DROUGHT FEEDING

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Feeding a horse is usually the largest cost of ownership – and never more so than in times of drought. When the grass has browned off – or completely gone - availability and price are the deciders when it comes to what to feed! With a little planning and a knowledge of how to construct a diet with alternative or unusual feedstuffs, it is possible to provide a pretty well-balanced diet. In drought years, good quality forage may be too expensive or unavailable. So let's look at the safety and efficacy of options for feeds not traditionally fed to horses.

Forage/fibre is the mandatory cornerstone for gut and horse health. Even in drought times a minimum of 1% of bodyweight in fibre must be provided.

Table 1 shows the minimum amount of roughage that must always be fed – even in times of drought, and the minimum total daily feed intake - which can be 90% roughage or a mixture of roughage + concentrate.

Table 1. MINIMUM TOTAL DAILY INTAKES

Daily minimum amount of chaff or hay (1% of bodyweight)		Minimum total daily feed intake roughage +/- concentrate (as a % of bodyweight)
Bodyweight	kg hay or chaff	
300kg	3kg	4.5kg
400kg	4kg	6kg
500kg	5kg	7.5kg
600kg	6kg	9kg

Regardless of the class of horse, the necessary roughage cannot be abandoned - even when traditional forage is difficult to find.

Roughages, by definition, are feeds that are over 17% fibre.

In addition to hay and pasture, there are many other high fibre feeds that can be used to totally replace or partially replace the roughage portion of your horse's diet. Table 2 lists some alternative roughage sources, along with their replacement value relative to grass or alfalfa hay.

Feeds with moderate levels of fibre (11 to 15 percent crude fibre) can also serve as an alternative during drought. These lower fibre feeds can't totally replace the roughage your horse needs, but they can reduce the amount of hay you have to feed. Start by ensuring your horse receives at least 1% of its body weight per day in roughage (Table 1). Then use moderate fibre feeds to complete the remaining portion of the diet. The feedstuffs in Table 2 can be fed to 'stretch' the hay supply – and in some cases replace it. So when chaff and hay are just not available or just way too expensive, the following feedstuffs can be used: cereal grain straw, ground corn cobs, hulls, whole corn plants can be pelleted and fed to horses for an energy source but, to provide a balanced diet, a protein, vitamin and mineral supplement must also be fed. By taking the time to carefully select top quality roughage (ie low in dust, mould, contaminants and weeds) and continually monitoring consumption patterns, you can make sure you're providing the best possible diets in times of scarcity.

Table 2. ALTERNATIVE ROUGHAGE SOURCES

A minimum of 1 percent of body weight as roughage is needed to maintain normal digestive function.

Roughage	Can be fed instead of hay	Can be mixed with hay	Amount to replace 1kg of oat or grass hay	Amount to replace 1kg of lucerne or clover hay	Notes
Lucerne hay/ chaff	Yes	Yes	~850g	1kg	Higher protein and calcium than grass hays, so less needed compared to grass hay.
Grass hay	Yes	Yes	1kg	1.2-1.5kg	Many types: cereal hay, meadow/grass hay, vetch, teff.
Haylage	Yes	Yes	1.5kg	1.85kg	Feed out whole bag within 2-3 days due to mould risk
Straw	Yes	Yes	1.25kg	1.5kg	Oat straw is palatable, soft and doesnt have the awns often present in wheat or barley straw. Low in protein, calcium and Vitamin A, high in phosphorus so supplement required especially in old, young, pregnant or working horses. Ammmonia, sodium hydroxide or acid treatment followed by yeast inoculation increases digestibility compared to untreated straw.
Beet pulp	No	Yes	700g	850g	Good source of fibre and calcium; feed up to 4kg per day, pellets can be soaked. Very low in phosphorus and B-vitamin content and contains no vitamin A.
Hulls	No	Yes	800g	1kg	Hulls from most cereal grains are typically safe and low-cost, especially for mature horses. They satisfy appetite and reduce boredom. obesity and vices. Soybean hulls, sunflower hulls and wheat mids are low in protein, calcium and phosphorus and a good supplement is required. Cottonseed hulls, peanut hulls, rice mill feed (rice grains + hulls) and even paper (free of dyes) can also be fed in limited amounts to provide fibre. Rice hulls alone offer almost no feed value and are not suitable for horses due to their sharp edges - can be used if ground. All hulls can be very dusty and low in protein, vitamin A and calcium. Peanut hulls have a high risk of aflatoxin contamination and are rarely fed to horses - if tested free of aflatoxin and dust they can be used. Limit hulls to 10% of the diet by weight and ensure free of dust, mould and foreign material; provide a well-formulated concentrate for vitamins and minerals.
Whole corn plants	No	Yes			whole corn plants can be pelleted and fed to horses for energy source but, to provide a balanced diet, a protein, vitamin and mineral supplement must also be fed.
Protein meals	These include coconut meal, corn gluten meal, cotton-seed meal, linseed meal, safflower meal, soybean meal and sunflower meal, all high in protein but amino acid profiles vary (this is important for young and working horses if you are looking for muscle development and not just 'condition' ie fat cover. If high in oil or full-fat rancidity can be a problem - so go for quality.				
Oils	These have almost 3 x the energy of grains so good if youre looking for body condition or work capacity				

