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# REVISION OF BENGAL POLYPORACEÆ : I. GENUS *HEXAGONIA*

BY

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(WITH PLATES I-II AND 3 TEXT-FIGURES)

## INTRODUCTION

The family Polyporaceæ is of great interest, not only from its academic point of view, but also on account of its world wide distribution and importance as a group comprising large number of wood-destroying fungi, saprophytic or parasitic upon felled or standing timbers respectively. The polypores also serve a very useful purpose in forestry causing slash rots of various types of wood in the forests.

Early history of Polyporaceæ has revealed that Linnæus (1753) has treated the fungi as an entire group but it is Persoon (1825) who seems to have been the first mycologist to separate the fungi with a poroid hymenium with the basidia lining the inner surfaces of the pore-tubes into a definitely named group called 'Porodermei'. Prior to Persoon (1825), however, Fries (1821) has divided the fungi primarily into four classes, one of which being the 'Hymenomycetes' which at that time has not only included the Hymenomycetes proper but also a large numbers of Ascomycetes.

Fries at first has recognised only three genera, namely, *Merulius, Dædalea,* and *Polyporus*. To this he has added *Favolus* as a subgenus of *Polyporus* and still later he (1928) has raised it to the generic rank. In 1836, he has established the genus *Trametes* and has given recognition to the genera *Cyclomyces* and *Hexagona*. Fries (1855), however, has eventually recognised only eight valid genera within the family and these are *Lenzites, Dædalea, Cyclomyces, Favolus, Hexagona, Trametes, Polystictus*, and *Polyporus*. Later in 1874, it seems that he has abandoned the genus *Polystictus*, as it has not appear in his '*Hymenomycetes Europæi*'.

Since Fries' time the number of genera belonging to the family Polyporaceæ has largly increased and Cook (1940), in one of his reviews on various genera, has recognised as many as fourty-six valid genera in North American Polyporaceæ.

The different genera and species of Polyporaceæ with their abundant form-variations are widely distributed throughout the length and breadth of India. Though some valuable contributions by Ames (1913). Bourdot and Galzin (1927 . Shope (1931), Donk (1933, 1964), Pilat (1931, 1934), Cooke (1885, 1886), Lloyd (1898-1925), Bondarzew and Singer (1941), Cunningham (1965) and others have appeared elsewhere, yet in our country detailed work has not been done to that effect. Bose (1918-1947) can be regarded not only as the pioneer worker in this field of study in India, but also the only investigator connected purely with the systematic study of the group in Bengal, now W. B. & Bangladesh. Unfortunately, his descriptions are often based on single collection, and as such form-variations within the species have not been recorded Further, these descriptions are not comprehensive, and keys for the identification of different species are totally lacking. In most cases the informations regarding the anatomy of the basidocarps are meagre. Recently, the study of anatomy of the basidiocarps in the taxonomy-study of Hymenomycetes has been fully realized, and as such, it cannot be ignored. This includes the study of hyphal systems, basidiospores, basidia and other anatomical structures like paraphyses, setæ, hyphal pegs, cystidia, etc., which play important role in the determination of various species belonging to this group. Further, informations regarding the habitat, distribution, synonymy, and the economic importance of each species so far available appear to be rather fragmentary. It is gratifying to note that recently Bakshi (1971) has tried to give an account of Indian Polyporaceæ but this work, though valuable, should have been more informative.

In his classical work on 'Polyporaceæ of Bengal', Bose (1918, 1947) has recorded nearly 140 species under thirteen genera. namely, *Polyporus, Polystictus, Fomes, Ganoderma, Amauroderma, Trametes, Dœdalea, Lenzites, Hexagonia, Favolus, Strobilomyces, Merulius,* and *Poria.* At present, there are about 5,000 specimens of Polyporaceæ in Boses' Herbarium* in the Department of Botany, Presidency College, Calcutta. It is now high time that the different genera and species from Bengal should be critically studied and a more thorough account should be presented based on such a huge collection of herbarium materials.

With this object in view, it has been decided to publish a revised account of 'Polyporaceæ of Bengal' with the available data and the present paper forms the first fascicle of the series. A key to different genera of 'Polyporaceæ of Bengal' will, however, be given after completion of this laborious work.

## Materials And Methods

The present investigation has been mainly based on a large collection of materials of Polyporaceæ kept in Boses's herbarium along with those maintained in

* Shifted from the Department of Botany, R. G. Kar Medical College, Calcutta.

the herbarium of the Mycology Laboratory of the Department of Botany, the University of Calcutta. These materials comprise collections from different districts of Bengal, extending over a period of fourty-two years. Naturally, it can be expected that such collections will include materials of each species well represented and showing a wide range of variation.

