

Trees for shade, shelter, survival and body maintenance

In the first of a short series of articles, written as factsheets for the Agroforestry Innovation Networks (AFINET) project, ORC Livestock Researcher **Lindsay Whistance** looks at how offering access to trees can improve the welfare of domestic animals.

Why offer animals access to trees?

The benefits of silvopasture to domestic animals include access to shelter in the winter and shade in the summer, as well as providing scratching posts to maintain coat condition. The behaviour of domestic animals can be grouped into the categories of locomotion, maternal, nutritional, reproductive, social and resting behaviours and access to trees can be of some benefit to them all. Much of an animal's daily behaviour is involved in maintaining balance, or homeostasis, for example, when an animal is hungry it will seek and eat food. Similarly, when hot or cold, it seeks shade or shelter and trees, shrubs and shelterbelts can offer effective protection. Coat condition is important in maintaining animal health and tree trunks and branches, are readily used as scratching posts. The newborn offspring of farm animals are either hiders (e.g. cattle) or followers (e.g. sheep) but mothers of all species, seek out available shelter when giving birth.

Key advantages

- Shade and shelter are important for good animal welfare.
- In hot weather, normal animal behaviour patterns are less disrupted than on open pasture.
- Good shelter promotes the bonding of mother and offspring and increases the survival rate of newborn animals.
- Coat condition is improved and risk of disease from external parasites is reduced with access to trees as rubbing posts.



Evergreen plantation: a living barn providing shade and shelter for dairy cattle, Over Viskum, Denmark

Shelterbelts offer good protection when perpendicular to the prevailing wind and porous shelterbelts slow down wind, offering better shelter than dense barriers that cause high levels of turbulence. Free access to tree trunks and low branches enable animals to use them as scratching posts.

Animal behaviour and tree management

Grooming helps to maintain coat condition and trees make good scratching posts. Although hens use their beaks for preening, they spend more time preening under trees than on open pasture. Moulting hair and fleece can be removed by rubbing against trees, along with seeds that can penetrate the skin and external parasites (e.g. ticks) can be dislodged, reducing risks of associated diseases. Additionally, excessive rubbing can alert carers to flystrike or mite infestations. Good access to different heights and angles including low-hanging branches allows animals to access most body parts however, appropriate positioning of such trees is important since they can make pasture more difficult to manage.

Shade from a well designed silvopasture can reduce solar radiation by 58% compared to open pasture and skin temperature of cattle is 4°C lower. Along with higher welfare, animal productivity is better maintained when they have access to shade in hot weather and the landscape is utilised more evenly than open pasture. With too little shade there is a risk of overcrowding and disease, parasite contamination, death of vegetation and soil compaction.



Sheep using low hanging branches as a scratching post

Placing and managing trees for the benefit of animals

Trees can be included in an animal's grazing environment in many ways. Trees offer a canopy that provides shade in the summer and, globally, this is their most important role. A canopy also provides shelter from rain and cold, acting as a buffer for temperature fluctuations, and minimum grass temperatures can be raised by 6°C. Trees with an alternative primary function can offer good shade and shelter, including biofuel plantations for pigs and commercial pine for living barns. The latter also offers protection against insects, since pine species have insect repellent properties. The positioning of trees is important in their effectiveness as protection against the weather.



Ewes and their lambs sheltered by trees, Hald Ege, Denmark



Cold winds negatively effect air temperature. For example, with a windspeed of 24 kph, and an air temperature of 2°C, the effective temperature becomes -7°C. Trees act as a buffer against temperature fluctuations reducing the need to feed animals extra energy for heat production. Shelterbelts, perpendicular to the prevailing wind, offer good shelter if well designed. Planted too densely, they can increase wind turbulence and if they are open at ground level, they can cause driving cold winds at animal resting level.

Cattle and deer are 'hider' species and mothers utilise trees and shrubs to hide their offspring for several days after birth. Even 'follower' species, like sheep, benefit from access to shelter at lambing time. Exposure and starvation together cause 30% of lamb deaths and lambs can lose as much as 10°C body heat in the first 30 minutes of life so they are highly reliant upon shelter from the environment. Offering ewes shelter close to feed and water encourages them to stay longer at a sheltered birth site promoting a strong ewe-lamb bond and increasing lamb survival. Since energy intake is directed towards growth rather than keeping warm, lambs with shelter have a higher growth rate than lambs with no shelter. Overcrowding of ewes at lambing time reduces lamb survival from mis-mothering, starvation and exposure.

Further information

1. Gregory NG (1997) The role of shelterbelts in protecting livestock: a review. *New Zealand Journal of Agricultural Research*. 38: 423-450.
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3. Schütz KE, Rogers AR, Poulouin YA, Cox NR, Tucker CB (2010) The amount shade influences the behavior and physiology of dairy cattle. *Journal of Dairy Science*. 93: 125-133.
4. Karki U, Goodman MS (2009) Cattle distribution and behavior in southern-pine silvopasture versus open pasture. *Agroforestry Systems*. 78: 159-168.