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SUCCESSION OF MYCOFLORA ON LEAF LITTER OF *HOLIGARNA FERRUGINEA MARCHAND* AND *GYMNACRANTHERA CANARICA* WARB., IN HOSMATA REGION OF WESTERN GHATS

H.S.SHENOY and **RASHEED AHMAD**

Department of Applied Botany, Mangalore University, Mangalagangotri - 574199, India.

The present study deals with the succession of mycoflora on leaf litter of *Holigarna ferruginea* Marchand and *Gymnacranthera canarica* Warb., in Hosmata forest of Western Ghats. A total of 81 genera of fungi were isolated from the litter of two species studied. Mycoflora varied between two host species. Among the various classes of fungi Deuteromycetes were the most dominant group.

Keywords : *Gymnacranthera canarica; Holigarna ferruginea; Litter; Mycoflora.*

Introduction

The integrity of an ecosystem is maintained by transfer of matter and energy through litter-fall. Leaf litter contains considerable amounts of nutrients and bound energy which are released during decomposition by the action of decomposing organisms[1]. The faster the rate of decomposition the more is the nutrient availability and consequently the greater is the forest productivity. Role of mycoflora in the degradation of litter has been emphasised by many workers[2,3] . The succession of mycoflora on the leaf litter of above said species has not been studied so far in Western Ghats. Hence, two common plant species of Hosmata Forest were taken up for the present investigation.

Study area Hosmata is located in the Puttur Taluk of Karnataka State in Western Ghats, confined between 74^0 25' to 74^0 30' East longitude and 12^0 44' to 12^0 46' North Latitude. The area has semi evergreen vegetation with Holi*garna ferruginea* and *Gymnacranthera canarica* being the main components.

Materials and Methods

Six Kg each of nearly senescent and fallen leaves of *Holigarna ferruginea* Marchand and *Gymnacranthera canarica* Warb., were collected from Hosmata forests of Western Ghats. The succession studies were carried out using the mesh bag technique.[4] Each lot of the collected leaf litter was equally divided into 12 parts of 500 g and placed in nylon bags of mesh size 1 cm^2 measuring 20 x 40 cm. The bags with leaf litter of particular species were placed on the forest floor below the corresponding plant species. To prevent the bags from being disturbed they were anchored to a peg with nylon thread. In the first week of each succeeding month one litter bag of each species was brought to the laboratory for further studies.

Identification of leaf litter fungi was done by plating the litter in Petriplates with three layers of wet blotters placed on a moistened absorbent cotton and incubated at room temperature for a month with alternate cycles of 12 hours of artificial light and darkness. The light source was fluorescent day light emitting 1,900 luxes of light. First observation was made after

seven days of incubation and subsequent observation of the same litter was done every week upto a period of one month.

Results and Discussion

The present study revealed that the population of fungi colonizing decomposing leaf litters vary significantly. The maximum number of fungi were recorded on the leaf litter of *Holigarna ferruginea* Marchand when compared with *Gymnacranthera canarica* Warb.

The fungi isolated from the leaf litter of two plant species belong to 81 genera (Table 1). Of these, the fungi imperfecti were represented by 70 genera (87%), Ascomycetes by 8 (10%), Phycomycetes 1 (1%), Myxomycetes 1(1%) and Basidiomycetes 1 (1%).

The fungi isolated from *Holigarna ferruginea* leaf litter belonged to 58 genera, of these fungi imperfecti were represented by 49 (84%) , Ascomycetes 7 (12%), Myxomycetes 1(2%) and Basidiomycetes 1 (2%). The primary colonizers of the litter were *Beltrania rhombica, Ellisiopsis galliseae, Nectria* sp., *Eutypa* sp., and *Fusarium oxysporum.* The secondary colonizers includes *Helicosporium vagetum, Helicomyces* sp., *Botryodiplodia theobromae, Pestalotiopsis funera, Cryptophiale kakombensis* and *Codinaea assamica.* The tertiary colonizers includes *Speiropsis hyalospora, Wiesneriomyces javanicas* and *Phalangispora constricta.*

Cryptophiale kakombensis, Ellisiopsis galliseae, Beltrania rhombica and *Pestalotiopsis funera* were frequent during early stages of decomposition where as, *Mycena galopus, Comatricha* sp. *Dactylella oviparasitica* during advanced stages of decomposition.

Myxomycetes fungi like *Comatricha* sp., Ascomycetes fungi like *Eutypa* sp., *Herpotrichia* sp., *Melanomma* sp., *Nectria* sp., Deuteromycetes fungi such as *Anguillospora longissima, Aureobasidium pullulans, Bactrodesmium* sp., *Beltraniopsis tanzaniensis, Collectotrichum gloeosporioides, Corynespora combretii, Corynespora kamatii, Cryptophiale kakombensis, Cylindrocarpon destructans, Cylindrotrichum triseptatum, Dactylella oviparasitica, Graphium putredinis, Gyrothrix podosperma, Gyrothrix verticillata, Helicorhoidion* sp., *Isthmotricladia laeensis, Mycoleptodiscus terrestris, Penicillium* sp., *Pyricularia* sp., *Redbia puccinicola, Spegazzinia parkeri, Sporidesmium eucalyptii, Subulispora procurvata, Thozetellopsis* sp. and *Zygosporium masonii* were exclusively isolated from this host.

