National Development Plan 2007 - 2013

Mushroom Research Update
Teagasc
Kinsealy

Helen Grogan

Agriculture and Food Development Authority

The Irish Agriculture and Food Development Authority

Mushroom Research & Advisory Group

Advisors:

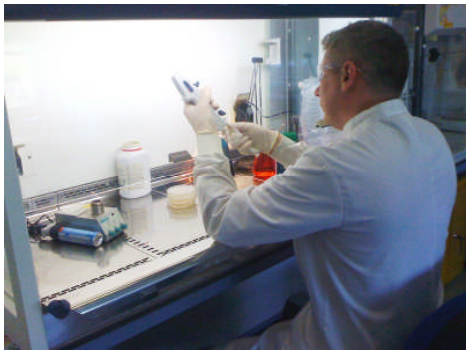
Gerry Walsh, Gorey, Co. Wexford
Tom Kellegher, Monaghan

Kinsealy Research Centre

Research Leader	Helen Grogan
Technologist	Brian McGuinness
Experimental Officers	Pat Raftery
	Oliver Sheridan

Walsh Fellows:

Balasubramanian Velusami	UCD, Dublin
Matthew O Brien	NUI, Maynooth
Greg Deakin	Reading University, UK

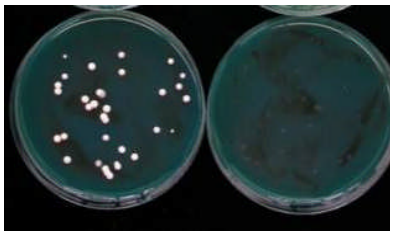


(1) Recently Completed Research

Measuring and managing Dry Bubble disease pressure on mushroom farms.

Dr. Justyna Piasecka (2010)

Key Results:



- **Useful selective medium for *Verticillium***
- **Live *Verticillium* was detectable:-**
  - **on most farms**
  - **most locations**
  - **different crop stages**
- **Live V*erticillium* was detected on 5 farms with <u>no obvious dry bubble</u> disease!**

(2) Recently Completed Research

Epidemiology, diagnostics and quality aspects of “brown mushroom syndrome” associated with Mushroom-Virus X (MVX). DAFF RSF Project 07-547.

- Collaborative project between Teagasc, AFBI and DIT
- Dr. Caoimhe Fleming-Archibald, Ms. Angela Ruggiero,
- Industry participation and survey

Key Results

- “Brown Mushroom” symptoms are caused by an “infection”
- Time of infection dictates the severity of the symptoms observed
  - **Infection at spawning generally produces few symptoms**
  - **Infection at the end of spawn run or at casing produces most symptoms**
- FTIR method may be useful to discriminate between MVX infected and non-infected mushrooms
- Improved molecular method shows promise for detection in mushroom compost

(3) Ongoing Research

Dynamics of hydrogen sulphide gas production in spent mushroom substrate (SMS) during disturbance and removal

Walsh Fellow: Balasubramanian Velusami (UCD).

- Collaborative work with Dr Tom Curran, UCD
- Industry participation – 4 commercial storage sites were studied

Monitoring emissions

Summary of results

Site	Heap Size (m^3)	% moisture	Heap Temp °C	Max H_2S Conc above SMC Face
1 Outdoor	2000	69 ± 2	30 ± 7	680
2 Outdoor	2300	70 ± 1	28 ± 3	**2083** 
3 Indoor	1800	**65 ± 4**	**46 ± 3**	687
4 Indoor	600	**61 ± 7**	37 ± 4	89

Equipment Used for Monitoring H_2S Gas Emissions

H_2S : 1 - 250 mg/kg
Data Logging: 1 Min/ 60 hrs
RAE Systems Inc

QRAE+

QRAE II

iTX

H_2S : 1 - 1000 mg/kg
Data Logging: 1 Min/ 360 hrs
Industrial Scientific Inc

Respiratory protection

Conclusions

- Real H_2S risk when working with stored SMC
- Lower % moisture and cooler temperatures reduce H_2S levels
- Indoor storage and smaller sized heaps are preferential

- H_2S personal monitors should be worn by operatives
- Operatives should take regular breaks
- Protective H_2S-specific face mask recommended

(4) Ongoing Research

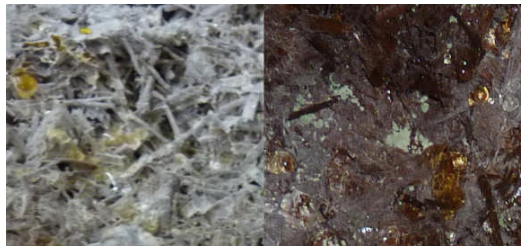
Epidemiology and detection of *Trichoderma aggressivum* with particular reference to mushroom compost production in Bulk Phase 3 systems.

Walsh Fellow: Matthew O Brien, NUI Maynooth

- Collaborative work with Dr Kevin Kavanagh, NUI
- Done in collaboration with HDC and FERA, UK

Key results:

- *T. aggressivum* sporulates less prolifically in the dark
- Good detection system for *T. aggressivum* in compost
- Bulk phase 3 compost can be infected at the end of spawn run



(5) Future Research -

MushTV: Solutions for the mushroom industry to emerging disease threats from *Trichoderma* and Virus

EU FP7 funding - €2.5 million; 16 Collaborators; 5 countries;

- Final stages of negotiations
- Due to start 1 January 2012
- 3 Years
- 30+ participants
- 300+ growers and composters to benefit

Work Packages:

WP 1	Identification of Alternative Disinfectant products and methods
WP 2	MVX characterisation, diagnostics and biology
WP 3	Volatile based diagnostic method for *Trichoderma aggressivum* detection in compost
WP 4	Investigations to locate reservoirs of *Trichoderma* and MVX on mushroom facilities
WP 5	Evaluation of the biopesticide *Bacillus subtilus* for the control of pathogens
WP 6	*Trichoderma* growth in phase 3 compost
WP 7	Tracking the incidence and spread of MVX inoculum on mushroom facilities
WP 8	Dissemination and training activities


teagasc
Agriculture and Food Development Authority


THE CIRCA GROUP
EUROPE


C . M . P
commercial mushroom producers
co-operative society ltd.


Funghi


STOWARZYSZENIE
BRANŻY GRZYBÓW UPRAWNYCH


AHDB


HDC


CNC
VOC
Natuurlijk Samen


emr
east malling
research


WAGENINGEN UR
PLANT RESEARCH INTERNATIONAL
WAGENINGEN UR


Province of
West Flanders
Driven by people


afbi
Agri-Food and
Biosciences Institute


WALSH
MUSHROOMS


STERCKX


HOOYMANS
COMPOST b.v. KERKDRIEL


Sylvan
CULTIVATING EXCELLENCE

Acknowledgements:

DAFF – Stimulus Fund

Dr. Thomas P. Curran (UCD)
Dr. Kevin Kavanagh (NUIM)
Dr. Jesus Frias (DIT)
Dr. Leixuri Aguirre (DIT)
Dr. Laura Alverez (DIT)
Mairead Kilpatrick (AFBI, NI)

Growers, composters, Allied Trades

Teagasc:
- **Brian McGuinness**
- **Gerry Walsh**
- **Tom Kellegher**
- **Pat Raftery**
- **Oliver Sheridan**