

THE CENTRAL QUEENSLAND SECTION OF THE TROPICAL GRASSLAND SOCIETY OF AUSTRALIA

FIELD MEETING—MAY 31, 1973

TOWNSVILLE STYLO

This field meeting was held in conjunction with the Proserpine Branch of the Central Coastal Graziers' Association. The following are summaries of the talks given.

“COLLINGVALE”—PROPERTY OF W. A. DEICKE, PROSERPINE

“Collingvale” is a 14,000 ha (35,000 ac.) property 16 km (10 miles) north of Proserpine, between the Bruce Highway and the coast. Topography varies from very hilly to large alluvial flats. The rainfall at the western end of the property is 1,650 mm (65 in.) and decreases to 1,150 mm (45 in.) on the coast. Soils range from fertile brown friable earths to infertile sandy duplex soils.

Development has been mainly with Townsville stylo. Over the last five years 200 ha (500 ac.) of Townsville stylo has been developed on the wetter parts of the property. In 1972, on the infertile sandy soils in the drier areas, 320 ha (800 ac.) of ti-tree (*Melaleuca*) country were cleared, ploughed twice and sown with 5.5 kg/ha (6 lb/ac) of Townsville stylo with 126 kg/ha (1 cwt/ac) of Mo 12 superphosphate. A further 280 ha (700 ac) of mainly ironbark ridges with some cockey apple and poplar-gum were Tordon treated and topdressed with 126 kg (1 cwt) of Mo single superphosphate. There was a good natural population of Townsville stylo and no seed was sown. The costs of these two forms of development are discussed later.

Most of the cattle on the property are Brahman cross and both breeding and fattening are done. Recently some Charolais blood has been introduced into the herd by using artificial insemination.

FERTILIZERS FOR TOWNSVILLE STYLO

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Townsville stylo is particularly well adapted to moderately-acid soils with sandy to loamy texture in the surface which occur in zones with annual rainfalls of 650–1,650 mm (25–65 inches). Liming is not generally required and the plant nodulates readily. The main nutrients which have been found to be deficient in the Townsville stylo soils in North-eastern Queensland are phosphorus, potassium, sulphur, copper, zinc, and molybdenum. Superphosphate (which contains phosphorus and sulphur) is almost always required and the question invariably arises as to how much should be applied and how often. Phosphorus appears to have quite a good residual value on these lighter soils. At our field station near Townsville we have found that an initial application of 378 kg/ha (3 cwt/ac) of superphosphate lasts well into the third year. When soil phosphorus levels have been built up by a few years of annual dressings, maintenance dressings of 126 kg/ha (1 cwt/ac) every second year are probably adequate and will cut down on distribution costs.

Only two types of soils in the Proserpine area have been studied from the point of view of soil fertility. These are the solodic soils on the *Melaleuca* woodlands and the neutral red duplex soils further west. Both of these have given responses to phosphorus, sulphur and molybdenum in experiments in the glasshouse, but the field experiments to confirm this have not yet been carried out. Levels of potassium in the solodic soils are marginal and this nutrient needs to be watched as pastures are improved.

Fertilizer practices can alter the botanical composition of Townsville stylo pastures. From work at both Townsville and Katherine in the Northern Territory, it

is clear that build-up in soil P (and presumably also in soil fertility in general) leads to increases in the grass content. How much and what type of grass invades is influenced by the grazing pressure. Much is still to be learnt about this system but it is clear that fertilizers can be used to manipulate pasture composition.

AGRONOMY AND MANAGEMENT OF TOWNSVILLE STYLO

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Townsville stylo is suited to a wide area of country in northern Australia. A recent survey of suitable country puts the area at 40,000,000 hectares (100,000,000 acres). Research at Rodds Bay, Swan's Lagoon, Lansdown, Katherine and other centres has shown that increases in animal production of between 5 and 10 fold are possible with the use of this tropical legume.

Dr. Don Cameron was responsible for selecting the released cultivars of Townsville stylo. He found that Townsville stylo was variable in flowering time, yield, growth habit and hard-seededness. Plants collected from dry areas were early flowering and plants from more humid areas late flowering. He concluded that it was necessary to select cultivars of high yield potential of both early, mid season and late flowering time to suit dry, intermediate and humid regions. Thus cultivar "Paterson" originally collected at Greenvale Station is early flowering and suited to dry country; cultivar "Lawson" from Galbraith Station is an intermediate type and cultivar "Gordon" from south of Darwin is late flowering and suited to high rainfall regions such as we have at Proserpine.

The establishment of Townsville stylo is best on prepared seedbeds. In this region two ploughings are generally necessary after clearing, in order to control regrowth. Townsville stylo establishes well under such conditions. However, graziers from drier country will be looking for cheaper methods of establishment. Experience from Kangaroo Hills suggests that best results are obtained if the seed dormancy is broken by removing the seed pods and pelleting the naked seed with rock phosphate. In addition it is important to reduce the body of grass on the sward either by burning in the very early wet season and aerially seeding immediately afterwards, or by heavy grazing in the dry season preferably with supplements. Stands of Townsville stylo established by this method are not very vigorous in the first year but improve in subsequent years provided the grazing pressure on the pasture is not too light. No evidence of Townsville stylo being eradicated with heavy grazing has been observed.

In some areas notably the coast of Queensland and Katherine in the Northern Territory, Townsville stylo pastures have been invaded by annual grasses. The effect of this change in species composition on animal production is not obvious, but it would be better to establish a perennial grass in the sward as a companion to Townsville stylo.

There are other species of the genus *Stylosanthes* such as *S. fruticosa* which is suited to very dry areas, *S. scabra* and *S. hamata* suited to intermediate areas and new introductions of *S. guyanensis* which are suited to 1,250–1,500 mm (50–60 inches) rainfall. These plants will be released to the industry when it can be shown that they are superior to the plants already in use.

