Institut Technique de la Betterave

Virus Yellows of sugar beet: New propagation risk of the disease if seed treatment with neonicotinoids is stopped without an alternative solution.

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The yellowing virus is an endemic disease of sugar beet. It is currently perfectly contained thanks to seed pellets containing insecticides from the neonicotinoid family. Prior to these products (1992), the control of aphids (*Myzus persicae, Macrosiphum europhorbiae, Myzus ascalonicus, Aulacorthum solani, Rhopalosiphum staphylae, Acyrthosiphum pisum*), which are the vectors of the viruses responsible of the various forms of yellowing, relied on leaf spraying with pyrethroids/carbamates, or other, no longer available products, which gave less satisfactory results.

The ITB has already issued numerous communications on the current adequacy of the use of systemic insecticides of the neonicotinoid family to tackle the issue of the vector of this virus, for instance "*Argumentaire technique de l'utilisation des traitements de semences à base de néonicotinoïdes en culture de betterave sucrière" (June 2015).*

In view of today's technical knowledge of the issue, the use of neonicotinoids for sugar beet, an anemophilous plant which is not attractive to pollinators, is the best solution for today's agro-ecological, economic and societal needs.

To date, we do not have any leads (alternative crop protection products - genetic resistance - alternative pest control methods) which could address the issue of tackling this disease, with a deadline in line with the 2016 biodiversity law which will ban the use of NNIs at the earliest in 2018 and at the latest in 2020.

Virus presence and alternative ways to control virus yellows

Annual risk assessment

Every year, the ITB organizes a "disease" observatory on reduced sized plots to verify the presence of these viruses and every year we find yellowing viruses in the plots without neonicotinoid treatment of beet seed.

The yield losses observed result from several factors, including the amount of viruliferous insects, the activity of said insects (flights, reproduction rate, infectious potential), duration of presence, aggressiveness of the viruses and each sugar beet's own susceptibility to infection (variety, growth stage at the time of infection).

Current control methods

The only control method currently available is to go back to using foliar spraying with pyrethroid - carbamate, products used for other crops with resistance situations already noticed.

Some farmers have already anticipated this protocol in 2017: the pictured plot below, in Seine Maritime, is an example of the results.

- "Standard" seeds without neonicotinoid insecticide seed treatment,
- Sown at the end of March,
- 3 post-emergence foliar treatments (sprayings) with insecticides during vegetation at 15-day intervals,

- Symptoms of yellowing viruses observed:

The yellowing viruses' impacts are very high and will affect productivity!

Picture ITB September 2017 - Nicolas Maillard

Facts:

- Aerial treatments based on pyrethroids do not provide the same protection for the agricultural plot. This lesser efficiency may result from aerial applications which are not sufficiently precise with regards to the development stage of the vector and/or the development by the vectors of resistance to these old products.
- Despite an extensive control of this disease for over two decades, the viral load and its vector appear sufficiently high to cause damage as early as the first year of non-protection.

Conclusion

- Virus Yellows and its vector (*Myzus persicae*) are permanently present on our territory.
- The vector/virus dynamic could affect sugar beet productivity from year one on the most exposed zones.
- Controlling the vector of the yellowing viruses with pyrethroids will be insufficient and incomparable to neonicotinoid seed treatment, for which we do not have an alternative.
- Concerning the IFT (Treatment Frequency Index) and the environment, we replace a seed treatment with three foliar sprays, corresponding to an increase of 3 points of the IFT out of a current total of 5 for all phytosanitary products applied for sugar beet.

The ITB is committed to research and finding alternative solutions through two projects conducted in partnership with public research and the major agricultural technical institutes. These research projects will not be completed before the scheduled end of neonicotinoid use, therefore exposing our agriculture to a major productivity issue, and thus an economic risk, in the near future.