

Taxonomic Importance of Ascostromatic Fungi*

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Respected Chairman, fellow mycologists, ladies and gentlemen, I feel very much honoured to be a speaker for the "Professor S. R. Bose Memorial Lecture" for the year 1991 organized by the Indian Mycological Society. I am thankful to the Executive Council of the Indian Mycological Society for giving me an opportunity to express my gratitude to Professor S. R. Bose to whom I owe so much that I am unable to express in words.

I came in touch with Professor Bose back in the year 1941 when I took up Honours in Botany in the Presidency College, Calcutta. Since then I was constantly in touch with him and got to know him very closely as a very much devoted mycologist and as a very disciplined person. I was fortunate to have access in his laboratory, valuable fungal herbarium and rich literature collections in the R. G. Kar Medical College and in the Tropical School of Medicine, Calcutta. From Professor Bose I got inspiration and training to get know the various aspects of fungi and allied organisms. He was, indeed, a tough task master. At times it was very hard to get along with him. Now I feel that was necessary for me as a basic training for which I am thankful to him.

I don't think there is any necessity to talk about the valuable contributions of Professor Bose on various aspects of fungi which are very well-known to all mycologists. To my mind he is the father of Mycology of Bengal subsequently West Bengal, if not India.

Before proceeding with the subject of my talk, I should mention that ascostromatic fungi bear asci directly in locules (cavities) within the stroma. If we take a quick look at the classical approach to the study of ascomycetous

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fungi, it will reveal that emphasis has been given on general features of ascocarp character without entering into further details. Fungi lacking ascocarp were grouped under the Subclass Protoascomycetes or Hemiascomycetes and those having well developed ascocarp under the Subclass Euascomycetes which again was sub-divided as : Series Plectomycetes, Discomycetes, and Pyrenomycetes having ascocarps cleistothecium, apothecium and perithecium respectively.

In course of time with the help of developmental studies it appeared that fungi whose ascocarps resemble superficially stromatic perithecia do not have true perithecia. In these fungi, to start with, plectenchymatous or pseudoparenchymatous stroma is developed from somatic hyphae. In the stroma one or more locules (cavities) appear. Hence the stroma may be unilocular or multilocular. Each locule, also known as ascolocule, develops into a fruit body called an ascostroma or a pseudoperithecium or a pseudothecium. The ascostroma is bounded simply by the pseudoparenchyma of the stroma. There is no special wall around the ascostroma as found in the perithecium of the stromatic Pyrenomycetes. Besides this, the ascostroma does not have paraphyses and ostiole. In case of unilocular ascostroma it is extremely difficult to distinguish from a true perithecium unless its development is studied. In the ascostroma one or many asci are developed among loose hyphal structures without free ends. These hyphal structures known as paraphysoids or pseudoparaphyses may be lacking in some ascostroma. Since asci are embedded in, or surrounded by pseudoparenchyma, they can discharge their spores only when an opening is formed by the dissolution of stromatic tissue lysigenously or when the pseudoparenchyma has absorbed water, undergone gelatinization, and then has broken down. As such there is no ostiole and no definite spore dispersal mechanism in an ascostroma as encountered in a perithecium. Hence an ascostroma is entirely different from a perithecium.

The structural peculiarities of ascostroma though recognised by Fries in 1823, but were widely detected much later. There has been a gradual tendency among the workers of the Pyrenomycetes to separate the ascostromatic Pyrenomycetes from the perithecial Pyrenomycetes and to give them a separate rank-Loculoascomycetes. Some of these workers are : Fuckel (1869), Lindau (1897), Hohnel (1907), Theissen and Sydow (1918), Petrak (1923), Miller (1928), Clements and Shear (1931), Nannfeldt (1932) and others. Nannfeldt initially designated the group as Ascoloculares. The age-old classification of the Ascomycetes (Series Plectomycetes, Discomycetes and Pyrenomycetes), for that matter, Subclass Euascomycetes has been modified and a fourth Series Loculoascomycetes has been established taking out ascostromatic fungi from the Series Pyrenomycetes.

Luttrell (1951) agreed with previous workers. Besides recognizing the separate entity of ascostromatic fungi based on ascostromatic character, he incorporated with the ascostromatic character the character of asci-unitunicate or bitunicate. Finally in 1955 he abolished the terms : Plectomycetes, Discomycetes and Pyrenomycetes and separated the ascocarp producing fungi as : Subclass Euscomycetidae (fungi having unitunicate asci and lacking locules and pseudoperithecia) and Subclass Loculoascomycetidae (fungi having bitunicate asci developed in locules and pseudoperithecia with or without pseudoparaphyses).

