

Changes in the number of the species and fungal populations colonizing decomposing wheat crop residues

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ABSTRACT

The present study investigated the changes in the number of the species and the fungal population colonizing the decomposing wheat crop residues. There was a slight increase in the number of species in decomposing wheat internodes on 30th day followed by substantial decline on 90th day. On the 150th day a sharp rise was observed followed by a sharp decline on 210th day. From decomposing wheat leaves the number of species isolated was exactly similar to that internode. However on 90th day moderate increase was observed. There was no change in number of species isolated from decomposing chaff on 30th day. On 90th day there is a negligible increase followed by a slight increase on 150th days. The number of fungal species isolated from the mixed straw remain unchanged till 30th day followed by moderate increase on 150th day when it reached almost double the number of species isolated in the beginning.

INTRODUCTION

A number of studies carried out on the pattern of microbial colonization or decomposing wheat straw (Sadasivan, 1939; Walker, 1941; Butler, 1953a,b,c, and 1959 Lal and Yadav, 1964; Burges and Griffin, 1967; Chang and Hudson, 1967; Fermor and Wood, 1979; Moubasher et al., 1982a,b; Charaya 1985; Broder and Wagner, 1988; Bowen and Harber, 1989)—All of these monitoring the development of fungal communities on one combined resource i.e., 'straw' only which include stem (nodes, internodes) as well as leaves. The stem (internodes) and the leaves constitute the major components of the straw and differ greatly in their chemical composition as well as physical construction (Percival, 1921; Harper and Lynch, 1981; Collins et al., 1990). The wheat spikelet is composed of several flowers which are enclosed a two pieces of chaff- the outer glums (Howard and Howard, 1979). With increasing mechanization now years are harvested leaving stem and leaf in the field. It would therefore, be interesting to determine the extent to which the distribution of saprobic fungi varies between different components of the straw (Wheat leaves, stem and chaff) separately with respect to intact straw. Though Robinson et al., (1994) carried out such a study with wheat straw and leaf in U.K., no study have been carried out to compare the fungal colonization and decomposition of wheat chaff, stem and leaves separately with that of the entire straw (combined).

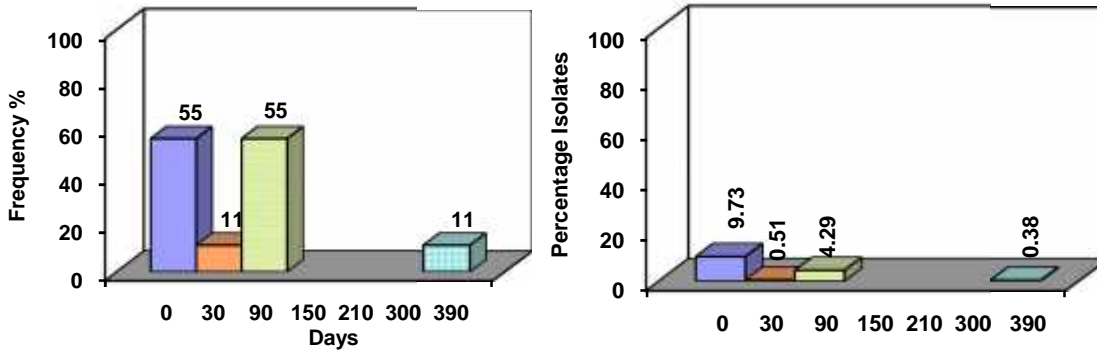
Material and methods

Different components i.e., internodes, leaves and spikes of wheat plants were separated. The seeds were removed from the spikes to collect chaff.