Details of the macroscopic examination of the materials have been obtained with the aid of a small hand lens (10 X). For microscopic examinations, free-hand sectioning method, as recommended by Overholts (1929) has been mainly followed with necessary modifications. A small piece of the dried material has been dipped in 95% alcohol for a minute, and then transferred to water till softened. Sections have been cut with a sharp razor. Some selected sections have then been transferred to a few drops of 10% KOH solution on a slide. These sections on examination have showed the fungal tissues in a remarkable state of turgidity, comparable to those of the fresh materials. The sections have then been thoroughly washed with distilled water, and mounted in warm lacto-phenol with or without staining. For temporary preparations, the sections after being treated with warm lacto-phenol have been quickly washed with 50% and then 70% alcohols, mounted in Erythrosine-glycerine jelly, and sealed. The preparations, in this medium, have remained in a good condition for a sufficiently long period.

For observing the hyphæ of the context, and those of the pore-tubes, comparatively thicker sections have been chosen. These have been given a preliminary treatment with 10% KOH solution, and subsequently washed in distilled water. These sections have then been carefully teased out into individual hyphal elements with the help of two fine needles under a dissecting microscope. The staining of the hyphæ has been found to be unnecessary because when mounted in lacto-phenol and examined under high power objectives of a compound microscope with its substage diaphragm and the condenser slightly regulated, their visibility has decidedly increased. However, stained preparations have also been made following the afore-said schedule. In the latter cases, teasing of the sections have been done after mounting the sections in Erythrosine-glycerine jelly and before covering them with cover glass.

It is well known that in cases of heterothallic species of basidiomycetes, the secondary mycelium with clamp-connexions differentiates into different types of hyphæ and ultimately produces one or more fructifications. In order to prove the veracity of the statement, in all cases the primary mycelia have been obtained from single basidiospore cultures of each species and by random pairing between primary mycelia of each species the secondary mycelia have been obtained. The secondary mycelium of each species in culture when examined shows the presence of all the three types of hyphæ, viz., generative, skeletal and binding. During anatomical study of the basidiocarp it has been noticed that the generative hyphæ in the fructifications appear to be comparatively few and this is due to either by their

complete modification and thickening or prolifertaion of their clamp-connexions so that their identity is completely lost.

## I. Genus *Hexagonia** Pollini

( *Epicr. Syst. Myc.*, p. 496, 1836-38. )

*Basidiocarp* annual ; usually sessile, rarely effuso-reflexed ; ungulate, subcircular or applanate ; in some cases very thick or thin ; corky-coriaceous or hard and woody. *Upper surface* azonate or faintly or distinctly zonate ; glabrous to coarsely hairy. *Context* thin ; usually corky-coriaceous ; brown to ferruginous. *Hymenium* distinctly poroid, may be dædaloid or lenzitoid due to breaking of the intervening walls of the pore-tubes at maturity ; pore-mouths regular, hexagonal or subcircular ; pore-tubes deep or shallow. *Basidium* hyaline ; clavate ; tetrasterigmatic and quadrisporous. *Basidiospore* hyaline ; at first more or less cylindrical, often becoming allantoid or boat-shaped at maturity ; surface of the wall smooth ; thin or slightly thick-walled.

The different species grow as saprophytes on timbers in storage. Some of them occur as wound parasites on fruit-trees in gardens and standing timbers in forests. They are tropical or subtropical in distribution.

In early days all fungi having a poroid hymenium have been named *Boletus*, and all of them under this name have been included in Linnæus' *Species Planatarum* (1753). Palisot-de-Beauvois (Lloyd, 1910) has first divided the polypores into two genera : those having large, round hexagonal or elongated pores, are called *Favolus*, and those with small and circular pore-mouths, *Microporus*. Fries (Lloyd, 1910) has divided Palisot's genus *Favolus* into two genera : *Hexagona*, with hexagonal pores, and *Favolus*, with elongated pores.

The early mycologists like Persoon, Klotzsch, and Berkelay have not at first considered a 'large pored' genus of much value till the appearance of Fries' *Epicrisis Systematis Mycologici* (1936-1938). Murrill (1904) has accepted the generic name *Hexagona*. Shope (1931) is in favour of enlisting *H. mori* Pollini as synonym of *Favolus alveolares* (DC.) Quel.

Lloyd (1910) has described the genus as *Hexagona* including those fungi with large round or hexagonal pores or *Polyporus*, with large round or circular pores. Theoretically, the genus is purely an artificial one based on a single character.

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* This genus is often reported by eminent mycologists as *Hexagona* Fr. Ainsworth (1967) states that the name *Hexagona* is an orthographical error by Fries.

So far, thirteen species of *Hexagonia* have been recorded from India (Butler and Bisby, (1931, 1960, 1962) of which three species namely, *Hexagonia apiaria, H. sulcata* and *H. discopoda*, have been reported from Bengal (Bose, 1918, 1928). Of these, all of them are regarded mostly to be inhabitants of the eastern hemisphere. The reports on the occurrence of *H. sulcata* in India, however, appear to be fragmentary. All of them grow either parasitically or saprophytically, mainly, on angiosperms, and so far known, the records of any gymnospermous host is wanting.