Luttrell was supported by Alexopoulos (1962). In course of time the group Loculoascomycetidae was raised to the rank : Class Loculoascomycetes stressing that a combination of bitunicate asci with ascostroma is necessary to define a Loculoascomycete (Bigelow, 1963 ; Luttrell, 1965, 1973 ; Checa, 1988).

These interesting ascostromatic fungi received attention of Indian mycologists (Mukherji and Kapoor, 1969 ; Tilak and Gaikward, 1974 ; Bilgrami and Rizwi, 1977). Besides these workers, Kar and Maity (1970), Kar and Bhattacharyya, (1982), and Datta and Chattopadhyay (1990) have collected and described ascostromatic fungi from West Bengal.

Some of them are appended below :

<i>Names of the ascostromatic fungi</i>	<i>Habitat</i>
<i>Astrocystis capparidis</i> Kar and Maity	On leaves of <i>Capparis horrida</i>
<i>Asteromassaria macrospora</i> (Desm.) var. Hohnel	On twig of <i>Solanum verbascifolium</i>
<i>Botryosphaeria ingiae</i> Kar and Maity	On stem of <i>Inga dulcis</i>
<i>Herpotrichia millettiae</i> Sivan	On bark of unidentified plant
<i>Leptosphaeria coniothyrium</i> Sacc.	On unidentified log of wood
<i>Leptosphaeria puniciae</i> Kar and Maity	On stem of <i>Punica granatum</i>
<i>Massarina capparicola</i> Kar and Maity	On stem of <i>capparis horrida</i>
<i>Zopfia rhizophila</i> Rabenh	On unidentified log of wood.

REFERENCES

- Batista, A. C. and Peres, G. E. P. (1960). Some species of *Leptosphaeria* Ces. and de Not. *Univ. Recife Inst. Micol. Pub.* 249, 1-14.
- Bigelow, H. E. and Barr, M. E. (1963). Contribution to the fungus flora of North Eastern America. III. *Rhodora*. 65, 289-309.
- Bilgrami, K. S. and Rizwi, M. A. (1977). *Leptosphaeria herpotrichiodes* de Not.—a new record from India. *Curr. Sci.* 46, 760.

- Boise, J. (1984). New and interesting fungi (Loculoascomycetes) from the Amazon. Supl. *Acta Amazonica*. 14, 49-53.
- Checa, J. (1988). Studies on Pyrenomycetes and Loculoascomycetes (Ascomycotina): III (Diatrypales and Dothideales). *Jard Bot. Nadr.* 45, 47-52.
- Datta, K. and Chattopadhyay, B. K. (1990). Three wood inhabiting Loculoascomycetes from West Bengal. *J. Mycopathol Res* 28, 39-44.
- Kar, A. K. and Maity, M. K. (1970). Pyrenomycetes of West Bengal (India)-II *Can. J. Bot.* 48, 1295-1302.
- Kar, A. K. and Bhattacharyya, N. (1982). Records of some Pyrenomycetes from India. *Indian Phytopath.* 35, 39-46.
- Luttrell, E. S. (1951). Taxonomy of the Pyrenomycetes. *Univ. Missouri studies* 24, 1-120.
- (1953). Development of the ascocarp of *Glonium steilatum* *Amer. J. Bot.* 40, 626-633.
- (1955). The Ascostromatic Ascomycetes. *Mycologia* 47, 511-532.
- (1965). Classification of the Loculoascomycetes. *Phytopath.* 55, 823-833.
- (1973). Loculoascomycetes. In: *The Fungi*. Vol. IV A. Eds., G. S. Ainsworth, F. K. Sparrow and A. S. Sussman: Academic Press, New York.
- Mukherji, K. G. and Kapoor, S. (1969). Fungi of Delhi V, Some interesting Loculoascomycetes, *Ceska Mykol* 23, 256-261.
- Ridley, G. S. (1988). New records and species of Loculoascomycetes from New Zealand *Nz. J. Bot.* 26, 409-422.
- Tilak, S. T. and Gaikward, Y. B. (1974). The genus *Botryosp. aerea* in India. *Botanique* 5, 113-118.