

New Project

M 54

Mushroom casings: Screening of microbial populations in relation to mushroom quality

Project Number: M 54

Project Title: Mushroom casings: Screening of microbial populations in relation to mushroom quality

Project Leader: Dr John Elphinstone & Prof Ralph Noble

Contractor: FERA & EMR

Industry Representative: Richard Gaze, Mushroom Panel

Start Date: 1st April 2011

End Date: 30th September 2012

Project Cost: £ 23,400.00

Project Summary:

- Test isolates of different species of pseudomonads obtained from casing, mushrooms, and culture collections for mushroom initiation stimulation and bacterial blotch pathogenicity.
- Assess value of pyrosequencing for analysing population dynamics of stimulatory and pathogenic *Pseudomonas* species in casing materials.
- Adapt PCR diagnostic tests for stimulatory and pathogenic isolates of *Pseudomonas* species (*P. putida*, *P. tolaasii*, *P. gingeri*, *P. reactans* and others) by comparison of 16S rRNA/rDNA or other gene sequences of stimulatory, pathogenic and non-pathogenic isolates.
- Validate PCR diagnostic test on commercial casings in relation to mushroom pinning behaviour and blotch disease incidence, to facilitate selection of casing materials and avoid blotch.

Background & Objectives:

- The casing material, its microbial population and watering management, and the growing room environment can have significant influences on mushroom initiation (stimulated by *Pseudomonas* species including *P. putida* and *P. poae* ¹) and the

appearance of bacterial blotch (caused by *Pseudomonas* species including *P. tolaasii*, *P. fluorescens*, *P. reactans* and *P. gingeri*²⁻⁸).

- In the same environment and watering regime, some casing materials stimulate more initials and/or are more prone to blotch disease than others.
- Some isolates of pseudomonads that stimulate mushroom initiation may also cause blotch, and some isolates that stimulate initiation are more closely related to the blotch causing *P. tolaasii* than to the initiation stimulating *P. putida*^{2,9}.
- Some casing materials result in over-stimulation of mushroom initials resulting in overcrowded, small and poor quality mushrooms. It is unclear whether this is due to the stimulatory bacterial population.
- Diagnostic tests for mushroom initiation stimulatory and/or blotch causing pseudomonads would provide information on the likely effects of the casing material on initiation and incidence of blotch disease. This could inform casing producers and growers in the selection of peat and other raw materials for casing.

Commercial Objectives

- To develop screening tests for *Pseudomonas* species in mushroom casing materials to assist in understanding their role in stimulation of mushroom initiation and disease development.
- Screen casing materials used in the UK for *Pseudomonas* species using the above test and relate the results to mushroom pinning and blotch incidence; this will facilitate selection of casing materials and management practices which reduce the risk of blotch disease and improve mushroom quality.

Benefits to industry

- Diagnosis of casing materials for mushroom initiation stimulatory and blotch-causing pseudomonad isolates from casing materials.
- This should lead to the selection of materials that reduce the risk of blotch, and are more predictable in terms of pinning and subsequent mushroom populations.

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.