

Anise – a new crop for Germany?!

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In Germany, more than 50% of the arable land is used for growing cereals like wheat, maize and barley. The resulting narrow crop rotation leads to an increasing disease pressure, resistance against plant protection products and an increase of harmful insects. Special measures have to be used to ensure high yields in the future. One important step is the widening of the crop rotation by growing crops of different plant families. This would impede a fast reproduction and spreading of pathogens.

A rarely seen plant family in German farming are Apiaceen, like fennel (*Foeniculum vulgare*), caraway (*Carum carvi*), carrots (*Daucus carota*) and anise (*Pimpinella anisum*). It is, like the others, a traditional medicinal plant in Europe. Today, most of the processed anise in Germany is imported from the Mediterranean region and East-Europe. The demand of anise in Germany is equivalent to 2500 ha.

Due to the climate change and the increasing drought periods, anise can be easier grown in Germany. It is adapted to a warm and dry climate. The sowing in spring enables the farmer to do a mechanic-weeding step, which is advantageous within an herbicide resistance management. Another aspect is the attractiveness of the flowering plants for all kinds of insects. The promotion of beneficial insects helps to decrease the amount of pest insects. Growing anise can be a reasonable tool of integrated plant protection and has beneficial environmental effects.

Since the German climate is quite different to the traditional growing regions of anise, suitable varieties have to be selected and an optimization of the cropping method is necessary. In 2021, several accessions of anise as well as populations from breeders and farmers are phenotyped at two locations (JKI Quedlinburg and University of Bonn) in the field. Additional to developmental and yield parameters the quantity and quality of the oil, as well as the taste is important. The fruits of anise are used as a spice and for medicinal purposes and have to fulfill defined quality standards.

Further, the optimization of the cropping technique is important to generate stable yields and a high quality product. Fast emergence of the plants is important to get a uniform and well-developing crop. The influence of the seeding time was tested in a field trial. Anise was sown from beginning of March until beginning of June. It could be seen that low temperatures in early spring but also drought in early summer slowed down the development. The influence of temperatures and seeding depth on the developmental speed and root growth will be investigated in further experiments.

After identifying advantageous genotypes, homozygous lines should be generated. These lines should be thoroughly phenotyped and be used later for creating synthetic populations. To be able to produce homozygous lines fast, a method for creating double-haploid genotypes should be established.

The aim of the projects is the optimization of the cropping method and breeding of adapted varieties to increase the cropping area of anise in Germany.