Potential biological control agents for *Nassella neesiana* (Poaceae) invading Australian native grasslands

F.E. Anderson[1], M.L. Díaz[1] and D.A. McLaren[2]
[1]CERZOS - UNS, Camino La Carrindanga Km 7, 8000, Bahía Blanca, Argentina, Email: anderson@criba.edu.ar, [2]DPI Frankston, CRC for Australian Weed Management, PO Box 48, Frankston 3199, Australia

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Introduction The introduction and proliferation of exotic stipoid grasses over the past 100 years seriously threatens agricultural productivity and the integrity of Australia's indigenous flora and fauna, particularly its grasslands (McLaren *et al*., 1998). The full effect on biodiversity by the spread of these grasses is unknown but likely to be major (Hocking, 1998). Conventional control techniques have not stopped the invasion adequately, so it is a priority to find control options to achieve an effective management strategy. A biological control project against *Nassella trichotoma* and *N. neesiana* was initiated in 1999 in Argentina. We report on the most recent findings on two pathogens, *Puccinia nassellae* and *Uromyces* cf *pencanus*, selected on the basis of previous results (Anderson *et al*., 2004), as potential biological control agents against *N. neesiana*, a South American species that can dominate both pasture and native grasslands in Australia.

Materials and methods *Puccinia nassellae,* Specificity tests: Six Australian accessions of *N. neesiana* (4 plants from each) were tested for their susceptibility to 3 different rust isolates. Inoculations were performed by spraying a suspension of urediniospores in water. Inoculated plants were kept in an environment cabinet (19-21ºC, 100% RH, 12 h photoperiod) for 2-3 weeks when plants were assessed for the presence of uredinia. *Uromyces* cf *pencanus,* Life cycle: Trials to germinate teliospores were performed following Evans (1987). Specificity tests: Inoculations used aqueous spore suspensions (for *N. neesiana*) or direct deposition of dry spores on leaves of the other species followed by incubation as described above. The species tested were: *N. neesiana* (7 Australian accessions*), N. trichotoma, N. tenuissima, Stipa brachychaeta* and *Poa ligularis* (one Argentinian accession of each).

Results Three Australian accessions of the weed were susceptible to one of the *P. nassellae* isolates. No infection was achieved with the others. This rust, studied since early stages of this project, has proved to be highly specific, as infection was achieved in most inoculation trials only when isolates and plants originated from the same site. This posed the problem of finding isolates that could infect the Australian accessions which need to be controlled. One such isolate has been found. Morphological characteristics of *U.* cf. *pencanus* uredinia and telia found in the field appear to coincide with those of *U. pencanus* (Greene & Cummins, 1958), but this rust is known to produce aecia on its grass host, and these have not been found to date. Teliospores did not produce basidiospores under any of the treatments, so it was not possible to study whether or not these infected *N. neesiana*, completing the life cycle on this host. This information is vital to assess the convenience of the rust as a biocontrol agent and to confirm its identity. All but one of the Australian accessions of *N. neesiana* were susceptible to this rust. None of the other species were infected, indicating an acceptable level of specificity at this stage.

Conclusion These findings are encouraging. They justify the continuation of investigations, which should now include further specificity testing against Australian native grasses.

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