

# **Grower Summary**

---

## **PC 302c**

Optimising the Macrolophus-based Tuta absoluta IPM strategy: Phase 1 – Identification of species on UK nurseries.

Final 2013

## **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](mailto: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.

<b>Project Number:</b>	PC 302c
<b>Project Title:</b>	Optimising the Macrolophus-based Tuta absoluta IPM strategy: Phase 1 – Identification of species on UK nurseries.
<b>Project Leader:</b>	Dr Jennifer Hodgetts
<b>Contractor:</b>	The Food and Environment Research Agency
<b>Industry Representative:</b>	Dr Philip Morely – British Tomato Growers Association
<b>Report:</b>	Final Report 2013
<b>Publication Date:</b>	05 July 2013
<b>Previous report/(s):</b>	None
<b>Start Date:</b>	01 December 2012
<b>End Date:</b>	31 March 2013
<b>Project Cost:</b>	£5,992

## Headline

Commercial samples of *Macrolophus* from three suppliers and a residual nursery population dating from the mid-1990s were all identified as *Macrolophus pygmaeus* using molecular techniques.

## Background

*Macrolophus* was first released into UK tomato crops as *M. caliginosus* (now = *M. melanotoma*) in 1995 to supplement the biological control of glasshouse whitefly. Within two growing seasons it became clear that the predators would also feed on tomato plants when invertebrate prey was limited. UK growers stopped releasing *Macrolophus* but populations survived between seasons and it became one of the most important pests of organic tomato crops. Research work from 2006 in HDC project PC 240 found a solution which allowed growers to obtain the predatory benefits of *Macrolophus* without suffering crop damage. Once pests had been controlled natural pyrethrins were used to reduce the population of *Macrolophus* before crop damage occurred. This resulted in renewed interest in the predator and some growers started to release it to supplement the control of tomato leaf miner (*Liriomyza bryoniae*). More recently, *Macrolophus* has formed the basis of an IPM strategy for the management of the new tomato pest, *Tuta absoluta*. As part of this IPM programme some growers have released *Macrolophus* at the start of each season while others have relied on the population already established on their nurseries. The *Macrolophus*-based IPM strategy has been successful in some situations but there have been inconsistencies which must be explained before these can be resolved.

During the last two decades, there has been considerable debate about the taxonomy of the *Macrolophus* complex of species. It was thought possible that the inconsistencies in the IPM results in UK tomato crops could be due to the presence of more than one species and the overall aim of the project was to study the genetic diversity of *Macrolophus* spp. and begin to consider the implications to the successful IPM of *Tuta absoluta*

As the first step to improving understanding of the use of *Macrolophus* it was important to compare the species of *Macrolophus* currently being sold by the main bio-control suppliers to those predator populations which become established in tomato crops each summer. In addition, the products were compared to a *Macrolophus* population which had been established on a commercial nursery for 18 years without being supplemented with any further purchased material.

## Summary

DNA sequences of four genes were analyzed from 21 separate adult *Macrolophus* specimens from seven separate sources / localities including three commercial bio-control agent suppliers and four commercial tomato growers. Three of the growers had released purchased *Macrolophus* during 2012 while the fourth had not released the predator since the mid-1990's.

Three genes (COI, ITS2 and D3) revealed identical DNA sequences across all the samples tested. One gene (CytB) revealed that one of the samples from a grower who released purchased material in 2012 had a slightly different DNA sequence to all other samples but they were still the same species. The CytB and COI DNA sequences were compared to publically available sequences of *M. melanotoma* and *M. pygmaeus*. This revealed that all samples tested were *M. pygmaeus*. Whilst this has demonstrated that overwintering and released populations of *Macrolophus* are the same species, any potential differences in the effectiveness of the two groups in terms of bio-control action cannot be inferred from this study. Therefore at present there are no recommended changes to the *Tuta absoluta* IPM strategy.

The results from the grower who had not released *Macrolophus* since the mid-1990's indicate that the material sold at that time was *M. pygmaeus* and not *M. caliginosus* (= *M. melanotoma*) as labelled. However, this was simply related to nomenclature and has probably not affected the IPM programmes used in the intervening period.

## Financial Benefits

There is no immediate financial benefit to UK growers from this study. However, the information is a prerequisite to further fine tuning of the *Macrolophus*-based IPM strategy for *T. absoluta*.

## Action Points

The results do not impact on growers at this stage but will influence further studies aimed at optimizing the overall IPM programme for tomato crops.