By Magda Verfaillie, Mycelia

On the Ugandan high plains

During our two-week stay in Uganda at the beginning of May there were two topics on our mushroom agenda. The first was getting acquainted with the oyster mushroom growing sector, which is still in its infancy in Uganda as an agricultural activity. The second was helping with the preparations for the planned 'First All-Africa Mushroom Conference on Edible and Medicinal Mushrooms'.
We knew that oyster mushrooms were being grown in this East African country, as we have been sending mother cultures regularly there over the past few years. But on arrival we were pleasantly surprised by the good supplies of excellent quality mushrooms on the local markets and in the supermarkets. We were able to visit a few oyster mushroom growers near the capital. It was exciting to see how the oyster mushroom varieties were flourishing in the mild climate of the Ugandan high plains, and how growing mushrooms provides a good income for a number of farmers.

Prof Olila and Dr. Nakalembe with dried Termitomyces microcarpus, destined for the research project.

Brick built growing rooms. The doors filled with wet charcoal help with humidity.

Pictures: Magda Verfaillie.

We had set aside a few days to visit the University of Makerere. Our contact person there is Prof. Deo Olila from the 'Faculty of Veterinary Medicine'. Because of his great interest in the medicinal qualities of mushrooms and plants he has created a special department in his faculty, aimed at conducting research into the presence of beneficial substances, in the first instance in the endemic mushroom varieties. His department works closely with the Dept. of Pharmacology.
Prof. Olila is also one of the driving forces behind the congress, to be held in Kampala from the 22nd to the 27th October 2006. The initial plans were made together with Prof. Okhuoya and Dr. Oman from Nigeria during a congress on medicinal mushrooms held in Port Townsend, USA, in November last year. These plans have now been crystallised and we had promised to lend our support in the form of logistic aid. In the course of a series of meetings with the organising committee a poster was designed that will be displayed on the Mycelia stand during the Dutch Mushroom Days. A congress website will also be launched shortly on www.mycelia.be (www.mycelia.be/africamushroomconf06). See box for more information.

Oyster mushroom growing

Prof. Olila is only indirectly involved in the cultivation side of things, but he naturally knows all the major figures at the university. He introduced us personally to three scientists who use mother cultures from Mycelia : Prof. Robert Muyanya and Gerald Kyeyune from the Dept. of Agriculture and doctoral student Stephen Katende. After their academic work, all three use the laboratory facilities to produce limited amounts of spawn. They make 250 gram bags of millet, which once sealed at the top are small enough to be able to incubate without a gas exchange system. The spawn is supplied to growers all around Kampala.
At the moment, oyster mushrooms are the only wood-grown mushrooms cultivated professionally in Uganda - for a number of reasons.
The production of oyster mushroom spawn, thanks to the rapid incubation of mycelium, can just about be achieved in the rather primitive laboratory conditions. This rapid growth also makes it possible to pasteurise and incubate ligneous waste from agriculture without too many preventative measures being taken. In addition, oyster mushrooms, contrary to other lignivorous mushrooms, are recognised by Ugandan consumers and therefore accepted as an edible variety.
There is a great deal of interest in growing other varieties of lignivorous mushrooms as well as mushrooms grown on compost (white button cap mushrooms imported from South Africa are very costly) but the growers currently lack the knowledge needed for successful cultivation.

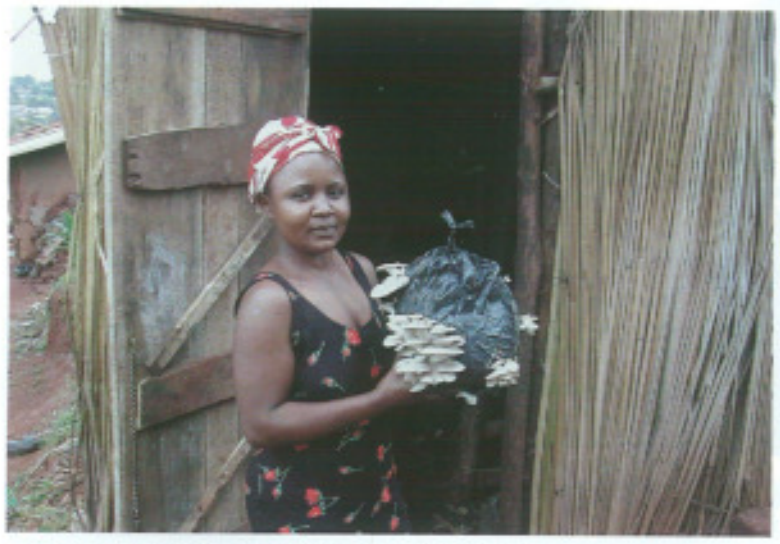
Stephen Bwiire and his incubating oyster mushroom substrates

