treatment (80-100°c). Seeds of varieties TGX 563-02D and TGX 293-63E are included in this category.

The degree of dormancy in seeds has been associated with many reasons including hard seededness (Hyde, 1954; Esau, 1965). Studies by Kozlowski (1971) have increasingly pointed out that the barrier effect of the seed 'coats' could be due to the physical or chemical characteristics of the seed coats as well as the permeability changes to water, gases or solutes (Khan, 1980). The scarcity of water available to the embryo due to impervious seed coats is no doubt an important aspect of dormancy (Agbool and Etejere, 1991). Some varieties given to farmers show poor performance in terms of germinability. This is despite the fact that they germinated in the laboratory though in a slow rate. This is likely due to the fact that some seeds might have lost their vigour and viability during storage. Some seed may also not have completed their overripening period after previous harvest (Akinola, 1980).

In the absence of all these factors the bad planting practices especially where seeds are buried too deep into the soil may be a contributing factor for their poor germiniability on the farm. However the use of viable seeds from recommended varieties such as those of Sam Soy-2, TGX 563-02D and TGX 849-313D is advised. More research work on the storability of the soybean seed is also advised.

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HIGH YIELDING FODDER GRASS SUITABLE FOR NORTH WESTERN ZONE OF TAMILNADU

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ABSTRACT

Production potential of nine perennial fodder grass entries was evaluated at the Tamil Nadu Agricultural University, Regional Research Station, Paiyur during 1984-87. The cumbu napier hybrid grass Co 1, produced higher green fodder yield (250 t ha^{-1} $year^{-1}$), exhibited a greater leaf to stem ratio (0.86) and high protein yield (8.41 t ha^{-1}) under irrigated condition.

KEY WORDS : Fodder grass, Yield, Protein, Economics

Maintenance of dairy cattle is an important north western zone of Tamil Nadu. Presently,

Table 1. Growth and yield attributes of fodder grasses (Mean of three years)

Grass variety	Plant height (cm)	Leaves clump^{-1}	Tillers clump^{-1}	Leaf stem ratio
Giant Napier	258.2	119.5	18.5	0.34
NB-21	236.2	200.0	19.4	0.52
BN 2	208.9	316.9	24.1	0.69
Co 1	214.9	335.8	21.4	0.86
GG 2	162.1	243.3	29.3	0.62
GG 3	158.3	225.7	34.0	0.61
Hamil	154.4	198.3	44.9	0.63
CBE local	133.6	239.3	41.2	0.61
Water grass	123.9	253.3	34.4	0.51
SEd	7.34	7.11	1.19	-
CD (P=0.05)	22.01	21.32	3.57	-

source of fodder. With the increase in the high yielding cross bred animals, there is an urgent need to produce large quantity of green fodder of high nutritional value to sustain the yield potential of these animals. The identification of a high yielding green fodder grass variety suitable for the tract is thus very essential.

Earlier studies at coimbatore indicated a high yield potential of 310 t ha^{-1} of green fodder from napier grass in an year (Mani and Kothandaraman, 1981; Vijendra Das, 1994). While guinea grass yielded about 226 t ha^{-1} fresh herbage per year (Narayanan and Dadabghao, 1972; Paramathma *et al.*, 1994). The present study was conducted to evaluate the productivity of different cumbu-napier hybrids and guinea grass varieties with irrigation under the agroclimatic conditions of north western zone of Tamil Nadu.

MATERIALS AND METHODS

The north western zone of Tamil Nadu is situated at 11° north latitude and 77° east longitude with a mean annual rainfall of 825 mm distributed in 47 rainy days. The soil type is red non-calcarious with sandy loam nature having low available nitrogen and medium available phosphorus and potassium. Nine entries of perennial grasses *viz* NB-21, BN-2, Co1, Giant Napier, GG 2, GG 3, Hamil, CBE local and water grass were compared at the Tamil Nadu Agricultural University, Regional Research Station, Paiyur, in randomised blocks design replicated thrice. The grass slips were planted in October 1984 immediately after first wetting with a spacing of 50 x 50 cm for cumbu napier hybrids and 50 x 30 cm for *panicum* grasses. Life irrigation was given third day after planting and subsequent irrigations at 10 days interval depending upon the rainfall. First cutting was made 60 days after planting and subsequent cuttings at an interval of 45-50 days for a period of three years. On an average, seven cuttings per year were taken. The fertilizers dose of 50-50-40 kg NPK ha^{-1} was

