

## MEET THE MAKER

# Science behind new mushroom medicine

FOR this month's chapter of Meet The Maker, Southerly Magazine spoke to Graham Upson from Touchwood Mushrooms at Somerset Hill near Denmark about his never-ending search for knowledge.

**Southerly Magazine:** Tell us about your career before mushroom farming.

**Graham Upson:** Well, 1976 is when I first became involved with mushrooms, but I was a photographer. I used to do commercial photography in Western Australia, and also in the UK. I worked in the North Sea for a while as an underwater photographer on the oil rigs.

**SM:** That would've been a bit hairy?

**GU:** Yes. Dangerous, cold. Basically, I was the photographer for a company that was involved with the maintenance of the rig. Make sure they didn't fall over. So, I'd go down and photograph the damage to the legs and then, depending on the strength of what my photographs revealed, decide to send down the underwater divers to weld it or abandon the rig. In Perth, I did everything from tabletop photography, industrial photography, even fashion photography for a couple of years. Lee and I were living in Triggs Island at the time, north of Scarborough. I'd always been interested in agriculture, as Dad was on the land in England before I came over when I was nine years old. Lee and I looked at this place in Kalamunda which was for sale. The owner was this retired wheat farmer who was growing a couple of mushrooms in his back shed. He was not doing a particularly good job of it because he knew nothing about it and, as I found out later, no one knew about it. He said if you could grow these damn things there was money in it, because everything he could grow he

could sell. The whole thing fascinated me, because there was a whole pile of compost there, steaming away, and I just didn't understand the physics of that.

**SM:** What variety was he growing?

**GU:** Just the ordinary button field mushrooms that you see in Coles and Woolworths. He said: "I've spoken to the Ag Department, and they said cows, wheat, sheep, pigs, we can help with, but mushrooms? We have no idea, go to France. They've grown mushrooms in the caves, have done for 100 years, go and learn off them". I wasn't about to go and do that. There was a couple of mushroom growers over east but their raw material is so different to ours, it had no relevance to over here.

**SM:** So you inherited his hobby?

**GU:** Well, I didn't buy his place. We ended up buying 10 acres down at Wellard and we put up a trial growing room and very successfully lost money for about six years, because it was that hard to do.

**SM:** Why so hard?

**GU:** Because the chemistry of understanding the compost, understanding the clones of mushroom we had in the environment and the conditions they required. Again, I was doing what he was doing. It was just hopeless, until we start to get the hang of it, and then start to understand what they wanted, but this was years into it.



**SM:** And how did you learn that? Trial and error?

**GU:** Absolutely, just keeping notes of what we were doing and comparing it to the previous one, and previous time of year. We didn't have air-conditioning, we didn't have any successful sterilising machinery or anything like this.

**SM:** What did you learn that you really required, for this to work, and for it to be productive?

**GU:** Most definitely it was environmental

control – cooling and heating – and also hygiene. We didn't think it was totally necessary, but it absolutely has to be pristine.

**SM:** It seems innocuous since we're talking about a fungus that grows in dirt.

**GU:** True, but if you're trying to grow mushrooms that are of a commercial yield and you want them to come up every week and you want a certain quantity to come up every week to pay the bills, you've got to have mushrooms



and then we went to 100 kilograms a week. And then we were growing 300 kilograms a week after about eight years. To cut a long story short, we got to nine rooms growing mushrooms with air-conditioning, and starting to get a little bit more serious about controlling the environment. Then it got to the stage where we were growing about three tonnes a week. We had about 15 to 17 staff.

**SM:** And it didn't stop there?

**GU:** No, we were starting to get the hang of it. We were starting to get the feel for the mushrooms and starting to think like a mushroom, some might say, which I've done ever since.

**SM:** There wouldn't have been much time for photography then?

**SM:** Not much, no. In 1990 we decided to go the whole hog, when we were really going quite well, to put up the state-of-the-art mushroom farm. We ended up putting in a turnkey project from Holland – the most high tech in the world. We ended up on 76 staff and I was growing 20-plus tonnes a week. We were supplying Coles and Woolworths and sending mushrooms to Singapore and Tokyo and everything.

