FARMER ASSESSMENT OF PASTURE ESTABLISHMENT RELIABILITY IN THE GYMPIE DISTRICT, SOUTH-EAST QUEENSLAND

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ABSTRACT

The opinions of forty-five dairy farmers in the Gympie District of south-east Queensland on the establishment of tropical and temperate pasture species were obtained. Temperate species were claimed to "almost always" establish reliably, whereas tropical species "usually" established satisfactorily. Most farmers interviewed had a good opinion of the commonly used tropical species as regards emergence and early seedling growth, with the exception of Lotononis bainesii *which was said to have a higher failure rate. Available data from experimental sowings in south-east Queensland support these views.*

INTRODUCTION

The unreliability of tropical grass emergence on self mulching clay soils is well documented (Leslie 1965, Rickert 1970), whereas successful establishment occurred in approximately 90 per cent of improved pastures sown in the far north coast of New South Wales (Swain, Bird and Drane 1970). There are no published data on the reliability of seedling establishment on soils in the wetter areas of south-east Queensland. A study of pasture establishment in this region comprising both survey and experimental programs, was commenced in 1968/69. This paper presents the results of a survey conducted in 1969/70 to assess farmers' opinions on the reliability of pasture establishment. In addition, emergence data on some experimental sowings in south-east Queensland are reported.

METHOD

Forty-five dairy farmers in the 900-1700 mm rainfall areas in the Gympie district of south-eastern Queensland (26°S 153°E) were interviewed about pasture establishment. The forty-five farmers were a random selection of the eighty-two interviewed in a dairy production survey who had sown tropical and/or temperate pastures. The basis on which farmers were selected in the dairy production survey has been described by Rees, Minson and Kerr (1972).

Farmers were asked questions on the frequency of successful emergence and establishment of both tropical and temperate pasture species. The importance of weed competition was also assessed for both old cultivation and virgin sites sown to tropical and temperate pastures. All questions referred to sowings on cultivated seedbeds, usually loam or clay loam topsoils. Farmers' answers were based on their experiences prior to 1969/70. Rees, Minson and Kerr (1972) showed that the great majority (95%) of tropical pasture sowings were made during the five years prior to the survey.

Also presented are some data on percentage emergence of viable seed from a number of species sown in small plot evaluation trials from 1962 to 1968 at Gympie, Samford, Beerwah, Conondale, Boonah and Pittsworth. The sowings were all hand broadcast on cultivated seed-beds which were subsequently harrowed. The sowings covered a wide range of soil types and establishment rainfall.

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RESULTS

Rainfall in the Gympie district in the five years prior to the survey (Table 1) tended to be above average in the cooler months and below average in the summer months.

TABLE 1

Rainfall at Gympie during the five years prior to the establishment survey (mm)

Year	Cool Season (April-September)	Warm Season (October-March)
1964-1965	378	442
1965-1966	582	691
1966-1967	342	740
1967-1968	521	1249
1968-1969	209	319
Long term average	363	785

Farmer assessment of the ease of pasture establishment is presented in Table 2. The numbers of farmers who assessed commonly sown cultivars as giving good or poor seedling emergence and having good or poor seedling competitive ability are shown in Table 3.

TABLE 2

The frequency with which farmers assessed they obtained satisfactory pasture emergence and establishment

Assessment of success	No. of farmers		% of farmers *	
	Temperate sp.	Tropical sp.	Temperate sp.	Tropical sp.
Almost always	37	8	95	26
Usually	2	18	5	58
Unusually	0	5	0	16
Never	0	0	0	0
Insufficient experience	6	14		
Total	45	45	100	100

(Distribution of success ratings between temperate and tropical species, excluding insufficient experience, significant to $P < 0.001$ by Chi-square test.)

* Excludes farmers with insufficient experience in each pasture type.

TABLE 3

The number of farmers who assessed commonly sown cultivars as giving good or poor seedling strikes and having good or poor seedling competitive ability

Species	Emergence		Good	Competitive ability		Good
	Good	Poor	%	Good	Poor	%
(a) *Temperate*						
White clover	39	0	100	34	3	92
Red clover	22	0	100	19	1	95
H. 1 rye	32	0	100	27	3	90
K. Valley rye	13	0	100	13	—	100
(b) *Tropical*						
Siratro	22	4	85	26	3	90
Greenleaf desmodium	20	2	91	19	2	90
Silverleaf desmodium	20	2	91	21	3	88
Glycine cultivars	16	3	84	16	4	80
Miles lotononis	4	3	57	2	4	33
Setaria cultivars	20	3	87	18	1	95
Green panic	17	2	89	13	0	100
Molasses grass	7	0	100	5	0	100
Guinea grass	5	1	83	6	0	100

Weeds, mainly dock (*Rumex sp.*) and stagger weed (*Stachys arvensis*), were listed as an establishment problem in temperate pastures on old cultivation land by 45 per cent of farmers. However, only about 15-20 per cent of farmers listed weeds as an establishment problem in the other three categories, temperate pastures on virgin land, and tropical pastures on both virgin land and old cultivation.