## *KEY TO THE SPECIES OF HEXAGONIA*

A. *Pore-tubes deep, pore-mouths large*

Upper surface of the basidiocarp with dense coarse, black and rigid hairs ; pore-mouths about 3-4 mm. in diameter ... ... (1) *H. apiaria*

Upper surface incrusted and provided with deep sulcate ridges ; basidiocarp thick, hard and sub-woody ; pore-mouths about 3 mm. in diameter ... ... (2) *H. sulcata*

B. *Pore-tubes shallow, pore-mouths small*

Upper surface bicoloured ; various shades of reddish-brown but with lighter or darker tinge towards the base ; distictly zonate ; pore-mouths about 0.8-1.5 mm. in diameter ; a narrow sterile zone behind the margin present ... ... (3) *H. discopoda*

### 1. *HEXAGONIA APIARIA* PERS.

( *Epicr. Syst. Myc.*, p. 497, 1838 )

A. *BASIDIOCARP*

(a) External Morphology

*Fructification* sessile, attached to the substratum by a comparatively narrow base ; annual ; single or in imbricate clusters ; rarely laterally confluent ; applanate ; dimidiate ; corky-coriaceous to woody, somewhat brittle on drying ; dimensions 1 2-8.4 cm. deep, 2.5-10.5 cm. across, and 0.1-0.7 cm. thick. *Margin* thin,

straight, entire or somewhat lacerated ; chocolate brown in colour. *Upper surface* coarsely hairy, covered with blackish-brown, branched, strigose hairs often matted, in old specimens hairs falling off, exposing longitudinally and divergently striated rough blackish surface ; when young, surface blackish brown and faintly zonate towards the margin, rarely throughout, usually with longitudinal striations behind. *Context* thin ; corky ; 1.5-4.0 mm. thick ; ferruginous. *Hymenial surface* distinctly poroid ; ferruginous ; often glaucous ; pore mouths large, regularly hexagonal, sometimes somewhat elongated, irregular or sinuous ; 3-4 mm. in diameter ; pore-tubes dipping unequally into the context, 6-12 mm. long ; dissepiments slightly thick at the base, 100-300 (500) $\mu$ thick (Plate I, figs. 1 & 2).

