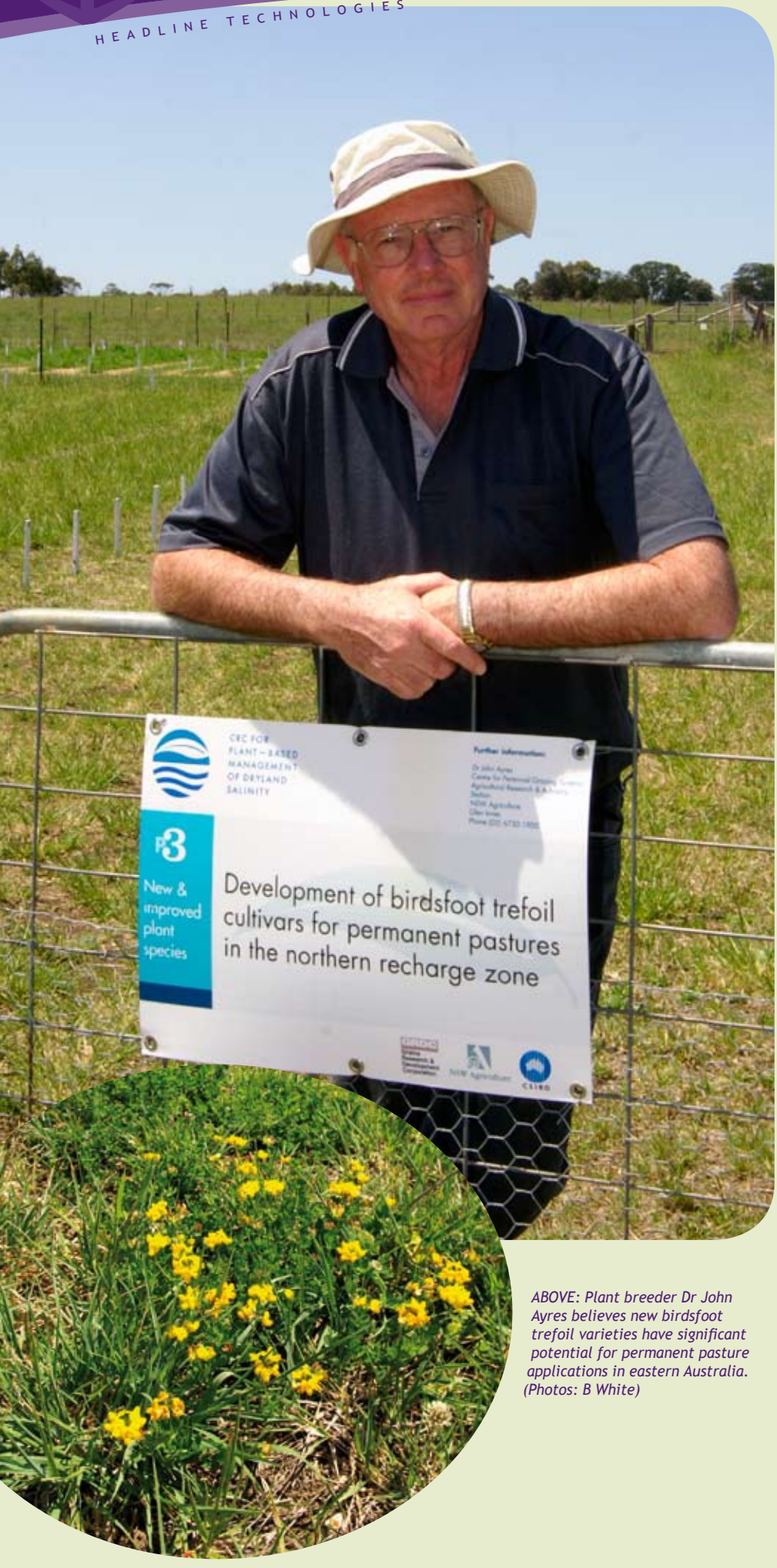


ABOVE: Plant breeder Dr John Ayres believes new birdsfoot trefoil varieties have significant potential for permanent pasture applications in eastern Australia. (Photos: B White)

The lure of *Lotus*

By Catriona Nicholls

As the development of locally-adapted birdsfoot trefoil (*Lotus corniculatus*) varieties reaches the commercialisation stage, NSW Department of Primary Industries plant breeder Dr John Ayres reflects on the journey so far.

"The potential use of birdsfoot trefoil in Australian pastures could be far reaching," Dr Ayres explained. "With the development of locally-adapted varieties, we now have the beginnings of a new and valuable pasture plant with major potential impacts for high-rainfall, permanent pasture applications."

"Birdsfoot trefoil is suitable for infertile acidic soils and is highly persistent, productive, drought tolerant and bloat-safe. In line with its extensive tap root system, birdsfoot trefoil can effectively mitigate dryland salinity through improving soil water use in recharge environments."

