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# Feeding Suggestions For Horses

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COOPERATIVE EXTENSION SERVICE CIRCULAR 1034

## **CONTENTS**

<i>Consumption and Weight . . . . .</i>	<b>3</b>
<i>Formulating Horse Rations . . . . .</i>	<b>4</b>
<i>Water . . . . .</i>	<b>4</b>
<i>Protein for Horses . . . . .</i>	<b>4</b>
<i>Minerals . . . . .</i>	<b>5</b>
<i>Vitamins . . . . .</i>	<b>5</b>
<i>Energy Needs . . . . .</i>	<b>6</b>
<i>Grains for Horses . . . . .</i>	<b>6</b>
<i>Roughage . . . . .</i>	<b>7</b>
<i>Feeding Costs . . . . .</i>	<b>8</b>
<i>Pastures . . . . .</i>	<b>9</b>
<i>Examples of Daily Rations . . . . .</i>	<b>10</b>
<i>Ration Calculations . . . . .</i>	<b>15</b>
<i>Some Feeding Questions and Answers . . . . .</i>	<b>16</b>

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# FEEDING SUGGESTIONS FOR HORSES

A WELL-FED, HEALTHY HORSE will be content and alert, have a keen appetite, and will have a sleek, lustrous coat. About 75 percent of the cost of raising horses (aside from purchase of breeding stock) is feed. Overfeeding can be wasteful and expensive, and underfeeding or a nutritional deficiency will not permit optimum performance. Since horses depend so much on their wind, feeds should be clean and free of mold and excessive dust. In order for a horse to be in the best possible condition, observe the following feeding practices.

- Feed a balanced ration. The term "ration" denotes feed for a 24-hour period.
- Accustom horses to feed gradually. In general, they may be given as much hay as they will eat. It is safe to start horses on  $\frac{1}{2}$  pound of grain daily for each hundred pounds of the animal's weight. Thereafter,  $\frac{1}{2}$  pound of grain added to the total ration every third day is advisable. Of course, as the grain ration is increased, roughage consumption will decline.
- Feed horses regularly. In warm weather, early and late feeding during the cooler hours is preferred.
- Feed two or three times daily. Usually feed grain before roughage.
- Avoid sudden or abrupt changes in types of rations. Horses can go off feed.
- Keep troughs and water containers clean.
- Exercise horses every day.
- Be sure your horse's teeth are sound.

## *Consumption and Weight*

Horses can eat about 2 to  $2\frac{1}{4}$  pounds of air-dry feeds (as grain in the bin and hay in the bale) daily per 100 pounds (cwt.) of their body weight.

In average condition, a light-legged mature mare over 14.2 hands (58 inches) will weigh approximately 1,100 pounds while mature geldings and stallions will weigh about 1,200 pounds.

Mature ponies under 46 inches will weigh from 400 to 600 pounds. Taller ponies up to 56 inches will average 700 to 900 pounds.

Weanling horse foals will weigh from 400 to 600 pounds when 7 months old. Pony foals will weigh from 200 to 300 pounds when 7 months old.

Well-fed foals will reach about 50 percent of their mature weight during the first year and about 75 percent at the end of the second year. Horses reach maturity between four and five years of age.

## *Formulating Horse Rations*

Water, protein, minerals, and vitamins are essential nutrients in a horse ration. Observe the following points when formulating the ration.

- Is the total quantity of the ration adequate?
- Is the energy produced by the ration suitable for the work or the performance required?
- Is the amount of crude protein (digestible protein) adequate?
- Is the proper amount of minerals and of vitamins A and D included in the ration?
- Is the ration economical but still nutritionally adequate?

## *Water*

Water is an essential nutrient for a horse. The average mature light horse may drink about 10 to 12 gallons daily varying with the amount of work, the type of feed, and the weather.

Horses should be watered regularly and frequently. After heavy exertion, very warm or very thirsty horses should be watered lightly until they are properly cooled. In very cold weather, water should be heated to 40 or 50° F.

