

# Analyzing effects of natural selection on populations of *Lolium perenne* L. and developing selection methods for the complex feature 'persistence'

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## Introduction

*Lolium perenne* L. (perennial ryegrass) is an out-crossing grass species of major agricultural importance and is cultivated in temperate regions world-wide.

## Project & Objectives

In a project on genotype persistence, initiated by the LfL, IPK is involved in the following objectives:

- Is there any genetic alteration in the genotypic composition of the above varieties in the period from sowing until the end of the second year of full yielding at the different trial sites?
- Which characteristics distinguish the superior genotypes?

## Material

- set of 19 forage and four lawn varieties, within the variety set: winter hard and less winter hard varieties
- five defined sites (Figure 1; sites 1-4 sown in 2004; site 5 sown in 2005):  
Detern (1), Lower Saxony; moor;  
Schmalenbeck (2), Lower Saxony; moor;  
Spitalhof (3), Bavaria; mountainous;  
Hötzelsdorf (4), Bavaria; mountainous;  
Malchow/Poel (5), Mecklenburg Western Pomerania; maritime.

## Current experiments

- detection of changes in SNP allele composition between original genotypes (seeds and genotypes in the field after four years (plants, cf. Fig. 2)
- starting material: two visually fittest varieties in trial locations vs. two least fit varieties, characterized via Pyrosequencing method of bulks (no. of bulks, cf. Fig. 3)
- based on the results: detailed analyses, aiming at selection of genotypes with increased persistence via AFLP method

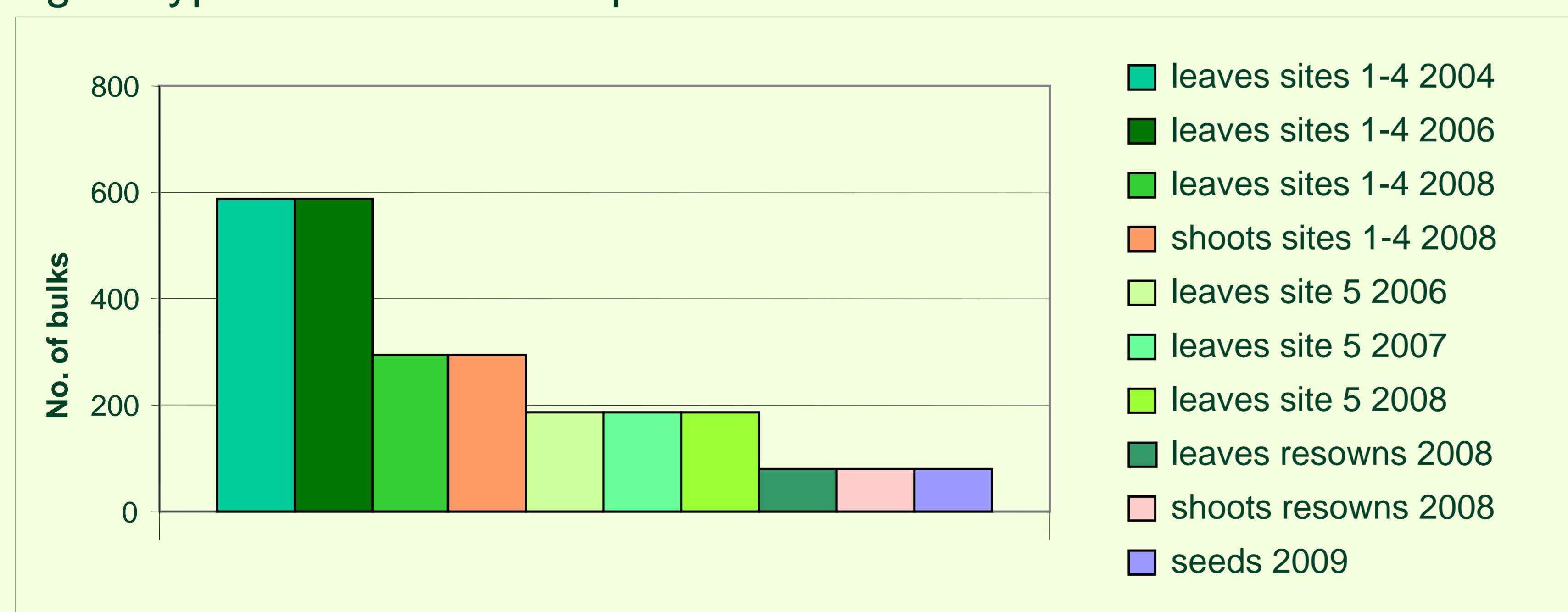


Figure 3: Chart showing the numbers of DNA bulks including 24 individuals per bulk and the material/location/year sampled.

