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GENUS *PHYSARUM* PERS. FROM MANUDEVI FOREST DIST. JALGAON, MAHARASHTRA (INDIA)

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Abstract

During the floristic study of the myxomycetes of this region author come across a number of myxomycetous species. In the present paper genus *Physarum* Pers. with three species are being described for the first time from this region i.e.1. *Physarum bivalve* Pers. 2. *Physarum cinerium* (Batch) Pers. And *3. Physarum compressum* Alb. & Schw.

Key Words: Myxomycetes, slime moulds.

Introduction

The Myxomycetes or 'the true slime – moulds' are the fungi like organisms, possess an assimilative phase of free living, multinucleate, mobile mass of protoplasm called as the plasmodium, and a sporulating phase consisting of a mass of spores typically borne in a simple or complex membranous or tough, non-cellular spore case. In addition to spores, often there is a system of free or netted threads forming a capillitium or pseudocapillitium. Manudevi forest the region under investigation is very rich in biodiversity-constitute the districts Jalgaon. The study of myxomycetes was practically neglected from this region. Hence, it was felt to undertake the study.

Materials and Methods

The present work is based on myxomycetous floristic exploration from the region. An extensive and intensive field work was undertaken to collect the maximum number of specimens of myxomycetes. Visits to different localities were made frequently. Localities for visit were selected so as to cover the maximum representation of the area under investigation. Repeated visits were made to some of the localities for the collection of the specimens. Specimens were collected along with collection of the specimens. Specimens were collected along with their natural substrates. For the preservation of specimens, empty cigarettes boxes found to be very suitable, convenient, easily available, easy to handle and economical. Paper trays of the proper size were prepared so as to get it fit inside the box tray. As per the spreading of the specimen, its natural substrate was cut into suitable size and glued with the fevicol adhesive in the centre of the paper tray. Each box was provided with field notes of respective specimen. The

accession number was written on the specimen box and on the paper tray also, and entered in accession register .After observation; specimen boxes were stored and placed in 'Generic' boxes provided with naphthalene ball to prevent insect entry. Generally specimen boxes were carried to the field to preserve the specimen intact. Sometimes because of heavy collection, specimens were brought to the laboratory on their natural substrate, in a special handling basket, so as not to disturb them. Then they were preserving. In rainy season, the collected specimens were dried in the incubator or and oven at 40'o c. But sun drying was found to be most suitable for maintaining natural characters. Artificial drying sometimes leads to the shrinkage of weak and flaccid stalk, hardening of wet sporangia and cracking of peridium.All the specimens were identified and confirmed with the help of Martin and Alexopoulos (1969) sometimes, Lister (1925),Hagelstein (1944), Farr (1976), were followed. Monographs on Indian Myxomycetes of Thind (1977), Lakhanpal and Mukerji (1981), were of almost indespensible for final confirmation. Concerned literature in this regards were also studied.

Results and Discussion

1. ***PHYSARUM BIVALVE*** Pers.

Ann. Bot. Uteri. **5**, 1795.

Martin, G. W. & C. J. Alexopoulos, **The Myxomycetes**, p. 288-289, 1969.

(FIG. 1)

Fructification plasmodiocarpous mixed with few sessile sporangia, scattered to gregarious. Plasmodiocarps short or long, simple to branched, segmented, strongly compressed laterally with upper fissure appearing as bivalve like mollusc, ochraceous to yellowish brown, 0.39 to 11.2 mm long, 0.22 to 0.47 mm in height. Sporangia small, on constricted base, appearing like stalk. Hypothallus inconspicuous. Peridium double ; outer layer thick, pale yellowish towards the upper part and darker towards the base, dehiscence along the upper fissure, after dehiscence it looks like bivalve mollusc ; inner peridium grayish white, sprinkled with lime, thin, membranous, transparent, dehisce irregularly, but remain intact for longer time. Capillitium abundant, composed of limy nodes and nonlimy internodes ; nodes many white, globose, subglobose, irregular, smooth ; internodes short, thin tubular, delicate, hyaline, connected to the nodes forming a network. Columella absent. Spore mass black, deep violaceous brown under transmitted light, globose, 7 to 11 μm in., minutely warted, warts in small curved line.

Collection Examined: NVC /129,130 Sept.2017, Manudevi, dist. Jalgaon. On dry leaves of angiospermic plant.

Distribution : India : Delhi (Singh and Pushpavathy, 1965 ; Lakhanpal and Mukerji, 1981) ; Gujrat (Salunkhe, 1995) ; H.P. (Lakhanpal, 1973 ; Thind, 1977) ; M. P. (Kharat, 2000) ; M. S. (Nanir, 1978, 1991 ; Rokade, 1989 ; Chimankar, 1993 ; Jadhav, 1994; Tembhurne, 2011) ; U.P. (Lodhi, 1934 ; and Sohi, 1955) ; W. B. (Thind, 1977).