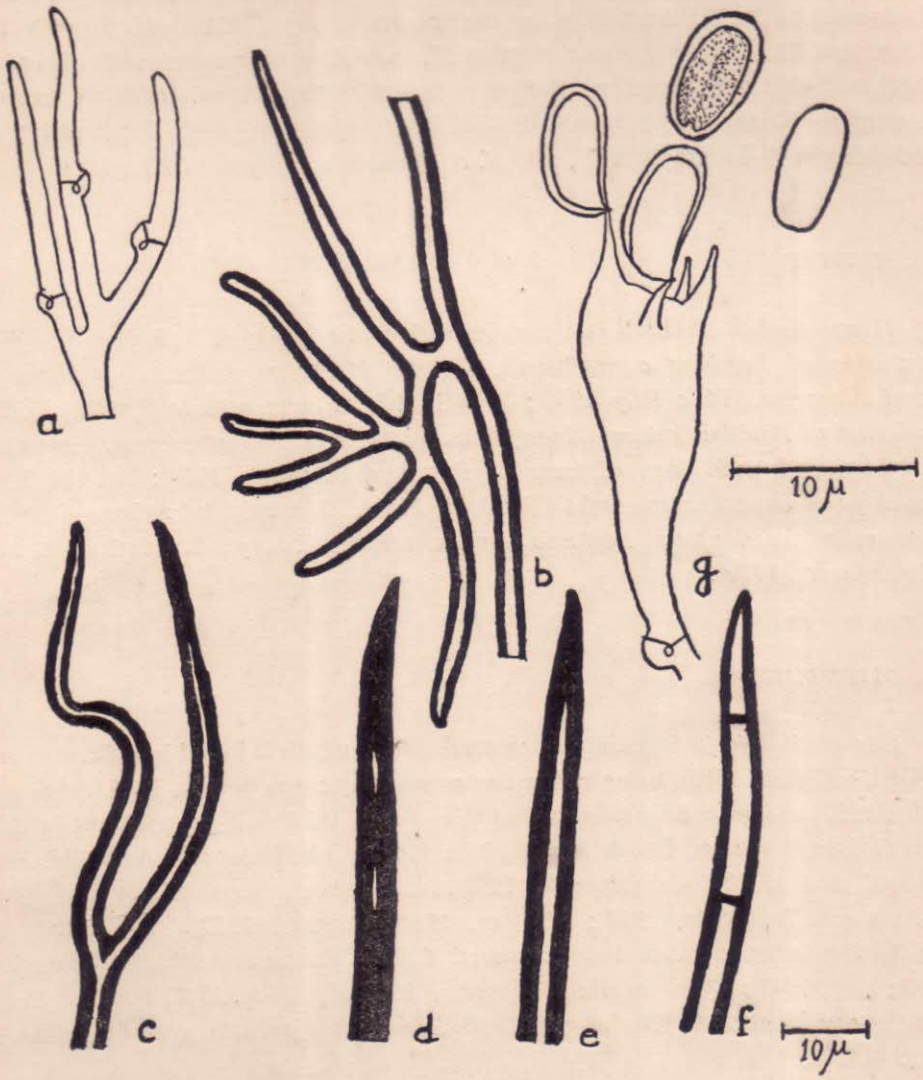
(b) Anatomical structures

*Basidium* broadly clavate, with a simple clamp-connexion at the base ; tetrasterigmatic and quadrisporous ; dimension 22-32 X 3.5-7.2$\mu$. (Text-fig. 1, g). *Basidiospore* hyaline ; boat-shaped with its concave side towards the long axis of the basidium, elliptical when viewed from the back, allantoid in side view showing a distinct apiculus, slightly thick-walled, surface of the wall smooth, 8-11 X 3-5 $\mu$ in dimension (Text-fig. 1, g). *Hyphal pegs* somewhat cylindrical but with acute apex ; originating from the trama ; projecting beyond the hymenium upto 65 $\mu$ ; composed of interlaced mass of agglutinated ferruginous hyphæ ; frequent ; dimension 90-120 X 30-45 $\mu$.

(c) Hyphal system

Three types of hyphæ, viz., generative, skeletal, and binding present. *Generative* more abundant in the underlying tissue of the hymenium than in the central region of the trama and contest, totally absent at the upper surface ; hyaline ; with abundant granular protoplasmic contents when young, becoming highly vacuolated with age ; flexuous ; sparsely branched ; interwoven with other types of hyphæ ; thin-walled, becoming slightly thick-walled with age ; 2-4 $\mu$ wide ; septation close or distant, each with prominant simple clamp-connexion. (Text-fig. 1, a). *Skeletal* abundant in the context and at the upper surface, practically very few just internal to the hymenium ; highly thick-walled with narrow lumina containing sparse protoplasmic contents or the lumina becoming obliterated at places due to irregular thickening and in extreme cases disappearing and forming a solid hyhæ ; apex obtuse and thin-walled or thick-walled and pointed ; without clamp-connexions ; septa apparantly absent due to extreme

thickening of the wall ; slightly flexuous or more or less straight ; unbranched ; yellowish-brown in colour ; 2.5-10 $\mu$ wide (Text-fig. 1, b-c). *Binding* less abundant, mostly present in the trama adjacent to the hymenium ; highly thick-




Text-fig. 1. Hyphal system (a-f), basidium and basidiospores (g) of *Hexagonia apiaria* Pers. (vide Text).

walled with lumina obliterated at places due to irregular thickening of the wall ; septation and clamp connexions not evident ; branches attenuated towards the apices ; yellowish-brown in colour, 1.0-4.0 $\mu$ wide (Text-fig. 1, d-f).

B. *SYNONYMY*

Fries (1836-1838) records *H. sinensis* Fr., *Trametes sinensis* Fr., and *Polyporus weightii* Kl., as synonymous with *H. apiaria.* Bresadola (1916) mentions it as *H. koeningii* Berk. According to Butler and Bisby (1931), *H. sinensis* Fr., *H. weightii* Kl., and *Polyporus weightii* Kl., are all synonymous with *H. apiaria* Teodoro (1937) considers it as *Polyporus apiarias* Pers. Banerjee (1947) regards *H. weightii* Kl., and *Polyporus weightii* Kl., as its synonyms while Petch and Bisby (1950) report *H. koeningii* Berk., and *H. crinigera* as synonyms of *H. apiaria.*

C. *HABITAT*

*H. apiaria* can live both as a parasite and as a saprophyte. It is found to grow on clumps of *Bambusa aurandinacea,* logs of *Mangifera indica,* and *Mimusops elengi* (Banerjee, 1947 ; Roy, 1948 ; Bakshi, 1971) *Shorea robusta* (Bagchee, 1954), dead stem of *Heritiera minor* (Anonymous, 1950 ; Bose in Herb, record.) as well as on unidentified dead logs of trees (Sydow and Bresadola, 1914 ; Bose in Herb. records) and on unknown trunks (Teodoro, 1937). Recently, it has been found to grow as a parasite on *Euphoria longan* causing heavy destruction of trees (Chakraborty, 1970).

D. *DISTRIBUTION*

*Hexagonia apiaria* is mainly an eastern species which is found in different parts of Ceylon (Petch, 1916), being rather common in dry zones (Petch, 1916, Petch and Bisby, 1950) and ascending hills on that side (Petch, 1916). It is also found in East New Guinea, Formosa, Dutch New Guinea, Hainan isle, Indonesia, Australia, New Zealand and Micronesia (Imazeki, 1952), and various parts of the Phillipines (Sydow and Bresadola, 1914 ; Teodoro, 1937 ; Imazeki, 1952). As regards its distribution in India, it has been recorded from Calcutta and suburbs (Banerjee, 1947 ; Roy, 1948 ; Bose, in Herb records), Hooghly (Roy, 1948, Bose in Herb. records) as well as from Khulna and Sunderbans (Bose in Herb. records), now in Bangla Desh.

