Our data reveal a strong correlation between genetic and epigenetic variation and suggest genetic variation as driving force of most epigenetic variation. This pattern was consistently observed across different plant species. These results suggest that, in perennial grassland species, selection of genetic variation underlies the rapid emergence of monoculture and mixture types.

Evidence for Rapid Evolution in Grasslands

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In long-term grassland biodiversity experiments the positive effect of biodiversity on plant productivity commonly increases with time. Previously it was shown that differential selection in monoculture and mixd species grassland communities could lead to the rapid emergence of monoculture and mixture phenotypes (Zuppinger-Dingley et al., 2014). We hypothesized that in biodiversity experiments pre-adapted genotypes or epigenetic variants could be sorted out from the standing genetic or epigenetic variation.

To test if biodiversity acted as selective environment, we grew offspring from plants that were exposed for twelve years to monoculture or mixture environments in the Jena Experiment under controlled glasshouse conditions.

We used epiGBS, a genotyping by sequencing approach combined with bisulphite conversion to provide integrative genetic and epigenetic data (van Gurp et al. 2015).

We found evidence of rapid genetic divergence in grassland species.

Our data reveal a strong correlation between genetic and epigenetic variation and suggest genetic variation as driving force of most epigenetic variation. This pattern was consistently observed across different plant species. These results suggest that, in perennial grassland species, selection of genetic variation underlies the rapid emergence of monoculture and mixture types.

Want to know more? Please get in touch! sofia.vanmoorsel@ieu.uzh.ch @sofiavanmoorsel

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