Micologia Aplicada International, 23(1), 2011, pp. 29-33
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www.micaplint.com

The good and the bad: fungi in Africa

R. H. Kurtzman, Jr.

Micologia Aplicada International, 445 Vassar Avenue, Berkeley, CA 94708, U.S.A.
www.oystermushrooms.net . E-mail: kurtzmanr@earthlink.net

TROPICS

We in temperate climates often think that the tropics are all hot moist places. However, many tropical places are cooler, year around, than many ordinary temperate places are in the summer months. In 2009, I told that much of Kenya, which is on the equator is often cool[1]. On the other hand, Ghana which is also tropical, but all north of 5º is hot year around. Most of Mozambique is also tropical and warm throughout the year. However, it is not so moist as Ghana. There is a simple explanation of temperatures, if other things are equal, it is cooler at higher altitudes. That leads to the simple way to express them: low land tropics, for the hot climates and high land tropics for the cooler places. Another thing that surprises many when they look carefully is that none of Europe is in the tropics, and the only part of North America in the tropics is just some of what is referred to as Central America. Also only a small part of Asia is tropical. Yet most of both Africa and South America are topical. While writing a book chapter with one colleague, he called Japan tropical, I had to correct him.

The purpose of all of these remarks about geography is to point out that different places, even in areas many of us lump together in our minds, require different strategies for growing or possibly preventing fungal growth. In some high land tropical places, heating may even be useful in order to grow mushrooms. Low land tropics generally cannot grow the mushroom varieties grown in temperate regions.

MOZAMBIQUE

In September 2009 I worked in Nampula, Mozambique (**Fig. 1**). It is low land tropics. However, the project was one to reduce aflatoxin in peanuts (ground nuts) and maize. Like all living things, *Aspergillus* requires water, so if the peanuts and maize are kept dry, after harvest, there should be little problem. Of course, the peanuts and maize require water to grow, so a large part of the