E. *ECONOMIC IMPORTANCE*

The destruction of fallen logs, trunks, etc., by *H. apiaria* is well known. Regarding its pathogenecity, data are very few. It has been found to grow as a parasite on *Heritiera minor* causing white spongy rot (Anonymous), 1950) and also on *Euphoria longan* showing die-back symptoms of the trees (Chakrabarty, 1970).

## 2. *HEXAGONIA SULCATA* BERK.

( Decads of Fungi, n. 183, tab. XX, f. 1. in *London Journal of Botany*, 6, 510, 1847 )

### A. *BASIDIOCARP*

#### (a) External morphology

*Fructification* sessile, attached to the substratum by a thick and broad base ; usually solitary, sometimes one or more growing together in an imbricate manner ; when young applanate, later ungulate ; hard and woody ; dimensions 3.5-15 cm. across 2.0-20.5 cm. deep, and 0.5-5.5 cm. thick. *Margin* thick, entire, sterile, snuff brown, becoming blackish brown with age. *Upper surface* rough, encrusted, crust hard, provided with deep sulcate ridges, sometimes rimose, may be finaly zonate towards the margin ; colour showing various shades of blackish brown, dark-brown or almost black *Context* comparatively thin in comparison to the thickness of the pore-tubes, corky, becoming subligenious on drying, ferruginous, 3.0-5.0 mm. thick. *Hymenial surface* distinctly poroid, yellowish-brown or brown in colour, pore mouths almost regular, angular or somewhat hexagonal, angles of the pores distinct or rounded, about 3 mm. in diameter, sometimes several pore-mouths fused and continuous due to breaking down of some of the dissepiments ; pore-tubes comparatively long, 1.0-1.5 cm. long, dipping unequally into the context, rigid, pale wood-brown in colour (Plate I, figs. 3 & 4).

