Forage for Horses

Section from Chapter 17: Forage Utilization, in the Idaho Forage Handbook, 3rd Edition, 2005

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Horses require forage in their diet to remain healthy. Forages are usually the most economical feed source for horses. Horses are difficult to feed because they are more susceptible to anti-quality factors than ruminants. The nutritional needs of a horse vary depending on age, size, and production or activity. Forages will meet dietary requirements of most horses, unless they are worked or ridden often. Supplemental feeding may be required for young, growing horses or lactating mares if the forage quality is low.

Horses are not ruminants. They have a relatively small stomach and an enlarged cecum in the lower digestive tract. In the cecum, bacteria digest the forage similar to the rumen of a cow. However, since horses digest much of the forage near the end of the digestive system, much of the microbial protein is not available. Thus, horses require a relatively good protein source, should be fed frequently, and should be offered good quality hay or pasture. The horse diet can consist of pasture, hay, concentrates, and high-quality corn or small grain silage—but not more than 50% of diet. Changes in the diet should be made gradually. The lactating mare and the growing foal need a high-quality, low fiber diet so that intake is not restricted. If forage quality is low, then a protein supplement with minerals and vitamins for the pregnant mare should be given and supplemental energy as grain may be needed for lactating mares or very active horses.

There are many myths about feeding horses, but the facts are:

- A grass-legume mix provides a more balanced mineral diet, and better proportions of amino acids.
- Inactive horses are often fed too much. It is not cruel to limit a horse's intake to just meet a maintenance diet.
- Alfalfa hay is an excellent horse forage. The statement, "*The high protein level in alfalfa will damage my horses kidneys,"* is a MYTH!

Hay for Horses

Idle mature horses and non-lactating mares do well on high quality hay, alone. Hay fed with concentrates will reduce colic and digestive problems. It is very important that the hay be free of mold and dust. Hay should be leafy, have a pleasant aroma, and be free of weeds and foreign objects. The weed nightshade is poisonous to horses. Visual inspection of hay is important, but a forage test by a reputable lab will assess the nutritional value. Green leafy forage harvested at an early stage of plant maturity should provide adequate amounts of carotene and B vitamins.

"Hay belly" refers to horses with large distended digestive tracts. Hay belly is the result of feeding large amounts of low quality hay—high quality hay should not cause the problem. A rule of thumb is to feed at least one pound of high quality forage for every 100 pounds of body weight.

Alfalfa hay is commonly used for horses in Idaho. In the era of the work horse, Idaho had a reputation for growing high quality alfalfa hay, which maintained condition on work horses without a grain supplement. Alfalfa can be fed as dry hay, cubes, pellets or de-hy. Alfalfa is an excellent source of protein, digestible energy, minerals, vitamins, and other nutrients. The maturity and amount of alfalfa fed should be adjusted to match the requirements of the particular horse. Alfalfa is usually higher in protein, energy, and Ca than other hays. Early maturity alfalfa hay should only be fed to horses with high requirements. Mid- to late-maturity alfalfa is more appropriate for idle horses. Remember, the amount of hay fed can be limited!

Table 17.8. Composition of several forage crops used in horse diets – on 100% dry matter basis.

