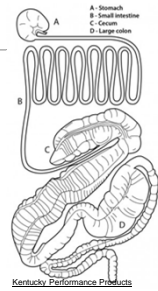


Hay-based diets for horses: Matching horse type to hay type

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Digestive tract

- Spends more time chewing than pre-gastric fermentors
- Feedstuffs reach hindgut within 4 hours
- Hindgut retention time 24-48 hours



Topics

- Horse biology and diversity within the species
- Importance of forage in a horse's diet
- Types of hays
- Matching hay with nutrient needs

Grazing behavior

- Foraging
 - Consuming forage
 - Seeking out forage
- 12-14 hours per day, when access unlimited



The horse as a grazer




Breed diversity




Work level diversity

Companions

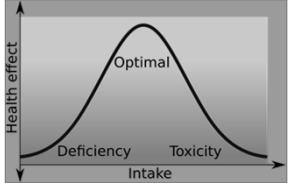


Competing horses




Needs of today's horse

- Calorie requirement
- Protein requirement
- Micronutrient requirements
- Fiber requirement
- Minimum time spent eating/ % of bodyweight



Selecting a diet

- What we feed a horse is important not only to nutrition but also to mental and digestive health
- If the horse could choose his lifestyle, what would it be?
 - To eat at least 14 hours a day
 - To be able to forage





Time spent eating

- Horses with free choice forage access
 - graze on average 14 hours per day
 - consume 2.5% of bodyweight in dry matter
 - Fleurance, et al., 2001, Anim Res; Flannigan and Stookey, 2002, App Anim Behav Sci; Boyd, 1988, App Anim Behav Sci
- Horses fed a mixture of hay and concentrate
 - 4.5 hours per feeding- 9 hours per day
 - Consume 1.5% bodyweight forage, 0.5% of bodyweight concentrate
- Greater than 6 hours between meals increases gastric ulcer risk
 - Luthersson, 2009, Equine Vet J

Selecting a diet

- What does the horse actually have?
- Lack of space for foraging behaviors
- Match forage type to horse type to maximize time

Effect on behavior





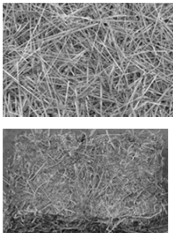


The bottom line

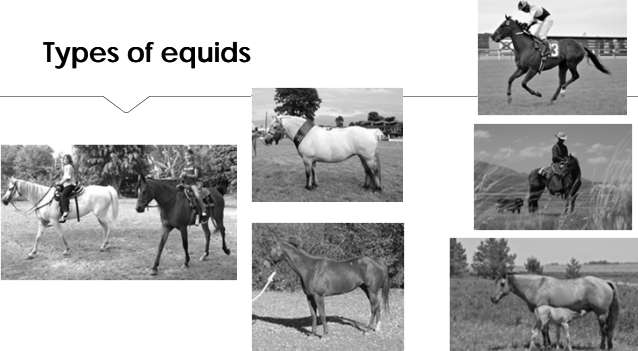
- Feed a forage based diet and use supplemental concentrates to balance protein and micronutrients.
- A few examples to follow

Hay quality- nutritional factors

- Digestible energy (DE) Mcal/lb- 0.7 – 1.3
- Crude protein- 7-20%
- NDF
 - 40%- mostly alfalfa, immature grasses
 - 41-46% immature grasses, some alfalfa
 - 46-53% mid maturity grass hay
 - 54-65%- grass hay
 - >66%- very mature grass hay
- What is one horse's low quality is another's best choice



Types of equids



Hays

<p>Grass hay- first cutting</p> <ul style="list-style-type: none"> ○ 0.83 Mcal/lb ○ 7.35 % crude protein ○ 70.15 % NDF 	<p>Mixed grass/alfalfa- third cutting</p> <ul style="list-style-type: none"> ○ 1.2 Mcal/lb ○ 19.27% crude protein ○ 40.22 % NDF
<p>Grass hay- second cutting</p> <ul style="list-style-type: none"> ○ 1 Mcal/lb ○ 10.5 % crude protein ○ 54.1 % NDF 	<p>Alfalfa</p> <ul style="list-style-type: none"> ○ 1.3 Mcal/lb ○ 24% crude protein ○ 34 % NDF


