Influence of seeding time on developmental and yield traits in anise (*Pimpinella anisum*)

Stache, Anne-Marie; Hähnel, Urs; Marthe, Frank

Julius Kühn Institute (JKI) – Federal Research Centre for Cultivated Plants, Institute for Breeding Research on Horticultural Crops, Quedlinburg, Germany. Email of corresponding author: anne-marie.stache@julius-kuehn.de

Anise (*Pimpinella anisum*) originates from the Mediterranean region, there most of the production is also situated. There is a high demand on high quality raw material for medicinal purposes and consumption in Germany, but nearly no production. Due to the climate change, Germany is facing more often dry and hot summers, which becomes increasingly problematic for traditional grown crops. So growing drought tolerant crops, like anise, could be a possibility to stabilize yields and income.

Since anise is a quite new crop to Germany, experience in handling the crop is very rare. Defining the optimal seeding time point is important for establishing a good crop in the field.

In a field experiment over two years, it was tested how the seeding time point influences developmental and yield traits. It could be shown, that late sowing (May, June) leads to delayed emergence and lower germination rates due to water scarcity. Earlier sowing dates (March, April) showed different emerging times, depending on the (soil) temperature. The plants itself, were tolerant against cold temperatures. Drought and heat during spring and early summer forces the farmer to sow as early as possible to use the available water in the soil.

Furthermore, the results showed, that an early sowing date is advantageous because the available water (soil and precipitation) can be used for establishing a homogeneous crop with less missing plants. A dense and closed crop is important to suppress weed grow.

Besides, flowering starts earlier than in later sown fields. This can be a reason for the higher essential oil content in early sown plots (2021). And consequently harvesting is also earlier in summer, which leads to a fast and homogeneous ripening. This could help to avoid cold and wet conditions during the ripening time. This weather conditions are problematic. It causes the seed to turn dark. Dark coloured seeds are of minor quality and less usable for consumption.

Genotypes tolerating cold temperatures during germination could be favourable for German cropping conditions. This would lead to a faster emergence. Thus, seeding and emergence can be better planned. This would also be advantageous for the weed management during crop establishment.