## *Protein for Horses*

Horses need protein for muscle growth, for lactation, and for reproduction. Protein needs are expressed as percent crude protein (C.P.) or more precisely as percent digestible protein (D.P.) of the ration. Horsemen usually add supplemental protein such as linseed meal, soybean meal, or other purchased protein to grass hay and grain rations. Legume hays such as alfalfa and red clover are also good protein sources. The average ration should contain approximately 12 percent crude protein.

Two good common oilmeal protein supplements that can be added to grass hay and grains are linseed meal (36 percent C.P.), and soybean meal (44 percent C.P. with hulls; 50 percent C.P. without hulls).

Other purchased protein supplements without urea can be used. In some cases peanut meal, cottonseed meal, and safflower meal are good substitutes if they are economical. Protein needs of various types of horses are summarized in Table 1.

Table 1.—Summary of Protein Needs for Horses

Type of horse	Percent crude protein (C.P.)	Percent digestible protein (D.P.)	Lb. oilmeal or protein equivalent to add to grass hay or grain rations daily <sup>a</sup>
Mature idle.....	10 <sup>a</sup>	7.5	.5
Dry mare in early pregnancy.....	11	8.5	.75
Yearling or 2-year old.....	12	9.0	1.0
Mare in last quarter of gestation..	12	9.0	1.0
Lactating mare.....	12 <sup>b</sup>	9.0	1.5
Stallion in heavy service.....	12++ <sup>c</sup>	9.0++	2.0
Foal under 6 months.....	14+ <sup>d</sup>	10.0+	...

<sup>a</sup> Four pounds of quality legume hays (alfalfa or clover) furnish approximately the same amount of digestible protein as 1 pound of soybean, linseed, or cottonseed meal.

<sup>b</sup> The highest amount of protein is needed during early lactation. Later the amount can be reduced.

<sup>c</sup> The amount of protein needed depends on how heavy is the breeding service. The minimum is 12 percent.

<sup>d</sup> A very young foal may need up to 20 percent protein. At 6 months, 14 percent is sufficient.

## Minerals

Common farm feeds provide minerals, but most horses need extra calcium, phosphorus, salt, and iodine. The daily salt requirement is about 2 to 3 ounces. The calcium requirement is about 0.5 percent of the ration and the phosphorus requirement is about 0.4 percent.

A good way to furnish supplemental minerals is to offer a free-choice mixture of equal parts of dicalcium phosphate and trace-mineralized salt in a box protected from the weather. In formulating complete mixed hay and grain rations, about 1 percent dicalcium phosphate and 0.5 percent trace-mineralized salt should be added.

## Vitamins

Special attention should be given to a horse's needs for vitamins. Generally, green grasses and hays furnish carotene that the horse converts to vitamin A. Vitamin D is obtained from sunshine. A horse needs about 20,000 to 30,000 International Units (I.U.) of vitamin A and about 3,000 I.U. of vitamin D daily.

Green feeds and wheat products such as wheat bran and wheat germ oil are rich in vitamin E which is often associated with reproduction.

Under some conditions, horses may not get enough vitamins. In such cases, economical supplements of vitamins A, D, and often E can be

mixed in the feed, injected intramuscularly, or furnished in stabilized mineral blocks.

The necessary B vitamins are synthesized by horses in the cecum. Small supplemental amounts may be added when stress conditions exist.

## Energy Needs

The basic ration for a horse is hay plus grain. The amount of grain a horse needs depends on the growth or performance expected. The amount of total ration is based on a consumption of 2 pounds of air-dry fed per cwt. Thus a 1,000-pound horse would receive a total daily ration of about 20 pounds. The energy need is often expressed as total digestible nutrients (T.D.N.). Generally grains provide more energy than hays because they analyze higher in T.D.N. and lower in crude fiber (C.F.). Table 2 gives grain requirements for several types of horses.