Hay quality

- Low dust
- No mold
- Bright color
- Smells fresh



Average horse requirements

<p>Requirements</p> <ul style="list-style-type: none"> ○ 15.2 Mcal per day ○ 690 grams of protein ○ 0.91 – 2.275 kg NDF minimum <small>(Wolter, 1993, Pratique Veterinaire Equine)</small> 	<p>Concerns</p> <ul style="list-style-type: none"> ○ Feeding enough forage
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Average horse hay options

690 grams of protein
0.91 - 2.275 kg NDF

<p>Grass hay- first cutting</p> <ul style="list-style-type: none"> ○ 9.2 kg, 1.8% of bodyweight ○ 614 grams of protein ○ 5.86 kg of NDF 	<p>Mixed grass/alfalfa- third cutting</p> <ul style="list-style-type: none"> ○ 6.2 kg, 1.2% of bodyweight ○ 1115 grams of protein ○ 2.3 kg of NDF
<p>Grass hay- second cutting</p> <ul style="list-style-type: none"> ○ 7.4 kg, 1.5% of bodyweight ○ 777 grams of protein ○ 4.0 kg of NDF 	<p>Alfalfa</p> <ul style="list-style-type: none"> ○ 5.9 kg, 1.2% of bodyweight ○ 1274 grams of protein ○ 1.8 kg of NDF

The easy keeper

The hard keeper

- Usually have higher calorie requirements, but not a corresponding increase in protein
- Most higher calorie hays are alfalfa based
- Immature grass hays can reach ~1 Mcal/lb
- Haylage
- Owners have to test...
- Other fiber sources
 - Beet pulp
- Additional concentrate or fat

Racehorse requirements

<p>Major concerns</p> <ul style="list-style-type: none"> ○ Lack of time ○ Poor appetite ○ High rate of gastric ulcers ○ 24 hour/day confinement ○ Belief that high grain diets are necessary (45-55% grain) <ul style="list-style-type: none"> ○ Racing Standardbreds perform as well on forage only diets (Jansson et al., 2012, animal) 	<p>Requirements</p> <ul style="list-style-type: none"> ○ 32 Mcal/day ○ 932 g CP/day ○ 2.84 kg-5.68 kg NDF
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The easy keeper

- No good estimate on calorie/day requirement
- Anecdotal- 1% of bodyweight, low calorie grass hay
 - NRC- 11 Mcal for 800 pound pony, actual- 6.6 Mcal
 - Consumption time <4 hours
- 0.6% of bodyweight to induce weight loss (Van Weyenberg, 2008, J Anim Physiol Anim Nutr)
- Higher NDF/lower calorie hay, straw mixture
 - Protein requirements met with forage balancer


Racehorse hay options

932 g CP/day
2.84 kg-5.68 kg NDF

<p>Grass hay- first cutting</p> <ul style="list-style-type: none"> ○ 19.4 kg of hay, 3.9% of bodyweight ○ 1294 grams of protein ○ 12.4 kg NDF 	<p>Mixed grass/alfalfa- third cutting</p> <ul style="list-style-type: none"> ○ 13 kg of hay, 2.6% of bodyweight ○ 2339 grams of protein ○ 4.9 kg NDF
<p>Grass hay- second cutting</p> <ul style="list-style-type: none"> ○ 15.6 kg of hay, 3.1% of bodyweight ○ 1638 grams of protein ○ 8.4 kg NDF 	<p>Alfalfa</p> <ul style="list-style-type: none"> ○ 12.4 kg of hay, 2.5% of bodyweight ○ 2678 grams of protein ○ 3.8 kg of NDF

Lactating broodmare

<p>Requirements</p> <ul style="list-style-type: none"> ○ 32 Mcal per day ○ 1500 grams of protein 	<p>Concerns</p> <ul style="list-style-type: none"> ○ Lysine requirement is much higher ○ Mineral requirements are much higher ○ Voluntary intake at 2.5% of bodyweight ○ Some amount of concentrate will be necessary to prevent loss of condition
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Broodmare hay options

<p>Grass hay- first cutting</p> <ul style="list-style-type: none"> ○ 19.4 kg of hay, 3.9% of bodyweight ○ 1294 grams of protein ○ 12.4 kg NDF 	<p>Mixed grass/alfalfa- third cutting</p> <ul style="list-style-type: none"> ○ 13 kg of hay, 2.6% of bodyweight ○ 2339 grams of protein ○ 4.9 kg NDF
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Summary

- Every type of horse needs a different type of hay
- There is a place in the horse world for low calorie, low protein hays
- Length of time to consume forage is critical for equine health and welfare