THE PHALLOIDEAE OF MYSORE

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Soil fungi belonging to the group Phalloideae which assume bizarre shapes and are generally of rare occurrence have always attracted the attention of botanists. Owing to the fact that these function pass through their developmental stages at a rapid rate during particular seasons, only a few living specimens have been and recorded by good photographs. Solitary specimens have often formed the basis for the founding of new species.

It is to be expected that the rain forests in India are likely places for the collection of these rare fungi, but during the last seventy years only four specimens of sporadic appearance, poorly illustrated by means of field sketches, have been recorded. Fischer (1, 2) mentions the following species as having been reported from India:—

- Ithyphallus aurantiacus. Collected at Pondicherry and Masulipatam (S. India).
- Dictvophora phalloidea Desvaux. Collected at Gudalur (S. India).
- Simblum periphragmoides Klotsch. Collected at Sibpur. Calcutta.

Clathrus cancellatus. Khasia Hills.

In addition to these, a doubtful species, viz., Calathiscus sepia collected on the Nilgiris, has been recorded, based only on a drawing Lloyd (5) believes it to be an Anthurus. It is of interest to note that Phalloids have been collected, even on the plains of S. India.

In the present paper a report is made of the occurrence of some interesting species of Phalloids, collected by the writer in the western ghat region of Mysore. They occur in abundance during August or Septemher. It was found that the fibrous shells of arecanut, form a favourable substratum for the development of Phalloids.

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The following species have been collected by the writer Colus gardneri Fisch; Simblum periphragmoides Klotsch; Aseroe arachnoidea Fisch; Dictyophora phalloidea Desv; Clathrella delicata Fisch.

Colus gardneri Fischer: This has been reported only from Ceylon hitherto, where Petch (8,9) was able to collect only a few specimens. In Mysore, it was found to occur in such abundance as many as one hundred and twenty specimens in an area of five acres—that it was possible to study the variations. The specimens collected varied from 10 cm. to 18 cm. in height, and from 1.4 cm. to 1.8 cm. in diameter, the length of arms being 2 to 3.5 cm. The colour of the receptacle was generally white and rarely straw coloured.

The arms, usually five in number, were found to be free at the base, and organically united at the tip. Three well defined areas may be recognised on each arm; viz., the basal portion, which is transversely rugulose, and devoid of gleba; the middle portion, more or less round, and thickly covered by the gleba, except along a furrow on the outer face; the tip, greyish in colour, round tapering and devoid of gleba. (Fig. 3-B). When the gleba was fully removed, peculiar projections could be made out with the aid of a magnifying lens. Petch (9) observed these structures in the Cevlon specimens and described them as "plicate processes and plates . The position and structure of these outgrowths have been studied by the writer in transverse sections of the arm. The arm has a tubular structure, the wall of the tube consisting of ten to twelve rows of pseudoparenchymatous cells. From out of this tissue, irregularly folded often branched cellular structures, are seen growing out in all directions with gleba masses situated in the interstices. These are, however, absent in a small area (Fig. 1-A), which corresponds to the furrow on the arm, which is devoid of gleba.

Variations in the number of arms, which is generally five, have often been met with. Fig. 1-B represents a group of specimens growing together. All of them have five arms except the one on the extreme right which has only three arms. It may be noted that the configuration of the three-armed specimen is different from that of the rest. In the former, the branching of the arms takes place from lower down the receptacle than is the case in the five-armed specimens. Specimens with four arms (Fig. 3-B) are of frequent occurrence. Petch (9) has also observed fourarmed specimens in Ceylon, and a rare one with six arms.

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Systematic position of Colus gardneri There had been much controversy in the past on the systematic position of this species. Massee (7) examining dried specimens in the Kew Herbarium came to the conclusion that the tips of the arms were not united, and that the specimen should be called Lysurus gardneri, the original name given by Berkeley. Fischer (1) found the arms organically united and on this account named | Colus gardneri. It is beyond doubt that the arms are organically united as the observations on living specimens by Petch in Ceylon, and the writer in Mysore go to show.

