Phoma stem canker (Leptosphaeria maculans)

The RAPOOL pipeline offers already today numerous options for your success tomorrow

Phoma is one of the most important diseases in oilseed rape cultivation due to its widespread and regular occurrence. Associated damages vary up to 20 % depending on the variety, cultivation, and year. In cases of early infestation, damages can be higher than 50 % This article gives more background information on the risks of infestation and how to prevent it effectively.

The causing agent of phoma is the fungus Leptosphaeria maculans. Starting from diseased rapeseed stubbles ascospores of L. maculans are distributed by the wind in autumn and infect leaves of the new crop. Upon infection, yellow spots with black punctiform fruiting bodies are visible on young rapeseed leaves. From these fruiting bodies spores are released, which lead to secondary infections in spring. If the infestation is more severe, leaves become necrotic and will die. However, it is the further development and spread of the fungus through the leaf petioles into the stem that makes it so damaging. While leaf infestation can be easily compensated by plant growth the spread of the fungus into the stem can cause the typical stem canker symptoms and is most relevant for field performance. The interruption of essential vascular pathways of the plant first leads to lodging and later to premature ripening and death of the whole plant, causing lower grain yields and finally economic losses.

The right management and choice of variety to fight infestation.

As the primary infection starts from spores formed on rapeseed stubbles, infestation can be limited by accurate ploughing of plant residues, especially on neighboring fields. In comparison, shallow stubble tillage increases risk of Phoma infections. Also, during threshing, infectious spores can be transmitted to seeds or reach neighboring fields, which are already prepared for the next rapeseed sowing. However, compared to the risk of infection from rapeseed stubbles, infections via threshing are only of minor relevance. But no matter where the infection originates from, if the rapeseed is infected once, there is a way to limit the ongoing infestation: Growing a Phoma resistant hybrid, adapted to your region.

From research to breeding

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RAPOOL is researching Phoma resistances since decades with the aim to offer the newest and best genetics to farmers. Thanks to our enormous research efforts, different resistances against Phoma could be found and integrated into our breeding programs for current and future rapeseed varieties. Several monogenic Phoma resistances (e.g. Rlm3, Rlm7) are widely used in modern oilseed rape varieties. In 2017 NPZ (one of RAPOOLs shareholders) published a novel stem canker resistance: APR37, which is now referred to as RlmS.

RlmS originates from turnip (B. rapa) and confers a high level of stem resistance in the field. The new resistance extends the range of available solutions against Phoma. This is important because growing the same resistance over time promotes the formation of pathotypes that can overcome this resistance. Currently Rlm7 is one of the most prevalent Phoma resistances in Europe but recent observations show the development of virulent pathotypes in some areas and the need of new resistances. By developing hybrids with different resistance genes, we support an effective and sustainable resistance management to maintain the resistances as long as possible and keep Phoma under control in your fields.

After successful registration of the first hybrid (NAPOLI) with RlmS resistance in France 2015, the RlmS resistant hybrid KICKER became the new benchmark for outstanding plant health and reliable yield stability in Central and Eastern Europe. But not only for KICKER, also for other candidates advancing in the RAPOOL pipeline, a unique but also a unique and general way plant health was found in connection with the RlmS resistance. Besides the extremely healthy stems (stay-green effect), these varieties are also robust against other pathogens of increasing importance, such as Sclerotinia or Verticillium (Figure 1). The very green and healthy stems coming along with RlmS could also improve drought tolerance by allowing these hybrids to assimilate nutrients longer.

One step ahead with RAPOOL

In recent years, rapeseed growers have faced various challenges like heavy pest pressure, late frost damages, the ban of several plant protection products or drought and the associated lower nitrogen uptake. For this reason, our focus in breeding has shifted from selection under optimal to stress conditions in order to develop varieties with a better yield stability. Especially in intensive crop rotations with a high share of rapeseed, the yield stability of a variety requires an excellent plant health with several resistances or field resistances in order to enable a satisfying yield production.