If grains increase in price, look at alternatives (Table 3) such as bran (usually wheat or rice), but as they are low in calcium and very high in phosphorus, it's absolutely necessary to provide calcium. Beet pulp is safe and higher in calcium than phosphorus – but low in protein, vitamins A, B and D. To correct deficiencies in the feedstuffs, include a small amount of a correctly-formulated concentrate. Depending on age, weight, work and reproductive status only 300-700g should be required to balance most diets. Pregnant, lactating and especially growing horses benefit from lucerne – so if it is in limited supply, reserve it for these horses.

When making changes to your horse's diet, note (preferably in a diary) any even slight changes in personality, manure, behaviour or activity of your horse. Often any changes are really subtle – the horse might seem just 'off' or not 'themself' or they may have less energy, loss of appetite or changes in manure – all of which can signal a sensitivity to the feed change. So always make changes in a gradual transition over 2-3 weeks – go slowly. It's so important to be aware of a 10-year study of colic that found a change in feed or less grazing time were the number one risk factor for colic! Worth reading on cost control and other feedstuffs that can be fed to horses, is an excellent book on drought feeding by David Nash.

http://agriculture.vic.gov.au/__data/assets/pdf_file/0020/228530/RIRDC-Drought-Feeding-and-Management-for-Horses.pdf

Feeding by weight is more precise than feeding by volume and avoids sudden fluctuations in the levels of nutrients, particularly energy. However drought conditions change this. Both yield and the nutrient levels are affected by drought and it cannot be assumed that what a horse eats one day will be the same as the next – even though there has been no change in the amount or type of feed given. In addition, volume and weight vary with the dipper used. Because of the effects of drought on grains, the weight of feed can vary – even though volume doesn't – due to variations in weight per bushel between and within grains. Lower weight grains have less energy per unit of volume.

For example, the same volume of oats can vary in weight by up to 30%, depending on soil fertility, variety and growing conditions. Over time, oats have been measured in pounds (lbs) per bushel – a bushel being 35.24 litres. Ideally a bushel of oats should weigh 40lbs, but can be anything from 27lbs to 52lbs. The lower weight grains have less energy per unit of volume. Thus a horse could receive almost twice as much by weight if heavier oats are used.

Table 3. ALTERNATIVE FEEDSTUFFS

If your horse is getting at least 1% of it's body weight as hay or other roughage each day, these feedstuffs can be included in the balance of the diet.