(Comment: With seed rates of 5.5 kg/ha (6 lb/ac) of Townsville stylo pods—

1. Excellent initial stands are obtained in the rainfall areas above 1,000 mm (40 inches). At present prices (about \$1/kg) there is no advantage to be gained from using dehulled seed. In any case it is not possible to buy dehulled seed commercially;
2. It is not local experience for aerial seeded Townsville stylo pastures to lack vigour in the first year, as compared to other methods of establishment.)

LAND DEVELOPMENT AND TOWNSVILLE STYLO ESTABLISHMENT TECHNIQUES

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A planned development programme will take into consideration the available resources of land, climate and finance.

Good land development will result in increased carrying capacity and improved animal performance. The probable results of alternative methods of development should be weighed up against estimated costs. The key figure for assessment purposes is the probable cost per beast area.

On the majority of coastal properties there is a considerable variation in soil types and topography. A balanced development programme will endeavour to capitalise on these variations by devising development techniques best suited to land types and eventual use.

DEVELOPMENT METHODS AND RELATIVE COSTS

Assume a typical area of coastal ti-tree (*Melaleuca*) country of reasonably flat topography. Alternative methods of development and pasture establishment are:—

- (a) Tordon treatment of timber and aerial seeding.
- (b) Timber clearing with ground or aerial seeding.
- (c) Timber clearing, ploughing and ground or aerial seeding.

Estimated costs per hectare for the alternative methods are:—

	A	B	C
	\$	\$	\$
Tordon treatment	15.00	—	—
Land Clearing & restacking	—	52.50	52.50
Ploughing (June & November)	—	—	22.00
Townsville stylo seed (6 kg/ha)	6.00	6.00	6.00
Superphosphate (252 kg Mo 12/ha)	9.25	9.25	9.25
Aerial spreading & marking	4.50	4.50	4.50
Line clearing	1.00	—	—
	\$35.75	\$72.25	\$94.25

Method A is appreciably cheaper than the alternatives and it allows the retention of useful perennial native grasses. Timber regrowth treatment will be required by the sixth year. Establishment of Townsville stylo is slower than for cleared or cultivated treatments.

Method B is a medium cost operation. Timber raking provides a reasonable seed bed without destroying perennial grasses. Timber regrowth will be more prolific than for Tordon treated areas but the cleared land can be slashed for regrowth control.

Method C is a high cost operation. Two ploughings prior to seeding will eliminate timber regrowth, but in the process native grasses will also be destroyed. Moreover, it is difficult to impose optimum grazing pressure on low lying, cultivated land during the critical establishment period because of "bogging" problems and soil erosion is a distinct possibility during periods of heavy rain.

With a rainfall of 1,000 mm or more per annum, a carrying capacity of 1 adult beast per 1.2 ha (3 acres) would be applicable for all of the development methods described. With undeveloped land valued at say \$30.00 per hectare, the relative costs per beast area would be:—

<i>Method</i>	<i>Land</i>	<i>Development</i>	<i>Total</i>
A	\$36.00	\$42.90	\$78.90
B	\$36.00	\$86.70	\$122.70
C	\$36.00	\$112.95	\$148.95

These costs can be compared with those for establishing improved perennial pastures, capable of carrying 1 adult beast to 0.8 ha (2 acres), namely:—

Land	\$ 24.00
Development	\$110.00
Total	\$134.00

Fencing and watering costs would be similar for all Townsville stylo establishment methods as well as perennial pastures. While the higher stocking rates on perennial pastures would tend to economise on fencing and water facilities, this is offset by the fact that Townsville stylo paddocks are usually twice the size of perennial pasture paddocks.

AERIAL SEEDING

Aerial seeding must be used for Tordon treated country. It also offers a speedy method of applying seed and fertilizer, regardless of topography or surface condition. Seeding is best carried out during late November—early December prior to the onset of heavy storm rains. Seed should be chemically treated to guard against seed harvesting ants (Lindane, Dieldrin or Chlordane). The following are practical guidelines for aerial seeding:—

1. Clearly define the area with a bulldozer line around perimeter. Regular shaped blocks with two parallel sides are best. Prepare a scale map of the area.
2. Preserve dry grass so that it can be burned just prior to seeding, to kill germinating annual grasses and to suppress perennial species.
3. Mix seed and fertilizer thoroughly. This can be done with a loader.
4. Mark each run for the plane using long poles with yellow or orange flags. Swarth widths of about 10 meter (11 yards) will allow the necessary overlap to ensure a complete coverage. The acceptable range is 7 to 13 meters (8 to 14 yards) and will depend on the capacity of the plane and the length of the run.
5. A venturi type spreader fitted to the plane will give a more even spread. Research results suggest an optimum flying height of 90 to 120 meters (300 to 400 feet) above ground level.
6. Calm conditions are essential for even distribution so early morning is the best time for seeding and fertilizing.

CATTLE PERFORMANCE AND MANAGEMENT ON TOWNSVILLE STYLO PASTURES

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The points discussed by John Bond have been largely covered by L. Wink's paper on "Townsville stylo Research at Swan's Lagoon" in *Tropical Grasslands* (1973), Vol. 7, No. 2, p. 201-208.

Main points highlighted were:—

1. Compared to native pastures, Townsville stylo fertilized with superphosphate improves the carrying capacity, liveweight gain and lengthens the period of weight gain.
2. Optimum returns are achieved by the integrated use of fertilized Townsville stylo with native pastures and a nitrogen supplement for the dry season.
3. With unfertilized Townsville stylo on phosphate deficient soils, feeding a phosphorus supplement during the wet season improves the rate of liveweight gain.