Biodiversity of aquatic fungi in China

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Aquatic fungi include those that occur in freshwater, marine, and brackish water habitats. In China, aquatic fungi have been investigated since 1920s. In this paper, we summarized the known data and provided a comprehensive list of aquatic fungi in China. To date, 969 species have been reported in China, including 782 and 213 species from freshwater and marine habitats, respectively, with 26 overlaps. The 782 freshwater species comprise 25 chytridiomycetes, 256 ascomycetes, 416 hyphomycetes, 63 oomycetes, and 22 zygomycetes. The 213 marine species comprise 117 ascomycetes, 48 hyphomycetes, 1 basidiomycete, 5 oomycetes, and 42 yeasts. Although the aquatic fungi in China are still poorly investigated, with most areas of the territory untouched, the number of recorded species is higher than most of the other countries in the world. The investigation of aquatic fungi in China is patchy as most species were reported from the southwest areas. There is little overlapped taxa found on different substrata, which implies that most aquatic fungi may have a substrate preference.

Keywords: ascomycota; chytridiomycota; freshwater fungi; marine fungi; oomycota

Introduction

“Aquatic fungi” covered in this paper includes the kingdom Fungi (Kirk et al. 2008) and taxa traditionally treated as fungi (e.g., oomycetes); they comprise highly diverse fungal groups including ascomycetes, basidiomycetes, chytridiomycetes, and zygomycetes (Shearer et al. 2007). Aquatic fungi play an essential role in ecosystems, which has been thoroughly reviewed by Krauss et al. (2011). Aquatic environments harbor many taxonomically unknown fungi, for example, a new fungal phylum Cryptomycota was recently discovered from the sediment in a pond (Jones et al. 2011). Until 2007, about 3000 fungal species and 138 saprolegnialean species have been reported from aquatic habitats (Shearer et al. 2007).

Although aquatic fungi have been reported since 1840s (Desmazières 1849), the diversity of this fungal group is still poorly understood compared to their terrestrial counterparts (Jones 2011). Geographical occurrence of aquatic fungi is significantly different between countries, for example, about 548 ascomycetes have been reported from freshwater habitats, mostly from Europe, North America, and South-East Asia (Raja et al. 2009). Studies on marine fungi were initially centered on Europe and the USA, but over the past decade this has shifted to Asia, while other geographical locations are still rarely studied (Jones 2011). Few reviews on regional data of aquatic fungi have been reported. Zhang et al. (2011) reviewed the freshwater fungi in Thailand and listed 173 ascomycetes and hyphomycetes. Jones and Pang (2011) reported the distribution of fungi in aquatic habitats in tropical regions and have highlighted the differences between fungi in freshwater and marine habitats. Most reviews were focused on some specific aquatic fungal groups e.g., ascomycetes (Vijaykrishna et al. 2006), freshwater fungi (Goh and Hyde 1996), and marine fungi (Jones 2011). Reviews covering all the fungal groups may provide more comprehensive knowledge of their diversity and geographical distribution. This paper reviews the Chinese data of aquatic fungi reported since 1920s.

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Freshwater fungi

Seven hundred and eighty-two freshwater fungal species (including 63 species of oomycetes) have been reported from China (Table 1). Freshwater fungi reported in China are highly diverse, including chytridiomycetes, ascomycetes, hyphomycetes, oomycetes, and zygomycetes (Table 1); but no freshwater basidiomycetes have been reported. These collections were from submerged wood, freshwater insects, herbaceous substrata, sediments, leaves, foams, and living plants.

Freshwater ascomycetes

Two hundred and fifty-six freshwater ascomycetes have been reported from China (Table 1) and are listed in Table 5. It is the second largest freshwater fungal group and accounted for 26% of the total aquatic species in China. This group of fungi is highly diverse, including chytridiomycetes, ascomycetes, hyphomycetes, oomycetes, and zygomycetes (Table 1); but no freshwater basidiomycetes have been reported. These collections were from submerged wood, freshwater insects, herbaceous substrata, sediments, leaves, foams, and living plants.

Table 1. Species number of different aquatic fungal groups reported in China.

|                | Freshwater | Marine |
|----------------|------------|--------|
| Basidiomycetes | —          | 1      |
| Chytridiomycetes | 25        | —      |
| Ascomycetes    | 256        | 117    |
| Hyphomycetes   | 416        | 48     |
| Oomycetes      | 63         | 5      |
| Yeasts         | —          | 42     |
| Zygomycetes    | 22         | —      |
| Total          | 782        | 213    |

monographs, with many in Chinese. A comprehensive review is presented in this paper.

256 ascomycetes belong to 17 orders, i.e., Calosphaeriales (1 sp.), Diaporthales (4 spp.), Halosphaeriales (4 spp.), Helotiales (2 spp.), Hypocreales (9 spp.), Jahnulales (6 spp.), Laboulbeniales (49 spp), Lulworthiales (1 sp.), Microascales (22 spp.), Orbiliales (1 sp.), Pleosporales (46 spp.), Pyrenulales (1 sp.), Rhytismatales (1 sp.), Pezizales (1 sp.), Savoryellales (7 spp.), Sordariales (25 spp.), Xylariaceae (18 spp.), and the 58 species referred to as incertae sedis. The results indicate that the freshwater ascomycetes are a miscellaneous group with representatives from most fungal groups. Annulataascaceae species are typical freshwater ascomycetes on submerged wood, with 28 species reported for China. The distinctive character of these taxa is the massive apical ring, which is illustrated in Figure 2 for the type species Annulatascus velatispora K.D. Hyde. The most frequent species in aquatic habitat is Kirschsteiniothelia elaterascus Shearer (Figure 3) (according to our statistics and the literatures), a cosmopolitan species, reported from the USA (Raja et al. 2009), Chile (Shearer 1993b), South Africa (Hyde et al. 1998) and Brunei (Ho et al. 2001).

Many genera (e.g., Arnium Nitschke ex G. Winter, Ascolacicola Ranghoo & K.D. Hyde, Gelasinospora Dowding) are represented by only one species in freshwater habitats in China, while others have multiple species. The most speciose genus is Chitonomyces Peyr. with 32 species, followed by Massarina Sacc. (12 spp.), and Lasiosphaeria Ces. & De Not. (10 spp.).