While KICKER has already proven its yield stability in Central and Eastern Europe, RAPOOL's newest varieties even go one step further and provide RlmS plus TuYV resistance, which is unique on the European market. Besides to the already launched hybrid DOMINATOR, newcomers like AKILAH will complement the RAPOOL portfolio and give more flexibility to innovative rapeseed farmers. Both varieties convince with successful registrations in Poland, Czech Republic, or Ukraine. Thanks to the combination of RlmS and TuYV resistance, this new generation of hybrids unify outstanding vigor in autumn, excellent nitrogen efficiency and plant health, resulting in a promising yield potential.

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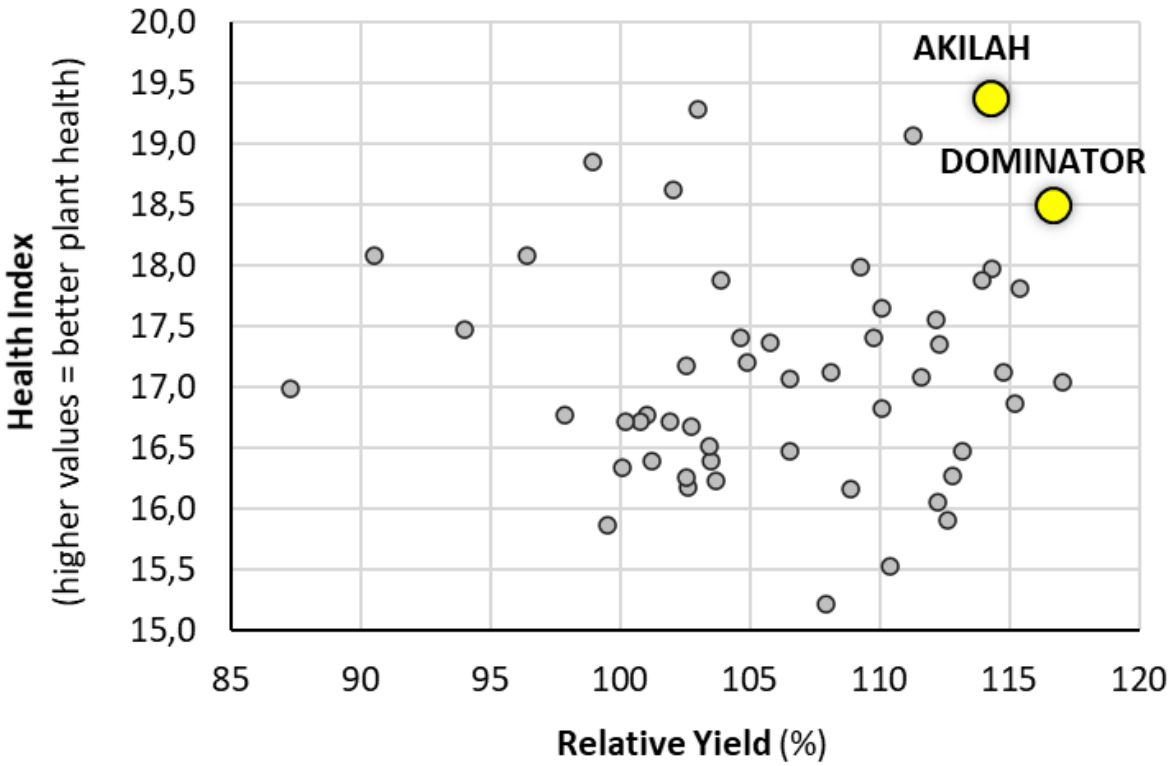

KEY POINTS

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- Intensive monitoring of fields to determine the individual risk of infestation.
- Initial infestation can be reduced by ploughing.
- To be on the safe side or in case of high infestation pressure, Phoma resistant varieties should be grown. Attention must be paid to an adequate resistance management! Switch between varieties with different resistance genes!
- With RlmS plus TuYV resistance, RAPOOL's new generation of hybrids offers higher yield stability in a wide range of growing conditions and an extra plant health in case of Verticillium and Sclerotinia pressure connected to RlmS.
- Additional yield effects and positive influence on environment as fungicides could be used more purposeful, which reduced the usage and increase the profitability at the same time.

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