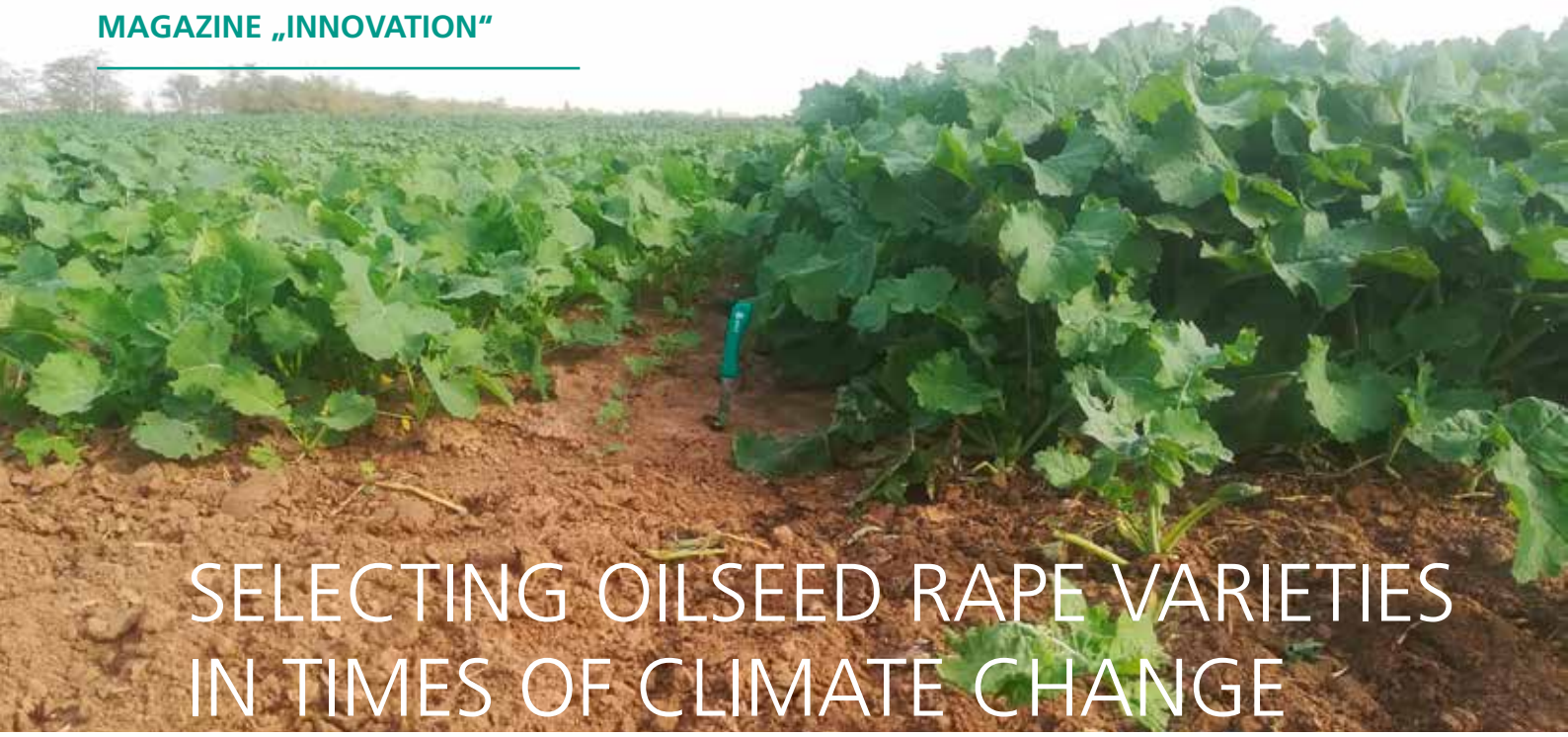


SELECTING OILSEED RAPE VARIETIES IN TIMES OF CLIMATE CHANGE

Weather extremes are a challenge in many respects. For oilseed rape growers, the challenge is also to choose the proper variety, because this decision has a significant impact on the success of the crop and the field management throughout the year. In response to the changing conditions, breeders have been developing and selecting new varieties. The following article discusses the details and offers new insights and assistance in making the right choice.

When deciding on the crop variety, farmers have to take a number of factors into account: weather conditions, sowing date, resistances and many more. The most important factors are discussed in the following article.

Temperature and precipitation are the two factors that have an immediate effect on the growth not only of the rapeseed crop but also on the growth and occurrence of the major pests and fungi affecting oilseed rape.

Although 2021 was a relatively wet year, with the consequence that in many regions in Germany we have a relatively good water balance, we all bear in mind the drought years 2018-2020. Yet averaged water balance figures conceal the fact that some regions, especially in eastern Germany, continue to struggle with a very difficult water balance situation.

Another factor is the sowing date. Growers who sow at an early date should choose a variety that doesn't grow too fast, because a rapid stem elongation will reduce the phase of bud differentiation - the length of which is very relevant for yield formation and should be sufficiently long. Whether an „early“ seeding date means late July or mid-August however depends on the location.

