

Plant breeding: *Lotus corniculatus* and *Lotus uliginosus*.

[MÓNICA REBUFFO*](#)

Instituto Nacional de Investigación Agropecuaria (INIA), INIA La Estanzuela, Colonia, Uruguay

* *Corresponding author*

Beef and dairy production are based on grazing systems in Uruguay. Natural grasslands dominated by grasses represent over 70% of the total grazing area (about 13 millions hectares), while agricultural areas are cultivated with legume pastures in rotation with cereal crops (1.2 millions hectares). *Lotus corniculatus* (birdsfoot trefoil), either pure or in mixtures, is the legume most extensively utilized, whereas the relevance of *Lotus uliginosus* (big trefoil) to improve forage production and quality of natural grasslands has sharply increased in recent years.

The main restriction for forage productivity in Uruguay is the lack of persistence of the legumes. Birdsfoot trefoil breeding program began in 1988. The objectives are the improvement of persistence and forage production, maintenance of seasonal forage distribution and seed production. San Gabriel is the most widely utilized cultivar in the country. Altier (1997) clearly pointed at the root rot complex (*Fusarium oxysporum*, *F. solani*, *Colletotrichum*, etc) as the main reason for the lack of persistency of this cultivar. The progress in persistence has been sustained throughout 4 cycles of recurrent selection performed under field conditions (Rebuffo and Altier, 1997). Dead plants in the third year dropped from 88% in Cycle 0 to 53% in Cycle 4. Breeding determined the increment in the tolerance to *F. oxysporum* (Altier *et al.*, 2000), in addition to the increment in crown size and in the proportion of plants with lateral roots. Cultivar INIA Draco, the outcome of Cycle 2, produces 15% more forage than San Gabriel (range from 5% up to 61 % increment in years with high incidence of root rot diseases). Additional strategies to improve persistency have been added to the objectives of the breeding program, such as the introgression of rhizome into the adapted germplasm.

The main restriction of big trefoil late flowering materials is the low seed production, due to the frequent water deficit during summer. The program has been working with diploid and tetraploid materials looking for the improvement of seed production. The breeding program started in 1983, with the introduction of a large collection of diploid accessions. The aim was to identify germplasm suitable for forage and seed production in the country. An early flowering experimental line is under evaluation at the present time. Its high seed production could build up the soil seed bank, and therefore facilitate reseeding in natural grasslands. The recent appearance of severe damages caused by *Uromyces* (rust) added another objective for this species (Ciliuti *et al.*, 2003). At the present time we are evaluating rust resistant lines for introgression into outstanding forage and seed production lines.

References

- ALTIER N. 1997. Enfermedades del *Lotus* en Uruguay. [*Lotus* diseases in Uruguay.] INIA, Montevideo, Uruguay. *Serie Técnica* **93**, 16 p. [In Spanish]
- ALTIER N., EHLKE N.J. and REBUFFO M. 2000. Divergent selection for resistance to *Fusarium* root rot in birdsfoot trefoil. *Crop Science* **40**, 670-675.
- CILIUTI J., ARRIVILLAGA S., GERMÁN S., STEWART S., REBUFFO M. and HERNÁNDEZ S. 2003. Studies of rust fungi on *Lotus subbiflorus* and *L. uliginosus*. *Lotus Newsletter*, **33**, 18-24.
- REBUFFO M. and ALTIER N. 1997. Breeding for persistence in *Lotus corniculatus* L. *Proceedings of The XVIII International Grassland Congress*, Canada. ID 1881.