

FEED QUALITY OF COMMON SUMMER GRASS AND BROADLEAF WEEDS IN ALFALFA HAY

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Abstract

Late summer grassy weed control is a questionable practice since it reduces alfalfa hay tonnage during summer slump, and the reduction in hay feed quality caused by these weeds in horse hay is questionable. A field experiment was conducted at the September alfalfa cutting to examine the feed quality of grassy and broadleaf weeds found in western Arizona hay fields at this time which corresponds with annual summer slump. These weeds included bermudagrass, junglerice (watergrass), Mexican sprangletop, Johnsongrass, purple nutsedge, and common purslane. Since hay cut during this period is used primarily for dry dairy cow and horse hay this study examined the suitability of alfalfa hay infested with these summer weeds as a feed for these animals. Based on this study, horse owners could benefit financially if they waited until late summer when hay prices slump, and purchase off-grade alfalfa hay containing less than one half grassy summer weeds for an economical, nutritious feed source.

Introduction

Summer weeds are a major economic concern to alfalfa growers throughout Arizona. Summer grasses including bermudagrass, junglerice (watergrass), Mexican sprangletop, and Johnsongrass are a major problem in many alfalfa stands. Nutsedge and purslane can also be troublesome summer weeds in alfalfa. These summer weeds can become a serious problem in weak alfalfa stands, especially during summer slump. Fortunately, peak summer weed infestations correspond with the latter part of the harvest season, when alfalfa is cut for dry dairy cow and horse hay.

Roughages fed to horses and cows are primarily hay. Hay quality varies in that it may be fine or coarse stemmed, high or low in crude protein and available energy, and may be legume or grass. The most common legume is alfalfa which has a broader leaf, heavier stem, and higher amounts of crude protein, minerals and vitamins than grasses, such as Bermuda. Since dairy cows require a protein rich diet while lactating, they are fed first or second cutting alfalfa hay as roughage. Alfalfa from the third through last harvests generally is not as rich in protein, vitamins, and minerals, so it is fed to dry cows and horses.

Summer weed control actually reduces hay tonnage, and the reduction in hay feed quality caused by weeds is sometimes argued. Early cut and protein rich alfalfa hay is too rich for horses and can cause colic if it is the only feed source. Summer grasses in alfalfa hay regulate the high protein levels of the alfalfa providing a good quality feed ration for horses. Feed with crude protein concentration ranging from 10 to 14%, and total digestible nutrient (TDN) levels ranging from 45 to 60% is suggested for most horses. Feed for dry dairy cows should have a relative feed value ranging from 100 to 115, and crude protein concentration from 12 to 15%.

Materials and Methods

A field experiment was conducted during summer, 1996 in Parker Valley located in western La Paz County and Mohave Valley, AZ located in western Mohave County to determine the feed quality of summer weeds in alfalfa hay. The experiment was conducted on four alfalfa fields in Parker Valley and two fields in Mohave Valley. During the month of September, mature weeds and alfalfa were hand harvested from each field from two to eight days prior to the growers actual hay harvest. Summer weeds collected from each field included bermudagrass, junglerice, Mexican sprangletop, Johnsongrass, purple nutsedge, and common purslane. An alfalfa sample was also hand harvested from each field to compare its feed quality to that of the weeds. The samples were dried, ground, and analyzed for dry matter, crude protein, acid detergent fiber (ADF), and neutral detergent fiber (NDF) by Stanworth Consultants (Blythe, CA). Relative feed value and total digest nutrient (TDN) levels were calculated from this data. Statistical analyses were performed on the data using each field as a replicate and ANOVA and the least significant difference (LSD) test at the 0.05 level of probability when appropriate.

Results and Discussion

For mature horses, a blend of grass and alfalfa hay is better than either one alone. Alfalfa has a higher nutritive value per pound than any other hay. It is good for colts, young horses, and dairy cows, but may be too rich for mature horses. Using a grass hay along with alfalfa limits the appetite of a horse to a safer amount and gives horses variation in their diet.

Problems from feeding alfalfa often occur from allowing the horse to eat too much, or feeding the horse low quality, stemmy alfalfa which causes compaction. Other problems can result from feeding horses improperly cured alfalfa hay. Over curing yields a dry hay with a relatively low nutrient value and shatters badly when handled, or under curing may lead to moldy hay. Horses may refuse to eat moldy hay, they may consume it and die of colic, or they may inhale the mold spores while eating which can lead to a respiratory condition called heaves that markedly reducing the horse's stamina.

