**Week 4: Dietary management**

We're going to look at:

Determining bodyweight

Condition scoring

Nutrient requirements for:

-- Horses at maintenance

-- Breeding horses

-- Growing horses

-- Working horses

**Bodyweight**

Determining bodyweight is important because nutrients are calculated on a percentage of bodyweight.

There are various methods to determine weight.

The most accurate is a weigh bridge, or a scale to walk the horse onto.

A weight tape can estimate bodyweight. It's more accurate than guessing.

Or you can use a measuring tape. Use the following calculation to estimate bodyweight.

Measure the circumference of the girth area, and then measure from point of shoulder to the point of the buttock.

Calculation: bodyweight in kilograms equals (heartgirth times heartgirth using centimeters) times length in cm divided by 11877.

For US horse owners: bodyweight in pounds equals (heartgirth times heartgirth using inches) times body length (inches) divided by 330.

**Body condition scoring**

Two systems:

1) The 0 to 5 system developed by Carroll and Hungtingdon in 1988: the ideal is 2 to 3.

2) The 1 to 9 system developed by Henneke et al in 1983: the ideal is 5 to 7. This is the more popular system.

We're looking to assess the following areas. See image in accompanying PDF:

Loins (purply/pink)

Ribs (yellow)

Tailhead (green)

Withers (red)

Neck (blue)

Shoulder (white).

Score each area individually from 1 to 9 and then average the scores to get an overall mark for body condition scoring.

**Thin horse**

We would see:

Loin: negative crease in spine in loin area.

Ribs: would be prominent, easily seen and felt, no fat padding.

Tailhead: would be prominent.

Withers: would be prominent and easily visible, but conformation can differ on different breeds.

Neck: we would see bone structure, little fat.

Shoulder: would be very prominent very little fat padding.

**Obese horse**

Loin area: we'd see crease down back area, fat bulging.

Ribs: wouldn't see ribs or feel them.

Tailhead: we'd see bulging fat.

Withers: little withers definition, a lot of bulging fat.

Neck: cresty neck, bulging, thick neck.

Shoulder: fat bulging around the shoulder, particularly behind the elbow.

**Nutrient requirements**

Think about the category the horse falls into, what production state does the horse fall into:

Maintenance, pregnant, growing, performing work

Nutrient requirements are additive. Start with maintenance and add on additional requirements.

Undersupplying or oversupplying nutrients has adverse affect on performance, productivity and health. We must balance the diet to the best of our ability.

**Maintenance horse**

Not working, not growing, not pregnant.

Requirements are dependent on the horse's bodyweight.

The environment also affects nutrient requirements. At lower temperatures, horses may have increased energy requirements.

Horses are also individuals, with different metabolic efficiencies.

We can feed based on information we have available, but we need to customize feeding for the horse.

Looking for an animal to eat 2 percent of bodyweight.

For a 500-kilogram (1,100-pound) horse, we would expect the horse to have an appetite of 10 kilograms (22 pounds) dry matter per day.

We need to look at feed on a dry-matter basis.

In general, for maintenance horses, we're looking to provide a forage-only diet.

Whether that means the horse is maintained purely at pasture or is stabled and getting conserved forage (hay) in the diet, it is unlikely the horse at maintenance needs supplementary feeding.

But it may need a forage balancer, a supplement that adds vitamins and minerals to the diet. It is advisable to include this if no other supplementary feed is being added to a forage diet.

**Pregnant mare**

The gestation period for a pregnant mare is 11 months.

The first four months, we're feeding for maintenance.

For the next seven months, we modify the diet.

We need to make sure the pregnant mare is getting enough nutrients, particularly to meet her increased requirement for energy and protein as she moves through her pregnancy.

The problem is the mare can have a reduced feed intake as she has a reduced gut capacity due do the increasing size of the uterus. The intake can be reduced down to 1.75 of body weight (from 2), even as her energy needs increase.

We need to include feedstuffs that are energy dense with good quality protein.

The majority of her feed should be good quality forage, but we need to provide supplementary feeds, either those formulated for pregnant horses from feed manufacturers or other feed stuffs such as high temperature-dried alfalfa or sugar beet pulp or oil to increase energy content. Oil is a particularly good way to increase energy content without adding bulk to the ration.

Also, in terms of protein, the mare will have increased requirements. Include feeds that have good protein levels, such as high-temp dried alfalfa and soybean meal. Soybean meal is a good source of lysine, the first limiting amino acid in the horse.

If you are unsure, formulate the diet based on a forage diet and then add in a supplementary mix purchased from a store that is prebalanced with appropriate vitamins and nutrients. Any mix high in cereal grains needs to be fed little and often. No big meals.

**Lactating mare**

The mare has more changes.

Lactation has two stages: early and late.

Early runs from birth to the foal being 12 weeks.

Late is 12 weeks on to weaning.

