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Presenter Information

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Introduction

Tedera (*Bituminaria bituminosa* var. *albomarginata* and var. *crassiuscula*) is a traditional forage species used for centuries in the Canary Islands (Méndez and Fernández 1990), that has increasingly attracted interest from researchers in regions with Mediterranean-type climates from Spain, Italy, Israel, Greece, Portugal, Morocco, Turkey and Australia. In 2000, Australian pasture researchers started a large and systematic screening process that evaluated about 720 species of exotic and native legumes, grasses and herbs for adaptation and productivity in Mediterranean and temperate environments (Real *et al.* 2011). Tedera was one of the few novel perennial legumes to show potential for domestication (Real *et al.* 2008; Real *et al.* 2011). Now an international multidisciplinary team has come together to take tedera forward towards commercial adoption by farmers in Mediterranean-type environments.

This paper provides a technical update and discussion on all research aspects conducted by the tedera research team up to February 2013.

Breeding

Tedera is a self-pollinated plant and elite parents were selected in 2010/11, based on the best linear unbiased predictors of agronomic merit at the single plant level in the field following the methodology described by Real and Verbyla (2010). Elite plants were hand-crossed to combine the best attributes in the new cultivars. Hybrid F1 crosses were confirmed by the use of micro-satellite markers (Pazos-Navarro *et al.* 2011). The single seed descent breeding method is being utilized to progress generations up to F5, where they will undergo field evaluation before

final selection. A parallel program is also progressing elite parents after several generations of self-pollination.

Animal Health

There has been no report in the literature of any health issues in animals (cattle, goats or sheep) grazing tedera in its green or dry form. However, tedera is never the sole diet in its native environment; therefore, studies of feeding/ grazing fresh tedera as a sole diet have been undertaken. In an animal house study, six sheep fed fresh tedera exclusively for 34 days readily consumed the forage and remained in good health as evident by a standard set of blood chemistry parameters and visual observations (Oldham *et al.*, submitted to Animal Production Science, 2013). In another experiment 22 sheep were kept grazing continuously on a pure stand of green tedera for 21 days in autumn. Again there were no health problems (Oldham *et al.* submitted to Crop and Pasture Science, 2013). A replicated grazing experiment is planned to start in 2014, in which the health and performance of ewes and their lambs grazing pastures that include tedera will be followed over three years.

Animal production

The animal house experiment established that the *in vivo* digestibility (60%) of leaf and edible stem of fresh tedera was similar to lucerne chaff. In addition, the young sheep that grazed on a stand of pure green tedera gained liveweight (1.6 kg/hd) and 0.3 of a body condition score (0-5 rating scale) over 21 days. However, both of these experiments were short term and small scale. The replicated grazing experiment to start in 2014 will provide large plot animal and plant data for the first time in

Australia. These data will be used to confirm the production assumptions for tедера used in whole-farm economic modelling (Finlayson *et al.* 2012) that showed substantial improvements in farm profitability associated with tедера use.

Agronomy package

Every aspect of an agronomic package for tедера is new. The adaptation of tедера to a wide range of soils (*e.g.* pH_{water} 5 to 7) and climates (annual rainfall 300 to 600 mm) are being evaluated in regional trials that started in 2006. Herbicide tolerance trials have been conducted at pot and field levels since 2008. Trials to measure the general response to fertiliser are yet to start; however, preliminary data suggests that tедера exploits available phosphorus very efficiently (Pang *et al.* 2010).

Seed production

Research to ensure that a viable seed industry can be established, has been conducted since 2009 with glasshouse and field trials, including a comparison of conventional crop harvesting methodology involving swathing with a purpose built direct-heading harvester.

Rhizobiology

Specific rhizobium strains effective in nitrogen fixation were selected for tедера in 2006/7 (Yates *et al.* 2009). After several years of field evaluation, we are now studying rhizobium persistence in different soil types so that an appropriate inoculant can be produced commercially.

Conclusion

The domestication of tедера is being conducted by an international multidisciplinary team with the aim of releasing cultivars of tедера with characteristics that will see it widely adopted by the farming community in Mediterranean-type environments such as southern Australia.

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