Alfalfa hay cut in September is normally fed to dry dairy cows and horses. Feed with crude protein concentration ranging from 10 to 14%, and total digestible nutrient (TDN) levels ranging from 45 to 60% is suggested for most horses. Feed for dry dairy cows should have a relative feed value ranging from 100 to 115, and crude protein concentration from 12 to 15% (Table 1).

Of the summer weeds examined in this experiment, only common purslane had a relative feed value (149) and total digestible nutrient level (61.9) statistically equal to alfalfa (Table 2). Although common purslane to have a feed quality similar to alfalfa, this succulent plant increases drying time which can reduce leafiness and feed quality of infested alfalfa hay, and can increase moisture content of baled alfalfa hay, making the hay more susceptible to molding in storage.

The summer grasses and sedges had relative feed values ranging from 74.9 to 87.7, total digestible nutrient (TDN) levels ranging from 50.9 to 55.1%, and crude protein concentrations ranging from 11.6 to 14.8%. A daily feed ration of 15 pounds alfalfa hay would provide 9.3 pounds of TDN, while 15 pounds of grassy weeds would provide 7.6 to 8.3 pounds of TDN. Grassy weeds alone would not provide suitable hay rations for most mature horses, and would require mixing with alfalfa to provide suitable horse feed ration. If these grassy weeds made up less than 50% of the weedy portion of the alfalfa hay, the feed ration would provide adequate nutrition for most mature horses. However, this hay would be of questionable feed quality for dry dairy cows. Nonetheless, horse owners could wait until late summer when hay prices slump, and purchase off-grade, properly cured alfalfa hay containing up to 50% grassy summer weeds as an economical, nutritious feed source.

Besides protein, phosphorus and calcium are important mineral components of a feed ration since these are the predominate mineral elements in a horse's skeleton. Although the calcium and phosphorus percentages of the weed

and alfalfa samples used in this study were not determined, we can make some assumptions about them. First it would be fair to assume that the alfalfa hay contained approximately 1.1% calcium and 0.16% phosphorus, while the grassy weeds contained approximately 0.35% calcium and 0.15% phosphorus. Thus, a feed ration of 15 pounds alfalfa per day would contain 0.17 pounds of calcium and 0.024 pounds of phosphorus. A feed ration of 7.5 pounds (50%) alfalfa plus 7.5 pounds (50%) grassy weeds would contain 0.11 pounds of calcium and 0.023 pounds of phosphorus. For a mature horse at medium work, both these daily rations would lack approximately 0.03 pounds of phosphorus and 8 to 9 Mcal of digestible energy, which would be supplemented by feeding 5 to 7 pounds of concentrate per day.

Table 1. Suggested minimum nutrient requirements needed by horses in several stages of growth and activities, and dry dairy cows.

Animal Stages/Activity	Crude Protein (%)	TDN (%)	Relative Feed Value (%)
<u>Horse Hay:</u>			
Yearling	14	60	---
Two Year Old	13	55	---
Mature/Light Work	10	45	---
Mature/Heavy Work	11	55	---
Mature/Lactating	13	55	---
<u>Dry Dairy Cow Hay:</u>	12 to 15	---	100 to 115

Table 2. Chemical composition of alfalfa and common weeds found during the September summer slump alfalfa harvest.

Species	ADF (%)	NDF (%)	Crude Protein (%)	TDN (%)	Relative Feed Value
Bermudagrass	36.2 b	72.4 a	14.8 c	55.1 b	78.1 b
Junglerice	38.8 ab	70.0 a	14.3 cd	53.2 bc	84.1 b
Mexican Sprangletop	39.0 ab	69.5 a	12.3 de	53.1 bc	78.4 b
Johnsongrass	41.8 a	70.0 a	11.6 e	50.9 c	74.9 b
Purple Nutsedge	36.8 b	63.9 b	13.7 cde	54.7 b	87.7 b
Common Purslane	27.2 c	42.5 c	18.1 b	61.9 a	149 a
Alfalfa	26.8 c	42.1 c	22.4 a	62.3 a	150 a

ADF = acid detergent fiber, NDF = neutral detergent fiber, and TDN = total digestible nutrients. Means followed by the same letter within the same column are not significantly different at the 0.05 level of probability according to the least significant difference test (LSD).