V. SUMMARY.
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The paddy seeds were stored in ambient storage conditions viz. Tin Granary and Thatch Granary.

The seed-borne fungi of paddy (*Oryza sativa* L.) were isolated by following the blotter and nutrient culture plate techniques during 1990.

In blotter technique a total number of 28 fungi were recorded out of which 12 fungi were identified as seed-borne from surface sterilized seeds. The predominantly occurring seed-borne fungi taken for the investigation were: *Alternaria alternata* (Fr) Keissler; *Aspergillus niger* Van Tiegh; *Aspergillus flavus* link ex Fres; *Curvularia lunata* (Walker) Boedijn; *Curvularia pallescens* Boedijn; *Fusarium pellidoroseum* (Cooke) Sacc; *Helminthosporium oryzae* Breda de Hann; and *Penicillium purpurogenum* Stoll. The incidence of total number of seed-borne fungi at the end of 12 months of analysis were recorded 528 in tin granary and 498 in thatch granary. The externally seed-borne fungi recorded were 1524 in tin granary and 1520 thatch granary. Both the types of seed-mycoflora (internally and externally seed-borne) exhibited more in tin granary than in the thatch granary. The existences of seed-borne fungi were observed in the seeds throughout the period of analysis, but they gradually reduce with the increase of storage period. The externally seed-borne fungi reduce gradually with the increase in storage months and were recorded up to August/September. Both the types of fungi in the
present investigation show monthly variation, and in the later months of the year, the externally seed-borne fungi were not recorded.

By nutrient culture plate technique, 12 species of seed-borne fungi were detected up to the end of storage period. The total number of internal seed-borne fungi at the end of 12 months of analysis were 546 in tin granary and 477 in thatch granary. The tin granary exhibited greater number of seed-borne fungi of both types. The incidences of internally seed-borne fungi were found gradually less in later months, in both the storage structures. Similarly externally seed-borne fungi were not observed in August/September.

An analysis of fungal spores and fungal types in the atmosphere of storage structures (Tin and Thatch granary) for 1990, 1991 and 1992 was carried out by gravity slide method and nutrient culture plate methods. A total of 12 types of fungal spores were observed by gravity slide method during the period of 12 months. The total number of fungal spores were 847, 1051 and 827 in thatch granary and 718, 951 and 764 in tin granary respectively in 1990, 1991 and 1992. The highest number of fungal spores yearly total were (1051) were recorded in the atmosphere of thatch granary and yearly total of fungal spores (951) in tin granary in the year 1991.

By nutrient culture plate method, a total of 28 types of fungal colonies were recorded. The total number of colonies recorded were 2946, 3326 and 3559 in thatch granary and 2951, 3434 and 3349 in the tin granary respectively in 1990, 1991.
and 1992. The highest number of fungal colonies 3559 was recorded in the atmosphere of thatch granary and 3424 in the atmosphere in granary in 1992 and 1991 respectively. The recorded data also indicate a marginal variation of total spores in tin and thatch granary in 1990 and a notable variation in 1992.

An analysis of fungal spores in the air over the paddy field was carried out by the nutrient culture plate method. A total of 32 types of fungal colonies were recorded and the highest number of colonies was recorded in the culture plates exposed at 12.00 hours. The maximum number of fungal colonies was observed in November (average 320) colonies per plate, and the minimum in June (average 62.6) colonies per plate. Of the total isolates, Alternaria alternata contributes the highest percentage (average 12.49), followed by Cladosporium cladosporic (8.69) ; Aspergillus niger (5.40) ; Aspergillus fumigatus (4.41) ; Curvularia lunata (5.05) ; Aspergillus flavus (4.16) ; Drechslera oryzae (3.79) ; Helminthosporium oryzae (4.61) ; Pyricularia oryzae (5.06) in the period and the others were less frequently occurring. The variations of fungal colonies in different hours of the day and in years were recorded.

The internal temperature of both the ambient storage structures shows a clear variation in the entire period of investigation.

The relative-humidity recorded in both the storage structures also exhibited a clear picture of variation in 12
months analysis.

The effects of relative-humidity and temperature on seed-moisture content of paddy in storage were carried out and the results exhibited fluctuations of seed-moisture of paddy in both the storage structures. The suitable storage months observed were May and June in Tin granary and June in Thatch granary. The rest of the months in both the storage structures are beyond the range of storability of seeds in ambient conditions.

The germinability of paddy seeds in ambient storage exhibited a gradual increase in germination upto June in both the storage structures and there after the same decline sharply and negligible percentage of seed germination was observed in November and December in both the storage structures.

