

# AFLP analysis of changes in genetic diversity and population genetic structure in forage legume germplasm grown in contrasting environments

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The genetic diversity present in temperate agricultural grassland has been eroded over the last half-century. The original landraces and ecotypes of grassland species have been replaced by productive commercial varieties with a more restricted genetic base.

This loss of diversity could be detrimental in terms of the adaptive potential of grassland populations in a changing climate.

We analysed within- and between-population genetic diversity in a range of forage legume germplasm using AFLP markers and assessed whether cultivation of this germplasm in contrasting sites over a number of years has resulted in changes in diversity.



## Populations

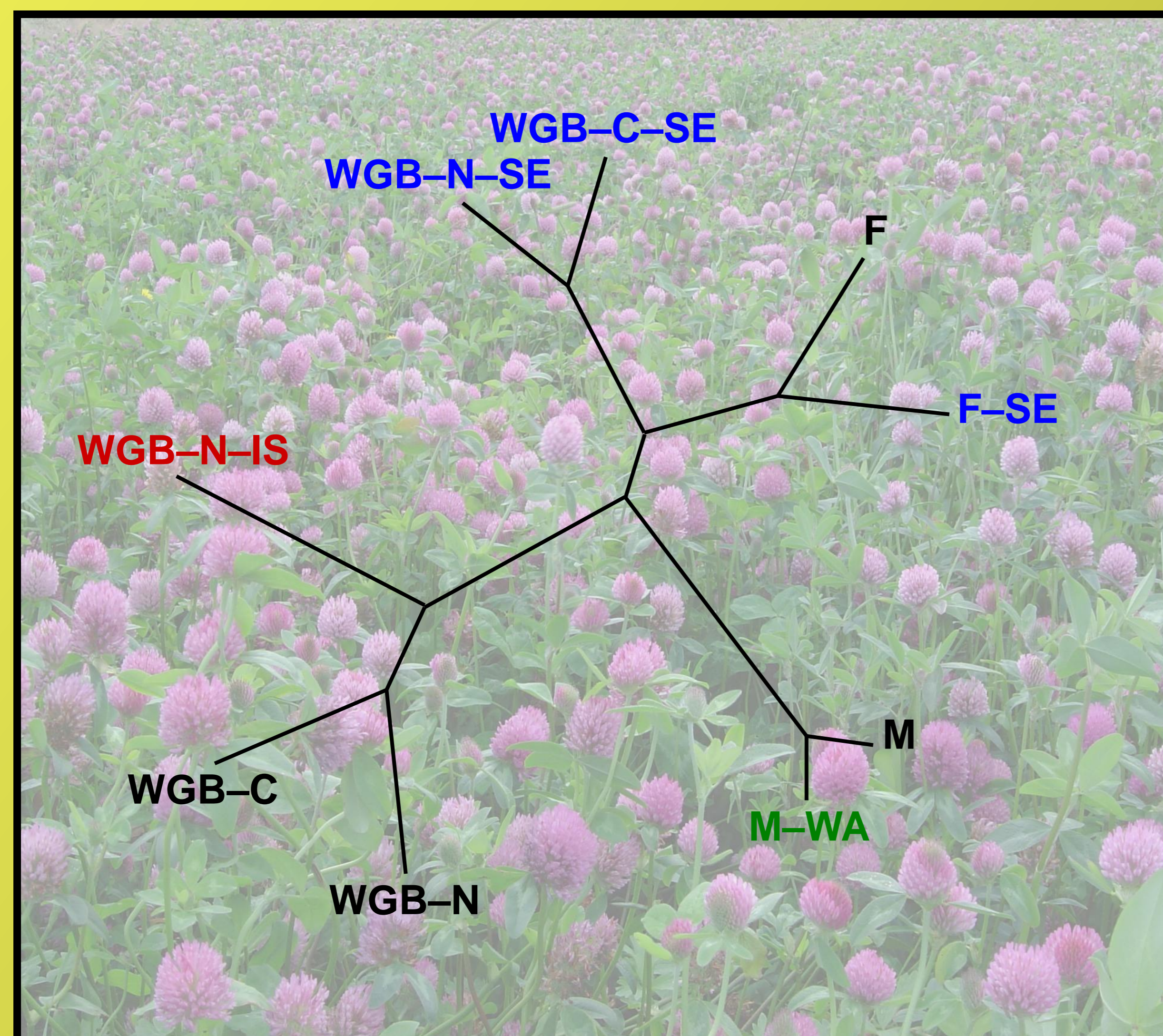
1. Single varieties of red clover: Fanny (F) and Merviot (M).
2. Single varieties of white clover: Ramona (R) and Norstar (N).
3. Wide genetic base composites for both species: Northern European origin (WGB-N) and Central European origin (WGB-C).
4. Survivor populations of 1-3 after natural selection for three to four years in Iceland (IS), Sweden (SE), Wales (WA).
5. Wild white clover ecotype from Iceland (W-IS).

