(I. GENERAL INTRODUCTION)

The present research topic is viz. "TAXONOMICAL STUDIES OF MELIOLACEOUS FUNGI AND THEIR HYPERPARASITES". The objective is to work out the meliolaceous fungi and their hyperparasites, mostly occurring on the leaves of phanerogamic plants from different localities confined to the South Western part of India.

Different organisms (pathogens) attack the plants and produce many diseases. The major pathogens are viz. Fungi, Bactaria and Viruses. The fungi as pathogens are major and produce: diseases viz. downy mildews, powdery mildews, black mildews, rusts, smuts, etc. The theme of the present research is to investigate and study taxonomically the group of diseases collectively known as Black Mildews and their associated fungi (= hyperparasites).

The systematic study of fungi results a foundation for a taxonomic research and hence by only through field study one can become familiar with variability of the species and the effect of environmental factors on them. The different habitats their appearance, range of variations within individual species, within particular area could be recognised by the field studies. Hence, the systematic study of the fungi is necessary. Therefore, the workers in the field of taxonomical mycology have to pay attention to their habitats, parasites and their hosts etc. and this become possible by frequent visits to a site or sites as many times as

R

possible throughout the year in different seasons to get maximum collection

Due to appearance with dark colonies, gross the superficial ascomycetes are designated as 'Sooty Moulds'. The term is applied not only to the superficial saprophytes but also to parasites. To distinguish certain taxonomic group of fungi of the family Capnodiaceae having usually dark coloured hyphae, produce brown to black colonies on the living plants. These moulds are associated with scale insects and honey-dew producers. Hyphae of these fungi are with mucilagenous outer wall which readily absorb/water from the atmosphere and also acts as an adhesive when handled these colonies will be peeled off easily. However Stevens (1931) deplored the use of "Sooty Moulds" to meliolaceous fungi.

In contrast to the sooty moulds, the "black mildews or dark mildews" or meliolaceous fungi are obligate ectoparasites, mostly foliicolous having superficial mycelium which produces both capitate and mucronate hyphopodia, perithecia and some sterile elements like setae, appendages etc. Asci many and arranged in group_s in hymenium, initially 4-8 spored, while at maturity, usually 2-4 spored and evanescent. Ascospores $0\frac{4}{1000}$ to 4-septate and brown coloured.

The parasitism of Meliolaceous fungi is equated to that of Uredinales, as the Meliolales show a high level of host specia2

CI Can

lisation, making it essential to know the host species before any attempt is made to identify these fungi at the species level, if not, at least upto the family level. It is not worth to describe a new taxon on an unidentified host plants (Hosagoudar, 1987a). Today, the concept of obligate parasitism has been partly broken of and many obligate plant parasites have been successfully cultured; but nobody succeed to culture any member of the black-mildew fungi.

Hansford (1961) stated that "No worker has yet reported growth of these fungi in the laboratory or as artificial inoculations on leaves". He indicated that his attempts to germinate the ascospores of Meliola and Asteridiella, both in the field and in the laboratory, were unsuccessful. Thite (1975), however, succeeded in germinating the ascospores of Μ. jasminicola P.Henn. in the laboratory and Goos & Palm, L. (1979) obtained germination of M. argentina Speg., M. palmicola Winter and M. juddiana Stev. under laboratory conditions. Both of these workers reported that growth of the germ tubes was limited and ceased to develop soon after emergence from the ascospore.

These fungi are most conspicuous and widely distributed but flourish well in the tropical and subtropical regions of the world. However, their distribution is also recorded from cold temperate zones. Large number of their species have been studied from different parts of the world. Obviously, many tropical and subtropical regions of the world are yet to be explored.

The collection of these fungi is very meagre during rainy season. However, they are available in abundance during the winter and summer seasons. In general, these fungi usually infect the indigenous plants of that particular regions. In absence of their native host plants due to deforestation they may switch over to their closely related plants as the hosts.