Various substrata in freshwater habitats in China have been investigated for ascomycetes. According to the main chemical components of the substrata, they can be divided into three groups: (1) woody substrata, deadwood fallen into water, composed of cellulose and lignin, e.g., submerged wood, twigs; (2) herbaceous substrata, mostly with chemical component of cellulose, e.g., bamboo culms, grasses; and (3) freshwater insects, insects living in freshwater habitats, the main chemical component being chitin. The species number reported on each substrate type is shown in Table 2.
Ascomycetes were most abundant on woody substrata (157 spp., Table 2) compared to the other two substrate types. He (1988) reported *Vibrissea truncorum* (Alb. & Schwein.) Fr. on submerged wood in Guizhou province. This was probably the first record of ascomycetes from submerged wood in China. About 10 years later, mycologists started to investigate the ascomycetes on submerged wood in Hong Kong and reported many new taxa. Tsui et al.
Figure 3. *Kirschsteiniothelia elaterascus*. (a) Ascomata on submerged wood. (b) Pseudoparaphyses. (c), (d) Asci. (e) Upper part of an ascus. (f)–(h) Ascospores. Scale bars: a = 200 µm, b = 5 µm, c,d = 20 µm, e–h = 5 µm.

Table 2. Species number of freshwater ascomycetes on different substrata.

| Substrata          | Woody substrata | Herbaceous substrata | Freshwater insects |
|--------------------|-----------------|----------------------|--------------------|
| Species number     | 157             | 62                   | 49                 |

(1997) described a new ascomycetes *Aniptodera inflati-ascigera* K.M. Tsui, K.D. Hyde & I.J. Hodgkiis in Lam Tsuen River in Hong Kong. It may be the first report of freshwater ascomycetes in Hong Kong. Since then, about 20 new species have been reported on submerged wood in Hong Kong within less than 10 years, which indicated a highly diverse fungal taxa on submerged wood in Hong Kong.

In Mainland China, the investigations of freshwater ascomycetes on submerged wood were mostly focused in Yunnan province. Cai et al. (2002) investigated the fungal diversity in Fuxian Lake in Yunnan province and reported 64 higher fungi, with a new ascomycete *Pseudohalonectria fuxianii* L. Cai, K.M. Tsui, K.Q. Zhang & K.D. Hyde. This study triggered a series of similar studies in Yunnan province. Many new species have since been described
including several new genera, e.g., *Dyriothipsis* L. Cai, Jeewon & K.D. Hyde (Jeewon et al. 2003), *Aquapeziza* D.M. Hu, L. Cai & K.D. Hyde (Hu, Chen, et al. 2012). In another investigation on freshwater fungi in Guangdong province by Liu et al. (2012), a new genus *Coniarium* F. Liu & L. Cai and a new species *Jobellisia guangdongensis* F. Liu & L. Cai was discovered.

Sixty-two ascomycetes have been reported on herbaceous substrata in China, mostly from bamboo and grasses, including two new genera, i.e., *Ascoyunnania* Cai et al. (2005) and *Ascorhombispora* L. Cai and K.D. Hyde (2007b). Wong and Hyde (2001) investigated the fungi on the senescent culms of several species of grasses in Hong Kong from 1997 to 1999 and reported 205 taxa including 61 ascomycetes. The results of these reports indicate the abundance of ascomycetes on herbaceous substrata in freshwater habitats. However, more investigation should be conducted to better understand freshwater fungi on these poorly investigated substrata.

Twenty-two ascomycetes were recorded on both woody and herbaceous substrata, i.e., *Aniptodera chesapeakeensis* Shearer & M.A. Mill., *Aniptodera lignatilis* K.D. Hyde, *Aniptodera palmicola* K.D. Hyde, W.H. Ho & K.M. Tsui, *Anthostomella aquatica* K.D. Hyde, *Ascoyunnania palmicola* K.D. Hyde, *Ascoyunnania sawada* H.S. Chang & S.-Y. Hsieh, *Astrosphaeriella papilata* K.D. Hyde & J. Fröhl., *Astrosphaeriella stellata* (Pat.) Sacc., *Caryospora minima* Jeffers, *Cataractispora receptaculorum* W.H. Ho, K.D. Hyde & I.J. Hodgkiss, *Cercophora costariensis* (Carroll and Munk) O. Hilber & R. Hilber, *Halosarpeia aquadulcis* S.Y. Hsieh, H.S. Chang & E.B.G. Jones, *Halosarpeia lotica* Shearer, Kirschsteiniothelia elaterascus Shearer, *Massarina purpurescens* K.D. Hyde & Aptroot, *Massarina thalassioidea* K.D. Hyde & Aptroot, *Nantantispora retorquens* Shearer & J.L. Crane, *Ophioceras dolichostomum* (Berk & M.A. Curtis) Sacc., *Ophioceras tenusporum* Shearer, J.L. Crane & W. Chen, *Pseudohalonectria lignicola* Minoura & T. Muroi, *Savoryella aquatica* K.D. Hyde, *Zopphiella latices* (N. Lundq.) Malloch & Cain. This indicates that some saprophytic ascomycetes were not substrate specific. A greater overlap in freshwater ascomycetes on woody and herbaceous substrata may occur as more studies are undertaken.

Morphologically, the Laboulbeniales are exceptional – structurally resulting from hyphal reduction and determinate cell division, and arthropod-dependent life cycles (Weir and Blackwell 2001). There are almost 2000 Laboulbeniales species (Riddick and Schaefer 2005), and many are known from freshwater insects. However, this group has been ignored in most reviews of aquatic fungi (Shearer 1993a; Goh and Hyde 1996; Goh 1997; Wong et al. 1998; Vijaykrishna et al. 2006; Shearer et al. 2007). Forty-nine parasitic ascomycetes belonging to Laboulbeniales have been reported on freshwater insects in China. Thaxter (1924, 1926, 1931) reported 41 species, of which 30 were new species and 31 on freshwater insects. Shen and Ye (2006) investigated the Laboulbeniales and reported 18 additional species on freshwater insects.

