

# Back 2 basics; Biological Pasture Management

## Forage trees and shrubs for horses

By Mariette van den Berg B.(Hons), MSc. (Equine Nutrition)

### Introduction

Adding trees in and around pastures can be beneficial for a number of reasons; it not only plays a major role in the hydration of the land and the control of erosion, but it can also provide shade, shelter and fodder. Many of you may be familiar with feeding tree and shrub forage to livestock but not a lot of horse owners know about the use of fodder tree and shrub for horses. This article will describe the benefits of trees and scrubs as a fodder and will give a selection of potential forage trees and shrubs for horses.



Horse eating leaves of a tree

### Primarily grazer or mixed feeder?

We recognize that horses evolved primarily as grazing herbivores, but they may also be categorised as mixed feeders depending on the feed availability and selection. The evolution of the horse, *Equus ferus caballus*, has occurred for approximately 55 million years. From studies of fossils, we derived knowledge about the phylogeny of the horse as an herbivore. It shows that the first 35 million years (Eocene to early Miocene) of equine phylogeny are characterized by browsing species with a relative small body size (~10-50 kg). The remaining 20 million years (middle Miocene until the present day) are characterized by either primarily browsing/grazing or mixed feeders with a large diversification in body size (~50-500kg). In addition, studies that observed the feeding behaviour of our present day wild horses and other equus species (e.g. zebras and wild asses) reported that equus species show grazing as well as browsing behaviour. In a natural system horses and other equus species browse various shrubs, trees and water plants to balance macro nutrients (energy, protein, water etc), minerals and vitamins requirements. Even

our domesticated horses in a confined pasture environment will show this browsing behaviour if various types of foliage are present.

### Choosing the right trees and shrubs

It is important to select the right tree and scrub species for each pasture or paddock. There are various native and several introduced species to choose from, but species differ in their site requirements and ideal soil type.

Some tree and shrubs species are toxic to horses and should be avoided around and within horse pastures/paddock. Plants have co-evolved with and are eaten by bacteria, insects, fungi and grazing animals. Because of these interactions plants have developed a range of defence mechanisms to help their survival. Tree legumes often have thorns, fibrous foliage and high tree crowns. Many plants also produce chemicals which are not directly involved in the process of plant growth - and are therefore called *secondary compounds*. These chemicals can protect the tree or scrub against insect and fungal attack. However, these compounds also affect animals and modify the nutritive value of forages. Mycotoxins which are produced by certain types of fungi are also a potential source of toxins in forages. Ryegrass and Paspalum grasses can contain mycotoxins which can cause staggers in horses. The effects of both secondary compounds and mycotoxins differ with animal species. Non-ruminants (e.g. pigs, poultry and horses) are usually more susceptible to these toxins than ruminants which have the capacity to denature potential toxins in the rumen.

Another concern that you may need to consider when selecting trees is the potential risk of housing populations of flying foxes which may spread the Hendra virus. Flying foxes are attracted to trees with blossoms (nectar), soft fruits, figs, berries, stone fruits such as mangos. However flying foxes can roost in any type of tree so it is advised to look at your property lay-out or farm design when planting (forage) trees.

### Nutritive value of forage trees and shrubs for horses

Forage trees and shrubs must have nutritive value to be useful as forage. The nutritive value of trees and shrubs as forage is determined by its ability to provide the nutrient required by an animal to balance requirements. Tree and shrub forage have been primarily used as feed for ruminants, although there are some reports of their inclusion in the diet of non-ruminants (poultry, pigs, goats and sheep). There is not much known about the feeding value and palatability of tree and scrub forage for horses. Most of the reports on plants and trees focus on the toxicity for horses.

When selecting forage trees and shrubs you must take into account that you may find limited information about the use of trees and shrubs for horses, moreover there are many contradictions in the literature regarding the acceptability of fodder from trees and shrubs.

This may be explained by the following aspects:

- Acceptability can change during the year. Animals may select only young leaves. With maturing of the leave the secondary compounds may increase and animals may not like the taste of the leaves anymore.
- In some cases it may take some time for animals to accept a new feed, but once accustomed they may consume it readily.
- Preference for one feed over another does not mean that they will not eat it when it is the choice is limited.
- Within a single species, differences can exist between varieties, individual trees and even between parts of the same tree. Acceptability can be influenced by climate and soil conditions.
- There is limited information about the nutritive value, palatability and toxicity of various parts of plants for horses.

#### **Benefits and selection of forage trees and shrubs for horses**

Trees and shrubs can potentially supplement the quantity and quality of pastures for grazing horses and reduce feeding cost of roughage. They can function as a substitute when there is seasonal shortage or risk of drought. Tree fodder systems also deliver additional benefits such as shelter, soil conservation, rough timber and habitat.

There are various trees and shrubs reported that can be browsed by horses with no obvious clinical signs of toxicity. However, there is limited information about the use of trees and shrub fodder as a feed source for horses. More research is necessary to determine the nutritive value, palatability and if applicable toxicity levels (amount that can be safely fed) of various potential fodder trees and shrubs for horses.

The leaves, stems, pods and fruits of trees and shrubs can be used as a *supplement* to their other feed. Tree and shrub fodder as a sole diet is not suitable for horses. Moreover, like with many other feed products, gradually introduce you horse to the fodder and don't over feed. It is recognized that horses may browse the following tree/shrub species (selection of native and introduced species).

