prices paid for alfalfa by the Texas dairymen and Texas dairymen were surprised at the low prices received by Oklahoma growers.

In September 1989, 110 producers who had been involved with high

impact scouting programs that have delivered interdisciplinary programs were surveyed to document program impact on attitudes, production practices, and on profit. Conclusions of that survey indicated that changes in practices and knowledge level take significant time and effort. Producers have a significant investment in the production system and changes in producer practices occur slowly. OSU Cooperative Extension educational programs have impacted producers resulting in changes in variety selection, insect management, soil fertility, weed management, and marketing. The reasons for the changes that occurred were: (1) our understanding of the production, economics, and marketing system; (2) producer input and ownership, and (3) direct input and ownership by county extension staff of programs (Stark et al. 1990).

Marketing is said to be the last void in farming. Many producers take advantage of improved varieties, pesticides, and production practices but leave marketing of their hay to chance. Producers need to improve production practices to increase forage yields, quality, and profits. Producers also need to improve their marketing procedures if they desire to reap the benefits of any increased price for added expenses made to improve feed quality (Rohweder, 1976).

Summary

Alfalfa is a perennial plant that produces well under both irrigated and dryland conditions. With proper and timely management, stands should remain productive between five to eight years. Profits are directly related to stand life, which means, that the longer a alfalfa stand remains productive, profits should increase as the stand gets older. This assumes that all other factors remain constant.

Knowing when to harvest is the factor that most affects the quality of alfalfa hay. Alfalfa should be harvested prior to the appearance of flowers, which would be in the bud stage. Another method is to harvest when lateral shoots start to elongate from the base of the crown (regrowth). Producers should be aware that repeated early cuts may affect the stand life.

Alfalfa's utility is derived from its value as a feed source. Horse, dairy, and beef enterprises use alfalfa for its high crude protein (15 - 25 percent), energy content, and digestibility.

CHAPTER III

METHODOLOGY

The purpose of this chapter is to describe the methods and procedures used to conduct this study. The purpose of this study was to solicit selected producers' perceptions of how marketing affects the management practices of Oklahoma alfalfa production.

Institutional Review Board (IRB)

Federal regulations and Oklahoma State University policy require review and approval of all research studies that involve human subjects before investigators can begin their research. The Oklahoma State University Office of University Research Services and the IRB conduct this review to protect the rights and welfare of human subjects involved in biomedical and behavioral research. In compliance with the aforementioned policy, this study received the proper surveillance and was granted permission to continue.

Objectives of the Study

The following objectives were established to accomplish the purpose of the study.

1. To determine whether or not management practices are affected by market price and decisions.
2. To determine whether or not demands for higher forage quality

affects harvest intervals and harvest dates.

3. To determine whether or not market value affects harvest intervals.

4. To determine the types of marketing information which are utilized by producers.

5. To determine the number of acres of alfalfa, both irrigated and dryland producers currently posses.

6. To determine what alfalfa varieties producers grow, how they perform, and what producers desire in a variety.

7. To determine what problems, both in marketing and in production producers perceive themselves to have.

The Population

The population of this study consisted of all alfalfa producers who advertized alfalfa hay on HAYMARKET during the years 1982 - 1990. Producers within this population included all age groups, individuals, family farms, and corporation farms with both irrigated and dryland alfalfa. The population was determined by the author, Extension Forage Specialist, and the IPM Extension Specialist. Table V reflects the Total population of this study by counties in Oklahoma.

Selection and Development of the Instrument

In the development of the instrument (See Appendix A) to meet the objectives of this study, instruments used in related studies were reviewed and evaluated. Specifically, those developed by Finley (1981), and Stark et al. (1990).

In analyzing various methods of gathering data, the mailed

TABLE V

RESPONDENTS BY COUNTY

County	Frequency	Distribution
	N	%
Grady	12	14.1
Kay	9	10.5
Grant	7	8.2
Garvin	6	7.0
Washita	5	5.7
Custer	5	5.7
Ellis	4	4.6
Cleveland	4	4.6
Stephens	3	3.5
Noble	3	3.5
Alfalfa	3	3.5
McClain	3	3.5
Canadian	3	3.5
Beaver	2	2.3
Garfield	2	2.3
Caddo	2	2.3
Payne	2	2.3
Blaine	2	2.3
Comanche	1	1.2
Woodward	1	1.2
Woods	1	1.2
Beckham	1	1.2
Haskell	1	1.2
Johnston	1	1.2
Hughes	1	1.2
Jackson	1	1.2
Total	85	100.0

questionnaire method was chosen to be the most appropriate to meet the objectives of the study. Other methods of data gathering that were considered included the personal interview and the telephone survey methods. It was determined to be unfeasible to utilize either method.

Despite an investigator's efforts in designing a questionnaire, a large number of respondents will fail to complete and return the instrument included in the initial mailing. As a result, individual instruments were inconspicuously coded so that a follow-up mailing could be conducted.

After reviewing examples of perception type questionnaires, the investigator and major advisor compiled and reviewed questions until a useable list was compiled. The list of questions were related to alfalfa management practices and perceived problems.

After completion of the list of questions to be used in the instrument, each question was reviewed to test the applicability, understandability, continuity, and relevance to management problems. Necessary revisions were made and the instrument was given to faculty members of the Agriculture Education Department, Oklahoma State University. After a number of revisions, the instrument was tested by the investigator and major advisor for continuity. During the process of development, the investigator was concerned that if the instrument was too lengthy, alfalfa producers would not take the time to complete and return the questionnaire. Having this as a major concern, great care was given to the types of questions to be asked. The instrument was designed to take 20 minutes (or less) of the alfalfa producers's time to complete and provide necessary and useful information.

The Instrument

To gather data concerning selected producers perceptions of how marketing affects the management practices of Oklahoma alfalfa production, 26 forced choice and three open-ended questions were included. The questions related to different areas of alfalfa management, those areas included; acres of alfalfa, insect management, soil fertility, fall harvest management, and marketing problems.

Collection of Data

After final revisions were made, the instrument was ready to be mailed to the selected Oklahoma alfalfa producers. The copies of the instrument were coded so that follow-up letters and surveys could be sent, if necessary. On January 18, 1991, questionnaires along with a cover letter were mailed to 143 producers who had participated in HAYMARKET during 1982 - 1990 (See Appendixes A and B). A second questionnaire was mailed on February 4, 1991 to 85 nonrespondents of the first survey. Producers completed 58 questionnaires mailed on January 18, and 27 of the questionnaires mailed on February 4, for a total response of 85 (59.4 percent).

Analysis of Data

Data from the instrument were analyzed by hand on a master questionnaire, utilizing descriptive statistics that included frequency distributions (N) and percentages (%).

> The primary use of descriptive statistics is to describe information or data through the use of numbers. The characteristics of groups of numbers representing information or data are called descriptive statistics. Descriptive statistics are used to describe groups of numerical data such as test

> scores, numbers or hours of instruction, or the number of students enrolled in a particular course (Key, 1981, p.126).

The data was reviewed and interpreted by the investigator and major adviser and presented in Chapter IV.

CHAPTER IV

PRESENTATION AND ANALYSIS OF DATA

Introduction

The purpose of this chapter is to report the findings from the questionnaire used to conduct the study. The intent of the study was to determine the selected alfalfa producer's perceptions of how marketing affects the management practices of Oklahoma alfalfa production.

