Earliness, Leaf Surface Wax and Sugar Content Predict Varietal Differences for Thrips Damage in Cabbage

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When cabbage is cultivated for storage in the Netherlands, it is usually harvested around mid-October. This type of cabbage crop may be severely damaged by thrips (*Thrips tabaci*). The thrips population on the plants and the more severe symptoms develop mostly during September and October. Also during cold storage symptoms continue to develop. The damage caused by thrips is due to the symptoms that develop after feeding, which are small callus-like growths that will turn brownish after some time and which may cover substantial amounts of leaf area.

Large differences exist between cabbage varieties in their susceptibility to thrips damage. It is not clear whether these differences are due to resistance (affecting the thrips population in the plant) or to tolerance (affecting the development of symptoms upon thrips feeding). Further, not much is known about plant traits affecting the resistance or tolerance to thrips. In order to guide selection and breeding for resistance to thrips, this study aimed to identify plant traits causing these differences. In the years 2005, 2006 and 2007 we performed field experiments with collections of varieties differing in a number of plant traits, with earliness varying from moderately late to very late. In the field experiments we relied upon natural infestation by thrips.

Several times during the period August-October plants were harvested and assessed for the amount of thrips damage and the number of thrips, as well as for several morphological and physiological traits, including head circumference, leaf thickness, developmental stage, head compactness, leaf surface wax, and Brix value as an indication of the content of soluble sugars.

One factor affecting the amount of thrips damage was the timing of the development of the head. Regression studies showed that more advanced plant development at the end of August increased thrips damage at the final harvest. Other plant traits affecting thrips damage were Brix and the amount of leaf surface wax.

However no single plant trait explained more than 45% of the variation in thrips damage at the final harvest. Optimal regression models, explaining up to 75% of the variation in thrips damage included Brix and leaf surface wax late in the season, as well as an indicator of plant development earlier in the season, and in 2005 also leaf thickness. The possible role of these plant traits in relation to thrips is discussed.

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