

**Research Article**

**CRATERIELLA – A NEW GENUS OF MYXOMYCETES FROM  
MAHARASHTRA (INDIA)**

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**ABSTRACT**

A new monotypic genus of myxomycetes viz. *Crateriella nullifila* has been established in Physaraceae from Maharashtra in India. Crateriform or cupulate sub sessile fruiting body, lack of stellate lime crystals on peridium and circumscissile dehiscence of sporangia at apex are characteristics of the new genus. Of sporangia at apex are characteristics of the new genus the specific name Nullifila is assigned due to absence of capillitium.

**Key Words:** *Myxomycetes, Crateriella, New Genus, Cupulate, Nullifila, Maharashtra*

**INTRODUCTION**

Myxomycetes or True Slime Moulds are relatively small but clearly delimited universally distributed unique group of organisms contributing the characteristics of both protozoans and fungi. They grow on the variety of substrate but appear in great profusion on dead and decaying wood, leaves, woody litters that are usually available in the forest area.

Western Maharashtra especially hilly regions and forest areas are rich in Myxomycetes (True Slime Moulds). During the investigation of Myxomycetes many locations have been visited periodically in the monsoon season in this part of India such as Sinhgad, Lohogad, Pune, Khandala, Lonwala, Kankeshwar, Purandhar etc. The collected forms have been brought to the laboratory for further study. From the specimens collected from various localities, a specimen found to be unique one closely associated to the Genus Craterium in the family Physaraceae, but lacking capillitium, columella or pseudocolumella and constricted fruiting body towards apex dividing it into two distinct parts and inner peridium occupying lower part of the fruiting body make it a new taxon – *Crateriella nullifila*.

**MATERIALS AND METHODS**

**Collection**

The specimens of *Crateriella nullifila* have been collected from Purandhar fort of Pune district of Maharashtra on dead and living leaves and stems of *Carvia callosa* (Nees.) Brem. during rainy season in month of August, 1976 and 1977. The collected specimens along with the substratum were immediately glued in plastic boxes and were labeled having the details like accession number, botanical name, habitat, locality, date, name of the collector etc. After bringing of the material to the laboratory the same were kept open for air dry in order to remove moisture to avoid the invasion of the other organism.

**Slide Preparation**

Once these materials are air dried, each of the mounted material was observed on the stage of the dissecting binocular microscope (Bosch and Lamb, Germany) to observe the color, size, nature of the fruiting body, dehiscence. The Methuen Handbook of Colors (Kornerup and Wanscheu, 1967) was referred to note the standard color of the fruiting body, spores and capillitium. For microscopic studies, temporary slides were prepared. Water mounting was found to be best for the actual detection of the colors while the semi permanent slides were prepared by using Amann's fluid in place of glycerin and sealed with the help of wax. To obtain the Camera Lucida sketches, "Erma" Camera Lucida was used to illustrate the habit, type of fruiting body and character of spores and capillitium at the stage level using

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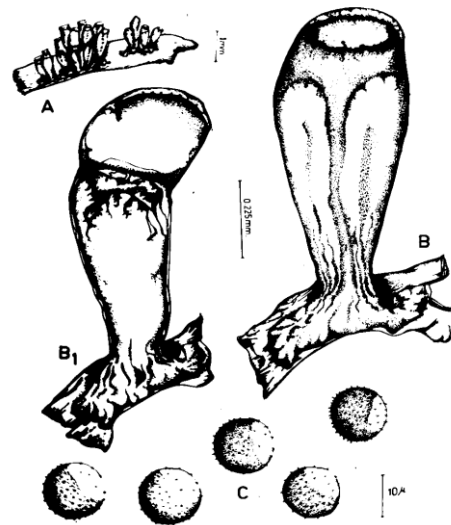
different combination of objectives like 5x, 10x, 40x, 60x and 100x and eyepiece like 5x, 10x, 15x and 20x. Measurements were taken by using 6x Ernst Wetzler ocular and 5x, 10x, 40x, 60x and 100x objectives. Photomicrographs of slides were also taken by using Ernst-Leitz Wetzler unit of photomicrography and habits photographs by Zoom camera (MA IV b Leitz Wetzler Co. Germany) to have more realistic views. Spores were inoculated on the Lactose Yeast extract Agar so as to obtain and study the type of plasmodia.

**Identification**

To make identification of species following literatures were referred. Lister G (1925); Lodhi (1934); Martin and Alexopoulos (1969); Ainsworth and Sussman (1973); Nannenga - Bremekamp (1974); Olive (1975); Thind (1977) and Lakhanpal and Mukerji (1981).



**Figure1: *Crateriella nullifila*.**  
 A Fruiting Body



**Figure 1: Camera lucida sketch of body *Crateriella nullifila*.**  
 A Fruiting body on dead woods  
 B and B<sub>1</sub> Whole fruiting body  
 C Spores

**RESULTS**

**Taxonomic Descriptions**

A – *Crateriella* Mishra and Ranade Gen. Nov.

