

BUSH PASTURE IN THE SOUTH-WEST

Just outside Donnybrook in the south-west of Western Australia, John Hearman and his family run the 700 hectare property "Tanglewood". At present the farm is carrying approximately 200 Hereford cross breeding cows and a further 280 steers for fattening. Added to this, 2000 Merino sheep were purchased in 1980 for fattening because of the drought conditions experienced in the state during the last few years. The Donnybrook area is characterised by a landscape of steep hills and rich red-loam soil, and an average rainfall of 1000 mm. Once thickly forested with jarrah and marri, this highly productive country is now cleared extensively for agriculture. All of the Hearmans' farm has been cleared in the past, however, about fifty years ago forty per cent was allowed to regenerate, and it is this area of approximately 280 hectares that constitutes the Hearmans' bush pasture.

Seventeen years ago, when the cost of clearing was expensive compared with the cost of land, John Hearman decided to utilise the uncleared parts of his land without the expense of clearing. "I must point out that we started it purely for economic reasons, not for conservation," he says. The conservation of a jarrah woodlot, water quality and the prevention of soil erosion have been bonuses.

In many respects the Hearmans' forest/pasture is not a new concept, for grazing stock through the bush in all parts of Australia has been practised since early pioneering days. Certainly, way before European settlement, the Australian aborigine utilised the concept quite deliberately in the "fire-stick farming" method of burning the bush to allow grasses to regenerate and attract game.

Although not unique, the Hearmans' farm is interesting

because it shows that in areas of adequate rainfall with continued fire and pasture management a cycle can be established wherein all parts—tree stock, pasture and live stock can be economically supported.

"When you start off of course, you've got to have a hot burn if you can get one."

The Hearmans burnt their forest understorey seventeen years ago in the early autumn, at a time when the vegetation and soil were very dry. This facilitated an intensive or "hot" burn which effectively reduced the understorey. The next step was to sow pelleted clover seed. This was done from a light aircraft, at the rate of 10 kg of clover to the hectare. Before sowing, the seed was mixed with superphosphate fertiliser applied at 170 kg per hectare.

Mr. John Hearman (right) has been ► using the bush pasture method for seventeen years. (G. Peard)

By the following summer the clover had germinated and covered the burnt ground previously covered by the understorey. The trees themselves, being jarrah or marri, had survived the intense flames. Stock could then be grazed successfully on the clover under the trees during the spring and summer, when the fully exposed pasture of the other parts of the farm had been either grazed down or made into hay for the winter feed.

MAINTAINING THE CYCLE

It was obvious that the original burning operation could not indefinitely hold back the native understorey from regenerating and providing too much competition for the regenerating clover. The wooded areas needed to be burnt again. Hence a burning cycle commenced that the Hearmans have continued since. Every two years in the autumn they deliberately burn their uncleared hectares.





▲ One of the few improvements in the wooded section of "Tanglewood" has been the construction of this water tank holding approximately 50 000 litres. (C. Pead)

▼ Contrary to common belief, the clover grows right up to the base of the trees. Note the trunk of this jarrah tree blackened from burning. (C. Pead)



Burning every year is not necessary as the build-up of leaf-litter and new native understorey has not been sufficient to feed a fire after only twelve months. Fire also creates favourable conditions for clover seed germination.

"I have seen clover sown in the bush for many many years," says John Hearman. "It's generally sown after a burn, then you don't have to worry about it again."

Of the varieties available Woodgenellup was the sub-clover best suited to the rainfall of the area and the burning cycle. It buries deeply a relatively large seed and because of a hard seed casing survives the hottest fires. The fires actually stimulate or scarify the clover seed, which helps germination once the rains come. In comparison, grasses or thistles for example, suffer with burning.

Without exception the clover regenerates every year since the initial sowing. John Hearman attributes this not only to the characteristics of the clover but to the good conditions provided by the open canopy of his jarrah stands and the creation of ashbeds as ready sources of nutrients. There is plenty of light provided at the same time as shade, and the topsoil is more friable than on cleared ground, thus facilitating ready germination of the sub-clover seed.

The clover is re-fertilised every year with superphosphate, benefiting both pasture and jarrah. Every year the cattle are grazed in the un-cleared paddocks from spring to late summer.

◀ Sheep grazing under the young jarrah re-growth. (R. Fremlin)

In order to keep stock grazing in the steepest country Mr. Hearman built a water tank on top of one of the highest hills. The water source entices the cattle up the hills and ensures that grazing is even throughout the high terrain. Sheep are let in after the cattle to graze the grasses more thoroughly. All stock are removed in the autumn when either a burn is conducted, or regeneration of the pasture commences. John Hearman agrees that the regular burning programme is vital in maintaining productive pasture.

RETURNS

The carrying capacity of the Hearmans' forested area is two-thirds that of their cleared land. The advantages in this case outweigh the loss because the pasture lasts longer under the trees, clearing is not required, water quality is maintained and erosion is prevented. In this steep country erosion of the topsoil has been a problem in the past where all or most trees have been removed.