**Saltbush** (*Atriplex spp.*) is a halophytic ('salt tolerant') shrub and has a long-term survival on moderately saline and waterlogged soils. It is drought tolerant and can be used as a fodder with other feeds. A number of *Atriplex* species are native to Australia. Old Man saltbush (*Atriplex Nummularia*), River saltbush (*Atriplex Amnicola*), Wavy-leaf saltbush (*Atriplex undulate*;

introduced from Argentina) and Quailbush (*Atriplex lentiformis*) show the best results in environmental tolerance (salinity, drought, frost, water logging and flooding), palatability and recovery after grazing. Most of the research that studied the nutritive values of saltbush species for animals is focussed on ruminants especially sheep. Saltbush spp contain oxalates and nitrates which may cause poisoning when consumed in high levels by cattle and sheep. Ruminants tend to prefer it more than horses, but it is observed that if saltbush is present in the pastures, horses may browse the shrubs. Particular the leaves of the Old man saltbush can be used as a fodder. There are companies that sell dried leaves as a fodder to horse owners.



**Old Man Saltbush (*Atriplex Nummularia*)**

**Bitter pea** (*Daviesia spp.*)— are several native shrubs that belong to Fabacea (pea) family. They can be found in most states. The fruits have a pleasant bitter flavour and various animals are fond of them. It is reported that livestock and horses prefer the leaves and young twigs of two kinds of species; Clustered bitter pea (*Daviesia corymbosa*) and Hop bitter pea (*Daviesia latifolia*).



**Hop bitter pea (*Daviesia latifolia*)**



**Dogwood** (*Jacksonia scoparia*) is a native pea-flowered shrub or small tree that reaches about 4 m high. It belongs to the Fabacea (pea) family and is found in south east of Queensland and eastern New South Wales. Dogwood can be used as a drought fodder and is reported to be relished by cattle and horses.



**Dogwood (*Jacksonia scoparia*)**

**Tagasaste** (*Chamaecytisus palmensis*) or Tree Lucerne is a small spreading evergreen tree that grows to a height and crown diameter of about 5 m. It is a member of the Fabaceae (pea) family and is indigenous to the Canary Islands (Spain). Tagasaste has been grown in Australia, New Zealand and many other countries as fodder crop. The trees can have long 5 drooping or upright, leafy branches. The white flowers develop into flattened pods about 5 cm long which can contain about 10 seeds. The nutritive value of leaves is similar to that of lucerne (*Medicago sativa*). The crude protein content can vary from 18% to 25% for tips and 8% for stems. Leaves are high in vitamin A and reported as highly palatable. However, animals take a little time to get used to it as a feed. There seems to be no reports of tagasaste containing compounds toxic to animals. Levels of tannins are low. The trees are extremely drought tolerant, fast growing and frost tolerant. Limitations are that they will not tolerate poor drainage or water logging. Tagasaste can become an invasive and over grow bushland if it is allowed to set seed.



**Tagasaste (*Chamaecytisus palmensis*)**

**Carob tree** (*Ceratonia siliqua*) or St John's Bread is a small to medium sized long-lived evergreen tree with dense foliage that grows up to 10 m tall. It is also a member of the Fabaceae (pea) family and is native to the Mediterranean region. The plants are cultivated for its edible seed pods. The trees develop dark brown flattened pods (fruit) about 10-30 cm long and about 2.5 cm wide. The pods contain pulp that has a sweet, chocolate taste and a number of bean-like seeds. Carob has a long history as a source of food, mainly for humans, but it is well recognised in parts of the world as a source of fodder for animals (goats, cattle, donkeys, horses). The pods of the carob, not the leaves, are consumed. The pods provide 5% crude protein, 70% carbohydrates and 3% crude fat. Because the pods are high in carbohydrates don't overfeed your horse, especially those horses that are sensitive to developing laminitis. Carob trees are drought and salt tolerant and tolerate any soil except heavy clay.



**Carob tree pods & seeds**



**Bamboo** is a group of evergreens that belong to the true grass family Poaceae (Subfamily Bambusoideae). There are various species of bamboo that are used for gardens, building materials, paper pulp, textile and the shoots and leaves can also be used as a food source for humans and animals. The non-invasive (clumping) bamboo *Bambusa ventricosa* and *Bambusa oldhamii* species have been reported to be relished by livestock and horses. Bamboo is high in fiber and can contain 10-20% crude protein. Large amounts of *Bambusa vulgaris* (Yellow Bamboo) have shown to be toxic for horses.



**Bambusa oldhamii**

**The best place of trees**

Planting trees just outside the fence around the pasture boundary is usually adequate. Trees can grow branches, which will extend over the fences and into the pasture to provide shade. For large fields, you can place a few fenced-off patches of trees within pastures or you can have separate blocks of various forage trees. For young trees, fencing is necessary to protect the trees from damage caused by the animals. Fencing will prevent rubbing injury to trees from horses that like to scratch. Even mature, full-grown trees should remain fenced off from horses to ensure survival of the trees. If you have flying fox populations near your property you may want to choose small shrubs and flower-less trees.



**Bambusa ventricosa**

**How to feed fodder-trees and shrubs**

Horses can browse the trees and shrubs while they grazing in the pasture or you can cut the branches and carry it to their pastures or stables. Cut and carry system is more preferred as you can control the amounts you feed to your horses. Pod legumes and seed can be collected and fed separately or mixed (for better digestibility you can crush or boil seeds) into the (hard) feed of your horse.

The forage trees and shrubs stated in this article represent a selection; there may be other trees more suitable for your environment (declared status, climate, soil conditions, rain fall etc). Moreover, as noted earlier there is limited information available about the nutritive value, palatability, and toxicity of forage trees and shrubs for horses.

For more information about the practical application of (forage) trees and shrubs for your property please contact **MB Equine Nutrition Consultancy** ([www.mberg.com.au](http://www.mberg.com.au))

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