



Moreover, the breeder's focus is to combine several resistance genes affecting the same pathogen in progenies to increase the stability of resistance (pyramiding).

In order to utilize molecular markers successfully it is essential to study the function of selected genes. In some cases genetic engineering is applied for this purpose.

### Fields of Activity

- Coordination of and collaboration in the German Fruit Genbank
- Collection and ex situ preservation of fruit genetic resources
- Phenotypic and genotypic evaluation of fruit genetic resources regarding agronomically important traits
- Combination of a durable resistance to diseases with an excellent fruit quality in new high productive fruit cultivars
- Development of fruit specific methods of evaluation, characterization and selection of the breeding material
- Genetic characterization of agronomically important traits
- Development and application of molecular markers in selection (marker assisted selection)
- Identification, molecular characterization, isolation, and transfer of relevant genes

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#### Travelling by car

*From south or west:* leave motorway A17 at exit Pirna; go on to B172a in direction Pirna, on S177 in direction Radeberg till exit Graupa; then direction Dresden-Pillnitz.

*From north or east:* leave motorway A4 at exit Hellerau, go direction Pillnitz (through suburbs of Dresden, Albertstadt and Radeberger Vorstadt).

#### Travelling by train

*Dresden Main Station:* take tram No. 10 towards Striesen up to bus stop Bergmannsstraße, change to bus 63 towards Graupa/Bonnewitz up to Pillnitzer Platz.

*Station Dresden-Neustadt:* take tram No. 6 towards Niedersedlitz up to Schillerplatz, change to bus 63 towards Graupa/Bonnewitz up to busstop Pillnitzer Platz.

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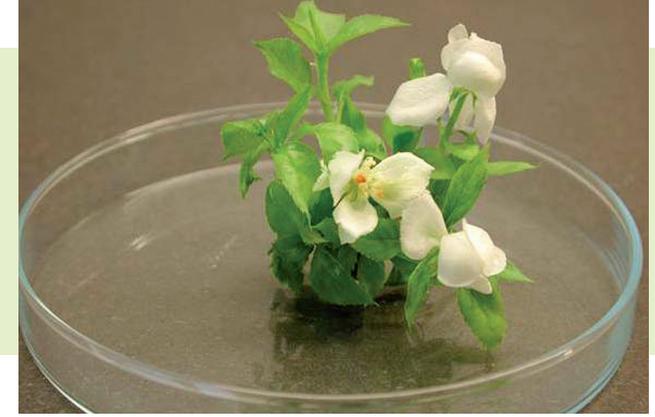
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## Expertise in Breeding and Breeding Research of Fruit Crop Species

The Institute for Breeding Research on Fruit Crops is one of 17 research institutes of the Julius Kühn-Institut (JKI), Federal Research Centre for Cultivated Plants. The Institute is located in Dresden-Pillnitz.

### The core expertise of the Institute is

- in collecting, preserving, and evaluating fruit genetic resources,
- in breeding of new fruit cultivars and rootstocks for a sustain-able and environmentally friendly fruit production,
- in developing innovative breeding methods

The Institute cooperates on the national and international levels with research institutions, universities and colleges, regional authorities, expert commissions etc.. It maintains the National Coordination Centre of the German Fruit Genebank ([www.Deutsche-Genbank-Obst.de](http://www.Deutsche-Genbank-Obst.de)).

## Main Tasks

### Collecting, Maintaining and Evaluating Fruit Genetic Resources

Approximately 30 different fruit crops species are grown in commercial fruit production in Germany, whereas the range of cultivars presented is very limited. Thus the Institute collects, preserves, characterizes and documents the diversity in fruit species and cultivars as well as in related wild species. Old German cultivars and cultivars with a sociocultural, local and historical relation to Germany are in the focus of research. The evaluation of the material includes pomological and phenological traits. In order to characterize the diversity, molecular markers are applied. These data provide a base to utilize the plant material in breeding, fruit production and landscape management.

The fruit genebank of the Institute contributes to the implementation of the "National Programme for Conservation and Sustainable Utilization of Genetic Resources of Agricultural and Horticultural Crops" and to the realization of the international framework of the European Cooperative Programme for Plant Genetic Resources (ECPGR), Working Groups *Malus/Pyrus* and *Prunus*.

### Fruit Collection of the Institute:

10 ha field collection for fruit species  
2.000 cultivars (apple, sweet and sour cherry, pear, strawberry, raspberry, blackberry and plum)  
1.000 accessions of related wild species of the genus

### National Coordination Centre of the German Fruit Genebank

Beside the Julius Kühn-Institute, other Federal and State institutions as well as non-governmental organizations are active in maintaining fruit species and cultivars in Germany. It can be assumed that there is a high percentage of identical cultivars in many of the collections. On the other hand, several cultivars are available only in one collection. This system of preservation holds the risk to lose genetic material irrecoverably.

The establishment of the German Fruit Genebank in 2008 was an innovative solution for a sustainable and cost efficient preservation of fruit genetic resources. Currently, fruit specific networks were organized for apple, pear, plum, sweet and sour cherry, and strawberry. Networks for berries will be established.

## Breeding new Fruit Cultivars

Fruit breeding is especially focused on resistance breeding (e. g. against mildew, fireblight, scab) to improve health and productivity of fruit plants and to decrease the demand on plant protection in the sense of a sustainable and environmentally friendly production. In addition, important breeding aims are improvement of fruit quality for fresh market and processing industry as well as high and stable cropping. Breeding is performed in apple, pear, sweet and sour cherries, strawberry and raspberry.

Breeding of new varieties starts with the creation of genetic variability by a targeted crossing of parents characterized by specific traits which should be combined in a new variety. Subsequently, the progenies of these crossings will be evaluated and promising candidates characterized by the designated traits will be selected.

The task of the Institute is to release a new cultivar to the market. New cultivars are protected by plant breeder's rights (see: [www.dsg-berlin.de](http://www.dsg-berlin.de)).

## Breeding Research in Fruit Crop Species

The success of fruit breeding depends more and more on the application of molecular and biotechnological methods. Especially marker assisted selection has become an essential technology. The challenge to combine important traits in progenies can be already predicted in the beginning of the breeding program. Later in the program molecular markers can select progenies on the basis of their genome in a very early developmental stage (desired traits still not detectable in the phenotype). This implies saving of labour, time and spatial resources.