

DOES ALFALFA HAVE A FUTURE FOR HORSES IN CALIFORNIA?

Janet F. Roser

Abstract: Historically, alfalfa had a slow start as a feed for horses. During the early 1900's, timothy became the popular hay for the sport horse on the East Coast. Tradition set in and horse owners were not willing to change as they moved west. When alfalfa was fed to horses, certain "problems" would arise and its value as a feed for horses became controversial. The prejudices against alfalfa are quickly disappearing as both research-based evidence and experience with feeding the legume demonstrate that it is an excellent feed for horses. The equine industry is experiencing rapid growth in California which will open up a tremendous market for alfalfa growers. There are close to 1 million horses in California which may translate into a 147 million dollar alfalfa market annually. Because of urbanization alfalfa pellets and cubes may become the horse feed of the future.

Keywords Horses Alfalfa

INTRODUCTION

Historically, alfalfa had a slow start as a feed for horses. Although cultivated to a certain degree in the colonial times, alfalfa was not a popular crop. Both George Washington and Thomas Jefferson tried to raise alfalfa, but with little luck. Perhaps it was the lack of knowledge of the pH soil requirement, the short summers or the wet weather that was the problem. In the classic book, Feeds and Feeding (1913), Henry mentions that attempts to grow alfalfa in the Eastern States generally ended in failure. The Spanish conquistadors brought alfalfa to California but the real impetus of alfalfa production in the West was the seed brought by the 49'ers who had seen the productive fields in South America as they travelled around Cape Horn. Alfalfa production quickly spread from California to other Western States. In 1900 about 99% of all U.S. alfalfa was grown west of the Mississippi River. Meanwhile on the East Coast the horse as a performance animal was gaining in popularity and being fed the available grass hays such as timothy and bluegrass. The standard diet of the race horse became timothy and oats, and gained popularity as the "winning combination". Thus, availability and tradition dictated the diet of the sport horse for many years and overshadowed alfalfa as a potential feed.

Although alfalfa grows well on the West Coast, its value as a feed for horses has been debated for years. It is still very controversial in certain circles of the horse industry. Among the negative comments are 1) alfalfa causes horses to become fat, sweat excessively, lose endurance and strength and to have kidney problems; 2) alfalfa is more moldy and dustier than grass hays; 3) alfalfa is highly laxative and causes colic and 4) alfalfa is too high in energy and protein for horses. For the most part, the prejudices against alfalfa are unfounded. Even as far back as 1912 strong alfalfa advocates such as Joseph E. Wing were reporting that horses can be fed alfalfa without causing colic or kidney damage (Wing, 1912). But these reports were few and far between. It was a simple lack of knowledge and poor feeding management practices which generated the above concerns and gave alfalfa a bad reputation as a feed for horses.

ALFALFA, A QUALITY FEED FOR HORSES

The prejudices against alfalfa are quickly disappearing as both research-based evidence and experience with feeding the legume demonstrate that it is an excellent feed for horses. As early as the 1920s experiments were being conducted to compare the efficiency of alfalfa to timothy as a feed for work horses. In 1925, R.S. Hudson of the Michigan Agriculture Experiment Station compared alfalfa and timothy for draft horses. He found that alfalfa fed horses worked just as efficiently using less hay than the timothy fed group over a years time. He reported that "Alfalfa is a safe, efficient and economical feed for work horses". A more recent study on alfalfa indicates that horses fed alfalfa maintain their body weight at a better rate and do not sweat more than horses fed timothy (Hintz, 1983). In this study

Department of Animal Science, University of California Davis CA 95616

the change in body temperature, pulse rate and respiration after exercise were similar between the alfalfa fed group and the timothy fed group.

The NRC

The latest edition of Nutrient Requirements of Horses put together by the National Research Council (NRC, 1989) encompasses a great deal of research on the nutrition and feeding of horses. By using the information presented in the publication, it is clear that alfalfa hay is an excellent feed for many classes of horses, i.e. the pregnant mare, lactating mare, growing horse and working horse. It is an excellent source of energy, protein, minerals and vitamins. Table 1 presents the composition of several forage crops used in horse diets and table 2 shows the nutrient requirements needed by horses in several stages of growth and activity. It is clear that alfalfa is higher in just about all the nutrients required by the horse when compared to oat and timothy hay. Furthermore, alfalfa provides lysine in the diet, an essential amino acid for growth. In the new NRC publication, recommendations for vitamin A, D and E are higher for some groups of horses. Alfalfa can provide adequate amounts of all these vitamins regardless of stage of maturity of the plant.

Supplement With Grain.

In general, none of the hays fed alone can supply enough energy, protein, minerals and vitamins for all the classes of horses. Supplementation using a grain mix is going to be essential and expensive. However, for the alfalfa fed horse, grain supplementation may make up only about 25% of the ration while for the oat fed horse, supplementation can approach 50%. Feeding alfalfa and thus cutting down grain supplementation translates into big savings for the average horse owner.

