

Can biological control agents replace chemical fungicides?

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Control of disease in two strawberry production systems

- Primary interest in grey-mould of fruit (*Botrytis cinerea*)
- Using outdoor and protected (polytunnel) fruit
- Main goal to reduce chemical usage
- How,
 - ◆ Decision support systems
 - ◆ Modified films
 - ◆ Biological control agents

Disease control in strawberry

- Typically use chemical fungicides
- Consumer sensitivity to residues
- Possible build up of tolerance in pathogen
 - ◆ Need to address this situation
- Reduce/remove fungicide usage
- Alternatives to be found
 - ◆ Biological control agents

Biological control agents (BCAs)

- Use of organism(s) to control pest/disease
- Several commercial BCAs



Can these commercial formulations work under Irish conditions?

Trial I: Evaluation of commercial BCAs in protected strawberry

- Trial in Teagasc, Clonroche 2003
- Used cv. Elsanta (13 mm crowns)
- Planted in modules (10 plants per bag)
- Sprayed all plants with *Botrytis* spores
- Applied five BCAs
- Rovral (chemical control)
- Two harvests ~ fruit yield & diseased fruit

Effect of BCAs (in italics) on average marketable yield and diseased fruit yield (g) per bag (10 plants) of strawberry (cv. Elsanta) over a 60-day cropping period (Summer 2003)

Treatment	Total yield (g)	Marketable yield (g)	Diseased fruit yield (g)
No Botrytis	1065.2	941.3	123.8 (12%)
Botrytis only	845.8*	717.8	128.0 (15%)
Botrytis + Rovral	1112.1	1029.8	82.8 (7%)
Botrytis + <i>Serenade</i>	1108.2	975.7	132.5 (12%)
Botrytis + <i>Trichospray</i>	1147.2	968.7	178.5 (16%)
Botrytis + <i>Trianium-P</i>	977.3	848.3	129.0 (13%)
Botrytis + <i>Trichodex</i>	909.0	794.0	115.0 (13%)
Botrytis + <i>Messenger</i>	1214.8	970.3	244.5 (20%)*

Significant differences:

yes

yes

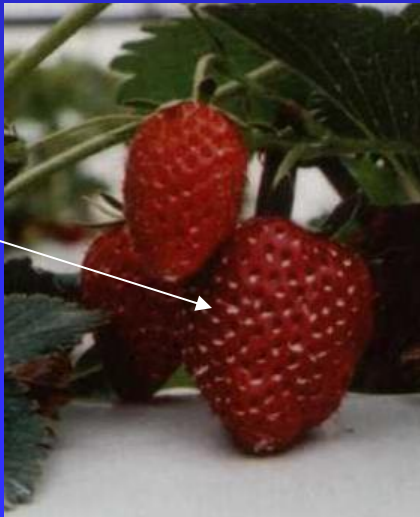
yes

Indoor trial I: Summary & conclusions

- BCAs can work in protected strawberry
e.g. under high disease pressure of trial
Loss with BCAs ~ 13% and no effect on yield
- Some BCAs seem inappropriate e.g.

Serenade

White
powdery
residue on
fruit



Messenger

Marketable yield: 970.3 g

Diseased fruit yield: 244.5 g

Diseased/total (%): 20%

Indoor trial I: Summary & conclusions

Future work

1. Repeat trial I – trials this year at Oak Park
 2. Include additional commercial BCAs (?)
 3. Trials under light modifying film covers
 4. Use Irish microorganisms
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Irish microorganisms as BCAs

- Foreign microbes do not always work well outside their own country/environment
- Irish microbes better suited to environment in Ireland (?)
- Use laboratory techniques to isolate microbes
- Use greenhouse and field trials to evaluate

Integrated Pest Management

Cultural techniques

variety choice, hygiene practice, water management etc.

in tandem with

BCAs instead of/with fungicides

with

Decision support system (outdoor)

or

Control of environment (indoor)

Acknowledgements



- Department of Agriculture, Food and Rural Development (Regional Stimulus Funded project under National Development Plan)
- Teagasc centres and staff in Clonroche, Oak Park & Kinsealy
- Prof. Martin Downes (NUI Maynooth)
- Liam Staunton (Teagasc, Kinsealy)
- Leslie Dowley & Jim Burke (Teagasc, Oak Park)
- Harry O'Brien (Tullow), Eamonn Kehoe (Enniscorthy), Dermot Roughneen (Kinsealy).