Classification of the Australian collection of Macrotyloma

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The legume genus Macrotyloma contains 24 species, all originating from Africa and Asia (1). Over the past twenty years many accessions of Macrotyloma have been introduced into Australia in the belief that the genus may provide useful pasture plants. The genus contains the commercially released cultivars M. axillare cv. Archer and M. uniflorum cv. Leichhardt. The description and classification of the Australian collection of Macrotyloma is a necessary precursor to the effective field evaluation of the genus.

Methods

One hundred accessions of Macrotyloma were grown in, and adjacent to, a glasshouse at Toowoomba (27o35'S) in two experiments between November 1983 and November 1984. The objective was to describe the collection on the basis of morphologic and agronomic attributes, and examine the affinities between accessions and between accessions and provenance. Twenty-five morphologic measurements were made on leaf, stem, flower, seed and pod characteristics. Eleven agronomic attributes were measured including seedling vigour, height of the cotyledonary node, estimates of dry matter production, leafiness, phenology and perenniality. The poorly represented species, M. densiflorum, M. ellipticum and M. maraguense needed no classification. The domesticated M. uniflorum was classified intuitively into four groups, on the basis of leaf shape and maturity. The well represented wild species; M. axillare, M. africanum and M. daltonii were classified numerically using hierarchical, ordination and graph-theoretic techniques.

Results and discussion

The 53 accessions included in the numerical classification agglomerated in seven morphologic/agronomic (M/A) groups. Days to first flower and days to first mature pod were each negatively correlated with latitude and positively correlated with the mean minimum temperature of the coldest month in the dry season at the site of origin in the annual species, M. daltonii and M. africanum. M. daltonii separated into two groups on the basis of the length of the calyx relative to the flower, bracteole length and phenology. The large number of morphologic characters included in the classification tended to mask real agronomic differences between accessions of M. africanum where all accessions were maintained in the one group. The perennial, M. axillare, separated into four groups largely on the basis of pod length, height of the cotyledonary node, dry matter production and pod hair length and density. The perennial groups appeared generally to originate from environments with higher rainfall and longer growing seasons than the annual groups.

The intuitive and numerical classifications have been successfully used as a tool to select representative accessions of this genus for field testing as pasture plants.

1. Verdcourt, B. 1970. Kew Bull. 24 379-447.