Fructificatio sporangifera, dense aggregata vel gregaria, sub-sessilia vel stipitata, elongate cupulata vel crateriformia ostentes constrictionem ad apicem ita dividentes in duos distinctus partes; peridium duplex; stratum externum tenue cartilagineum, flavidum brunneum solutum superne, album calcareum intra superiorem partem; granula calcis amorphia; stratum interdum tenue, membranaceum, obducta calcis granulus amorphis et albis, restrictis tantum parte inferiori; dehiscencia, regularis circumscissilis; columella nec pseudo-columella adest ant; capillitium aut pseudo-capillitium deest; sporae nigrae massa, liberare peridium, purpurea brunneae luce transmissa, spherica vel sub-globosa, pariete crassi; plasmodium phaneroplasmodium.

Typus collectus in foliis emortuis in loco Purandhar montho Augusto anni 1976, 1977. Fructifications sporangiate, densely crowded or gregarious, sub-sessile or stipitate, elongated cupulate or crateriform,

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showing a constriction towards the apex thus dividing into two distinct parts; peridium double, outer peridium thin, cartilaginous, purplish brown, fading upwards, white, calcareous within the upper part; inner layer membranous, thin, restricted to the lower part only and covered with white amorphous lime granules; dehiscence regular and circumscissile at first, irregular afterwards, leaving persistent peridium at the base as a deep cup; columella or pseudo-columella absent; capillitium or pseudo-capillitium absent; spores black in mass, remote from peridium, purplish brown by transmitted light, free, spherical or subglobular, thick walled; plasmodium phaneroplasmodium type.

Specimens were collected on dead and living leaves and stems of *Carvia callosa* (Nees.) Brem. from Purandhar in month of August, 1976 and 1977.

*Crateriella Nullifila* Mishra and Ranade sp. Nov.

Fructificatio sporangifera, dense aggregata vel gregaria, interdum sporangia conjuncta ad faciendam fasciculos parvos, plerumque sub sessilia, interdum brevia stipitata, elongata, cupulata, vel crateriformia ostentes constrictionem ad apicem ita dividentes in duos distinctus partes viz. superiorem parvam sed partem latiore et inferiorem majorem sed deorsum decrescentem, pars-interior 6-7 cristis longitudinalibus notata, atropurpurea latere, inferiore et gradatum sursum lerriter, 0.26-0.35mm lata parte superiore et 0.24-0.30mm lata parte inferiore, formae sessiles 0.53-0.8mm altitudinae totali cum bria stipitata 0.9-1.1mm altitudine tota; hypothallus tenuis, brunneus, membranaceum, venulosus et communis; stipe cum adest brevis, concoloured hypothallo, valida, parum convoluta, straita, 0.12-0.16mm longus; peridium duplex; stratum externum tenue cartilagineum, flavidum brunneum solutum superne, album calcareum intra superiorem partem; granula calcis amorphae; stratum interum tenue, membranaceum, obducta calcis granulus amorphis et albis, restrictis tantum parte inferiori; dehiscencia, regularis circumscissilis; columella nec pseudo columella adest aut; capillitium aut pseudocapillitium deest; sporae nigrae massa, purpurea brunneae luce transmissa, liberal, spherical vel subglobosa, pariete crassi, stratae unilatera cum spinis numerosis arte et irregulariter dispositis alterolatero vero pallioides cum spinis paras sporsin dispositae, 10.5-13.5  $\mu$  diametro.

Plasmodium viridiflavium phaneroplasmodium. Typus collectus in foliis emortuis et viventibus et cavate *Carvia callosa* (Nees.) Brem. in loco Purandhar, die 8 Augusto, anni, 1976; 20 Augusto, anni 1977. Fructifications sporangiate, densely crowded or gregarious, sometimes sporangia fused to form small clusters, usually sub sessile, occasionally stipitate, elongated cupulate or crateriform, showing a constriction towards the apex thus dividing into two distinct parts viz. upper smaller but broader part and lower larger but narrowing downwards, the lower part marked with 6-7 longitudinal ridges, dark purplish brown at lower side and gradually becoming faint upwards, 0.26-0.35mm broad in upper part and 0.24 - 0.30mm broad in the lower part; sub-sessile forms 0.53-0.8mm in total height while short stipitate 0.9-1.1mm in total height; hypothallus thin, brown, membranous, venulose and common; stipe when present short, concoloured with the hypothallus, stout, slightly twisted, fluted, 0.12-0.16mm long; peridium double; outer peridium thin, cartilaginous, purplish brown, fading upwards, white, calcareous within the upper part and gradually becoming scanty to the lower part; inner layer membranous, thin, restricted to the lower part only and covered with white amorphous lime granules; dehiscence regular and circumscissile at first, irregular afterwards, leaving persistent peridium at the base as a deep cup; columella or pseudocolumella absent; capillitium or pseudocapillitium absent; spores black in mass, remote from peridium, purplish brown by transmitted light, free, spherical or subglobose, thick walled, darker on one side with large number of spines closely and irregularly arranged while the other side paler with less number of sparsely arranged spines, 10.5-13.5 $\mu$  in diameter. Plasmodium is greenish yellow and phaneroplasmodium type.