During lactation, the mare has extremely high energy requirements.

During the early stage, her energy requirements are twice that of a maintenance horse, which is higher than the energy requirements of a horse in racing work.

During the late stage, she still has considerable requirements, about 1.7 times maintenance.

Her feed intake can increase to about 2.5 percent bodyweight.

Because lactating mares are producing a lot of milk, especially in the early stages, they will have increased water intake and must have constant access to water.

Lactating mares need access to good quality forage. Good quality pasture should be fine, but you may need to supplement with conserved forage. This could include a "stud mix" (preformulated mix) as a supplementary feed. Don't feed stud mix at more than 40 percent of the diet. Also, feed little and often. You can reduce the amount of stud mix required by adding other feeds to the ration, such as high-temperature dried alfalfa, high quality fiber such as sugar beet pulp and oil for energy. Soybean meal can improve protein quality.

It's simpler to use stud mix. Make sure you feed little and often, split into several feeds throughout day.

Monitor the body condition of the mare. If she is losing weight, she needs more energy in her diet. We can monitor energy requirements by eye. If she is not getting enough energy, she will lose weight. But it's difficult to monitor nutrients such as protein, vitamins and minerals.

For good doers, or easy keepers, we may need to reduce the stud mix and just feed good quality forage alongside forage balancers.

**Breeding stallion**

Naturally, the breeding season starts in spring, though this can differ for different breeds and competitions.

In nonbreeding season, the stallion has maintenance requirements.

During breeding, energy and protein requirements increase about 20 percent above maintenance levels, or to 1.2 percent of normal.

This depends on his workload, or how many mares he's breeding.

Monitor his condition.

He'll also have increased vitamin and mineral requirements. If he's not getting supplementary feeds, it's advisable to include a forage balancer in his ration.

His feed intake will be 2 to 2.5 percent of his bodyweight.

During nonbreeding, the majority of this will consist of forage (with a forage balancer).

During the breeding season, include supplementary feedstuffs to meet his increased energy and other requirements. Supplementary feeds could be a stud mix, high-temperature dried alfalfa, sugar beet pulp, oil, etc. Again, feed little and often.

It is very important to monitor his condition. If stallions become overweight, this can affect breeding performance.

**Growing horses**

For the growing horse, we want to ensure a steady increase in size and bodyweight.

Avoid very rapid growth rates, which can be detrimental, particularly in bone development.

We also want to avoid compensatory growth spurts that parallel grass abundance. Also, avoid letting the growing horse get overweight, again due to bone development.

The newborn foal will be 10 percent the weight of an adult horse.

By 1 year, it will be 60 to 70 percent the weight of an adult horse.

A considerable amount of growth occurs in the first year.

By 1 year, the foal will also be 80 to 90 percent of adult height.

Nutrient requirements in first year -- it's essential to get this correct.

For the first three months, the foal will consume all of its nutrients in the mare's milk.

At about three months, the milk will reduce; this coincides with an increase in the foal's requirements.

Must include feed stuffs in diet. Introduce them at 3 months, which prepares the foal for weaning.

This naturally occurs later on in the wild, but, in the domestic horse, we do this at 4 to 6 months of age.

In terms of the kind of feed, we want good quality protein, with protein high in lysine. We don't want feed stuffs high in starch, which can adversely affect the health of foal, making the foal grow too fast and affecting GI health.

The foal needs to be receiving good vitamin and mineral levels.

It needs to be getting a good quality forage source.

In the majority of cases, the foal will be maintained on grass, good quality pasture. At certain times of the year, particularly in the spring and summer, this should provide all of nutrients the foal requires. However, it is advantageous to include a forage balancer in the diet.

We could use a youngstock pellet, but some foals are good doers. We may only need a forage balancer.

Between age 1 and 2 for the foal, the growth rate slows, but correct feeding is still essential.

In general, we should be looking to feed ad lib forage or conserved forages. If they are getting a forage-only diet, add a forage balancer.

If youngsters lose weight, may include a stud feed in the diet. If appreciable levels of stud feed being fed, there's no need for a forage balancer. Also, you could look at alternatives such as sugar beet pulp, alfalfa, oil, etc., to increase energy and protein levels.

From age 2 on, the environment affects whether horses move on to training. Those not in training can be fed a forage-only diet with supplementary feed provided as necessary.

Racehorses start training at 2.

These animals have greater nutrient requirements; they are still growing and performing work. If a 2-year-old is not in training, you can feed with forage only and use supplementary feed stuffs, if necessary.

Growing and training horses have elevated requirements: forage first, plus supplementary feedstuffs.

**Working horses**

**Light work**

Light work might be recreational riding or the beginning of a training program.

\*\*We overestimate how hard our horses are working and overfeed.

Be sure you get the level of work correct.

The appetite of a working horse will be 2 percent of its bodyweight.