The scope of the study included a total of 143 selected alfalfa producers in Oklahoma. The questionnaire was mailed to the selected alfalfa producers on January 18, 1991 and again to the nonrespondents on February 4, 1991. Of the 143 included in the study, 85 or 59.4 percent responded to the questionnaire.

Findings

Reported in Table VI is the frequency distribution of respondents by the number of acres of alfalfa they have under production. Of the 18 respondents, six (33.3 percent) indicated they have 1 to 75 acres of irrigated alfalfa. Nine (50.0 percent) of the respondents have 76 to 150 acres and three (16.7 percent) have 151 to 225 acres. Finally, none (00.0 percent) of the respondents indicated they have 226 or more acres of irrigated alfalfa. Of the 71 respondents, 29 (40.8 percent) indicated they have 1 to 75 acres of dryland alfalfa. Nineteen (26.8 percent) of the respondents have 76 to 150 acres and nine (12.7 percent)

TABLE VI

FREQUENCY DISTRIBUTION OF RESPONDENTS BY THE NUMBER OF ACRES OF ALFALFA THEY HAVE IN PRODUCTION

Number of Acres	Frequency N	Distribution %
Irrigated		
1 - 75	6	33.3
76 - 150	9	50.0
151 - 225	3	16.7
226 or more	0	0.0
Total	18	100.0
Dryland		
1 - 75	29	40.8
76 - 150	19	26.8
151 - 225	9	12.7
226 or more	14	19.7
Total	71	100.0

have 151 to 225 acres. Finally, 14 (19.7 percent) of the respondents indicated they have 226 or more acres of dryland alfalfa.

Reported in Table VII is the frequency distribution of respondents by whether the majority of their alfalfa land is owned, rented, leased, or sharecropped. Of the 85 respondents, 57 (67.0 percent) indicated they owned the majority of their alfalfa land. Nine (10.6 percent) of the respondents rented the majority of their alfalfa land, and two (2.3 percent) leased the majority of their alfalfa land. Finally, 17 (20.1 percent) of the respondents indicated they sharecrop the majority of their alfalfa land.

Reported in Table VIII is the frequency distribution of respondents by what alfalfa varieties produce the best, very good, good, and poor. Of the varieties grown by the respondents, Cimarron was reported to be "best" by 26 respondents, "very good" by nine respondents, "good" by two respondents, and none reported Cimarron to be "poor". Oklahoma common was reported to be "best" by 14 respondents, "very good" by seven respondents, "good" by five respondents and none reported Oklahoma common as "poor". WL-320 was reported to be "best" by six respondents, "very good" by one respondent, "good" by one respondent, and "poor" by one respondent. WL-318 was reported to be "best" by three respondents, "very good" by three respondents, "good" by two respondents and none reported WL-318 to be "poor". Pioneer Brand 555 was reported to be "best" by four respondents, "very good" by one respondent, "good" by two respondents, and "poor" by one respondent. Arc was reported to be "best" by three respondents, "very good" by three respondents, "good" by one respondent, and none reported Arc to be "poor".

TABLE VII

FREQUENCY DISTRIBUTION OF RESPONDENTS BY WHETHER OR NOT THE MAJORITY OF ALFALFA (LAND) IS OWNED, RENTED, LEASED, OR SHARECROPPED

Majority of Land Utilized For Alfalfa Production	Frequency Distribution	
	N	%
Owned	57	67.0
Rented	9	10.6
Leased	2	2.3
Sharecropped	17	20.1
Total	85	100.0

TABLE VIII

FREQUENCY DISTRIBUTION OF RESPONDENTS BY WHAT ALFALFA VARIETIES PRODUCE THE BEST, VERY GOOD, GOOD, AND POOR

Varieties	Frequency Distribution			
	Best	Very Good	Good	Poor
Cimarron	26	9	2	0
OK common	14	7	5	0
WL 320	6	1	1	1
WL 318	3	3	2	0
555	4	1	2	1
Arc	3	3	1	0
Apollo	3	1	2	0
Buffalo	3	1	1	1
Liberty	2	2	0	1
Cody	2	0	0	2
OK08	1	1	0	1
Cimarron VR	1	0	0	0
Arrow	1	0	0	0
5183	1	0	0	0
KS common	1	0	0	0
Dawson	0	1	0	0
Team	0	1	0	0
Kanza	0	0	1	0
So. Special	0	0	0	1

Reported in Table IX is the frequency distribution of respondents by whether or not using improved varieties are worth the extra cost. Of the 84 respondents, 33 (39.3 percent) indicated that improved varieties is always worth the extra cost. Thirty-four (40.5 percent) of the respondents indicated that improved varieties are usually worth the extra cost, and 13 (15.5 percent) indicated that improved varieties are seldom worth the extra cost. Finally, four (4.7 percent) of the respondents indicated that improved varieties are never worth the extra cost.

Reported in Table X is the frequency distribution of respondents by what is most important in varietal selection. Of the 78 respondents, 14 (17.9 percent) indicated that insect resistance is most important in varietal selection. Seven (9.0 percent) of the respondents indicated that disease resistance is most important and 37 (47.4 percent) indicated that improved yield is most important. Finally, 20 (25.7 percent) of the respondents indicated that longer stand life is most important in varietal selection.

Reported in Table XI is the frequency distribution of respondents by how they determine when to spray for insects. Of the 84 respondents, 30 (35.7 percent) indicated that visible damage determined when to spray for insects. Twenty-seven (32.1 percent) of the respondents indicated that insect population determined when to spray for insects and 25 (29.8 percent) indicated that a scout report determined when to spray for insects. Finally, two (2.4 percent) of the respondents indicated that an applicator recommendation determined when to spray for insects.

Reported in Table XII is the frequency distribution of respondents by the number of insecticide applications per year. Of the 84

TABLE IX

FREQUENCY DISTRIBUTION OF RESPONDENTS BY WHETHER OR NOT USING IMPROVED VARIETIES IS WORTH THE EXTRA COST

Improved Varieties worth extra cost	Frequency N	Distribution %
Always	33	39.3
Usually	34	40.5
Seldom	13	15.5
Never	4	4.7
Total	84	100.0

TABLE X

FREQUENCY DISTRIBUTION OF RESPONDENTS BY TRAITS CONSIDERED MOST IMPORTANT IN VARIETAL SELECTION

Varietal Selection Traits	Frequency N	Distribution %
Insect Resistance	14	17.9
Disease Resistance	7	9.0
Improved Yield	37	47.4
Longer Stand Life	20	25.7
Total	78	100.0

TABLE XI

FREQUENCY DISTRIBUTION OF RESPONDENTS BY METHODS USED TO DETERMINE WHEN TO SPRAY FOR INSECTS

When to Spray	Frequency N	Distribution %
Visible Damage	30	35.7
Insect Population	27	32.1
Scout Report	25	29.8
Applicator Recommendation	2	2.4
Total	84	100.0

TABLE XII

FREQUENCY DISTRIBUTION OF RESPONDENTS BY THE NUMBER OF INSECTICIDE APPLICATIONS PER YEAR

Insecticide Applications	Frequency N	Distribution %
0 to 1 times/year	70	83.3
1 to 2 times/year	11	13.1
3 or more times/year	2	2.4
Never	1	1.2
Total	84	100.0

respondents, 70 (83.3 percent) indicated they applied insecticide 0 to 1 times per year. Eleven (13.1 percent) of the respondents indicated they applied insecticide 1 to 2 times per year and two (2.4 percent) indicated that they applied insecticide 3 or more times per year. Finally, one (1.2 percent) of the respondents indicated never applying insecticide.

