

Review

of

literature

#### A. STUDY OF SOIL FUNGI

Adamez (1886) was the first person who studied the mycoflora of two soils but the method of isolation was not mentioned. Reinitzer (1900) studied the fungus flora of soils and its biochemical activities. Hagem (1910) isolated Mucorales from superficial layers of soils and according to him the species of Mucor are present in greater percentage in the superficial layers of soil and a large numbers of Mucorales; Penicillia, Aspergilli and Cladosporia were found by him in cultivated and forest soils.

Dale (1912-14) reported the fungi from neutral, alkaline and sandy soil containing very little organic matter. Goddard (1913) isolated from a rich clay loam Michigan soil many species of fungi but did not find any variability as to their occurrence at different depths. On the otherhand, Waksman (1916) observed that the number of fungi decreased rapidly with depth so that at 12" - 20" below the surface, very few fungi were found, the largest number occurring within the upper ten cms layer of the soil.

Warkenthin (1916) isolated a number of fungi from Texas soils. He did not find any variation between cultivated and virgin soils. He concluded that there was constant characteristic fungal flora in each soil. Aspergilli seemed to be the predominant fungi in the South, while Penicilli and Mucorales were found more

extensive in the Northern soils.

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'Waksman (1917) also did not find much difference in soil fungi of cultivated and virgin soils, like Warkenthin (1916). He stated that more fertile soils contained more fungi in both number and species than those in the less fertile soils. Acidic, soils were richer in number and species of Trichoderma, than the normal agricultural soils. Waksman (1922) observed that potassium salts and phosphate stimulated the development of micro-organisms and more so in the presence of lime, than in it's absence. Leclerg and Smith (1928) showed that fewer species of fungi are isolated from soils containing high quantities of soluble salts than from the soils with low salt content. Greter number of Penicilli were found in soils of high salt content than that of any other fungus. He also reported that alkali salts tend to reduce fungal flora. Although Fusarium sp. were abundant in this type of soils. Jensen (1931) has reported that the number of fungi in Denish soils of different types and of reacticns varying from pH 3.34 to 8.35 . There was also no relation between the number of fungi and soil reaction. The addition of lime to acid soil did not markedly depress the number of fungi, but addition of farm yard manure increased the microbial populations.

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'Timonin (1935) has reported that the A - horizon of virgin Manitoba soils showed the highest count of each group of micro-organisms and the C - hcrizon lowest. This has been later

confirmed by Jefferys et al., (1953) and Blue et al., (1955). Miller et al., (1957) found that the total number of fungi as compared with the number of bacteria and actinomycetes was greater in forest soils than in cultivated soils of Georgia. Secondly it varied more with soil types than with geographical region. Penicillium was the chief genus in forest soils, while Aspergillus was dominant in cultivated soils.

The climatic factors are the powerful ecological determinants in distribution of micro-organisms in general. Earlier worker Stevenson and Chase (1957) have worked out the seasonal distribution of soil micro-organisms in various parts of the world. Various seasons influence the microfungal component of the soil organisms presumably by bringing variation in moisture and temperature and food supply affect the microbial activity fundamentally.

Szilvinyl (1948) concluded that both soil temperature and humidity influence the soil micro-organisms and that particularly fungi are first influenced by temperature. Moisture provides a very broad range for optimum growth and survival of fungi in general. The moisture content and fungal number in different soils types have already been reported to have a direct correlation. Soil is suitable substratum for the growth and multiplications of microbes. Many research papers and review articles have contributed much to understand the inter relationship of soil factors, crop remains, root exudates and microflora.

Although investigations of fungi of Indian soils were initiated by Butter in (1907). Significant contributions on the microfungi of forest communities were made by Shetye (1954). Different forest soils of Himalayan as well as sub Himalayan tracks giving their chemical composition and distribution of micro-fungi at various depth during different seasons of the year have been studied by various workers.

Investigations on soil fungi in India is worth mentioning. The fungal flora of Varanasi, Banaras, West Bengal, Orissa, Allahabad, Sagar, South India, Andhra pradesh have been recorded by various scientist. Verma et al., (1965) and Ramaswami and Nair (1966) have studied the relative soil fungi of Narmada valley in Madras state. Phycomycetes in agricultural soils with special reference to pythiaceae studied by Soumini, Rajgopalan and Ramkrishan (1963). Some fungi in forest soil Vikarabad, Hyderabad studied by Rao and C. Manoharachary (1973-74).

In India seasonal trend of fungi distribution in soil has been studied by Saksena and Sarbhoy (1963), Kamal and Bhargava (1971) both in quality and quantity in rainy, winter and summer seasons. Seasonal variation in fungistasis in some soils studied by Dutta and Isaac (1979).

Soil fungi in Maharashtra state have not received sufficient attention although in other states of the country, they are being extensively studied. Mujumdar (1966-67) has

studied the population study of soil fungi of four Agro-climatic regions of Maharashtra. Ursekar (1975) has studied the soil and Rhizosphere fungi. Patil et al., (1976) have studied the soil fungi of Maharashtra. Kale (1981) studied soil fungi in weastern Maharashtra. Pawar (1978) has studied on Rhizosphere of parthenium.

#### B. METHODS OF STUDY THE SOIL FUNGI

Different workers have applied different techniques for qualitative and quantitative determination of soils fungi each with it's own advantage. During the course of present study, dilution plate method was used for this purpose, several workers have employed the dilution plate method successfully. Usually the total number and types of fungi per unit of soils are determined by the apperance of fungal colonies on one or more media by soil dilution plates. The population of fungi obtained by this method may be more than the true populations due to heavey sporulation, or may be less since some fungal spores germinates more slowly than others or are subjected to the antagonastic effects of other fungi. But inspite of it's limitations, for the purpose of enumeration, the conventional plate counts have been most widely used and are considered to be a standard method for large scale studies of soil fungi.

Smith and Dowson (1944) studied the bactariostatic action

of Rose Bengal in the medium for isolation of soil fungi for the first time and reported that Glucose-nitrate soil extract agar containing 65 mg/liter Rose Bengal was the best. Only bacteria that tolerate the dye appeared on this medium.

Littman (1947) used crystal violet as bacterial inhibitor. Martin (1950) was first to suggest the use of antibiotics in the isolation medium. According to many workers the combination of Rose Bengal and Streptomycin sulphate is best for avoiding bacterial contamination in the medium. So author used it in the culture media. The control of bacterial contamination in plates is of greater significance.