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Seed protein variability and abiotic stress in naturalised Italian ryegrass (*Lolium multiflorum* Lam.)

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Abstract : Electrophoretic (SDS-PAGE) analysis of seed proteins was employed to reveal genetic variability in naturalized populations of *Lolium multiflorum* from unmanaged land in a region of the Province of Buenos Aires located in the Flooding Pampas of Argentina. The populations came from the following four site types, defined according to the species composition of the plant communities found at each: (i) a community designated 'loam' that was the least edaphologically and topographically limiting; (ii) 'half-loam' that presented intermediate limitations of drainage and alkalinity; (iii) 'alkaline lowland' that presented the most severe limits of alkalinity; and (iv) 'humid lowland' that only presented hydro-morphological limits. SDS-PAGE applied to samples obtained from each population revealed multiple banding patterns that could be divided into six electrophoretic zones, A to F. Individual bands were further sub-classified as follows: A1, A2, A3, B1, B2, B3, B4, B5, C1, C2, C3, C4, C5, D1, E1, E2 y F1. The banding patterns of each population sample were compared, once the minimum sample size required to represent the variability of the each population was derived by the Method of Pielou. In some comparisons, discrimination between populations could be made by observing only one band; for example, band C1 discriminated 'alkaline lowland' from 'humid lowland' and band C4 'half-loam' from 'alkaline lowland'. In other comparisons, it was necessary to observe several bands simultaneously. By this means, all the six pair-wise comparisons between the four populations provided sufficient information for discrimination to be made. If the divergence between populations is related to the conditions found at each topographical site, these populations may comprise a useful source of genetic variability for stress tolerance and might offer the potential for the development of new cultivars adapted to local conditions. We believe this to be the first report of the use of this methodology to characterise and distinguish natural populations of *L. multiflorum* found in different topographical positions in the grasslands of the region under study.

Key words : electrophoresis ; method of Pielou ; alkaline lowland ; humid lowland ; topographical position ; grassland

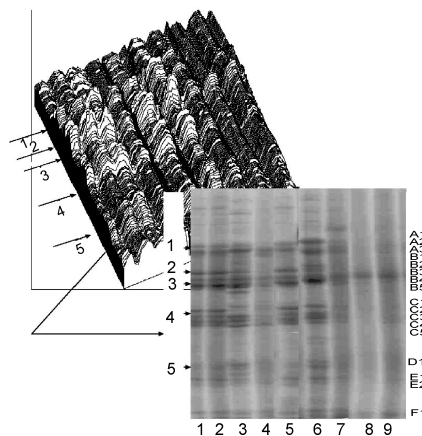


Figure 1 Example gel of observed protein profiles. Lanes 1-3 : standard cultivar Nui ; Lane 4 : half-loam ; Lanes 5-6 : loam ; Lanes 7-8 : alkaline lowland ; Lanes 9 : humid lowland . Arrows indicate the reference bands of cultivar Nui, originally designated in cultivar Dalita (ISTA, 1992), while the lines on the right hand side represent the range of bands covered by each denominated zone A to F (modified classification of Galussi et al., 1997). Included is a plot produced by the programme Scion Image, where each trace corresponds to a gel lane and shows the peak area and relative position of each band.

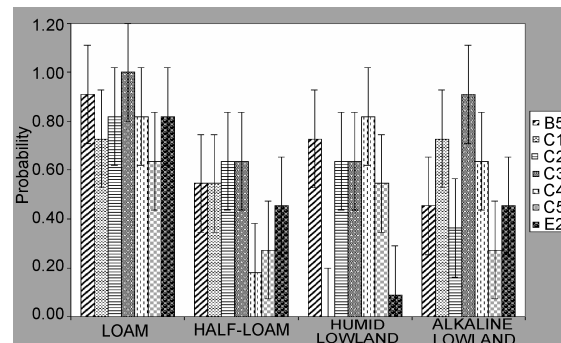


Figure 2 Frequency profile for the bands significant in differentiating populations from distinct topographical positions ($t < 0.5\%$).