the physiological status of the host on disease development. This knowledge will be of value in developing improved pastures of plants with enough genetic diversity to reduce the risk of heavy losses due to plant diseases.

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TECHNICAL NOTE

A GENETIC BASIS FOR MALE STERILITY IN KIKUYU GRASS

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ABSTRACT

Evidence from controlled crosses suggests that male sterility in kikuyu grass (associated with non-exsertion of stamens) is controlled by a single dominant gene, with fertility (exsertion of stamens) being recessive. Genetic dominance of male sterility influences the spread of kikuyu grass and the ways in which the genetic merit of indigenous pastures can be upgraded.

INTRODUCTION

Plants of kikuyu grass (*Pennisetum clandestinum* Hochst. ex Chiov.) which do not exsert stamens are male sterile. The morphological processes have been well documented (Stapf 1921; Edwards 1937; Parker 1941; Narayan 1955; Carr and Eng Kok Ng 1956; Madhava Rao and Ramalingam 1964; Piggot and Morgan 1983). Information about the physiology and genetics of male sterility is limited. Narayan (1955), from a few relatively uncontrolled crosses, suggested that male sterility was a recessive condition, although Carr and Eng Kok Ng (1956) disputed this conclusion. Our work attempted to clarify the inheritance of male sterility because the subject is relevant when considering the spread of kikuyu grass, and the methods of plant breeding and improvement of indigenous kikuyu grass pastures.

MATERIALS AND METHODS

During the summer of 1983–84, clonal propagants of 3 male steriles (codenamed "Dargaville–MS", "Gisborne–MS", "Kaikohe–MS") in pots were grown alongside plants of a local male fertile strain in a greenhouse. There were other fertile strains in the same greenhouse which cannot be ruled out as sources of pollen. Seed from the 3 male steriles was collected in March 1984, germination tested (90% or better), and 62 seedlings from each were randomly selected and grown in pots, 32 inside a greenhouse and 30 outside. Seed from the pollinating plants was also collected and 16 plants grown as a check (outside). During spring to autumn of 1984–85 plants were observed, generally daily, for the presence of stamens under stimulatory trimming to 40 mm (Carr and Eng Kok Ng 1956), mild moisture stress, and, for the greenhouse, high daily temperatures.

RESULTS AND DISCUSSION

Stigmas appeared from late September 1984 and stamen exsertion from mid October. From the observation of stamen exsertion (Table 1), the ratio of male sterile:male fertile plants was 50% (± 4% SE). The 16 check plants grown from the pollinating parents were all fertile.

TABLE 1

The numbers of male sterile or male fertile offspring from 3 male sterile parents

Male sterile Parent	Glasshouse		Outside	
	Male fertile	Male sterile	Male fertile	Male sterile
"Dargaville–MS"	18	14	13	17
"Gisborne–MS"	17	15	15	15
"Kaikohe–MS"	15	17	14	16

The inferences from this test cross are that exsertion of stamens is controlled by a single recessive gene and is expressed by the homozygous condition. The conclusion, that male sterility is dominant, contradicts Narayan (1955), although we consider that our methods and number of experimental plants (168 vs 7) were superior. Our work verifies the view of Carr and Eng Kok Ng (1956) that male sterility exists as a heterozygous condition.

The genetic dominance of male sterility has agricultural implications in regions (such as Northland, New Zealand) where the initial introduction of kikuyu grass was predominantly male sterile material, propagated and spread vegetatively by farmers. The presence of male sterile plants in a population or a paddock does not signify an absence of fertile plants or of seed. Control of vegetative spread will not avoid the spread of kikuyu grass from male sterile populations if a source of pollen is available, since seed dispersal can occur. Conversely, the presence of seed does not indicate the sole presence of male fertile plants. The breeding of improved male sterile genotypes is simplified by the dominance of male sterility. Indigenous pastures of male sterile plants could be improved by natural reseeding, by introducing male fertile plants of improved genotypes as a source of pollen.

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TECHNICAL NOTE

A METHOD FOR ENHANCING ESTABLISHMENT OF *LEUCAENA LEUCOCEPHALA* (LAM.) DE WIT IN INFERTILE ACID SOILS

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ABSTRACT

The effect of soil cores as a means for enhancing establishment of Leucaena leucocephala *(Lam.) de Wit in an infertile acid soil was examined in a glasshouse trial. Treatments were small cores of black earth soil or peat implanted in a larger pot of podzolic soil. Growth was compared to black earth and podzolic controls. Destructive harvests were made at 2 week intervals over 12 weeks. The black earth core and peat core treatments gave significantly better top and root yields than when seed was sown directly into the podzolic soil. Improved growth was attributed to nodulation which occurred only in the black earth and peat mediums. It was concluded that transplanting leucaena seedlings in cores of medium favouring nodulation will enhance establishment in acid soils.*

INTRODUCTION

Leucaena leucocephala (Lam.) de Wit is a versatile tropical legume that has demonstrated potential as a forage shrub or tree in tropical and sub-tropical Australia. A major factor limiting its widespread use in Australia is its slow growth during establishment in infertile, acid soils (Hutton and Andrew 1978; Lesleighter 1985). This has been related to acid soil factors such as high soil solution aluminium and manganese levels (Hutton and Andrew 1978) which may limit leucaena growth directly or indirectly through deleterious effects on nodulation and nitrogen fixation (Ruaysoongnern *et al.* 1984).

Establishment of leucaena seedlings in pots of limed soil planted in acid soil was suggested by Olvera *et al.* (1982) as a means of enhancing establishment. Surface liming was thought to increase root penetration into acid soils.

This study examines the possible enhancement of growth and nodulation of seedlings grown in small cores of favourable media implanted into an infertile acid soil.

MATERIALS AND METHODS

Environment

The experiment was conducted in an unshaded glasshouse at St. Lucia, Brisbane (Lat. 27°28′) during summer (December 1983–March 1984). The mean weekly maximum and minimum temperature ranges were 34.1–29.3°C and 22.1–19.6°C respectively.