

**ASSOCIATION OF APPLIED BIOLOGISTS**

**ASPECTS OF APPLIED BIOLOGY 120**

**Positive Plant Microbial Interactions:  
Their role in maintaining sustainable and  
natural ecosystems**

**Forest Pines Golf & Country Club,  
Brigg, N Lincolnshire, UK**

**2-3 December 2013**

**Produced by the Association of Applied Biologists**

**Copies available from: The AAB Office  
Warwick Enterprise Park, Wellesbourne,  
Warwick CV35 9EF, UK**

## REFERENCES

The correct form of reference for this publication, which is based on a meeting of the Association of Applied Biologists, is:

*Aspects of Applied Biology 120, Positive Plant Microbial Interactions: Their role in maintaining sustainable and natural ecosystems*, pp. xx–xx

Papers are included herein without any liability for loss or damage suffered as a result of their application or use. Reference herein to trade names and proprietary products without special acknowledgement does not imply that such names, as defined by the relevant protection laws, may be regarded as unprotected and thus free for general use. No endorsement of named products is intended nor is any criticism implied of similar products which are not mentioned. *Please note* certain names of chemicals featured in this publication are Registered Trademarks.

This publication is copyright under the Berne Convention and the Universal Copyright Convention. All rights reserved. Apart from any relaxation permitted under national copyright laws, no part of this publication may be reproduced, stored in a retrieval system or transmitted in any form or by any means without prior permission of the copyright owners. Permission is not, however, required to copy Abstracts of papers on condition that a full reference to the source\* is shown. Multiple copying of the contents of the publication without permission from both The Association of Applied Biologists through the Executive Officer and separately from the author, or other holder of the unilateral copyright, is always illegal.

The Association of Applied Biologists and Editors cannot be held responsible for errors or any consequences arising from the use of information contained in this publication; the views and opinions expressed do not necessarily reflect those of the Association of Applied Biologists and Editors.

## ENQUIRIES

Enquiries concerning the technical content of chapters should be addressed directly to the authors but other matters should be directed to the Executive Officer, AAB Office, Warwick Enterprise Park, Wellesbourne, Warwick CV35 9EF, UK.

Printed in UK

Published by the Association of Applied Biologists  
Warwick Enterprise Park, Wellesbourne, Warwick CV35 9EF, UK

©2013 The Association of Applied Biologists

ISSN 0265-1491

\*Full reference: *Aspects of Applied Biology 120, Positive Plant Microbial Interactions: Their role in maintaining sustainable and natural ecosystems*, pp. xx–xx, published by the Association of Applied Biologists, Warwick Enterprise Park, Wellesbourne, Warwick CV35 9EF, UK.

## INTRODUCTION

This is the fourth AAB conference on '*Positive plant microbial interactions*'. This conference provides an opportunity to discuss recent developments in the understanding of how microorganisms can interact positively with plants in agricultural and natural ecosystems such that ecosystem sustainability is maintained or enhanced. These interactions include: bacterial (via production of exopolysaccharides) and mycorrhizal (via hyphae enmeshing soil particles) stabilisation of soil aggregates and structure; rhizobacterial promotion of plant growth due to increased nutrient availability via, for example, associative nitrogen fixation, phosphorus solubilisation and production of siderophores and increased iron availability; rhizosphere and endophytic bacterial promotion of plant growth by influencing plant hormone balance; rhizosphere and endophytic bacterial promotion of plant abiotic (temperature, water, salt, heavy metal) stress tolerance; endophytic and symbiotic nitrogen fixation; mycorrhizal uptake of nutrients and water; rhizobacterial suppression of plant disease via, for example, competitive exclusion of rhizosphere pathogens, production of antibiotics and the induction of systemic resistance; associative fungal protection against plant parasitic nematodes; endophytic fungal protection against herbivore pests; associative microbial (bacteria, fungi and viruses) protection against insect pests and bacteriophage protection against disease.

