

Pastures for horses

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Introduction

A good pasture will meet the nutritional needs of most horses including brood and lactating mares and growing foals, although working horses may require some supplementation. However, the grazing habits of horses require that special consideration is given to the selection and management of the pasture. Because of New South Wales' range of soils and rainfall, no single pasture species suits all horse properties. Select pastures suited to your area and then select from these the most suitable for horses.



Well managed high quality pastures can meet the nutritional needs of most horses including brood and lactating mares and growing foals.

Feed requirements of horses

Recent research has shown that high quality pastures can meet the feed requirements of horses. However, most horse establishments supplementary feed their horses because they are held in confined areas where they can be checked on a regular basis. These areas are usually set

stocked with the result that the pasture is damaged and only the toughest plants or weeds survive. Supplementary feeding also guarantees feed quality and quantity and counters seasonal fluctuations in pasture supply.

Species or varieties do not define a high duality pasture. They are important, but the management of the pasture is just as important. Grazing in the early vegetative stages, having a mix of legumes and grasses, applying adequate fertiliser, weed control and maintaining sufficient moisture will affect the quality and feed value of the pasture.

A critical time of the year is July/August when mares heavily in foal have to eat pastures that are frost affected. Frost-affected kikuyu, paspalum and couch are adequate if clovers are in the pasture mix.

High quality pasture is essential when a mare foals to ensure that the mare produces enough milk to support her rapidly growing foal. Also, it is important that the mare does not lose condition at this time because she will be mated for next year's foal.

For further information on feeding requirements of horses read Primefact 425 *Practical feeding of horses*, Primefact 526 *Feeding the brood mare*, and Primefact 527 *Feeding the working horse*.

Why are horses and the management of their pastures special?

- Horses have a different digestive system to cows and sheep. Cows and sheep have four stomachs, horses have one stomach and a well developed large intestine. This limits the digestion of low quality feed and increases grazing time for horses. As a general rule, a 500 kg horse will eat less than a 500 kg cow but a horse wastes more pasture. The stocking rate for horses is similar to that of cattle.
- Horses are very selective in their grazing habits. They prefer certain pastures and crops and leave species that are unpalatable. These 'weeds' can soon dominate more desirable species.



- Horses prefer short pastures to tall pastures. A paddock stocked with horses will have a short cropped 'lawn area' where the horses graze and long rank areas where they defecate. Horses do not like to graze where there is horse manure. Thus, the 'lawn area' becomes depleted of nutrients that are moved to areas where the horses prefer not to graze. Only in drought conditions or in overstocked paddocks will horses graze up to manure pats.
- Management of pastures, especially the management of manure and application of fertiliser, requires special consideration. Rotation of paddocks is critical with horses. Always have spare paddocks to allow rotation.
- Select pastures and crops suited to the area, then select from that list the pastures and crops that horses prefer.

What type of pastures do your horses need?

The horse industry comprises many types of horse enterprises. Most enterprises can be divided into one or more of the following.

Stud breeding farm

A stud-breeding farm standing a stallion has a great demand on its pastures in spring and summer. Visiting mares arrive as early as August and leave in January

A suitable pasture for a stud-breeding farm would be a summer growing pasture that is well adapted to that area, e.g. kikuyu or lucerne, and a spring pasture, e.g. phalaris, fescue, cocksfoot, ryegrass (all or one of the preceding) and sub clover and white clover.

Because stocking rates are low in autumn and winter, this is an ideal time to get pastures and crops established for spring and summer.

Broodmare farm

A stud farm not standing a stallion has feed requirements opposite to that of a stud-breeding complex.

The mares are at the farm from February to July/August. The previous year's yearling foals will require pasture during the summer period.

A suitable pasture in this situation is a winter growing pasture comprising phalaris, fescue, cocksfoot, ryegrass, lucerne, sub clover, and white clover, assuming these species are well adapted to the area.

Riding hacks, pleasure horses

These horses need a continuity of feed throughout the year. However, because winter is the period of poorest pasture growth it may be necessary for some form of winter pasture or winter crop to be grown or a supplementary feed provided.

During periods of feed shortage or without rotational grazing, the desirable pasture species are eaten out and the pasture deteriorates rapidly. At these times horses may be better managed by keeping them in a stable and/or yard with supplementary feed and letting them out to graze for limited periods.

Suitable species

Grasses

Prairie grass

Prairie grass is very acceptable to horses. Prairie grass performs well on very fertile soils under favourable growing conditions. It will not persist under dry conditions. Some varieties have a longer growing season and are not as prone to go to seed as early as the naturalised strain of prairie grass which starts seeding in August/September.