Table 2.—Amount of Grain To Be Included in a Horse's Ration  
Per Cwt. of the Horse's Weight

Grain per cwt., lb.	Work expected from the horse	Gain or growth	Breeding stock
None	Idle mature horse	Maintenance	.....
.5	Light (0 to 3 hours per day)	Light	.....
.75	Moderate (3 to 6 hours per day)	Average	Mare in drylot nursing foal
1.0	Heavy (more than 6 hours per day)	Faster growth or fattening	Stallion in heavy service

The table suggests that an idle mature horse weighing 1,000 pounds should receive 20 pounds of hay with no grain while a similar horse doing heavy work or a stallion in heavy service should receive 10 pounds of hay and 10 pounds of grain daily.

## Grains for Horses

Oats are the preferred grain to feed horses, but other grains can also be used. Horses like variety, so mixed grains are often fed.

*Oats* are excellent. They are often crimped or crushed for cleaning and palatability.

*Barley* is similar to oats. It needs to be rolled or crushed.

*Shelled corn* is better utilized when coarse cracked. Corn produces considerable heat during digestion, so it is better not to include over 50

percent and preferably not over 33 percent of it in the mix in warm weather.

*Milo* needs to be crushed or cracked; otherwise it will be voided in manure as whole grain. Do not include more than 50 percent and preferably not more than 33 percent milo in the mix in warm weather.

*Wheat* is generally expensive and needs cracking or crushing. Do not include over 50 percent wheat in the grain mix.

*Rye* also needs cracking or crushing. It is not very palatable.

*Wheat bran* is good as bulk. One pound daily is sufficient. A warm soaked bran mash of 3 to 4 pounds, fed either straight or mixed equally with oats, is an excellent idle-day feed.

## **Roughage**

Hay is used in the ration for bulk and energy, and can be fed loose, pelleted, or chopped.

While growth, work, and reproduction require that some of the ration consists of grain, nonlactating broodmares and idle mature horses can get along satisfactorily on hay alone. On the other hand, working horses can easily be fed too much roughage, resulting in labored breathing and lack of stamina.

**Grass hays** usually contain about 5 percent crude protein. However, this figure can be higher if grass hays are harvested in early bloom.

*Bromegrass*, is a perennial, productive, and palatable forage.

*Orchard grass* is a perennial palatable forage often seeded with bromegrass.

*Timothy* is highly regarded but it is a less-productive hay in Illinois.

*Prairie hay* is a mixture of grasses usually of western or southwestern origin.

**Legume hays** usually contain about 15 percent crude protein when cut at the one-third bloom stage. While legume hays will not harm horses, it is suggested that not over one pound be fed per cwt. Very green legume hays may be a little laxative and may cause more frequent urination.

*Alfalfa*, a perennial, is hardy and productive.

*Red clover*, a biennial, will need reseeding after two years. Occasionally, second-cutting red clover may cause slobbering.

*Lespedeza* is commonly grown in southern Illinois.

**Mixed hays** include grass and legumes. They offer variety and more protein than straight grass hay.

**Straws** are used primarily for bedding but clean oat and wheat straw can be used as a filler roughage. Oat straw is more palatable.

## *Feeding Costs*

The cost of feeding a horse varies with the season and the availability of feed. Some approximate on-farm costs of feedstuffs and supplements are given below. These costs will be higher in urban areas because of additional expenses for transportation and handling.

*Hay* costs 20 to 30 dollars per ton or 1 to 1½ cents per pound.

*Oats* cost 64 to 80 cents per bushel or 2 to 2½ cents per pound.

*Shelled corn* costs about \$1.12 per bushel or 2 cents per pound.

*Soybean meal* (42 to 50 percent C.P.) costs about 100 dollars per ton or 5 cents per pound.

*Linseed meal* (36 percent C.P.) costs about 100 dollars per ton or 5 cents per pound.

*Complete pelleted feed* costs 85 to 100 dollars per ton or 4½ to 5 cents per pound.

*Dicalcium phosphate* costs about 5 dollars per 100 pounds or 5 cents per pound.