Harvesting And Feeding Management Procedures

Proper harvesting and feeding management procedures can take care of many of the misconceptions concerning alfalfa hay as a poor feed for horses. The method of harvesting, curing and storing can greatly effect the quality and moisture content of the hay. Because of the leafiness of the legume and irrigation schedules, alfalfa may be more prone to dust and mold than grass or cereal hays. Careful harvesting, curing and storing procedures can help avoid these problems. Most horses really enjoy eating alfalfa hay. Because it is highly palatable and has a higher digestible energy content, it is much easier to overfeed horses alfalfa than timothy or oat hay. Overeating may lead to digestive problems such as colic. By feeding approximately 85% as much alfalfa as oat or timothy, the horse will receive the appropriate nutrients while at the same time obesity and colic can be avoided. Unlike dairy cows, horses do not need 20-25% CP in their diets. To satisfy both the dairy and horse industry, the alfalfa grower could plan his/her schedule so that early spring and fall cuttings could go to the dairy cows (high in protein) while mid summer cutting - fast growing hay with lower CP content - could go to horses. Any excess protein not used by the horse is converted to energy compounds and nitrogen is eliminated as ammonia. It has been said that high amounts of ammonia could burn out a horse's kidney. This statement is scientifically unfounded. Only kidneys that are already damaged might be further irritated by an alfalfa diet. Horses that are on alfalfa might excrete a little more urine and in a poorly ventilated barn the ammonia smell might be a little stronger. The increased amount of urine is hardly noticeable and a poorly ventilated barn is inexcusable. Some horse owners do not like to feed early bloom alfalfa because they believe it is highly laxative. There is little, if any, scientific evidence to support this belief. Some horse owners feel that the ratio of calcium to phosphorus is too high in alfalfa (6:1). For mature adult horses this is no problem but for the growing horse, supplementing with grain and/or monosodium phosphate will help balance the mineral content. Some horse owners believe that changing the diet from a grass or oat hay to alfalfa causes colic. Indeed a fast switch of any diet may cause changes in the digestive tract, diarrhea and/or colic. By changing the diet slowly over 7 to 10 days, digestive disturbances can be avoided. Many knowledgeable horse owners are now feeding a mix of both alfalfa and oat hay. This cuts down the overall cost of feed and allows for a more balanced ration, especially if feeding several classes of horses on one farm.

THE FUTURE OF ALFALFA IN THE HORSE INDUSTRY

Growth of the Equine Industry

According to the American Horse Council (AHC, Survey, 1987), California is second only to Texas in the number of horses with 389,000. This may be conservative since in 1989, the United States Equine Marketing Association (USEMA; Horse World, USA, 1989) reported a total number of 999,190 horses in California. Californians spend approximately 1.6 billion dollars annually to maintain their horses which is higher than any other state including Texas (AHC, 1987). In addition, the spectator sport and commercial economy generate more than 467 million dollars at horse races (442 million) and horse shows (25 million) (AHC, 1987). In California, the horse is primarily used for breeding, pleasure and sport, competition and racing. These categories involve about 80% of all the horses in this state (AHC, 1987). The majority of the owners of these horses will put their money into high quality hay. If alfalfa is going for \$112 per ton and 60% of the owners of horses in the above categories are feeding alfalfa then that translates into about 147 million dollars per year (Table 3). Over the past few decades, the horse population has increased by about 10% annually. By the year 2010 the annual income generated by feeding alfalfa to horses may be around 178+ million dollars.

Processed Feeds

Urbanization is cutting down the amount of land available to grow hay and the space available to store it. Therefore, alfalfa pellets and cubes may be the horse feed of the future. There are advantages and disadvantages in feeding processed feeds. The advantages of processed feeds are: 1) they can increase the palatability of the ration, i.e., molasses can be added; 2) the steam process can cut down mold and dust; 3) other ingredients can be added, making it attractive as a total ration; 4) they ensure a consistent ration on a day to day basis, 5) there is less wastage by the horse and 5) they require less storage space and less transportation cost. A ton of pellets occupies 1/3 the space as compared to a ton of baled hay. It appears that horses do better on quality pellets or cubes than on quality hay. A horse being fed 18 lbs of loose hay could be fed 15 lbs of pellets and do just as well. The disadvantages of processed feeds are: 1) they can be too soft and crumbly breaking into fines that can be lost or cause digestive problems; 2) it is difficult to determine quality and 3) they may encourage wood chewing and other vices. The disadvantages can be overcome by selling good quality feeds and by appropriate management procedures. Cubes may have an advantage over pellets in that the quality can be assessed more readily with cubes, but pellets have the distinct advantage over cubes in that additional concentrates and/or other hays can be added. Since alfalfa has its own natural binder, lignin, artificial binders such as bentonite do not have to be added. Most horse owners using pellets prefer a 70% alfalfa / 30% oat hay mix. It cuts down the cost of the pellet, satisfies the nutrient requirements of many classes of horses when fed with grain and is still quite palatable. Processed feeds are more expensive, but there is a large population of sport horse owners living in the suburbs of California who will put their dollars into top quality feed. The processed feed market exists. With a good quality product and good promotional efforts, it could be quite lucrative.