In a later report on C. gardneri, Petch (9) instituted a new genus, viz., Pharus, for the inclusion of C. gardneri, on the basis that the arm was covered by the peculiar outgrowths, called by him "plicate processes and plates". On this account, Petch has renamed the species, Pharus gardner. While it has to be admitted that these peculiar outgrowths are extremely interesting and that a thorough anatomical investigation of these in Colus gardneri is highly essential, it may not be without interest to take note of similar structures described in literature, that are reported to occur in other Phalloideae. In this connection it is interesting to note the description of C javanicus by Penzig, quoted by Fischer (3). He found the inner surface of the arms of C. javanicus. covered over by similar structures, which he described as "unregelmassig, gefransten, durchlocherten Kammerwanden . So far as we can make out from the descriptions, it is probable that these structures occurring in C. gardneri and 1 javanicus, are morphologically the same, but whether they are identical in the two cases remains to be investigated anatomically. It may further be mentioned that in Dictyophora irpicina, the surface of the pileus is convoluted in folds with the gleba covering them and permeating the interspaces between them. Petch (8) describing this species, says that "the cap has the appearance of the arm of Colus gardners, and as in that species, the sporiferous part consists of closely packed contorted or flat anastamosing membranous processes at right angles to the basal layer of tissue."

With our present state of knowledge of these structures and in the absence of anatomical investigations, it is not safe to assert that these structures, which so far as we know occur only in Colus cardneri. (javanicus, and Dictyophora irpicina are one and the same. In the writer's opinion there is not sufficient justification to warrant the creation of a new genus, *Pharus*, for the inclusion of C. gardneri.



VEXKATARAYAN - Indropogon pertusus Willd.

PLATE I.

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VENKATARAYAN Andropogon pertusus Willd.

PLATE IL



J L B. S. XI : 3.

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The genus Pseudocolus: According to Lloyd (5), the genus Pseudocolus is classified under the "Columnar" section, and Colus under the "Clathrate" section, the differentiating characters being that Pseudocolus has three arms and a shorter stalk than Colus, which generally has five arms. Lloyd created the genus Pseudocolus for the inclusion of all the three-armed species, most of them known only from a single specimen such as C. garciae Moller C javanicus Penzig, and C. rothae. As far as can be made out from published photographs, the number of arms even in the genus Pseudocolus does not appear to be constant. Pseudocolus rothae as pictured by Prof. Yasuda from Japan has three arms with a distinct stalk; the picture given by Barton-Cleland (6), however, shows a four-armed species with no distinct stalk. Ps. carcieae has three to four arms according to Fischer (3).

The writer's finding of a three-armed specimen growing along with C. gardneri with four and five arms, shows that variations in the number of arms occur in C. gardneri. If the threearmed specimen had been examined separately, it would have been relegated to Pseudocolus. It is always risky to base specific values on variations observed in solitary specimens, and most of the species of Pseudocolus are according to Lloyd, only known from a single record. In the writer's opinion, the genus Pseudocolus should not be separated from Colus.*

2. Aseroe Arachnoidea Fisch.

This species is not so widely distributed as C. gardneri. It is altogether absent in areas of heavy rainfall. At the time when C. gardneri is abundant viz., during mid-monsoon, only ill developed specimens of A. arachnoidea are to be seen. These occur only after the heavy monsoon has subsided, that is during October The weird shape of this phalloid has earned for it the local name "Ravana anabe" or monster mushroom. It is bright cochineal red in colour. The rugose character of the stalk is well seen in Fig. 2-A. The arms are generally twelve in number radiating from a central disc-like portion, which is covered by hairlike structures.

The arms are wavy in appearance, with prominent vein-like swellings (Fig. 2-B) and end in a flagella-like manner. The

[•] In a letter to the writer, Prof. Ed. Fischer wrote "Wenn sie mich nun nach meinen Ansicht über die Berechtigung der Unter scheidung von Colus und Pseudocolus fragen, so weiche ich eher dazu neigen-wenigstens soweit ich heute die Dinge überblicke-, sie nicht zu trennen."

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photograph of A. arachnoidea by Penzig reproduced in Lloyd's "Synopsis" does not show the fine tailing off of the arms. Measurements: Height from the disc-like portion to the base 82 mm.; Diameter of the receptacle 12 mm. at the base, and 17 mm. nearer to the top, disc-like portion being 20-22 mm. Length of arms 38-40 mm. The arrangement of the gleba and the arms in the egg is shown in Fig. 3-C.