Reported in Table XIII is the frequency distribution of respondents by what insecticide is most economical to use by the types of pests. Of the 81 respondents, 40 (49.4 percent) indicated that parathion was most economical to use on alfalfa weevils. Nine (11.1 percent) of the respondents indicated that Lorsban was most economical to use on alfalfa weevils and 30 (37.0 percent) indicated that Furadan was most economical to use on this pest. Finally, two (2.5 percent) of the respondents indicated that they used other insecticides on alfalfa weevils. Regarding aphid control, of the 60 respondents, 46 (76.7 percent) indicated that parathion was most economical to use. Seven (11.7 percent) of the respondents indicated that Lorsban was most economical to use and six (10.0 percent) of the respondents indicated that Furadan was most economical for use on alfalfa aphids. Finally, one (1.6 percent) of the respondents indicated that they used other insecticides on alfalfa aphids.

Reported in Table XIV is the frequency distribution of respondents by the number of producers enrolled in an integrated pest management program. Of the 84 respondents, 17 (20.2 percent) indicated that they were enrolled in an IPM program, but 67 (79.8 percent) of the respondents indicated that they were not enrolled in an IPM program.

Reported in Table XV is the frequency distribution of respondents

TABLE XIII

FREQUENCY DISTRIBUTION OF RESPONDENTS BY PERCEPTIONS OF MOST ECONOMICAL INSECTICIDES

Insecticide	Frequency N	Distribution %
Alfalfa Weevils		
Parathion	40	49.4
Lorsban	9	11.1
Furadan	30	37.0
Other	2	2.5
Total	81	100.0
Aphids		
Parathion	46	76.7
Lorsban	7	11.7
Furadan	6	10.0
Other	1	1.6
Total	60	100.0

TABLE XIV

FREQUENCY DISTRIBUTION OF RESPONDENTS BY ENROLLMENT IN AN INTEGRATED PEST MANAGEMENT PROGRAM

IPM Program	Frequency N	Distribution %
Yes	17	20.2
No	67	79.8
Total	84	100.0

TABLE XV

FREQUENCY DISTRIBUTION OF RESPONDENTS BY THE NUMBER OF PRODUCERS HAVING A SOIL ANALYSIS ON ALFALFA FIELDS PRIOR TO PLANTING

Soil Analysis	Frequency N	Distribution %
Always	50	58.8
Usually	25	29.4
Seldom	7	8.2
Never	3	3.6
Total	85	100.0

by the number of producers that have a soil analysis performed on alfalfa fields prior to planting. Of the 85 respondents, 50 (58.8 percent) indicated that they always have a soil analysis performed. Twenty-five (29.4 percent) of the respondents indicated they usually have a soil analysis performed and seven (8.2 percent) indicated that they seldom have this done. Finally, three (3.6 percent) of the respondents indicated that they never have their soil analyzed.

Reported in Table XVI is the frequency distribution of respondents by how often the producers apply fertilizer to existing alfalfa fields. Of the 78 respondents, 10 (12.8 percent) indicated they apply fertilizer every three years. Nineteen (24.3 percent) of the respondents indicated they apply fertilizer every two years and 41 (52.6 percent indicated they apply fertilizer every year. Finally, eight (10.3 percent) of the respondents indicated they never apply fertilizer.

Reported in Table XVII is the frequency distribution of respondents by how often the producers have a soil analysis performed on established stands. Of the 83 respondents, 31 (37.3 percent) indicated they perform a soil analysis every year. Twenty-one (25.3 percent) of the respondents indicated they perform a soil analysis every two or three years and 14 (16.9 percent) indicated they perform a soil analysis every three or four years. Finally, 17 (20.5 percent) of the respondents indicated they never perform a soil analysis.

Reported in Table XVIII is the frequency distribution of respondents by whether it is always, usually, seldom, or never profitable to keep the fertility adequate on established stands. Of the 81 respondents, 31 (38.3 percent) indicated it is always profitable to keep the fertility adequate. Thirty-five (43.2 percent) of the

TABLE XVI

FREQUENCY DISTRIBUTION OF RESPONDENTS BY HOW OFTEN FERTILIZER IS APPLIED TO EXISTING ALFALFA FIELDS

Apply Fertilizer	Frequency N	Distribution %
Every three years	10	12.8
Every two years	19	24.3
Every year	41	52.6
Never	8	10.3
Total	78	100.0

TABLE XVII

FREQUENCY DISTRIBUTION OF RESPONDENTS BY HOW OFTEN SOIL ANALYSES ARE PERFORMED ON ESTABLISHED STANDS

Soil Analysis	Frequency N	Distribution %
Every year	31	37.3
Two or three years	21	25.3
Three or four years	14	16.9
Never	17	20.5
Total	83	100.0

TABLE XVIII

FREQUENCY DISTRIBUTION OF RESPONDENTS PERCEPTIONS OF THE PROFITABILITY OF KEEPING FERTILITY ADEQUATE ON ESTABLISHED STANDS

Fertility	Frequency N	Distribution %
Always	31	38.3
Usually	35	43.2
Seldom	12	14.8
Never	3	3.7
Total	81	100.0

respondents indicated it is usually profitable and 12 (14.8 percent) indicated it is seldom profitable to keep the fertility adequate. Finally, three (3.7 percent) of the respondents indicated it is never profitable to keep the fertility adequate.

Reported in Table XIX is the frequency distribution of respondents by those attempting to produce higher forage yields or higher quality. Of the 84 respondents, six (7.1 percent) indicated they attempted to produce higher forage yields. Twenty-eight (33.3 percent) of the respondents indicated they attempted to produce higher quality and 49 (58.3 percent) indicated they attempted to produce both higher forage yields and higher quality. Finally, one (1.3 percent) of the respondents indicated they attempted to produce neither higher forage yields nor higher quality.

Reported in Table XX is the frequency distribution of respondents by when producers take the final harvest of the season. Of the 81 respondents, 10 (12.3 percent) indicated they take the final harvest September 1 - 10. Ten (12.3 percent) of the respondents indicated they take the final harvest September 11 - 20 and 24 (29.6 percent) indicated they take the final harvest September 21 - 30. Finally, 37 (45.8 percent) of the respondents indicated they take the final harvest October 1 or later.

Reported in Table XXI is the frequency distribution of respondents by the stage of growth at which they usually harvest. Of the 84 respondents, five (5.9 percent) indicated they harvest at 75 to 100% bud. Fifty-six (66.7 percent) of the respondents indicated they harvest at 1 - 10% bloom and 19 (22.6 percent) indicated they harvest at over 10% bloom. Finally, four (4.8 percent) of the respondents indicated

TABLE XIX

FREQUENCY DISTRIBUTION OF RESPONDENTS BY THOSE ATTEMPTING TO PRODUCE HIGHER FORAGE YIELDS OR HIGHER QUALITY

Goals	Frequency N	Distribution %
Higher forage	6	7.1
Higher quality	28	33.3
Both	49	58.3
Neither	1	1.3
Total	84	100.0

TABLE XX

FREQUENCY DISTRIBUTION OF RESPONDENTS BY WHEN THE FINAL HARVEST OF THE SEASON IS TAKEN

Final Harvest	Frequency N	Distribution %
September 1 - 10	10	12.3
September 11 - 20	10	12.3
September 21 - 30	24	29.6
October 1 or later	37	45.8
Total	81	100.0

TABLE XXI

FREQUENCY DISTRIBUTION OF RESPONDENTS BY STAGE OF GROWTH AT WHICH TO HARVEST

Stage of Growth	Frequency N	Distribution %
75 - 100% bud	5	5.9
1 - 10% bloom	56	66.7
Over 10% bloom	19	22.6
Visible regrowth	4	4.8
Total	84	100.0

they harvest at visible regrowth.

