

ECHNICAL SHEE

Rhizomania



IN BRIEF

Rhizomania is one of the main sugar beet diseases.

It is caused by the Beet Necrotic Yellow Vein Virus (BNYVV), which is itself transmitted by the root parasite *Polymyxa betae*.

The main symptom is a proliferation of rootlets, adversely affecting the main tap root.

CHARACTERISTICS

Development conditions

The vector of the virus, Polymyxa betae, is a protist living in the soil and parasitising the roots. It survives in the soil in the form of sporosores, masses of highly resistant dormant spores. In the absence of favourable conditions, the Polymyxa betae/BNYVV complex can maintain its infectious potential for several decades in the soil. When the soil temperature reaches 15 to 25°C, and the soil moisture level is high, the dormant spores germinate and produce primary zoospores. Attracted by secretions from the rootlets of the host plant, the zoospores swim through the water in the soil, propelled by their flagella. When the zoospores reach the outer surface of the rootlets, they hook onto it, and discharge their cellular contents inside the plant's cells. This results in the formation of a plurinucleated cytoplasmic mass (known as the 'plasmodium'). In this way, the virus in the zoospores is also discharged into the plant cells, where it begins its own multiplication cycle.

Polymyxa betae spores can be dispersed by water (in the form of rainfall, run-off, irrigation, etc.), as well as in soil (via farming equipment and transportation of crops of sugar beet, potatoes, turnips, etc.). The environmental factors that contribute to the development of the disease are the same as those that favour the proliferation of its vector in the soil: presence of a host plant, high temperatures, and abundant rainfall (warm, wet spring). A neutral to alkaline soil pH is also favourable to the development of *Polymyxa betae*.

Host plants

The *Polymyxa betae*/BNYVV complex multiplies mainly in plants belonging to the chenopodiaceae family (sugar beet, chenopodium, spinach) and the amaranth family.

Symptoms





IN THE ROOTS

- Girdling of the lower part of the root
- Development of dense, dark root hair adversely affecting the beet
- Necrosis of the vascular rings
- Sometimes accompanied by the development of lateral roots

IN FOLIAGE

- Wilting during the hottest part of the day
- Towards the end of summer, the foliage turns a pale green colour
- The new leaf blades produced are narrow; their leaf stalks are long and upright

Rhizomania can cause severe damage to your sugar beet fields. In contaminated fields, sugar content falls, yield is considerably reduced, land tare increases, and extractability is reduced.







BIOTIC STRESS DEPARTMENT

Erik De Bruyne

CAN RHIZOMANIA BE CONFUSED WITH ANY OTHER DISEASE?

EdB: The wilting observed in the leaves can also be the result of poor water uptake.

Yellowing of foliage can be caused by a lack of nitrogen.

The development of root hair caused by an outbreak of nematodes bears a strong resemblance to the symptoms of rhizomania. The presence or absence of white cysts makes it possible to distinguish between them. The appearance of lateral roots can also be due to poor soil structure or an attack by Aphanomyces cochlioides.

WHAT METHODS ARE AVAILABLE FOR COMBATING RHIZOMANIA?

EdB: There is no authorized chemical treatment for rhizomania. The only effective and accessible way to control it is by using a seed variety that has partial-resistance to the disease, thereby limiting the spread of the virus in the plant and therefore reducing its infectious potential in the soil. Over the course of the last 20 years, progress in the genetics of varieties with partial-resistance to rhizomania has been remarkable. In addition to using a variety that is rhizomaniatolerant, a number of agronomic measures are recommended:

- Ensuring low levels of moisture in the soil (sufficient drainage, maintenance or improvement of the soil structure, sparse irrigation, or irrigation limited to 70% of the crop's requirements)
- Avoidance of soil movement (harvesting in dry conditions)
- Early sowing

Extending rotation is advised, but will only have a limited effect on the infectious potential of the soil, given Polymyxa betae/BNYVV's capacity to survive for decades in the soil.

HOW IS SESVANDERHAVE POSITIONED IN THIS MARKET SEGMENT?

EdB: In the 1980s, SES EUROPE (as it was known at the time) saved sugar beet growing by developing and marketing the first rhizomania-tolerant variety.

If we hadn't done this, sugar beet would no longer be grown anywhere. We are genuine leaders in sugar beet diseases and parasites thanks to our unrivalled knowledge and experience.

TO WHAT DOES SESVANDERHAVE OWE ITS SUCCESS?

EdB: SESVanderHave controls the quality of its products at every step.

The rhizomania-tolerant varieties that we market also have a high yield potential. Thanks to our experience, and our specialised team comprising dozens of scientists, yields are assured for all sugar beet growers. In addition, SESVanderHave works with renowned universities and international institutes specialised in combating rhizomania. We are, and will always remain, ahead of the competition.

ARE YOU EXPECTING TO REMAIN AT THE CUTTING EDGE IN THIS MARKET SEGMENT?

EdB: For some severely affected regions, such as the Loiret in France and the Red River Valley in the USA, SESVanderHave has developed Tandem Technology[®], which combines two sources of resistance to rhizomania, thereby boosting the tolerance of the variety. Our challenge for the coming years to is to combine this with nematode tolerance. Our teams our working hard on this as we speak.



More info?

Check our social media channels and website www.sesvanderhave.com