

Developing a feed ration

Developing a feed ration consists of choosing the feed, working out the proportions in the ration and the quantities to be distributed to meet your horse's needs.

by **Pauline Doligez, Laetitia MARNAY-LE MASNE** | 06.03.2017 |

Translated from french by : Alison Drummond

Technical level   



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Know the recommended daily allowances

Horses are herbivores, and their daily ration is made up of green or dry forage, to which vegetable mixtures (grains and others) and possible supplements may be added.

This intended to cover the horses nutritional requirements:

- In energy: expressed in HFU, Horse Feed Units
- Protein: expressed in g of MADC (Matières Azotées Digestibles Cheval in French - Digestible Crude Protein for the Horse)
- In minerals: macro and trace elements
- And in vitamins (see factsheet on the horse's nutritional needs: generalities)

The recommended daily intake takes into account the needs of the animals according to their physiological situation (sex, size, age, activity...). Nevertheless, the condition and feeding behaviour of each individual should also be taken into consideration when adjusting the ration.

As an example: (source INRA 2012)

	Daily requirements for	Maintenance	Average work
Thoroughbred (500kg)	In HFUs	4,1	7,8
	In g of MADC	267	562
Draught horse (800kg)	In HFUs	5,6	14,2
	In g of MADC	421	1 424

Understanding feeds and their nutritional values

Water content of feeds - concept of dry matter (DM)

Feeds are composed of water and dry matter. The dry matter (DM) is made up of mineral matter and organic matter which contains carbohydrates, lipids (fats) and proteins (total nitrogenous matter).

The water (moisture) content of food varies from:

- 80-85% for young grass (which therefore contains 15-20% DM),
- 77-88 % for beets or carrots,
- 8-15% for cereals, meal, commercial feed, hay, straw (i.e. 85-92% DM).

When the nutritional value of a feed is given, it can be presented per kg gross or per kg DM

The ration is calculated by adding up all the feed intake in kg DM of feed.



e.g. a concentrated feed with the following nutritional values:

- Moisture 11.5%, 0.94 HFU/kg gross and 72 g MADC/kg gross
- Dry Matter: $100\% - 11.5\% = 88.5\%$
- Energy value: $0.94 \times 0.885 = 0.83$ HFU/kg DM of feed
- Protein value: $72 \times 0.885 = 63.72$ g MADC/kg DM of feed

Forage

Forage often makes up the bulk of the ration. It is important to know its nutritional value in order to supplement this as accurately as possible. Although the nutritional value can be estimated from the characteristics of the forage (species harvested, time and conditions of harvest) using food tables, this often leads to significant errors. See also: Estimating the quality of preserved forage intended for horses and The chemical analysis of forage



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Good field hay can provide 0.5 HFU and 60g of MADC /kg gross weight. BUT, if it is harvested late or in unfavourable weather conditions it may only result in between 10 and 20 g of MADC/kg gross weight. A laboratory analysis of a representative sample of the stock is essential for a more accurate approach. The cost of analysis is generally between €30 and €50 depending on the elements requested. The use of wet-preserved forage (silage, wrapped) requires further analysis of how it is stored.

Examples of hay nutrient values per kg gross weight: (Source: INRA 2012)

Hay reference	% DM	HFU/kg gross	MADC/kg gross	weight P/kg gross	weight Ca/kg gross
Reference: INRA F 0080	85	0.41	34	2.67	3.52
Plot GG - 2011	82	0.49	28	2.1	3.2
Plot PM - 07/2011	85	0.48	18	1.77	3.7
Plot 15 - 07/2012	88	0.51	44	2.5	3.6

Warning: In general, laboratory analysis results are given per kg DM (dry matter).

Concentrated feeds

Concentrated feeds such as cereal grains/oilseeds/protein crops generally have nutritional values that fluctuate less.

Commercially prepared foods have a known and approximately constant nutritional value.

Follow basic rules for the use of forages

What percentage of forages?

Low needs = Lots of forages

80 to 100% forage for:

- Thoroughbred brood mares, draught brood mares, mares whose milk has died up
- Brood mares in early gestation
- Stallions not standing at stud
- Foals that will be trained at an older age

50 to 60% forage for:

- Lactating thoroughbred or draught horse brood mares
- Sport horses
- Stallions standing at stud
- Foals that will be trained at a young age

30 to 40% forage for:

- Race horses
- High-level competition horses

High needs = Little forages

It is important to check that the daily ration provides a sufficient quantity of forage to avoid any risk of digestive dysfunction.

Generally speaking, the proportion of forages may be at its highest for animals with low needs (80 to 100% of the daily ration). It decreases as the needs increase to reach 50 or even 40% of the quantity of dry matter distributed per day. The use of high nutritional value forages (wrapped, early harvested hay) can fully cover the needs of working horses.

Straw should be distributed in limited quantities because it is rich in non-digestible fibres and can cause digestive disorders (stasis colic).

Generally speaking, spring grass or young grass has a high nutritional value, potentially covering the needs of all types of animals, even those with high requirements. In contrast, care should be taken to limit the quantities available to animals with low needs and which are already overweight.