*Trace-mineralized salt* costs about \$2.50 per 100 pounds or 2½ cents per pound.

Three examples of the cost of feeding a horse are given below. These figures are based on a horse consuming about 2 pounds of feed per 100 pounds of body weight per day.

**Example A:** Horse weighing 1,100 pounds fed only mixed grass-legume hay.

$$1,100 \text{ lb.} \times 2 \text{ lb. per cwt.} = 22 \text{ lb. daily;}$$

$$22 \text{ lb.} \times 365 \text{ days} = 8,030 \text{ lb. annually;}$$

$$8,030 \text{ lb.} \times \$0.015 = \$120.85 \text{ annual cost.}$$

**Example B:** Horse weighing 1,100 pounds working about 3 to 6 hours per day.

$$8 \text{ lb. grain} \times \$0.025 \text{ per lb.} = \$0.20;$$

$$13 \text{ lb. grass hay} \times \$0.015 \text{ per lb.} = \$0.20;$$

$$1 \text{ lb. soybean meal or linseed meal} \times \$0.05 \text{ per lb.} = \$0.05;$$

$$\text{Total daily cost} = \$0.45;$$

$$\$0.45 \times 365 \text{ days} = \$164.25 \text{ annual cost.}$$

**Example C:** Horse weighing 1,100 pounds fed a complete pelleted ration.

$$1,100 \text{ lb.} \times 2 \text{ lb. per cwt.} = 22 \text{ lb. daily;}$$

$$22 \text{ lb.} \times \$0.05 \text{ per lb.} = \$1.10;$$

$$\$1.10 \times 365 \text{ days} = \$391.50 \text{ annual cost.}$$

## *Pastures*

Good pastures are an excellent source of nutrients. Pastures can supply the complete ration, but usually working horses and sometimes lactating mares are fed additional grain. Foals are often creep-fed on pasture.

The pasture season in central Illinois begins about the first week in May and lasts until about the middle of October. It begins about a week earlier for each 100 miles south of central Illinois and a week later for each 100 miles north of central Illinois.

Both temporary (one-season) and permanent pastures are used to provide feed for horses. An example of a temporary pasture schedule is given below.

<i>Season</i>	<i>Forage</i>	<i>Seeding time</i>	<i>Grazing time</i>
Spring	Oats and barley	Late March and April	May and June
Summer	Sudangrass	Late April and May	June until frost <sup>a</sup>
Fall	Wheat and rye	Late August and September	October and No- vember; April

<sup>a</sup> Sudangrass is not safe immediately after frost or when severely stunted by drought.

Mixtures of legume and grasses in permanent pasture provide variety and more forage. Bromegrass or orchardgrass with alfalfa are suitable in most of Illinois. Fescue with lespedeza is often used in southern Illinois.

Establishment of a permanent pasture involves a considerable investment in money and labor. Good management is also required. The following suggestions will help you establish and maintain a good permanent pasture.



Pastures are an excellent source of nutrients for horses. In addition, horses on pasture have ample room to exercise.

- Test the soil fertility and add necessary limestone, phosphorus, potassium, and nitrogen.
- Prepare a good seedbed.
- Use recommended and adapted seeds and inoculate legumes.
- Use a grass-legume mixture.
- Seed at the proper time, preferably in early spring or fall.
- Seed with a nurse crop. Oats are good. Remove the nurse crop early when oats are in the dough stage.
- Cover the seed with  $\frac{1}{4}$  to  $\frac{1}{2}$  inch of soil.
- Firm the seedbed by rolling.
- Clip weeds, setting the sickle bar high.
- Do not pasture the first season because horses will trample the seedlings.
- Harrow established pastures in the early spring to spread dung piles. This will help to control parasites.
- Topdress pastures with nitrogen in the early spring. This encourages forage growth and increases carrying capacity.

### *Examples of Daily Rations*

Some examples of daily rations for several types of horses are given below. Modifications can be made in these rations depending on the availability and cost of feeds.