SUMMARY

Alfalfa is an excellent feed for horses. Research-based information and good feeding practices have proven that many of the "problems" in feeding alfalfa are completely unfounded. The equine industry is experiencing rapid growth in California which opens up a tremendous market for high quality hay. Alfalfa growers should tap into this market and start thinking about processed feeds such as alfalfa pellets and cubes as the horse feed of the future.

REFERENCES

- American Horse Council (1987) *The economic impact of the U.S. horse industry*. Washington, D.C.
- Cunha, T.J. (1980) *Horse Feeding and Nutrition*. New York: Academic Press.
- Henry, W.A. (1913) *Feeds and Feeding*. Madison, WI: Henry Publ
- Hintz, H.F. (1983) Feeds. *In*: *Horse Nutrition. A Practical Guide*. New York: Arco Publ. Co pp 84-153.
- Hudson, R.S. (1925) Alfalfa and horses. *Mich Agr. Exp. Stat Quart. Bull.* 7:75
- Lewis, L.D. (1982) *Feeding and Care of the Horse*. Philadelphia: Lea & Febiger.
- National Research Council (1989) *Nutrient Requirements of Horses*, Fifth edition. Washington, D.C.: National Academy Press.
- United States Equine Marketing Association (1989) "Equine survey: The California Horse Industry." *Horse World USA*, Huntington Station, NY, March 1:24.
- Wing, J.E. (1912) *Alfalfa in America*. Chicago: Sanders Publ. Co

Table 1. Composition of several forage crops in horse diets (100% DM)*

<u>Forage Crop</u>	<u>Stage of Maturity</u>	<u>DE Mcal/kg</u>	<u>CP (%)</u>	<u>Lysine (%)</u>	<u>CA (%)</u>	<u>P (%)</u>	<u>Vitamin A (IU/kg)</u>	<u>Vitamin D (IU/kg)</u>	<u>Vitamin E (IU/kg)</u>
Alfalfa	Early bloom	2.48	19.9	0.90	1.41	0.21	55,918	2,000	26.0
	Mid bloom	2.28	18.7	0.88	1.34	0.24	46,000	2,000	11.0
	Full bloom	2.17	17.0	0.87	1.19	0.24	26,000	2,000	11.0
Oat	Sun-cured	1.92	9.5		0.32	0.25	11,898	1,543	
Timothy	Early bloom	2.06	10.8		0.51	0.29	21,000		13.0
	Mid bloom	1.99	9.7		0.48	0.23	21,340	1,984	
	Full bloom	1.94	8.1		0.43	0.20	19,000		

Adapted from the NRC (1989) Nutrient Requirements of Horses

Table 2. Suggested daily nutrient requirements needed by horses in several stages of growth and activity. (Total diet: dry matter basis)*

<u>Stage</u>	<u>DE</u> <u>Mcal/kg</u>	<u>CP</u> <u>(%)</u>	<u>Lysine</u> <u>(%)</u>	<u>CA</u> <u>(%)</u>	<u>P</u> <u>(%)</u>	<u>Vitamin A</u> <u>(IU/kg)</u>	<u>Vitamin D</u> <u>(IU/kg)</u>	<u>Vitamin E</u> <u>(IU/kg)</u>
Maintenance	2.00	8.0	0.28	0.24	0.17	1,830	300	50
Pregnant (last 3 mos)	2.30	10.2	0.36	0.44	0.33	3,670	600	80
Lactating (early)	2.60	13.2	0.46	0.52	0.34	2,750	600	80
Working (moderate)	2.65	10.4	0.37	0.31	0.23	2,420	300	80
Weanling (6 mos) moderate growth rate	2.90	14.5	0.61	0.56	0.31	1,870	800	80
Yearling (12 mos)	2.80	12.6	0.53	0.43	0.24	2,160	800	80
Two-year-old (not in training)	2.45	10.4	0.42	0.31	0.17	2,640	800	80

* Adapted from the NRC (1989) Nutrient Requirements of Horses

Table 3

ma: fo: :se:

Alfalfa - \$112/ton

Cost of feeding alfalfa to one horse

day, /yea:	15 lbs, day	54	lbs/yea:
54	lbs/yea:	1b:	
		106	60,

Number of horses fed alfalfa

.90 ho:	(US	Survey
of horses		
competit:	ac:	Survey
99	.90	horse:
60		horses fed
79	60	horses

Money spent on alfalfa per year

306	.04	00
-----	-----	----