

Johnson Grass Hay Versus Timothy Hay As a Feed for Horses and Mules

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INTRODUCTION

THE COMPARATIVE feeding value of Johnson grass and timothy hays, as well as their relative economy, is of interest to those who use large quantities of hay for horse and mule feeding, and to farmers who produce the hay for sale.

Timothy hay is sold under definite standards and grades on the leading markets of the country. Its value as a roughage for work animals has long been recognized. For this reason it furnishes a good basis for comparison in determining the value of other grass hays which are not so well known. Timothy hay is produced largely in the northern and middle western states. It reaches southern markets where it comes in direct competition with Johnson grass hay, a product grown extensively in the Black Belt of Alabama and Mississippi.

Table I shows that timothy hay and Johnson grass hay are very similar in food nutrients and the observations of practical feeders indicate that there is very little difference in the feeding value of the two hays.

TABLE I.—DIGESTIBLE NUTRIENTS IN JOHNSON GRASS HAY AND TIMOTHY HAY†

	Total dry matter in 100 lbs.	Digestible nutrients in 100 pounds			
		Crude protein	Carbohydrates	Fat	Total
Johnson grass hay	89.9	2.9	45.0	1.0	50.1
Timothy hay	88.4	3.0	42.8	1.2	48.5

Lloyd (‡) of the Mississippi Station reported the feeding of two groups of two and three-year-old mules for a period of 89 days on a grain mixture of corn and cob meal, oats and cottonseed meal.

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†Feeds and Feeding—18th Edition, Henry and Morrison.

‡Information to the authors.

In addition, Lot I received 11.3 pounds of Johnson grass hay per head daily and Lot II received 11.3 pounds of timothy hay per head daily. The daily grain allowance was the same in each lot. The mules which were fed Johnson grass hay gained an average of 40 pounds each during the experiment at a feed cost of 36 cents per pound gain, and the mules which were fed timothy hay gained during the same period 39.6 pounds each at a feed cost of 48 cents per pound gain. Hay was charged at \$11 per ton for Johnson grass and \$20 per ton for timothy. Templeton (‡) found that a ration of 13.7 pounds of ear corn and 12 pounds of Johnson grass hay daily per 1,000 pounds live weight was practically the equivalent of 13.7 pounds of ear corn and 11 pounds of soybean hay for maintaining the weight of farm mules while at heavy work.

The two experiments reported in this bulletin were planned to obtain further authentic information on this subject. The object of the experiments were:

- (a) To compare the feeding value of Johnson grass hay and timothy hay as a roughage for horses and mules.
- (b) To determine the relative economy of the two feeds as used under southern conditions.

EXPERIMENT NO. I.—JULY 29, 1928 TO OCT. 20, 1928
(84 days)

THIS experiment was conducted in cooperation with the Tennessee Coal, Iron, and Railroad Company, Muscoda Ore Mine, Bessemer, Alabama, who furnished the animals and feed for this test.

Nine horses and nineteen mules were used in the test. Most of them were worked in teams of two each, and the remaining ones were worked single. Various types of animals constituted the group since they were used to perform various classes of work outside of the mine and around the mining camp. The duties of individual teams varied from very light to very heavy work. All animals were in fair to good condition of flesh at the beginning of the experiment.

Allotments.—The group of animals was divided into two lots as uniformly as possible according to weight, type of work performed, condition, conformation, and age. In the case of double teams the team mates were placed in different lots.

Lot I, which received Johnson grass hay, was composed of four horses and ten mules, and Lot II, which received timothy hay, consisted of five horses and nine mules.

Feeds and Plan of Feeding.—No. 2 shelled oats were used as the entire grain ration in both lots. The oats were fed as whole

‡Miss. Sta. Bul. No. 70.

grain during the first 28-day period. During the remaining 56 days the oats were crushed.

It was planned to feed No. 1 hay in both lots but when the experiment started there was no Johnson grass hay of No. 1 grade on the market, so No. 2 Johnson grass and No. 2 timothy were used during the first 34 days of the test. During the remainder of the experiment No. 1 Johnson grass and No. 1 timothy were used.

Feeding operations were carried out in the same manner as had previously been the practice in regard to time and frequency of feeding. The entire daily allowance of grain and hay was fed in the evening and the animals had access to the feed overnight.

It was originally planned to feed a one per cent ration of grain and hay based on the live weight. The animals soon began losing weight in both lots, however, and the grain allowance was increased. During the latter part of the experiment the animals were fed according to their individual condition. Some of the thinner animals received a larger grain allowance than others, a fact which explains the difference in grain allowance per 1,000 pounds live weight in the two lots as shown in Table II.