Unseparated straw (without grain) used as combined straw. Hence, four types of samples were prepared for investigation viz., internodes, leaves, chaff and straw. 150 nylon net bags (15x10 cm) with mesh size of 1mm were prepared. These were divided into 4 sets: set I, II and III of 30 bags each and set IV of 60 bags. Each bag of the set I, II and III was filled with 10 grams of internodes, chaff and straw respectively and IVth set with 5 gms of leaves. Six pits (200 x 50 x 50 cm) were dug in the soil. Small holes were made in the side walls of the pits- the distance between the adjacent holes being 15 cm. All bags of wheat residue were placed randomly in the holes- one bag per hole. The pits were filled with soil and the location of different holes as well as the type of litter placed in the holes were recorded. The analysis of samples for mycobiota was done immediately on the first day. Samples for further analysis were collected on 30th, 90th, 150th, 210th, 300th, 390th day. On the specify day 4 bags of each residues- internodes, chaff and straw as well as 8 bags of leaves were collected from different holes for analysis.

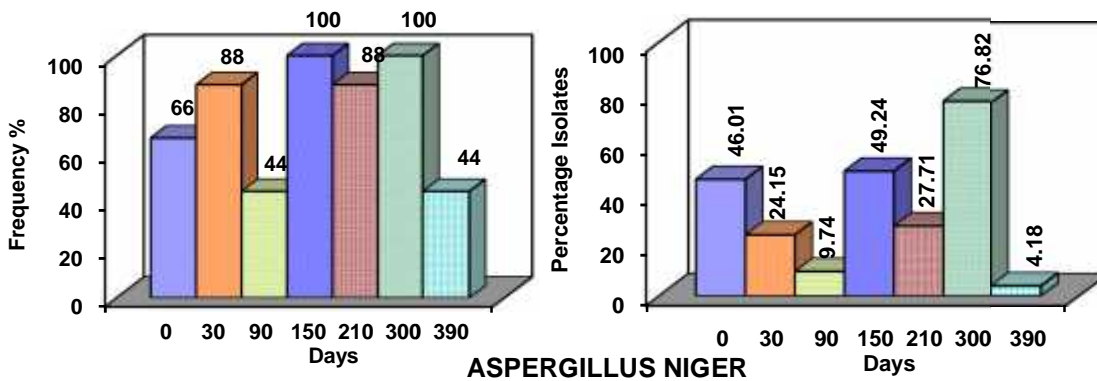
Result

Wheat internodes: Variations in the number of fungal species colonizing decomposing wheat internodes at different time intervals presented in fig. 1 and 2. There was a slight increase in the number of species on 30th day followed by substantial decline on 90th day so that the number of species recorded on the 90th day was even lesser than the initial observation. On 150th day, a sharp rise was observed followed by a sharp decline on 210th day reaching the level

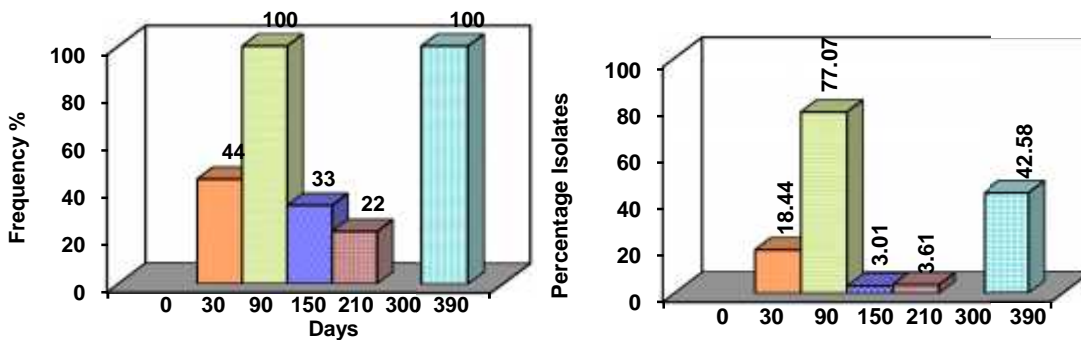


ASPERGILLUS FUMIGATUS

Fig. 1: Frequency percentage and percentage isolates of some fungi colonising wheat internodes decomposing underground



ASPERGILLUS NIGER



ASPERGILLUS LUCHUENSIS

Fig. 2: Frequency percentage and percentage isolates of some fungi colonising wheat internodes decomposing underground