The sanitary quality of the fodder (absence of dust, mould) is also crucial in order to avoid respiratory and infectious problems.

Preparing a feed ration

Preparing a ration is complex. It can be done with the help of rationing software, but it is wise to ask your veterinarian or specialist technician for advice.

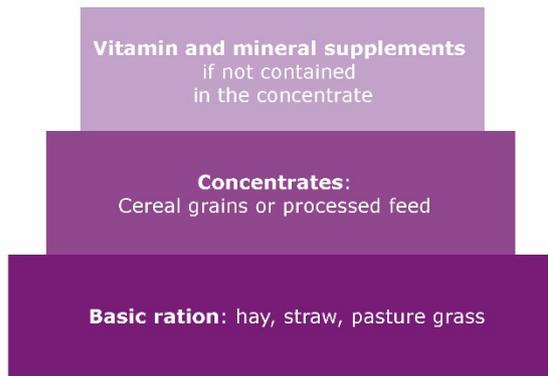
The general approach is as follows:

1. Record the recommended daily allowances for the animal in question (see "Nutrition et alimentation des chevaux" ed. W. Martin Rosset, Quae 2012 edition)
2. Make an inventory of the feeds available: forages intended to provide the basic ration, concentrates and the nutritional values of each
3. Calculate the intake achieved by the quantity of forages distributed
4. Possibly supplement with other feedstuffs that make up the supplementary ration, according to the needs linked to the physiological situation of the animal.

In practice, this will include:

- **Providing a daily ration adapted to the horse**, representing 2 to 3.5 kg DM (dry matter) per 100 kg live weight depending on the work/production and the proportion of forage distributed. A minimum quantity is necessary for the digestive tract to function properly. If the quantity required is too large, for example: high needs and a ration composed of forages of low nutritional value distributed alone: the ration will not be able to cover the horse's needs despite the daily quantity ingested;
- **Balance the ration in energy and protein;**
- **Respect a balanced and sufficient mineral intake:** in particular, make sure you provide an adequate amount of calcium and phosphorus with between 1.5 and 1.8 times more Ca than P.
- Finally, for breeding horses, brood mares and young foals, care must be taken to ensure a **supply of "quality" protein**, i.e. containing essential amino acids such as lysine and methionine. These amino acids are found naturally in alfalfa or soybean meal, for example. They are often incorporated into speciality foods.

**The ration is built in a pyramid:
basic ration, concentrates and finally supplements**



Forage(s) + cereals + mineral and vitamin supplement

or Forage(s) + complementary forage feed (including an adapted mineral and vitamin supplement)

or forage(s) + cereals + forage and cereal supplement (including an adapted mineral and vitamin supplement)

or forage(s) + "home-made" complementary food + adapted vitamin and mineral supplements

Some examples of types of rations

Example 1: to maintain the weight of a 600kg horse fed only on hay

	feed distributed	Gross weight	HFUs	MADC	P	Ca
Ration 1	Inra Hay	For 1 kg	0.47	44	2.67	3.52
	Total daily intake	= 10.5kg	4.9	464	28	37
Ration 2	Hay plot PM - 07/2011	For 1 kg	0.48	18	1.77	3.7
	Total daily intake	= 10.5kg	5.04	189	18.6	38.8
	Recommended daily intake		4.8	312	17	24

In general, good quality hay (see ration 1 above) is easily enough to cover the needs of a horse which should maintain its condition. On the other hand, with average quality hay (see ration 2 above), the needs, particularly in terms of MADDC, may not be covered.

Example 2: a 600kg horse working 1 hour/day, fed on hay + pellets

feed distributed	Gross weight	HFUs	MADC	P	Ca
Hay plot GG – 2011	For 10 kg	4.9	280	21	32
+ "Club" food	For 2 kg	1.44	162	9.6	17.6
= Total daily intake	12.5kg	6.34	442	30.6	49.6
Recommended daily intake		6.3	450	23	36

Better quality hay would better cover daily needs in terms of MADC.

Correctly distributing the ration



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- Do not overlook forage, a basic horse food, and a source of fibres necessary for the proper functioning of the digestive tract. It also limits boredom.
- Divide the daily ration into at least 2-3 meals.
- Distribute rations at regular hours.
- Do not give more than the equivalent of 2 kg of barley per meal for a 500 kg horse: avoid massive starch intakes.
- In the event of a change of ration, make sure to transition the change over a minimum of one week in order to allow the horse's digestive system to adapt.
- Make sure there is access to clean water at all times.

Things to remember



- Preparing a ration helps to improve the performance and well-being of the horse, taking a rational and economical approach.
- The horse can process many feeds, making it possible to establish an endless supply of varied rations, thus optimising costs.
- A poorly adapted ration can have repercussions on your horse in the short or longer terms: don't improvise!
- Feed management involves monitoring the body condition of each animal in order to adjust the quantities distributed to its metabolism.

About our writers

Pauline DOLIGEZ Engineer IFCE
Laetitia MARNAY-LE MASNE IFCE