



Agriculture & Horticulture
DEVELOPMENT BOARD



Grower Summary

FV 397

Management, monitoring and
biology of chard and spinach
leafminers

Final 2012

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.

The results and conclusions in this report may be based on an investigation conducted over one year. Therefore, care must be taken with the interpretation of the results.

Use of pesticides

Only officially approved pesticides may be used in the UK. Approvals are normally granted only in relation to individual products and for specified uses. It is an offence to use non-approved products or to use approved products in a manner that does not comply with the statutory conditions of use, except where the crop or situation is the subject of an off-label extension of use.

Before using all pesticides check the approval status and conditions of use.

Read the label before use: use pesticides safely.

Further information

If you would like a copy of the full report, please email the HDC office (hdc@hdc.ahdb.org.uk), quoting your HDC number, alternatively contact the HDC at the address below.

HDC
Stoneleigh Park
Kenilworth
Warwickshire
CV8 2TL

Tel – 0247 669 2051

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

Project Number: FV 397

Project Title: Management, monitoring and biology of chard and spinach leafminers

Project Leader: Professor John Colvin

Industry Representative: Thane Goodrich, Intercrop Ltd
John Allan, Emmett Nottinghamshire Ltd

Report: Final 2012

Publication Date: 02/08/2012

Previous report/(s): None

Start Date: 1st April 2011

End Date: 31st March 2012

Project Cost (Total project Cost): £22,788 (£24,788)

Headline

Chard and spinach leafminer damage can be reduced to commercially acceptable levels by using a combination of monitoring, cultural practices and insecticides.

Background

Growers of high value leafy salads use mesh netting to protect some of their crops from a complex of insect and vertebrate pests and this has proved commercially effective against the leafminer species that can damage leafy salad Brassicas (HDC project FV 301). It is impractical, however, to use netting to protect chard and spinach, which can cover much larger areas, but, more importantly, can also be prone to damage by the netting. These particular crops were vulnerable to the recent increase in pest pressure from leafminer species therefore effective methods of managing the problem were required urgently.

This project aimed to investigate the possibility of improved insecticide-based control methods for chard and spinach leafminers and to disseminate the new knowledge to growers. The specific objectives were to:

- i) rear leafminer species collected from chard and spinach crops in the SE and NE of England;
- ii) develop a monitoring methodology for chard and spinach leafminers;
- iii) evaluate seven insecticide-based management treatments in a field trial;
- iv) disseminate new information to growers.

Summary

In 2011, the only leafminer pest species of any significance that was found to be attacking chard and spinach crops was the beet leafminer or mangold fly” *Pegomya hyoscyami*.

Various sampling methods were used to collect leafminers and the most effective was collecting pupae from the soil beneath mined plants early in the year. Removal of volunteer chard and spinach plants, particularly early in the year would therefore be an effective cultural control method for helping to reducing pest pressure.

Mass-rearing and monitoring data showed that there are probably only three generations of *P. hyoscyami* in most years. This means that significant egg-laying by the mangold fly is therefore most likely to occur in south England during late May to mid-June and from mid-August to September.

A comparison of monitoring methods found that the most effective and direct technique would be to plant a small area of 'trap' red chard at monthly intervals, positioned near the main crops) and check these regularly for the presence of the distinctive white eggs.

Of the actives tested, Decis Protech (deltamethrin), the coded product HDCI 015 and Gazelle (acetamaprid) all reduced leafminer damage substantially and prevented larvae maturing to the later instars when they become large white maggots.

No evidence of resistance to insecticides was detected. The effective actives all have different modes of action, which is very encouraging, because this should reduce the risk of resistance development and thus ensure the longer-term sustainable production of spinach and chard crops, even in *P. hyoscyami* 'hot-spots'.

Financial Benefits

The project has delivered significant financial benefits, because it proposes a low-risk management method for the mangold fly that does not rely on the use of nets. The research has also shown that several insecticides, both currently available and a coded product near registration, will prevent the development of large leafminer maggots in the crop. The full financial consequences of having crops rejected, or lost, due to the presence of leafminer maggots or mines is difficult to quantify precisely, but the estimated sales value of spinach and chard ranges between £10,000 to £20,000 per hectare. The funding provided by the HDC was £22,788.00 and so within a single season, the full value of the project could be recovered by avoiding the damage caused by leafminer and maintaining the sales value of only 1 to 2 hectares of crop.

Action Points

- Removal of volunteer chard and spinach plants in spring should be encouraged to reduce host availability for leafminer populations emerging from winter diapause.
- Early preparation of fields to plough-in mined leafminer host plants, should reduce populations by killing pupae present in the soil.
- To prevent insecticide-resistance development and thus ensure sustainable long-term chard and spinach production, a leafminer monitoring system should be put into practice. This will enable a reduction in the number of sprays applied to crops.

- When the monitoring data indicates the need for sprays, the use of available actives should be alternated. They have different modes of action and so this will also help prevent resistance development.