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SOUTHERN AFRICAN RANGELAND PLANTS IN SEMI-ARID QUEENSLAND

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The best grazing plants are those adapted to local soils and climate and which evolved under regular grazing by similar animals. Pastoralists in Australia have searched the world for 'better' pasture species. In higher rainfall areas, many exotic grazing plants were beneficial, e.g. ryegrass, green panic, white clover and lucerne. In drier rangelands, co-evolution with animals has proven less critical than soil and climate adaptation.

A plant introduction programme centred on Charleville in south west Queensland was financed by the Australian Wool Corporation from 1966 to 1983. The climate is semi-arid (MAR 350-500mm) with a slight summer rainfall dominance but aseasonal distribution of effective rains for pasture growth. Radiation frosts are common in winter. Four major soil types are found: (i) infertile red earths (mulga country); (ii) infertile acid sands (spinifex desert); (iii) fertile grey vertisols (Mitchell grass downs); (iv) hard setting solodics (Eucalypt woodlands).

In all, 204 exotic species were tested against 60 native species. The majority were grasses and legumes but some chenopods, shrubs and forbs were tested. Grasses were the most promising group, the best accessions almost all coming from southern Africa. The most successful legumes were *Stylosanthes* species. The exotics grew best on acid red earths but none regenerated as well as the native *Thyridolepis* (mulga mitchell grasses). The native *Astrebla* (mitchell grasses) matched buffel grass (*Cenchrus ciliaris)* on the alkaline grey vertisols.

Southern African plants are better adapted climatically than North American ones. Growth of the latter, e.g., *Andropogon hallii, Bouteloua* spp., is closely synchronised to daylength not moisture. Hence they flower and go dormant at the same time each year, irrespective of soil moisture availability. Most African and Australian rangeland plants respond well to moisture all year except mid-winter, e.g. *C. ciliaris, Eragrostis curvula, Dichanthium sericeum, Monachather paradoxa.* Most African annuals tested had weak seed dormancy and were disadvantaged by the unreliable break of summer rains, e.g., *Dactyloctenium giganteum.*

The best source of material has been the Kalahari sands. *Anthephora pubescens* and *Schmidtia pappophoroides* grew well but *Anthephora* is too palatable while *Schmidtia* does not hold its dominance in a pasture long enough. *Eragrostis curvula* does not require phosphate fertilizer for establishment but it lacks adequate drought tolerance and some strains are potential weeds in wetter climates. *Digitaria milanjiana, D. smutsii* and *Panicum stapfianum* all show promise but need wider testing. Native mulga (*Acacia aneura)* was the best spineless shrub on acid red earths. On saline soils the native *Atriplex nummularia* outlasted saltbushes from overseas.

None of the plants evaluated have yet displaced the commercial Australian Buffel cultivars Biloela and Gayndah for yield potential and none are as persistent under grazing on infertile soils as native species.