## Percentage of total molecular variation among and between populations

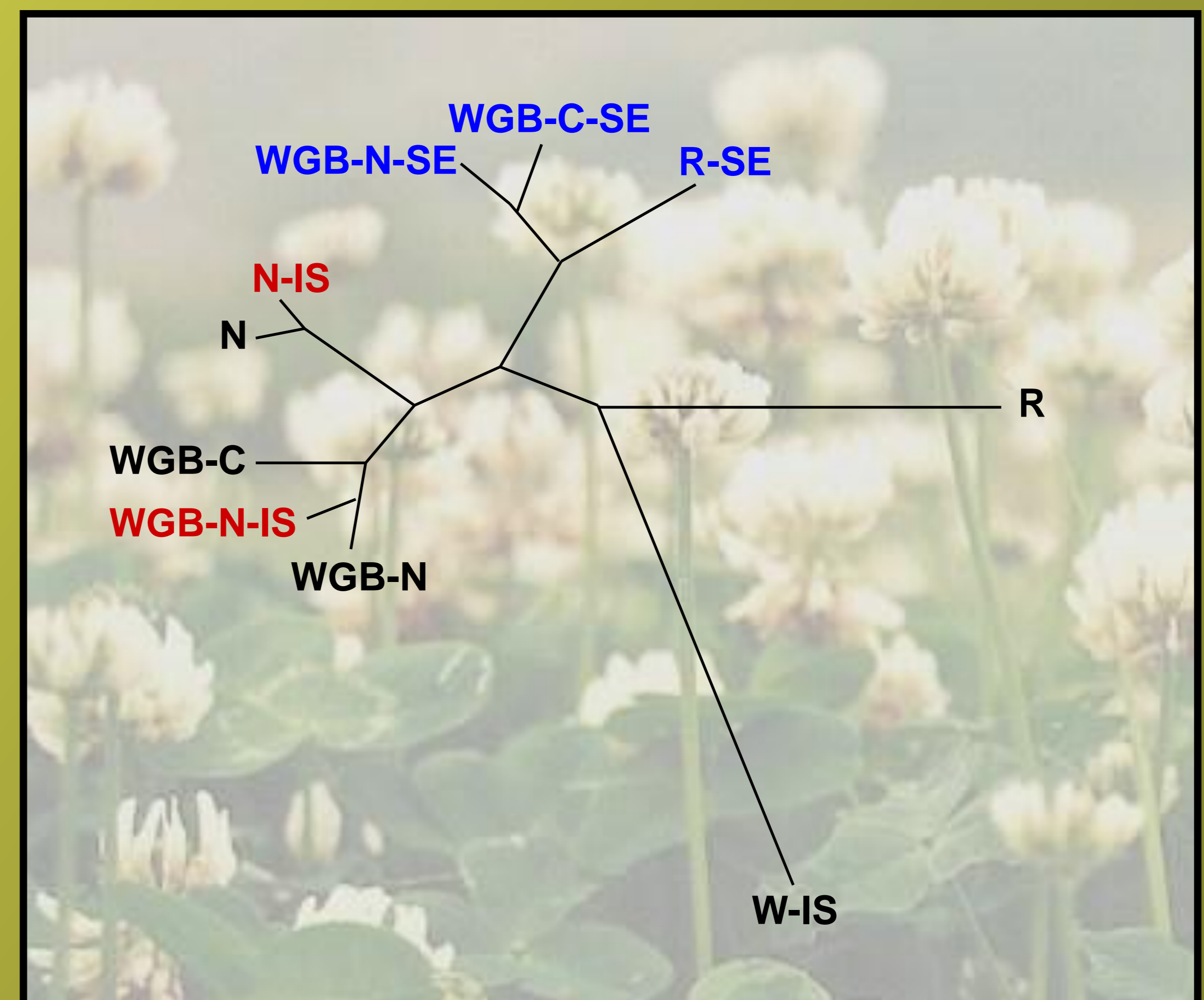
Species	No. of populations	Among populations	Within populations
Red clover	9	8	92
White clover	10	14	85

## Genetic differentiation between populations

Red clover



White clover



## Important results

Genetic diversity was reduced in some survivor populations compared to the originals.

The wild white clover population sampled in Iceland showed the lowest level of genetic diversity.

The composite populations did not exhibit greater genetic diversity than single varieties.

Genetic differentiation between populations was low in both species.

Clear evidence of population shift occurred in Sweden. This site showed the greatest annual amplitude in temperature during the experiment and was also the driest. One or both of these factors may have exerted strong selective pressure on the populations grown there.