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## Population structure in landrace barley (*Hordeum vulgare* L.) during the late 19th century crop failures in Fennoscandia.

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Abstract: Agricultural disasters and the subsequent need for supply of relief seed can be expected to influence the genetic composition of crop plant populations. The consequences of disasters and seed relief have, however, rarely been studied since specimens sampled before the events are seldomly available. A series of crop failures struck northern Fennoscandia (Norway, Sweden and Finland) during the second half of the 19th century. In order to assess population genetic dynamics of landrace barley (*Hordeum vulgare*), and consequences of crop failure and possible seed relief during this time period, we genotyped seeds from 16 historical accessions originating from two time periods spanning the period of repeated crop failure. Reliable identification of genetic structuring is highly dependent on sampling regimes and detecting fine-scale geographic or temporal differentiation requires large sample sizes. The robustness of the results under different sampling regimes was evaluated by analyzing subsets of the data and an artificially pooled dataset. The results led to the conclusion that six individuals per accession were insufficient for reliable detection of the observed genetic structure. We found that population structure among the data was best explained by collection year of accessions, rather than geographic origin. The correlation with collection year indicated a change in genetic composition of landrace barley in the area after repeated crop failures, likely a consequence of introgression of relief seed in local populations. Identical genotypes were found to be shared among some accessions, suggesting founder effects and local seed exchange along known routes for trade and cultural exchange.

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