Forage Crop	Stage of Maturity	DE[a] Mcal/lb	TDN[b] %	CP[c] %	NDF[d] %	ADF[e] %	Ca %	P %
Alfalfa, fresh	Late vegetative	1.34	67	22.2	30.9	24.0	1.71	0.30
Alfalfa, hay[f]	Early bloom	1.13	57	19.9	39.3	31.9	1.41	0.21
	Mid-bloom	1.03	52	18.7	47.1	36.7	1.37	0.24
	Full bloom	0.98	49	17.0	48.8	38.7	1.19	0.24
Bluegrass, Kentucky, fresh	Vegetative	0.95	48	17.4	-	-	0.50	0.44
Bromegrass, smooth, fresh	Early vegetative	1.17	59	21.3	47.9	31.0	0.55	0.45
Bromegrass, smooth, hay	Mid-bloom	0.97	49	14.4	57.7	36.8	0.29	0.28
	Mature	0.77	39	6.0	70.5	44.8	0.26	0.22
Crested wheatgrass, fresh	Early vegetative	1.16	58	21.0	-	-	0.44	0.33
Orchardgrass, fresh	Early bloom	1.04	52	12.8	55.1	30.7	0.25	0.39
	Mid-bloom	0.92	46	10.1	57.6	35.6	0.23	0.17
Orchardgrass, hay	Early bloom	0.99	50	12.8	59.6	33.8	0.27	0.34
	Late bloom	0.87	44	8.4	65.0	37.8	0.26	0.30
Tall fescue, fresh	----	1.01	51	15.0	62.2	34.4	0.51	0.37
Tall fescue, hay	Full bloom	1.01	51	12.9	67.1	39.2	0.43	0.32
Timothy, fresh	Late vegetative	1.08	54	12.2	55.7	29.0	0.40	0.26
	Mid-bloom	0.91	46	9.1	-	-	0.38	0.30
Timothy, hay	Early bloom	0.94	47	10.8	61.4	35.2	0.51	0.29
	Full bloom	0.88	44	8.1	64.2	37.5	0.43	0.20

Adapted: NRC, Nutrient Requirements of Horses, 5th Rev. Ed., 1989

[a] Total Digestible Energy, multiply by 2.2 to obtain (Mcal/kg.)

[b] Total Digestible Nutrients; calculated with the constant 4.4 Mcal DE = 1 kg TDN; improved harvest techniques can increase values 10 percent.

[c] Crude Protein

[d] Neutral Detergent Fiber

[e] Acid Detergent Fiber

[f] Sun-cured

Notes: Fresh forages generally are 23 to 30% dry matter and sun-cured hays are 90 to 85% dry matter. Therefore, 10 lbs of fresh forage produces from 2.3 to 3 lbs forage dry matter. Digestibility declines with increasing ADF. Intake decreases as NDF increases.

Table 17.9. Suggested daily nutrient requirement needed by horses in several stages of growth and activities.

Stages/Activity	Daily DMI[a]-lb.	DE[b] Mcal	TDN[c] lb.	CP[d]		Ca		P	
				%	lb.	%	g	%	G
Growing horse--475 lbs	11	14.9	7.5	15	1.6	0.57	29	0.31	16
Yearling—715 lbs	15	18.9	9.5	14	1.9	0.43	29	0.24	16
Mature Horse–1100 lbs									
Maintenance[e]	18	16.4	8.2	10	1.4	0.24	20	0.17	14
Pregnancy-last 90 days	22	22.0	11.0	11	2.1	0.50	42	0.35	31
Lactation-30 lbs milk	24	28.2	14.1	13	3.1	0.50	56	0.35	36
Medium work[f]	20	24.6	12.3	11	2.2	0.32	30	0.23	21
Intense work[g]	25	32.7	16.4	11	2.9	0.35	40	0.25	29

Adapted: NRC, Nutrient Requirements of Horses, 5th Rev. Ed., 1989

[a] Digestible Energy

[b] Dry Matter Intake; to convert to fresh forage basis multiply by 1.1 for 90% DM hay, or 3.3 for 30% DM forage

[c] Total Digestible Nutrients; calculated by DE * (1kg TDN/4.4 Mcal) * 2.2 lb/kg

[d] Crude Protein

[e] Idle adult horse

[f] Horses for pleasure, riding, etc.

[g] Horse in race training, barrel racing, etc.

Table 17.10: Typical rations of hay and grain for horses in several stages of growth and activities using hays of varying quality – pounds per day[a].