Prof. Stephen Cummings  
Convener, Applied Mycology &  
Bacteriology Group

## CONTENTS

<b>The effect of organic and conventional farm management practices on the soil microbial community at the phylum level</b> C H ORR, C LEIFERT, J M COOPER & S P CUMMINGS	1–7
<b>Application of Endophytic Bacteria Possessing Plant Growth Promoting Traits for the Use in Bioenergy Crop <i>Brassica napus</i></b> RICHARD LALLY, ANTONIO SERGIO MOREIRA, PAUL GALBALLY, DAVID RYAN, KIERAN GERMAINE & DAVID DOWLING	9–13
<b>Biocontrol of stem-base infection by mycotoxin-producing <i>Fusarium</i> species by <i>Fusarium equiseti</i> and other fungal antagonists</b> S A M PERRYMAN & J S WEST	15–21
<b>Screening of large collections of plant associated bacteria for effective plant growth promotion and colonisation</b> NICHOLAS OTIENO, JOHN CULHANE , KIERAN J GERMAINE, DINA BRAZIL, DAVID RYAN & DAVID N DOWLING	23–28
<b>Exploiting rhizobacteria that mediate plant hormone status</b> IAN C DODD, ANDREY A BELIMOV, E DAVID ELPHINSTONE, LIN CHEN, ROSALIA GARCIA TEIJEIRO, CAROLINE KEMP, HAZEL FIELDING & HANNAH WRIGHT	29–34
<b>Mechanisms of beneficial colonisation of barley by fungal root endophytes</b> B R MURPHY, T H HODKINSON & F M DOOHAN	35–44
<b>PAMP-triggered Immunity in <i>Arabidopsis thaliana</i>-<i>Hyaloperonospora arabidopsidis</i> pathosystem</b> E FANTOZZI, G BOZTAŞ, A WOODS-TÖR, C ZIPFEL & M TÖR	45–51
<b>Plant microbial interactions in agricultural soils: relevant at the field scale?</b> J M COOPER, J A BELL, S CUMMINGS, J KIDD, C H ORR & L REMPELOS	53–56
<b>An insight into apoplastic effectors in <i>Arabidopsis thaliana</i> – <i>Hyaloperonospora arabidopsidis</i> pathosystem</b> G BOZTAŞ, E FANTOZZI, A WOODS-TÖR, C ZIPFEL & M TÖR	55–62
<b>Protecting crops with food by-products</b> MABEL NNADI, OLATUNDE BANWO, WASIQ AMIR, XUE CHEAH, MONICA PRICE & KEITH THOMAS	65–70
<b>Studying the microbiome of AMF cultivated <i>in vitro</i></b> N GULBIS, L ROBINSON BOYER & G ROBINSON	71–76
<b>Seasonal abundance and distribution of nematode pests of <i>Musa</i> spp. in Ilorin, Kwara State of Nigeria</b> N B IZUOGU	77–83

<i>Posters</i>	<i>Page</i>
<b>Can differing Arbuscular Mycorrhizal fungal communities influence pollinator visitation rates and in turn yield? – An initial test experiment</b> PETER ORRELL	85–90
<b>The effect of <i>Piriformospora indica</i>, an endophytic fungus, on wheat resistance to <i>Fusarium</i> disease</b> M RABIEY, I ULLAH & M W SHAW	91–94
<b>Rhizobacterial colonisation of, and physiological effects on, peanut (<i>Arachis hypogaea</i> L.) under water-limited conditions</b> HANNAH R WRIGHT, WORAWUT NOYPANG, NIMITR VORASOOT, SANUN JOGLOY & IAN C DODD	95–100
<b>Inoculation with the ACC-deaminase containing rhizobacterium <i>Variovorax paradoxus</i> 3C-1 increased lettuce yield under UK field conditions</b> CAROLINE L KEMP & IAN C DODD	101–105
<b>The industrial end of microbial success in the UK</b> LOUISA ROBINSON BOYER, NATALLIA GULBIS & QIAOYI LIN	107–108
<b>Physiological effects of ACC deaminase producing rhizobacteria on broccoli (<i>Brassica oleracea</i>)</b> H A FIELDING & I C DODD	109–114

