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Domestication of mediterranean annual pasture legumes for Australian farming systems

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Introduction Since 1996, scientists in southern Australia have released cultivars of eleven new annual pasture legume species to agriculture, with four new species currently under consideration for release (Nichols et al. 2007). This paper outlines the processes involved in their domestication .

Processes involved in domestication of new species The methodology used in the germplasm acquisition, selection and cultivar release processes are summarised in Figure 1. Agronomic trials to optimise grazing management practices and seed production and to refine areas of adaptation are also required post-release.

Identification of agronomic need or potential opportunity (new agro-ecological niches or new farming systems)
+
Germplasm acquisition (from Genetic Resource Centres or targeted collection expeditions to Centres of Origin)
+
Genotype characterisation (measurement of important agronomic characters at a central location , 1-2 years)
+
Short-listing of species with desirable characters (eg.growth habit, pod and seed characteristics)
+
Nursery trials of short-listed species (1-2 genotypes or bulks of 2-5 representative genotypes , limited locations , small plots , 2-3 replicates , 2-3 years duration)
Selection of best adapted species for production , persistence and commercial potential \clubsuit
Field evaluation of elite genotypes of the best species , in comparison with best existing pasture option (5-20 genotypes , multi-location trials in target environments under intended management system , 3-5 replicates , measurement of biomass production , persistence and seed production over 3-4 years duration)
+
Cultivar release decision (determination of whether the best genotype(s) of the new species should be commercialised)
+
Duty of care trials (quantification of any known or likely anti-nutritional or toxic chemicals in the species , conduct of grazing trials to confirm safety to grazing animals and weed risk assessment studies , 1-3 years duration (Revell and Revell 2007))
↓
Cultivar release (production and release of breeder's seed to industry , pending satisfactory Duty of care trial outcomes)

Figure 1 Steps involved in the domestication of new annual pasture legume species .

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