**SM:** How did you manage to find the workforce the staff for an enterprise like that?

**GU:** It was not a problem. It was in the Kwinana district and it seemed that we had a very good area for that. We always had at least 40 people wanting to start. It was not a problem for staff, but getting good ones was another story. We did do the calculation once that over the 20 odd years we grew mushrooms I employed 1,000 people. You were losing eight to 10 a week and putting more on. Anyway, we basically trundled along at 20-plus tonnes a week. It was a big business and a very high-tech facility.

**SM:** How much compost was required for that level of production?

**GU:** We would produce about 150 tonnes of compost a week to grow 20 tonnes of mushrooms.

**SM:** How did you do that?

**GU:** We had a massive concrete area – a shed with big composting machines. We're talking about machines that are six to seven metres long, two to three metres wide, big drums on the front that pick the compost up and throw it over the back and water it and mix it up properly.

**SM:** Where were you getting the materials for that?

everywhere. It's no good growing five kilograms to the square metre when you're looking for 30. After six years we were confident enough to put up a couple more growing rooms



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**GU:** We used to get the bulk of the chicken manure from the metropolitan area from the farms. The base constituent of the compost was wheat straw, which was the stubble. That's all we needed because we're looking for high lignan and cellulose levels, and that was the perfect material, providing it was the right type of straw. I was very fussy about the straw type because if it was too short and too dense then it would produce a very dense compost – very anaerobic – and you couldn't grow any mushrooms. So, there was science, there was tests, chemical analysis and all that all the time. So brewers grain, chicken manure, gypsum, straw – that was the mix. Some soybean meal, sometimes canola meal and things like that go in there as well for protein levels. That was at one end of the farm because that is a dirty operation. If it's done incorrectly it can be very smelly, but if it's done properly it's a nice smell. You can walk into the compost yard and know if you're doing it wrong.

**SM:** What as the process from there?

**GU:** The compost goes into the pasteurisation tunnel where it aerated. It stays in there for a week, and that turns that smelly compost into something that just smells like sweet earth. Then we cooled it down to below 30 degrees and spawned it.

**SM:** How does the spawning process work?

**GU:** A mushroom drops in the region of 20 million spawns on average, and to collect that spawn is a laboratory process. At that stage we weren't making our spawn. It was several million dollars to set up a spawn lab that would handle the load that we wanted, so we were sourcing it from Sydney.



**SM:** How is it supplied?

**SM:** The spawn comes impregnated onto wheat grain. So we get the grain, we throw it onto the crop and the spawn will grow out from the grain. It's a two-week process from adding the spawn to ready-to-go cropping. In the growing rooms you add a casing layer, which is about 40mm to 45mm of peat moss, the very best peat moss from Europe. We're talking about Irish, German or Russian peat moss – something that's at least 40,000 years old so it holds water. There's not any of these peat mosses in Australia. We are very particular in the mushroom game about the quality of peat. We used to bring it over by container load because we were using so much. That goes across the top and the spawn then spends about six days permeating the casing layer.

**SM:** What happens when it reaches the surface?

**GU:** We flush all the CO2 out with fresh air, it senses the change in environment and the mushroom just pings. It forms tiny little

pinheads and that will be a mushroom. It will grow from a pinhead to a fully grown button mushroom, ready to eat, in six to eight days. Very fast. From that point onwards we would get two to three flushes.

**SM:** What becomes of the used compost?

**GU:** All the compost is then used on gardens, so it's a great recycling story. We take by-products and then turn it into a food and then we use the compost for growing more things. It's a very efficient industry.

**SM:** What prompted the move to Denmark?

**GU:** We sold that farm in 1995. We got a very good offer for it and moved to Denmark because I was very interested in wine – particularly the wine making process. I did try a little vineyard at the mushroom farm up there, which was half an acre of cabernet vines and a bit of

chardonnay. I was just playing around and talking to a local winemaker. I just got the bug, so we ended up coming down here because I always fancied Denmark. We put a vineyard in and we grew the vines for 20 years. We did rather well with them, including in Copenhagen when ours was named the best pinot in the world.