Referring to A. arachnoidea, Lloyd (5) says, "The colour is white, all others are red." The specimens observed by the writer in Mysore are bright cochineal red, with simple arms, not bifd A. zevlandica, reported from ('eylon and Java, and photographed by Bernard is bright in colour, but the disc-like portion is flatter and the opening in the centre of the disc much wider than is the case with the present specimen. In addition a cross section of an arm shows only a single chamber, which is considered by Fischer (3) to be characteristic of A arachnoidea while other Aseroe forms are many-chambered. Hence the writer believes that the Mysore specimen is A arachnoidea, though the colour is reddish.

3. Simblum Periphragmoides Klotsch.

This is the commonest phalloid met with during the rainy season in July, on the coffee estates. The receptacle is generally yellowish in colour, but whitish forms are also met with. The honevcomb-like clathrate portion on the top of the receptacle has 70–100 meshes. There is generally an abrupt contraction of the receptacle at where the clathrate portion begins, but often forms are also met with in which the receptacle and the clathrate portion are continuous. The latter form was originally described as S. gracile from Ceylon. Height of the specimen 10 to 13 cm.: Diameter of the head 3–3 cm. The description given by Petch (8) of this specimen in Ceylon tallies exactly to the one collected in Mysore (Fig. 3-A).

Clathroll delicata Field: (Clathrus delicatus B. et Br.) This tiny phalloid has been hitherto known to occur only in Ceylon. It has been occasionally observed in Mysore during the heavy monsoon season, growing attached to rotting twigs. It consists of a simple network without a stalk, with the gleba on the inner side, which is situated in small clumps in angles, formed by the meshes (Fig. 1-D). As described by Petch (8), the gleba is confined to the concave upper surface of the cup, which is supported on three short legs one continuous with each arm. Fischer (4) has described the development of the fruit body of Clathrella delicata in detail. Fig. 1-C shows a section through two concave cups (c) on which the gleba (g) is borne.

Declyophora phalloidea: Another common phalloid met with in these areas during July, is the elegant Dictvophora phalloidea. The specimens observed by me measured from 18 to 20 cm. in height. This species has been thoroughly described by Petch in Ceylon. The specimens collected in Mysore conform to the Ceylon specimens in all details except the colour of the indusium which was reported to be generally salmon pink in colour, while it was always found to be snowy white in the Mysore specimens (Fig. 4). In I anchagani, Bombay, situated in another portion of the western ghats, a specimen of Dictvophora collected by Rev. E. J. Blatter, and kindly sent to the writer, answered to the description of D. irpicma, the cap having a granular appearance as in the case of the arm of Colus gardneri. D. irpicina has not been met with in Mysore by the writer.

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- (5) LLOYD, C. G. Synopsis of known Phalloids.
- (6) ————Mycological Notes, 48.
- (7) MASSEE, G. Grevillea XIX. 1890-1.
- (8) PETCH, T. The Phalloideae of Ceylon. Annals. Royal Bot. Gard. Peradineya, Vol. IV., 1908.

Explanation of Figures.

Fig. 1. A. Transverse section of an arm of Colus gardneri. Irregularly branched structures enclosing black gleba masses are seen radiating from the centre. These are absent at the furrow on the left.

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- B. A clump of C. gardneri. The drooping one in the foreground is fully developed and yet has the arms united. The one on the extreme right with three arms has longer arms than the others, and a different shape.
- C. Section through the gleba bearing portion of Clathrella delicata. Two cups (e) with the black mass of gleba (g) on them are seen.
- D. Clathrella delicata showing the sessile network arising from the volva. The gleba is situated at the knots in the network.
- Fig. 2 A. In the centre, a side view of Aseroe arachnoidea, with rugose stalk; at the sides, two eggs ripped open to show the arrangement of the arms and the black gleba.
 - B. Top view of A arachnoidea showing twelve flagellalike arms (one of them broken). Note the undulations at the base of the arms and the vem-like markings. The central crater is covered over with a cottony growth.
- Fig 3 A. Simblum periphragmoides, showing a fully developed specimen in the centre, and eggs in the foreground. On the extreme right is seen the contents of an egg ripped open.
 - B. An enlarged view of the four arms of Colus gardneri. The gleba has been washed off to show the plicate plates. Furrows are seen on two of the arms.
 - C. Side view (left) and top view (right) of the gleba bearing portions in eggs of Aseroe arachnoidea. The black rleba is seen closely packed between the white arms, which converge at the top.
- Fig 4. Dictyophora phalloidea. 3 Nat size.

NARASIMHAN-Phalloideae of Mysore.

FIGURE 1.



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