#### **Example A: Idle mature horse or pony**

*Nutrient requirements:*

	Weight, lb.	Daily ration, lb.	Daily T.D.N., lb.	Daily D.P., lb.
Horse.....	1,200	20 to 24	9.6	.8
Pony.....	800	16 to 18	6.4	.6

#### *Ration 1:*

Horse: 20 to 24 pounds mixed hay ( $\frac{1}{3}$  alfalfa and  $\frac{2}{3}$  grass).

Pony: 16 pounds mixed hay.

#### *Ration 2:*

Horse: 20 to 24 pounds grass hay and  $\frac{1}{2}$  pound linseed meal or soybean meal.

Pony: 14 to 16 pounds grass hay and  $\frac{1}{4}$  pound oilmeal.

## Example B: Mature horse or pony doing moderate work

*Nutrient requirements:*

	Weight, lb.	Daily ration, lb.	Daily T.D.N., lb.	Daily D.P., lb.
Horse.....	1,200	20 to 24	14.0	1.3
Pony.....	800	16 to 18 <small>d</small>	11.0	.92

*Ration 1:*

Horse: 15 pounds mixed hay ( $\frac{1}{3}$  alfalfa and  $\frac{2}{3}$  grass) and 9 pounds oats.

Pony: 10 pounds mixed hay and 6 pounds oats.

*Ration 2:*

Horse: 15 pounds mixed hay ( $\frac{1}{3}$  red clover and  $\frac{2}{3}$  grass), 6 pounds oats, and 3 pounds cracked corn.

Pony: 10 pounds mixed hay, 4 pounds oats, and 2 pounds cracked corn.

*Ration 3:*

Horse: 15 pounds grass hay, 6 pounds oats, 3 pounds cracked corn, and  $\frac{1}{2}$  pound linseed meal or soybean meal.

Pony: 10 pounds grass hay, 4 pounds oats, 2 pounds cracked corn, and  $\frac{1}{4}$  pound linseed meal or soybean meal.



Horses can be given their rations at an outdoor feeder such as the one shown here.

**Example C: Weanling 6 months to 1 year old***Nutrient requirements:*

	Weight, lb.	Daily ration, lb.	Daily T.D.N., lb.	Daily D.P., lb.
Weanling.....	600	12 to 14	10 to 11	1.3

*Ration 1:*

8 pounds mixed hay ( $\frac{1}{3}$  alfalfa and  $\frac{2}{3}$  grass), 6 pounds oats, and  $\frac{1}{2}$  pound linseed meal.

*Ration 2:*

8 pounds grass hay, 3 pounds oats, 3 pounds cracked corn, and 1 pound soybean meal or linseed meal.

**Example D: Yearling to 2-year-old horses***Nutrient requirements:*

	Weight, lb.	Daily ration, lb.	Daily T.D.N., lb.	Daily D.P., lb.
Yearling to 2-year-old.....	900	18 to 20	12	1.5

*Ration 1:*

11 pounds mixed hay ( $\frac{1}{3}$  red clover and  $\frac{2}{3}$  grass), 6 pounds oats, 3 pounds cracked corn, and  $\frac{1}{2}$  pound linseed meal or soybean meal.

*Ration 2:*

11 pounds grass hay, 6 pounds oats, 3 pounds cracked corn, and 1 pound linseed meal or soybean meal.

**Example E: Mare nursing foal***Nutrient requirements:*

	Weight, lb.	Daily ration, lb.	Daily T.D.N., lb.	Daily D.P., lb.
Mare.....	1,100	20 to 22	18	1.9

*Ration 1:*

Pasture and 6 pounds grain. The grain might consist of 4 pounds oats, 1 pound cracked corn, and 1 pound bran.

*Ration 2:*

11 pounds mixed hay ( $\frac{1}{3}$  alfalfa and  $\frac{2}{3}$  grass), 7 pounds oats, 3 pounds cracked corn, and 1 pound linseed meal or soybean meal.