A 500-kilogram horse (1,100 pounds) will eat 10 kilograms (22 pounds) of dry matter per day.

Horses in light work can be maintained on good quality forage. There may be some need for supplemental feed stuffs, depending on the animal, time of year and management practices.

During winter, if the horses loses weight, then supplement.

If providing a forage-only diet, then include a forage balancer to meet the vitamin and mineral requirements.

Forage should be a minimum of 70 percent of of the ration.

If supplementing, feed a lower-energy mix and highly degradable fiber sources, such as alfalfa, sugar beet pulp and oil, but the majority of the needs should be met with forage and a broad spectrum vitamin and mineral supplement.

The type of energy source required depends on the intensity of the exercise, duration of the exercise, temperament of horse and any clinical conditions.

Racehorses need energy sources that have a high level of starch, those that are a much more rapidly available source of energy.

Endurance horses need a slower release energy source in the form of oil or fiber.

Energy is basically calories. In horses, we use megajoules, 1 megajoule is 239 calories.

The digestible energy contents of feeds is the amount of energy digested in the GI tract, so the amount of energy eaten minus the amount expelled in the fecal material is the amount absorbed in the GI tract.

Fiber is a slow-release energy for the horse. It's a very good form for horses and can meet the energy requirements of horses that are at slower intensity work levels.

Fiber is essential for gut health. Fiber- and forage-based rations should form the basis of all types of management strategies.

Starch is an instant energy source.

We need to feed horses based on temperament.

High starch diets can cause excitability in horses.

Horses with those types of temperaments need diets with lower levels of starch.

Starch also not good for horses with certain clinical conditions, such as laminitis, or those that are overweight.

Oil is an energy dense feed stuff, but it is a slow-release feed stuff.

Also, horses are less excitable with high-oil diets compared to high-starch diets.

What is important with oil is to introdiuce it gradually and build up slowly.

If we want to introduce a maximum of 500 milliliters of oil into the diet of a 500-kilogram horse, we would do this gradually over five or six weeks, building by 100 milliliters of oil per week. We don't want to feed more than 100 millimeters of oil per 100 kilograms of bodyweight.

If feeding oil, we need to feed an antioxidant, such as Vitamin E, with it to reduce free radical damage.

**Moderate work**

A novice or intermediate eventer, a dressage horse at medium level or a Grade A show jumper.

The horse's appetite might increase slightly to 2.25 percent of bodyweight.

For feed, this horse needs a good quality forage source, but this horse may need supplementary feeding, depending on its work.

Forage should comprise 60 to 70 percent of its ration. This should be fresh grass or conserved hay such as haylage.

Supplementary feeds might include feed mixes, sugar beet pulp, high-temperature dried alfalfa, and oil.

If you're unsure about putting a diet together, use proprietary mix.

If using a proprietary mix, feed little and often and you may not need a forage balancer.

**Heavy work**

Three-day eventer or endurance horse doing 70- to 100-mile rides.

This horse will have an appetite of 2.5 percent of its bodyweight.

This horse needs a good quality forage, plus supplementary feeding.

Forage should be 50 to 60 percent of the diet.

Forage should never drop below 50 percent. This can affect gut health and integrity, plus the behavior of the horse.

Horses can develop bad behaviors because they're not satisfying their need to chew and eat on a regular basis.

Can provide supplementary mixes or make use of highly degradable fiber sources, such as sugar beet pulp, high-tempearture dried alfalfa, oils.

While these horses need starch, we can use other feedstuffs to reduce the reliance on cereal grains, which can illicit intestinal disorders when used in high levels.

**Very heavy work**

Racehorse

This horse has energy requirements 90 percent above maintenance.

The appetite will be 2.25 to 2.5 percent bodyweight.

It's important to stress that horses in very heavy work still need forage never less than 50 percent of their diet. Many racehorses are fed less than this. This leads to adverse effects on their health and behavior. Many have ulcers, crib and weave. This may not always be evident. Forage should form the basis of the diet. Forage can be haylage, high in nutritive value but low in dust.

Supplements can include racing mixes, but still draw on other forms. Racehorses can also have oil added to the diet.

Conclusion reviews these same feeding principles.

Also says to provide good, freely available water source.

Horses that are in higher work or that are lactating have increased water requirements, as do horses in summer.

Control parasites, which can adversely affect gut function. Check teeth regularly to make sure the diet is chewed correctly, resulting in quality digestive processes.

Regularly monitor the horse's condition by using body condition scoring and estimating the weight. Weigh horses regularly and adjust the diet accordingly.

Provide regular exercise. Horses are nomadic historically and motivated to exercise. Give them opportunities to exercise and socialize.

Provide good quality forage source both nutritionally and hygienically. Horses in higher work needed highly degradable fibrous feed stuffs; these can include cereal grains but we need to feed in moderation and little and often, and it's essential to monitor bodyweight.