

## GERMANY

# King oyster mushroom reigns at HLP Pilztag

Growers of lignivorous mushrooms in Europe don't have many opportunities to widen their knowledge or enjoy some networking. However, the Hessischer Pilztag is one of those occasions and the very best of its kind!

By Magda Verfaillie, Mycelia

**T**he annual two-day event organised by the HLP (*Hessische Landesfachgruppe für Pilzanbau*) is gaining in stature as it offers growers a forum to meet, find and exchange the latest information. This group now numbers 102 members representing 12 countries, and at least half of them travelled to the venue for this year's event. Pilzhof Lippe acted as host. The enterprise recently started and produces *pleurotus eryngii* close to Bad Salzflufen, between Dortmund and Hannover.

In line with tradition, the AGM was opened on the first Tuesday in November by HLP chairman Jürgen Kynast. After the necessary formalities, such as adopting the annual report, the members chose the activities for the coming year. A

trip around Poland is on the list for spring 2017 and an HLP meeting at Edelpilze Kernser in Switzerland is scheduled for November. Everyone is looking forward to visiting this ambitious project initiated by the Häcki family, who intend to provide half of Europe with substrate for *pleurotus eryngii* and *lentinula edodes*.

### Research

The overarching topic for the presentation sessions in the evening was 'mushroom research'. First to speak was Miriam Sari of University of Applied Sciences Niederrhein. She presented the results of screening for  $\beta$ -glucans in a series of wild and commercially grown mushrooms. Interestingly, the highest concentrations were found in the stems and some,

Miriam Sari (Hochschule Niederrhein) spoke on  $\beta$ -glucans in mushrooms.



The HLP members enjoyed a great mushroom buffet at the conference hotel.

Richard Stuckman,

mainly wild varieties, scored unexpectedly high. She was followed by Dr. Christian Suarez Franco who presented a study on the interaction between mushrooms and bacteria, including in pasteurised oyster mushroom substrate. Bacteria appear to have positive and negative effects on fruit body development, however further research is required to precisely identify them. Next, Natalie Rangno discussed her study into optimising substrates to suit various mushroom varieties. This included focusing on various waste streams, such as hydrothermally degelatinised fibres and spent substrates. The sessions were rounded off by Marisa Tello Martin who spoke on the expansion of a 'genetic databank' for native mushrooms by the CTICH in La Rioja (see report on HLP trip to Spain), where until now some 103 varieties have been cloned and conserved. The evening ended as usual in animated discussions between colleagues in an enjoyable and relaxed mood.

### From pigs to mushrooms

The highpoint of the HLP meeting was, of course, the visit to the host company: Pilzhof Lippe is a newcomer to the mushroom scene, the company cultivates *pleurotus eryngii* in Bad Salzflen. We were warmly welcomed by Richard and Ingeborg Stuckman in their wonderful reception area in a restored barn. The family has farmed in these beautiful surroundings for many generations. Until a few years ago the focus was on pig farming, but when prices continued to permanently show a downward trend, alternative sources of income were investigated. In 2014, matters were decided and subsequently pigs have given way to mushrooms. Their previous experiences with the importance of hygiene stood Richard and Ingeborg in good

stead when they started growing infection-sensitive mushrooms like *pleurotus eryngii*. They also attended training to avoid the specific pitfalls beginners come up against in mushroom growing. In the start-up phase ready-to-use substrate was bought from a range of suppliers – to learn the trade as it were – but since about a year, they produce a major part of the substrate themselves. 35% of the 2.5 tons of saleable mushrooms produced daily is grown on their own substrate, with the intention being to increase this share. The production method used is super-pasteurisation of individual bags of mushrooms. They are heated for at least 12 hours in a sauna-like oven until the core temperature of the bags reaches 98° Celsius. The energy required is partly generated by their own PV array, or sourced from a neighbouring biogas plant. The substrates are inoculated and sealed in a cleanroom, and the contents of the bags are then mixed in a mixing drum. The blocks first spend three weeks in a separate incubation room before going to one of the growing rooms. The bags are left closed until the pinheads start to form. They do not scratch their own substrates. Richard and Ingeborg had no secrets about how they work, they fully answered all the questions and we were all free to explore all areas on the farm. And, it has to be said: the results were extremely impressive!