"Our research in NSW tablelands and slopes environments, from the Queensland border to the Victorian border, shows that birdsfoot trefoil has qualities that will see it become a mainstream perennial legume in many areas where we currently lack an adapted pasture legume."

Originally a white clover breeder, the lure of birdsfoot trefoil has come somewhat out of left-field for John. However, his experience with *Lotus* species from trials on farm sites across NSW, and progress with his breeding work (developing locally adapted birdsfoot trefoil varieties) has convinced him of its potential. He has been strongly supported in this work with the genetics expertise and prior breeding work of Dr Walter Kelman CSIRO, Plant Industry.

key points

- Birdsfoot trefoil shows significant potential as a perennial legume for permanent pastures in high rainfall regions
- Breeding has focussed on short daylength varieties that flower prolifcally for persistance
- New varieties are ready for commercialisation.

Meeting the challenges

On the world stage, there is nothing new about birdsfoot trefoil according to Dr Ayres. The prominence of this perennial legume in many other countries is well established, and its usage surpasses that of lucerne in countries that are ill-equipped to manage bloat — a serious hazard with lucerne. But until now, the availability of birdsfoot trefoil varieties suited to Australian conditions has proven to be elusive.

"Birdsfoot trefoil is typically a long-day plant," Dr Ayres explained, "it requires more than 14 hours of daylength leading up to flowering to set large amounts of seed, which is an essential pre-requisite of regeneration and hence persistence. However, daylength on the summer solstice in northern NSW is a little less than 14 hours.

The challenge of the breeding program has been to develop low latitude/short daylength varieties. Dr Ayres believes this will allow growers in the potential areas suitable for birdsfoot trefoil to rapidly adopt birdsfoot trefoil-based pastures following release of locally-adapted varieties. From CSIRO climatic modelling work, the target area for birdsfoot trefoil was suggested to be a large potential adaptation zone — comparable but larger than the white clover zone, which is some 8 million hectares in eastern Australia.

The journey

"During the 1990s, a state-wide project in NSW, funded by MLA, refined our understanding of the zone of adaptation of birdsfoot trefoil in NSW, and developed objectives for breeding," Dr Ayres said.

A subsequent project (1999-2002) funded by the NSW government *Acid Soil Action Program* evaluated and characterised world-sourced birdsfoot trefoil germplasm to identify lines that flower prolifically under short daylength conditions.

ABOVE: Birdsfoot trefoil is suitable for grazing under a mixed sward culture, is bloat-safe and has a potential feed value comparable with lucerne.

RIGHT: Seedling recruitment is the limitation of existing varieties and has been a focus of the breeding program.

"During this second phase, we found that although there were no varieties suited to low latitude regions in Australia, we did identify a small set of accessions (and a breeding line developed by Dr Walter Kelman) with strong flowering capability suitable for further breeding," Dr Ayres said.

Since the late 1990s, with funding support from GRDC and CRC Salinity, Dr Ayres has focused on the breeding program, and three varieties of birdsfoot trefoil are now on the brink of commercialisation.

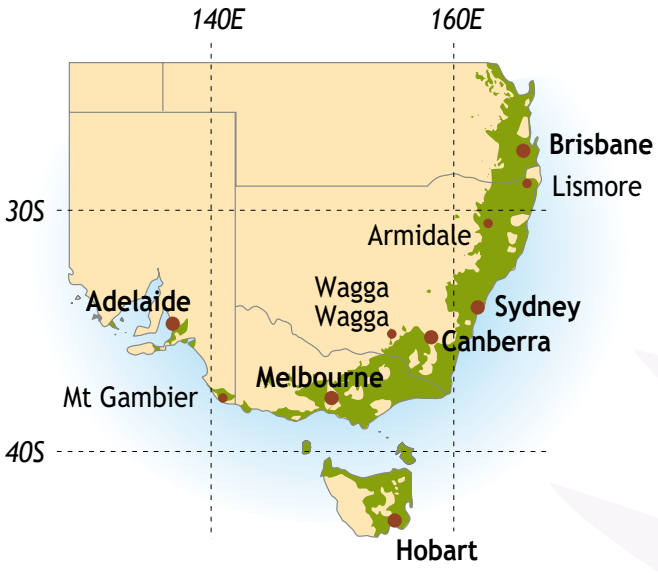
"We are currently in the process of seed multiplication, merit testing and working through PBR.

"The next step is to select a commercial partner to work on commercial release as soon as possible," Dr Ayres said.

More information

John Ayres, NSW DPI
T: (02) 6730 1930
E: john.ayres@dpi.nsw.gov.au

FIGURE 1 The potential area of adaption for birdsfoot trefoil



Snapshot

Birdsfoot trefoil is a small seeded, perennial pasture legume suitable for over-sowing into native grasses or planting with introduced pasture species.

Rainfall requirements:
650 — 1000 mm average annual rainfall.

Soil requirements:
Broadly adapted to acidic low fertility soils.

Benefits:
Persistent under grazing, suitable for problem soils and mitigating groundwater recharge, high feed value, bloat-safe, drought tolerant.