Mini data sheet on 'Syndrome des basses richesses'

Added in 2012 – Deleted in 2016

Reasons for deletion:
The 'syndrome des basses richesses' has been included in EPPO Alert List for more than 3 years and during this period no particular international action was requested by the EPPO member countries. The Panel on Phytosanitary Measures agreed that it could be deleted. In 2016, it was therefore considered that sufficient alert has been given and the disease was deleted from the Alert List.

'Syndrome des basses richesses' – a disease of sugar beet associated with '*Candidatus* Arsenophonus phytopathogenicus' and transmitted by *Pentastiridius leporinus* (Hemiptera: Cixiidae)

Why
'Syndrome des basses richesses' is an emerging disease of sugar beet (*Beta vulgaris*). It is associated with a γ-proteobacterium '*Candidatus* Arsenophonus phytopathogenicus' and transmitted by a planthopper, *Pentastiridius leporinus* (Hemiptera: Cixiidae). This disease was first found in Eastern France in 1991 but its etiology remained uncertain for a long period. Syndrome des basses richesses causes a reduction in the sugar content at the time of harvest, thus leading to significant economic losses for growers. Because this syndrome has recently been detected in Germany, the Panel on Phytosanitary measures decided to add it to the EPPO Alert List.

Where
The disease was first observed in Eastern France in 1991. So far, it has only been observed in the departments of Côte-d'Or, Saône-et-Loire (Bourgogne region), and Jura (Franche-Comté region). In Hungary, similar symptoms were observed in 2005. At that time, the presence of bacterium-like organisms was detected in the phloem of diseased sugar beet plants but no recent information could be found to confirm the presence of '*Ca*. A. phytopathogenicus' in Hungary. In Germany, the 'syndrome des basses richesses' was first observed in 2009 in several sugar beet fields near Heilbronn (Baden-Württemberg) and '*Ca.* A. phytopathogenicus' was detected in diseased plants. The presence of *P. leporinus* was also noticed in affected fields. So far, the disease has only been found in Heilbroon, but investigations are being carried out in Baden-Württemberg to determine the extent and impact of the disease in sugar beet production.

EPPO region: France (Côte d'Or, Saône-et-Loire, Jura), Germany (near Heilbronn in Baden-Württemberg), Hungary (symptoms only).

The insect vector, *Pentastiridius leporinus*, is considered to be distributed thoughout Europe, the Near East, Central and East Asia, and Northern Africa. From the literature, the following distribution list could be prepared.

EPPO region: Albania, Algeria, Armenia, Austria, Azerbaijan, Belgium, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Lithuania, Netherlands, Poland, Portugal, Romania, Russia, Slovakia, Spain, Sweden, Switzerland, Tunisia, Turkey, Ukraine, United Kingdom.

Africa: Algeria, Tunisia.

Asia: Afghanistan, China, Iran, Kazakhstan, Kyrgyzstan, Mongolia, Turkmenistan.

On which plants
Sugar beet (*Beta vulgaris*).

Until recently, the vector *P. leporinus*, was only reported to live on common reed (*Phragmites australis*). But studies carried out in Eastern France have shown that this insect was also associated with cultivated plants such as sugar beet and wheat (*Triticum aestivum*). In Eastern France, *P. leporinus* has only one generation per year and spends most of its life cyle as terricolous nymphal stages. Adults can colonize, mate, and lay eggs on sugar beet plants. Nymphs hatch within 10 to 15 days and by feeding on sugar beet roots, they develop into second and third instars from August to October. After a winter diapause, nymphs complete their development during the following spring by feeding on the roots of winter wheat. Adults then emerge from wheat fields in summer (June/July) and migrate to neighbouring sugar beet fields. Although it is supposed that *P. leporinus* has been able to shift from wild host plants to sugar beet fields and adapt to sugar beet/wheat rotations, these wild hosts have not yet been identified in Eastern France.

Damage: Symptoms appear shortly before the crop is harvested (usually in September). They include yellowing and bending of old leaves accompanied by new growth of central leaves which appear chlorotic, lanceolated and asymetric. The bacterium systemically invades the phloem of sugar beet causing necrosis of the vascular bundles. The infected roots have lower sugar content (reduction of 2 to 4%). It is reported that this reduction of sugar content can have dramatic economic consequences for growers. For example, in 1992 the loss of income observed in Eastern France was of about 50% over 1000 ha. In 2004, the rate of affected plants in sugar beet fields varied from 15 to 100 % over 1 800 ha, but no estimation of crop losses was given.

Transmission: *P. leporinus* has been identified as the main vector of '*Ca.* A. phytopathogenicus' in sugar beet fields. It transmits the pathogen in a persistant mode. It is suggested that the emergence of the 'syndrome des basses richesses' in Eastern France has been coincidental with the increasing populations of *P. leporinus* in sugar beet fields.

Pathway: Infectious insect vectors.

Possible risks: Sugar beet is an economically important crop in the EPPO region. Direct control of the bacterium is not possible but it has been observed in Eastern France that the reduction of the vector populations with different techniques, such as chemical insect control, crop rotation with barley, and reduced tillage significantly lowered the impact of the disease. An express PRA conducted by the German NPPO concluded that the 'syndrome des basses richesses' presented a high risk for Germany, although many uncertainties remained due the general lack of data. Finally, the whole picture is further complicated by the fact that '*Ca*. A. phytopathogenicus' might also affect strawberry (*Fragaria ananassa*). It has recently been proposed that '*Ca*. A. phytopathogenicus' was also the causal agent of strawberry marginal chlorosis. This disease of strawberry observed in France, Japan, and possibly Italy was initially thought to be associated with '*Candidatus* Phlomobacter fragariae' and transmitted by *Cixius wagneri* (Hemiptera: Cixiidae). If it is further confirmed that the diseases of sugar beet and strawberry are caused by the same pathogen, this will add to the risk.

Sources:

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INTERNET

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