Reported in Table XXII is the frequency distribution of respondents by how many harvests they get per year. Of the 18 respondents with irrigated alfalfa, none (00.0 percent) indicated they get three harvests per year. Four (22.2 percent) of the respondents indicated they get four harvests per year and nine (50.0 percent) indicated they get five harvests per year. Finally, five (27.8 percent) of the respondents indicated they get six or more irrigated harvests per year. Of the 71 respondents with dryland alfalfa, none (00.0 percent) indicated they get one harvest per year. Two (2.8 percent) of the respondents indicated they get two harvests per year and six (8.4 percent) indicated they get three harvests per year. Finally, 63 (88.8 percent) of the respondents indicated they get four or more dryland harvests per year.

Reported in Table XXIII is the frequency distribution of respondents by whether or not they produce a seed crop each year. Of the 84 respondents, two (2.4 percent) indicated they always produce a seed crop. Ten (11.9 percent) of the respondents indicated they usually produce a seed crop and 39 (46.4 percent) seldom produce a seed crop. Finally, 33 (39.3 percent) of the respondents indicated they never produce a seed crop.

Reported in Table XXIV is the frequency distribution of respondents by the principle purchasers of their alfalfa hay. Of the 84 respondents, 13 (15.5 percent) indicated they sold to beef cattle producers. Fifty-six (66.7 percent) of the respondents indicated they sold to dairy farms and eight (9.5 percent) indicated they sold to horse producers. Finally, seven (8.3 percent) of the respondents indicated they did not sell their hay.

TABLE XXII

FREQUENCY DISTRIBUTION OF RESPONDENTS BY
NUMBER OF HARVESTS PER YEAR

Number of Harvests	Frequency N	Distribution %
IRRIGATED		
Three	0	0.0
Four	4	22.2
Five	9	50.0
Six or more	5	27.8
Total	18	100.0
DRYLAND		
One	0	0.0
Two	2	2.8
Three	6	8.4
Four or more	63	88.8
Total	71	100.0

TABLE XXIII

FREQUENCY DISTRIBUTION OF RESPONDENTS BY
PRODUCING AN ANNUAL SEED CROP

Produce Seed Crop	Frequency N	Distribution %
Always	2	2.4
Usually	10	11.9
Seldom	39	46.4
Never	33	39.3
Total	84	100.0

TABLE XXIV

FREQUENCY DISTRIBUTION OF RESPONDENTS BY PRINCIPLE BUYERS OF MOST OF THEIR ALFALFA HAY

Buyer	Frequency N	Distribution %
Beef cattle producers	13	15.5
Dairy farms	56	66.7
Horse producers	8	9.5
Do not sell	7	8.3
Total	84	100.0

Reported in Table XXV is the frequency distribution of respondents by how long they store alfalfa hay before selling. Of the 79 respondents, 34 (43.0 percent) indicated they store hay between 0 to 4 months. Forty-three (54.4 percent) of the respondents indicated they store hay between 5 to 8 months and two (2.6 percent) indicated they store hay between 9 to 12 months. Finally, none (00.0 percent) of the respondents indicated they store hay over 1 year.

Reported in Table XXVI is the frequency distribution of respondents by how many producers receive requests for higher quality alfalfa hay. Of the 80 respondents, 19 (23.7 percent) indicated they always receive requests for higher quality hay. Thirty-Three (41.2 percent) of the respondents indicated they usually receive requests for higher quality hay and 24 (30.0 percent) indicated they seldom receive requests for higher quality hay. Finally, four (5.1 percent) of the respondents indicated they never receive requests for higher quality hay.

Reported in Table XXVII is the frequency distribution of respondents by how many producers receive higher prices for higher quality alfalfa hay. Of the 81 respondents, 26 (32.1 percent) indicated they always receive higher prices for higher quality hay. Forty-seven (58.0 percent) of the respondents indicated they usually receive higher prices for higher quality hay and six (7.4 percent) of the respondents indicated they seldom receive higher prices for higher quality hay. Finally, two (2.5 percent) of the respondents indicated they never receive higher prices for higher quality hay.

Reported in Table XXVIII is the frequency distribution of respondents by where they list alfalfa hay for sale. Of the 75 respondents, 42 (56.0 percent) indicated they list alfalfa hay on

TABLE XXV

FREQUENCY DISTRIBUTION OF RESPONDENTS BY LENGTH OF TIME THEY STORE ALFALFA HAY BEFORE SELLING

Hay Storage	Frequency N	Distribution %
0 - 4 months	34	43.0
5 - 8 months	43	54.4
9 - 12 months	2	2.6
Over 1 year	0	0.0
Total	79	100.0

TABLE XXVI

FREQUENCY DISTRIBUTION OF RESPONDENTS BY REQUESTS FOR HIGHER QUALITY ALFALFA HAY

Receive Requests	Frequency N	Distribution %
Always	19	23.7
Usually	33	41.2
Seldom	24	30.0
Never	4	5.1
Total	80	100.0

TABLE XXVII

FREQUENCY DISTRIBUTION OF RESPONDENTS BY WHETHER OR NOT THEY RECEIVE HIGHER PRICES FOR HIGHER QUALITY ALFALFA HAY

Receive Higher Prices	Frequency N	Distribution %
Always	26	32.1
Usually	47	58.0
Seldom	6	7.4
Never	2	2.5
Total	81	100.0

TABLE XXVIII

FREQUENCY DISTRIBUTION OF RESPONDENTS BY WHERE THEY LIST ALFALFA HAY FOR SALE

Where Producers List	Frequency N	Distribution %
HAYMARKET	42	56.0
Radio	0	0.0
Newspaper	11	14.7
Other	33	44.0

* Respondents were allowed to check more than one answer therefore columns were not totaled

HAYMARKET. None (00.0 percent) of the respondents indicated they list alfalfa hay on radio and 11 (14.7 percent) indicated they list alfalfa hay in the newspaper. Finally, 33 (44.0 percent) of the respondents indicated they list alfalfa hay in other sources.

Reported in Table XXIX is the frequency distribution of respondents by whether or not they contract alfalfa hay for sale. Of the 83 respondents, three (3.6 percent) indicated they always contracted hay for sale. Seven (8.4 percent) of the respondents indicated they usually contract hay for sale and 32 (38.5 percent) indicated they seldom contracted hay for sale. Finally, 41 (49.5 percent) of the respondents indicated they never contract hay for sale.

Reported in Table XXX is the frequency distribution of respondents by whether or not they have listed alfalfa hay on HAYMARKET in the last two years. Of the 83 respondents, 28 (33.7 percent) indicated they had listed hay on HAYMARKET and 55 (66.3 percent) indicated they had not listed hay on HAYMARKET.

Reported in Table XXXI is the frequency distribution of respondents by whether or not they believe HAYMARKET has helped them find prospective buyers. Of the 76 respondents, 60 (78.9 percent) indicated they believe HAYMARKET helped them to find buyers and 16 (21.1 percent) indicated they do not believe HAYMARKET helped them to find buyers.