The "sick paddock" is the name used by the Hearmans for one uncleared paddock on their farm. They have found that some cattle grazed in the cleared paddocks suffer from a deficiency of trace elements, such as copper and molybdenum. The cure is to transfer the ailing cattle to the "sick paddock" for a season, where the deficiencies are corrected and the cattle become healthy again. The Hearmans attribute this to the high quality of feed in this paddock.

In terms of natural balance, water quality is maintained, as the turbidity of water run-off associated with extensive

removal of vegetation is avoided. The Hearmans believe that the clover effectively replaces the native understorey in its capacity to use water. The high transpiration rates of jarrah and marri still remain the same. These factors become critical in drier areas where salination of the water supply caused by extensive agricultural clearing is common.

LOWER RAINFALL

The test for the method would be in lower rainfall areas. Mr. and Mrs. Ray Ward of West Cranbrook are using this same bush pasture method on their 1300 hectare property within the catchment area of the Kent River. The average rainfall in the Cranbrook area is 600 mm, however the Wards chose a particularly exposed bush block as a trial under the driest conditions on their farm.

The first burn was conducted only two years ago in the 20 hectare block of open wandoo/jarrah woodland. The burn was slow to establish and keep going because of the very open nature of the understorey, and some debris was left. This is expected to clear up with further burns. Mr. Ward then aerial sowed with Esperance clover, a variety more suitable to the lighter rainfall. The seed germinated quite well immediately and in the following year when there was no burn.

The bush here cannot support a burn every alternate year, so the Wards plan to burn every third year. They are optimistic about the continued germination of their clover and the viability of the bush pasture method. It will be interesting to observe their progress in the ensuing seasons.



Bruce Hearman (second from left) ▲ shows Forests Department officers the soil in the "sick paddock" immediately after a burn. The clover had yet to germinate. (G. Pead)

Germination of the clover is sometimes variable. This picture shows one shoot amid several burrs which failed to germinate during the year in which no burn was conducted. Note the build-up of leaf litter around the clover burrs. (R. Fremlin)



PROBLEMS

It is important to assess some of the problems the Hearmans have encountered. In other regions different problems may arise, but in most instances the reduction in the potential carrying capacity of the land in the short term would be the biggest problem.

Mustering of sheep and cattle, particularly in steep, densely wooded country can be time consuming and difficult. Also, germination of the clover can be variable, particularly in the year in which no burning is conducted. Poor germination can result from too little sun during the winter combined with cold temperatures. Mr. Hearman stresses the need to burn to ensure consistent clover germination.

Some poisonous plants, for example, species of *Gastrolobium*, may also be encouraged by fire, although on the Hearmans' farm *Gastrolobium* is not present. Some species of native fauna are encouraged by the establishment of pasture

▼ The Ward's clover establishment trial at West Cranbrook has been successful. Note the older and more open forest type. (H. Bradbury)

under trees. Kangaroos and wallabies, for example, inhabit areas that offer the greatest grazing potential. The Hearmans don't regard the kangaroos on their property as serious competitors for the pasture. However, in other areas such as Cranbrook where the feed and shelter are generally less abundant, increased populations of kangaroos on farms could prove to be a problem.

TREE FARMING

Although the Hearmans are working their bush pasture for the greatest agricultural return, they have not exploited the full potential of their forests. They use the jarrah/marri on their farm for domestic fencing and fuel supply. They do not use the forest produce commercially as all millable trees were cut with the initial clearing. The forest regrowth now is quite young and is not of high milling value at present, although it will improve with time.

Were they to be interested in commercial tree growing as well as farming, more attention would have had to have been

paid in the past to the amount and rate of cutting carried out to ensure a continued supply of jarrah. Tree farming or tree management requires long-term thought beyond the farmer's life-time. The regrowth forest on the Hearmans' land is now about fifty years old.

Regeneration of the trees will definitely have to be managed because the stock naturally eat out the new growth, and the pasture competes with the germinants. One option is to fence off areas in the forest, perhaps with temporary electric fencing, which would protect new shoots from the stock.

The Hearmans and the Wards are practising agro-forestry. There are various combinations of methods and degrees of agro-forestry, whereby forested areas on farms are regarded as part of the farming enterprise. This is just one method, a method that has proven viable for the Hearmans. Perhaps it could be considered by farmers in the south-west where the rainfall is adequate and where total clearing is not an option.

Helen Bradbury

ACKNOWLEDGEMENTS

Thanks are due to the Hon. John Hearman, C.M.G., Mrs. Hearman and Mr. Bruce Hearman for their enthusiasm and co-operation, and to Mr. and Mrs. Ward for their help in the writing of this article. For their expertise and assistance thanks must also go to Richard Moore and Ray Fremlin from the Forests Department, Busselton, and Roger Edmiston from the Forests Department, Como.