*Ration 3:*

11 pounds grass hay, 7 pounds oats, 3 pounds cracked corn, and 1½ pounds linseed meal or soybean meal.

**Example F: Breeding stallion in moderate service**

*Nutrient requirements:*

	Weight, lb.	Daily ration, lb.	Daily T.D.N., lb.	Daily D.P., lb.
Stallion.....	1,300	22 to 26	16	2.5

*Ration 1:*

12 pounds mixed hay ( $\frac{1}{3}$  alfalfa and  $\frac{2}{3}$  grass), 8 pounds oats, 4 pounds cracked corn, 1 pound wheat bran, and 1 pound linseed meal.

*Ration 2:*

12 pounds grass hay, 8 pounds oats, 4 pounds cracked corn, 1 pound wheat bran, and 1½ pounds linseed meal or soybean meal.



Many horses are housed in boxstalls and fed from individual mangers.

### **Example G: Creep rations for a nursing foal**

A creep ration is commonly fed free choice where only foals can eat it.

#### *Ration 1:*

5 parts crimped oats, 3 parts cracked corn, and 1 part linseed pellets.

#### *Ration 2:*

8 parts crimped oats and 1 part linseed pellets.

#### *Ration 3:*

This is a formula for a highly palatable creep ration. It analyzes approximately 18 percent C.P. (13.5 percent D.P.), 70 percent T.D.N., and 8 percent C.F.

<i>Ingredient</i>	<i>Percent</i>
Crimped oats.....	40
Cracked corn.....	30
Soybean meal (50-percent).....	20
Dehydrated alfalfa.....	4
Dried molasses .....	4
Dicalcium phosphate .....	1
Trace-mineralized salt.....	.5
Vitamin mix <sup>a</sup> .....	.5
Aurofac <sup>b</sup> .....	+

<sup>a</sup> To furnish 5,000 I.U. of vitamin A per pound of ration plus B vitamins.

<sup>b</sup> To furnish 40 mg. of antibiotic per pound of ration.

### **Example H: Complete pelleted ration**

This formula analyzes approximately 14 percent C.P. (9.8 percent D.P.), 58 percent T.D.N., and 24 percent C.F.

<i>Ingredient</i>	<i>Percent</i>
Alfalfa hay (chopped) .....	62
Oats.....	15
Cracked corn.....	15
Dried molasses.....	4
Soybean meal (50 percent C.P.).....	2
Dicalcium phosphate .....	1
Trace-mineralized salt.....	.5
Vitamin premix <sup>a</sup> .....	.5

<sup>a</sup> To furnish 2,000 I.U. of vitamin A per pound of ration.

## Ration Calculations

A knowledge of the composition of a ration along with feed analyses (Table 3) makes it possible to calculate the percent protein and percent energy of a ration. Research shows that the maintenance requirement of a horse is about 0.8 pound of T.D.N. per cwt. and that a pound of gain above maintenance requires about 3.63 pounds of T.D.N. per cwt.

The percent of crude protein (C.P.) and digestible protein (D.P.) in a typical ration for an 800-pound yearling can be calculated as in the following example. The C.P. figures are taken from Table 3.

Daily ration of:	lb.	×	C.P.	=	lb. C.P.
Oats.....	6		.12		.72
Corn.....	2		.08		.16
Alfalfa.....	5		.15		.75
Bromegrass.....	5		.05		.25
Soybean meal.....	.75		.50		.375
Totals .....	18.75				2.255

Dividing the total C.P. in pounds by the total amount of the ration ( $2.255 \div 18.75$ ) gives a C.P. content of 12 percent. The average digestion coefficient for crude protein of grain is about 75 percent and about 65 percent for the crude protein of roughages. Taking an average of 70 percent and multiplying the C.P. figure by this amount ( $12 \times .70$ ), a result of 8.4 percent for the digestible protein (D.P.) in the ration is obtained.

The percent T.D.N. in the ration can be calculated in a similar manner. The figures for percent T.D.N. in various feeds in the following example are taken from Table 3.

