Diagnostics of *Stemphylium beticola* nom. prov. in sugar beet

Bram Hanse[a], Joyce H.C. Woudenberg[b] & Ellen van Oorschot[a]

Introduction

Since 2007 yellow leaf spots appear on the leaves of sugar beet on fields in the Netherlands (Figure 1). The causal fungus was identified as *Stemphylium beticola* nom. prov. (Box 1) and cause sugar yield losses up to 40% in Dutch sugar beet production [1-3].

Figure 1. Infestation of *Stemphylium beticola* nom. prov. on a Dutch sugar beet field. Photo: 21-9-2007

Epidemiology

The first infestation of *Stemphylium beticola* nom. prov. appears in June-August on the leaves of sugar beet and develops as shown in figure 2-5. Due to the loss of leaves the canopy collapses and in case of a severe infestation the soil becomes visible in August-September (Figure 1).

Figure 2. Infestation starts with small irregular spots (0.5-2 mm). Photo: 25x.

Figure 3. Subsequently, the yellow spots necrotise into a brownish tissue. Photo: 25x.

Figure 4. New spots are formed by spores. The brown spots may grow in size to 1-3 cm. Photo: 5x.

Figure 5. The spots spread over the leaves and the whole plant becomes infested.

Box 1. Identification

The CBS-KNAW analysed 356 isolates (18 isolated from yellow spots on sugar beet leaves) from the genus *Stemphylium*. Based on the sequence of the ITS in combination with a partial sequence of the GAPDH and CALM genes, the isolates from sugar beet form a unique cluster in the phylogenetic tree (together with seven isolates from the CBS-KNAW collection isolated from various hosts). The name *Stemphylium beticola* will be proposed for this species.

Figure 6. *Stemphylium beticola.* Photo: 400x.

Confusion in diagnostics

Due to the damage caused by this fungal infestation, the damage threshold is at the appearance of the first spots. Therefore, it is important to distinguish yellow spots caused by *Stemphylium beticola* nom. prov. from all other yellow spots with various causes presented in figures 7-10.

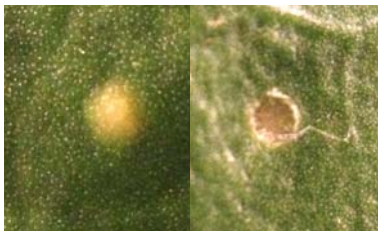

Figure 7. Leaf spot caused by insect damage. Left: front, right: backside of the leaf. Photo: 25x.

Figure 8. Leaf spot caused by *Pseudomonas syringae.* Photo: 25x

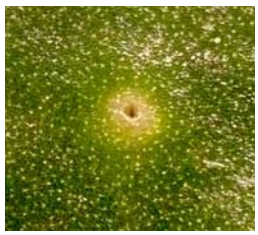

Figure 9. Leaf spot caused by insect damage. Photo: 25x.

Figure 10. Symptoms of Mn-deficiency.

References

1. **Hanse, B.**: Research on *Stemphylium* spp. the causal agent of the yellow leaf spot disease in sugar beet in 2012. *IRS, Bergen op Zoom,* pp. 32, 2013.
2. **Hanse, B. and Raaijmakers, E.**: Stemphylium, a new foliar disease in sugar beet. *Proceedings of the 74th IIRB congress, Dresden (D) 1-3 July, 2014*. Vol. 74, pp. 14, IIRB, Brussels (B).
3. **Hanse, B., Raaijmakers, E.E.M., Schoone, A.H.L. and Van Oorschot, P.M.S.**: *Stemphylium* sp., the cause of yellow leaf spot disease in sugar beet (*Beta vulgaris* L.) in the Netherlands. *European Journal of Plant Pathology* 141: 1-12, 2015.

a

IRS *Institute of Sugar Beet Research*
P.O.Box 32
NL-4600 AA Bergen op Zoom
www.irs.nl
hanse@irs.nl

b

CBS-KNAW *Fungal Biodiversity Centre*
P.O.Box 85167
NL-3508 AD Utrecht
www.cbs.knaw.nl