Ryegrass

Ryegrass is a lush, desirable, cool season pasture for horses. It requires high rainfall or irrigation, good soil fertility, and good grazing management to persist.

Phalaris

Phalaris sown with white, red and sub clover and/or lucerne is quite acceptable for horses. It must be rotationally grazed to allow seedhead development in spring and good growth after autumn breaking rains.

Fescue

Fescue pastures are very acceptable to horses in the first year of growth. The plants tend to become tussocky and coarse and less acceptable to horses in later years. Fescues prefer moist areas. These areas are prone to damage by horses, making management difficult.

Fescues and ryegrasses can contain endophytes. They are bred into ryegrass and fescue to improve the plants' tolerance to insects and to improve productivity. Endophytes can affect the acceptability of the pasture, ultimately affecting livestock performance. When selecting ryegrasses and fescues check the endophyte status.

Cocksfoot

Cocksfoot is more suited to high altitudes. It thrives in the tableland areas of New South Wales.

Cocksfoot dominant pastures in South Africa have caused calcium deficiency in horses.

Kikuyu

Kikuyu is the most common coastal NSW horse pasture because of its ability to persist. It contains an oxalate that inhibits the uptake of calcium. This deficiency can be overcome by supplementary feeding a calcium supplement (see below) or by overseeding ryegrass and clover into the kikuyu in autumn.

Couch grass

Couch grass has often been regarded as a weed. It is very acceptable to horses, very hardy and capable of tolerating high stocking rates on poorer sandy soils.

Red clover

Red clover has always been regarded as a most acceptable clover for horses because of its summer growth habit. Always select a low oestrogen variety as infertility has been reported in broodmares grazing high oestrogen varieties.

Subterranean clover

Sub clover is a self-regenerating annual with winter spring growth habit. It is adapted to many horse areas. Horses readily accept subterranean clover. Some older varieties contain high

oestrogen levels.

White clover

White clovers are not readily accepted. In most cases horses prefer to graze other pasture species and weeds in the paddock. However, white clovers should be included in pasture mixes because they are widely adapted to coastal and milder inland areas.

Lucerne

Lucerne is another popular legume for horses, more suited to non-coastal situations. To increase persistence and yield it is important that the plants are not overgrazed. Rotational grazing is especially important when managing lucerne as it allows the plant to build up energy reserves and to persist. Lucerne is susceptible to leaf spot diseases. Mares grazing lucerne or eating lucerne hay with excessive leaf spot may have fertility problems.

Calcium problems associated with pasture species

The ideal calcium to phosphorus ratio for horses is 2:1. Most clovers and medics (including lucerne) have ratios in excess of 2:1. Most grasses have calcium to phosphorus ratios of 1:1. However, the lush a grass is the lower the calcium to phosphorus ratio. In some cases the ratio may be 0.8:1. Pastures that are over-fertilised with effluent run-off and are very lush can be a problem. Including grasses, clovers and medics in the pasture mix will overcome this problem. See Table 1.

Table 1. Feed value of common horse pastures and forage crops on a dry matter basis (Ref. Camdairy)

| Pasture/crop | Metabolisable Energy | Crude Protein (%) | Ca : P (g/kg) |
|-------------------------|----------------------|-------------------|---------------|
| Lucerne early veg. | 10 | 22 | 4.57 : 1 |
| Lucerne late veg. | 9 | 18 | 4.48 : 1 |
| Lucerne flowering | 8.5 | 16 | 4.48 : 1 |
| Ryegrass early veg. | 12.5 | 22 | 1.3 : 1 |
| Ryegrass late veg. | 12 | 18 | 1.3: 1 |
| Oats early veg. | 11.3 | 20 | 1.5 : 1 |
| Oats late veg. | 10.2 | 17 | 1.5:1 |
| White clover early veg. | 11.5 | 23 | 4.3 : 1 |
| White clover late veg. | 11.0 | 18 | 5.4 : 1 |
| Kikuyu early veg. | 8.5 | 16 | 1.1 : 1 |
| Kikuyu late veg. | 8.0 | 13 | 1.1:1 |

Table 2. Effect of calcium:oxalate ratio on availability of calcium (adapted from Hinz, 1990)

| Names | Calcium % | Oxalate % | Ca oxalate | Ca availability |
|----------------|-----------|-----------|------------|-----------------|
| Flinders grass | 0.49 | 0.25 | 1.92 | 99% |
| Rhodes | 0.80 | 0.45 | 1.79 | 76% |
| Oaten chaff | 0.11 | 0.08 | 1.36 | 100% |
| Buffel | 0.40 | 1.06 | 0.38 | 17% |
| Green panic | 0.26 | 0.81 | 0.32 | 42% |
| Kikuyu | 0.28 | 1.30 | 0.23 | 20% |
| Narok setaria | 0.27 | 1.60 | 0.13 | 0% |

