

Cross-scale vegetation patterns of Flooding Pampa Grasslands.

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Summary

1 The spatial pattern of vegetation heterogeneity across different scales may indicate the major environmental controls on vegetation structure, and thus guide strategies for the conservation of biodiversity.

2 We analysed cross-scale vegetation patterns in a 90 000-km² area of natural grasslands in the Flooding Pampa, Argentina. We assessed the contribution of regional (latitudinal) and landscape (topographic) patterns of species turnover to overall heterogeneity using data from 749 censuses.

3 A large proportion of the variation in species composition across the entire region was observed at very fine spatial scales (0.1–10 km²), associated with subtle topographic features and soil salinity gradients. Latitudinal variation played a secondary role.

4 Species turnover among stands occupying different landscape positions at the same latitude was 50% greater than among inventories encompassing two degrees of latitude.

The fine-grain heterogeneity determined that an area of 10 km² was often sufficient to include 50% of all vascular plant species of the region.

5 Although a large proportion (nearly 70%) of the vascular flora was composed of rare (satellite) species that occurred in less than 10% of the samples, few core species (i.e. those occurring in more than 90% of the samples) were seen at any scale of analysis.

6 Latitude contributed most clearly to variation in species composition among the zonal communities located in well-drained soils where differences in relative cover of C3 and C4 grasses were seen. However, photosynthetic pathways still varied more along salinity or topographic gradients than across regions. A latitudinal pattern in abundance of the different *Poaceae* tribes was also consistent with their climatic classification.

7 Alpha diversity showed a threefold variation among different stands within a landscape: it increased from low topographic positions and high soil salinity to high topographic positions and low salinity. However, it was constant among surveys within the region.

8 Nearly 25% of the species were exotic, mostly European, whose invasion was promoted by livestock grazing. Compared with the native species, exotics were consistently enriched in annuals, particularly forbs, across latitude, and were less tightly associated with landscape heterogeneity than native species.

Key-words: alpha and beta diversity, core-satellite hypothesis, C3 and C4 grasses, exotics, heterogeneity, species–area relationship.