Reported in Table XXXII is the frequency distribution of respondents by whether or not they plan on listing alfalfa hay on HAYMARKET in the future. Of the 77 respondents, 60 (77.9 percent) indicated they planned to list hay on HAYMARKET in the future and 17 (22.1 percent) indicated they did not plan to list hay on HAYMARKET in the future.

TABLE XXIX

FREQUENCY DISTRIBUTION OF RESPONDENTS BY CONTRACTING ALFALFA HAY FOR SALE

Contract Hay	Frequency N	Distribution %
Always	3	3.6
Usually	7	8.4
Seldom	32	38.5
Never	41	49.5
Total	83	100.0

TABLE XXX

FREQUENCY DISTRIBUTION OF RESPONDENTS BY LISTING ALFALFA HAY ON HAYMARKET IN THE LAST TWO YEARS

HAYMARKET	Frequency N	Distribution %
Yes	28	33.7
No	55	66.3
Total	83	100.0

TABLE XXXI

FREQUENCY DISTRIBUTION OF RESPONDENTS BY WHETHER OR NOT THEY BELIEVE HAYMARKET HAS HELPED FIND PROSPECTIVE BUYERS

Prospective Buyers	Frequency N	Distribution %
Yes	60	78.9
No	16	21.1
Total	76	100.0

TABLE XXXII

FREQUENCY DISTRIBUTION OF RESPONDENTS BY WHETHER OR NOT THEY PLAN TO LIST ALFALFA HAY ON HAYMARKET IN THE FUTURE

List Hay in the Future	Frequency Distribution	
	N	%
Yes	60	77.9
No	17	22.1
Total	77	100.0

The alfalfa producers were asked to respond to the following open-ended question: "In your opinion, what is the major problem in producing alfalfa?" The major problems cited and the responses to each are presented as follows:

Problem	Number of Responses
Weather	37
Insects	24
Weeds	7
Storage	3
Conditioning	3
Baling at correct moisture	3
Maintaining good stands	3
Equipment costs & maintenance	3
Soil compaction	3
Need better chemicals	2
Gophers	2
Management	2
Maintaining Quality	2
Fertilizer Costs	1
Lost wheat base	1
Stand Establishment	1
Disease	1
Low Yields	1
Grazing safely	1
Trying for top yields	1
Hot checks	1
Labor	1
Better varieties	1
Lost business to large bales	1

Note. Respondents were able to list more than one problem.

The alfalfa producers were also asked to respond to the following open-ended question: "In your opinion, what is the major marketing problem facing producers?" Their marketing problems are indicated and number of responses to each are presented as follows:

Problem	Number of Respondents
Market price	13
Producing higher quality hay	10
Access to a good market	8
Hot checks	5
Producers knowing quality of their hay	5
Advertizing	4
Buyers not knowing quality of hay	3
Selling hay	3
Learning marketing techniques	3
Lack of buyers	3
Trucking restrictions	2
Lack of personal contact with consumer	2
What bale sizes are wanted	2
Competition from wheat hay	2
Cheap milk prices	2
Weather	1
Producers selling hay at cheaper prices	1
Feed value determining price	1
Lack of a cuber	1
Not enough profit in beef and dairy cattle	1
Competition outside Oklahoma	1
Overproduction	1
Reliable buyers	1
Grazing PIC wheat	1
Lack of research as to possible uses	1
Costs	1

Note. Respondents were able to list more than one problem.

CHAPTER V

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

Introduction

The purpose of this chapter is to summarize the procedures and findings of the study, and to present the following conclusions and recommendations which are based upon the analysis of data collected by the author.

Scope of the Study

The scope of this study included 143 selected Oklahoma alfalfa producers who, had advertized alfalfa hay on HAYMARKET from 1982 - 1990. The number of producers who responded to this survey was 85 (59.4 percent).

Statement of the Problem

Alfalfa has the highest yield potential and one of the highest feed values of all forages. Because of these characteristics, along with high protein content and excellent palatability, alfalfa is the base forage in dairy, horse, beef cattle, and sheep rations.

Producers may significantly regulate the quality of alfalfa by utilizing management practices such as stage of maturity at harvest and foreign material in the hay. The producer needs to decide what protein and quality level will net the largest profit; therefore research should

be conducted that would provide necessary information and producers could be assisted with the decision making process. Traditionally producers strive for maximum forage production with little thought concerning quality. But with the recent demands for a higher quality alfalfa hay, producers are confronted with the problem of when to harvest for high quality and also good forage yields.

High quality has its drawback, less than maximum forage production. Most producers accept that the compromise for quality and forage production is to harvest at 10% bloom. But many times, this is no longer acceptable for proteins of 20% or better. Many producers have started harvesting at 50 - 95% bud (late bud) stage of growth to achieve higher protein levels.

Purpose of the Study

The purpose of this study was to obtain selected producers perceptions of how marketing affects the management practices of Oklahoma alfalfa production.

Objectives of the Study

The following objectives were established to accomplish the purpose of the study.

1. To determine whether or not management practices are affected by market price and decisions.
2. To determine whether or not demands for higher forage quality affects harvest intervals and harvest dates.
3. To determine whether or not market value affects harvest intervals.

4. To determine the types of marketing information which are utilized by producers.

5. To determine the number of acres of alfalfa, both irrigated and dryland producers currently posses.

6. To determine what alfalfa varieties producers grow, how they perform, and what producers desire in a variety.

7. To determine what problems, both in marketing and in production producers perceive themselves to have.

Summary of the Findings

Presented in Table XXXIII is an overall summary of the findings. Of the respondents who indicated they produced irrigated alfalfa, 15 (or 83.3 percent) farm 150 acres or less. Of the respondents who produce dryland alfalfa, most of them (58 or 69.6 percent) farm 150 acres or less. Very few respondents farmed more than 150 acres of either irrigated or dryland alfalfa. Most of the respondents (57 or 67.0 percent) owned the land which they utilized to produce alfalfa.

Sixty-seven (79.8 percent) of the respondents indicated that improved varieties were worth the extra cost a purchase and 57 (73.1 percent) indicated they predominantly selected varieties which would improve their yield or would extend stand life.

Most all of the respondent further indicated that to determine when to spray insects, they either detect visible damage themselves or become aware of the insect population by depending upon scout reports. A large majority of the respondents (70 or 83.3 percent) apply insecticides at most once per year. The most economical insecticides, as reported by many of the respondents, were either parathion or Furadan to be used on

TABLE XXXIII

SUMMARY OF THE FINDINGS

Questions Asked	Frequency N	Distribution %	Frequency N	Distribution %
Number of Acres of ...	Irrigated Alfalfa		Dryland Alfalfa	
1 - 75	6	33.3	29	40.8
76 - 150	9	50.0	19	26.8
151 - 225	3	16.7	9	12.7
226 or more	--	-----	14	19.7
Total	18	100.0	71	100.0
Land Utilized for Alfalfa Production				
Owned		57		67.0
Rented		9		10.6
Leased		2		2.3
Sharecropped		17		20.1
Total		85		100.0
Improved Varieties Worth Extra Cost				
Always		33		39.3
Usually		34		40.5
Seldom		13		15.5
Never		4		4.7
Total		84		100.0
Reasons for Varietal Selection				
Insect Resistance		14		17.9
Disease Resistance		7		9.0
Improved Yield		37		48.4
Longer Stand Life		20		25.7
Total		78		100.0
Determine When to Spray Insects				
Visible Damage		30		35.7
Insect Population		27		32.1
Scout Report		25		29.8
Applicator Recommendation		2		2.4
Total		84		100.0