Strongly laterally compressed, sinuous plasmodiocarps, double peridium ; preformed longitudinal fissure, minutely and uniformly spinulose, paler spores of 8-10 µm in diam., are the marks of the species which are differentiating it from *P. bitectum* G. Lister. Dehisced sporangia of *P. bivalve* Pers. appear like bivalve mollusc easily distinguishes it from others. The species may vary from simple to branched plasmodiocarp to sporangiate form. It is close to *P. leavosporum* Agnihothrudu. However later is marked by smaller spores, terete, slightly laterally compressed, yellowish brown or grayish brown fruiting with quite larger nodes upto 100 um in diam. and irregular dehiscence.

It can be campared with *P. echinosporum* Lister is characterized by strongly compressed chalk-white fructification, a double peridium and dark and strongly verrucose (or spinulose) larger spores, 7 – 11 um in diameter. The spiny warts are arranged in irregular lines, forming very incomplete and very irregular reticulation.

2. ***PHYSARUM CINEREUM*** (Batch) Pers.

Neues. Mag. Bot., **1**, 89, 1974.

Martin, G. W. & C. J. Alexopoulos, **The Myxomycetes**, p. 291-292, 1969.

(FIG. 2)

Fructification sporangiate to plasmodiocarpous, white to grayish white, scattered to gregarious. Sporangia globose to subglobose, 0.2 to 0.4 mm diam. Plasmodiocarps small, straight or curved, with few branches, small segmented, terete, constricted at the base. Hypothallus inconspicuous, thin membranous, transparent, limeless. Peridium single, thin, membranous, iridescent, transparent, hyaline, impregnated with lime granular, densely or sparsely covered with white lime globules of granular lime. Dehiscence irregular. Capillitium abundant, network of limy nodes and limeless internodes along with the many limeless junctions ; nodes white, small, globose, oval, spindle or rod like or angular ; internodes thin, short, tubular, hyaline. Columella absent ; rarely white, limy pseudocolumella may be present. Spore mass brown, pale purple brown under transmitted light, globose, 7.3 to 15 um in diam., minutely warted, warts, in small short lines.

Collection Examined: NVC / 131,135, July2016, Botanical garden Bhadgaon College, 136, Sept. 2016, Manudevi, dist Jalgaon. On decaying wood. dry leaves and pod of *Albezia lebeck*.

Distribution : India : Assam (Agnihothrudu, 1959) ; Delhi and H.P. (Lakhanpal and Mukerji, 1981) ; Gujrat (Salunkhe, 1995) ; Karnataka (Indira, 1968) ; M.S. (Nanir, 1978 ; Rokade, 1989 ; Chimankar, 1993 ; Jadhav, 1994; Tembhurne 2011) ; M. P. (Kharat, 2000) ; Punjab (Thind, 1977) ; T. Nadu (Agnihothrudu, 1955) ; U. P. (Lodhi 1934 ; Thind and Sohi, 1955).

Physarum cinereum (Batchs) Pers., is characterized by profuse growth, ash-coloured sporangiate to plasmodiocarpous fructification, plasmodiocarps being small and unbranched, fragile peridium bearing calcareous flakes, and purplish brown, minutely verrucose species of 8 – 10 um in diameter. It is campared with *P. vernum* Somm. ex Fries is marked by darker, larger, and prominently verrucose spores. Besides, the calcareous nodes of the capillitium are often massed in the centre to form a pseudocolumella in the case of *P. vernum* Somm. ex Fries but this is not observed to occur in *P. cinereum* (Batchs) Pers. The two species are hard to differentiate by superficial characters. Both have intermixed sporangia and plasmodiocarps in the same collection. However, plasmodiocarps are reported to be longer and even netted in the case of *P. vernum* Somm. ex Fries while this is not so in *P. cinereum* (Batchs) Pers.

It is one of the commonest species occurring abundantly, grows even of the living herbaceous plants. Population studied show some differences from earlier reports from India. Habit as noted is both sporangiate and plasmodiocarpous, one dominate the other, gregarious to heaped. Peridium cinereous to pinkish ash gray with irregular to petaloid dehiscence. In some cases capillitium appears badhamoid, nodes massed in the centre to form pseudocolumella. Spore size recorded for the species is variable i.e. 7-10 um (Lister, 1925; Hagelstein, 1944). For Indian specimen, 8-10 um (Thind, 1977), 8-11um (Lakhanpal & Mukerji, 1981). Population studied mostly have spore size in the range of (7-) 8-14 (-15) um.

3. ***PHYSARUM COMPRESSUM*** Alb. & Schw.

Consp. Fung. p. 97, 1805.

Martin, G. W. & C. J. Alexopoulos, **The Myxomycetes**, p. 293, 1969.