The number of ascomycetes reported in freshwater habitats in different provinces/districts are listed in Table 3. Hong Kong is the most studied area with 153 recorded species (Table 3). Yunnan province has also attracted much attention, with 69 recorded ascomycete species (Table 3). The reason that the two regions seem to be attractive to mycologists may be due to the high biodiversity of freshwater fungi in tropical regions (Goh 1997). Among the 34 provinces/districts, only 12 provinces/districts have data on freshwater ascomycetes (Table 3). Even though freshwater ascomycetes have not been investigated in the other 22 provinces/districts (which cover two-thirds of the territory), the total species number of freshwater ascomycetes reported in China was more than that for any other country (Shearer and Raja 2010).

**Freshwater hyphomycetes**

In total, 416 hyphomycetes have been reported from freshwater habitats in China (Table 1), which is the largest freshwater fungal group accounting for 48.8% of total reported species. A full list of freshwater hyphomycetes is presented in Table 5. Goh and Hyde (1996) divided the freshwater hyphomycetes into four biological groups, i.e., aero-aquatic hyphomycetes, Ingoldian hyphomycetes, submerged-aquatic hyphomycetes, and terrestrial-aquatic hyphomycetes. According to our statistics, the freshwater hyphomycetes reported in China mostly belong to Ingoldian and the submerged-aquatic hyphomycetes.

Yu and Liu (1993) listed 51 species (belonging to 26 genera) of Ingoldian fungi from China, common genera were *Tricladium* Ingold (7 spp.), *Anguillospora* Ingold (6 spp.), and *Dactylella* Grove (6 spp.). Investigations on Ingoldian hyphomycetes in China were mostly carried out in the twentieth century, with few studies after 2000, as research focused on submerged-aquatic hyphomycetes.

Most freshwater hyphomycetes recorded in China are submerged-aquatic hyphomycetes and represent a heterogeneous assemblage of fungi growing on submerged decaying plant materials; and are nearly all dematiaceous with relatively thick-walled conidiophores and/or conidia (Goh and Hyde 1996). Common genera of submerged-aquatic hyphomycetes include *Acrogenospora* M.B. Ellis (5 spp.), *Canalisporium* Nawawi & Kuthub. (6 spp.), *Dactylaria* Sacc. (14 spp.), *Dictyosporium* Corda (20 spp.), *Ellisiospora* Subram. (7 spp.), *Endophragmiella* B. Sutton (6 spp.), *Monodictys* S. Hughes (7 spp.), *Spadicoides* S. Hughes (6 spp.), and *Xylomyces* Goos, R.D. Brooks & Lamore (5 spp.). The conidia of some common freshwater hyphomycetes are illustrated in Figure 4. Two new genera and 21 new species of submerged-aquatic hyphomycetes
Table 3. Number of freshwater fungi in different provinces/districts of China.

| Provinces | Ascomycetes | Hyphomycetes | Chytridiomycetes | Oomycetes | Zygomycetes | Total |
|-----------|-------------|--------------|------------------|-----------|-------------|-------|
| Anhui     | —           | 14           | —                | —         | —           | 14    |
| Beijing   | —           | 25           | —                | 20        | —           | 45    |
| Fujian    | 29          | —            | 1                | —         | —           | 30    |
| Gansu     | 1           | 1            | —                | —         | —           | 2     |
| Guangdong | 5           | 1            | —                | 4         | —           | 8     |
| Guizhou   | 1           | 16           | —                | 3         | —           | 20    |
| Hainan    | 4           | —            | —                | —         | —           | 4     |
| Hebei     | —           | —            | 3                | 10        | —           | 13    |
| Heilongjiang | 7      | 25           | 10               | 6         | 4           | 52    |
| Hong Kong | 153         | 261          | —                | 1         | 416         |       |
| Hubei     | —           | —            | 3                | —         | —           | 3     |
| Hunan     | —           | 2            | —                | —         | —           | 2     |
| Inner Mongolia | 2   | —            | —                | —         | —           | 2     |
| Jiansu    | 4           | —            | 6                | 10        | —           | 10    |
| Jilin     | —           | —            | —                | 1         | —           | 1     |
| Liaoning  | —           | —            | 7                | —         | —           | 7     |
| Shaanxi   | —           | —            | —                | 2         | 14          | 16    |
| Shandong  | 1           | 1            | —                | —         | —           | 2     |
| Si Chuan  | —           | 21           | 6                | 9         | 36          |       |
| Taiwan    | 11          | 22           | —                | 8         | 41          |       |
| Tibet     | —           | —            | 1                | —         | —           | 1     |
| Xinjiang  | —           | 3            | —                | 3         | 3           |       |
| Yunnan    | 69          | 98           | 12               | 27        | —           | 193   |
| Zhejiang  | —           | 10           | 1                | 2         | —           | 13    |
| Total     | 256         | 416          | 25               | 63        | 22          | 782   |

have been reported in China since 2003 (Cai et al. 2003a, 2003b, 2004, 2008; Cai and Hyde 2007a; Hu et al. 2007, 2010; Wongsawas et al. 2008, 2009). Most of these new taxa were collected on submerged wood, and indicate the high diversity of submerged-aquatic hyphomycetes.

Freshwater hyphomycetes in China were reported on woody substrata (submerged wood, twigs), herbaceous substrata (bamboo, grass), sediments, leaves, and water samples; the species number reported on each substrate was listed in Table 4. Two hundred and twenty-one species have been reported on woody substrata (Table 4), which accounts for 53.1% of total freshwater hyphomycetes reported in China. Among the six substrate types, woody substrata presented the highest species number, which may be due to the high available nutrient and the intensity of investigation. Most fungi were reported on only one type of substratum, with six species on more than two substrate types, i.e., *Clavariopsis aquatica* De Wildeman, *Flabellospora acuminata* Descala, *Lunulospora cymbiformis* Miura, *Tricladium attenuatum* Iqbal, *Triscelophorous acuminatus* Nawawi, and *Triscelophorus monosporus* Ingold. Only a few species overlapped between different substrate types, which may indicate host–substrate specificity.

Two hundred and sixty-one freshwater hyphomycetes were recorded in Hong Kong where most freshwater fungi were recorded; with 98 from Yunnan province and 25 species from Beijing and Heilongjiang (Table 3).

