

# CASE STUDY

# MONAGHAN MUSHROOMS

**Monaghan Mushrooms is one of the largest mushroom-only companies in the world. Started by Ronnie Wilson in the early 1980s, it has grown to a company of more than 3,000 staff, with composting yards and growing facilities in Ireland, the UK and Canada.**

Like many mushroom businesses, Monaghan Mushrooms is facing the dual challenge of increasing productivity while also improving sustainability. To achieve this, the company invests strongly in Research and Development (R&D), and are heavily invested in the search for an alternative to peat. While details are commercial in confidence, there are suggestions the team could be close to finding a product that works.

## **New products to expand market reach**

Monaghan also has a strong focus on the health benefits of mushrooms. Chief Scientific Officer, Dr Jude Wilson, sees this as a real point of difference for the company. Monaghan, in collaboration with world class scientists based in Ireland have confirmed the immune and gut health boosting benefits of mushrooms, as well as their high antioxidant content and anti-inflammatory properties.

Monaghan have also developed a range of mushrooms with enhanced levels of Vitamin D, B12, B6, and selenium. According to Jude, the market for Vitamin D enhanced mushrooms absolutely boomed during COVID-19 because of the association with improved immunity against respiratory illness.

Moreover, people in the UK and Ireland can be deficient in Vitamin D, especially during winter months when there is not much sun. Monaghan's vitamin D 'chestnut' mushrooms can provide 100% of the RDA (recommended daily allowance) of Vitamin D.

Monaghan is also the only UK- based source of organic *Agaricus*, with organic production in dedicated growing rooms at farms in Britain and Ireland. In total, one in six crops are organic, with both brown and white varieties grown.



A packed cardboard punnet. - Photo company supplied.

Similarly to Australia, organic mushrooms are marketed in flow wrapped cardboard punnets - a point of difference which has created new challenges. Cardboard must be managed differently to plastic in order to balance moisture absorption against condensation.

In addition, Monaghan has removed PVC from all of its films and the majority of its punnets are made from recyclable material.

## **Growing the crop**

All Monaghan mushrooms are grown in shelf systems filled with Phase 3 compost. Monaghan has two compost yards in the UK and sources compost from facilities in Ireland and the continent.. While Australians may think of the UK as a small island, travel times of five hours or longer are common. Luckily the climate is



Mushroom researcher Dr Ralph Noble (left) and Monaghan farm manager Gavin Coventry (orange vest) observing filling.



Compost is topped fairly loosely with casing at room filling, with compost added and the surface ruffled several days later.



Rooms at Monaghan are a massive 60m long.

cool enough that transit heating is not usually an issue. However, compost still requires the application of ice or needs to be vacuum chilled during the summer. Compost travelling from Ireland also has a lower supplement rate to reduce the risk of overheating.

Despite efforts to keep inputs consistent, variability in compost quality still creates challenges when growing a consistent crop.

“In the last couple of years we have noticed significant shifts in poultry manure quality. This could be due to changes in the litter, but also the feed they are given. For example, organic certified chickens are free to wander outside, which may be one factor changing the qualities of the litter,” comments farm manager Gavin Coventry.

Spawn for whites comes from Sylvan (A15) and browns from Amycel (Heirloom, sold as ‘chestnuts’), which are the dominant strains grown in the UK.

Although the six high shelf system is standard, the rooms are a massive 60m long. This gives a growing area close to 900m<sup>2</sup> for each growing room and although three full loads of compost are needed to fill a room, shelves are relatively lightly filled, with a target of 88kg/m<sup>2</sup>. Casing is added at room filling and compost is added to the casing four or five days later, then machine ruffled to mix it through (CAC).



**Figure 5.** When the shelves are tilted the bed splits cleanly down the middle; although all that separated the compost at filling was a simple scoring blade, this division remains over the life of the crop.



**Figure 6.** the tilting shelves allow pickers to stand upright and use both hands, reducing strain and improving picking rates.

Mushroom casing is still sourced in bulk from Scotland and Ireland. Although peat extraction in the UK is due to be phased out by 2026, partial exemptions will be put in place for some sectors, including for mushrooms, as there is still no viable substitute. However, from 2030, there will be a complete ban on the use of peat in UK horticulture.

### The innovation of tilting shelves

While Monaghan's Whitley farm was built some years ago, two years ago the company decided to invest in something very new. Six additional rooms were built, designed to hold the new GTL Europe tilting shelf system. The new rooms don't look especially different to the standard rooms, fitting within the existing building footprint. Key differences include an expanded portico and altered door design to allow exit of the moving belts.

The tilting shelf system is described more thoroughly elsewhere in this journal, so we won't repeat it here. One difference from the Nesco Farm is that the harvest belts take mushrooms to the utility area outside the room, rather than to a purpose-built mezzanine packing area, to fit in with the existing infrastructure.

Discussion with the team at Monaghan highlighted some great benefits from the system, but also a few challenges. For example:

- Baby buttons don't fit into the holes in the belt; thinning still needs to be done by cutting and packing in the room
- Because there are four belts in the room, there can only be four to eight pickers working at one time

This last point has proven a particular issue for the 60m long rooms at Monaghan. The mushrooms grow so fast it is hard for the pickers to keep pace. In theory, this could be overcome with multiple shifts operating around the clock. However, that is not feasible for either good business management or staff welfare. The company has overcome this issue by using the six rooms with tilting shelves specifically for organic crops. With slightly slower growth and lower yield, this makes it possible for four pickers to keep pace with growth.

There are also some very real benefits of the system:

- Pickers can see the mushrooms clearly and have an upright posture; harvest is more comfortable and workers are happier

- As the pickers use both hands they can harvest around 100kg/hour compared to normal pick rates of around 30kg/hour; even with needing one packer per picker, there is still a major productivity gain
- Getting knives out of the growing room and packing areas is good for both OH&S and food safety
- The system has so far been very reliable, with few breakdowns

'Graze' picking is feasible as the pickers can move quickly across the crop, targeting the larger mushrooms first, then returning later for smaller sizes

The concept of 'graze' picking, where each bed is harvested several times daily, is particularly interesting. The growers at Monaghans have found that this increases total yield as the mushroom size can be optimised. It certainly gives the developing mushrooms more space, helping them reach the size band required while avoiding crowding on the bed.

Like Australia, labour availability in the UK has been an issue, especially with Brexit. While new rules providing Ukrainians with three-year visas has helped many UK mushroom farms get workers, other eastern Europeans can only get six month visas – just about long enough for them to become fully trained and productive. To overcome this issue, harvesters may be partially trained before arrival so as to maximise value from the six month visa system. Monaghan also try to re-recruit trained harvesters.

Efficient use of labour is one way that growers can reduce costs without compromising quality. However, fully replacing staff with picking robots still seems a long way off. While the farm system is designed to potentially incorporate robotic packers, robotic picking seems much further off.

Humans are just better at picking mushrooms and one thing is clear; the pickers like tilting shelves. Happy workers are both more productive and more likely to stay. And that, perhaps, is something money can't easily buy.



**Figure 7.** Mushrooms placed into the harvest belts are whisked out of the growing rooms through an access door into the utility area for packing.