

Dynamics of *Leymus chinensis* and *Hierochloe glabra* in grassland plantings within the Songnen Plains of China

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Introduction Two grasses, *Leymus chinensis* and *Hierochloe glabra* are rhizomatous plants distributed broadly within the Songnen Plains of China (Yang *et al.*, 2006; Guo *et al.*, 2004). Because germination rate of seeds is less in *L. chinensis* than *H. glabra* there is a successional progression in plantings from *H. glabra* to *L. chinensis*. The capability of vegetative reproduction is stronger in *H. glabra* population than in *L. chinensis* population. Therefore *L. chinensis* is a late successional grass and *H. glabra* is an early successional grass. *H. glabra* usually forms many patches of dominant species in the planted grassland at early stage. *H. glabra* is then replaced by *L. chinensis* with successional progression occurring gradually. Eventually, *L. chinensis* would become the dominant species in the community. More complete understanding of the dynamics of populations of *L. chinensis* and *H. glabra* could provide an improved understanding for management of these reseeded grasslands.

Materials and methods The experiment was carried out at the Pasture Ecology Research Station of Northeast Normal University, Changling, Jilin province of China (44°45'N, 123°31'E). In the middle of May 2004, 15 mixed communities with different proportions of *L. chinensis* to *H. glabra* were sampled. Each sample area was 0.25 m × 0.25 m and the depth was 0.25 m. Numbers of tillers and buds were counted, the accumulated length of rhizomes was measured and the rhizomes were washed, dried and weighed. Thereafter the quantitative characters of each sample were changed from the sample area into unit area of 1 m × 1 m and statistic analysis was regarded, respectively (This is a confusing sentence-please rewrite).

Results The corresponding quantitative characters in two populations, as the number of tillers (NTLc), biomass of rhizomes (BRLc), accumulated length of rhizomes (LRLc) and the number of buds (NBLc) of *L. chinensis* increased, the number of tillers (NTHg), biomass of rhizomes (BRHg), accumulated length of rhizomes (LRHg) and the number of buds (NBHg) of *H. glabra* decreased with a pattern of the logarithm function, respectively (Figure 1). The correlation coefficients (r) between NRHg and NRLc, between BRHg and BRLc and between LRHg and LRLc were different ($P < 0.01$), NBHg and NBLc were different ($P < 0.05$) in successional development of the planted grassland.

Conclusions There was a significant negative correlation between NTHg and NTLc, between BRHg and BRLc, between LRHg and LRLc and between NBHg and NBLc in planted grassland. The quantitative characters of *H. glabra* population decreased gradually with increasing presence of *L. chinensis*. Because of their different biologic characteristics (*L. chinensis* is taller than *H. glabra* in tiller height) *L. chinensis* restrains the photosynthesis of *H. glabra* in the middle and late period of the growing season, which restricts the expansion of rhizomes and the biomass accumulation of rhizomes of *H. glabra*. Thus, bud generation of *H. glabra* was reduced. Although they are both rhizomatous grasses, *L. chinensis* replaces *H. glabra* and becomes the dominant species in these planted grasslands over time.

References

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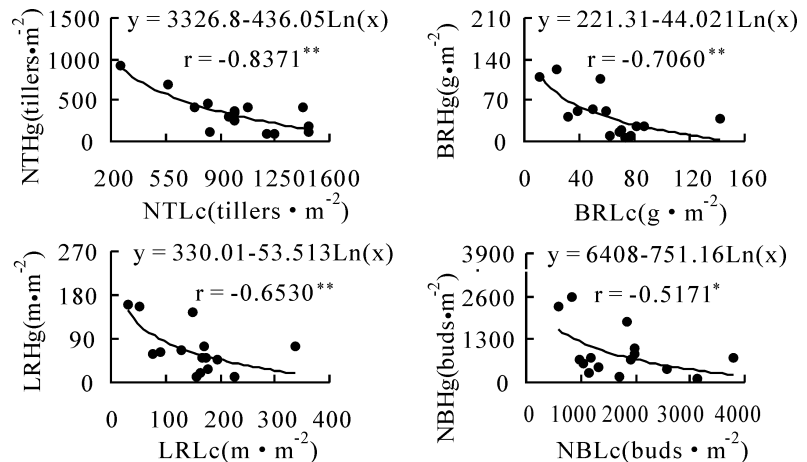


Figure 1 Observed data and simulated curves of the quantitative characters both *Hierochloe glabra* and *Leymus chinensis* in different series progress.