The deterioration of nutrient content of paddy seeds from the two ambient storage structures was studied. It was observed that the starch and protein content of seeds decreased gradually with the increase in storage months. The losses of starch is more in tin granary than in thatch granary. The other nutrients (total sugar, reducing sugar, and non-reducing sugar) increased gradually upto September and thereafter the nutrient content were declined (October, November and December).

The effects of fungicidal seed treatment on the germination and the root-shoot growth of paddy seedlings were
carried out. The results showed that the fungicides such as Diathane M-45, Zebtane, Bavistin and Jkstein increased seed germination of paddy. The fungicidal treatments showed the reduction in root and shoot growth of paddy in all the concentrations.

The culture-filtrates of *Alternaria alternata* (Fr) Keissler; *Aspergillus niger* Van Teigh; *Aspergillus flavus* link ex. Fres; *Curvularia lunata* (Walker) Boedijn; *Curvularia pallescens* Boedinn; *Fusarium pallidoroseum* (Cooke) Sacc; *Helminthosporium oryzae* Breda de Hann and *Penicillium purpurogenum* Stoll inhibited the germination of paddy seeds.

The effects of culture filtrates of fungi on the root and shoot growth of paddy seedlings were studied. The fungal culture-filtrates were found to be inhibitory in seedlings growth, except the filtrate of *Alternaria alternata*, where the filtrate stimulates the root growth of paddy. It was observed that all the culture-filtrates of the above fungi were found to inhibit the germination and the root shoot growth of paddy seedlings.

The effects of different temperatures (18°C, 28°C, 30°C and 35°C) on fungal growth and sporulation were studied. The test fungi *Aspergillus niger* Van Teigh and *Aspergillus flavus* link ex. Fres. showed excellent growth and sporulation at 30°C and the rest, *Alternaria alternata* (Fr) Keissler; *Curvularia lunata* (Walker) Boedijn; *Curvularia pallescens* Boedinn; *Fusarium pallidoroseum* (Cook) Sacc.; *Helminthosporium oryzae* Breda de Hann; *Penicillium*
The test fungi showed negligible growth and sporulation at the lowest 18°C and highest at 35°C.

The relative-humidity showed excellent growth and sporulation of test fungi at 100% and better growth and sporulation at 96.6% r.h. and less growth at 80.6 and 90.7% relative-humidity.

The extracts (whole plant, root and leaf) of *Echhornia crassips*, *Polygonum orientalis*; and *Ludwigia odsendens* showed differential effects on the growth of test fungi. The extracts of *Echhornia crassips*, inhibited the growth of *Aspergillus niger*; *Aspergillus flavus*; *Curvularia lunata*; *Fusarium pallidoroseum* and *Penicillium purpurogenum* and stimulated the growth of *Alternaria alternata*; *Curvularia pallescens* and *Helminthosporium oryzae*.

The leaf extract of *Penicillium orientalis* inhibited the growth of *Alternaria alternata*; *Aspergillus niger*; *Aspergillus flavus*; *Curvularia lunata*; *Curvularia pallescens*; *Fusarium pallidoroseum* and *Helminthosporium oryzae* and stimulated the growth of *Penicillium purpurogenum*.

The root extract of the same plant inhibited the growth of *Curvularia lunata* and *Curvularia pallescens* and stimulated the growth of *Alternaria alternata*; *Aspergillus niger*; *Aspergillus flavus*; *Fusarium pallidoroseum*; *Helminthosporium oryzae* and *Penicillium purpurogenum*.
The leaf extract of *Ludwigia odscendens* showed inhibition of growth of *Aspergillus niger*; *Aspergillus flavus* and *Curvularia pallescens* and stimulation in the growth of *Alternaria alternata*; *Curvularia lunata*; *Fusarium pallidoroseum*; *Helminthosporium oryzae* and *Penicillium purpurogenum*.

Similarly, the root extract of *Ludwigia odscendens* was found to inhibit the growth of *Alternaria alternata*; *Aspergillus niger*; *Aspergillus flavus*; *Curvularia lunata* and *Curvularia pallescens* and stimulate the growth of *Fusarium pallidoroseum*; *Helminthosporium oryzae* and *Penicillium purpurogenum*.

The seed leachates of paddy of different soaking hours (12, 24, 36 and 48 hours), showed inhibition of fungal spore germination, and inhibitory effect was found more with the increase of soaking hours.

The seed leachates of paddy stored for 6 months were analysed for the determination of phenol (total phenol). The result showed the presence of total phenol in the leachates of seeds collected from both the ambient storage structures. The maximum total phenols (84 mg/ml) was determined in the seeds stored at tin granary.