CHAPTER 1

INTRODUCTION

Mushrooms have always been an important part of the human existence. When the approximately 5300-year-old frozen body of a Late Neolithic shepherd (named “Ötzi”) was discovered high in the Tyrolean Alps in 1991, investigation of his knapsack revealed, amongst his equipment and weapons, two types of mushrooms (Jaroff, 1993). They were birch polypores (*Piptoporus betulinus* (Bull. Ex Fr) Karst.) and another as yet unidentified mushroom. The polypores have proven antibiotic qualities and the somewhat arthritic, whipworm infested man (http://www.gla.ac.uk/Acad/IBLS/DEEB/jd.htm) probably carried it along for medicinal purposes. Mushrooms have since become desirable for culinary as well as medicinal purposes (Stamets, 1993).

Different cultures have vastly different tastes for food. The white button mushroom (*Agaricus bisporus* (Lange) Imbach) is the most popularised edible fungus in the West. However, other cultures have many other mushrooms on their menu. As the world has become smaller in terms of travel, various cultures have learnt to appreciate and even indulge in each other’s culinary delights. In recent years, what can be described as a mycophilic awakening, has gained momentum. This is confirmed by the fact that the cultivation of what is known as “speciality mushrooms” (Royse 1995) is drawing so much attention from Western cultivators. So it is that South Africa has not been completely left behind in this mycophilic awakening. Asian, Eastern and African preferences have greatly influenced our own experiences. This has lead to the local commercial cultivation of several species of the oyster mushroom, *Pleurotus* spp. (McVeigh 1993), and appears as if it could become a lucrative venture for South African mushroom farmers (Van Tonder 1995). The market has great potential and some cultivators from abroad regard *Pleurotus* as one of the easiest, cheapest and “quickest-to-the-dinner-table” mushrooms to cultivate (Northwest Mycological Consultants, unknown; Chang and Miles, 1989, (http://www.keil.ukans.edu/~fungi/)).
*Pleurotus* spp. occurs naturally on wood where it degrades lignin as well as cellulose. This characteristic has enabled utilisation of several (often very cheap) substrates in the cultivation of these mushrooms (Poppe & Hofte 1995, Azizi *et al.*, 1990). The substrate of choice for the South African *Pleurotus*-cultivator is wheat straw. This is obtainable throughout the year, since South African wheat is cultivated in both winter and summer rainfall regions. Studies have been undertaken to establish alternative, possibly indigenous substrates (Pakela, 1997). Commercial cultivating techniques are refined to an art by each individual cultivator. The basic procedures used in South African cultivation are summarised in Figure 1.

What appears to be a relatively uncomplicated produce when compared with *Agaricus*-production, however, is proving to have problems that are quite capable of devastating even seasoned cultivators. Some of the most often encountered difficulties include severe infection of the growth columns or tubes by other fungi, attack by insects and poor yields. Infections also rarely start as independent occurrences, but are often suspected to be the visible symptoms of previous errors in the farming practice itself. Exceptions will be possible whenever a coincidental vector can be indicated as the cause of the infection. In practice the solutions to these problems are not always as apparent as indicated by popular literature. The most obvious aspect to consider is the fact that the South African cultivator has to work in a climate that is not ideally suited to grow speciality mushrooms. The creation of artificial conditions does not always give the desired results and infection of the substrate sometimes leads to complete loss of the crop.

The objective of this study was to determine the most prevalent infective organisms found on the prepared substrate used for *Pleurotus* production in South Africa. A distinction is made between the occasional fungal invaders (so-called weed fungi) and fungi that actively compete for the same resources as the mushrooms (true competitors). This paper reports on the species of fungi, insects and nematodes found on the substrate. Furthermore, meteorological conditions and seasonal changes in meteorological conditions are investigated to establish whether they play any part in the occurrence of infective episodes. An attempt will be made to correlate climatic conditions, infective episodes, farming practice and farming hygiene.