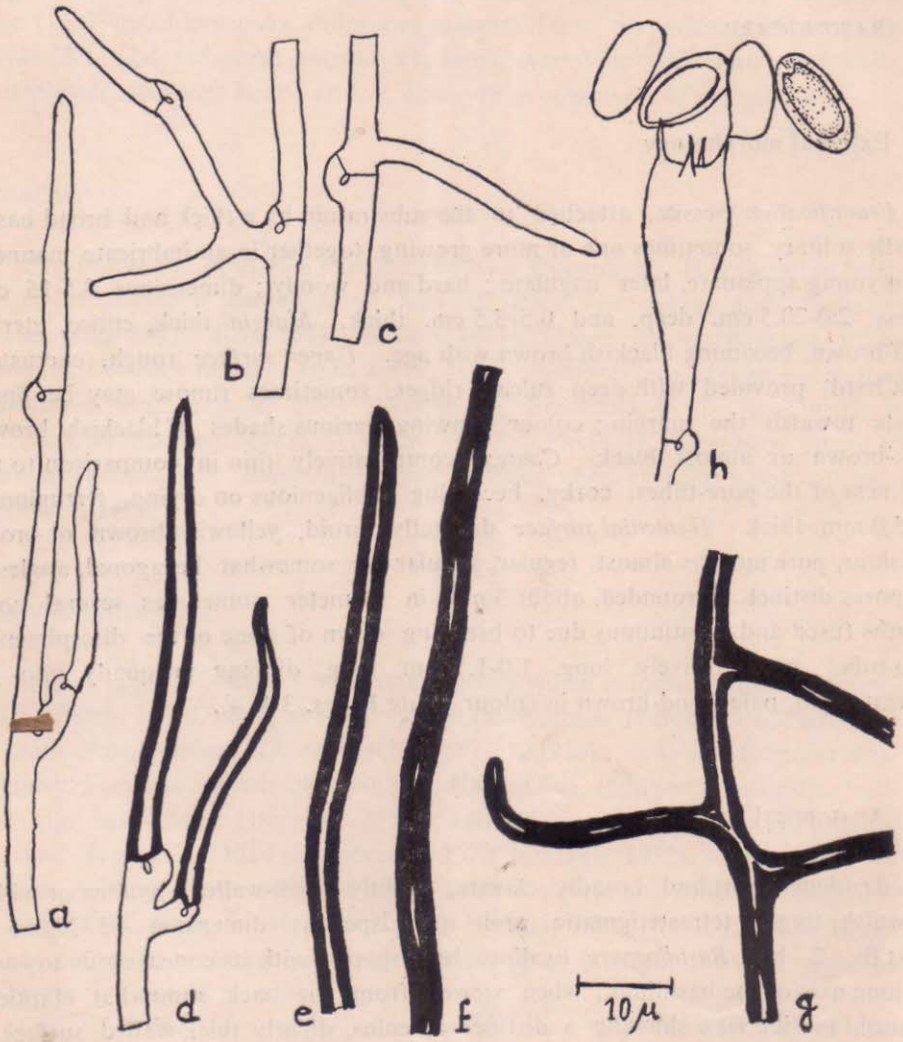
#### (b) Anatomical structures

*Basidium* short and broadly clavate, slightly thick-walled, hyaline or with a brownish tinge, tetrasterigmatic and quadrisporous, dimension 4.5 X 8.5 $\mu$. (Text fig. 2, h). *Basidiospore* hyaline, boat-shaped with its concave side towards the long axis of the basidium ; when viewed from the back somewhat elliptical, allantoid in side view showing a distinct apiculus, slightly thick-walled, surface of the wall smooth, 4.0-5.5 X 1.5-2.0 $\mu$. in dimension. (Text-fig. 2, h).

#### (c) Hyphal system

All the three types of hyphæ, viz. generative, skeletal, and binding present. *Genrative* frequent in the hymenial region and in fresh specimens, gradually

becoming infrequent in the context and practically absent in the tissue near the upper surface, hyaline, always thin-walled with dense protoplasmic contents, septation plain or with frequent simple clamp-connexions, often proliferating and




Text-fig. 2. Hyphal system (a-g), basidium and basidiospores (h) of *Hexagonia sulcata* Berk. (vide Text).

giving rise directly to generative, skeletal and binding types, sparsely branched, branches also originating from the opposite side of clamp-connexions just below the septa or from any point of the wall, 1.5-4.5 $\mu$ wide (Text fig. 2, a-c, d).

H-connexions present ; *Skeletal* hyaline or cream coloured, unbranched, slightly or highly thick-walled, without any clamp-connexion, wall-thickening in extreme cases often obliterating the lumina uniformly or interruptedly, protplasmic contents scanty or totally absent ; 2 5-3.5 $\mu$ wide ; apices round, thick-walled (Text-fig. 2 e-f). *Binding* hyaline to cream coloured, thick-walled, wall-thickening uniform, in extreme cases the branches becoming more or less solid, sparingly branched, without any clamp connexion, protoplasmic contents scanty or none, 2.0-3.0 $\mu$ wide (Text-fig. 2, g).

B. *SYNONYMY*

Lloyd (1910) states that Berkeley described *Hexagona sulcata* as *H. durissima* from Ceylon. Petch and Bisby (1950) also hold the same opinion.

C. *HABITAT*

Bagchee (1954) records it on *Boswellia serrata* and on *Shorea robusta* (also Anonymous, 1950). Bose (1920-'21). Roy (1948), and Petch and Bisby (1950) report the fungus as growing on unidentfied wood while Teodoro (1937) finds it growing on trunks of some unidentified tree.

D. *DISTRIBUTION*

The reports on the occurrence of *H. sulcata* outside India is rather fragmentary. From the records so far available, the fungus can be considered as an oriental species. Though Lloyd (1910) states that this species is known only from Ceylon, yet Petch (1916) informs that the fungus has not been collected by him from this land. It has also been reported from a few states of the Phillipines (Teodoro, 1937).

In India, this fungus occurs in Darjeeling, particularly in the Buxa division, and also in Jalpaiguri (Anonymous, 1950 ; Bagchee 1954 ; Bakshi, 1971 ; Bose, 1920, 1921, in Herb. records ; Roy, 1948 . Bose (1920, 1921) further states that this fungus grows on various types of wood in Indian forests, specially on trees and stumps of *Shorea robusta*. (Bakshi, 1971).

E. *ECONOMIC IMPORTANCE*

*H. sulcata* causes brown cubical rot in *Shorea robusta* (Anonymous, 1950). Bagchee (1954) reports the fungus as a wood-rotting pathogen. It enters through the fire scars and causes heart rot, the indications of which are noticed in deformations, such as the bulb-shaped immature trees. The rot progressess as the three matures, ultimately rendering the trees useless for commercial purposes.

### 3. *HEXAGONIA DISCOPODA* PAT. ET HAR.

(*Bull. Soc. Myc.*, p. 209, 1893)

