

Stemphylium in sugar beet

- factors influencing infection

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Introduction

Since 2007, yellow leaf spots appear on sugar beet leaves on fields in the Netherlands. The causal fungus was identified as *Stemphylium beticola* nom. prov. and caused sugar yield losses up to 40% in Dutch sugar beet production [1-4]. Climate room trials were performed to investigate the infection circumstances of *Stemphylium beticola* nom. prov. and susceptibility of different sugar beet varieties.

Materials & methods

In the infection circumstances trial, 8 week old plants of varieties Coyote (SESVanderHave) and Sandra KWS (KWS) were grown and inoculated with *Stemphylium beticola* nom. prov. (isolate GV 10-140) as described by Hanse *et al.* [3]. After inoculation the leaf wetness and air humidity were

regulated by opening and closing the plastic bag that covered the plants. Periods of 0, 2, 4, 8, 16 en 24 hours per day were realised with approx. 100% air humidity and wet leaves. All objects were grown at 9, 13, 23 and 28°C during day (16h) and 8, 10, 18 and 24°C during night (8h). Four days after inoculation, the plants were assessed for infected leaf area.

To test the susceptibility of sugar beet varieties, 10 week old plants of 10 varieties were inoculated with three isolates of *Stemphylium beticola* nom. prov. according to the method described by Hanse *et al.* [3]. After 14 days in the climate room (23°C day (16h; 20.000 lux) and 16°C night) plants were assessed for infected leaf area.

Results

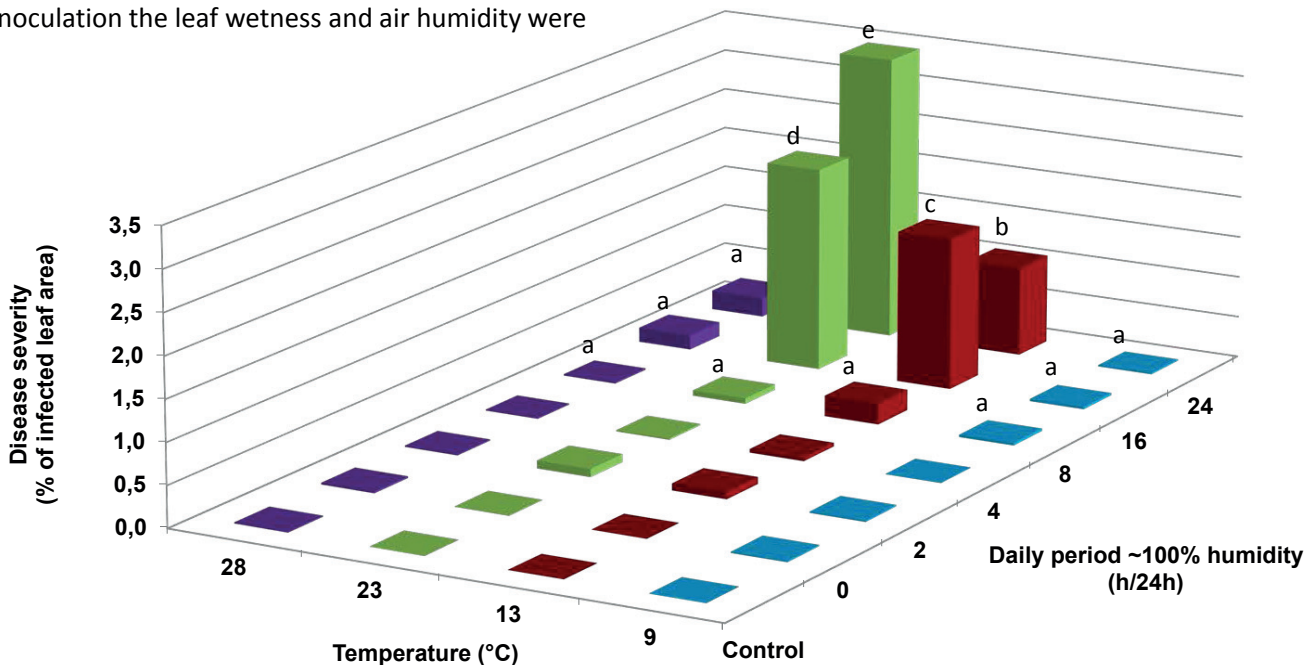


Figure 1. Results of the infection circumstances trial. There was a significant effect of temperature and air humidity with optimum temperature between 13 and 28 °C and ≥8h per 24h h ~100% humidity.

Least susceptible	IFZ2014 020-1	GV 14-693	GV 11-265
↑	A ^a	A ^a	B ^a
	B ^{ab}	F ^{ab}	D ^a
	C ^{ab}	E ^{abc}	F ^{ab}
	D ^{ab}	B ^{abc}	G ^{ab}
	E ^{bc}	G ^{bcd}	E ^{abc}
	F ^{bc}	D ^{bcd}	A ^{abc}
	G ^{bc}	C ^{bcd}	I ^{bcd}
	H ^{bc}	I ^{cd}	H ^{cd}
	I ^{bc}	J ^d	J ^{de}
↓	J ^c	H ^d	C ^e
Highly susceptible			

Figure 2. Susceptibility of variety A-J depended on the *Stemphylium beticola* nom. prov. isolate. Superscript letters indicate significant differences (LSD 5%).

Conclusions

- Temperature and air humidity had a significant effect on *Stemphylium beticola* nom. prov. infection;
- Optimum temperatures for infection were between 13 and 28 °C;
- ≥8h per 24h leaf wetness or approx. 100% air humidity were required for infection;
- Susceptibility of varieties depended on the *Stemphylium beticola* nom. prov. isolate.

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.
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.
4. Hanse, B., Woudenberg, J.H.C., Van Oorschot, P.M.S.: Diagnostics of *Stemphylium beticola* nom. prov. in sugar beet. *Proceedings of the 75th IIRB Congress*, Brussels 16-17 February 2016.



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