

A COMPARATIVE STUDY OF PENICILLIA FROM SOIL, LEAF, LITTER AND AIR IN A COASTAL SANDY BELT OF ORISSA

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Occurrence and distribution of *Penicillia* was studied from soil, leaf, litter and air. A total of 26 species were isolated of which soil had a share of 20 species, leaf and litter had 20 species and the air contributed 19 species. Litter contained higher population of *Penicillia* than the soil and air. The dominant species were *P. citrinum*, *P. lanosum*, *P. minioluteum*, *P. nigricans*, *P. oxalicum*, *P. rubrum* and *P. verruculosum*.

Keywords: Coastal sandy belt; Distribution; *Penicillia*.

Plant material falling on to the ground enter into a new microbial world mostly inhabitants of soil. Several micro fungi are known to occur in both the phylloplane and on dead leaves in the early stages of decay¹. *Penicillium* is an important cellulose decomposing fungi common in tropical forest soil² whose occurrence and distribution in India has been variously reported³⁻⁵. Its role as a decomposer in forest floors has also been studied in detail^{6,7}. In Orissa, few workers have reported the incidence and some ecological aspects of these micro fungi⁸. But so far as the coastal habitat of Orissa is concerned, no one earlier paid heed to this type of study. The present paper reports a comparative study of *Penicillia* in a coastal sandy belt of Orissa stabilized with uniculture plantation of *Casuarina equisetifolia* L.

The site for the present study was Ganjam district of Orissa, 19° 15' N Latitude and 84° 50' E Longitude having 60kms of sea coast along the Bay of Bengal at a height of 6-8m above MSL. Soil sample were collected from two sites i.e. SA (virgin coastal sand dune) and SB coastal and sand dune with unicultured plantation of *Casuarina equisetifolia* L. For leaf and litter study four samples i.e. yellow senescent leaf needle (SL), freshly fall needle (FL), partially decomposed litter (PDL) and humus litter needle (HL) were collected. For air study 3 spots i.e. inside field (IF), outside field (OF) and far-outside field (FOF) were selected. Soil fungi have been isolated by dilution plate⁹ as well as soil plate method¹⁰. Leaf and litter mycoflora was isolated by leaf wash method. The aeromycoflora was studied by exposing nutrient plates for five minutes at three sites.

In temperate environment *Penicillium* is

predominant in soil and on other substrates. Nevertheless, it is the second dominant genus in tropical countries^{11,12}. Of 26 species of *Penicillium* recorded, soil and leaf-litter had a share of 20 each and air contributed 19 species (Table 1). The *Penicillia* population of leaf-litter was higher than soil and air (Table 1) similar to the finding of Garg¹³. In the present study population of *Penicillia* in general increased as the litter underwent decomposition corroborating to Minderman and Daniels¹⁴. Rai¹⁵ observed a gradual increase in number of fungi with ageing from senescent to decomposing litter. Higher population of *Penicillia* on litter possibly due to higher nutrients on leached leaves. *P. citrinum*, *P. lanosum*, *P. minioluteum*, *P. nigricans*, *P. oxalicum*, *P. rubrum* and *P. verruculosum* were the dominant species in all the samples under study (Table 1). They have been frequently isolated in various soils of India³⁻⁵. They were also not uncommon in air^{16,17}.

Of 26 species, 15 were common, while a few were restricted in their distribution. However, categorization of these species into distinct ecological groups based on their habitat or vegetation cover was not possible in this study^{18,19}.

The present study isolated less number of species to that of species reported from India²⁰ and it is suggested that a diversity of media and methods be employed from different soil habitats of Orissa.

References

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Table 1. Frequency of occurrence of different *Penicillia* from soil, leaf, litter and air (average of two years).

Fungal species	Frequency of occurrence (%)						IF	OF	FOF	Population/gdw x 10 ² (gdw - Gram dry weight)					
	SA	SB	SL	FL	PDL	HL				SA	SB	SL	FL	PDL	HL
<i>Penicillium adametezi</i>	-	29.1	-	-	-	-	8.3	-	16.6	-	4.5	-	-	-	-
<i>P. cacemberti</i>	-	-	-	8.3	-	-	-	-	-	-	-	-	16.9	-	-
<i>P. chermesium</i>	-	25.0	-	-	-	-	-	-	8.3	-	4.5	-	-	-	-
<i>P. chrysogenum</i>	-	29.1	-	-	-	-	-	-	-	4.53	-	5.65	-	-	-
<i>P. citrinum</i>	91.6	100	58.3	100	100	100	25	75	66.6	17.6	21.8	48.1	97.8	356.8	270.1
<i>P. corylophilum</i>	-	-	-	-	-	-	8.3	-	-	-	-	-	-	-	-
<i>P. cyaneum</i>	-	29.1	-	-	-	33.3	8.3	8.3	-	-	2.7	-	-	-	50.2
<i>P. decumbens</i>	-	29.1	8.3	8.3	-	-	25.0	16.6	8.3	-	4.1	-	-	-	-
<i>P. expansum</i>	-	16.6	50.0	-	-	-	33.3	-	-	2.7	2.0	29.0	-	27.3	-
<i>P. fellutanum</i>	33.3	8.3	8.3	-	-	-	16.6	-	16.6	-	3.2	-	-	-	-
<i>P. glabrum</i>	-	37.5	-	-	-	-	-	-	-	-	7.2	3.9	-	-	-
<i>P. granulatum</i>	-	-	-	-	-	-	-	-	-	1.2	2.1	-	-	-	-
<i>P. italicum</i>	-	-	-	-	-	-	8.3	-	-	-	-	-	-	-	-
<i>P. islandicum</i>	16.6	58.3	-	-	25.0	-	-	8.3	-	0.56	6.6	-	5.4	-	-
<i>P. implicatum</i>	-	-	-	-	-	-	-	-	-	-	-	3.2	-	-	-
<i>P. lanosum</i>	27.2	20.8	25.0	8.3	8.3	8.3	16.6	50.0	8.3	4.2	1.5	14.8	6.6	-	3.9
<i>P. minioleum</i>	-	54.1	16.6	41.6	8.3	25.0	8.3	8.3	8.3	-	6.8	2.6	27.4	33.4	17.7
<i>P. nigricans</i>	33.3	54.1	25.0	50.0	58.3	33.3	16.6	41.6	-	9.7	5.9	22.7	3.5	9.0	13.2
<i>P. oxalicum</i>	20.8	33.3	66.6	66.6	16.3	-	25.0	25.0	16.6	4.2	6.1	75.9	72.5	30.4	7.5
<i>P. palladium</i>	-	-	-	-	-	-	-	-	-	-	-	-	2.4	-	-
<i>P. purpurogenum</i>	41.6	-	-	-	-	-	-	-	-	-	5.7	-	-	-	-
<i>P. resticulosum</i>	-	20.8	8.3	-	-	-	-	-	8.3	-	2.5	-	-	-	-
<i>P. roseo-purpureum</i>	16.6	-	8.3	8.3	25.0	16.6	-	8.3	-	3.0	-	1.5	7.2	8.3	-
<i>P. rubrum</i>	8.3	75.0	16.6	-	33.3	8.3	8.3	33.3	8.3	1.0	5.1	7.4	10.7	18.2	20.3
<i>P. rugulosum</i>	25.0	45.8	-	-	-	-	8.3	-	16.6	2.9	5.4	-	-	4.2	-
<i>P. verrucosum</i>	66.6	100	16.6	75.0	100	100	41.6	16.6	16.6	8.5	25.0	14.3	66.7	570.9	383.3

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