**SM:** And again, pinot is a wonderful thing but it's difficult to get right, from a growing perspective.

**GU:** Well, that's me all over. If it's easy to do I'm not particularly interested in it, like mushrooms. It was a bit harder than I thought, that one, but I was particularly interested in pinot, because it was supposed to be hard to do. And I was very interested in champagne production, so the two hardest things to get right is what I embarked on. Sauvignon blanc and semillon came along for the ride, but that was all pretty straightforward. I'm a self-taught wine maker because I didn't have time to go through four years of school and learn winemaking. I understood a fair amount of the chemistry involved anyway, with what I was doing with this.

**SM:** And yet you've sold the vineyard side of the enterprise?

**GU:** I quit while I was ahead, basically, because the mushrooms got a hold of me again. I sold it about four years ago to Harewood Vines and they continue to go very well.

**SM:** You couldn't shake the mushroom addiction?

**GU:** It is an addiction. We out up the complex here and started to grow button mushrooms again, field mushrooms and portobellos. And we were trying to grow them organically, which is not easy because a lot of the button mushrooms require some chemicals to grow. So we really had to watch what we were doing or all sorts of moulds could have taken over.

**SM:** And then you took a different path yet again?

**GU:** In the back of my mind I was always interested in medicinal mushrooms. I was reading a lot about the benefits for people's health, but these mushrooms were not easy to grow and not easy to get. So I've built here a Class 100 laboratory which is very high spec. We have a big autoclave which sterilises all our mediums. I work with medicinal mushrooms now because I feel I can help people with my knowledge. We could have gone fishing but I felt that with all the years of knowledge we'd gained,



that would have been a waste.

**SM:** What types of health issues can they help with?

**GU:** Lion's mane is a very popular mushroom, but if you saw it in the forest you wouldn't eat it. You would assume it was poisonous but it is very good for your cognitive function. It is good for boosting your immune system and is very high in antioxidants. Reishi is very good for gut health and also immunity. Maitake is a very power mushroom and is linked to killing off cancer cells. It helps with type 2 diabetes and can negate some of the had side-effects of chemotherapy. Turkey tail mushrooms are anti-viral and is a good anti-cancer mushroom. Again, it is good for boosting immunity and gut health. Shiitake is well known as an edible mushroom and is another one which is good for immunity, but also respiratory health, liver health and cardiovascular health.

**SM:** And they are sold as a powder?

**GU:** Yes, and they are all different colours.

**SM:** How far down the medicinal path is this new side of the business?

**GU:** They're all ready to go. The website is up and running. I've supplied samples to QEII for cancer research. We've got the University of Hong Kong working with us, so we're getting very seriously into it now.

**SM:** Presumably there are big numbers of varieties that can be useful?

**GU:** I'm thinking there is no end to this.

There are mushrooms out there that we haven't identified and haven't picked yet, but it could save the world. Who knows? It's a lifetime study and the reason I like it is because I know I'll never get to the bottom of it. There's 2 million mushrooms in the world and 2,000 have been declared reasonably edible. Out of those 2,000 only a tiny percentage have been checked out for medicinal benefits.

**SM:** So there's still more work to be done?

**GU:** And that's why I built the Class 100 lab. I can make all my own spawn in there, all my own tissue cultures, I can clone any mushroom, grow it out

into crops and have them analysed for beneficial compounds.

**SM:** You still grow enough food mushrooms to sell locally?

**GU:** I only grow enough to sell locally to restaurants around here and for the Albany Farmers Markets. I like that because it's a social morning and it's a chance to talk about the medicinal side.

**SM:** What would you say would be the ideal meal using your mushrooms and how would it be prepared?

**GU:** They're so versatile. I could name a dozen, but I'll go simple. I'll go with a

gourmet mushroom omelette with four or five different types of mushrooms. I tell you, it would be like no other omelette you've tasted before. I would go shiitake, button, cremini, portobello, field mushroom and oyster mushroom.

**SM:** You're still having fun?

**GU:** I just love the subject. It's a daily challenge. I liked the winemaking side as well. It was a bit warm and fuzzy but it didn't pack a huge interest for me in the end. We won a lot of medals which turned a lot of people on. It's one thing to make someone feel good with alcohol but it's a whole other thing to cure them and make them feel good forever. **S**



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