Thus, the "black mildews" are obligate parasites. In many instances, they leave no mark of their existence on the host leaf after remova! of the colonis, while, some species produce marked yellow haloes around the colonies and also cause yellow spots on the corresponding opposite surface of the leaves e.g. <u>Amazonia</u> <u>peregrina</u> Syd., <u>Meliola hunteriae</u> Hosagoudar etc. <u>Asteridiella</u> <u>clerodendricola</u> Hosagoudar stretche's rest of the leaf portion towards the infected parts. <u>Meliola plumbaginis</u> Hansf. and Stev. reported from East Africa is the only species that causes the death of the host plant (necrosis).



To study these group of fungi is a most fascinating especially their taxonomical aspects and also their hyperparasites which are very abundant to form mosaic pattern. Ascomycetous and Deuteromycetous taxa are quite predominent and luxuriently growing on the colonies of Meliolaceae which are rough large and providing good support (either mechanical alone or nutritional too) and thus also an additional interest to work with them only because they are so common in this part of area and almost neglected from India, the reason not known.

Ľ

studied systematically. In India, Hansford and Thirumalachar (1948) collected a few species from Karnataka State. While Thite and Kulkarni (1973, 1978), Patil & Thite (1977, 1980), Pawar & Patil (1986) vstudied considerable number of these fungi from the Maharashtra State. Kar et al. (1970a, 1970b, 1971, 1972) contributed a good number of taxa to this group from West Bengal. Kapoor (1967) made few collections of these fungi from Sikkim. While Hosagoudar (1987b, 1987c, 1991 a,b,c) studied considerable number of these fungi from Kerala, but did not reflect the full picture of the "black mildew" fungi of India as to compare the different geographical situations vast area and with varied climatic conditions. Not more than 300 taxa have been reported belonging to 6 genera out of 25 valid genera of this family (Eriksson et al., 1987). Very recently two more genera viz. Diporotheca and Ophioirenina were recorded from India (which) are monotypic by Patil (1989, 1991).

This clearly indicates that nobody has given a good and full taxonomical justice to this group of fungi except a few and requires careful search systematically, thus, а very their identification authentically not only the parasite but also its host, an essential part in the taxonomy of the Meliolaceae taxa which are being considered not only obligate parasites but balanced obligate parasites producing but little injuries to its host or part of host infected mostly the leaves except a few cases where some sort of injuries, yellowing, swelling or necrosis have been reported.

0

in clear contrain

Fungi as an aids in higher plant classification (Savile, 1979). some clues are used in case of Black mildew fungi which tropical Meliolales. are the counter part of the temperate, Erysiphales - powdery predominately mildews. The 👝 heavy pigmentation served to reduce water loss in seasonally dry tropical air and protection from ultraviolet radiations (adaptation ollis Bluest to tolerance to radiation). Their host and geographical range is certainly controlled by the environment. These fungi need tropical and subtropical area with monsoon-savana type of climate and scare in rain forest. Their host leaves mostly (95 %) are coriaceous. The greatest number of species recorded on the hosts of the following families viz. Anonaceae, Lauraceae, Myrtaceae, Euphorbiaceae. Fabaceae, Fagaceae. Moraceae, Oleaceae. Apocynaceae, Rubiaceae, Solanaceae, Bignoniaceae and Verbenaceae. The scarcity of their occurrence on great tropical members of the family Orchidaceae is presumably due to the majority of species being confined to rain forest.

Nutrition is considered as one of the criterion for host specificity of the pathogen. Most obligate balance parasites have a limited host range which are closely adapted to their hosts and metabolic systems of parasites and are probably delicately balanced and slightly changed in either way may convert compatibility (susceptibility) to incompatibility (resistance). Infections generally observed less in cross-pollinated plants. But the host

6

and

range of these taxa is wide in one way and very limited on its extreme cases but not experimentally proved. But neither the host nor the parasite has a static entity. Therefore, the level of host specificity is different for different parasites, cannot (be fixed even for a single species because fungi select their hosts <u>,</u>\-r> on a physiological basis where as the taxonomist classifies them $1^{5^{-1}}$ on a morphological basis.

a) **Climatic Conditions :**

The black mildew fungi which have been studied, were collected from different localities of different districts of Maharashtra. Karnataka. Tamil-Nadu and Kerala State. The geography, rainfall and forest type of particular locality are as follows :

A) Maharashtra State :

6

1) Amboli - It is situated in Sindhudurg district, between 6°.05'N and 74°.10' E at elavation of 1023 m above sea level. The average rainfall of about 3600-6000 mm. The vegetation is of evergreen, dry mixed deciduous type.