TABLE XXXIII (Continued)

Questions Asked	Frequency Distribution	
	N	%
Number of Insecticide Applications		
0 to 1 time/year	70	83.3
1 to 2 time/year	11	13.1
3 or more time/year	2	2.4
Never	1	1.2
Total	84	100.0
Most Economical Insecticide	**Alfalfa Weevils**	**Aphids**
Parathion	40 49.4	46 76.9
Lorsban	9 11.1	7 11 7
Furadan	30 37.0	6 10.0
Other	2 2.5	1 1.6
Total	81 100.0	60 100.0
Enrolled in IPM Program		
Yes	17	20.2
No	67	79.8
Total	84	100.0
Soil Analysis Performed Prior to Planting		
Always	50	58.8
Usually	25	29.4
Seldom	7	8.2
Never	3	3.6
Total	85	100.0
Apply Fertilizer		
Every three years	10	12.8
Every two years	19	24.3
Every year	41	52.6
Never	8	10.3
Total	78	100.0
Soil Analysis Performed on Established Stands		
Every Year	31	37.3
Two or Three Years	21	25.3
Three or Four Years	14	16.9
Never	17	20.5
Total	83	100.0

TABLE XXXIII (Continued)

Questions Asked	Frequency		Distribution	
	N		%	
Profitable to keep Fertility Adequate				
Always			31	38.3
Usually			35	43.2
Seldom			12	14.8
Never			3	3.7
Total			81	100.0
Attempt to Produce ...				
Higher Forage			6	7.1
Higher Quality			28	33.3
Both			49	58.3
Neither			1	1.3
Total			84	100.0
Final Harvest Date				
September 1 - 10			10	12.3
September 11 - 20			10	12.3
September 21 - 30			24	29.6
October 1 or later			37	45.8
Total			81	100.0
Stage of Growth at Harvest				
75 - 100% bud			5	5.9
1 - 10% bloom			56	66.7
Over 10% bloom			19	22.6
Visible Regrowth			4	4.8
Total			84	100.0
Number of Harvests Per Year				
Two	--	-----	2	2.8
Three	--	-----	6	8.4
Four (or more dryland)	4	22.3	63	88.8
Five	9	50.0	--	-----
Six (or more irrigated)	5	27.8	--	-----
Total	18	100.0	71	100.0

TABLE XXXIII (Continued)

Questions Asked	Frequency	Distribution
	N	%
Produce Seed Crop Each Year		
Always	2	2.4
Usually	10	11.9
Seldom	39	46.4
Never	33	39.3
Total	84	100.0
Sell Alfalfa Hay to ...		
Beef Cattle Producers	13	15.5
Dairy Farms	56	66.7
Horse Producers	8	9.5
Do not sell	7	8.3
Total	84	100.0
Store Alfalfa Hay Before Selling		
0 - 4 months	34	43.0
5 - 8 months	43	54.4
9 - 12 months	2	2.6
Over 1 year	--	-----
Total	79	100.0
Receive Requests for Higher Quality Hay		
Always	19	23.7
Usually	33	41.2
Seldom	24	30.0
Never	4	5.1
Total	80	100.0
Receive Higher Priced for Higher Quality		
Always	26	32.1
Usually	47	58.0
Seldom	6	7.4
Never	2	2.5
Total	81	100.0
Where Hay Listed for Sale		
HAYMARKET	42	56.0
Radio	--	-----
Newspaper	11	14.7
Other	33	44.0

TABLE XXXIII (Continued)

Questions Asked	Frequency	Distribution
	N	%
Contract Hay for Sale		
Always	3	3.6
Usually	7	8.4
Seldom	32	38.5
Never	41	49.5
Total	83	100.0
List Hay on HAYMARKET Last Two Years		
Yes	28	33.7
No	55	66.3
Total	83	100.0
HAYMARKET Helped Find Buyers		
Yes	60	78.9
No	16	21.1
Total	76	100.0
Plan to List on HAYMARKET Again		
Yes	60	78.9
No	17	22.1
Total	77	100.0

alfalfa weevils and/or aphids.

Furthermore, a large majority of the respondents (67 or 79.8 percent) were not enrolled in an integrated pest management (IPM) program.

Pertaining to soil analysis, a large majority of the respondents (75 or 88.2 percent) conduct an analysis prior to planting alfalfa. Relative to the application of fertilizer, a large majority of the respondents (60 or 76.9 percent) apply fertilizer either every year or every two years. Furthermore, a majority of the respondents (51 or 62.6

percent) conduct a soil analysis on established stands either every year or at least every two or three years. Also, a large majority of the respondents (49 or 58.3 percent) indicated that they attempted to produce both more forage and a higher quality of forage.

Most of the respondents (61 or 75.4 percent) indicated that they harvested their final crop of alfalfa September 21 or later. Also, a large majority of the respondents (56 or 66.7 percent) harvest their alfalfa when it is in the stage of one to 10 percent bloom. Furthermore, most of the respondents, (63 or 88.8 percent) who indicated they farmed dryland alfalfa, generally harvest their alfalfa four or more times per year, whereas most of the respondents (14 or 77.8 percent) who indicated they farmed irrigated alfalfa, generally harvest their alfalfa five or more times per year. Most of the respondents (72 or 85.7 percent) seldom, if ever, produce a seed crop each year.

Relative to alfalfa hay sales, a large majority of the respondents (56 or 66.7 percent) sell hay to dairy farms and a majority of the respondents (43 or 54.4 percent) store their hay from five to eight months prior to selling.

It is notable to report that many of the respondents (52 or 64.9 percent) receive requests for higher quality alfalfa hay and an overwhelming number of respondents (73 or 85.1 percent) receive higher prices for the higher quality hay. Furthermore, a majority of the respondents (42 or 56.0 percent) list the hay they have for sale on HAYMARKET. Of particular interest is that a large majority of the respondents (73 or 88.0 percent) seldom, if ever, contract their hay for sale and 55 (or 66.3 percent) of the respondents have not listed their hay on HAYMARKET within the last two years. However, most of the

respondents (60 or 78.9 percent) indicated that HAYMARKET helped them to find buyers. Also, 60 (or 77.9 percent) indicated that they plan to list their alfalfa hay for sale on HAYMARKET.

Other findings of notable importance is the face that many respondents considered either Cimarron or Oklahoma common to be the alfalfa varieties of choice. Furthermore, according to many of the respondents, the weather and/or insects seem to be the major problem they are confronted with when producing alfalfa. Finally, the major marketing problem confronting the respondents is the price which they receive for their alfalfa.

Conclusions

Based upon the analysis and interpretation of the data, the following conclusions were drawn and presented as follows:

1. In general, the majority of Oklahoma alfalfa producers who responded to the survey, farm between 1 - 150 acres of irrigated and/or 1 - 150 acres of dryland alfalfa. And, the majority of respondents own the land that is producing alfalfa.

2. In general, respondents highly favored newer improved varieties despite higher initial costs for seed, over traditional varieties because of traits such as improved yield and longer stand life.

3. Respondents are well aware of insect populations in their alfalfa fields and utilize scout reports along with visible damage to determine when to spray and often, they need only spray once a season with either parathion or Furadan for alfalfa weevils and parathion for aphids.

