A closer look at Iranian spawn

Two years after the first series of training sessions in Iran, the same growers' organisation grouped around Mohammed Entessari invited us to visit Iran again. The plan this time was to take a close, critical look at a number of small spawn laboratories, before making some proposals about how they could improve their working practices.

Discussion about storing pure cultures.

A proud Nami Movahedi with the double door autoclave he built.

Lab under construction at Mohammed Entessari's new compost plant.

Photographs: Magda Verfaillie.

By Magda Verfaillie, Mycelia, Belgium

Mushroom growing is gaining in importance in Iran. Growers who produce acceptable yields can earn good money. And investment levels are high too: A couple of large composting annex farms are under construction, with a number also at the planning stage. For an update on the current state of affairs of mushroom growing in Iran, see the article by Mark Den Ouden from C Point in this edition. There has been a clearly positive evolution compared to 2005, when Mrak contributed to the first edition of Mushroom Business with an article about Iran. Even though top yields are not achieved by all, the growers are making every effort to improve their performances. One of the initiatives in this respect is inviting western experts to study a specific part of the cultivation process. In November, it was the turn of compost quality, while in December the focus was on running a scan of local spawn production.

The prevailing situation

Iranians are well aware that the quality of the spawn must be thoroughly reliable, as only then can an objective evaluation be formed of the other parameters.
Imported spawn is an unaffordable luxury for the Iranian mushroom growing community. Transport costs are so expensive, and furthermore the risk of quality loss during shipment too high, so growers have no other option than to multiply the mycelium themselves. At the moment the spawn is produced in small laboratories, each attached to a farm.
During the first series of training sessions in 2004, Joris Hoozee (KaHo, Technical University of Ghent) and myself (Mycelia) explained the most important aspects of spawn production. At the time, we

laboratories

noticed immediately that our audience was highly educated, an ideal sponge to absorb our theoretical approach. Armed with the main basic principles, the growers experimented for two years in their individual laboratories, so we were very curious to see the results of all their studies and efforts.

Extremes

We intended to visit one or two laboratories each day. The labs are situated close to large farms, but there are often great distances to be travelled between the farms. This gave us the opportunity to enjoy spectacular journeys through the beautiful natural countryside. The sheer size of the country and its location between the mountains and the coast creates immense temperature differences between the various regions. The most northerly laboratory was in the province of Ardabil, close to Azerbaijan. In the winter it is bitterly cold, up to 25 degrees below zero. When we were there it was exceptionally mild, with only a slight frost and a 10cm dusting of snow. Most of the farms are situated in a circle of 100 kilometres around Teheran, to the south of the Caspian Sea, where the climate is similar to continental Europe. Temperatures hovered around 8° Celsius in December, 10 degrees above the usual figure. The most southerly of the farms lies close to Iraq and the Persian Gulf, near Dezful, where it is pleasantly warm in the winter (average 25°C) but scorchingly hot in the summer (45°C!). Luckily, energy costs are not a problem in Iran; otherwise mushrooms would be worth their weight in gold.

The cooked wheat is placed on tables for the steam to escape before being placed in bags and sterilised.

Apart from cheap energy, the average Iranian doesn't share in the huge profits generated by the oil industry. These flow into the pockets of the ruling religious class, which unsurprisingly doesn't please the rest of the population.

Findings

To avoid going into too much detail about each of the laboratories we visited, some of our general findings are mentioned.

The situation was not always ideal. Previously the laboratories were built against the growing rooms, with all the inherent risks of cross contamination. With a few exceptions, this is still the case today. Since our series of lessons in 2004 growers have tried to introduce some extra safety measures, including placing corridors as a physical separation and keeping the personnel separate.