Daily ration of:	lb.	×	T.D.N.	=	lb. T.D.N.
Oats.....	6		.72		4.32
Corn.....	2		.80		1.60
Alfalfa.....	5		.50		2.50
Bromegrass.....	5		.50		2.50
Soybean meal.....	.75		.80		.60
Totals .....	18.75				11.52

Dividing the total T.D.N. in pounds by the total amount of the ration ( $11.52 \div 18.75$ ) gives a T.D.N. content of 61.4 percent.

The 800-pound yearling used in the examples requires 6.4 pounds T.D.N. for maintenance ( $800 \text{ lb.} \times 0.8 \text{ lb. per cwt.}$ ). Subtracting 6.4

Table 3.—Average Analyses of Some Horse Feeds on an Air-Dry Basis

Feed	Total digestible nutrients (T.D.N.)	Crude protein (C.P.)	Digestible protein (D.P.)	Crude fiber (C.F.)
	percent	percent	percent	percent
<b>Grains</b>				
Oats.....	72	12	9.4	12
Shelled corn.....	80	8 to 9	7	3
Barley.....	79	12	9	6
Milo.....	79	9	7	3
Ground ear corn.....	75	7.5	6	9
Wheat.....	82	12	10	3
Wheat bran.....	70	17	13	9
<b>Protein oil meals</b>				
Linseed meal.....	75	36	31	9
Soybean meal with hulls.....	79	44	36	5
Soybean meal without hulls.....	80	50	42	0
Cottonseed meal.....	80	44	35	9
Peanut meal.....	80	50	43	5
<b>Grass hays</b>				
Bromegrass.....	45 to 50	5 to 6	3 to 3.5	33
Orchard grass.....	45 to 50	5 to 6	3 to 3.5	33
Timothy.....	45 to 50	5 to 6	3 to 3.5	33
Prairie hay (western).....	45 to 50	5 to 6	3 to 3.5	33
<b>Legume hays</b>				
Alfalfa.....	50 to 55	15	10	33
Red clover.....	50 to 55	13 to 15	9	33
<b>Mixed hays</b>				
½ alfalfa and ⅔ grass.....	50	8 to 9	5	33
<b>Straw</b>				
Oats.....	40	4	1	40
Wheat.....	40	3 to 4	.5 to .75	40

pounds from 11.52 (the T.D.N. in the ration) leaves 5.12 pounds T.D.N. available after maintenance. Dividing 5.12 pounds by 3.63 pounds (the amount of T.D.N. required for 1 pound of gain) gives a daily gain of 1.4 pounds for an 800-pound yearling fed the ration used in the above examples.

### *Some Feeding Questions and Answers*

- Can ear corn be fed to horses? Ear corn is a satisfactory feed and is good for greedy horses that bolt their grain.
- Are pelleted rations satisfactory? Yes. Pelleted rations have proven popular because they are convenient to handle, easily stored, and reduce dustiness. However, grinding and pelleting increase ration costs.



Foals are often offered grain in a creep in addition to pasture and the mare's milk.

• What causes wood chewing and how can it be minimized? Wood chewing may be a result of boredom or of a deficiency in the diet. Boredom may be reduced by feeding three times daily, increasing exercise, or offering some additional straw or coarse hay to the horse when feeding pellets.

• Can silage be fed to horses? The use of silage requires especially good management. However, good-quality silage free from mold and not frozen can be a good roughage during the winter. If silage is fed, it is a good idea to also use 3 to 4 pounds of dry hay daily.

• How many pounds of silage are equivalent to a pound of hay? Corn silage is ensiled at 60 to 65 percent moisture. About 2.5 wet pounds of corn silage are equal to 1 pound of air-dry hay. Grasses and legumes are usually ensiled at 40 to 50 percent moisture and are called haylage. About 1.6 pounds of wet haylage is equal to 1 pound of air-dry hay.