**Freshwater chytridiomycetes**

Chytridiomycetes species in freshwater environment are usually saprobes or parasites on decaying and living organic materials. They mostly live in freshwater or soil that provides a periodic film of surface water for zoospore dissemination (Shearer et al. 2007). The 706 known species of Chytridiomycota that have been described all over the world are in two classes (Chytridiomycetes and Monoblepharidomycetes) (Kirk et al. 2008). In China, 25 freshwater chytridiomycetes have been reported (Table 5). The common genera were *Olpidium* (A. Braun) J. Schröt. (6 spp.) and *Rhizophyllum* Schenk (5 spp.). Seventeen species were parasitic on algae. Twelve species and ten species were recorded in Yunnan and Heilongjiang provinces, respectively (Table 3). In respect to geographical distribution, Shearer et al. (2007, p. 51) concluded that

The Northern Temperate Region of the Western Hemisphere and European Temperate regions of the Eastern Hemisphere are the two areas from which most chytrids have been reported. The abundance of chytrids from these regions is likely a result of more chytrid researchers in these regions compared to other areas.
It is evident that chytrids have been under-collected in Southern Temperate and Tropical regions around the world, the Middle East, and Arctic/Antarctic regions.

**Freshwater zygomycetes**

Zygomycetes are relatively rare in aquatic habitats (Shearer et al. 2007). In China, only 22 species in two orders (Harpellales: 17 spp. and Mucorales: 5 spp.) were recorded (Table 5). Harpellales, an order of Trichomycetes, occur within the digestive tract of freshwater arthropods (Kirk et al. 2008). Two hundred species of Harpellales have been described as endocommensals or parasites of freshwater arthropods (Kirk et al. 2008). These fungi have an interesting life style and co-evolution with their host arthropods. However, in China they were poorly investigated, with little knowledge on their diversity and biology. One new genus (Wang et al. 2010) and six new species (Strongman and Xu 2006; Strongman et al. 2010) have been described from western China. The discovery of these new taxa indicates that more trichomycetes await discovery and description in China.
Table 5. Species list of fungi and fungi-like organisms in China.

