TAGASASTE

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Benefits
The benefits of planting a deep-rooted perennial fodder shrub like tagasaste (lucerne tree) are:

- an increase in the available fodder supply for livestock during the year, but most importantly in summer and the autumn months, decreasing or eliminating the need to supplementary feed
- they are high water use plants which reduce recharge to the groundwater and assist in controlling salinity
- provides shelter and shade for stock
- help prevent soil erosion when planted in rows against the prevailing (or most damaging) wind direction

ESTABLISHMENT

Site Requirements

- deep, sandy, moisture gaining but well drained soils, tagasaste will not tolerate saline or waterlogged soils even for short periods and should not be planted at sites where the water table regularly rises to less than one metre from the surface; it is best suited to those sandy soil types where lucerne, perennial grass and sub clovers do not persist
- preferred pH range 4.8-6.0 (CaCI2) or 5.5-6.5 (water): tagasaste has been established on sites with pH of 8.6 but effects on production are unknown
- minimum average rainfall of 350 mm but greatest production in areas with greater than 450 mm
- tagasaste seedlings are tolerant of mild frost but are susceptible to severe frost - mature plants are frost tolerant.

Bare Rooted and Tubestock Seedlings
Bare rooted seedlings are 12 month old root- and top-pruned seedlings supplied in bundles with no soil on the root system. They are common in WA but so far little used in SA. Seedlings should be ordered in advance (preferably 6 months) and bought in bulk from various outlets.

Latest Seedling Planting Times

Southern Murraylands	June
Upper South East (Nth Keith)	late June
Upper South East (Sth Keith)	early July
Lower South East	late July

Direct Seeding

Direct seeding is an economical and effective method to establish tagasaste, but seed must be sown into a moist seedbed to achieve good results. This will require the use of a wetting agent on non-wetting sands.

Tagasaste seed germinates at a lower temperature, therefore can be sown earlier in the season compared to most native seed. Seed rate is a maximum 500 g/km on non-wetting soils, 350 g/km on wetting soils, in a scraped or delved trench. This trench can be 10- 100 cm wide depending on the wind erosion risk of the site. Drifting sand can bury the seed too deep for successful emergence.

Sow seed 1-2.5 cm deep. Use scarified or heat-treated seed. For heat treatment, tip seed into boiling water and boil for 30-60 seconds (no longer) then take out and leave to dry before sowing. Seed should also be inoculated. Inoculant may be bought from agricultural merchandisers. Inoculum code is CC1502.

Direct Seeding Times

Southern Murraylands	late May - June
Upper South East (North of Keith)	June - July
Upper South East (South of Keith)	July
Lower South East	August

Ripping

Ripping along the planting lines is not essential, but can help the growth of seedlings. Rip 6-12 months in advance to at least 30 cm deep along the planting lines prior to planting seedlings or direct seeding. Rip non-wetting sands when they are wet. Ripping can assist in breaking up plant residues which allows planting machines easier passage.

Weed Control

The best results have been achieved where there is a minimum 2 metre weed free zone on the planting line. If erosion risk is low, 2.5 - 3 m is preferred, if erosion risk is very high, only spray to a width of 1 m, but spray-top the remaining interrow. Knock-down and residual chemicals must be used in the prior or current season and are highly effective. Weedy sites will require both treatments in both years.

Weed control must begin for perennial plants on the site (particularly in the planting row) in the growing season before you wish to establish the tagasaste. Plants to control early include clovers, sorrel, wireweed, primrose, veldt grass, lucerne, fat hen, skeleton weed, self sown

cereals and lupins, ie. any plant that is hard to remove and a vigorous competitor for moisture in that vital first year of establishment.

Cover crops to help prevent erosion can be early sown (late April early May). Crops must not establish any closer than 2 metres from the planting row (they can be sown close to planting row but must be sprayed out to that 2 metre zone). An exception is where rows cannot be oriented against the prevailing winds and funnelling effects may cause wind erosion.

Suitable species for cover crops include lupins, triticale or cereal rye, depending on wind erosion risk and herbicide history. If establishing into crop residues from the previous season, manage grazing to leave sufficient plant material to minimise wind erosion.

Contact contractors for herbicide plant-back periods and local weed control options, particularly if the erosion risk is high.

Insect/Vermin Control
Insect control is essential for such pests as red legged earth mite, pink cut worm and pasture loopers and rabbits but they must be controlled early after seeding or planting. Rabbits will cause serious damage - carry out a thorough control program in the summer prior to establishing tagasaste.

