



Grower Summary

FV 427

Outdoor lettuce: screening
crops for presence of virus

Annual 2014

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Further information

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HDC is a division of the Agriculture and Horticulture Development Board.

Project Number: FV 427

Project Title: Outdoor lettuce: screening crops for presence of virus

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GROWER SUMMARY

Headline

Four of the nine different viruses that were detected in lettuce tested in July and September 2014 had not been previously reported in lettuce in the UK. Virus detection was not always linked to symptom expression and a higher virus incidence was detected in samples tested in September than in July.

Background

Well-known viruses such as *Lettuce mosaic virus* and *Mirafiori lettuce big vein virus* usually cause characteristic and recognisable symptoms in field lettuce. However, many other viruses that infect lettuce can either be symptomless or cause diverse range of symptoms that can potentially be attributed to other factors. Previous HDC-funded research found that hitherto unsuspected virus activity caused crop problems. For example, project FV 384 linked long-term decline in asparagus crops to virus presence. Similarly, FV 365, which looked at *Turnip yellows virus* in brassicas, found that a high percentage of plants were infected and, while plants exhibited minimal symptoms, yield and shelf life were affected. A survey of viruses in UK lettuce has not been performed for a considerable time and this research effectively establishes a baseline for further study. In this project, the state of knowledge regarding viruses in lettuce was determined through a literature review, and an initial screen of viruses was performed on samples from commercial crops in July and September 2014. It is important to note that, while this was a fairly comprehensive screen, virus detection was not exhaustive as we were constrained by the availability of antisera reagents for ELISA (serological) detection.

Summary

Seventeen viruses were assessed over two sampling periods during this study. Forty samples were tested in July and forty-two in September. Of these, lettuce tested positive for nine viruses and negative for eight viruses (Table 1). Four of these viruses (*Broad bean wilt virus I*, *Endive necrotic mosaic virus*, *Tobacco rattle virus*, and *Alfalfa mosaic virus*) have not previously been reported in UK lettuce crops, although some are known to be present in the UK on other crop or weed species (see *Literature review* for further details). There was a general increase in the number of samples testing positive for viruses between the July sampling period and the September sampling period, which was perhaps to be expected, particularly for aphid or similar vectors. No apparent correlation was seen between virus incidence and samples declared by growers as symptomatic. Virus incidence also appeared

not to be linked to specific lettuce cultivars, but may have been linked to geographical location. Definitive conclusions regarding such correlations cannot yet be drawn. Further testing in year 2 of this project may clarify any links between virus incidence and variety, geography, and/or apparent symptoms.

Table 1. Viruses assessed in UK lettuce in 2014 (July and September)

Viruses testing positive in UK lettuce samples	<p>Alfalfa mosaic virus</p> <p>Broad bean wilt virus I</p> <p>Beet yellow stunt virus</p> <p>Cucumber mosaic virus</p> <p>Endive necrotic mosaic virus</p> <p>Mirafiori lettuce big-vein virus</p> <p>Tobacco rattle virus</p> <p>Turnip yellows virus</p> <p>Lettuce mosaic virus</p>
Viruses testing negative in UK lettuce samples	<p>Arabis mosaic virus</p> <p>Broad bean wilt virus II</p> <p>Impatiens necrotic spot virus</p> <p>Lettuce necrotic stunt virus</p> <p>Lettuce ring necrosis virus</p> <p>Tobacco mosaic virus</p> <p>Tomato spotted wilt virus</p> <p>Turnip mosaic virus</p>

Viruses highlighted in **bold** tested positive and have not, to our knowledge, been reported in UK lettuce previously.

Financial Benefits

It is not yet clear whether the viruses found in the UK lettuce samples in this project have an impact on yield or product quality, and therefore financial benefits cannot yet be assessed.

Action Points

At this stage, it is not clear exactly what strategies growers should use, beyond the usual vector (e.g., aphid) control measures already employed, to mitigate against virus infection. It may become clearer as the project progresses whether viruses lead to yield/quality losses and how control might be addressed both practically and economically. This will depend to some extent on how the individual viruses carry over between seasons, e.g., by seeds, transplants, and weeds etc. The majority of the viruses found in this study are known to be aphid-transmitted, some can be seed-borne, and many are also found in a variety of weeds. Identification of virus reservoirs may therefore be of importance when considering control measures.