The fungi isolated from *Gymnacranthera canarica* Warb. Leaf litter belonged to 53 genera. Deuteromycetes 47 (89%), Ascomycetes 4(7%), Phycomycetes 1(2%) and Basidiomycetes by 1(2%). The primary colonizers of the litter were *Beltrania rhombica, Ardhachandra selenoides, Asterina* sp.

Table 1. Different fungi isolated from leaf litter of *Holigarna ferruginea* Marchand and *Gymnacranthera canarica* Warb., from Hosmata forest of Western Ghats.

S1.No.	Fungi	*Holigarna ferruginea*	*Gymnacranthera canarica*
	Myxomycetes		
1.	*Comatricha* Sp.	+	–
	Phycomycetes		
2.	*Helicocephalum sarcophilum* Thaxt.	-	+
	Ascomycetes		
3.	*Asterina* sp.	+	+
4.	*Chaetomium* sp.	+	+
5.	*Choranophora* sp.	–	+
6.	*Eutypa* sp.	+	-
7.	*Herpotrichia* sp.	+	-
8.	*Lophodermium* sp.	+	+
9.	*Melanomma* sp.	+	-
10.	*Nectria* sp.	+	-
	Basidiomycetes		
11.	*Mycena galopus* (Fr.) S.F.Gray,	+	+
	Deuteromycetes		
12.	*Anguillospora longissima* (de willd.) Ingold	+	-
13.	*Arachnophora fagicola* Hennebet	-	+
14.	*Ardhachandra selenoides* (de Hoog) Subram. & Sudha	-	+
15.	*Arthrinium* sp.	-	+
16.	*Aspergillus* sp.	+	+
17.	*Asteromyces* sp.	-	+
18.	*Aureobasidium pullulans* (De Bary) Arnaud	+	-
19.	*Bactrodesmium* sp.	+	-
20.	*Beltrania rhombica* O. Penzig,	+	+
21.	*Beltraniella* sp.	-	+
22.	*Beltraniopsis tanzaniensis* Pirozynski	+	-
23.	*Botryodiplodia theobromae* Pat.	+	+
24.	*Camposporium antennatum* Harkness	+	+
25.	*Camposporium pellucidam*(Grove) Hughes	-	+
26.	*Campylospora chaetochladia* Ranzoni	+	-
27.	*Chaetendophragmina triangularia* Matsushima	+	+
28.	*Circinotrichum fertile*Pirozynski & Hodge	+	+
29.	*Codinaea assamica* (Agnihothrudu) Hughes & Kendrick	+	+
30.	*Colletotrichum gloeosporioides* Penz.	+	-
31.	*Corynespora combretii* M.B.Ellis	+	-
32.	*Corynespora kamatii* (Vasant Rao) M.B.Ellis	+	-
33.	*Cryptophiale kakombensis* Pirozynski	+	+
34.	*Cryptophiale udugawae* Pirozynski & Ichinoe	+	-
35.	*Curvularia pallescens* Boedijn	+	+
36.	*Cylindrocarpon destructans* Wollenweber,	+	-
37.	*Cylindrocladium ilicicola* (Hawl.) Boedijn & Reitsma	+	+
38.	*Cylindrotrichum triseptatum* E.B.Ellis	+	-
39.	*Dactylella oviparasitica* Stirling & Mankan	+	-
40.	*Dictyosporium heptasporum* (Garov.) Damon	-	+
41.	*Diplocladiella scalaroides* Arnaud	+	+
42.	*Dinemasporium strigosum* (Persn. ex Fr.) Sacc.	+	-
43.	*Domingoella asterinarum*		