4. In general, respondents are informed about the fertility needs

of alfalfa and indicate this by having soil analyses performed on fields prior to planting and on existing stands of alfalfa. They also agree that fertility must be adequately maintained to produce high yields and extend stand life, and as such, fertilizer applications are performed on a regular basis.

5. Respondents strive to produce both high yields and high quality hay by harvesting at the 1 - 10% bloom growth stage, this allows for increased harvests per season and also pushes the final harvest date back to September 21 or later.

6. In general, respondents have little to no interest in producing seed on present fields.

7. Requests for higher quality hay are complemented by higher prices offered for quality hay, large amounts of hay sold to dairy industries, and the relative short storage periods.

8. In general, respondents recognized the need for advertizing to potentially large numbers of buyers and although many respondents had not listed hay on HAYMARKET recently, HAYMARKET was credited with introducing buyers to sellers and the majority of respondents intend to support the HAYMARKET effort.

Recommendations

Based on the findings of this study and the conclusions derived from the analysis of the data. the following recommendations are made:

1. Producers should stay informed as to what varieties are currently available and what the multiple pest resistant varieties have to offer over common varieties.

2. Producers should enroll and/or continue to utilize local IPM

programs to supplement their own observations as to the need for insecticide applications and what chemicals afford the best protection.

3. Producers should be commended for their knowledge of soil fertility and crop needs. They need to continue to sample existing fields on a regular basis.

4. Higher quality hay is obtained by early harvests and respondents should be aware that harvesting as early as possible will produce the higher quality hay.

5. Producers should support the HAYMARKET effort to introduce buyers and sellers by advertizing whenever possible.

Recommendations for Additional Research

The following recommendations are made in regard to additional research. The recommendations are judgements based on having conducted the study and on evaluation of the data.

1. There should be a study conducted with Oklahoma alfalfa producers to determine management practices and marketing strategies and how they would compare with the respondents of this study.

2. There should be a study conducted with HAYMARKET to determine if producers who advertize on HAYMARKET consistently receive better prices for hay than producers who choose not to advertize.

3. There should be a study conducted with statewide alfalfa producers to determine fertility management practices, as well as annual costs related to these practices.

BIBLIOGRAPHY

Ahlgren, G. H. (1949). Forage crops. McGraw - Hill Books Co. Inc., New York.

Arnold, W. L. (1976). Potential demand for an alfalfa cash crop in the beef market [Summary]. Proceedings of the Sixth Annual Alfalfa Symposium, (pp. 12-13).

Barber, S. A. (1984). Liming materials and practices. In F. Adams (Ed.) Soil acidity and liming. 2nd ed. Agronomy 12, 171-209.

Barnes, D. K., and D. M. Smith. (1976). Availability of nitrogen from alfalfa varieties plowed in the fall of the establishment year. American Society of Agronomy, Madison, Wisconsin. In Agronomy Abstracts, pp. 80-81.

Bartholomew, W. V., W. D. Shrader, and A. J. Endlehorn. (1957). Nitrogen changes attending various crop rotations on Clarion-Webster soils in Iowa. Agronomy Journal, 49, 415-418.

Blaser, R. E., and E. L. Kimbrough. (1968). Potassium nutrition of forage crops with perennials. In V. J. Kilmer (Ed.), The roll of potassium in agriculture pp. 423-445. American Society of Agronomy, Madison, Wisconsin.

Bolton, J. L. (1962). Alfalfa - botany, cultivation and utilization. World Crop Books, Leonard Hill, London.

Bolton, J. L., B. P. Goplen, and H. Baenziger. (1972). World distribution and historical developments. In C. H. Hanson (ed.) Alfalfa science and technology, Agronomy 15, 1-34.

Crawford, B H. (1976). Potential demand for an alfalfa cash crop in the horse market [Summary]. Proceedings of the Sixth Annual Alfalfa Symposium, (pp. 14-16).

Finley, G. E. (1981). Wheat producers' awareness, attitudes, and practices concerning integrated pest management and production problems in a four-county area of Oklahoma. PhD. Dissertation. Oklahoma State University, Stillwater, Oklahoma.

Freeman, D. W. (1986). Marketing hay to horse owners. Proceedings of the Alfalfa Management Satellite Teleconference I. Cooperative Extension Service, Oklahoma State University, Stillwater, (Circular E - 859), pp. 7-8.

Fuess, F.W., and Tesar, M.B. (1968). Photosynthetic efficiency, yields, and leaf loss in alfalfa. Crop Science, 8, 159-163.

Graduate College. Thesis Writing Manual. Stillwater, Oklahoma, Oklahoma State University, Revised 1987.

Hendry, G. W. (1923). Alfalfa in history. Journal American Society of Agronomy, 15, 171-176.

Hojjati, S. M., W. C. Templeton, Jr., and J. H. Taylor. (1978). Nitrogen fertilizer in establishing forage legumes. Agronomy Journal, 70, 429-433.

Key, J. P. (1981). Module on Descriptive Statistics. Research and Design in Occupational Education, Section 51 (p. 126). Agriculture Education Department, Oklahoma State University, Stillwater.

Klinkowski, M. (1933). Lucerne: Its ecological position and distribution in the world (Translated by G. M. Roseveare). Imperial Bureau of Plant Genetics: Herbage Plants, Bull. 12, Aberystnyth, Wales. (Cited by Bolton, Goplen, and Baenziger 1972).

Lipke, L. A., H. W. Ladewig, and E. Taylor-Powell. National assessment of extension efforts to increase farm profitability through integrated programs. Texas Agricultural Extension Service, College Station, Texas.

Marble, V. L. (1989). Fodders for the near east: alfalfa. Food and Agriculture Organizations of the United Nations, Rome, Italy.

Nelson, C.J., and Smith, D. (1968). Growth of birdsfoot trefoil and alfalfa. II. Morphological development and dry matter distribution. Crop Science, 8, 21-25.

Pearson, R. W., and C. S. Hoveland. (1974). Lime needs of forage crops. In D. A. Mays (Ed.) Forage fertilization (pp. 301-322). American Society of Agronomy, Madison, Wisconsin.

Rohweder, D. A. (1976). Pricing alfalfa for the cash market, hay grading and testing - national scope [Summary]. Proceedings of the Sixth Annual Alfalfa Symposium, (pp. 17-23).

Row, E. H. (1976). Potential demand for an alfalfa cash crop...the dairy market [Summary]. Proceedings of the Sixth Annual Alfalfa Symposium, (pp. 7-11).

Scofield, C. S. (1908). USDA Bureau of Plant Industry Bull. No. 131. (Cited by Bolton, Goplen, and Baenziger 1972).

Sholar, J. R., J. L. Caddel, L. Rommann, J. Stritzke, G. Johnson, D. Schwab, S. Coppock, R. C. Berberet, E. Williams, W. Bowers, and T. Shaklee. (1982). Alfalfa pest management in Oklahoma (Circular E-826). Stillwater: Oklahoma State University, Cooperative Extension Service, Division of Agriculture.

Sholar, J. R. (1984). Management of alfalfa (Medicago sativa L.) in the southern plains. PhD. Dissertation. Oklahoma State University, Stillwater, Oklahoma.

Smith, D. (1969). Influence of temperature on the yield and chemical composition of 'Vernal' alfalfa at first flower. Agronomy Journal, 61, 470-473.

Stark, J. A., G. W. Cuperus, C. Ward, R. Huhnke, L. Rommann, P. Mulder, J. Stritzke, G. Johnson, J. T. Criswell, and R. Berberet. (1990). Integrated Managements Systems: A case study of Oklahoma alfalfa management. Cooperative Extension Service, Oklahoma State University, Stillwater.

