ISMS e-Congress
14-17 September 2021

Keynote Speakers Program

Day 1 – Tuesday 14 September

Research into Mushroom Quality – a personal view. *Dr Kerry Burton*

Dr Kerry Burton has researched into mushroom quality over a number of years. Mushroom quality is an important issue for the mushroom industry influencing more than competition between producers but also between mushrooms and other food choices.

He trained as a Biochemist, and his research has involved this and other scientific disciplines such as Biomechanics, Molecular Genetics, Genomics and Post-harvest Technologies. This address is based largely on personal experience and research findings on a *Agaricus bisporous* and he will present a consolidated view that is accessible to the mushroom industry with principles that can be translated to other cultivated mushrooms. Furthermore, the presentation acknowledges how consumer attitudes have changed and now include ethical, environmental and health/wellbeing considerations.

Dr Kerry Burton gained a BSc. In Biochemistry from Bristol University, MSc in Plant Sciences, Wye College, London University and a PhD. In Microbiology from Kings College London.

He has worked in the research and development for over 40 years on a variety of research disciplines including biochemistry, biomechanics, molecular genetics and genomics to investigate developmental and metabolic biology of fungi and plants. His main area of work has been with the mushroom *Agaricus bisporu*s, first examining mushroom quality - color, flavour, texture and development using physiology, gene expression and practical technologies, such as cooling, modified atmosphere packaging and biomechanics to understand bruising.

He has examined the biochemistry of 1-octen-3-ol and its role in the initiation of mushroom primordia. He was one of the initiators for Agaricus Genome Project. He has used genomics to understand the environmental regulation of morphogenesis, and nitrogen and carbon metabolism in fungi. More recently he has examined Multiple Viral Infections, their interactions and pathogenesis in *Agaricus bisporus*. His other research interests include plant polymer decomposition and bioconversion.

Day 2 - Wednesday 15 September

The Development of the Modern Mushroom Industry in China. Dr Chang-Tian Li

Dr Changtian-Tian Li will cover many aspects of the rapid development of the mushroom industry in China such as:

- Historical and statistical overview of development in the industry
- How and why the evolving market share of the different mushrooms in China is impacting the development of the industry
- Key discoveries that have shaped the industry with a focus on Chinese research
- Commercialization of species not previously cultivated
- Adoption of modern technology
- Impact of corporations entering the Chinese mushroom industry

Dr Changtian-Tian Li is a Professor and Director of the Engineering Research Centre of the Chinese Ministry of Education for Edible and Medicinal Fungi at the Jilin Agriculture University in Changchun, China. He has had an extensive career in mushroom research in China and South Korea and brings a wealth of knowledge and experience to his presentation.

Day 3 - Thursday 16 September

Fungi in Fashion. Philip Ross

MycoWorks grows sheets of high-performance mycelium for the luxury fashion industry and has inspired a global movement to advance the capabilities of fungal materials. MycoWorks' co-founder and CTO Philip Ross will share the story of how this form of fermentation developed at the intersection of art, design, and biotechnology, and will describe the history and future of this novel industry. Philip will cover the basics of the technical process and manufacture while illuminating the motivations, circumstances and desires driving global brands to seek these refined materials.

Philip Ross is the Co-Founder and Chief Technical Officer of MycoWorks, a company that grows high performance mycelium for the fashion industry. With three decades of experience cultivating fungi, Philip's inventions have pioneered the engineering and applications of mushroom materials for industry. Known as a thought leader on biomimicry, his artworks have been featured at NY MoMA, the Moscow Biennale of Contemporary Art, and the Venice Biennial of Architecture. In 2014 Philip joined Stanford University's Department of Bioengineering as a Visiting Scholar, where he contributed designs towards the internet of biological things- the Bionet.

Day 4 – Friday 17 September

Research Progress on Key Technologies of Morel Cultivation in China. Dr Weihong Peng

With over a hundred years' effort, the research history of artificial domestication and cultivation of morels (*Morchella* spp.) began in 1882. After research accumulation for years, the Sichuan Academy of Agricultural Sciences (SAAS) bred a new variety of *M. importuna,* the "Sichuan *Morchella* 1".

The morel industry is receiving extensive attention. However, the scientific research of morels is lagging behind production practices. Problems such as low cultivation efficiency and fructification failure are very common.

Dr Peng's presentation will cover:

- An overview of commercial morel cultivation in China where over 8000 hectares are now in production across 20 provinces.
- Commercial cultivation practices in China.
- Varieties and IP protection
- Challenges to production
- Responses from research
- An overview of physiological research and the role of soil microbial ecology and nutrition status on morel fruiting

Dr Weihong Peng is the chief expert in Edible Fungus Innovation Team, Sichuan, China. Dr. Peng's team became the first in the world to commercialize the cultivation of morels in 2012, making an important contribution for the development of China's morels industry.

Dr. Peng's research focuses on genetic breeding and cultivation of mushroom since 1996. Her research topics cover the breeding of new varieties of edible fungi, including *Morchella* ,*Auricularia polytricha*, *Tremella fuciformis* and *Flammulina filiformis*, as well as the establishment of corresponding cultivation techniques.

Some achievements have also been achieved in the identification of pathogen and the development of prevention and control technology for typical mushroom diseases in industry.

Dr. Peng is the director in Microbiology Research Center, Institute of Agricultural Resources and Environment, Sichuan Academy of Agricultural Sciences (SAAS), Chengdu, China. This research center is the largest research institute for mushrooms in western China, with more than 60 team members engaged in mushroom research and industrialization development.

Day 4 – Friday 17 September continued

Tackling Mushroom Disease Control in an Environmentally Conscious World. *Dr Helen Grogan*

Dr Grogan's presentation takes a look recent research on mushroom disease management from a range of perspectives including:

- Recent work on cobweb resistance to Viviando, and new research looking at bacillus-based products.
- Work on the genetics of Agaricus response to cobweb, Lecanicillium and Trichoderma aggressivum. This type of research is new for Agaricus and should shed light on the how the host and pathogen interact, and the potential for indicators of what future 'disease tolerant' strains should have in their genetic make-up.
- The response of three different Agaricus strains to MVX opening the way for breeders or breeding research projects to target strains with different host responses to pathogens to look for potential resistance traits.
- New disease challenges when looking at alternatives to peat for commercial horticulture.
- A reminder that acute attention to hygiene, steam cook out and shorter crop durations will continue to be key to keeping on top of diseases, and preventing them getting out of control.

Dr. Helen Grogan has worked in mushroom science and mushroom pathology for over 30 years, first at Horticulture Research International in England and since 2005, she has been a Senior Research Officer with Teagasc in Ireland. In that time she has had responsibility for a broad portfolio of research projects with national and international funding agencies, working closely with the mushroom industry worldwide to solve industry issues through targeted research.

Helen is currently involved in several EU and nationally funded research projects including: 'SoftGrip' - a project looking to develop a soft gripper for the robotic harvesting of mushrooms, and 'BioBubble' - a project on Dry Bubble disease, looking at the genetic response of the Agaricus bisporus mushroom to the disease, and the potential of biocontrol products to control it. She has recently starting working on projects to support a sustainable transition away from peat-use in mushroom casing as well as looking at novel peat-replacement materials for commercial horticulture.

Helen has published numerous research papers and technical articles, supervised many PhD students and early stage researchers, and presented her work at international science and mushroom conferences around the world. She continues to have a passionate interest in advancing the frontiers of mushroom science so that the sector can avail of the latest technologies and developments, enabling it to remain relevant and sustainable into the future.