

## Development of Late Blight (*Phytophthora infestans*) Resistant Potato Breeding Material for Organic Farming

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### Project

The German Federal Office for Agriculture and Food has funded a project to develop potato breeding material for organic farming in Germany. It aims at combining low susceptibility against late blight with other resistance and quality traits in potatoes. The network consists of the Bayerische Landesanstalt für Landwirtschaft (LfL), the Julius Kühn-Institut (JKI), the Leibniz-Institut für Pflanzengenetik und Kulturpflanzenforschung (IPK), several potato breeders, organic farming organisations, as well as three organic potato farmers.

### Field Trials

Field trials have been carried out since 2012 at three different locations in Germany. More than 140 potato varieties are grown and examined under organic farming conditions and natural *Phytophthora* infection.

By including potatoes from modern and historical gene pools, a large genetic diversity can be assessed for late blight tolerance, agronomic properties, starch content, and taste. Varieties are contributed by potato breeders, the IPK gene bank, the JKI, and the LfL.



### Breeding

For traditional breeding 10 000 potato seedlings per year are screened for phenotypic traits. 2000 seedling tubers are then chosen and revised under organic farming conditions. In a participative approach the organic farmers are actively involved in the selection process.

Simultaneously, DNA markers are analysed to give evidence for virus (PVY), nematode (*G. rostochensis*, *G. pallida*), and *Phytophthora* resistance. Molecular analyses are used to complement and accelerate traditional breeding methods.

### Research

Field trials, trait assessment and DNA marker analyses will illustrate the phenotypic and genotypic diversity within the currently available breeding material. We will focus on using, evaluating, and developing DNA markers which are connected with *Phytophthora* resistance. Information gained in the process will be used for concerted potato breeding.

On the trial fields *Phytophthora* population will be monitored. Identification of the strain composition will be used to interpret differences in late blight tolerance between locations.



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