Stages/Activity	Daily Feed-lb.	Alfalfa first bloom[b]		Alfalfa full bloom[c]		Timothy head[d]	
		Hay	Grain	Hay	Grain	Hay	Grain
Weanling	11	6	5	-	-	-	-
Yearling	14	8	6	8	6	8	6
Two-year old	16	11*	5	11*	5	11	5
Mature Horse–1300 lbs							
Maintenance	21	10	4	10	5	11	5
Pregnancy-last 90 days	20	10**	5	12**	5	20	5
Lactation-30 lbs milk	25	20	4	18**	7	18	7
Light work	20	10**	5	12**	5	12	8
Heavy work	25	20	4	18**	7	18	7

Adapted: NRC, Nutrient Requirements of Horses, 5th Rev. Ed., 1989

[a] Grain mix of oats/corn (50/50) = DE-3.6 Mcal, TDN-80%, CP-11%, Ca-0.06%, P-0.5%
[b] CP high with all except foals; monosodium phosphate fed free-choice
[c] Will not meet needs of foals; CP high for all classes; monosodium phosphate fed free-choice
[d] Will not meet needs of foals; CP supplement needed for all classes; calcium supplement fed free-choice
* See statement (pp.__) on mixing alfalfa and grass hays
** Added early cut grass hay may be fed

Table 17.11. Recommended daily feed dry matter intake as percent of body weight.

Stages/Acitvity	Forage	Concentrate	Total
Weanling	0.5 -1.0	1.5 - 3.0	2.0 - 3.0
Yearling	1.0 - 1.5	1.0 - 2.0	1.8 - 3.0
Mature Horse			
Idle	1.5 - 2.0	0 - 0.5	1.5 - 2.0
Pregnancy-last 90 days	1.0 - 1.5	0.5 - 1.0	1.5 - 2.0
Lactation-30 lbs milk	1.0 - 2.0	1.0 - 2.0	2.0 - 3.0
Working[a]	0.8 - 2.0	0.5 - 2.0	1.5 - 3.0

Adapted: NRC, Nutrient Requirements of Horses, 5th Rev. Ed., 1989
[a] Depends on intensity of work, higher intensity = higher intake

Pasture for Horses

Pasture grazing by horses is a low-cost and healthful means of providing their diet. Grazing is also a deterrent to horse behavior problems such as cribbing (eating wood). A mature horse requires from one to two acres for proper grazing. Horses prefer grasses but will eat most legumes. Vetch and arrow-leaf clover are not very palatable to horses. Kentucky bluegrass, orchardgrass, timothy, smooth brome, and endophyte-free tall fescue are commonly used for horse pasture. Legumes seeded with grasses provide a high quality protein diet and the legumes reduce the amount of nitrogen fertilizer required.

- Pastures vary greatly in productivity.
- Acreage required to pasture one horse during a growing season ranges from 0.5 to 4 acres.
- Horse pastures should include both grasses and legumes.
- If legumes are less than 20% of the pasture, then nitrogen fertilizer should be applied.
- Tall fescue sod is more horse resistant than Kentucky bluegrass.
- Avoid sorghum, sudangrass, sudangrass hybrids, and endophyte infected tall fescue!

Horses are more selective when grazing than cattle and will spot graze. Horses will select areas for grazing lawns (closely grazed areas) and areas for defecation, which are avoided for grazing. Rotation grazing is designed to permit maximum use of the pasture. A small pasture and high stocking rate will minimize selective grazing effects. Grazing cows following horses will help to mediate the selective grazing effects of horses. Mechanical harvesting may be necessary to remove mature forage and promote grazing. Limiting time the horses are allowed in the pasture to grazing time will reduce the effect of trampling by horses hooves, which is more destructive than other grazers.

Table 17.12. Nutritional requirements for different classes of horses.

Class of horse	Crude protein	Calcium:phosphorus ratio		
	%	Minimum	Maximum	Optimum
Weanling	17	1:1	3:1	2:1
Yearling	17	1:1	3:1	2:1
2-year olds, lactating mares	17	1:1	3:1	2:1
Mature, maintenance	17	1:1	3:1	2:1

Source of Information: Idaho Forage Handbook, 3rd Edition, Bulletin 547, http://info.ag.uidaho.edu/Catalog/catalog.html