(FIG. 3)

Fructification sporangiate, stipitate, sometimes subsessile, solitary or in clusters, grayish or ash white, 0.67 to 1.0 mm tall, erect or slanting. Sporangia laterally

compressed, 0.25 to 0.5 mm x 0.3 to 0.8 mm in size and 0.25 to 0.3 mm in thickness, obconic fan shaped, lobed. Stipe thick, stout, opaque slightly tapering upwards, somewhat flattened, vertically rugose, yellowish brown towards the base, limeless or densely sprinkled with lime towards the apex, 0.33 to 0.63 mm long. Hypothallus well developed, rotate, thin membranous, non-limy, brown, venulose. Peridium single, ashes gray, membranous, impregnated with white, globose to subglobose or irregular lime globules forming more or less reticulum hence become thick and brittle. Dehiscence irregular, from upper part. Columella absent. Capillitium dense, network of limy nodes and non-limy internodes ; nodes many, white, globose, fusiform angular, connected by short, delicate, tubular, hyaline, internodes, towards the base appears to be badhamoid. Spore-mass black, violaceous brown under transmitted light, globose to subglobose 9.5 to 12.5 um in diam., minutely warted, warts in small lines, sometimes with faint compression ridges.

Collection Examined: NVC / 150, 151, Aug.-2015, Pachora, dist. Jalgaon, 136 , Sept.2016, Manudevi, dist. Jalgaon. On dead Papaya wood and dry leaves of angiospermic plants.

Distribu**ion : India :** Assam (Agnihothrudu, 1959) ; Gujrat (Salunkhe, 1995); H.P. (Lakhanpal and Mukerji, 1981) ; Karnataka (Indira, 1968) ; M. P. (Kharat, 2000) ; M.S. (Nanir et al 1998 ; Chimankar, 1993 ; Jadhav, 1994; Tembhurne 2011) ; T.N. (Agnihothrudu, 1956) ; U.P. (Thind and Sohi, 1956).

The species is characterized by its laterally compressed fan shaped sporangia. Thind (1977), mentioned the occurance of ' always stipitate sporangia ' in Indian population without limy stalk. Indira (1968), reported stipitate as well as sessile sporangia and plasmodiocarps in cultural study.

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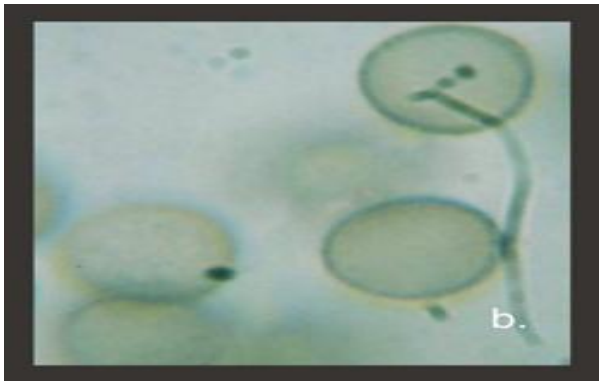
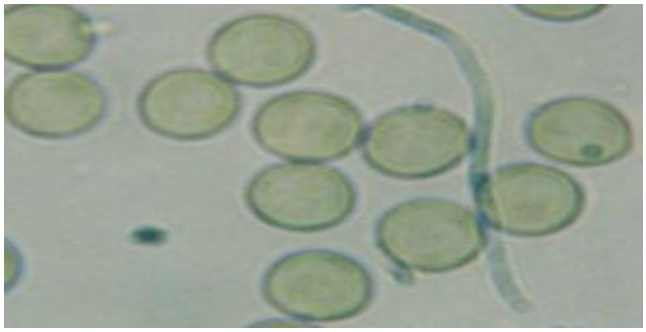
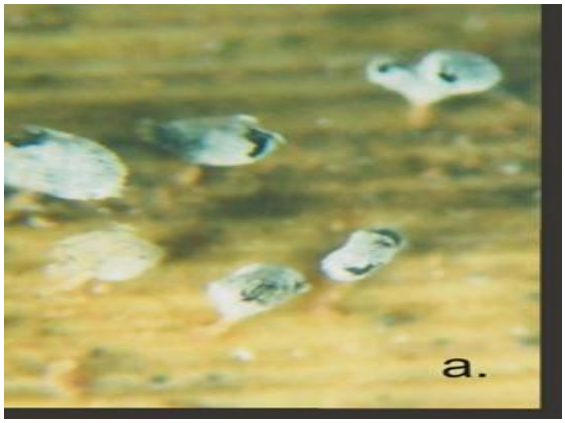
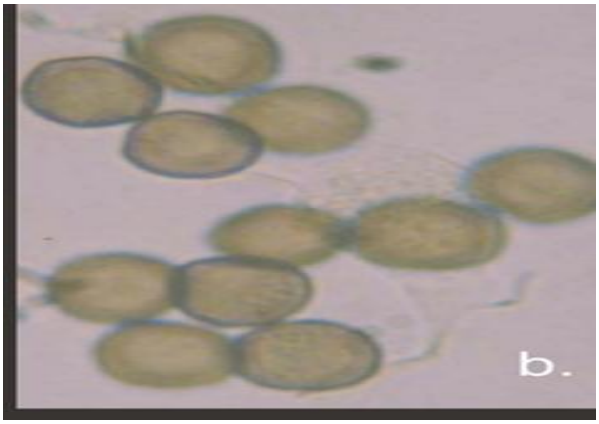


1.Physarum bivalve Pers. (a) Habit (b) Spores



2.Physarum cinerium (Batch) Pers. (a) Habit **(b) Spores**





3.Physarum compressum. Alb. & Schw. (a) Habit (b) Spores