Price of Feeds.—The feeds used in this experiment were charged at actual cost on the Birmingham markets: oats \$0.85 per bushel, timothy hay \$25 per ton, and Johnson grass hay \$20 per ton.

Records.—Individual weights were taken of all horses and mules at the beginning of the experiment and at 28-day intervals thereafter throughout the test. Daily individual feed records were kept of all feed used. Each day refuse hay was weighed and these weights recorded.

Results and Discussion.—The results of this experiment are shown in Table II.

It will be noted that neither lot maintained its weight on the ration allowed. However, Lot II lost less weight while consuming 11.06 pounds of oats and 9.36 pounds of timothy hay daily per 1,000 pounds live weight than did Lot I while consuming 11.74 pounds of oats and 9.40 pounds of Johnson grass hay. The waste from Johnson grass hay was greater than that from timothy hay. The horses refused 4.97 per cent of the Johnson grass hay and only 0.72 per cent of the timothy hay. The waste consisted mainly of the coarse stems of the No. 2 Johnson grass hay used during the first part of the experiment. There was 9.2 per cent of refusal where No. 2 Johnson grass was used and only 2.4 per cent where No. 1 Johnson grass was used. Even though the animals in Lot I consumed more grain and hay per unit of live weight than did those in Lot II the daily feed cost including wastage was less in Lot I. Based on the price of feeds on the local market, it cost 51.1 cents per day to feed the animals in Johnson grass hay lot and 52.5 cents for those in the timothy hay lot.

TABLE II.—SUMMARY OF RESULTS IN FEEDING JOHNSON GRASS HAY VERSUS TIMOTHY HAY TO HORSES AND MULES

July 29, 1928 to October 20, 1928 (84 days)

Lots and Rations	Lot I	Lot II
	Johnson grass hay and oats	Timothy hay and oats
Total number of animals	14	14
Total initial weight, pounds	17,570.00	17,930.00
Average initial weight per animal, pounds	1,255.00	1,280.00
Total loss in weight per lot, pounds	305.00	150.00
Average loss in weight per animal, pounds	21.79	10.71
Total feed allowed:		
Oats, pounds	14,858.00	14,527.00
Hay, pounds	12,540.00	12,381.00
Total feed refused:		
Hay, pounds	623.00	89.00
Total hay consumed, pounds	11,917.00	12,292.00
Average daily feed per animal:		
Oats, pounds	14.60	14.10
Hay (fed), pounds	12.32	12.00
Hay (consumed), pounds	11.70	11.93
Average daily feed per 1,000 pounds live weight:		
Oats, pounds	11.74	11.06
Hay (fed), pounds	9.90	9.41
Hay (consumed), pounds	9.40	9.36
Hay refused (waste) per cent, pounds	4.97	0.72
Total feed cost per lot	\$520.62	\$541.18
Daily feed cost per animal	\$0.511	\$0.525

There are several factors which probably contributed to the loss of weight of animals in both lots during the experiment. Previous to the beginning of the experiment the animals had been receiving a heavy allowance of sweet feed and alfalfa hay. They were changed abruptly to the experimental feed which was not so palatable and which contained a smaller allowance of grain. The one per cent ration of grain and hay proved insufficient in quantity for those animals which were doing heavy work. In addition to this the experiment was started in midsummer and it was intensely hot during the first half of the test.

General observation during the entire period of feeding revealed no noticeable differences in Lots I and II as to spirit of the animals, their physical condition, or their efficiency in the performance of work.

EXPERIMENT No. II—DECEMBER 10, 1928 TO APRIL 29, 1929
(140 days)

THE WORK reported here was done in cooperation with the Field Artillery Detachment of the Military Department, Alabama Polytechnic Institute, Auburn, Alabama, which furnished the horses and feed for this experiment.

Forty horses, twenty-seven of which were of the saddle type and thirteen of the light draft type, were selected from a group of over seventy at the army stables. They were doing only light work throughout the experiment.

Allotment.—The animals were divided into two lots of twenty horses each, according to weight, conformation, and type of work. It was not convenient to separate teammates in the case of draft horses. Seven draft and thirteen saddle horses were placed in Lot III. Six draft and fourteen saddle horses made up Lot IV.

Feeds and Plan of Feeding.—No. 2 shelled white oats were fed to both lots as the grain ration. No. 1 Johnson grass hay was given to Lot III and No. 1 timothy hay to Lot IV.