	Petrak & Cif.	-	+
44.	*Ellisiopsis galliseae* Batista & Nascimento	+	+
45.	*Endocalyx melanoxanthus* (Berk.& Br.) Petch	-	+
46.	*Fusarium oxysporium* Schl, ex Fries	+	-
47.	*Flabellospora verticillata* Alasoadura	-	+
48.	*Geotrichum candidum* Link	+	+
49.	*Gonytrichum caesium* Nees ex Pres.	+	-
50.	*Gliocladium roseum* (Link) Barimer	-	+
51.	*Gooseomyces* sp.	-	+
52.	*Graphium putredinis* (Corda) Hughes	+	-
53.	*Gyrothrix circinata* (Berk. & Curt.) Hughes	-	+
54.	*Gyrothrix podosperma* (Corda) Rabenhort	+	-
55.	*Gyrothrix verticillata* Pirozynski	+	-
56.	*Helicomyces roseus* Link	+	+
57.	*Helicorhoidion* sp.	+	-
58.	*Helicosporium vagetum* Nees ex Fries	+	+
59.	*Isthmotricladia laeensis* Matsushima,	+	-
60.	*Minisporella* sp.	+	+
61.	*Minisporopsis theobromae* Hughes	+	+
62.	*Monodictys putredinis* (Wallr.) Hughes	-	+
63.	*Mycoleptodiscus terrestris* (Gerdemann) Ostazeski	+	-
64.	*Mycoleptodiscus* sp.	-	+
65.	*Myrothecium* sp.	-	+
66.	*Paecillomyces* sp.	-	+
67.	*Penicillium* sp.	+	-
68.	*Pestalotiopsis funera* (Desm.) Steyart	+	+
69.	*Phalagispora constricta* Singh	+	+
70.	*Phoma* sp.	+	+
71.	*Pithomyces chartarum* (Berk. & Curt) M.B.Ellis	-	+
72.	*Pseudobotrytis terrestris* (Timonin) Subram	+	+
73.	*Pyricularia* sp.	+	-
74.	*Redbia puccinicola* Deighton & Pirozynski	+	-
75.	*Spegazzinia parkeri* Sivasithamparam	+	-
76.	*Speiropsis hyalospora* Subram. & Lodha	+	+
77.	*Sporidesmium ellisii* Pirozynski	+	+
78.	*Sporidesmium eucalyptii* M.B.Ellis & D.Shaw	+	-
79.	*Stachybotrys parvispora* Hughes	-	+
80.	*Streptomyces* sp.	-	+
81.	*Subulispora procurvata* Tubaki	+	-
82.	*Thozetelopsis sp.*	+	-
83.	*Torula caligans* (Batista & Upadhyay) M.B.Ellis	-	+
84.	*Trichoderma viridae* Pers. ex Fries	-	+
85.	*Trichothecium roseum* (Pers.) Link ex Fries	-	+
86.	*Tubercularia vulgaris* Tode ex Fries	-	+
87.	*Wiesneriomyces javanicus* Koorders	+	+
88.	*Zygosporium masonii* Hughes	+	-

+ = Present; - = Absent.

Helicomyces roseus and *Botryodiplodia theobromae.* The secondary colonizers includes *Phalangispora constricta, Speiropsis hyalospora, Codinaea assamica* and *Menisporella* sp. Tertiary colonizers includes *Dactylella oviparasitica, Diplocladiella scalaroides* and *Camposporium antennatum.*

The fruiting bodies of *Mycenea galopus* was frequent during February. *Gooseomyces* sp isolated only once during April. Appearance of *Endocalyx melanoxanthus* was frequent during May-June period.

Phycomycetes fungi such as *Helicocephalum sarcophilum,* Deuteromycetes fungi like *Arachnophora fagicola, Ardhachandra selenoides, Arthrinium* sp., *Asteromyces* sp., *Beltraniella* sp., *Camposporium pellucidam, Dictyosporium heptasporum, Domingoella asterinarum, Endocalyx melanoxanthus, Flabellospora verticillata, Gliocladium roseum, Gooseomyces* sp., *Gyrothrix circinata, Monodictys putredinis, Myrothecium* sp., *Paecillomyces* sp., *Pithomyces chartarum, Stachybotrys parvispora, Streptomyces* sp, *Torula caligans, Trichoderma viriae, Tubercularia vulgaris* and Ascomycetes fungi like *Choranophora* sp. were exclusively isolated from this host. Deuteromycetes were dominant fungi colonizing the leaf litter, followed by Ascomycetes and Phycomycetes. Freshly fallen litter had maximum number of fungi i.e. in September.

Preponderance of fungi on decomposing leaf litters has been reported earlier[5] . Shetty and Ahmad[3] found that the members of fungi imperfecti are strong colonizers of litters showing better adaptability and higher percentage distribution compared to the members of Phycomycetes, Myxomycetes, Basidiomycetes and Ascomycetes.

The concept of fungal succession on plant litter and other substrata has now become well established[6,7]. The sequence of this succession upon natural substratum reflects a complex interaction of nutritional relationship between each fungus and substratum, together with competition between individual fungi[5]. The succession of fungi on leaf litters reported here by and large, agrees with the general scheme of fungal succession on litter proposed by Hudson[6] In this study Deuteromycetes fungi were found colonizing litters during all the stages of decay. The predominance of fungi imperfecti on leaf litters may be related to their high sporulating ability and fast growth. Majority of the genera belonging to this group are recognised as very active cellulose decomposers[8].

The present study revealed that the number of saprophytic fungal species on litter are maximum during September in contrast to the findings by Shetty and Ahmad[3], where maximum number of fungi were reported during February to April, also there was slight variation in the primary, secondary and tertiary colonizers. The reason for this may be the change in environmental

conditions, habitat and also the host itself.

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