Horses grazing some tropical grasses for extended periods can suffer 'Big Head' disease or *Osteodystrophia fibrosa*. These grasses are buffel grass, green panic, setaria, kikuyu, guinea grass, para grass, pangola grass and signal grass. The cause of the problem is a high level of oxalates. Calcium oxalate is insoluble and unavailable to the horse. There needs to be more calcium than oxalate in the pasture for the calcium to be available. See Table 2.

Oaten chaff has 0.11 percent calcium with 0.08 percent oxalate and 100 percent of the oaten chaff calcium is available. However, Narok setaria has 0.27 percent calcium and 1.6 percent oxalate. It has a calcium to oxalate ratio of 0.1:3. Because oxalate dominates, it means none of the calcium is available to the horse.

Mineral supplement mixtures that provide the required amount of calcium to phosphorus should be made available to horses grazing setaria, buffel and kikuyu pastures. Good mixtures are 1 kilogram of rock phosphate mixed with 1.5 kilograms of molasses or 1 kilogram of a mixture of 1.33 kilograms of ground limestone and 0.66 kilograms of dicalcium phosphate mixed with 1.5 kilograms of molasses. Alternatively, supplement with a feed that is a good source of calcium such as lucerne hay.

Fodder crops

Fodder crops are usually grown in rotation with pastures providing feed when pastures are not actively growing.

Winter

For winter feed the most acceptable or preferred crops in order are triticale, barley, ryegrass and oats. Horse breeders have accepted for many years that barley was the most acceptable but recent observations at Hawkesbury Agricultural College indicate that triticale is the most acceptable.

Saia oats, one of the most productive oats, is totally unacceptable to horses until it goes to seed. The horses will then selectively eat the seedheads.

Berseem clover, a winter/spring growing legume, has been sown with ryegrass as a pasture. In the County of Cumberland it is grown as a winter forage crop for horses; baled wet it is fed to thoroughbred racehorses in work at the major racetracks in Sydney.

Summer

Summer feed has often been a problem on breeding stud farms. Farmers have experimented with various crops with little success. The most common summer forage crops are shirohie and japanese millet, pearl millets, hybrid millets, hybrid forage sorghums and sudan grass. They grow actively from November to March.

Horses do not like grazing the millets, hybrid sorghums and sudan grass. They prefer to graze summer grasses that might be growing in the paddock. The millets have an advantage over the hybrid sorghums and sudan grasses in that they do not cause prussic acid poisoning. The hybrid Sudan grasses are the best sorghum, sudan grass options because they have lower prussic acid and thinner stems with more leaf. Always check with the seed company for recommended grazing and cutting heights.

In areas of south-western United States, forage sorghums are reported to cause an increasing number of cases of 'Cystitis syndrome' in horses. The condition causes irritation of the urethra and vagina in the mare, and of the urethra in the stallion and gelding. Another symptom is muscular incoordination in the rear quarters. So far as is known, sudan grass hay, if properly cured, may be used without danger.

Establishing pastures for horses

Soil fertility

A property can have many different soil types; therefore do not treat the whole property as if it were one paddock.

The most common nutrient deficiencies in New South Wales soils are phosphorus, sulphur, potassium, molybdenum and nitrogen.

To determine nutrient deficiencies and the level of nutrient deficiency, do a soil test. A soil test will provide the level of available soil nutrient. Then a fertiliser program needs to be developed for the property. Remember that each property, and paddocks on that property, are unique and must be treated as such.

A well-planned fertiliser program can be one of the best investments on a property. More feed is produced and the quality of feed is better, which ultimately means livestock performance and profitability are increased.

Applying small balanced rates of nitrogen; phosphorus; potassium; and sulphur; fertiliser on a regular basis is sensible where they are all deficient, when compared to the alternative of applying large quantities of only one nutrient.

When applying high rates of any fertiliser it is important to understand the effect of the program on other soil nutrients. In the past, some farmers have applied Mo single superphosphate annually over many years to find their livestock are copper deficient. Excess molybdenum can tie up copper, inducing copper deficiency in livestock.

Calcium, magnesium, copper and zinc may also be deficient in some soils. It is important that all deficiencies be met because one deficiency may limit the response to the other nutrients.