- Of what value is molasses? Wet or dry molasses are sometimes included in the ration to increase palatability and consumption. To keep the ration from being too laxative, it should not include more than 4 to 5 percent molasses.
- If legume hays analyze higher in crude protein, why do horsemen often prefer grass hay? Grass hays often cure more easily and thus are considered to be cleaner and less apt to contain mold.
- Is it advisable to limit feed hay? Hay is often limited for race horses to insure an ingestion of more energy from grain. Roughage is sometimes limited for show horses to avoid hay bellies.
- Is it possible to feed rations that are too rich? Yes. Overfeeding, or bringing to a heavy feed of grain too quickly without sufficient exercise, can result in colic, stocked legs, and puffy or swollen hocks.
- How can greedy horses be prevented from bolting or eating their grain too quickly? Put a few baseball-sized smooth stones in the grain box. Ear corn will also help.
- What is founder? Founder is a metabolic disorder resulting from overeating and sometimes from drinking cold water when overheated. It results in excessive growth of the hooves. Immediate cold packs on the horse's legs or standing the front legs in cold water are good first aid measures. Severe cases require the attention of a veterinarian.
- What is colic? Colic or bellyache results from gas accumulation. Drenching with a pint of mineral oil or several quarts of water containing one-half cup of salt or epsom salt may offer relief.
- Can horses use urea or other nonprotein nitrogen sources for protein? Not efficiently because the cecum (a pouch of the large intestine where nonprotein nitrogen would be converted to useful protein) is located too far down the digestive tract. Too much urea could be toxic to the horse so avoid using it.
- Do antibiotics improve growth? The feeding of 85 milligrams of aureomycin daily to foals up to 1 year old improves growth rates slightly. When properly prescribed, antibiotics appear to be more desirable for therapeutic uses for diseases.
- What should one look for on a feedtag when buying commercial horse feed? Take special note of the percentages of total daily nutrients (T.D.N.), crude protein (C.P.), crude fiber (C.F.), and the feed ingredients. Also be sure to read the feeding directions.
- What is meant by percent T.D.N.? The percent T.D.N. (total digestible nutrients) is that part of the ration that will be digested and retained in the horse's body as energy.

• Of what significance is crude fiber (C.F.) in the ration? Generally, the higher the percent crude fiber, the lower the percent T.D.N. in the ration. Shelled corn analyzes about 3 percent crude fiber, oats 12 percent, and hays 24 to 30 percent. Rations analyzing more than 8 to 12 percent crude fiber probably contain considerable roughage.

• Can an orphan foal be raised on cow's milk? Yes, but at the beginning it is desirable for the foal to receive some colostrum. There are also milk replacers available on the market.

• How should cow's milk be modified for a foal? Mare's milk, as compared with cow's milk, is lower in protein and fat and higher in water and sugar. Therefore, add one tablespoon of sugar and four tablespoons of water to a pint of cow's milk. Warm to about 100° F. and feed  $\frac{1}{2}$  pint every two hours for the first few days. After four weeks the foal can be gradually switched to undiluted cow's milk or skimmed milk.

• Why furnish extra vitamin A in the ration if green feeds are a good source of carotene that can be converted to vitamin A in the body? Research has shown that high uptake of nitrogen in plants can interfere with carotene conversion to vitamin A. Vitamin A is especially important for breeding horses. Supplemental vitamin A is inexpensive and good insurance for the horse's health.

• Should salt be fed loose or in the block? Salt can be fed either way, but consumption may be higher in the loose form.

• Do mares need grain before foaling? Mares fed good hay and in thrifty condition (healthy and neither fat nor thin) may not need extra grain. Thin or old mares may need some grain. In late gestation, a light grain ration along with good roughage is acceptable, but the mare should not be overfed. Heavy feeding can cause foaling trouble because the mare may become too fat.

• How should mares be fed after foaling? Feed only light grain with hay for 7 to 10 days after foaling. Lactation that is too heavy can cause scouring. Increase grain slowly for the mare until the foal is old enough to take more milk.

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