MANAGEMENT

Fertilisers
Tagasaste has a major requirement for phosphorus at all stages of growth, especially in deficient soils. Field work indicates with soil test levels less than 20 ppm (Colwell), young plants in particular respond to super applied at establishment at rates of 25 g/m of row (see table on last page for kg/ha rates). This is best applied near the planting line but not on the seed or young plants. Mature trees should be tissue tested to monitor their nutrient requirements.

If soil test indicates less than 50 ppm (Colwell) potassium, young tagasaste plants may respond to super potash 2:1 applied at 25 g/m of row in the spring of the year of establishment. This must not be applied on the plants but close by. Field work indicates that mature plants have no known requirement for potash at this stage.

Superphosphate has increased both the growth and feed quality of tagasaste in WA research Once established, tagasaste is an excellent forager of nutrients. All sites should be establishec with trace elements in the fertiliser if none has been applied to the site in the last 10 years.

Establishing tagasaste in a cropping or pasture renovation phase can make full use of th fertilisers added.

Watering
No watering should be required if sites are established when soils are wet with good sub-so moisture available. Wetting agent will boost sub-soil moisture on sands.

Grazing

Sole sheep grazing requires regular pruning to cut excess growth beyond their reach. A combination of sheep and cattle is very effective. Sheep may cause bark stripping so the plants should be monitored daily.

Feed value will vary depending on management. The most nutritious growth is that which is approximately 10 cm in length and is fresh and leafy. New leaf is about 25% crude protein and up to 80% digestible matter compared to edible stem of 9% and 46% respectively.

Young plants can be grazed lightly with cattle at about 18 months, with full production from 3 years of age.

Pruning

Young tagasaste should be topped (cut) in the winter after establishment to a minimum height of 30 cm to promote branching. They must be cut cleanly with sharp blades similar to a reciprocating mower or a header cutter bar. Blunt blades, especially on slashers and disc mowers, can bruise the plant and reduce the regrowth. If grazing with sheep, a second pruning may be necessary to form a protective low-branch barrier to the trunk.

Plants and feed quality will degenerate if allowed to flower (in spring) and set seed. If this can be prevented by early grazing, a more nutritious fodder will be produced.

Tagasaste can become an invasive weed in native vegetation if allowed to flower and shed seed, highlighting the need for good grazing/pruning management.

The state of the plants should be monitored regularly. Pruning of tagasaste either yearly or bi-annually may be required in winter to keep a 'broccoli' shape hedgerow of quality fodder within reach of stock and to prevent seed set. Effective cattle grazing management will decrease or eliminate the need for costly mechanical pruning .

Inter-row Pasture and Cropping

Research indicates that for each additional kilogram of green inter-row pasture there will be one less kilogram of tagasaste produced, so production of pasture will be a compromise with production of tagasaste. Sowing lucerne or any deep rooted perennial will be disadvantageous as they will be competing for the same supply of water and nutrients.

Maintaining inter-row pasture should only be considered in an alley system with rows of tagasaste every 30-50 m or more. The distance between rows (alley width) in grazing alley systems will vary according to rainfall (and desired stocking rates). For example, less than 10 m alley width is useful in a 350 mm or less area, 8-9 m in a 400-425 mm area, and 6-7 m in a 450 mm or more area. An alley width of less than 10 m, however means the inter-row is really an animal traffic thoroughfare and pastures can be quickly eaten out or physically damaged due to the high stocking rate.

Tagasaste can be planted in rows 30 m or more apart (plants 1-2 m apart within rows) to allow cropping in between, but this is not recommended on non-wetting sandy rises.

Stocking Rates

Grazing with sheep at high stocking rates (about 50-100/ha) for short periods (eg. less than 5 weeks) with a 10 month rest period over winter and spring produces good results, but monitor regularly for signs of ringbarking or bark stripping. After 5 weeks sheep graze the regrowth buds too closely affecting the plants ability to recover.

If grazed once a year, tagasaste will be of adequate quality for animal maintenance (and wool growth) but not for rapid body growth. Tagasaste grazed regularly will have a greater proportion of the more nutritious young leaves and shoots.

Cattle stocking rates are still being determined in SA, but in WA set stocked stands have consistently achieved 10-15 DSE/ha and some with good fertiliser and grazing management, are carrying in excess of this. The best results are achieved by managing the grazing to produce a 'broccoli' shaped hedgerow 1-1.5 metres in height.