A. *BASIDIOCARP*

(a) External morphology

*Fructification* annual ; sessile, sometimes effuso-reflexed, when sessile attached to the substratum by a narrow base ; usually solitary, sometimes imbricate and partially laterally confluent ; dimidiate ; flabelliform, reniform or auriform ; stiff, coriaceous, not brittle ; dimension of the reflexed part 1.5-11 cm. across, 1-5 (8) cm. deep and 0.2-0.3 cm. thick. *Margin* thin, entire or broadly wavy, smooth, yellowish-brown on drying. *Upper surface* distinctly two coloured, various shades of reddish brown but with lighter or darker tinge near the base, sometimes blackish but with some lighter reddish tinge surface somewhat rough due to wrinkles, often crust-like, concentrically zoned throughout, zones narrow or broad, concolourous towards the margin, but darker behind, with a shinhing luster when fresh, becoming dull on drying, usually with longitudinal wrinkles in older dried specimens. *Context* thin, brownish stiff-coriaceous, 0.5-1 mm. thick. *Hymenial surface* distinctly poroid, yellowish-brown to greyish in colour when dry ; pore-mouths stiff, at first circular, later becoming angular and regularly hexagonal, 0.8-1.5 mm. in diameter ; pore-tubes short, shallow, dipping unequally into the context, 1.0-1.5 mm. thick ; in some cases a narrow zone present behind the margin (Plate II, figs. 5-7).

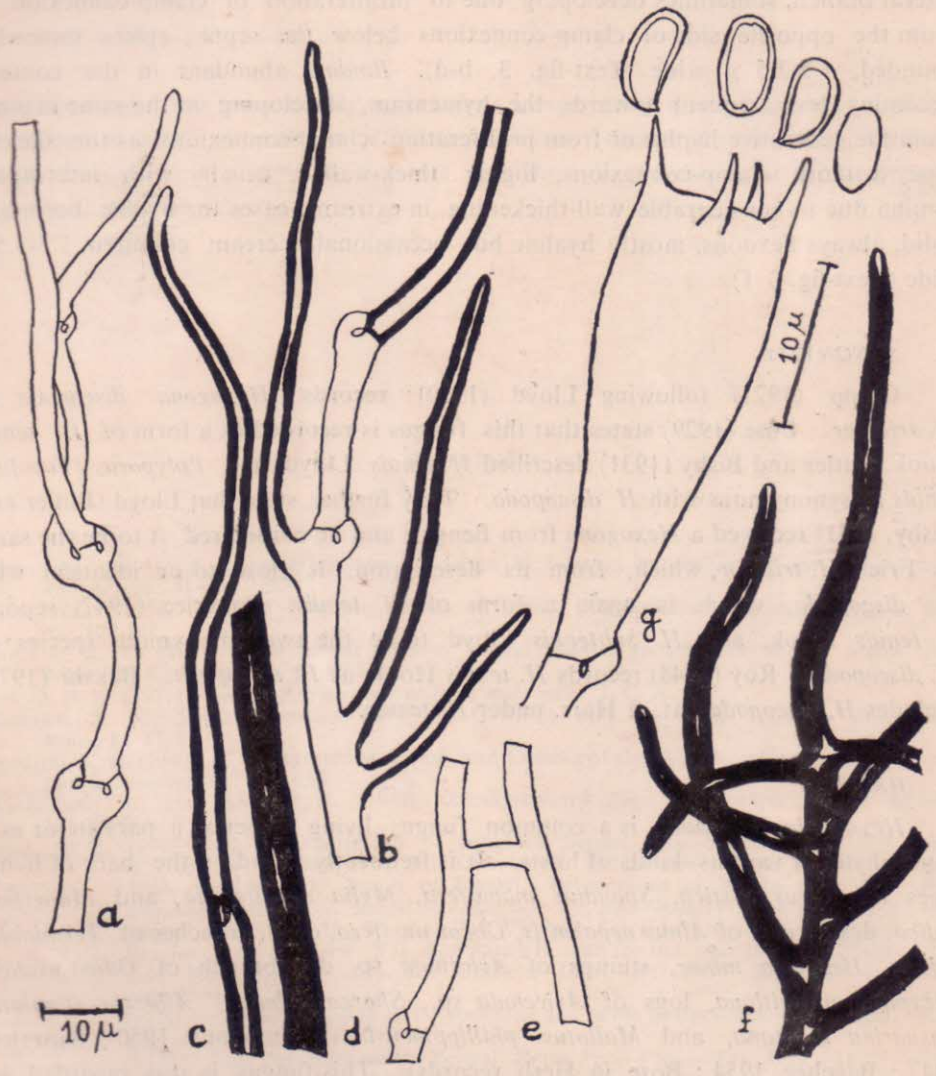
(b) Anatomical structures

*Basidium* short, broadly clavate, tetrasterigmatic and quadrisporous, dimension 30-32 X 14-16 $\mu$. (Text-fig. 3, g). *Basidiospore* hyaline at first cylindrical becoming boat-shaped at maturity, with its concave side towards the long axis of the basidium, elliptical when viewed from the back, allantoid in side view showing a distinct apiculus ; slightly thick-walled, surface of the wall smooth, 4.6-6.3 X 3.4 4 5 $\mu$ in dimension. (Text-fig. 3, g).