Bwiire

The largest grower we visited, Stephen Bwiire, has a – for Ugandan standards – large brick building. A part of this is currently used a living accommodation and partly as a growing room, where he harvests 50 kilos of oyster mushrooms daily. There are plans to use the whole building and to expand production by a factor of 14. The raw materials, which chiefly consist of cotton seed husks and rice grains, are pasteurised in the courtyard in oil drums over a wooden fire. Portions of 3 to 4 kilos of substrate are inoculated with 5% spawn, packed into black plastic bags and incubated on wooden shelving. Most of the plastic is cut away vertically around the incubated substrate (see photo), and the bags are hung from the shelves.
The climate control is simple but efficient. Wide air vents at the top of the building, protected from the wind and sun by a layer of bamboo, supply fresh air (see photo). There are sprays to create the correct humidity level, but there is also another ingenious system: the doors consist of a framework sandwiched around a double wire panel. This panel contains a layer of wet charcoal, which the wind blows though keeping the interior of the building cool and damp.
The farm is strategically located, close to the tourist region of Jinja at the source of the Nile, and at about one and a half hour's drive from Kampala, so there is no problem selling all the mushrooms produced fresh. The mushrooms are marketed via a wholesaler, who packages the mushrooms and sells them to hotels, restaurants and supermarkets.
Smaller scale growers, like those we visited near Kampala (see photo), don't produce their own substrate, but purchase it from a substrate producer who uses the same oil drum procedure as Mr. Bwiire. The low budget growing rooms are made from bamboo and equipped with bamboo shelving. Fresh air comes through the walls, and pots made from earth hung up around the room help provide moisture. The continuous evaporation through the porous the exterior of the pots helps towards a better moisture balance.

Mycolex

An interesting tale comes from Alex Musoke from the company Mycolex, who calls himself the main motivator behind Ugandan oyster mushroom growing. Since 1992, this science teacher has succeeded in regularly managing to source funding for education and training and equipment for his actively networking company. The German Government Bank granted him financial help for studies in China, and in educational trips to former Yugoslavia and the UK. This allowed him to attain a trainer's status and create a network of growers around him. Thanks to the World Bank he has been the proud owner of a small autoclave since 1997 and a laminar air flow, which he uses to produce small bags of spawn for 'his' growers. He has created a well functioning satellite system of about a hundred growers in the region of Fort Portal, in the south west of the country. The climate is cool here for Ugandan standards (around 25 degrees Celsius) and highly suitable for mushroom growing. The growers have very limited means and construct the primitive bamboo sheds themselves. They don't need to invest in Alex Musoke's system. His spawn is delivered together with the raw materials to a number of substrate producers, who make portions of sub-



Oyster mushrooms growing in a low budget shed.

Conference poster.

Still life with hanging oyster mushroom substrate.

strate, which is in turn supplied to the growers.

No money exchanges hands until the very last link in the chain. Mycolex is namely committed to paying the difference when the mushrooms are supplied. Uganda lacks any organised system of refrigerated transport, and only oyster mushrooms grown around Kampala reach the fresh market. The harvest from the more remote villages is nearly entirely dried in the sun. Small growers pick around 5 to 10 kilos of oyster mushrooms each day, which weighs around 1 to 2 kilos when dried. According to Alex Musoke, this small scale growing provides farmers with a basic income of 10 to 12 US dollar a day, which is considerably better than the wage many unskilled labourers earn in the capital city.

Termitomyces

Eating dried mushrooms is an integral part of the local eating habits. Ugandans love the many Termitomyces varieties that grow here. Traditionally large amounts are gathered and dried, so they can be traded throughout the year. Most Ugandans actually prefer the concentrated flavour of dried mushrooms to fresh ones.

The Termitomyces genus are mushrooms whose lifecycle is symbiotically linked to a certain type of termite. The termites provide the mycelium of 'their' mushrooms with a ready made substrate, on which the mushrooms flourish, so there is a ready supply of nutrition for the termite colony. When the termites move they carry the spores to their new mound, thereby ensuring a constant food supply.

Termitomyces are highly sought after for their excellent taste. The most common type in Uganda is Termitomyces microcarpus, a small variety that is found in abundance on the low nests of a small termite variety. A researcher in Prof. Deo Olila's team, Dr. Nakalembe, is currently running a study into the medicinal properties of this variety. Attempts are being made to cultivate Termitomyces varieties, but have not yet progressed beyond the mycelium stage.

Network

We were told that the average Ugandan is a little cautious about eating mushrooms that greatly differ in appearance to the traditionally consumed varieties. Oyster mushrooms have an advantage in this respect, as they are also picked in the wild. There is still a long way to go before a wide range of cultivated mushrooms are found on the market. Both adapted technology and an adapted marketing approach are needed. During the first pan-African congress the organisers want to create a network of research centres throughout Africa to stimulate knowledge exchange and encourage mutual cooperation. In this way they hope to pave the way for the emerging countries to gain quick access to new mushroom related technology.

First All-Africa Conference on Edible and Medicinal Mushrooms
Date: 26-29 October 2006
Venue: Makerere University, Kampala, Uganda
Theme: Edible and Medicinal Mushrooms for Health and Poverty Alleviation
Key speaker: Prof. Emer. Dr. Chang, University of Hong Kong
Goal: stimulation of networking amongst African researchers and mushroom professionals, and between the latter and the rest of the world
Information: Prof Deo Olila: mushrooms@vetmed.mak.ac.ug
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Extra sponsors are still welcome for this congress! The organisers request that interested parties and partners respond quickly, particularly for registration to visit the Wildlife Education Centre.