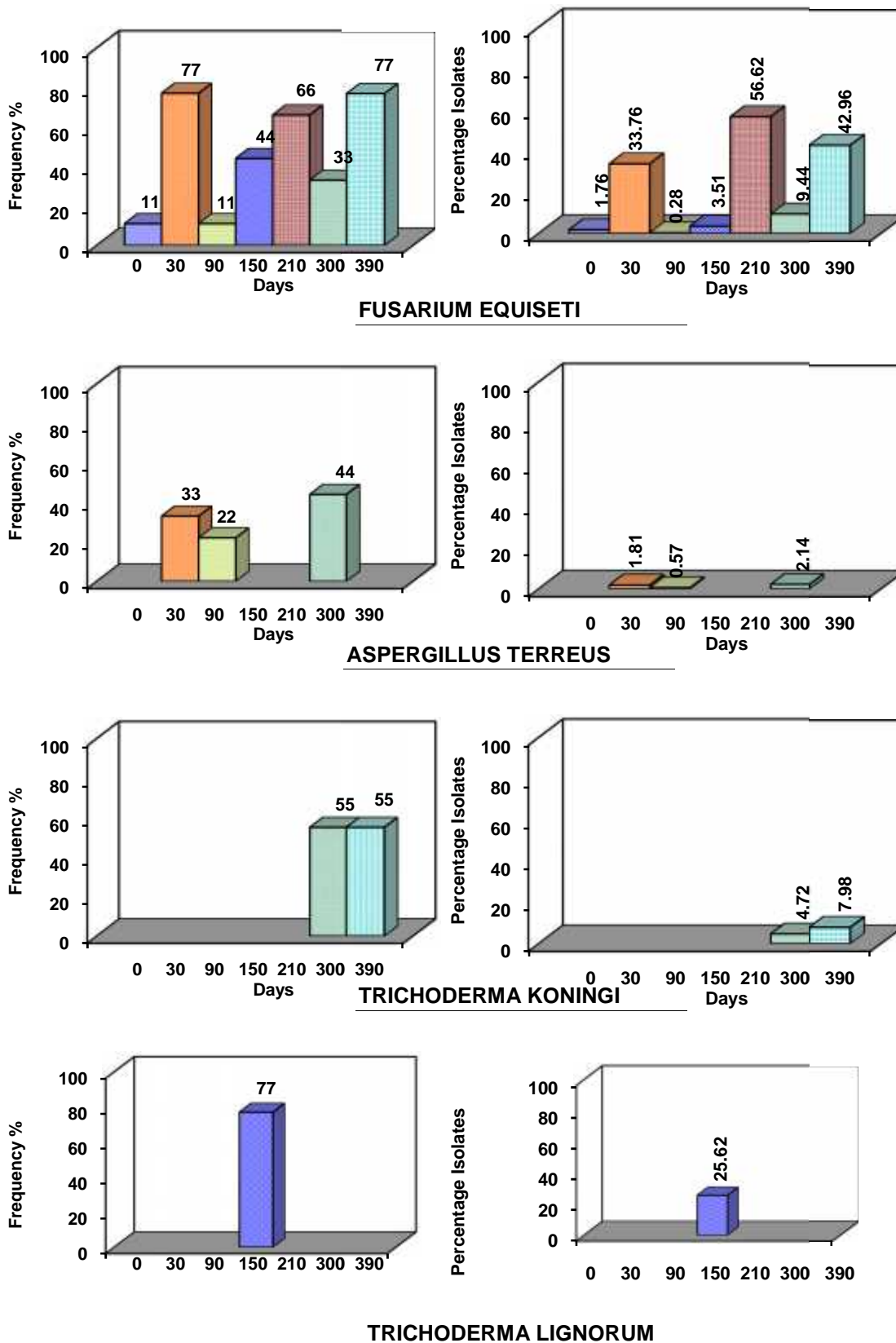


Fig. 3. Fungal population (per g dry liter) isolated at different intervals from aboveground wheat crop residues decomposing underground