| Species                                      | Substrata                                                      | Distribution | References                          |
|----------------------------------------------|----------------------------------------------------------------|--------------|--------------------------------------|
| *Freshwater ascomycetes*                     |                                                                |              |                                      |
| *Aniptodera aquadulcis* (S.Y. Hsieh, H.S. Chang & E.B.G. Jones) | Submerged wood                                                 | 1. Taiwan    | 1. Hsieh et al. 1995                 |
|                                              |                                                                | 2. Hong Kong  | 2. Hyde et al. 1999a                 |
|                                              |                                                                | 3. Yunnan     | 3. Luo et al. 2004a                  |
| *Aniptodera chesapeakensis* Shearer & M.A. Mill. | 1. Grass, Submerged wood                                       | 1. Hong Kong  | 1. Tsui and Hyde 2004; Wong and Hyde 2001a |
|                                              |                                                                | 2. Submerged wood | 2. Tsui et al. 2000                 |
|                                              |                                                                | 3. Submerged wood | 3. Cai et al. 2002                  |
| *Aniptodera haispora* Vrijmoed, K.D. Hyde & E.B.G. Jones | Submerged wood                                                 | Hong Kong    | Tsui and Hyde 2004                   |
| *Aniptodera inflataiscigera* K.M. Tsui, K.D. Hyde & Hodgkiss | Submerged wood                                                 | Hong Kong    | Tsui et al. 2000; Tsui et al. 1997b |
| *Aniptodera lignatilis* K.D. Hyde             | 1. Submerged wood                                               | 1. Hong Kong  | 1. Tsui and Hyde 2004; Tsui et al. 2000; |
|                                              |                                                                | 2. Yunnan     | 2. Luo et al. 2004a                  |
| *Aniptodera margartiona* Shearer             | Submerged wood                                                 | Yunnan       | Cai et al. 2002                      |
| *Aniptodera mauritaniensis* K.D. Hyde, W.H. Ho & K.M. Tsui | Submerged wood                                                 | Yunnan       | Luo et al. 2004a                     |
| *Aniptodera megalospora* K.D. Hyde, W.H. Ho and K.M. Tsui | Submerged wood                                                 | Hong Kong    | Hyde et al. 1999a                   |
| *Aniptodera palmicola* K.D. Hyde, W.H. Ho & K.M. Tsui | Submerged wood, bamboo, Grass                                  | Hong Kong    | Ho et al. 1999b                     |
| *Annulatascus aquaticus* W.H. Ho, K.D. Hyde and J.J. Hodgkiss | Submerged wood                                                 | Hong Kong    | Ho et al. 1999d                     |
| *Annulatascus biatrisporus* K.D. Hyde         | Submerged wood                                                 | Hong Kong    | Tsui et al. 2000                     |
| *Annulatascus hongkongensis* W.H. Ho, V.M. Ranghoo, K.D. Hyde and J.J. Hodgkiss | Submerged wood                                                 | Hong Kong    | Ho et al. 1999b                     |
| *Annulatascus longisporus* V.M. Ranghoo and K.D. Hyde | Submerged wood                                                 | Hong Kong    | Ranghoo and Hyde 1998               |
| *Annulatascus mengensis* D.M. Hu, L. Cai & K.D. Hyde | Submerged wood                                                 | Yunnan       | Hu et al. 2012a                     |
| *Annulatascus triseptatus* S.W. Wong, K.D. Hyde & E.B.G. Jones | Grass                                                          | Hong Kong    | Wong and Hyde 1999                  |
| *Annulatascus velatissporus* K.D. Hyde        | Submerged wood                                                 | 1. Hong Kong  | 1. Tsui et al. 2000                 |
|                                              |                                                                | 2. Yunnan     | 2. Luo et al. 2004b                 |
| *Annulosmagnus triseptatus* (S.W. Wong, K.D. Hyde & E.B.G. Jones) | Submerged wood                                                 | Yunnan       | Ho et al. 2001                      |
|                                              |                                                                |              |                                      |
| *Anthostomella aquatica* K.D. Hyde            | Submerged wood, bamboo                                          | Hong Kong    | Hyde and Goh 1998                   |
| *Anthostomella punctulata* (Roberge ex Desm.) Sacc. | Grass                                                          | Hong Kong    | Wong and Hyde 2001a                 |
| *Anumitea heterospora* P.M. Kirk              | Submerged wood                                                 | Hong Kong    | Ho 1998                             |
| *Apiospora montagni* Sacc.                   | Submerged wood                                                 | Hong Kong    | Wong and Hyde 2001a                 |
| *Apiospora sinensis* K.D. Hyde, J. Frohli, & Joan E. Taylor | Grass                                                          | Yunnan       | Luo et al. 2004a                    |
| *Aqualignicola hyalina* V.M. Ranghoo, K.M. Tsui & K.D. Hyde | Submerged wood                                                 | Hong Kong    | Ranghoo et al. 2001                 |
| *Aqualignicola vaginata* D.M. Hu, L. Cai & K.D. Hyde | Submerged wood                                                 | Yunnan       | Hu et al. 2012a                     |
| *Aquapeziza globispora* D.M. Hu, L. Cai & K.D. Hyde | Submerged wood                                                 | Yunnan       | Hu et al. 2012b                     |
| *Aquaticola hyalomura* W.H. Ho, K.M. Tsui, J.J. Hodgkiss and K.D. Hyde | Submerged wood                                                 | Hong Kong    | Ho et al. 1999c; Tsui et al. 2000    |
| *Aquaticola minutiguttulata* K.M. Tsui, Hodgkiss & K.D. Hyde | Submerged wood                                                 | Hong Kong    | Tsui et al. 2003                     |
| *Aquaticola rhomboidea* W.H. Ho, K.M.Tsui, K.D. Hyde & J.J. Hodgkiss | Submerged wood                                                 | Hong Kong    | Ho 1998; Tsui et al. 2000            |
| Species                                                                 | Habitat                          | Location       | Authors                                      |
|------------------------------------------------------------------------|----------------------------------|----------------|---------------------------------------------|
| *Aquaticola triseptata*                                               | K.M. Tsui, Hodgkiss & K.D. Hyde  | Hong Kong      | Tsui et al. 2003                           |
| *Areophila serrulata*                                                 | (Ellis & G. Martin) K.D. Hyde    |                | Wang and Hyde 2001a                        |
| *Arnium apiculatum*                                                   | (Griffiths) Lundq.               |                | Ho 1998                                     |
| *Ascolacicala aquatica*                                               | Ranghoo & K.D. Hyde              |                | Ranghoo and Hyde 1998                      |
| *Ascominuta lignicola*                                                | V.M. Ranghoo and K.D. Hyde       |                | Ranghoo and Hyde 2000                      |
| *Ascomycia aquatica*                                                  | Ranghoo & K.D. Hyde              |                | Ranghoo and Hyde 1998                      |
| *Ascomycia unicaudatum*                                               | (E.B.G. Jones & Camp.-Als.) J. Campb., J.L. Anderson & Shearer |                | Ranghoo and Hyde 2000                      |
| *Ascotaiwania hsilio*                                                 | H.S. Chang & S.-Y. Hsieh         |                | Tsui et al. 2000                           |
| *Ascotaiwania lixigalica*                                             | Sivan. & hs Chang                |                | Sivanesan and Chang 1992                   |
| *Ascotaiwania mitriformis*                                            | Ranghoo & K.D. Hyde              |                | Ranghoo and Hyde 1998                      |
| *Ascotaiwania palmicola*                                              | K.D. Hyde                        |                | Luo et al. 2004a                           |
| *Ascotaiwania pennisetarum*                                           | K.M. Wong & K.D. Hyde            |                | Wong and Hyde 2001a                        |
| *Ascotaiwania pseudomucronata*                                        | H.S. Chang & S.-Y. Hsieh         |                | Chang et al. 1998                          |
| *Ascotaiwania wulai*                                                  | H.S. Chang & S.-Y. Hsieh         |                | Tsui et al. 2001; Wong and Hyde 2001a      |
| *Astrosphaeriella papillata*                                          | K.D. Hyde & J. Fröh.             |                | Luo et al. 2004a                           |
| *Astrosphaeriella stellata*                                           | (Pat.) Sacc.                     |                | Cai et al. 2002                            |
| *Astrosphaeriella trochus*                                             | (Penz. & Sacc.) D. Hawksw         |                | Thaxter 1931                               |
| *Astrosphaeriella vesuvius*                                           | D. Hawksw. & Boise               |                | Shen and Ye 2006                           |
| *Autoicomyces chinensis*                                              | D.H. Ye & Y.H. Shen              |                | Shen and Ye 2006                           |
| *Autoicomyces falcifer*                                               | (Thaxt.) Thaxt.                  |                |                             |
| *Autoicomyces helobacteris*                                           | Thaxt.                           |                |                             |
| *Autoicomyces japonicus*                                              | Thaxt.                           |                |                             |
| *Autoicomyces latens*                                                 | Thaxt.                           |                |                             |
| *Bionectria ochroleuca*                                               | (Schwein.) Schroers & Samuels    |                |                             |
| *Boerlagiomyces lacunispora*                                          | (K.D. Hyde) S.J. Stanley and K.D. Hyde |                |                             |
| *Brunneosporella aquatica*                                            | Ranghoo & K.D. Hyde              |                |                             |
| *Byssosphaeria oviformis*                                             | M.E. Barr                        |                |                             |
| *Byssosphaeria schiedermyeriana* (Fuckel)                             | M.E. Barr                        |                |                             |
| *Caryospora callicarpa*                                               | (Curry) Nitschke ex Fuckel        |                |                             |
| *Caryospora minima*                                                   | Jeffers                          |                |                             |
| *Cataractispora receptacularum*                                       | W.H. Ho, K.D. Hyde & I.J. Hodgkiss |                |                             |

(Continued)
Table 5. (Continued).