2) Vishalghar - It is situated in Kolhapur district about 110 Km NW from Kolhapur. It receives annual rainfall about 3000-4000 mm. The vegetation is everyreen.

3) Mahabaleshwar - It is situated in Satara district between 17°.55' N and 73°.35' E at one of the Sahyadri spurs, at elavation of 1372 m above sea level and 54 Kms West of Satara.

7

-h0

The average rainfall is about 6225 mm. The vegetation is of $\sqrt{2}$ bevergreen, dry mixed deciduous and wet mixed deciduous type.

Karnataka State:

E

4) <u>Anmode</u> - It is situated in Belgaum district about 60 Km to West from Belgaum having altitude 2100 to 2500 m above sea level. It receives annual rainfall 4500-9000 mm. The type of forest is dry deciduous to moist deciduous.

5) <u>Kankumbi</u> - It is situated in Belgaum district having annual rainfall 1500-4500 mm. The vegetation is moist semi-evergreen to moist deciduous.

6) <u>Kamengundi</u> - It is situated in Coorg district and about 50 Kms away from Tarikere and between 13°.42' N and 75°.52' E. It receives annual rainfall of about 6000 mm. and vegetation is evergreen forest of moist and dry deciduous.

7) <u>Dandeli</u> - It is situated in Karnataka State. It receive annual rainfall of about 4000 mm and vegetation is evergreen and dry deciduous type.

<u>Kodaikanal</u> - This locality is situated between 10°.15' N
and 77°.31' E in Tamil-Nadu State. It receives annual rainfall
1644 mm having altitude between 1500-2000 m. The vegetation is
evergreen.

9) <u>Trivendrum</u> - It is situated between 8°.15' N, 76°.55' E in Kerala State. It receives annual rainfall 1812 mm and having

altitude 1500 m.

f

Maharashtra is one of the major States of India It extends from 15°.45' N to 22° N and 72°.45' E to 80.45' E. The hill characteristic and valleys have 'lava' topography ranges consisting of flat tops and stiff escrapments on flanks which carry several steps. The soil vary from tract to tract. A variety of soil from rich loam to poor thin 'murmad'. In the valley the soil are of brownish to reddish type. Sandy, marshy or alkaline soil is met in the coastal konkan. Red soil occur in the uplands and hills. The monssoon rains shower only for three months from mid-June to mid-September. The monsoon accounts for 85 % of the annual rainfall of the state.

The temperature conditions in the state vary throughout the year, season to season and also day and night. In the summer the maximum temperature recorded was 41° C in Konkan and 46- 48° C, in northern and eastern parts of the state, the mean maximum temperature ranges from 35° to 40° C. in the month of April while it declines with burst of the monsoon as low as 24 to 26° C. In the winter the mean daily temperature observed 21- 22° C or even less.

The vegetation depends upon the distribution of the climatic elements over the region, soil condition and biotic factors. Among them temperature and rainfall are most important which determines and distinguishes the vegetation.



10

what about they are The vegetation of the state is grouped in two main -----categories and further into subcategories as follows :

> Humid Type - Consisting, tropical and subtropical evergreen, 1) semievergreen and moist deciduous types of forest receiving annual rainfall about 1500 mm.

> Tropical evergreen forests - Receiving rainfall more than a) 2000 mm per year. Evergreen forests of West zone are luxuriently developed.

> b) Tropical semi-evergreen forests - It receives the rainfall less than 2000 mm per annum.

> Tropical monsoon forest or moist deciduous forest - It receives C) annual rainfall about 1200 mm to 1600 mm.

> d) Subtropical evergreen forests - These forests are found at high plateau upto 1000 mm at Mahabaleshwar and on peaks of Ghat.

