Recent advances in *Stylosanthes* research in tropical America

B. GROF[1], C.D. FERNANDES[2] AND J.R. VERZIGNASSI[2]
[1] *11Aminga Court, Palmwoods, Queensland 4555, Australia, E-mail: bgrof@bigpond.com,*
[2] *Laboratório de Fitopatologia, EMBRAPA, Gado de Corte, CP154, Campo Grande MS, Brazil*

Introduction

The potential of neotropical savannas is very large for pasture-based livestock systems. There are 250 M ha of well drained lowland savannas in the American tropics. Over 200 M ha are situated in the Cerrados Region of Brazil. The Cerrados supports 42% of the national herd. Although these ranges support large populations of livestock, productivity is generally low. Poor nutritive value of native pastures and monospecific swards of *Brachiaria* spp. are the principal causes of this low productivity, especially in the dry season, when these grasslands often provide no more than 60% of the animal's maintenance requirements. The best option to increase pasture/livestock productivity is the use of improved pastures, particularly those based on adapted tropical legume-grass associations. Research in tropical America has concentrated on the evaluation and selection of *Stylosanthes* species adapted to infertile acid soils and resistant to anthracnose (*Colletotrichum gloeosporioides*). Anthracnose is considered the major limitation to the commercial use of *Stylosanthes* on a world-wide basis.

Materials and methods

Significant advances in cultivar development of three species (*S. capitata, S. macrocephala* and *S. guianensis)* were made during the 1990s at the National Beef Cattle Research Center (EMBRAPA Gado de Corte/CNPGC). There are about 45 good species of *Stylosanthes,* of which 25 are native to Brazil, mainly to the Cerrados agro-ecosystem. *Stylosanthes* spp. are adapted to acid-soil savannas and tolerate Mn toxicity and high Al saturation of the bases. In general, stylos have a low requirement for soil phosphorus. *Stylosanthes* cv. Campo Grande was officially released by EMBRAPA in Brazil in 2000. This variety is the hybrid-derived progeny of 11 accessions of Venezuelan *S. capitata* and six accessions of Brazilian origin. In order to maximise genetic diversity and obtain protection against anthracnose, seed of *S. macrocephala* was mixed with that of the composite hybrid population at the rate of 20% by weight of the total.

Results

The 'stacked' resistance genes of Brazilian and Venezuelan accessions compounded in cv. Campo Grande resulted in quantitative, multigene resistance to anthracnose. Studies conducted in the Colombian Llanos indicated 91.6% anthracnose susceptibility in native *Stylosanthes* var. *vulgaris* and 39.5% in var. *pauciflora* accessions (Miles and Lapointe 1992). Significant genetic progress has been achieved by the *Stylosanthes* selection program. Populations of *S. guianensis* var. *vulgaris* × var. *pauciflora,* selected for resistance in Colombia, succumbed to the disease in Brazil. Five cycles of recurrent selection and progeny testing of these selections in Brazil, SE Asia and Australia gave material with durable, quantitative, multigene resistance. Verzignassi (2001) recorded the response of 60 of these intervarietal hybrids of *S. guianensis* to 11 monosporic isolates of anthracnose. The 60 hybrids displayed 98.3% resistance to the disease. A highly significant aspect of the selection process for anthracnose-resistant *S. guianensis* is that it has been carried out in Brazil, the native habitat and probable centre of origin and diversity of the species, where extensive variability in virulence of the pathogen and specialised forms of the disease have been identified.

Conclusion

Disease resistance of selected lines of *Stylosanthes capitata, S. macrocephala* and *S. guianensis* was confirmed in vastly different agro-ecosystems, in tropical South and central America, SE Asia and Australia. Selections have been released in Thailand (M. Hare, personal communication, 2003), central and South America (R.S. Bradley and G. Sauma, personal communication, 2003) and Australia (B. Grof, unpublished data).

References

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