Stewart, G. (1926). Alfalfa growing in the United States and Canada. McMillian Co., New York.

Tesar, M. B., and K. Lawton, and B. Kawin. (1954). Comparison of Band seeding and other methods of seeding legumes. Agronomy Journal, 46, 189-194.

Ward, C. E. (1986). Economics of alfalfa hay in dairy rations. Proceedings of the Alfalfa Management Satellite Teleconference I. Cooperative Extension Service, Oklahoma State University, Stillwater, (Circular E - 859), pp. 16-21.

Ward, C. E. (1987). Economics of alfalfa production. Proceedings of the Alfalfa Management Satellite Teleconference II and III. Cooperative Extension Service, Oklahoma State University, Stillwater, (Circular E - 860), pp. 1-7.

Ward, C. E., G W. Cuperus, and L. W. Rommann. (1988). HAYMARKET: Five years experience (Fact Sheet No. 503). Stillwater: Oklahoma State University, Cooperative Extension Service.

Woodruff, C. M. (1967). Crop response to lime in the midwestern United States. In R. W. Pearson and F. Adams (Eds.), Soils acidity and liming Agronomy, 12. pp. 207-231.

APPENDIXES

APPENDIX A

INSTRUMENT

ALFALFA SURVEY

Please circle the letter that best describes your alfalfa operation.

(1) Presently, how many acres of alfalfa do you have under cultivation?
IRRIGATED
(a) 1 - 75 (b) 76 - 150 (c) 151 - 225 (d) 226 or more
DRYLAND
(a) 1 - 75 (b) 76 - 150 (c) 151 - 225 (d) 226 or more

(2) Do you:
(a) own (b) rent (c) lease (d) share-crop
the majority of your alfalfa?

(3) What alfalfa varieties produce the best for you?
(a) best_____ (c) good_____
(b) very good_____ (d) poor_____

(4) Do you believe that using improved varieties is worth the extra cost?
(a) always (b) usually (c) seldom (d) never

(5) In varietal selection, which is most important to you?
(a) insect resistance (c) improved yield
(b) disease resistance (d) longer stand life

(6) How do you determine when to spray for insect pests?
(a) visible damage (c) scout report
(b) insect population (d) applicator recommendation

(7) How often do you use insecticides?
(a) 1 or 2 times/year (c) 3 or more times/year
(b) 0 to 1 times/year (d) never

(8) If you do use insecticides, what is the most economical in terms of cost and retreatment if necessary?
For alfalfa weevils:
(a) parathion (b) Lorsban (c) Furadan (d) other_____
For aphids:
(a) parathion (b) Lorsban (c) Furadan (d) other_____

(9) Are you presently enrolled in an Integrated Pest Management (IPM) program?
(a) yes (b) no

(10) Do you have a soil analysis performed on your fields prior to planting?
(a) always (b) usually (c) seldom (d) never

(11) How often do you apply fertilizer?
(a) every three years (c) every year
(b) every two years (d) never

(12) How often do you test the soil on established stands?
(a) every year (c) 3 - 4 years
(b) 2 - 3 years (d) never

(13) Is it profitable for you to fertilize to the soil recommendations, and keep the fertility adequate on established stands?
(a) always (b) usually (c) seldom (d) never

(14) Do you attempt to produce higher forage yields or higher quality?
(a) forage (b) quality (c) both (d) neither

(15) When do you usually take the final harvest of the season?
(a) September 1 - 10 (c) September 21 - 30
(b) September 11 - 20 (d) October 1 or later

(16) At what stage of growth do you usually harvest?
(a) 75 - 100% bud (c) Over 10% bloom
(b) 1 - 10% bloom (d) visible regrowth

(17) How many harvests do you usually get per year?
IRRIGATED (a) 3 (b) 4 (c) 5 (d) 6
DRYLAND (a) 1 (b) 2 (c) 3 (d) 4

(18) Do you produce a seed crop each year?
(a) always (b) usually (c) seldom (d) never

(19) To whom do you sell most of your alfalfa hay?
(a) beef cattle producers (c) horse producers
(b) dairy farms (d) do not sell

(20) How long do you store hay before selling?
(a) 0 - 4 months (b) 5 - 8 months (c) 9 - 12 months (d) over 1 year

(21) Do you receive requests for higher quality hay?
(a) always (b) usually (c) seldom (d) never

(22) Do you receive higher prices for higher quality?
(a) always (b) usually (c) seldom (d) never

(23) Where do you list hay for sale?
(a) HAYMARKET (b) radio (c) newspaper (d) other_____

(24) Do you ever contract hay for sale?
(a) always (b) usually (c) seldom (d) never

(25) Have you listed hay on HAYMARKET in the last two years?
(a) yes (b) no

(26) Do you feel HAYMARKET has helped you to find prospective buyers?
(a) yes (b) no

(27) Do you plan on listing hay on HAYMARKET in the future?
(a) yes (b) no

(28) In your opinion, what is the major problem in producing alfalfa?

_____

_____

_____

(29) In your opinion, what is the major marketing problem facing producers?

_____

_____

_____

APPENDIX B

LETTER

OSU

Oklahoma State University

DEPARTMENT OF AGRICULTURAL EDUCATION
DIVISION OF AGRICULTURE

STILLWATER OKLAHOMA 74078
AGRICULTURAL HALL 448
405-624-5129

January 15, 1991

Dear Alfalfa Producer,

Presently, I am conducting research concerning your perception of how marketing affects the management practices of Oklahoma alfalfa production. Therefore, the purpose of this survey, is to ask you, the producer to help provide useful information so that an understanding of your marketing strategies and management practices can be developed.

I realize that your time is precious, however, your help and participation is invaluable to the success of this project. All efforts in completing this survey will be extremely appreciated. Thank you once again for your assistance in completing this survey, I hope the results will help us to address future problems concerning alfalfa production.

Respectfully,

Kevin Shelton

Kevin Shelton
Graduate Student in Agricultural Education

CENTENNIAL DECADE
1980 • 1990

VITA

Kevin Trent Shelton

Candidate for the Degree of

Master of Science

Thesis: SELECTED PRODUCERS PERCEPTIONS OF HOW MARKETING AFFECTS THE MANAGEMENT PRACTICES OF OKLAHOMA ALFALFA PRODUCTION

Major Field: Agricultural Education

Biographical:

Personal Data: Born in Altus, Oklahoma, August 19, 1961, the son of Dale and Bonnie Shelton.

Education: Graduated from Blair High School, Blair, Oklahoma, May, 1979; received Associate Degree of Science from Western Oklahoma State College, Altus, Oklahoma, 1981; received Bachelor of Science Degree from Oklahoma State University, Stillwater, Oklahoma, 1983, with a major in Agronomy; completed requirements for the Master of Science degree at Oklahoma State University in May, 1991.

Professional Experience: IPM Scout, Cooperative Extension Service, Altus, Oklahoma, May, 1983 to September, 1983; Temporary Professional, Southwest Agronomy Research Station, Tipton, Oklahoma, October 1983 to February 1984; Senior Agriculturist, Oklahoma State University Agronomy Department, Stillwater, Oklahoma, March 1984 to Present.

Professional Organizations: Member of Central Alfalfa Improvement Conference, Western Alfalfa Improvement Conference, and North American Alfalfa Improvement Conference.