The regular routine of army practice was followed in feeding and care of the animals. The daily grain allowance was divided into three equal parts and fed morning, noon, and evening. One-third of the daily hay allowance was fed at noon and the remaining two-thirds at night. It was not practicable to weigh each horse's feed separately at each feeding but the grain was measured out to the individual animals in a graduated container, and the daily allowance of hay was weighed for each lot and distributed among the horses as nearly equal as possible by this method. It was the plan to feed ten pounds of grain and twelve pounds of hay to each animal daily. The individual weight of each animal was taken at the beginning of the experiment and at twenty-eight day intervals throughout the test.

Results and Discussions.—The results of this experiment are recorded in Table III.

Due to the fact that low grade grass hay was used in the stalls for bedding, it was impossible to keep accurate records of hay refused by each lot. Observation revealed, however, that there was less refuse in the lot fed timothy hay. The horses in both lots made considerable gains during the experiment. Lot III, fed Johnson grass hay, gained 56.25 pounds per animal while Lot IV, fed timothy, gained 57.70 pounds per animal. The actual daily feed allowed per 1,000 pounds live weight was 9.42 pounds oats and 11.31 pounds Johnson grass hay in Lot III and 9.69 pounds oats and 11.40 pounds timothy hay in Lot IV.

The cost of the two feeds was again in favor of Johnson grass hay. The daily cost of feed per animal was 33.9 cents in Lot III and 37.0 cents in Lot IV. This difference was largely due to the difference in the price of the two hays on the local market.

TABLE III.—SUMMARY OF RESULTS IN FEEDING JOHNSON GRASS HAY VERSUS TIMOTHY HAY TO HORSES

December 10, 1928 to April 29, 1929 (140 days)

Ration	Lot III	Lot IV
	Johnson grass hay and oats	Timothy hay and oats
Total number of animals	20	20
Total initial weight, pounds	20,665.00	20,488.00
Average initial weight per animal	1,033.25	1,024.40
Total gain in weight, pounds	1,125.00	1,154.00
Average gain per animal, pounds	56.25	57.70
Total feed allowed:		
Grain, pounds	28,000.00	28,553.00
Hay, pounds	33,600.00	33,600.00
Average daily feed per animal:		
Grain, pounds	10.00	10.20
Hay, pounds	12.00	12.00
Average daily feed per 1,000 pounds live weight:		
Grain, pounds	9.42	9.69
Hay, pounds	11.31	11.40
*Total feed cost per lot	\$950.88	\$1,036.40
Daily feed cost per animal	\$0.3396	\$0.3701
*Prices of feeds:	Johnson grass hay	\$21.60 per ton f.o.b. Auburn
	Timothy hay	26.00 per ton
	Oats	2.10 per cwt.

SUMMARY

IN THE FIRST experiment with horses and mules doing heavy work the ration of oats and timothy hay proved slightly more efficient in maintaining the animals' weight than did the ration of oats and Johnson grass hay.

The average daily feed consumed per 1,000 pounds live weight in the first experiment was 11.74 pounds oats and 9.40 pounds Johnson grass hay in Lot I, and 11.06 pounds oats and 9.33 pounds timothy hay in Lot II.

The average loss in weight per animal during the 84 days was 21.79 pounds in Lot I, and 10.71 pounds in Lot II.

The animals refused 4.97 per cent of the Johnson grass hay and 0.72 per cent of the timothy.

The price of feeds on the Birmingham market when this experiment was conducted was: oats 85 cents per bushel, Johnson grass hay \$20 per ton, and timothy hay \$25 per ton. Based upon these figures the average daily feed cost per animal (including hay

refused) was 51 cents in the Johnson grass hay lot and 52.5 cents in the timothy hay lot.

With horses doing light work in the second experiment there was no noticeable difference in the efficiency of the two hays so far as the well-being of the animals was concerned.

The average daily feed allowed in the second experiment per thousand pounds live weight was 9.49 pounds oats and 11.39 pounds Johnson grass hay in Lot III, and 9.69 pounds oats and 11.40 pounds timothy hay in Lot IV.

The average gain in weight per animal during the 140-day experiment was 56.25 pounds in Lot III and 57.70 pounds in Lot IV.

The actual cost of feeds (f.o.b. Auburn) used in the second experiment was: oats 67 cents per bushel, Johnson grass hay \$21.60 per ton, and timothy hay \$26.00 per ton. Based on these prices the average daily feed cost per animal was 33.9 cents in the Johnson grass hay lot and 37 cents in the timothy hay lot.

There was no noticeable difference in either of the experiments in the health and vigor of the animals or in their ability to do the work assigned which might be contributed to the feed.