Integrating woody perennial forages into farming systems

Peter Milthorpe
Senior Research Agronomist, NSW Agriculture, Condobolin, NSW
peter.milthorpe@agric.nsw.gov.au

Introduction

There is a growing awareness of the need for perennials to be reintroduced into the landscape to stem, or reverse, the rate of land degradation by erosion and dryland salinity. To successfully introduce perennials back into agricultural systems they must be robust enough to sustain severe grazing, provide positive financial return, or demonstrate significant environmental benefits.

Forage shrubs are a group of plants that offer this potential; however, few species are capable of fulfilling the role needed to protect the vast areas of land currently under threat of dryland salinity in New South Wales. All the attributes of any likely species need to be assessed before selecting it for your area. It is also important to consider how stands of forage shrubs will be integrated into the farming system and how they will be managed.

I have been involved in assessing the potential of old man saltbush (*Atriplex nummularia*) as a forage plant over the past few years, and this species will be used as an example to illustrate points in this paper. Old man saltbush is best suited to the drier agricultural areas and is unlikely to be suitable in areas where altitude exceeds 350 m above sea level or where rainfall exceeds 550 to 600 mm per year. In wetter or more elevated parts of the agricultural area, other more suitable species will be required.

Selecting the right species to grow

Potential users need to have a good understanding of all the attributes that forage shrubs possess and how the benefits or limitations affect not only the short-term production goals, but also the long-term environmental well-being of the landscape. Table 1 summarises the many positive and negative attributes of old man saltbush.

The incorporation of permanent alleys or blocks of woody perennials, such as old man saltbush, into the existing production systems offers a means of mimicking the stable vegetation and water-use patterns that naturally occurred. Old man saltbush is an ideal plant to address these problems in the drier agricultural regions as it is deep rooted, drought tolerant, edible by stock, and adaptable to many soil types. As well, it is relatively easy and cheap to establish on a 'broadacre' basis. Further, its incorporation into the agricultural system does not require the development of new markets or marketing infrastructure, but rather its presence can be used to increase farm profit by allowing a shift in product type and at the same time reduce financial risk.

Table 1. Complexity of positive and negative attributes of old man saltbush that need to be considered when planning to establish forage shrubs.

Consideration	Positive attributes	Negative attributes
Environmental	• permanent planting • deep-rooted • ideal for dryland salinity prevention • wind protection • sink for carbon sequestration	• cool-temperature dormancy • acid soil intolerant • unsuited to waterlogged soils • may provide harbour for rabbits
Stock management	• feed not wasted or fouled • head-up grazing – less worms • high protein • greater flexibility in stock type • high-quality product potential	• moderate digestibility • needs high-energy supplement • animals need to be trained to eat it • plants accumulate high levels of salt • needs good-quality water • potential Ca:Na imbalance in stock
Plantation management	• year-round feed • reliable supply • able to assess feed on-hand • fills seasonal feed gaps very well • not favoured by feral animals • a tool to improve pastures in other paddocks	• ties up land that could have other uses • expensive to establish • slow growth • needs good management • can't handle pasture competition • needs fertiliser • ± high Na, N, and oxalate content • needs a high-quality or value product to be profitable

Management considerations

Managing the stand

There is a need for diligent management to establish and maintain saltbush to get the best value from it. During the planning phase it will be necessary to decide whether alleys of plants or block plantings will be made. This will be largely determined on a farm-by-farm basis, as subdivision and watering points are important as are fencing and position of arable paddocks. In the establishment phase, soil-moisture availability and weed control are important. Once established, saltbush needs to be grazed regularly, irrespective of seasonal conditions, to maintain plant vigour, as well as keeping plants within the grazing height of the animals. Older, ungrazed shrubs become woody with unpalatable leaves and a lower nutritional value.

Managing stock

Stock management is most important if the best is to be obtained from the stock. Animals need to become familiar with saltbush and learn how to browse it in conjunction with grazing pastures. There will be an initial acclimatisation period so that stomach flora of the stock can adapt and properly digest the plant (similar to when you start grain feeding). Young stock also need to be educated to eat saltbush, and it may take 3 or 4 weeks for them to adjust. The inclusion of some older, experienced stock helps to hasten this transition period. Once stock are familiar with old man saltbush, they readily browse it on return grazings; but there will still be a short acclimatisation period for their stomachs to adjust.

Saltbush is high in salt; therefore, stock grazing it must have a ready supply of good-quality water. It is very high in protein (15% to 20%) and generally low in energy and needs to be supplemented with other feed sources, such as pasture or grain, for optimum livestock performance. With old man saltbush, the feed supply is up off the ground and is not trampled or fouled, reducing worm problems.

Ideally, stocking rates should be set so that grazing of an area is completed in 1 to 3 weeks, with 6 weeks the maximum. The shorter the grazing period used, the greater the production from both saltbush and the underlying pasture. However, to get the most from saltbush and the animals grazing it, there is a need to have continuous grazing for several months at a time. Hence, several paddocks of old man saltbush are required so that stock can be moved from one area to the next as feed is utilised. Saltbush provides excellent shelter and confined paddocks for lambing, provided there is adequate pasture or supplementation for lactating ewes. Paddocks can also provide a nutritional boost to ewes pre-joining. The best use of the feed and shelter can be achieved by initially grazing lambs or lambing ewes in a fresh block, followed by a flock of wethers to clean up the remainder. In favourable seasons, excessive pasture growth may be controlled by high-density grazing for short periods.

Opportunities from well-managed shrub stands

Forage shrubs provide an opportunity to improve overall feed quality, as well as to maintain nutritional quality throughout the year. This may allow a change of enterprise to provide greater and more stable economic returns, as well as increasing vegetative stability of the farm. For example, with prime lambs reared on lucerne and natural pastures, problems of feed availability can occur in extended dry periods as a result of leaf drop by lucerne. Saltbush supplies a similar quality and quantity of feed as lucerne and can overcome these problems. The benefits of maintaining good nutritional supply throughout the year is prominent in the wool industry's target of consistent fibre strength. As autumn feed gaps are commonplace in much of southern New South Wales, planning to incorporate old man saltbush as part of an extended feed supply would be most useful, particularly as longer exposure to animals improves efficiency. In the northern parts of New South Wales, a winter–spring feed gap more commonly needs to be filled.

As old man saltbush retains its leaf year round, easy assessment of how much green feed is available can be made at any time of the year. This allows better adjustment of stock numbers, resulting in improved management flexibility and productivity on a whole-farm basis.

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