| Species | Substrata | Distribution | References |
|---------|-----------|--------------|------------|
| *Cataractispora viscosa* K.D. Hyde, S.W. Wong & E.B.G. Jones | Submerged wood | Hong Kong | Hyde et al. 1999b |
| *Cataractispora appendiculata* S.W. Wong, K.D. Hyde & E.B.G. Jones | Submerged wood | Hong Kong | Ho 1998 |
| *Cercophora appalachianensis* O. Hilber and R. Hilber | Submerged wood | Hong Kong | Ho 1998; Ho et al. 2001 |
| *Cercophora caudata* (Cur.) Lundq. | Submerged wood | Hong Kong | Tsui et al. 2000 |
| *Cercophora coprophila* (Fr.) Lundq. | Submerged wood | Hong Kong | Ho 1998 |
| *Cercophora costariensis* (Carroll and Munk) O. Hilber and R. Hilber | Submerged wood, bamboo, wood | Hong Kong | Tsui et al. 2000 |
| *Ceriospora hongkongensis* S.W. Wong, K.D. Hyde & E.B.G. Jones | Submerged wood | Hong Kong | Ho 1998 |
| *Chaetosphaeria anglica* P.J. Fisher and Petrini | Submerged wood | Hong Kong | Tsui et al. 2001 |
| *Chaetosphaeria higensis* Hino | Submerged wood | Hong Kong | Tsui et al. 2000 |
| *Chaetosphaeria lapazina* Carroll & Munk | Submerged wood | Hong Kong | Ho et al. 2001 |
| *Chaetosphaeria lentomita* W. Gams and Hol.-Jech. | Submerged wood | Hong Kong | Tsui et al. 2001 |
| *Chitonomyces aculeifer* Sp. | Insects | Fujian | Shen and Ye 2006 |
| *Chitonomyces amoyensis* Thaxt. | Insects | Fujian | Thaxter 1926 |
| *Chitonomyces australasieae* Thaxt. | Insects | Hainan | Sheng and Ye 2006 |
| *Chitonomyces bakert* Thaxt. | Insects | Fujian | Thaxter 1926 |
| *Chitonomyces bidecius* (Thaxt.) Thaxt. | Insects | Fujian | Thaxter 1926 |
| *Chitonomyces ceratomyctecalis* Thaxt. | Insects | Fujian | Thaxter 1926 |
| *Chitonomyces chinensis* Thaxt. | Insects | Fujian, Jiangsu | Thaxter 1926 |
| *Chitonomyces chungii* Thaxt. | Insects | Fujian | Thaxter 1926 |
| *Chitonomyces corniculatus* Thaxt. | Insects | Fujian | Thaxter 1926 |
| *Chitonomyces excavatus* Thaxt. | Insects | Fujian | Thaxter 1926 |
| *Chitonomyces furcatus* Thaxt. | Insects | Fujian | Thaxter 1926 |
| *Chitonomyces gracilipes* Thaxt. | Insects | Fujian, Jiangsu | Thaxter 1926 |
| *Chitonomyces hydrophi* Thaxt. | Insects | Fujian | Thaxter 1926 |
| *Chitonomyces indentatus* Thaxt. | Insects | Fujian | Thaxter 1926 |
| *Chitonomyces intermedius* Thaxt. | Insects | Fujian | Thaxter 1926 |
| *Chitonomyces japonensis* Thaxt. | Insects | Fujian | Thaxter 1926 |
| *Chitonomyces juvavicus* Thaxt. | Insects | Fujian | Thaxter 1926 |
| *Chitonomyces laubouleniioides* Thaxt. | Insects | Fujian | Thaxter 1926 |
| *Chitonomyces ligulatus* Thaxt. | Insects | Fujian | Thaxter 1926 |
| *Chitonomyces melananus* Peyr. | Insects | Fujian | Thaxter 1926 |
| *Chitonomyces orientalis* Thaxt. | Insects | Fujian, Jiangsu | Thaxter 1926 |
| *Chitonomyces paradoxus* Thaxt. | Insects | Fujian | Thaxter 1926 |
| *Chitonomyces paradoxos* Thaxt. | Insects | Fujian | Thaxter 1926 |
| *Chitonomyces pullus* Thaxt. | Insects | Fujian | Thaxter 1926 |
| *Chitonomyces recurvatus* Thaxt. | Insects | Fujian | Thaxter 1926 |
| *Chitonomyces spinosus* Thaxt. | Insects | Fujian, Guangdong | Shen and Ye 2006 |
| *Chitonomyces strictus* Thaxt. | Insects | Fujian | Thaxter 1926 |
| *Chitonomyces tardicola* Thaxt. | Insects | Fujian | Thaxter 1926 |
| *Chitonomyces unciger* Thaxt. | Insects | Not recorded | Thaxter 1926 |
| *Chitonomyces vixvisibilis* Thaxt. | Insects | Fujian | Thaxter 1926 |
Chitonomyces yunnanensis Y.H. Shen & T.H. Li
Chitonomyces zonatus Thaxt.
Clohiesia corticola K.D. Hyde
Clohiesia curvispora L. Cai & K. D. Hyde
Clohiesia lignicola K.M. Tsui, K.D. Hyde & I.J. Hodgkiss
Clophosphera uniseptata K. M. Tsui, K. D. Hyde & Hodgkiss
Conlarium duplumascospora F. Liu & L. Cai
Coreomyces chinensis Thaxt.
Coreomyces curvatus Thaxt.
Coreomyces italicus Thaxt.
Coreomyces microconae Thaxt.
Coreomyces minor Thaxt.
Coreomyces orientalis Thaxt.
Coreomyces recurvatus Thaxt.
Diaporthe beckhausii Nitschke
Diaporthe minutis K.M. Wong & K.D. Hyde
Didymella aptrootii K.D. Hyde & S.W. Wong
Didymosphaeria conoidea Niessl
Dyriothopsis lakefuxianensis L. Cai, R. Jeewon & K.D. Hyde
Errwella minitissima A.I. Romero & Samuels
Fluminicola bipolaris S.W. Wong, K.D. Hyde & E.B.G. Jones
Frondosphaeria joanneae J. Fröh. & K.D. Hyde
Gelasinospora retispora Cain
Hadrospora fallax (Mouton) Boise
Haematococca haematococca (Berk. & Broome) Samuels & Nirenberg
Halosarphea abonnis Kohlm.
Halosarphea aquadulcis S.Y. Hsieh, H.S. Chang & E.B.G. Jones
Halosarphea heteroguttulata S.W. Wong, K.D. Hyde and E.B.G. Jones
Halosarphea lotica Shearer
Halosarphea retrorquens Shearer & J.L. Crane
Halosphaeria cucullata (Kohl.) Kohlm.
Hypocrea lixii Pat
Hypocrea viridescens Jaklitsch & Samuels
Hypoxylon kretzschmarioides Y.M. Ju and J.D. Rogers

