

## Shelterbelts.

When we build houses, one of the first things we often do is to plant shelter around the homestead to protect us from that ugly southerly or what ever the dominant wind happens to be. And what a difference it makes. It's not any different for livestock – they need shelter too..

Providing adequate shelter on the farm for livestock is becoming an important animal health issue. It is one of the key requirements of the Farmsure Quality Assurance program designed by farmers for farmers for future proofing their industry. Also, talk to Tasco's in the UK and they probably consider animal health issues more important than some of the environmental issues floating around at the moment.

Developing an effective shelterbelt can provide protection from both cold and hot weather conditions and increase production in both livestock and crops. Research has shown that dry matter productions can increase up to 40% with adequate shelter. It also reduces livestock stress, enhances metabolic conversion of feed, and consequently better weight gains. Most farmers have experiences of some paddocks coming around quicker in the rotation, all because of shelter.

Correct design and layout of a shelterbelt is critical. In order to get it right it is important to understand the basic principles of shelter. These include:

1. The area protected downwind of the shelterbelt is proportional to its height. Research shows that wind can be reduced by 30% to 50% up to a distance out into the paddock of 10 times its height at maturity. You can expect a 10% to 20% reduction up to 20 times its height. There will also be a reduction in wind speed of 50 to 80% from 1-5 times the height upwind of the belt. For maximum area protected, a continuous length of at least 24 times the mature height of the shelterbelt is desirable.
2. The eddying wind flow behind a shelterbelt varies greatly depending on the density of the belt. When wind hits an impermeable barrier, it is forced up and over, reducing its speed and creating turbulence on the other side, before it carries on and regains normal velocity. This turbulence created on the leeward side is more damaging than a straight wind. Some turbulence is also created on the windward side.

To minimise the effects of this turbulence you want a shelterbelt with 40-60% permeability (this is when if you are standing on one side of the belt and a tractor is working the paddock on the other side, you can easily picture the tractor but would be unable to determine who the driver is), so the belt acts as a wind filter rather than a barrier. This will provide maximum area of protection out into the paddock. Appropriate spacings between trees and proper management such as pruning and trimming will help to achieve good permeability

3. Shelter should be maintained down to ground level as bottom draughts can create wind funnelling. Trimming encourages foliage growth to ground level in a number of species. Alternatively, a lower-growing species can be planted windward of a taller species to prevent bottom draughts, particularly if it is intended the taller species be pruned. To avoid any gaps where wind may funnel through, 100% survival of trees in the belt is required. Blanking (replacing dead trees) may be necessary in the season after planting to ensure even growth of the belt.

When designing a shelterbelt the following factors should be considered:

- Orientation should be as close to 90 degrees from the wind you want to protect from.
- Length of the shelterbelt should be long enough to provide sufficient protection if the wind veers. Ideally you want a length at least 24 times the mature height of the proposed shelterbelt.
- The belt needs to be continuous to prevent funneling. Physical restrictions such as roads, overhead wires, irrigation, drainage and existing fence lines needs to be considered to so as to eliminate any possible gaps in the belt.
- The natural shelter in the landscape should be considered and how it fits into the existing farm shelter. Also consider the impact it will have on stock movement, vehicle access and microclimates on the property.

Other questions you should ask yourself are: What is the primary objective of the belt and when is the shelter most needed? Is the effect of shading at certain times of the year desirable? What crops or livestock will be utilizing the belt? What are the soil conditions like? Could the shelterbelt have opportunities for timber production, aesthetics, biodiversity values, stock grazing patterns? The answers to these questions will dictate species selection, single species vs. multi species, and single row vs. multi row etc.

When establishing shelterbelts you need to aim for 100% survival of the trees planted, and any losses must be replaced, to ensure that the belt is continuous. In addition to this, it is also extremely important that the rows are protected from livestock grazing through fencing. When erecting the fence consider the future growth of the trees and the distance cattle can stretch through the fence.

Shelter is an important asset for your farming system. Providing adequate shelter not only improves livestock and crop performance but it goes along way to future proofing your property against potential bureaucracy and trade barriers.