Specimens were collected on dead and living leaves and stems of *Carvia callosa* (Nees.) Brem., Purandhar, August 8, 1976; August 20, 1977.

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### **DISCUSSION**

The present specimen manifests unique combination of characters. It has elongated, cupulate or crateriform sporangia showing constriction towards the apex, thus dividing it into upper smaller but broader part and lower larger but narrower part, marked with 6-7 longitudinal ridges; amorphous lime granules on the inner surface of the cartilaginous, purplish brown outer peridium becoming more prominent on the upper part of the sporangium, and a lack of capillitium or pseudo-capillitium and columella or pseudo-columella as well. The inner peridium occupies only the lower narrower portion of the fruiting body and dehiscence is circumscissile.

If one follows the classification system of Martin and Alexopoulos (1969) there is no place where in the present specimen can be fitted. On the basis of absence of true capillitium, it shows affinity with order Liceales, however, its calcareous cartilaginous peridium, purplish brown spores and its phaneroplasmodium do not permit its inclusion in order Liceales as latter shows usually non-calcareous peridium, very rarely dark brown spores and plasmodium in the form of protoplasmodium.

Purplish brown spores, calcareous peridium and plasmodium of phaneroplasmodium type speak for its closer affinity with order Physarales rather than order Liceales except the fact that it lacks capillitium or pseudo-capillitium.

Therefore, present specimen can find a resting place in order Physarales simply by broadening the concept of Physarales to allow it to accommodate members that lack capillitium or pseudo-capillitium.

Since the present specimen is devoid of capillitium, the problem of its taxonomic position in order Physarales become more acute as to in which family it should be placed, whether Physaraceae or Didymiaceae.

The family Physaraceae is characterized by the forms where entire fructification is limy, capillitium is intricate and also lime but lime is in the form of non-crystalline granules. On the other hand the family Didymiaceae shows the forms where peridium and often stipe is limy; capillitium is non-calcareous and lime frequently crystalline.

Therefore, by considering the amorphous nature of lime, in the present specimen, it can be classified under Physaraceae rather than Didymiaceae except for genera *Diderma* Pers., *Wilczekia* Meylan and *Physarina* Hohn. where non-crystalline lime granules are present on the peridium.

The present specimen is quite distinguishable from *Physarina* in lacking blunt peg-like protuberances on the peridium and from *Wilczekia* in absence of scanty lime and having cartilaginous peridium. It also shows affinity with sub-genus *Leangium* Link. of the genus *Diderma* in possessing calcareous double peridium in which outer being cartilaginous and shining one. But it shows disparities from the same in having abundant lime on the upper smaller part of the sporangium which gradually becoming scanty on the lower side; thin smooth, outer peridium and in the absence of columella and pseudo-columella.

In the family Physaraceae, it closely resembles the genera like *Physarum* Pers., and *Craterium* Trem. It shows resemblance with *Physarum* in having sporangiate fruitings, calcareous peridium, lime in the form of amorphous granules and dark spores; however, it lacks capillitium, columella or pseudo-columella unlike *Physarum*. The dehiscence in the present specimen is also unique which is circumscissile having a basal deep persistent cup after the dehiscence. Such method of dehiscence is hardly known in any species of *Physarum* except *P. oblatum* Macbr. In *P. oblatum* sporangia are stipitate, rarely sessile, depressed globose and scattered and are of orange yellow or bright yellow colour. Nevertheless, in the present specimen sporangia are usually sub-sessile, cyathiform or crateriform, densely crowded and scattered and are purplish brown for most of the part and without capillitium.

It resemblance *Craterium* in having cyathiform or crateriform sporangia; cartilaginous peridium more or less charged with lime granules and circumscissile dehiscence at the apex leaving the lower part as a deep cup at the base. However, radically differs from the latter in lacking capillitium or pseudo-capillitium, columella or pseudo-columella; in having fruiting body which is constricted towards the apex dividing

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into two distinct parts; longitudinal ridges and furrows and inner peridium which occupies only the lower part of the fruiting body.

In the genus *Craterium*, present specimen manifests its resemblance with *C. leucocephalum* (Pers.) Ditmar in possessing crateriform sporangia; persistent peridial cup at the base; circumscissile dehiscence; absence of columella and darker spores, however, it differs *C. leucocephalum* in having usually sub-sessile, dark purplish brown sporangia with double peridium, prominent hypothallus, absence of capillitium and spiny spores.

Affinity of the present specimen with *Squamuloderma* Kowalski is in the respect of capillitium and columella that are absent and in presence of dark brown spiny spores' paler on one side. However, it principally differs from the same in lacking stellate lime crystals on peridium; having sub-sessile, crateriform sporangia; double peridium in which outer being cartilaginous; comparatively larger fruiting bodies as well as spores.

Considering the unique features of the present population, its affinity or resemblance as stated above, authors feel that a new taxon should be erected. Hence it is named as *Crateriella nullifila*.

### **Herbarium**

The type specimen is being deposited in Ajarekar Mycological Herbarium of Agharkar Research Institute at Pune of Maharashtra. The Accession Number will be provided as soon as received from the concerned authority.

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