Table 2. Green and dry fodder, protein yields and economics of grass cultivation (Mean of three years)

Grass variety	Green fodder yield (t ha^{-1} year^{-1})	Dry foddr yield (t ha^{-1} year^{-1})	Protein yield (t ha^{-1} year^{-1})	Cost of cultivation (Rs. ha^{-1} year^{-1})	Net return (Rs. ha^{-1} year^{-1})	Cost benefit ratio
Giant Napier	236.0	44.5	4.47	8020	21,480	1:3.68
NB-21	236.6	42.1	4.54	8020	21,555	1:3.18
BN 2	204.4	37.6	3.86	8020	17,530	1:2.68
Co 1	250.0	47.3	8.41	8020	23,230	1:3.90
GG 2	164.4	38.9	4.54	6898	13,652	1:2.47
GG 3	178.9	42.0	4.50	6898	15,465	1:2.73
Hamil	163.4	34.9	3.57	6898	13,527	1:2.38
CBE local	169.9	36.5	3.96	6898	14,340	1:2.57
Water grass	138.9	26.2	2.36	6898	10,465	1:2.09
SEd	12.81	2.72	0.40	-	-	-

applied basally and additional 100 kg N ha^{-1} after each cutting at the time of earthing up. Observations on plant height, tillers per clump, leaf- stem ratio, green fodder, dry fodder and protein yields were recorded at each cutting.

RESULTS AND DISCUSSION

The data on growth and yield attributes, green and dry fodder and protein yields and economics are furnished in Tables 1 and 2.

Growth and yield attributes

The growth and yield attributes of forage grasses differed significantly among the different varieties (Table 1). Giant napier and NB-21 were taller than other varieties of grasses while more number of leaves were produced by Co 1 cumbu napier hybrid, followed by BN 2. Hamil and CBE local, guinea grass types produced more tillers than other grass varieties. The cumbu napier hybrid Co1 recorded a high leaf-stem ratio of 0.86, which would favour better palatability by animals. Similarly, better growth and yield attributes were observed with Napier-bajra hybrid grass by Gupta *et al.* (1974), Barevadia *et al.* (1976), Shanmuga sundaram (1985a) and Sivasamy *et al.* (1994) under irrigated conditions.

Yields of green and dry fodder and protein

The green fodder yield in seven cuttings per year was the highest with an average of 250 t ha^{-1} (dry fodder yield of 47.3 t ha^{-1}) for Co 1 cumbu napier hybrid followed by NB-21 and giant napier grasses (Table 2). High leafy portions recorded with Co 1 cumbu napier hybrid grass might have contributed to high green fodder yield. Similar findings were made earlier by Natarajan (1976), Muldoon and Pearson (1977), Shanmugasundaram (1985b) and Sivasamy *et al* (1994) with hybrid fodder grasses. High protein yield of 8.4 t ha^{-1} was also recorded by Co 1 cumbu napier hybrid. Whereas, the crude protein yield from NB-21 and Giant Napier was only 50 per cent as that of Co 1 grass which was more a reflection of its protein content rather than its green fodder yield.

Economics

The analysis of costs and returns of cultivation 2) revealed that Co 1 grass gave net return of Rs. 23,230 ha^{-1} in an year with a cost-benefit ratio of 1:3.90 followed by giant napier and NB-21 with 1:3.68 and 1:3.18, respectively.

The results of the three-year study indicated that cumbu napier hybrid Co 1 could be profitably raised under irrigated conditions in north western zone of Tamil nadu to achieve a green fooder yield level of 250 t ha^{-1} $year^{-1}$ with greater palatability and high protein content.

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