(Continued)
| Species | Substrata | Distribution | References |
|---------|-----------|--------------|------------|
| Jahnula aquatica (Plötz & Kirschst.) Kirschst. | Submerged wood, Wood | Hong Kong | Ho 1998 |
| Jahnula australiensis K.D. Hyde | Submerged wood | Hong Kong | Ho et al. 2001 |
| Jahnula bipolaris (K.D. Hyde) K.D. Hyde | Submerged wood | Hong Kong | Tsui and Hyde 2004; Tsui et al. 2000 |
| Jahnula granulosa K.D. Hyde & S.W. Wong | Submerged wood | Yunnan | Cai et al. 2002 |
| Jahnula poonythii K.D. Hyde & S.W. Wong | Submerged wood | Yunnan | Cai et al. 2002; Luo et al. 2004a |
| Jahnula sylvula K.D. Hyde and S.W. Wong | Submerged wood, Wood | Hong Kong | Ho 1998 |
| Jobellisia guangdongensis F. Liu & L. Cai | Submerged wood | Guangdong | Li et al. 2012 |
| Jobellisia viridifusca K.M. Tsui & K.D. Hyde | Submerged wood | Hong Kong | Ranghoo et al. 2001 |
| Kirschsteiniothelia elaterascus Shearer | Submerged wood, bamboo, Grass | 1. Yunnan | 1. Cai et al. 2002; Luo et al. 2004a |
| Lasiosphaeria breviseta P. Karst. | Submerged wood | 2. Hong Kong | 2. Tsui et al. 2000 |
| Lasiosphaeria inmensa P. Karst. | Submerged wood | Hong Kong | Tsui et al. 2000 |
| Lasiosphaeria lapaziana Carroll & Munk | Submerged wood | Hong Kong | Tsui et al. 2000 |
| Leptosphaeria blumeri E. Müll. | Grass | Hong Kong | Wong and Hyde 2001a |
| Leptosphaeria compositarum E. Müll. | Grass | Hong Kong | Wong and Hyde 2001a |
| Leptosphaeria doliolum (Pers.) Ces. & De Not. | Submerged wood, Wood | Hong Kong | Ho 1998 |
| Leptosphaeria honiarenis Matsush. | Submerged wood | Hong Kong | Tsui 1999 |
| Leptosphaeria impexa (Ellis and Everh.) J.Walker | Submerged wood | Hong Kong | Tsui 1999 |
| Leptosphaeria lapaziana (Fautrey) L. Holm | Submerged wood | Hong Kong | Wong and Hyde 2004 |
| Lignincola laevis Höhnk | Submerged wood | 1. Yunnan | 1. Cai et al. 2002 |
| Lindomyces ingoldianus Shearer & K.D. Hyde | Submerged wood | 2. Hong Kong | 2. Ho et al. 2001; Tsui et al. 2000 |
| Linocarpon angustatum K.D. Hyde & Alias | Grass | Hong Kong | Wong and Hyde 2001a |
| Lophodermium macice Sokolski & Bérubé | Water | Heilingjiang | Song and Wu 2010 |
| Ludworthia grandispora Meyers | Submerged wood | Hong Kong | Tsui and Hyde 2004 |
| Macrospora scirpicola (DC.) Fuckel | Grass | Hong Kong | Wong and Hyde 2001a |
| Magnaporthella salvinii (Catt.) R.A. Krause & R.K. Webster | Submerged wood | Hong Kong | Tsui and Hyde 2004 |
| Marinospaera mangrovei K.D. Hyde | Submerged wood | Yunnan | Cai et al. 2002 |
| Massarina aquatica J. Webster | Grass | Hong Kong | Wong and Hyde 2001a |
| Massarina arundinariae (Ellis & Everh.) M.E. Barr | Submerged wood, Wood | Hong Kong | Ho 1998; Tsui et al. 2000 |
| Massarina bipolaris K.D. Hyde | Submerged wood | 1. Yunnan | 1. Cai et al. 2002 |
| Massarina corticola (Fuckel) L. Holm | Submerged wood | 2. Hong Kong | 2. Tsui et al. 2000; 2001d |
| Massarina fronsisubmersa K.D. Hyde | Grass | Hong Kong | Wong and Hyde 2001a |
| Massarina ingoldiana Shearer & K.D. Hyde | Submerged wood, Wood | Hong Kong | Ho 1998; Tsui et al. 2000 |
| Massarina peerallyi K.D. Hyde & Aptroot | Submerged wood | Yunnan | Cai et al. 2002 |
| Massarina phragmiticola O.K. Poon & K.D. Hyde | Grass | Yunnan | Luo et al. 2004b |
| Massarina phragmiticola Poon & K.D. Hyde | Grass | Hong Kong | Wong and Hyde 2001a |
| Species                                    | Host                | Geographic Location | Reference 1 | Reference 2 | Reference 3 |
|--------------------------------------------|---------------------|---------------------|-------------|-------------|-------------|
| *Massarina proprietunicata* K.M. Tsui, K.D. Hyde & I.J. Hodgkiss | Submerged wood      | Hong Kong            |             |             |             |
| *Massarina purpureascens* K.D. Hyde & Aptroot | Submerged wood, Grass | Hong Kong            |             |             |             |
| *Massarina thalassioidea* K.D. Hyde & Aptroot | Submerged wood, bamboo, Grass | Hong Kong            |             |             |             |
| *Massariosphaeria composita* (E.Müll.) Leuchtm | Submerged wood      | Hong Kong            |             |             |             |
| *Mauritiana rhizophorae* Poonyth, K.D. Hyde, Aptroot & Peerally | Submerged wood | Hong Kong            |             |             |             |
| *Melanochaeta hemispha* (Berk. & Broome) E. Müll., Harr. & Sulmont | Submerged wood      | Hong Kong            |             |             |             |
| *Myxorrhizum dendromorphum* Matsush. | Grass               | Hong Kong            |             |             |             |
| *Nais aquatica* K.D. Hyde | Grass               | Hong Kong            |             |             |             |
| *Nais inornata* Kohlm. | Grass               | Hong Kong            |             |             |             |
| *Natantispora lotica* (Shearer) J. Campb., J.L. Anderson et Shearer | Grass               | Hong Kong            |             |             |             |
| *Nac. retronque* Shearer & J.L. Crane | Grass               | Hong Kong            |             |             |             |
| *Neptunella longirostris* (Cribb & J.W.Cribb) Kohlm. | Grass               | Hong Kong            |             |             |             |
| *Ophioceras arcuatusporum* Shearer, J.L. Crane & Chen | Grass               | Hong Kong            |             |             |             |
| *Ophioceras communis* Shearer, J.L. Crane & W. Chen | Grass               | Hong Kong            |             |             |             |
| *Ophioceras dolichostomum* (Berk. & M. A. Curtis) Sacc. | Grass               | Hong Kong            |             |             |             |
| *Ophioceras filiforme* (Henn.) Höhn. | Grass               | Hong Kong            |             |             |             |
| *Ophioceras guttulatum* K.M. Tsui, Y.M. Leung, K.D. Hyde & Hodgkiss | Grass               | Hong Kong            |             |             |             |
| *Ophioceras hongkongense* K.M. Tsui, Y.M. Leung, K.D. Hyde & Hodgkiss | Grass               | Hong Kong            |             |             |             |
| *Oxydothis miscanthicola* M.K.M. Wong & K.D. Hyde | Grass               | Hong Kong            |             |             |             |
| *Paraniesslia aquatica* L. Cai & K.D. Hyde | Grass               | Hong Kong            |             |             |             |