> Dry Types - It consists of scruby and thorny jungles 2) receiving annual rainfall less than 1000 mm.

> a) Deciduous Forests - Receive 800-1200 mm rainfall Dry annually and are found in lower foot hills of Ghats of Deccan.

> Scrub Jungles or Thorny Forest - Receive annual rainfall b) of about 800 mm.

b) Review of Literature

X

The Meliolaceous fungi are obligate ectoparasites and they are peculiar due to their habits. They are abundant in tropical and subtropical region and growing mostly on the leaves in moist environment.

The type genus <u>Meliola</u> of the family Meliolaceae was first established by Fries (1823) based on the type species <u>Meliola aamphitricha</u>. Bornet (1851) has given the first general description of this genus along wiith six additional species. Gaillard (1892) in his monograph gave a detail description of this genus and recognised lll species with many synonyms.

arnaud (1918) who thas selected <u>Meliola hibisci</u> (Spreng.) Fr. as the type species. Beeli (1920) in his work gave an account of 459 species of the genus <u>Meliola</u> Fr. and mentioned that <u>M.</u> <u>amphitricha</u> Fr. and <u>M.hibisci</u> (Spreng.) Fr. as types. He also introduced the formula known as 'Beeli Formula'. Clement' & Shear (1931) designated <u>M. nidulanse</u> Schw. as the type. But Toro (1952) did not agree about all these above views about the type species, and selected <u>Meliola trichostroma</u> (Kunze) Toro as lectotype. Kunze (1927) established the genus <u>Myxothecium</u> with the type species <u>M. musae</u>Kunze. Montagne (1838) showed that it belonged to the genus <u>Meliola</u> Fries. Saccardo (1882) has established the genus viz. <u>Asteridium</u> with 2-spored characters of asci.

Mc Alpine (1897) established a genus viz. <u>Asteridiella</u> from South Wales. <u>But</u> Stevens (1927, 1928 a) in his monograph stated that the genus <u>Irenina</u> was proposed to accommodate the species of the genus <u>Irene</u> in having "no mycelial setae, no perithecial setae and no larviform appendages" with the type <u>Irenina glabra</u> (Berk. & Curt.) Stevens.

Stevens (1927) has introduced confusion when he stated that the type designated for Irene was Meliola inermis K. & C. larviform appendages. The forms with larviform which has appendages must bear the name Irene, not Appendiculella von Hoehnel. Hansford & Doidge (1961) examined the wide range of South African species and found that these are not perithecial appendages. But Stevens (1927) found that these are conoid wall cells. projections of perithecial Hence, the species classified by Stevens under the genus Irene which (s) nothing but the species of the genus Appendiculella, while those of Irenina are true species of Irene Theiss. & H.Sydow.

(1961) rediscovered McAlpine's (1897) genus Hansford Asteridiella which established with the was characters "superficial and hyphopodiate mycelia, absence of perithecial and mycelial setae and lacks perithecial appendages with globose perithecia". Obviously the true Irenina Theiss. & H.Sydow McAlpin's (1897) genus corresponds this genus. Hence to Asteridiella antedates Irene.

Theissen (1913a) proposed the genus <u>Amazonia</u> with the characters "mycelium superficial, hyphopodiate, <u>Meliola</u> -like; perithecium radial, shield-shaped and inverse; asci 2-spored and spores 5-celled." The type is <u>A. asterinoides</u> (Wint.) Theissen. Because of its radial perithecia, it was placed under the family Microthyriaceae. But von Hoehnel (1918) has shown the existence of a thin walled, perithecium under the brown shield.

Sydow, H. & Sydow, P. (1914 c) proposed another genus viz. <u>Actinodothis</u> with the type species viz. <u>A. piperis</u> Sydow & Sydow. Because of its tenuous perithecia, this genus was placed under Dothidiales. However, Stevens (1927), based on the mycelium and spore characters placed it under Meliolineae. Batista & Maia (1960) were the first to divide the genus <u>Amazonia</u> Theissen, by proposing a new genus <u>Amazoniella</u> Bat & Maia with the type species <u>A. straussiae</u> Bat. & Maia. But this genus differs from the former in having paraphyses.