Lime is often used on acid soils to increase soil pH and calcium levels. Many horse owners believe horses do better on soils that are regularly limed regardless of the soil pH. This is incorrect. As long as a soil has adequate calcium levels and a desirable pH the addition of extra lime can be wasteful and in some cases dangerous. The amount of calcium relative to other minerals, particularly phosphorus, is more critical.

Poultry manure is readily available in the Sydney, Central Coast and Tamworth areas. It is a low analysis (approximately 3:2:1 N:P:K) organic fertiliser that must be applied at heavy rates (e.g. 10 t/ha) to get the best results. Cartage and spreading are difficult and costly. It is best applied in early spring. The Sydney and Central Coast area is dominated by poor sandstone soils which have a high prevalence of kikuyu and responds well to poultry manure.

Ground preparation

The most important issue in preparing a paddock for a pasture is weeds. Most horse paddocks have high populations of weeds because horses are supplementary fed grain that contains weed seeds. Also the selective grazing of pastures by horses encourages weeds.

Weeds can be classified into perennial, winter, spring annuals and summer annuals. Therefore a relatively quick ground preparation in autumn may not control the hard to kill perennials and summer annuals. It is important to know what weeds you have before sowing a pasture.

Pastures can be established by direct drill techniques (herbicides and no-till seeders), or by sowing into a prepared seedbed or a combination of both.

On heavily compacted soils, or where kikuyu is to be sown, sowing into a prepared seedbed may be the best option.

Time of sowing

March, April, May is the preferred time for most pasture species. In cool climates, sowing in August is an option. The subtropical grasses like kikuyu must be sown from October to March when soil temperatures are high. Where summer grass weeds are a problem sow in February/early March.

Pasture management

Stocking rates

The biggest problem on most horse properties is overstocking. Also horses dominate small holdings. Table 3 provides a guide to desirable stocking rates.

Table 3. A Guide to Stocking Rates on small holdings

| Pasture | Horses per 2 hectares |
|--|-----------------------|
| Highly pasture improved with summer and winter pasture species. High rates of fertiliser and irrigation. | 4 |
| Reasonable summer dominant pasture with some winter pasture species and moderate rate of fertiliser. | 2 |
| Poor pasture, low rate of fertiliser mainly summer dominant pasture. | 1 |

Note: the above is only a guide to assist new horse owners.

Relating the feed required by a dry sheep (wether) to the carrying capacity of land is another way of determining suitable stocking rates (see tables 4 & 5).

Example: A light horse has a DSE rating of 10. If the horse is grazing cleared, moderate fertility, native grasses, with no seed or fertiliser then the horse will need 5 hectares of pasture to survive.

It should be remembered that DSE ratings are a very approximate guide to carrying capacity and that monitoring and adjustments are continually needed to match the area to livestock requirements.

Table 4. Livestock DSE Ratings

| Class of Livestock | DSE |
|--------------------|------|
| Merino wether | 1.0 |
| Merino ewe | 1.5 |
| Steer | 10.0 |
| Cow | 13.0 |
| Light horse | 10.0 |
| Draught horse | 14.0 |
| Pony | 6.0 |
| Horse - light work | 13.5 |
| Horse - heavy work | 18.7 |

Determining trace element deficiencies

Consult your veterinarian for advice on trace elements. Although blood test is the most accurate method of determining deficiencies, mineral imbalances are hard to diagnose, even with blood tests. The horse's metabolism will try to keep the

blood level of minerals at normal levels even when there is insufficient for normal bone growth. It is best to prevent problems by providing a good balance in the pasture.

Care needs to be taken with lush pastures because some horses, particularly ponies, are prone to founder (laminitis) when the feed is lush. Urgent veterinary attention must be sought for any horse that shows a reluctance to move which might be the first stages of founder.

Grazing management

Horses are wasteful grazers. They selectively graze pastures, damaging parts of the pasture by overgrazing and leaving other parts of the pasture tall and rank and relatively unacceptable.

Management practices should reduce wastage of feed.

At all times maintain a high level of ground cover to prevent erosion. The appropriate level will vary with the situation (soil type, rainfall, slope, etc.) For most high rainfall areas of New South Wales 90% ground cover is acceptable.

Allow horses to graze the pasture. After they have grazed the paddock to 2.5 cm in height over 20 percent of the paddock, remove the horses. Slash or mulch the paddock and harrow the manure. Wait until the pasture is 10 cm in height before regrazing.

