BIODETERIORATING FUNGI

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Abstract: The present paper deals with the study of fungal colonies associated with the biodeterioration of book material. The exposure of petriplate study was done monthly in the library of Amolakchand Mahavidyalaya, Yawatmal. The fungal flora of library responsible for deterioration of paper was studied.

Keywords: Biodeterioration, *Fusarium*, *Helminthosporium*, *Nigrospora*

Introduction:

The aerobiological studies mainly deal with the distribution of airborne fungal spores, pollen grains and other airborne microorganisms in air. Aerobiology has multidisciplinary approach (Edmonds and Benninghoof (1973). The concentration of all these microorganisms in an external environment is called airspora (Gregory, (1952). The two classes of Aerobiology are Intramural or indoor aerobiology and extramural or outdoor. Intramural studies include hospital, museum, offices, residence, poultry shed. (Giri and Saoji (2003), Hogale (2008),

Deterioration of books and other valuable material of library caused by these microorganisms. Many workers made their contribution on library studies. Upadhyaya and Jain, (2005), Hogale (2008), Sarma, R.B. and Basumatary, S. (2004).

Material and methods:

The petriplates with PDA medium were exposed in the month of July, August, September and October 2016. Slides have been prepared and scanned. Identification was done by using authentic literature, photographs, reference slides etc.

Observation table

Sr no.	Name of fungus	Number of colonies			
		July	August	September	October
1	<i>Rhizopus</i>	3	3	-	1
2	<i>Alternaria</i>	6	3	7	1
3	<i>Aspergillus</i>	3	5	5	3
4	<i>Cladosporium</i>	8	6	5	3
5	<i>Fusarium</i>	-	5	2	4
6	<i>Helminthosporium</i>	6	-	9	3
7	<i>Curvularia</i>	4	4	6	1
8	<i>Nigrospora</i>	-	-	7	5
9	<i>Penicillium</i>	4	3	-	1

Result and Discussion:***Rhizopus* Ehrenberg.**

Spores one celled, unequal, round to oval, thin walled, smooth, striate, dark in mass 9-11x7um in diameter.

***Aspergillus* Micheli ex Link.**

Spores one celled, globose to subglobose, smooth or finely echinulate, hyalineolive-green or dull-green in mass, spores in basipetal chains, 4-4x 3-4um.

***Alternaria* Nees.**

Spores dark fusiform, variously shaped, obclavate to elliptical ovoid, beaked or with simple or branched appendages often in acropetal chains. It is 7.5-70 37.5-117um

***Cladosporium* Link.-**

Conidia one or two celled, variable in shape and size, ovoid to cylindrical or irregular, some typically lemon shaped, 4-24 2-4.7 um, yellowish to light brown, conidiophore variously branched, conidia in cluster or isolated..

***Curvularia* Boed.**

Spores usually 3-4 septate, olivaceous brown, ellipsoid, typically curved or bent one of the central cells distinctly larger and darker than the terminal cells. Terminal cells pale,. Spores smooth or verrucose. 17-45x11-20um. Conidiophores erect or decumbent, straight, bent or flexuous, usually simple septate, brown, geniculate towards the apex.

***Fusarium* Link.**

Spores hyaline, principally of two kinds: macroconidia delicate, sickle shaped, 3-6 septate, curved or bent at the pointed ends, typically cone shaped, tapering toward either end, 30-70x 2-5um.

***Helminthosporium* Link.**

Spores obclavate to cylindrical, slightly curved or bent, apex somewhat rounded sub-hyaline to dark brown, with 3- many pseudospeta, with prominent basal scar 35-95x 11-18 um.

***Nigrospora* Zimm.**

Spores 1-celled, globose, subglobose or depressed globose, black and opaque, smooth 14-23 um in diameter.

***Penicillium* Link.**

Spores 1 celled, mostly globose, ovoid or elliptical, smooth or echinulate, hyaline, olive-brown or dull green in mass, 2.5-3.5 um in diameter.

The fungal members isolated from dust and walls of library, deteriorated papers of the books revealed the presence of fungi like *Rhizopus*, *Alternaria*, *Helminthosporium*, *Curvularia*, *Nigrospora*, *Cladosporium* and *Fusarium*.

The maximum rainfall was recorded in the month of October with the humidity of 80%. The maximum humidity was recorded in the month of July. The colonies of *Rhizopus* and *Penicillium* were not reported due to less rainfall and humidity. Even though in the month of July and August abundant rainfall and high humidity, all suitable conditions were present, the spore types like *Fusarium*, *Helminthosporium* and *Nigrospora* were not reported

The changes in the meteorological parameters like moderate range of temperature, relative humidity have their role in the concentrations of fungal flora. (DD Cunningham (1873). These fungi in response to meteorological parameters causes biodeterioration of valuable books, journals, documents etc. (S Chingduang & et.al. (1995). Due to saprobic fungi the books get damaged, discolouration of photographs, sketches and prints. (RL Hughes & et.al. (1968), T Ohtsuki, (1982). The biodeterioration leads to staining, foxing and brittling of leather and paper. Similar contributions were also reported by Lindenberg and Archer (1931), Murdhankar (1990), Swapana kalbende & et.al (2012) Maggi et al., (2000) ; Gallo et al., (2002) ; Sclocchi et al., (2002).

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