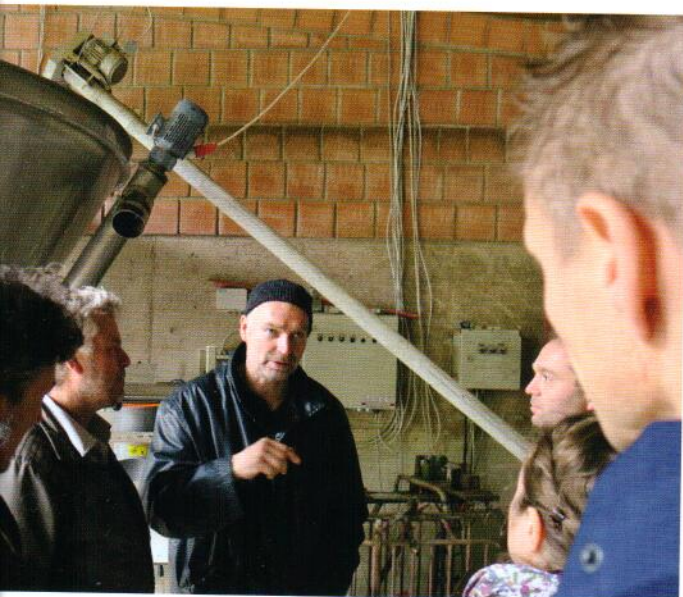
### King oyster mushroom

A generous mushroom buffet, organised by Ingeborg, awaited us back at the hotel. After this delicious lunch, we settled down for the afternoon sessions, centred on the theme of "Pleurotus eryngii".

The first speaker, Prof. Claudia Jonas, expanded on her study performed last year, when she



The *pleurotus* farm runs on energy generated by their own PV array and a neighbouring biogas plant.



owner of Pilzhof Lippe, explains the operation.



*Eryngii*- blocks at Pilzhof Lippe.

concluded that the high protein contents regularly published for mushrooms do not reflect reality. The Kjeldahl analytical method used to calculate nitrogen in food doesn't really work for mushrooms, as a considerable portion of the nitrogen present in mushrooms is found in the indigestible chitin in the cell walls. The legal directives regarding determination of the protein content of food have not been amended for mushroom products. Alternative measuring and calculation methods should be established instead.

A trio of substrate producers had been asked to each highlight one aspect of substrate preparation based on their own experiences. Jürgen Kynast (Substratproduktion Kynast-Löcke) presented an extensive overview of raw materials that contain lignocelluloses that can be considered for *eryngii* substrate, provided the recipe can be adapted to suit the methods. Bert Rademakers (CNC Exotic Mushrooms) compared hygienisation in bulk and in individual packages, and the use of filter bags and laser-perforated bags. He also mentioned incubation temperatures and the practice of scratching. Sepp Häcki (Kernser Edelpilze) proudly showed the results of the first substrate production in his brand-new plant, beautifully colonised blocks of shiitake and *eryngii* in laser-perforated bags. He now pasteurises bulk volumes of five tons and has a capacity of 500 tons a week. He told us about the importance of using a standard recipe, and about compressing the blocks when bagging the substrate to encourage efficient pinheading.

*Eryngii are being prepared for sales.*



At next year's HLP meeting, we will see this process in practice.

## Cultivation and shelves

Two growers also took to the floor. Patrick Romanens (Fine Fungi) talked on how essential a good climate is during the various production phases. The parameters for control are temperature and RH, air movement and CO<sub>2</sub>. Sufficient evaporation levels are crucial for normal growth, but too low relative humidity can cause too much dehydration. Bert van Avezaat presented a chronological summary of pin-heading and pinhead development of *pleurotus eryngii*, and emphasised the importance of strict hygiene in the growing rooms. He also stressed that combining different varieties and production phases in a single room must be avoided at all costs.

Bob Holtermans (Mush Comb) advocated greater standardisation of shelving systems, particularly with an eye to further automation. He has developed a modular shelving system suitable for *pleurotus ostreatus* substrate blocks. In this system the blocks are attached to vertical pins that can be rotated during harvesting. This system is space-saving, and allows a higher volume of substrate to be filled into the growing room.

## Nutrition

Finally, two scientists lectured on mushrooms as a source of vital nutrition. Dr. Martin Rühl is conducting research at the UNI Giessen into the presence of vitamin D in mushrooms. He concluded that the copious quantities of ergosterol (provitamin D<sub>2</sub>) are converted into vitamin D<sub>2</sub> if exposed to the right type of light. In this way, *agaricus bisporus*, for example, can reach exceptionally high contents of 400 µg per 100 g of mushroom. Dr. Sabine Ellinger of the University of Applied Sciences Niederrhein continued on the same topic, and showed that mushrooms provide many other interesting nutrients such as selenium, and, very importantly, beta-glucans. Beta-glucans have gained fame as being a class apart, partly thanks to the modulating effect they have on the immune system, and their influence on lowering glucose and cholesterol levels in the bloodstream. To mark the end of this highly educational HLP meeting, the lecturers were treated to a selection of exotic mushrooms. We all parted company satisfied and are already counting the days until the next edition.