

Participatory plant breeding in Uruguay

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Introduction The introduction of forage legumes into the native pastures of Uruguay is considered an environmentally safe method with which to increase the level of production through the addition of biologically fixed nitrogen. An integrated plant breeding programme was initiated at INIA (National Agricultural Research Institute), Uruguay, with the aim of developing forage legumes able to persist and produce in co-existence with the native (grass dominant) vegetation under cattle and sheep grazing. The programme was conducted in parallel with rhizobial strain selection. During 1998 to 2001 at Glencoe Research Station (32° 01'32''S lat; 57° 00' 39''W long), 326 temperate and subtropical forage legume species were evaluated in the basaltic region of Uruguay. This study provided a set of data with which the legume species could be ranked according to their performance (Real *et al.*, 2004) so that the best 10% could be selected for further evaluation and breeding. The best species according to objectively measured characters (i.e. forage and seed yield) could be very valuable to certain farming systems and farmers, but might be of little value for other farmers and their systems. A significant relationship between the farm decision making unit and the farming systems has been reported for this region (Ferreira, 1997). Participatory research has proved to be an effective way to include farmers' local knowledge in plant breeding programmes (Dusseldorp & Box, 1993). Therefore, to aid the conventional plant breeding approach, a farmer participatory breeding group was formed.

Materials and methods The 13.6 million ha. of native grasslands could be divided into several regions according to soils and climate. There are also different farming systems and farmers within regions, with different approaches to farming and decision-making schemes. One of the aims was to select a group, to include as many different farmers to represent the existing variability. The size of the group was restricted to 35 farmers, all of them being leaders in their communities. Three meetings per year (spring, autumn and winter) were conducted from 2001 to the present time, in which the farmers were able to score (1 to 5 and halves) the coded species in the field according to their perception of the value of the species. After the field work, a meeting was held to present the results of the previous meetings and to discuss the impressions from the field work.

Results The outcome of this participatory group has exceeded all the expectations that were considered at the start in 2001. The group has not only helped in the selection of the best 10% of the species, but also has remained as a working group for the next phase of the breeding programme in which the best 40 species were evaluated from 2002 to 2004. Moreover, the group, together with INIA scientists, has prioritised in autumn 2004 the best four species in which INIA will start their breeding programmes. In 1999, INIA initiated the breeding of the subtropical forage legume *Lotononis bainesii* Bak (*L. bainesii*), strongly prioritised by the group. The cultivar 'INIA Glencoe' was released in 2003 (Real & Altier, 2005). The first seed multiplication areas for this species were at INIA research stations and also on farms belonging to group members.

Conclusions The participatory plant breeding approach has helped to prioritise efforts and resources towards species that would be welcomed and needed by the farming community. Also, farmers feel part of the breeding process, having made a real input whilst understanding the long timeframe that usually is required. Therefore, the demand for the new species or cultivars will already exist even before the release. Participation will also improve the adoption process as appears to be the case with 'INIA Glencoe'.

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