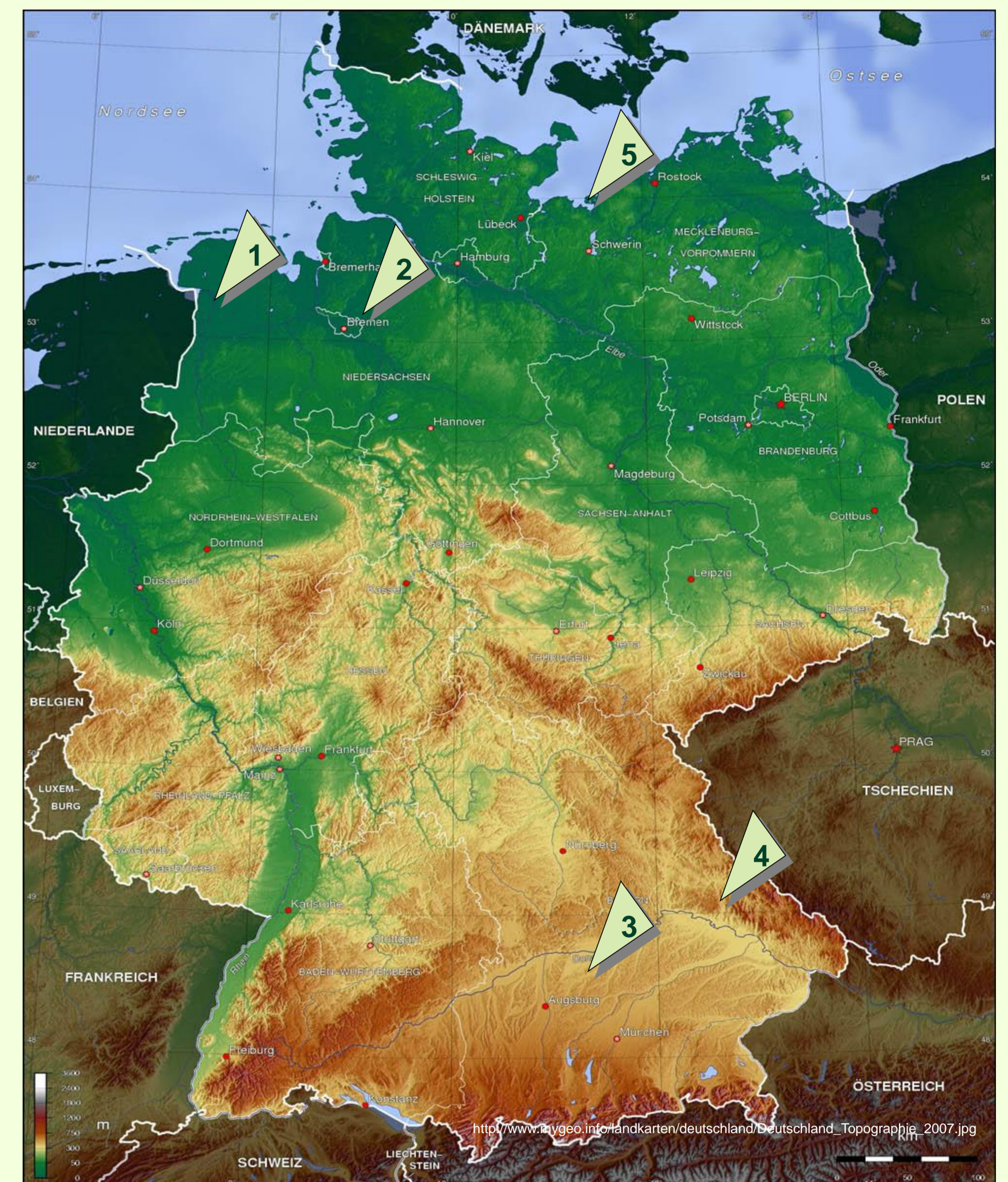


Figure 1: Map of Germany showing the five experimental sites (for numeration, cf. to 'Material').



Figure 2: Genotype mixtures and winter survival of variety 'Guru' from sites Hötzelsdorf (A; mountainous) and Schmalenbeck (B; moor) after four years of cultivation, with drastic changes being visible in material from Schmalenbeck.

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