Stevens (1927) treated the genus <u>Meliolaster</u> Doidge synonymous to <u>Amazonia</u> Theiss, while <u>Actinodothis</u> H. Sydow & Sydow was considered with istinct characters from that of <u>Amazonia</u> in having dimidiate perithecia with no free mycelium.

aih

 $\hat{\nabla}$

Theissen & H.Sydow (1915) described a new genus <u>Armatella</u> based on <u>Dimerosporium litseae</u> P.Henn. with the type species viz. <u>A. litseae</u> (P.Henn.) Theissen & H.Sydow. However, it was placed in Dothidiales but Hansford (1946) and placed it under Meliolaceae. Batista & Maia (1960) described again one more new genus viz. <u>Artallendea</u> with the type species <u>A. cinnamomi</u> Bat. & Maia. But Katumoto (1962) compared these two genera viz. <u>Armatella</u> and <u>Artallendea</u> and <u>Artallendea</u> considered as a synonym.

Theissen & H.Sydow (1917) made the subdivision of the genus <u>Meliola</u> by proposing a new genus <u>Irene</u> with the type <u>I</u>. <u>inermis</u> (K. & C.) Theiss. & H. Sydow to accommodate those species having no mycelial or perithecial setae. Certain species included by Theissen & H.Sydow (1917) in the genus <u>Irene</u> had a peculiar larviform perithecial appendages. To accommodate such species, von Hoehnel (1919) proposed a new genus viz. Appendiculella with the type A. calostroma (Desm.) Hoehnel.

Stevens (1927) proposed a new genus <u>Irenopsis</u> and <u>I.</u> tortuosa (Wint.) Stev. as a type species having true perithecial setae.

Hansford (1961) brought out up-to-date studies about this group in his monograph and included 5 genera viz. <u>Amazonia</u>, <u>Appendiculella</u>, <u>Asteridiella</u>, <u>Irenopsis</u> and <u>Meliola</u>, and stabilized the validity of the different taxa so far known upto 1960.

Gordon and Shaw (1960) proposed a new genus <u>Diporotheca</u> on the roots of <u>Solanum tuberosum</u> L. from Washington (America) which is characterised by the presence of superficial dark, septate mycelium bearing capitate hyphopodia and asci

8-spored; ascospores 2-septate, central cell larger and having pore at each end. The spore is covered with gelatineous sheath. Hosagoudar& Goos (1989) excluded this monotypic genus <u>Diporotheca</u> Gordon & Shaw due to its saprobic and rhizophillous habit, but Patil (1989) reported a second species of the same genus viz. <u>D. litseae</u> Patil on the leaves of <u>Litsea</u> from S.India which is parasitic and supported its validity as a member of the family Meliolaceae. This is only the second species of this genus known from India.

The number of genera in the family Meliolaceae varies from person to person (Ascomycelologist).^{Hawksworth} <u>et al.</u> (1983) accepted 30 genera while Eriksson <u>et al.</u> (1987) accepted 7 to 45 genera. Eriksson <u>et al.</u> (1987) accepted 25 valid genera and others are treated as synonyms. But other genera of family Meliolaceae are quite rare and these are known by only its type species.

Batiste <u>et al.</u> (1962, 1963, 1965a, 1965b, 1966) have described about 50 new species and varieties from South America. Huguenin (1969) surveyed the meliolaceous fungi of New Caledonia which resulted in 25 new taxa and reported 7 other species common to Australia, Indo-Malaysia and Pacific Islands. Farr (1969) studied 14 species of Meliolaceous fungi collected from Dominica Island.

Goos and Anderson (1972) provided a list of Meliolaceous

15

 γ

Her.

fungi occurring in Hawaii Islands. Ellis (1974) described two unusual thalloid <u>Meliola</u> series, viz. <u>M. araucariae</u> and <u>M.</u> <u>agathidis</u> from Australia. Lim (1975) surveyed the black mildews of Singapore and Malaya peninsula.