Opinions differ on the management of manure droppings in horse pastures. Spreading manure droppings evenly by running a chain harrow will add fertility to the soil and spread any parasite eggs in the droppings where they can be killed more easily by sunlight. Collecting and removing manure will help grazing management but could lead to major nutrient deficiencies. It is critical to apply a balanced fertiliser program with potassium if all the manure is removed. The other alternative of leaving the manure in the paddock encourages

Table 5. Estimated dryland carrying capacity in DSE ratings for the Northern Slopes of New South Wales

| Class of Pasture | Average DSE/ha* |
|---|-----------------|
| Native, unimproved, low fertility or country dominated by Poa Tussock | 1.25 |
| Cleared, moderate fertility, native grasses, no seed or fertiliser | 2.0 |
| Moderate fertility, native grasses plus sub-clover and fertiliser | 5.75–6.0 |
| Moderate fertility sown with phalaris sub-clover and fertiliser | 7.5–10.5 |
| Rotational grazed lucerne | 12.5 |
| Extensively grazed lucerne | 8.75 |
| Kikuyu + clover + oversown ryegrass and fertiliser (intensive) | 25–30 |

* A 'DSE' is the dry sheep equivalent and is equal to the amount of feed needed to sustain a 50 kg Merino wether over a 12 month period.

selective grazing.

Rotational grazing is a must for horses. It is desirable to have at least 3 paddocks for a group of horses. However, because horses have a pecking order that includes biting and kicking, many horse managers prefer to set stock paddocks with smaller numbers of horses which means that paddocks do not get a rest to recuperate.

The rotation of clean pastures, in conjunction with a good parasite control program, will help to discourage parasites and diseases.

Keep horses out of the pasture during extreme wet weather to prevent 'pugging' of the soil with hooves.

Most pasture species will benefit from spelling – some to set seed and others to replenish energy reserves.

The optimum time to graze ryegrass is at the three-leaf stage, prairie grass at the five-leaf stage and kikuyu at the four and a half leaf stage.

To encourage vigorous growth of pastures it may be necessary to topdress with nitrogen fertilisers such as urea and nitram. Apply these fertilisers straight after mulching or slashing and give the paddock at least 4 weeks to regrow before grazing.

Weed management

Weeds are a problem in horse pastures because of selective grazing by horses and also because horses are usually supplementary fed. The bought feed can contain weed seeds. Correct grazing management is critical in controlling weeds but particular weeds can cause problems.

- Annual and perennial broadleaf weeds like Paterson's curse, Paddy's lucerne, wild radish and nettles thrive in horse paddocks. They grow in the overgrazed areas of the paddock. Spraying with a registered herbicide or removing by hand is necessary. These weeds usually grow near fence lines and under trees.
- Advanced hepatic disease has been noted in horses grazing Paterson's curse (*Echium plantagineum*) and Fireweed (*Senecio madagascariensis*) in New South Wales.
- Horses have the ability to spread weed seeds. Paddy's lucerne (*Sida* sp.) has improved seed germination after passing through the digestive tract of a horse. St. John-Sweeting and Morris (1990) suggested horses that have previously grazed weeds should be held and fed in yards or stables for 10 days before being introduced to weed-free pastures.
- Crofton weed is very poisonous to horses. It thrives on coastal hill country with high rainfall,

preferring sandstone and rocky escarpments. Inspect all horse pastures for this weed.

- Catsear or flatweed (*Hypochaeris radicata*) causes stringhalt in horses. It is often confused with annual smooth catsear (*Hypochaeris glabra*) and dandelion (*Taraxacum officinale*). Do not graze horses in heavily infested fields during the summer–autumn growth period.

Further reading

The following factsheets contain information on pastures. The factsheets are available from www.dpi.nsw.gov.au/aboutus/resources/factsheets

- P2.2.4 *Pasture establishment on native country: central and southern tablelands*
- P2.2.5 *Lucerne for pasture and fodder*
- P2.5.1 *Phalaris pastures*
- P2.5.5 *Cocksfoot - a versatile pasture grass*
- *Pastures for Horses – A Winning Resource* by Angela Avery, published by RIRDC

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Adequate subdivision enables rotational grazing, a practice which ensures horses are continually presented with clean pastures, better pasture utilisation, less weeds and adequate ground cover.

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PASTURE IMPROVEMENT CAUTIONS

Pasture improvement may be associated with an increase in the incidence of certain livestock health disorders. Livestock and production losses from some disorders are possible. Management may need to be modified to minimise risk. Consult your veterinarian or adviser when planning pasture improvement.

The *Native Vegetation Act 2003* restricts some pasture improvement practices where existing pasture contains native species. Inquire through your office of the Department of Natural Resources for further details.

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