A BYDV-infested barley field in western Germany in spring 2021. A BYDV-sensitive variety may suffer massive damage by the virus.

BARLEY YELLOW DWARF VIRUS – THE LEGACY OF APHIDS

Although the Barley Yellow Dwarf Virus was less of an issue during the 2021/2022 crop year compared with the previous year, farmers should stay alert and take precautions, such as by making an existing variety resistant and and save input costs at the same time.

Climate change is here! Every year, we experience a new record in terms of extreme weather incidents. 2020 was the second hottest year on record in Germany and just behind the 2018 record year. Not only is agriculture struggling with the immediate consequences of hot temperatures but also with the impact of climate change on the spreading of pests, many of these being vectors of diseases, so-called virus vectors.

The large cereal aphid *(Rhopalosiphum padi)* is a BYDV vector.

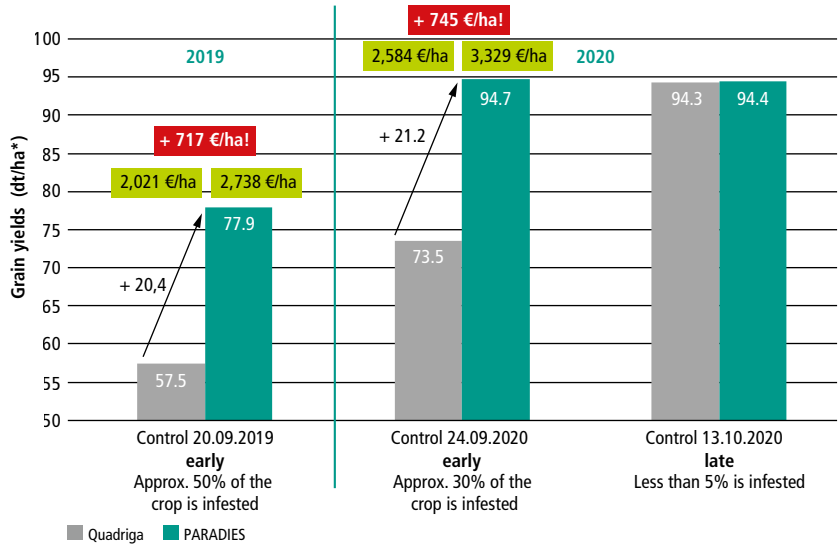
One prominent virus in Germany is the Barley Yellow Dwarf Virus (BYDV) which enters cereal crops by using aphids as hosts. The risk of BYDV infection is particularly high for early-sown winter barley, because this offers the pest a large time window for entering the stand. Although there is no cure for the virus itself, there are various ways of limiting the damage by taking special arable and crop management measures. Varieties that are resistant to BYDV offer a great yield security and input-saving potential.

Protecting the crop and saving money

In 2019 and 2020, experts from the German Chamber of Agriculture North Rhine-Westphalia compared the BYDV-sensitive variety Quadriga with the virus-resistant variety PARADIES in field trials (see fig. 1). The graph shows only the control crops that were not treated with an insecticide. The sowing date in 2019 was early – on 20 September 2019. A year later, in 2020, the crop was sown on 24 September and 13 October. It was found that 30% and 50% respectively of the plants sown on the early date were infested with BYDV and needed spraying. The virus-resistant variety produced surplus yields of more than 2t/ha in both years. This shows that the resistant crops that were sown early and received no insecticide treatment led to an increase of proceeds by up to €745 per hectare (calculation based on the feed barley producer price in week 20 in 2022 of €35.15/dt*).

Obvious dwarfism as well as discoloured and deformed leaves are indicators of BYDV infestation.

FIG. 1: BYDV-RELATED YIELD LOSSES. CROPS SOWN IN 2019 AND 2020



Source: Chamber of Agriculture North Rhine-Westphalia, Plant Protection Services, own presentation

Producer price in week 20, 2022: €35.15/dt*

By comparison, in the infestation rate in the crop sown at the later date in 2020 was only 4% – a much lower rate and well below the threshold that calls for treatment. The resistant variety did not produce significant surplus yields. The requirement for an integrated pest control expects growers to further reduce their chemical inputs. Provided appropriate agronomic measures for controlling BYDV are in place and the variety grown is resistant to the pest, growers can skip the chemical treatment for vector aphids. Although resistant varieties continue to remain targets of the aphids and carry the virus in their DNA, they will show no symptoms and hence no negative yields when infested. The risk of infection varies every year. While low temperatures and rainy autumn weather has a significant impact on aphid mobility, an "Indian Summer" increases the risk of infection. The 2020/2021 crop year was considered a BYDV year in many regions, whereas the 2021/2022 crop year saw hardly any stands that were infested with Barley Yellow Dwarf Virus.

Summary

BYDV resistance can safeguard yields and reduce input costs. The trials by the Chamber of Agriculture North Rhine-Westphalia also reveal that sowing dates play an important role as to BYDV infection. Winter cereals that are sown early are more exposed to aphids infesting the stand.

* = 1dt is the equivalent to 100kg

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