(c) Hyphal system

All the three types of hyphæ, viz., generative, binding and skeletel present. *Generative* frequent below the hymenium, becoming less and less evident between

the context and the upper surface, always hyaline, thin-walled or slightly thick-walled, sparingly or distantly branched, flexuous, closely or distantly septate, septation plain or with simple clamp-connexion, opposite clamp-connexions




Text-fig. 3. Hyphal system (a-f), basidium and basidiospores (g) of *Hexagonia discopoda* Pat. et Har. (vide Text).

infrequent, often proliferating and giving rise directly to the generative, skeletal, or binding types, full of granular protoplasmic contents, 1.5-3.5 (4.5) μ wide

(Text-fig. 3, a, e). *Skeletal* abundant in the context and towards the upper surface, always unbranched straight or slightly flexuous, mostly hyaline, often becoming cream coloured, thick-walled with uniform lumina interrupted by a few transverse septa, without clamp-connexion, granular protoplasmic contents few or none, originating directly from the terminal cell of the generative hyphæ or as its lateral branch, sometimes developing due to proliferation of clamp-connexion or from the opposite side of clamp-connexions below the septa ; apices somewhat rounded, 1.5-3.5 $\mu$ wide (Text-fig. 3, b-d). *Binding* abundant in the context, becoming less frequent towards the hymenium, developing in the same manner from the generative hyphæ or from proliferating clamp-connexions as the skeletal type, without clamp-connexions, highly thick-walled, usually with interrupted lumina due to considerable wall-thickening, in extreame cases the hyphæ becoming solid, always flexuous, mostly hyaline but occassionally cream coloured, 1 5-3.5 $\mu$ wide (Text-fig. 3 f).

B. *SYNONYMY*

Chipp (1921) following Lloyd (1910) records *Hexagona discopoda* as *H. tricolor*. Bose (1929) states that this fungus is recorded as a form of *H. tenuis* Hook. Butler and Bisby (1931) described *H. tenuis* Lloyd and *Polyporus (Favolus) tenuis* as synonymous with *H discopoda*. They further state that Lloyd (Butler and Bisby, 1931) received a *Hexagona* from Bengal and he considered it to be the same as Fries' *H. tricolor*, which, from its description, is close to or identical with *H. discopoda*, which is again a form of *H tenuis*. Banerjee (1947) reports *H. tenuis* Hook. and *H. subtenuis* Lloyd to be the two synonymous species of *H. discopoda*. Roy (1948) records *H. tenuis* Hook. as *H. discopoda*. Bakshi (1971) includes *H. discopoda* Pat. & Harr. under *H. tenuis*.

C. *HABITAT*

*Hexagonia discopoda* is a common fungus living either as a parasite or as a saprophyte on various kinds of hosts. It is frequently found on the bark of living trees like *Ficus elastica, Spondius mangifera, Melia azadirachta*, and *Mangifera indica*, dead wood of *Alnus nepalensis, Cocos nucifera*, dead branches of *Terminalia arjuna, Heritiera minor*, stumps of *Avicennia* sp., dry branch of *Odina wodier, Zizyphus mauritiana*, logs of *Avicennia* sp., *Shorea robusta Albizzia stipulata, Casuarina montana*, and *Mallotus phillippinensis* (Anonymous 1950 ; Banerjee, 1947 ; Bagchee, 1954 ; Bose in Herb. records). This fungus is also recorded by Boedijin (1948) as occurring on unidentified wood.

D. *DISTRIBUTION*

*H. discopoda* is a tropical fungus of the eastern hemisphere (Bose 1929). It is reported from Africa by Lloyd (1910) and from Sierra Leone in West Africa by

Deighton (1936). Boedijin (1940) records it from Krakatau in Vertatin islands. Petch (1916), and Petch and Bisby (1950) report it from Ceylon as a common Ceylon *Hexagona*. Banerjee (1947), Bose (in Herb. records), and Roy (1948) report it from Calcutta and suburbs and also from Darjeeling.

## E. *ECONOMIC IMPORTANCE*

The fungus has been mainly regarded as a sap-rotting one (Anonymous, 1950). It causes a white sap-rot on *Albizzia stipulata*. *Casuarina montana, Mallotus phillippinensis,* white sap-and bark-rot on *Mangifera indica* and white spongy sap-rot on *Shorea robusta*.

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## EXPLANATION OF PLATES

### PLATE I

Fig. 1. Photograph of the basidiocarp showing upper surface of *H. apiaria* Pers.
Fig. 2. Photograph of the basidiocarp showing hymenial surface *H. apiaria* Pers.
Fig. 3. Photograph of the basidiocarp showing upper surface of *H. sulcata* Berk.
Fig. 4. Photograph of the basidiocarp showing hymenial surface of *H. sulcata* Berk.

### PLATE II

Fig. 5. Photograph showing basidiocarps of *H. discopoda* Pat. & Harr. growing on a branch of *Mangifera indica* L.
Fig. 6. Photograph of the basidiocarp showing upper surface of *H. discopoda* Pat. & Harr.
Fig. 7. Photograph of the basidiocarp showing hymenial surface of *H. discopoda* Pat. & Harr.