

New Project

FV 384a

Asparagus : Screening UK crops for
virus infection

Project Number: FV 384a

Title: Asparagus : Screening UK crops for virus infection

Start and end dates: 1st September 2011 to 29th February 2012

Project Leader: Cathryn Lambourne, Stockbridge Technology Centre Ltd

Industry Representative: Mr P Knight

Location: Stockbridge Technology Centre, Cawood, Selby, North Yorkshire, YO8 3TZ

HDC Cost: £8660

Project Summary:

There are several known viruses that affect asparagus some being associated with a condition known as 'asparagus decline' where vigour is reduced and yield deteriorates prematurely especially when crops are infected early. Unlike virus infections in other crops, asparagus tends not to exhibit typical virus-like symptoms so infection may go unnoticed. However, infected crops may be weakened and hence more susceptible to other pathogens; resulting in economic yield/quality loss. The three most important viruses in terms of 'decline', based largely on information from overseas, are considered to be Asparagus Virus I (AV-I), Asparagus Virus II (AV-II) and Tobacco Streak Virus (TSV). AV-I is aphid transmitted (non-persistent) and older plantations may have 100% infection with yield losses of up to 30% claimed. AV-II has no known insect vector but is transmitted mechanically via sap e.g. on cutting knives and is also potentially seed-borne. It has a wider host range than AV-I, and, based on previous testing in other countries, is considered to be the most widespread with yield loss estimates varying between 20-30% though may be much higher. Tobacco Streak Virus has an even wider host range and is transmitted by thrips, though it is also seed-borne.

In addition, Cucumber Mosaic Virus (CMV), Arabis Mosaic Virus (AMV), Strawberry Latent Ringspot Virus (SLRV) and Tomato Black Ring Virus (TBRV) are also known to infect asparagus. Asparagus Virus III (AV-III) has now also been confirmed infecting asparagus, but only in Japan to date.

In 1998, some 12 years ago, HDC commissioned a literature search on asparagus viruses (Project FV 213). One of the recommendations from this study was for a survey of asparagus crops of different ages over three successive seasons to confirm the identity of the viruses causing asparagus decline in the UK. The first round of this testing was carried out by STC on 20 asparagus crops in the UK. Results from this work indicated that the 2 most commonly detected viruses were AV-I and CMV where 100% and 79% of samples were found to contain the respective virus. Approx 18% were infected with AV-II, 18% were infected with SLRV and 35% with TSV. No AV-III or TBRV was detected.

The aim of this proposal is to update the full literature review conducted 10+ years ago of the viruses known to affect asparagus and produce information on possible correlations between virus presence and the impact on yield and 'asparagus decline' STC will undertake a second year of asparagus virus screening during September-October 2011 on a larger number of samples to determine whether the results from 2010 are consistent with other crops and to try and determine if there is any correlation between the incidence of virus in

crops and the recorded yield. This can be gathered retrospectively for the 2010 crops tested to help produce a clearer picture in the same crops year on year.

Aims & Objectives:

i) Overall Aim of the project

To gather information on the possible consequences of virus infections in asparagus with regard to the condition called 'Asparagus Decline'. To carry out a second season of screening in a range of UK asparagus crops for virus infection in autumn 2011. The sample numbers will be increased to ensure that a more robust set of results is produced.

ii) Specific Objectives

- To update the literature review covering the incidence of virus infections in asparagus crops. The update will focus particularly on the possible impacts and consequences of virus in crops and any correlation between virus, yield reduction and the 'asparagus decline'.
- Repeat virus testing on a selection of the 20 asparagus crops tested in 2010 will be carried out (guided by the project co-ordinator), but to include those where AV-II was detected previously in HDV Project FV 384. A further 20 – 25 sites will be identified.
- Organise collection of fern samples (min. of 2-4 samples/crop) and delivery to STC
- Collection of crop and yield data for the 2010 and 2011 samples.
- Process samples by ELISA for virus infection*
- Submit a summary report of the results

* the number of viruses screened for will be reduced from 7 to 4 in the 2011 work based on the findings in 2010. These will be AV-I, AV-II, CMV and TSV.

Disclaimer

AHDB, operating through its HDC division seeks to ensure that the information contained within this document is accurate at the time of printing. No warranty is given in respect thereof and, to the maximum extent permitted by law the Agriculture and Horticulture Development Board accepts no liability for loss, damage or injury howsoever caused (including that caused by negligence) or suffered directly or indirectly in relation to information and opinions contained in or omitted from this document.

No part of this publication may be reproduced in any material form (including by photocopy or storage in any medium by electronic means) or any copy or adaptation stored, published or distributed (by physical, electronic or other means) without the prior permission in writing of the Agriculture and Horticulture Development Board, other than by reproduction in an unmodified form for the sole purpose of use as an information resource when the Agriculture and Horticulture Development Board or HDC is clearly acknowledged as the source, or in accordance with the provisions of the Copyright, Designs and Patents Act 1988. All rights reserved.

AHDB (logo) is a registered trademark of the Agriculture and Horticulture Development Board. HDC is a registered trademark of the Agriculture and Horticulture Development Board, for use by its HDC division. All other trademarks, logos and brand names contained in this publication are the trademarks of their respective holders. No rights are granted without the prior written permission of the relevant owners.

Further information

Email the HDC office (hdc@hdc.ahdb.org.uk), quoting your HDC number, alternatively contact the HDC at the address below:

HDC
AHDB
Stoneleigh Park
Kenilworth
Warwickshire
CV8 2TL

Tel – 0247 669 2051

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