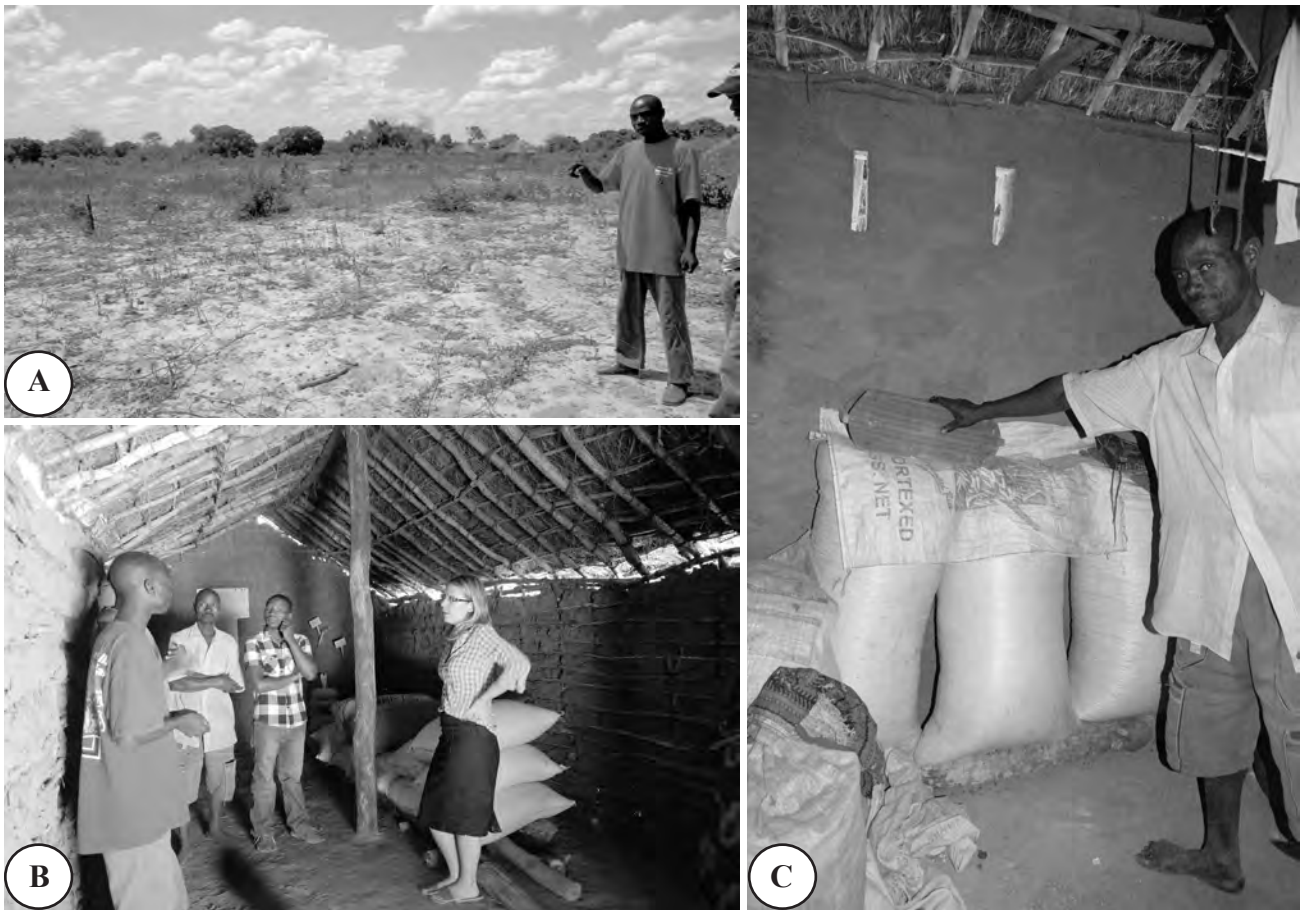

Fig. 1. Mozambique. A: A peanut field in off (dry) season. B: My client's peanut warehouse in a farm village. C: Traditional, native home storage, same village.

problem occurs just before and just after harvest, when the seeds are still moist from growing. But the problem has increased in recent years because woven polypropylene bags, which ventilate poorly, have replaced burlap and other natural fiber bags. In addition, the farmers were being "helped" by people who built warehouses, with poorly maintained roofs, for storage. Traditionally, farmers had kept the peanuts in their houses where they were constantly aware of any leaks in their roofs. Unfortunately, my clients (the helpers) thought testing for aflatoxin came first and prevention was secondary. The farmers saw the huge livers in their chickens, but had not been taught the meaning or how to control aflatoxin. Sadly, I was given little opportunity to educate.

GHANA

In December 2010, I worked in the Volta region of Ghana. Incidentally, it was cocoa harvest time and small farmers had the beans out to dry. In Ghana, the government buys the beans from the farmers and then sells them to chocolate processors (**Fig. 2**).

They supply and require the use of natural fiber bags. The cocoa beans are much more valuable than peanuts, so I suspect they learned the hard way that woven polypropylene bags are not safe. Cocoa was not my job, it was just all around me. I never talked to anyone knowledgeable about policies.

This time I was helping a beginning mushroom grower. They had read my web-site book (www.oystermushrooms.net) and had done many things to arrange for my arrival. There were several unfortunate things, they wanted to start big and spawn was a problem. They built a mud and thatch building 24 x 67 feet (*ca.* 6 x 17 m). They spent several hundred US dollars to build a large steel tank for pasteurizing, the weight of water made it bend. Two ordinary steel drums would have cost a fraction of what they spent and would have saved some of the labor required to carry water and fire wood. Also, the mud stove had no grate, so the fire was not as hot as it could have been and there was much smoke. They had made no plans of arranging things, they just wanted it big. However, the building had windows, with shutters, so sun light and natural ventilation could be controlled although the light may be too limited. The floor is covered with oil palm seed shells. The shells are very hard, but I assume that under moist conditions they will rot, harbor disease and pests. Here is a place where someone who has spent limited time in low land tropics was, as expected, less than completely competent. I knew much of what to expect, I knew it would be warm and I knew that they could do little to cool the growing area, but I did not know about oil palm nut shells. Spawn is a problem in many developing countries, but I did not know what the situation would be in Ghana. I also knew that most *Pleurotus* cultures that I had would not do well in their climate. I was pleased to learn that native *Pleurotus* is common and collected by natives for food. The spawn that was available was of spotty quality, at best. Some that they bought was green with *Trichoderma* and other bottles were not fully grown.