Feed	Notes: Provide free-choice access to water and salt
Rice bran	High in fat and phosphorus, need calcium supplement; 1/2kg can replace 1kg of grass hay and 600g can replace 1kg of lucerne.
Wheat bran	High in phosphorus; calcium supplement required; 600g can replace 1kg of grassy and 700g can replace 1kg of lucerne hay or chaff.
Ground corn cobs	Around 30% less energy than oats and little in the way of vitamin, minerals and protein but good fibre
Oats	Feed no more than 1% of bodyweight each day, vitamin/mineral supplement needed. Divide the daily amount into several smaller meals. Each grain meal should not exceed 0.5 percent of body weight. Make any changes to the diet gradually over 1 to 2 weeks.
Corn gluten meal & corn gluten feed, distillers grains	Provide fibre, low in starch, enough energy for mature horses; corn gluten and meal can be fed at 5% of the diet for young and working horses and 10% for mature horses. Distillers dried grains with solubles (DDGS) can be fed at 15% of the diet. One concern with these by-products is mycotoxins from mould. There are several hundred types of mycotoxins and many can survive the milling process. Drought and other stressors can increase susceptibility to mould infection. However, all cereal grains and forages may have mould and mycotoxin contamination.
Potatoes	Not palatable to all horses, high in moisture so may cause loose manure, chop to prevent choke. Never feed green, rotting or sprouting potatoes.
Citrus pulp	Has been fed to horses for many years especially in times of drought; a substitue for oats, can be included in pellets at 15%,
Bakery products	These are usually low in fibre and high in fat; can be included at 10% of the diet, risk of mould so feed straight away

Feeding by weight then is important because the weight per dipper determines the energy density of the feed. However, during prolonged and severe drought, grain protein composition changes. The result of these sources of variation is that although it is assumed that there has been no change in feeding, there can in fact be considerable variation in the amount fed to an individual horse from one day to the next. This is often overlooked in the evaluation of the potential role of nutrition in the aetiology of certain conditions, such as changes in form, laminitis, colic, gastric ulcers, osteochondrosis and tying up.

Monitoring water, weeds and worms is also important during a drought. Horses require 30 to 50 litres of water each day. Water quality can be compromised during drought – manure contamination, salinity, stagnation, algal growth (encouraged by sunlight and fertilisers) can all make water undrinkable. Horses fare best when the salinity (called 'total dissolved solids') is around 4000mg/litre and not over 6000. They can tolerate 6-7000mg/litre but only for a short period. There are several products approved for control of blue-green algae. A quick check with your local state department of agriculture is worthwhile as they must be used in strict accordance with their label conditions and directions – and these can vary between states. Most are registered for use in farm dams, rice paddies and irrigation conveyance, but cannot be used in, or contaminate rivers, streams, creeks, wetlands, lakes or billabongs.

Horses, as we know are browsers and foragers – and when feed/pasture is less available – or not at all, they may eat weeds, trees, plants, bushes etc that are not ordinarily selected. This is fine as long as the plants are not toxic! Have a walk around your paddocks, taking time to identify the species of vegetation. Note that some plants are only poisonous at certain times of the year or under certain conditions. Endless information is available to help work out if you have a potential risk that needs to be managed and there are some excellent publications on plants that are poisonous to horses.[1,2,3] Knowledge of what plants are a problem in your local area or areas your horse may be moving/travelling to, is a good thing to have and most state agriculture departments have written reviews to assist owners.

An unexpected risk in droughts is laminitis – normally associated with spring and times of abundance. A plant is basically a sugar factory, turning sunlight into energy. The amount of sunlight determines the amount of sugar produced, and the amount of growth determines how much sugar is used. When there is plenty of sun, but not much growth due to lack of water, the sugar isn't being used up and is stored in the plant. What this means to us as horse owners is that even dead, brown-looking dried up plants can be high in sugar. Any horse or pony that is at risk for founder or is insulin-resistant will be at risk – even in times of drought!

1. *http://www.horsecouncil.org.au/wp-content/uploads/2015/11/Plants-Poisonous-to-Horses-Aust-field-guide.pdf*
2. *http://kb.rspca.org.au/How-do-I-find-out-what-plants-are-poisonous-to-livestock-or-horses_379.html*
3. *https://www.dpi.nsw.gov.au/animals-and-livestock/horses*

ABOUT THE AUTHOR

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is an equine veterinarian with over thirty five years of experience. She is also a consultant nutritionist and has formulated feeds, custom mixes and supplements for leading international horse feed manufacturers in Australia, India, Ireland, Japan, New Zealand, Philippines, South Africa, Thailand, Turkey and the UAE.

Dr Stewart is passionate about equine nutrition and it's role in the management, treatment and prevention of many equine diseases and she is committed to bringing 'science to the feed bin'.

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