Hughes and Pirozynski (1995) very recently proposed a new genus viz. <u>Endomeliola</u> from New Zealand on the species of <u>Coprosma</u> (F. Caprifoliaceae) which is characterised by its immersed hyphae bearing hyphopodia. Immersed hyphae emerge via stomata and form a compact pulvinate crust which bears phialides (Mucronate hyphopodia) and separate ascomata or ascomatous locules in pulvinate stromata, with the type <u>E.</u> dingleyae Hughes & Pirozynski.

The first report of the genus <u>Meliola</u> from India was by Cooke (1980, 1984) from Belgaum (K.S.) as <u>M. densa</u> Cooke and <u>M. zigzag</u> Berk & Curtis. Gamble (1899) collected <u>M. amphitricha</u> Fr. from Dehra Dun (U.P.). Many workers then studied these fungi viz. Bal <u>et al.</u> (1921-22) reported <u>Meliola cadigensis</u> Yates, <u>M. stenospora</u> Wint. and <u>M. jasminicola</u> P.Henn. from West Bengal. Uppal <u>et al.</u> (1935) reported <u>Meliola sacchari</u> H.& P.Sydow, <u>M.</u> <u>citricola</u> H. & P.Syd. and <u>M. psidi</u> Fries. Hansford (1947) described <u>Meliola bambusicola</u> from Ooty. Hansford & Thirumalachar (1948) described 19 new species, one new variety and three new record to India. Agnihothrudu (1960) reported <u>Meliola albizziae</u> Hansf. & Deight. from Assam. Bose & Muller (1964) described

<u>Irenopsis crataegi</u> and reported <u>Asteridiella</u> <u>taxi</u> (Sawada) Hansf. and <u>Meliola melanochaeta</u> H.Sydow from Himalayas. Rao (1967) described new variety from Andhra Pradesh. Anahosur (1969) described <u>Irene indica</u> from Karnataka.

Kar & Maity (1970a,b and 1971) described 8 new species, 2 new varieties and reported Meliola palmicola wint. var. africana Hansf. froom West Bengal. They (1972) further added many taxa from West Bengal. Nair (1971) reported Meliola juțtingii Hansf. from Kerala. Thite & Kulkarni (1973, 1978) have described two new species and reported 18 species of the genus Meliola from Maharashtra. Srinivasulu (1974) described 10 new species and reported 10 species of the genus Meliola from Maharashtra. Rao Narendra (1974) reported Meliola caseariicola Hansf. 8 from Mahabaleshwar (M.S.) while Patil & Thite (1974) described Meliola argyreiae and reported M. entadae Hansf. from Maharashtra. Subhedar & Rao (1977) described Irenopsis agumbensis from Karnataka. Patil & Thite (1977) reported 40 species of Meliola from Kolhapur (M.S.). Maity (1978) described Meliola reevesiae and reported 3 species of Meliola from West Bengal. Patil & Thite (1980) have added some new records to India. Srivastava & Topal (1981) described Meliola garhwalensis from Garhwal Himalayas. Kar & Bhattacharyya (1982) reported Meliola capensis (K. & C.) Theiss. var. allophyllicola Hansf. & Deight. and M. capensis (K.& C. Theiss. var. <u>malayensis</u> Hansf. from West Bengal. Kamal <u>et</u> al. (1982) while surveying the fungi of Gorakhapur, described M. <u>carrissae</u> Doidge Meliola parvifoliae and reported from