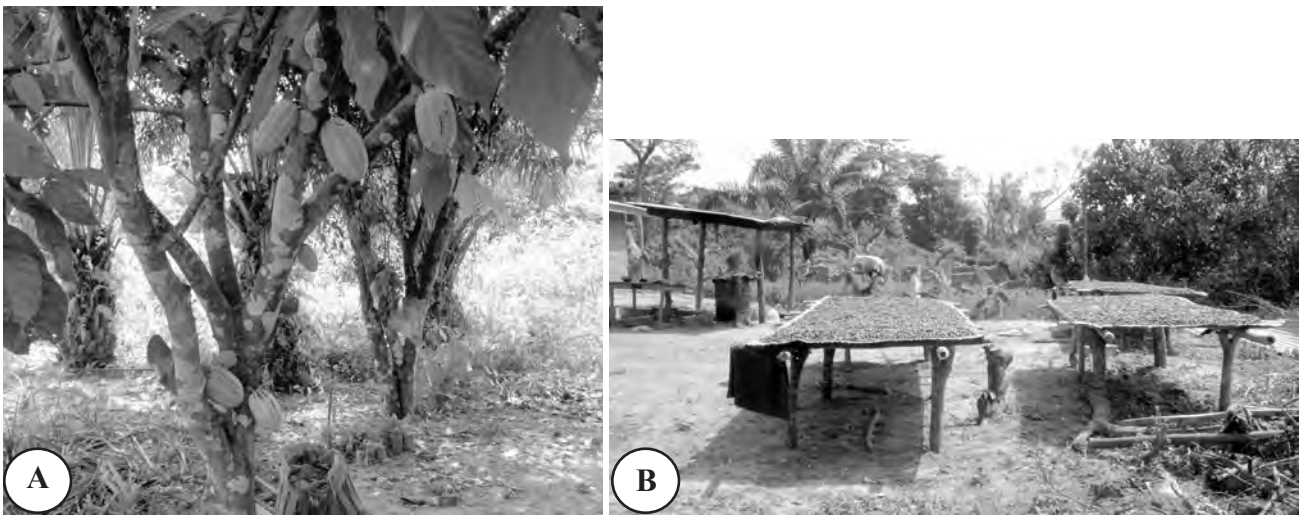

Fig. 2. Ghana. A: Cacao trees with pods, before harvest. B: Cocoa beans drying in the sun.

I was in for a surprise when we pasteurized their rice straw. Unlike all other rice, or other straw that I had worked with, it cooled quickly and developed almost no sweet-sour odor. I have two possible explanations: 1) Other places I have worked irrigate rice and simply add water as it evaporates. In Ghana it is grown during their wet season and excess water runs off – thus the straw is continually leached. 2) The straw was a year old, rice was being harvested while I was there. The straw showed no sign of rotting, but possibly it had been leached by the rain after harvesting. When I arrived it was in thin piles on a simple rack, well above the ground. Once I recognized the problem, I suggested mixing in some other field waste, especially banana leaves and that they pasteurize at 60-63 C rather than a degree or two cooler (**Fig. 3**).

But, what about their spawn problem you may ask. If you know of anyone who would like to donate about US$ 70 thousands, I am sure we can put a good, small facility into operation there. An entrepreneur with that kind of money will also do. In developing countries, where their government does not cause problems, money for equipment and other needs for start-up are usually a major problem. For Ghana, someone must supply money or they will struggle for many years, if they are fortunate. The going, bank, interest rate is about 30% in Ghana.

LITERATURE CITED

1. Kurtzman, R. H., Jr. 2009. Mushrooms in developing countries - 2008. *Micologia Aplicada International* 21: 37-42.

Fig. 3. Ghana. Below, A: Collecting a wild oyster mushroom near Wli Falls. Opposite page, B: Mud-thatch mushrooms house, left, center. To right, men dumping water into pasteurization tank. Man carrying water to the tank and rack where straw had been kept. C: Lecturing to prospective mushroom farmers. D: Checking the pasteurization. E: Those who attended the pasteurization – spawning demonstration.


B


C


D


E