

NO NEED TO FEAR THE VIRUS!

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There is widespread concern that the turnip yellows virus (TuYV) now poses a significant threat to oilseed rape crops. Yet TuYV is not a new phenomenon in winter oilseed rape cropping. When the viral infection strikes during the growing season and weather conditions are mild, as in 2016, it can cause stunted growth, resulting in low yields of seed and oil.

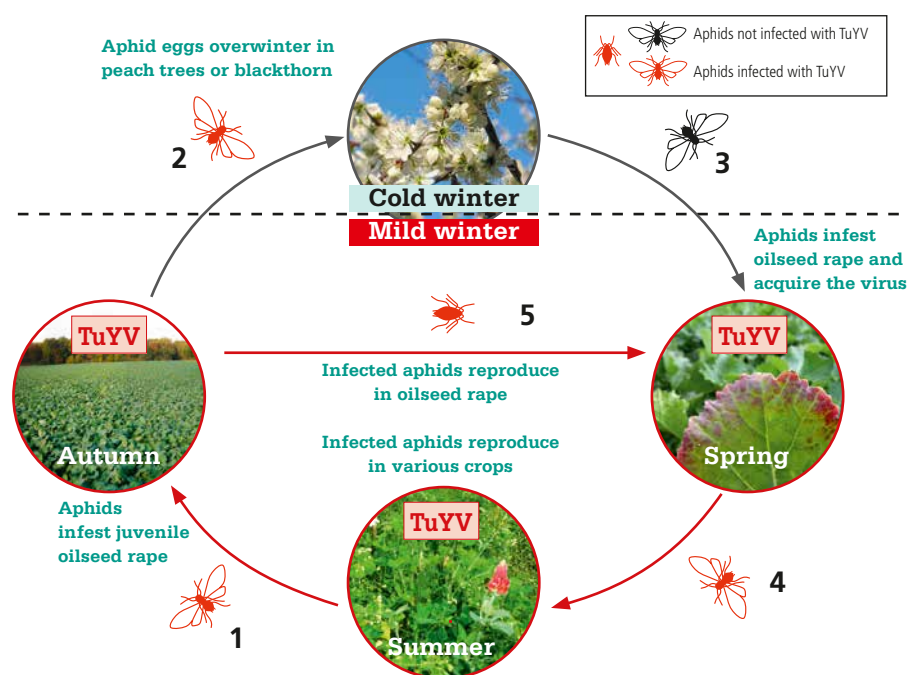
TuYV is carried and transmitted by aphids. The main symptoms of TuYV infection are purple discolouration at the edges of the leaves, which, although present in autumn, may not become apparent until the spring. Leaf symptoms generally appear from mid-November

to late February. However, these symptoms are not a clear indication of viral infection and can easily be confused with nutrient deficiencies and abiotic stress. Ultimately, the only way to confirm the presence of the virus is by ELISA detection.

How does the infection progress?

The peach-potato aphid (*Myzus persicae*) is one of the main vectors of the turnip yellows virus, although it can also be transmitted by many other aphid species (e.g. the cabbage aphid) (Fig. 1). Winged aphids colonise the crop in autumn shortly after emergence of the oilseed rape, bringing the infection with them (1). These aphids migrate from cover crops and/or summer crops and are already infected when they transfer to the oilseed rape. In warm autumn weather, wingless aphid populations can explode before winter sets in, leading to large-scale infection. As temperatures in autumn start to fall, the aphids migrate to peach trees or blackthorn (sloe) to lay the overwintering eggs (2). In early spring as temperatures start to rise, the aphid progeny leave their winter quarters, acquire the virus from the infected oilseed rape crop and spread it further (3). At the same time, the aphids transmit the virus to weeds and other crops, which then provide a further source of infection (4). As our autumns become increasingly warmer and our winters milder, aphids manage to persist in the oilseed rape crops in autumn and even over winter and continue to reproduce (5). The incidence and spread of TuYV infections are largely dependent on the weather. Seasonal and climatic conditions determine aphid activity and the spread of the virus in the oilseed rape.

Fig. 1: Aphid life cycle



Source: Schliephake, Rabenstein, Habekuß (2016) modified by DSV



Typical TuYV-symptoms in autumn

Previous studies (Schaardt 2006) suggest that there is nothing new about this viral infection in oilseed rape and that although the incidence appears to have increased in recent years, the impact on yields has not risen.

The increased awareness of TuYV can be attributed to the following factors:

- > Political framework: Lack of insecticidal seed treatments.
- > Climate change/weather: Higher temperatures in autumn and milder winters.
- > Increased cultivation of potential host plants.
- > Severe reduction in the use of chemical insecticides.

Options for controlling the virus

Up until 2014, insecticidal seed treatments were an effective means of preventing a viral infection and subsequent yield losses. An insecticidal treatment to control aphids makes however less sense, because it does not target the aphids specifically and *M. persicae* is already resistant to several insecticides (Heimbach 2016). The only option of controlling the virus given the current restrictions is to grow tolerant and resistant varieties.

TuYV-tolerance and resistance are not new to DSV breeders. Varieties in the outdoor nursery are exposed to the natural stress conditions of each respective year and only the strongest are selected. This is evident from the official trial results.

The latest success for DSV was the registration of TEMPTATION in France. It is the first TuYV resistant variety in the portfolio of DSV and it showed excellent yield result in trials all over Europe.

Conclusion

The turnip yellows virus (TuYV), transmitted by aphids, has become more of a threat in recent years. This is attributed to climate change on the one hand and the absence of insecticidal seed treatment on the other. For DSV this 'problem' is not new; in fact, it is a long-standing and on-going breeding objective in their nurseries, where only the best and strongest varieties are selected for independent official trials, where they prove their worth in the face of virus pressure.

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