Leaf litter fungi found on Pinus longifolia Salisb.

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Very few studies (W e b st er, 1957; Pugh, 1958) have been made on leaf litter fungi in the world. In India so far no studies have been made on this material. Leaf-litter is the material from which the greater part of the organic horizon of the soil is derived, and certain of its properties play dominant roles in determining the nature of the organic horizon (H a n d l e y, 1954) and in the development of soil profile (J of f e, 1932). The leaf-litter of *Pinus longifolia* S a l i s b., is a very convenient material for study, as the forests of Pine are generally found in the Himalayan tracts in India. In the present study the place chosen was Ranikhet, District Almora, U. P. The leaf litter of *Pinus longifolia* Salisb., has strong humus forming tendencies and the protracted breakdown process leads to considerably accumulation of litter in progressive stages of decay which may be recognised as the litter, 'fermentation' and 'humification' as defined by H e s s e l m a n (1926).

Material and Methods.

Leaf litters of Pine needles which have accumulated on the soil were selected for the present study. The main needle falls in August with a secondary fall in May. These pine needles were collected in September and June in sterilized containers. The pine litters are of two types (i). The fallen needles which are dark grey in colour and quite fresh (fresh litter), (ii). The needles which become mixed with soil and old (old litter). These leaf litters were collected and different fungi were isolated by the following methods on different media (Hay extract agar, Potatodextrose agar and Czapek's agar).

1. Hyphal isolation method (Warcup, 1955a).

2. Dilution method (Waksman, 1927).

3. Direct method (Waksman, 1916).

Mycelia growing in the interior of pine needles were selectively isolated by sterilizing the needles with 0.1% (W/V) aqueous mercuric chloride solution before plating.

Observations.

The fungi isolated by different methods were identified with the help of relevant literature.

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	Fungi	Sep I	tember Fresh litter	1963 Old litter	June Fresh litter	1964 Old litter
1. Absi	dia spinosa Lendner		+		+	
2. Gon	gronella butleri (Lend.) Peyronel					
& D	al Vesco.			1	+	10. t-
3. Rhiz	copus stolonifer (Ehrenberg) Fres.		+	+	+	+
4. Circ	inella muscae (Sorokine) Berl. & Det	oni	+	+		
5. Muc	or racemosus Fresenius		+	+	+	+
6. Muc	or jansseni Lendner			+	+	
7. Muc	or luteus Linnemann			+	+	+
8. Mor	tierella ambiqua Mehrotra		+	+	+	+
* 9. Mor	tierella spp.		+	+	+	+
10. Hela	icostylum spp.		+	+		
11. Ach	lya spp.		+	+	+	+
12. Asp	ergillus sydowi (Bain & Sar.)					
Tho	m & Church		+		-	
13. Asp.	ergillus fumigatus Fres.		+	+	+	+.
14. Asp	ergillus awamori Nakazava		+	+	+	+
15. Pen	icillium funiculosum Thom		+	+	+	+
16. Pen	icillium stipitatum Thom		+		+	+
* 17. Pen	icillium duclauxi Delacroix		+			-
18. Neod	cosmospora vasinfecta Smith (E. F	·.)	+		-	Manual View
19. Hun	<i>nicola grisea</i> Traaen		+		-	
20. Clad	losporium herbarum (Persoon) Lin	k	+	+	+	+
21. Trie	choderma viride Fres.		+	+	+	+
* 22. Paec	cilomyces puntonii (Vuill) Nannizzi				+	+
23. Pul	lularia pullans (de Bary) Berk.		+	+	+	+
* 24. Stac	hybotrys spp.		+	+	+	+

The fungus flora obtained from old leaves was found altered as the leaf material decomposed. This can be very well judged by the presence or absence of various fungi in the list. The number of species, and the number of isolations, were least in the oldest litter and greatest on the new surface leaves. Similar was the finding of P ug h (1958). Chesters has postulated that the so called "soil fungi" in fact grow upon particles of organic matter, so it may be appropriate to consider some opinions regarding the changes induced during colonization of such particles in the soil. Garrett (1951) was of the opinion that the changes which attributed in the flora to the progressive breakdown of the newly invaded substrate by a succession of heterotrophic micro-organisms, and N e w m a n and N orm an 1943) suggested that the nature of the available energy materials largely determined the fungus flora.

The most common fungi in the present studies were Aspergillus awamori, Mortierella, ambigua, Mortierella spp., Penicillium funiculosum, Achlya spp., Pullularia pullans, Stachybotrys spp., and Trichoderma viride. Out of these species isolated and identified from the fresh and old litter of Pinus longifolia Salisb., in September and June, viz., P. duclauxi Delacroix and Paecilomyces puntonii (Vuill.) Nannizzi, were new records from India. Isolation techniques have shown that *Penicillium*, *Trichoderma* and *Mortierella* are widespread in old litter, *Mortierella* spp. often predominating.

The microflora recorded from inside the needles included are *Pullularia pullans*, *Stachybotrys* spp. and *Mortierella* spp. only.

Summary.

The most common fungi present in the leaf litters of Pine forests found on Himalayan tract in India were Aspergillus awamori, Mortierella ambigua, Mortierella spp., Penicillium funiculosum, Achlya spp. and Trichoderma viride. Out of the twentyfour species isolated and identified from the fresh and old litter of Pinus longifolia Salisb., viz., Penicillium duclauxi Delacroix, Paecilomyces puntonii (Vuill.) Nannizzi, Stachybotrys and Mortierella spp. were new records from India.

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