

RlmS Interview between Steffen Rietz, Christian Flachenecker and Barbara Henze

Barbara: Hello Christian, hello Steffen, the rapeseed season 2020 shows again a broad range of new challenges for winter rapeseed in Europe. While the north of Europe suffered quite a lot from strong rainfalls and higher temperatures during winter the south of Europe was faced with another long-lasting period of drought, even during winter.

Barbara: @ Christian: As the final rapeseed yields in Germany were quite high, could we say rapeseed was with around 3,7 t/ha the “secret winner” of a challenging season 2020?

- Christian: In Germany, Poland, and Baltic States, the yields of winter oilseed rape exceeded our expectation and showed the capability of rapeseed to compensate many stress situations, when the conditions become favorable again. But persisting drought conditions in France and Eastern Europe led again to low rapeseed yields. When the stress is too strong, even rapeseed is unable to cope with it.

@ Steffen: The winter 2019/2020 in Northern Europe was particularly mild and wet, especially in January and February. Due to climate change we may see such conditions more frequently in the future. For you as a plant disease expert this might be quite interesting conditions. What were your final observations from the fields?

- Steffen: Usually, such conditions provoke higher fungal infestations like for phoma stem canker. We did see some leaf infections but symptoms at the stem in spring were not causing major damages. Breeding for better phoma resistance in the past has clearly contributed here. Since the climate is changing and the pathogen adapts to plant resistance in the field, breeding for plant resistance is not yet finished but can rather be seen as a constant battle. In recent years, light leaf spot disease was observed more frequently in Northern Europe, probably due to the mild and wet winters comparable to the conditions in UK. In light of changing climate conditions, we probably have to adopt quickly our resistances not only to phoma but also other fungal diseases like light leaf spot.

Barbara: Phoma lingam is a well-known disease in the European rapeseed market and we observe that farmers pay attention to Phoma resistance when choosing their varieties. But if we look backwards the last “Phoma year” was quite long time ago. @ Christian: What are the reasons?

- Christian: During the last years we had in many regions a lack of moisture directly after drilling and around flowering. Since humidity is needed for a successful spread and infection of the fungus, phoma was less prominent in many regions. But climate change will in the future not only cause hotter and drier summers, but also warmer and wetter winters. Therefore, I expect in the coming years more favorable conditions for phoma again and we need to be prepared by developing varieties with new phoma resistance traits, like RlmS.

Barbara: @ Steffen: Can you tell us more about the development behind RlmS? What are the differences to the other Phoma resistances like Rlm7?

- Steffen: Enhancement of rapeseed resistance to pathogens like phoma is a major breeding goal for a

RlmS Interview between Steffen Rietz, Christian Flachenecker and Barbara Henze

long time and in this context RlmS was introduced from turnip rape. In order to select for RlmS during breeding we developed a biotest that measures the resistance at the stem base. This so called Winkelmann-Test was applied for many years to develop rapeseed lines containing this novel phoma resistance. Thus, RlmS is completely different from Rlm7. Since phoma races in the field can adopt to single resistance traits over time and then cause disease, alternative resistance mechanisms are important for a sustainable crop management. Greenhouse biotests have proven good stem resistance against many Phoma races from the field including ones that can infect plants carrying Rlm7. To deal with phoma disease in the field distinct resistances are needed on the long run and RlmS represents a new option here.

Barbara: Since a few years, we observe a clear trend to combine several resistances in one variety. Hybrids with three or more resistance traits are not uncommon. @ Christian: Will we see varieties stacked with even more resistances in the future?

- Christian: Since there is a political will to reduce the use of pesticides, resistant varieties are one solution to cope with these conditions. However, I believe it is not helpful to combine as many traits and resistances as possible, since new resistances are often introgressed from exotic germplasm and come along with negative side effects, like lower yield or other susceptibilities. Rapool follows an alternative approach and develops varieties adapted to specific regions. While farmers in maritime regions need varieties with good disease resistances, farmers in continental regions favor drought tolerance and pod shatter resistance. Besides that, there are only a limited number of disease resistances available and we should use and grow them wisely, e.g. alternating, to keep these resistances effective for many years.

Barbara: @ Christian: Coming back to RlmS, such robust and healthy varieties stay longer green and come later to maturity, a disadvantage for the farmer?

- Christian: Besides plant health also maturity and threshability must be considered when developing tailor-made hybrids. RlmS indeed has a certain stay-green effect, which delays maturity, but we are already working on early flowering varieties with RlmS, which will reach maturity also in cooler growing areas. In regions with heat and drought stress, the stay-green effect, coming along with RlmS, could even be an advantage to allow these hybrids a further increase in yield, while other varieties have already completely dry stems. We are currently conducting further trials to investigate the effect of RlmS under stress conditions.

Barbara: While rapeseed was in the past a stable cash crop for the European farmers, the situation changed in the last years, mainly influenced by new challenges like abiotic stresses, new pests and restrictions in using pesticides and fertilizer. Pesticides should be reduced by 50% and fertilizers by 20% until 2030, as stipulated in the Farm-to-Fork strategy, one of the key elements of the European Green Deal. Therefore, plant breeding needs to deliver new solutions to increase the yield stability even under more challenging conditions. @ Steffen: Do you see chances to reduce the fungicide intensity with the new hybrid generation and resistances like RlmS and therefore to increase the profitability?

RlmS Interview between Steffen Rietz, Christian Flachenecker and Barbara Henze

- Steffen: It is difficult to give numbers in terms of profitability, but we do expect that crop management will become easier. RlmS increases plant robustness against Phoma disease and thus will increase yield stability. At high infection pressure farmers have more flexibility as to when fungicides are applied, for example to combine a fungicide with other applications. At low infection pressure, the focus may be more on the growth regulating side, for example to permit early sowing to escape from flea beetle without risking damages by Phoma.

Barbara: Dear Christian and Steffen, thank you very much for the interview. We are looking forward to the next candidates and wish you all the best for the coming months.