

BROWSE, PRESERVED TREE FODDER AND NUTRITION

How offering access to browse and feeding tree fodder can supplement the diet of domestic animals



THE WHAT AND WHY

Why offer animals access to browse or tree fodder?

In general, browse (i.e. fresh tree leaves and small branches) and tree fodder (preserved browse) are good sources of nutrition and compare favourably with grasses grown in the same environment. Trees are also a good source of micronutrients including vitamins and particularly minerals. Where animals have access to trees or hedgerows, they will readily browse indicating its attractiveness as a feed. Browse can range from 12-55 %, 20-76 % and 60-93 % for cattle, sheep and goats

respectively. Goats tolerate high levels of browse in the diet due to their saliva that can bind tannins and a large liver that effectively processes tannins. Although the gastrointestinal tract of cattle is well adapted to a grass diet, it does not inhibit efficient digestion of browse. Browse is accessible up to a height of 2 m for cattle and 1.2 m for sheep. Goats are termed vertical browsers, having no meaningful browse height, given their physical agility.



Trees with a clear browse line from cattle in 2017 Stonehenge, UK.
L. Whistance



Hereford cattle browsing in a mixed-species hedgerow in 2014, Hereford, UK
L. Whistance

HOW IS THE CHALLENGE ADDRESSED

The benefits of feeding browse and tree fodder

Sourcing good protein for animal feed is a global issue. Crude and degradable protein levels in tree leaves, particularly in ash, lime and mulberry, compare well with levels found in alfalfa and ryegrass. Additionally, although condensed tannins in browse inhibit normal digestion of protein in the rumen, the stomach enzymes binding the proteins are themselves broken down in the abomasum, effectively delivering a good-quality rumen

bypass protein to the small intestine. Mineral content in browse can also be high. Zinc plays a role in important biological functions and promotes the efficient metabolism of protein and carbohydrates. Selenium deficiency is common in natural grazing systems. Selenium and zinc are abundant in willow. Browse can also be an important source of vitamin E, particularly in dry conditions.



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HIGHLIGHTS

- Browse and tree fodder are good sources of protein, vitamins and minerals.
- Browse and tree fodder are readily eaten by farm animals.
- Silvopasture is more productive than open pasture
- Animals with nutritional deficiencies can seek out appropriate feed sources in a diverse environment.



Ewe browsing on hawthorn (*Crataegus monogyna*) in 2009, Hald Ege, Denmark.
L. Whistance

The content of some minerals is higher in tree fodder than fresh browse, increasing its value as a sustainable source of minerals. Nevertheless, controlling intake is important as excess minerals can be toxic particularly for susceptible breeds.

Browse/tree fodder systems require sufficient yields for all animals to have access. For browsing, controlled defoliation (up to 50%) and sufficient time (around eight

FURTHER INFORMATION

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ADVANTAGES AND DISADVANTAGES

Diverse systems promote self-regulation in diet and intake

Overall, silvopasture produces more forage per unit area than pasture alone. With a varied diet, animals tend to eat more of everything, where more palatable plants act as a buffer. Browse can be highly palatable and summer growth offers a good additional feed source to pasture as well as being preserved as tree fodder for winter to feed animals. Preserving tree fodder by drying or ensiling increases palatability by reducing the bitter taste of tannins.

Through the presence of condensed tannins, good quality protein is available as rumen-bypass protein. Additional protein promotes 1) growth of juveniles, 2) production including improved wool quality, 3) reproduction including improved fertility, and 4) health including an increased resilience to intestinal parasites. However, although condensed tannins at 1-4 % of dry matter intake can be of benefit, beyond 5% it can cause digestibility problems. Animals are considered capable of self-regulating intake, but this is only possible with a diversity of feed sources so that they can avoid excessive intake of single species.

Animals are sensitive to nutrient deficiencies and can seek them out if a defining property (taste or smell) enables learning to occur. The relationship between taste and ingestive processes can alter the palatability of a feed so for animals, suffering from a deficiency, the importance of taste diminishes in favour of other components.

weeks) for regrowth is needed as hard browsing can reduce a tree's ability to regrow. The more palatable a species is, the harder it will be browsed. Establishing silvopasture is a long-term investment and browsing is not recommended until trees are three years old. To function well, silvopastoral systems need to be well-designed and well-managed. The quality of management of both plants and animals is key to success.

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