The same standardised methods are used everywhere when preparing the substra-

>

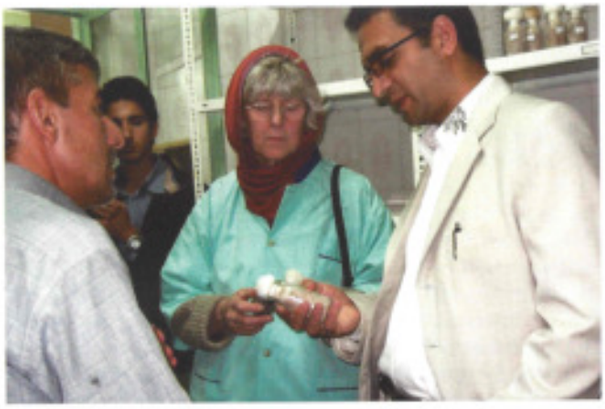
Rahim Islamisadeh with his trial of the heat loving wild Agaricus he has domesticated.

Promising heat-loving Agaricus bisporus from Dezful

Rahim Eslamizadeh (see photo left) graduated as an entomologist and runs a farm with his brothers in Dezful, near the Persian Gulf. Their main income is generated by the production of organic citrus fruits. They also have a mushroom farm that is well worth seeing. What really grabbed our attention was a trial growing room with a new type of heat-loving mushroom, isolated by Rahim in the inner regions of Iran. As this Agaricus bisporus variety is perfectly at home in temperatures above 20°C, it could in time represent the solution for sub-tropical regions where the current range of commercial varieties fails to perform well. What we saw in the growing room was a reasonable, albeit fluctuating, production of firm, short stalked mushrooms with a broad dented cap. They vaguely resemble the sidewalk mushroom (Agaricus edulis), but an olfactory test immediately convinced us of its superior aroma and flavour. We are very impressed by this new member of the family and happily took a pure culture with us back to Belgium for further testing. In the meantime, Mycelia have produced the first bags of spawn, destined for the Belgian Research Centre in Beitem and Grad van de Wert's company in the Netherlands. If the results from cultivation are favourable the variety will gradually be introduced onto the market. Interested parties can still contact us at info@mycelia.be.

> tes: cook out, allowing the steam to evaporate, mixing additives. We did wonder why the grains are pre-soaked beforehand. The grains are placed in bags of 1 to 2 kg content, with a sort of cotton wool plug used as a filter. All the laboratories were equipped with a good single door autoclave, and Nami Movahedi from Pars Shariar had even built his own double-door autoclave. The sterilisation procedure was followed to the letter, but many mistakes were made when the sterilised material was transferred to the area used for cooling. Each of the labs had LAF (Laminar Air Flow), which met the standards in most cases. In general, too few inspections and checks were made, and the LAF wasn't always used correctly. Incubation is done in one or maximum two areas, with a greater risk of secondary infection as a result. Allowing incubation to take place in the same space as the mother cultures, mother spawn and spawn is asking for trouble.

A rather large example of the new Agaricus bisporus variety (see text page 19).



A bottle with the pure culture is handed over, for further trials in Europe.

New layout

We used an interesting concept to evaluate the laboratories. The whole group of growers and laboratory staff came with us from one lab to another. Normally, a complete migration of so many people is inadvisable because of the risk of transmitting diseases, but in this case we waived the rules for the good of the common cause. During the visits everyone had the opportunity to ask questions and make remarks. We took photographs and noted our findings and made sketches and floor plans of the existing situation. All this information was subsequently used as the basis for the evaluation meeting later in the day. In each case we could propose a new layout, for an acceptable price. No matter how limited the laboratory was in size, we were still able to convert part of it into a clean room zone, with sterile over pressure and pressure drops. On condition that all the rules we suggested for correct hygiene practice are observed, we are convinced that the infection problem will be drastically reduced in the future.

We also examined a laboratory that was still being built, at the new compost yard at Sadaf Mushrooms. Mohammed Entessari showed that he was one of the best students in the class by showing us the excellent design and still rudimentary construction of his new lab. Together we corrected a few minor errors relating to the flow of goods and air treatment, but if these details are modified the lab should function perfectly.

Detail of the trial set up of this promising variety.

A united future

It was a joy to witness how these colleagues interacted. Partly due to their geographically isolated positions, they realise there is more to be gained by collaboration than competition. The ultimate dream of the group of growers is to set up a central spawn laboratory, built and equipped according to the strictest standards and with enough capacity to supply the large farms. We will definitely help them make this dream a reality.