The emergence percentages of viable seed from the pasture screening trials in south-east Queensland are presented in Table 4. Also shown are the usual range of emergence percentages for temperate species, taken from a survey by Roe (1958) of a large number of sowings in temperate areas.

TABLE 4

Emergence percentage of viable seed from some screening trials of pasture species in south-eastern Queensland

Species	No. of sowings	Mean Emergence & S.E.	Data of Roe (1958)
		%	%
Medicago sativa cv. Hunter River—winter sown	5	59 ± 5.1	41-75
Trifolium repens cv. Ladino white clover	4	34 ± 3.5	29-33
Trifolium repens cv. Lousiana white clover	4	32 ± 4.5	29-33
Medicago tribuloides barrel medic	6	64 ± 8.0	
T. subterraneum cv. Bacchus Marsh	4	61 ± 8.2	55-64
Phalaris tuberosa x *arundinacea*	7	41 ± 6.3	20-40*
Festuca arundinacea cv. Demeter	5	41 ± 7.7	23-38
Lolium perenne cv. Kangaroo Valley	4	51 ± 5.5	31-57
Medicago sativa cv. Hunter River—summer sown	3	15 ± 10.5	
Macroptilium atropurpureum cv. Siratro	13	53 ± 6.8	
Desmodium intortum cv. Greenleaf	9	32 ± 5.3	
Lotononis bainesii cv. Miles	6	10 ± 8.9	
Setaria sphacelata (all cultivars)	11	25 ± 7.4	

* Data for *Phalaris tuberosa.*

DISCUSSION

Tropical pasture sowings usually gave satisfactory establishment, though it was clear that tropical species were not regarded as quite as reliable as temperates (Table 2). This impression could be a result of factors such as seasonal rainfall conditions during years prior to the survey (Table 1), use of irrigation on temperate pastures (Rees, Minson and Kerr 1972), less familiarity with tropical pastures, and the lower number of viable tropical seeds usually sown per unit area compared with irrigated temperate pastures.

About 90 per cent of farmers stated that the commonly used tropical pasture species gave reliable emergence and establishment (Table 3). The one exception was Miles lotononis (*Lotononis bainesii*), which although only named by seven farmers, appeared to be less satisfactory under the usual establishment conditions operating in this area (Table 3). Cloutier (1971) mentioned lotononis as being unreliable to establish in the Lismore area. Excessively deep sowing and mid-summer sowing could be possible reasons for the failure of the very small lotononis seed to establish well in farm sowings. Betts (1972) has suggested that lotononis be surface sown and then rolled.

Farmers were equally satisfied with Siratro, Greenleaf desmodium and glycine (*Glycine javanica*) establishment, although research data reviewed by Jones and Jones (1971) indicate that Siratro gives better emergence and seedling vigour than desmodium or glycine. As there are ten times as many Greenleaf desmodium seeds as Siratro in a given weight of seed it could be difficult to compare emergence in these species by visual assessment.

There appeared to be no more weed problems with establishment of tropical pastures on old cultivation land than on virgin land. This different result for

tropical, as compared with temperate pastures, may be partly due to the different sites favoured for sowing the two pasture types. Tropical pastures are usually sown on hillslopes and temperate pastures on fertile alluvium with a longer cultivation history.

The limited amount of research data on the emergence of viable seed supports the farmers' views on the relative reliability of temperate and tropical pasture establishment. Data on the emergence of temperate species in south-east Queensland compares favourably with data from temperate environments. The eleven per cent emergence of viable lotononis seed (Table 4) was the mean of six sowings with emergence percentages of 0, 0, 0, 1, 8 and 55 per cent. This further confirms that lotononis establishment can be unreliable when harrowed in after summer sowing on cultivated seed-beds.

The reasonably successful establishment of sown pastures in south eastern Queensland reported in this paper does not imply that pasture establishment on cultivated seed-beds cannot be improved, but provides quantitative support for the suggestion (Luck, 1971) that establishment is not a major limitation to the successful use of sown pastures in the coastal sub-tropics of eastern Australia.

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