At Telopea Downs (Vic), where rainfall is 425 mm, 120 ha of tagasaste on a property of 728 ha has influenced the overall farm DSE as follows: 5 DSE/ha until the late 70's on Hunter River lucerne, after this period it dropped to 2 DSE/ha. At present the overall rate is 4.5 DSE/ha.

One 7 year old stand of 26 ha has produced the following results with cattle: spring 1994, 197 DSE/ha for 13 weeks and spring summer 1995, 74 DSE/ha for 13 weeks .

ORIENTATION AND DESIGN

Orientation

Orientate the rows against the prevailing (or most damaging) winds if site has high erosion risk and is undulating, avoid steep slopes if crops are to be established between the rows. Establish rows on the contours of high-erosion-risk steep sand ridges. If possible, trees are best established in rows on a north-south aspect to maximise sunlight effect on each side of the rows, but minimising erosion has a higher priority.

Placement in Paddock

Establish in straight lines where possible so that stock can be easily observed on a regular basis as well greatly assisting mustering. Some paddocks will have a steep slope or ridge which will prevent a clear view from fence to fence. A vehicle track along the ridge will help with monitoring stock.

Gaps should be left at intervals (eg. every 40 m) along the rows of tagasaste or can be created later. These gaps create laneways running across the plantation to assist in mustering stock. The gaps should be 10 m wide initially but will become narrower as the tagasaste grow.

A gap of 15-20 m should be left between the fence and the tagasaste to allow for the movement of machinery and stock. If cropping in an alley farming system, also allow sufficient gaps/space for headlands.

Plant Density within Rows

At this stage the optimum spacing within rows is rainfall dependant. One plant every 2 m or less at maturity is desired. As some seedlings may die before establishment, plant seedlings at 1-1.5 m spacing initially.

ESTABLISHMENT COSTS

Costs vary greatly according to establishment method, design and site conditions. Totals range from $50 to $200 per hectare. Initial costs are offset by the longevity of the plants: there are commercial sites in WA which are now 16 years old and are still producing maximum stocking rates.

Guide to help calculate costs

Distance between rows (m)	Metres of row/ha	Initial kg/ha - Super at 25g/m row	Seeds (gm) req/ha (at 500g/km)	plants/ha with 1.5m between plants in each row
6	1667	42	834	1111
7	1429	36	714	953
8	1250	31	625	833
9	1111	28	555	741
10	1000	25	500	667

FURTHER INFORMATION

Contact any of the following contractors or call Bob Peake, Keith PISA office 087 553 166 or Zita Stokes, Struan PISA office 087 647 419.

* Melvin's Fodder Shrubs, bare rooted seedlings: P0 Box 155 Dowerin WA 6461. Ph. (096) 341 024 or Fax (096) 341 053
* SE Direct Seeding Service: Mig and Peter Brookman, "Cairndale" Keith SA 5267 Ph/Fax (087) 565 019, planter for hire; Jamie and Josie Jackson "Tallawong" Willalooka, Ph/Fax. (087) 578 276
* Mimosa Tree Seeding Service: Peter Feast, P0 Box 1013 Mount Gambier SA 5290 Ph. (087) 388 070
* Triffid Trees: Andrew Bradey, RMB 638 Edenhope Vic 3318. Ph. (055) 873 558, planter for hire
* Tom Matthews, bare rooted seedlings: P0 Box 953 Naracoorte SA 5271 Ph/Fax (087) 667 037, Mobile (015) 797 640, planter for hire
* Western's Nursery, speedlings: Rhyce Western, By Pass Rd Waikerie SA 5330. Ph. (085) 412 988, planter for hire
* Topline Plant Co., speedlings/seedlings: Swamp Rd Uraidla SA 5142. Ph. (08) 390 3369 or Fax (08) 390 3603.
* El Nino Plants, tubestock: Vic Dowd C/0 P0 Lower Light SA 5501. Ph. (085) 202 937
* Narromine Transplants, speedlings: P0 Box 123 Narromine NSW 2821. Ph. (068) 892 111 or Fax (068) 892 500
* State Flora Murray Bridge, tubestock/quickpots: Bremer Rd, P0 Box 752 Murray Bridge SA 5253. Ph. (085) 311 420
* PG (Peter) & AM Will, planting machine for hire or contract planting only, seedlings available: Box 567 Bordertown SA 5268. Ph (087) 584 054.