»AS A RULE, A VARIETY THAT IS SOWN EARLY SHOULD BE HEALTHY, SHOW SLOW STEM GROWTH AND GOOD GERMINATION PROPERTIES IN DRY SOILS.«

Simon Kröger

Choosing a very vigorous oilseed rape may bring peace of mind to growers but it also involves the risk of this variety absorbing too much N in the autumn and then "starving" on N during the winter. Furthermore, the buds in the axils may not get enough light, which in turn leads to reduced branching in the spring.

When choosing a late seeding date, the focus should be on a reliable crop establishment before the winter. This means a fast and vigorous early growth is essential.

Another important factor is resistance. An early variety should be very resistant or tolerant to diseases, because these too are usually controlled by temperature. Early seeding increases the risk of infestation with e.g. clubroot, phoma, verticillium and light leaf spot disease. The risk increases even during the vegetation periode when the diseases can spread in the stand.

New oil rapeseed varieties – the „climate change“ generation

The new oilseed rape varieties must meet specific criteria to be competitive in a changing climate. For quite some time, breeders have been working on climate-adapted varieties that are resistencies well with dry soils at the time of seeding and with very warm temperatures all the way into December and yet suggest a successful harvest. For this

purpose, breeders test certain candidates both in field and lab trials. On a so-called temperature grading table (a method that simulates various temperatures), the variety's germination capacity and root development are tested at various temperatures. This way, it is possible to select candidates that germinate and show good root development at high temperatures (e.g. the new variety DAKTARI germinates even at temperatures as high as 40 °C).

Weather is an issue also for breeders. For example, at the winter oilseed rape breeding stations of Deutsche Saatveredelung AG (DSV) we observe the growth of rapeseed plants and from these observations we derive criteria for breeding varieties of a „climate change generation".

The weather in the autumn of 2021 was very mixed. Stem elongation in trials at the DSV winter oilseed rape breeding stations set in as early as in November, with the 6-leaf stage being reached by the end of September. From then on, the N requirement of the crop increased. N however has to be supplied by the soil itself following stricter application regulations.

To take up enough N, the plants have to show a good root development.

The temperatures at the DSV breeding station in Leutewitz (Saxony) were above average until the 6-leaf stage, but due to lack of rain the plants developed only slowly. Sown into a min-till field with a heavy straw cover from the previous crop, the seeds would have required much more than 50mm of rain for growing rapidly. Yet, the actual total rainfall at the site was 43mm which were spread across several small events. This left the oilseed rape developed poorly for the winter showing less leaf mass and eventually no stem elongation.

Summing up the insights gained in the winter 2021/22, we can state that for early seeding into dry soil it is best to choose a variety that shows a more vigorous growth than varieties that grow in similar soils yet in wetter climates, such as in regions in northern and western Germany.

How is the oilseed rape performing in the spring 2022?

The last winter was also mild and many regional weather stations reported early hazel flowering and the first few snowdrop flowers in February 2022. This means that spring was around the corner as early as in February. Without really cold temperatures, autumn was followed by the entry into an early spring.

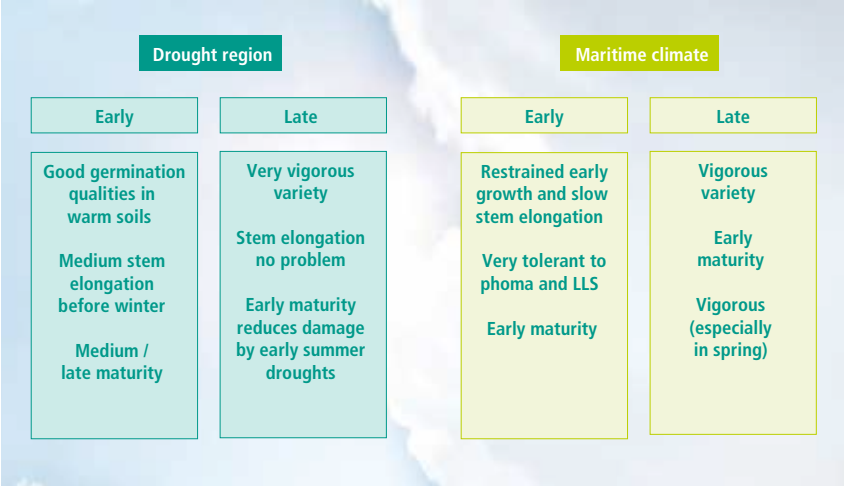
Photo 1: The effects of late frosts: Shoots bend, the water supply is scarce and the plant tips are wilted.

The oilseed rape plants showed further growth in February 2022 and some very early trial varieties started to show. Oilseed rape is tolerant to frost during the budding stage and before flowering. This is an important quality in view of the risk of losing buds and ultimately pods to late frost - a risk that increases when the plants develop quickly. To address this risk, breeders have selected genotypes that are much better at coping with these weather events.

For example, when temperatures drop below -5 °C in spring, the oilseed rape is already filled with water and nutrients and suffers a major setback in terms of growth.

Therefore, tolerance to frost before the flowering stage is an important criterion for choosing the proper oilseed rape variety. Another issue are cracks in the plant tissue at sub-zero temperatures, which allow pathogens to invade the stems (fig. 1). In conclusion, figure 1 summarises the key characteristics of varieties for performing well in specific climatic regions and after specific seeding dates.

FIGURE 1: KEY CRITERIA FOR A DECISION TREE ON CHOOSING A VARIETY BY CLIMATE REGION AND SEEDING DATE



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