

# Old evaluation trials delivering a legacy of new persistent legume varieties

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## Introduction

Finding legume varieties that are persistent and productive in the long-term for the Brigalow Belt climatic zone has been challenging. Graziers advise that most of the legume cultivars that were previously released for use in the Brigalow Belt were not persistent with competitive sown Buffel grass (*Cenchrus ciliaris*) pastures typical in the region. The highest priority trait for new legume varieties identified by graziers is long-term persistence described as >20 to 50 years; however, research funding cycles are typically 3 to 5 years, which means that long-term persistence cannot be directly measured before legume accessions are selected for release as new cultivars. This paper describes using a network of old pasture evaluation trials sites to identify legume species, cultivars and experimental accessions that have persisted and are productive in the long-term.

## Methods

Forty-eight old pasture evaluation trials located across the Brigalow Belt bioregion were inspected. Re-visiting and describing the trial sites relied on multiple retired pasture scientists that had established the trials. The average age of the trial sites at the time of inspection was 18 years post sowing.

The old trial sites were initially inspected to describe long-term persistence of commercially available legume varieties; however, these sites also enabled the identification of non-released accessions for further evaluation and potential release as new cultivars. Legumes re-collected from these trials have been evaluated in new research programs, with some lines identified for release as new persistent and productive varieties.

## Results

Some commercially available legume varieties persisted across broad geographical areas of the Brigalow Belt; however other legumes commonly recommended to graziers were not widely persistent. Five new stylos have been identified for release as new varieties with 40-70% higher yield and better persistence on light textured soils in frosty locations. Two additional stylo and two *Desmanthus* accessions have been identified for further evaluation. These accessions recorded two to four times higher yields than commercially available varieties in a limited number of trial locations.

## Discussion and conclusion

More widespread and successful adoption of legumes is critical to sustainably improving the productivity and returns for grazing industries in the Brigalow Belt climate zone that carries 30% of Northern Australia's beef herd. The network of old pasture evaluation trials across southern and central Queensland provided valuable insights about the long-term performance of commercially available legume cultivars and identified better-performing legume accessions for potential release as new varieties.

Five new stylo varieties that were identified and re-collected from old trial sites have the potential to increase the geographic range suitable for sowing legumes in southern Queensland (i.e. previously there were no suitable legume varieties), as well as improving productivity for large areas where existing varieties are suited. Two additional shrubby stylo accessions were identified and are being evaluated as potential replacements for cv. Seca, which is the most widely used legume in Northern Australia. New research has commenced that has identified improved *Desmanthus* accessions, with further work potentially identifying other accessions with useful traits for industry.

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