Gorakhpur forest. Thite & Patil (1982) have again reported 13 species more of Meliola from Maharashtra. Thite & Patil (1983) described Meliola piperis ("Piperae"), M. ochrocarpi and reported M. asclepiadacearum Hansf. and M. simillina Ell. & Ev. from Maharashtra. Nair & Kaul (1983) described Meliola balakrishnanii, M. coilicosa and M. buchenaviae Bat. var. terminaliae from Maharashtra. Thite & Patil (1985) described Meliola blepharidis from Maharashtra. Gupta & Gupta (1985a,b) reported Asteridiella quercina Hansf., Meliola mitragynes H.Sydow & Sydow, M. panici (Toro) Hansf. and M. malactricha Speg. from Uttar Pradesh. Hosagoudar (1985a) transferred Irene indica (Anahosur) Hosagoudar (1985b) reported Meliola holigarnae Stev. & M. osyridicola Hansf. from Tamil Nadu & Kerala. Hosagoudar & Raju (1985) described a new variety Meliola grewiae Hansf. var. longispora from Maharashtra. Patil & Pawar (1986) reported 9 species & two varieties which are new to India. Hosagoudar (1986, 1987b,c, 1988a, b, c and 1989) and others have added many taxa mostly from Kerala and also from other states of South India, a major contribution from S. India to the Indian Meliolaceae. Patil et al. (1989) have added a genus viz. Diporotheca as a new species from South India to the fungi of the India. Patil (1991) has also studied one more additional genus Ophioirenina, which were not known in India. Both genera were known as - \propto monotypic. Hosagoudar & Goos (1989 and 1990a,b, 1991) have described the Meliolaceous fungi from Kerala State. Hosagoudar

(1991a) has provided a key to the taxa of <u>Armatella</u> and (1991b,c) described the fungi of South India.

In India alone 22000 species of fungi have been recorded (Sarbhoy. 1994). Out of these. 20 * constitutes only of Ascomycetes i.e. 1/5th known species in India. Total fungi known world are approximately 77000 in which 3/5th are in the Ascomycetes, the most dominant and largest group among fungi. Comparatively, Ascomycetous fungi are less known because of their less exploration and the difficulty of their identification. Even the Meliolaceo us taxa known from India are comparatively less as to compare the known taxa (more than 2000 spp.). This is only because of poor exploration, non-systematic study, poor not using proper and sound criteria of taxonomical base and speciation. Thus, about 50 % known or reported taxa in India require their revision that will definitely reduce the total number by one half - good and sound taxa. Meliolaceous fungi studied well but not in detailed exact from a few states. About 322 taxa (265 spp. 6 57 varieties) belonged to 8 genera have been recorded upto 1990, since from the first record of the species from 1882. These taxa have been recorded on 295 perfectly identified species of 212 host genera of 85 families of 48 orders of Trachyophyta (Takhtajan, 1980). More than 400 taxa are known which belonged to six major genera. Very recently, two additional genera were collected viz. Diporotheca Gordon & Shaw and Ophioirenina Sawada and Yamamoto, both from South India, which

,)

are only known by their type species from America and China respectively (Patil, 1989, 1991) as their type localities.

The most dominent genus in India is Meliola represented by 257 taxa (204 species and 53 varieties), i.e. 80% known taxa of Meliolaceae in India. Remaining seven genera which constituted by) 20 % taxa viz. Asteridiella (18 spp. & 2 varieties), Amazonia (16 spp.), Irenopsis (13 spp. & 2 varieties), Armatella (8 spp.) Appendiculella (3 spp.), Diporotheca and Ophioirenina, each represented by one species. About 92 % taxa have been recorded only on Dicotyledonous hosts and remaining (8 %) on Pteridophytes, Gymnosperms and Monocotyledons are only parasitized by Meliola except one viz. Asteridiella on Taxus. Out of 85 host families, 76 host families belonged to only Dicotyledons.

The members of Lauraceae harbours maximum i.e. 25 taxa of the Meliolaceae belonged to four genera viz. <u>Amazonia</u>, <u>Armatella</u>, <u>Diporotheca</u> and <u>Meliola</u>. The species of the genus <u>Armatella</u> which only parasitised the members (Patil, 1992) which requires its confirmation. The host parasite relationship has been accepted but not experimentally proved. The most favourable host to <u>Meliola</u> species to parasite are of families viz. Rubiaceae (17 taxa), Rutaceae and Euphorbiaceae (16 taxa each), Lauraceae (14 taxa), Apocynaceae (11 taxa), Fabaceae (9 taxa), Verbenaceae and Poaceae (8 taxa each).

About 88 % of taxa have been distributed in four states

 $\langle \gamma \rangle$

viz. Kerala, Tamil Nadu, Karnataka and Maharashtra which found a part of South India.