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ORIGINAL ARTICLE

Effect of environmental factors on the yield of selected mushroom species growing in two different agro ecological zones of Pakistan

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Abstract Mushrooms are a rich source of protein and vitamins as human food. In view of the growing importance of mushroom in Pakistan, a research study was initiated with the objective to examine the suitability of Oyster mushroom cultivation and to compare the growth and yield of Oyster mushroom in two different areas (Peshawar and Swat, North-West region of Pakistan) with different ecological conditions. Spawn running time, number of crops, stalk height, stalk diameter, cap size, fresh weight, number of production days, and the interval in days between the time of bag opening and the time of starting fruiting bodies formation were among the important parameters investigated in the current study. Stalk height, stalk diameter, cap size and fresh weight of mushrooms were found higher in Peshawar region as compared to those growing in Swat region. On the other side, the spawn running time, formation of fruiting bodies and the number of productions were higher in Swat region as compared to the mushroom under study in Peshawar region. Mild winter temperatures of Peshawar region, and low summer temperatures in Swat, were found most suitable for growth and yield of *Pleurotus ostreatus*.

1. Introduction

The study area is located in the north west of Khyber Pukhtoon Khwa (KPK), lies between 34°34′ to 35°−07′N latitudes and 72°−36′ to 73°−35′E longitudes in Pakistan (Map 1). The rapid population growth coupled with poverty and unabated natural and man made disaster in Northern parts of Pakistan including the study area raising questions that how the poor cope with the special challenges in the form of earn their livelihoods access to diets and food especially for the most vulnerable groups. Limited Livelihood opportunities followed by both the natural and man made disaster are the

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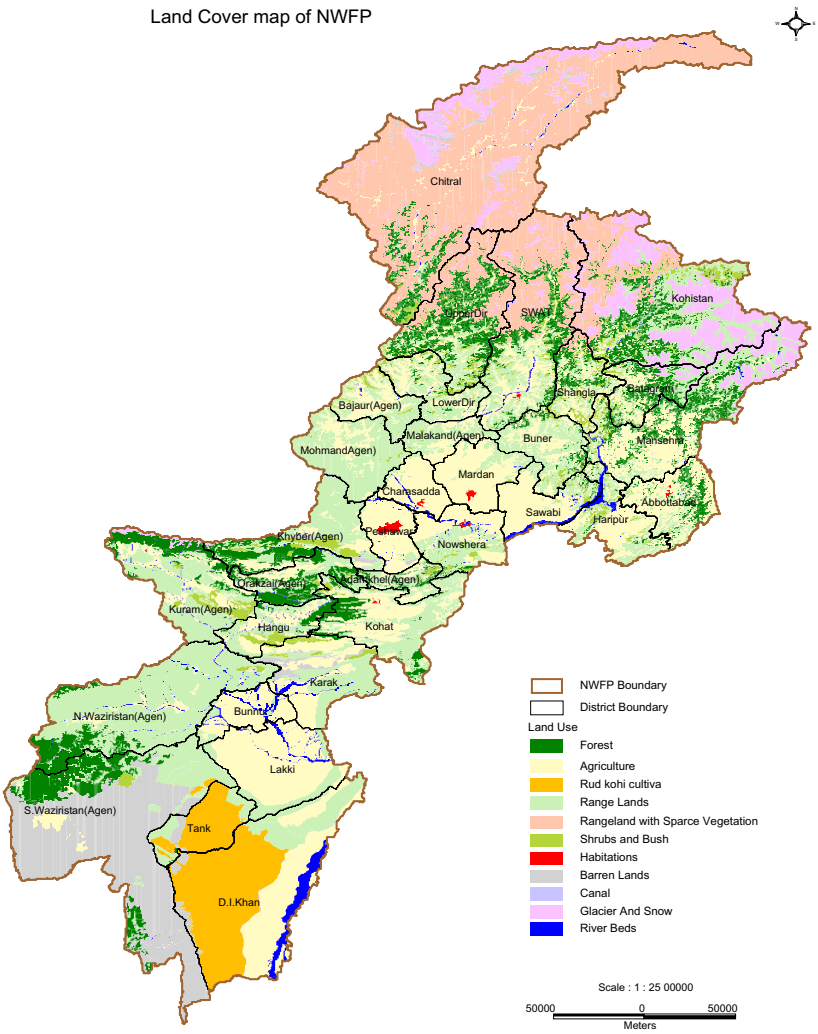

Map-1 of KPK-Pakistan

Map 1 Pakistan.

major constraint beyond the food insecurity (Sher et al., 2005). Food availability and household food security in mountain areas are closely related to agriculture and crisis in area. Moreover, the traditional ways of farming and livestock rearing have further reduce the income opportunity of the local, as a result about 60% of the population have very little purchasing power and most of the population especially children and women are suffering from malnutrition diseases (Sher and Hussain, 2009). The present study was therefore, undertaken with the over goal to demonstrate the mushroom cultivation technology to the farmers community with the aim to get protein and vitamins richest food and combat the threat of food insecurity and malnutrition diseases.

Fungi have been at work since life began on earth. Mushrooms are freshly spore bearing fungi and their edible nature is the main attraction to man as a source of food. In several cases, wild varieties of edible mushrooms were found less tasty and unpalatable. However, mushrooms are known to have a broad range of uses both as food and medicine (Chang and Miles, 1987). The complex and varying morphology, chemical composition, and biological activity of mushrooms attracted the attention of scientists. Among edible mushrooms, *Pleurotus pulmonarius* and *Pleurotus ostreatus*, exhibited strong anti-inflammatory and immunomodulatory properties due to their chemical composition (Lavi et al., 2010; Selegean et al., 2009), while *Morchella elats* showed highly potent radical scavenging activity (Kalvoncu et al., 2010). Grifolin derivatives isolated from *Boletus pseudocalopus* (Basidiomycetes) possessed anticancer and moderate radical scavenging activities (Song et al., 2009). Many mushrooms such as Hedyotis species, *P. ostreatus* and *M. giganteus*, were found to be active against bacteria and yeast (Kalvoncu et al., 2010; Ahmad et al., 2005), while *Galerina autumnalis*, *G. marginatus*, *G. venenate*, *Lepiota josserandii*, *L. helveola*, *L. castanea*, and *Amanita smithiana* were found toxic and contained dangerous toxins (West et al., 2009; Danel et al., 2001).

The toxicity of *Cortinarius speciocissimus* was attributed to its poisonous chemical constituent orellanine which caused irreversible kidney damage (Münstermann et al., 2002). Phallolysin isolated from *A. phalloides* was found to be a haemolytic toxin (Erguven et al., 2007; Seeger, 1975), while *A. phalloides* was reported life threatening poison because of causing acute multiorgan failure (Hydzik et al., 2008). In an earlier study conducted in Swat (Pakistan), amatoxin was established to be the main toxic compound of mushrooms from Swat region (Pakistan) which was responsible for gastrointestinal symptoms as well as hepatic and renal failure (Chandra and Perkaysth, 1977).