(Continued)
Table 5. (Continued).

| Species | Substrata | Distribution | References |
|---------|-----------|--------------|------------|
| Paraniesslia tuberculata K.M. Tsui, K.D. Hyde & Hodgkiss | Submerged wood | Hong Kong | Tsui et al. 2001d |
| Paraphaeosphaeria schoenoplecti M.K.M. Wong, Goh & K.D. Hyde | Grass | Hong Kong | Wong and Hyde 2001a |
| Phaeonectriella appendiculata K.D. Hyde & W.H. Ho | Submerged wood | Yunnan | Cai et al. 2002 |
| Phaeonectriella lignicola R.A. Eaton & E.B.G. Jones | Submerged wood | Yunnan | Luo et al. 2004a |
| Phaeosphaeria lucutosa Otani & Mikawa | Submerged wood | Yunnan | Cai et al. 2002 |
| Phaeosphaeria variisepata (G.L. Stout) Shoemaker & C.E. Babc. | Grass | Hong Kong | Wong and Hyde 2001a |
| Phomatospora acrostichi K.D. Hyde | Submerged wood | 1. Yunnan | 1. Cai et al. 2002 |
| Phomatospora berkeleyi Sacc. | Grass | Hong Kong | Wong and Hyde 2001a |
| Phomatospora phragmiticola Poon & K.D. Hyde | Grass | Hong Kong | Wong and Hyde 2001a |
| Phragmitensis ellipsoidea M.K.M. Wong, Goh & K.D. Hyde | Grass | Hong Kong | Wong and Hyde 2001a |
| Phragmitensis marina M.K.M. Wong, Poon & K.D. Hyde | Grass | Hong Kong | Wong and Hyde 2001a |
| Phomatospora obtusus Thaxt. | Insects | Fujian | Thaxter 1931 |
| Phomatospora phragmiticola | Grass | Hong Kong | Wong and Hyde 2001a |
| Pseudohalonectria adversaria Shearer | Grass | Hong Kong | Tsui et al. 2000 |
| Pseudohalonectria falcata Shearer | Submerged wood | Hong Kong | Tsui 1999 |
| Pseudohalonectria fusican L. Cai, K. Zhang & K.D. Hyde | Submerged wood | Yunnan | Cai et al. 2002 |
| Pseudohalonectria lignicola Minoura & T. Muroi | Submerged wood | 1. Yunnan | 1. Cai et al. 2002; Luo et al. 2004a |
| Pseudohalonectria longirostrum Shearer | Submerged wood | 2. Hong Kong | 2. Tsui et al. 2000 |
| Pseudohalonectria lutea Shearer | Submerged wood | Hong Kong | Tsui and Hyde 2004; Yuen et al. 1999 |
| Pseudohalonectria phialidica Shearer | Submerged wood | Yunnan | Cai et al. 2002 |
| Pseudomassariella septicaliformis (De Not.) Arx | Submerged wood | Hong Kong | Tsui 1999 |
| Pseudoproboscispora aquatica (S.W. Wong and K.D. Hyde) Punith | Submerged wood | Ho 1998 | Chen et al. 2011 |
| Quaternaria dissepta (Fr.) Tul. & C. Tul. | Submerged wood | Gansu | Chen et al. 2011 |
| Rhamphoria pyriforis (Fries) Höhn. | Submerged wood | Hong Kong | Ho et al. 2001 |
| Rivulicola incrustata K.D. Hyde | Submerged wood | Hong Kong | Ranghoo et al. 2000; Tsui et al. 2000 |
| Saccaroidella aquatica K.M. Tsui, K.D. Hyde, I.J. Hodgkiss & Goh | Submerged wood | Hong Kong | Tsui and Hyde 2004; Tsui et al. 1998a |
| Saccaroidella minuta L. Cai & K.D. Hyde | Submerged wood | Yunnan | Luo et al. 2004a; Yin 2003 |
| Savoryella aquatica K.D. Hyde | Submerged wood | 1. Hong Kong | 1. Tsui et al. 2000 |
| Savoryella curvispora W.H. Ho, K.D. Hyde & Hodgkiss | Submerged wood | 2. Yunnan | 2. Luo et al. 2004a; Yin 2003 |
| Savoryella fusiformis W.H. Ho, K.D. Hyde and I.J. Hodgkiss | Submerged wood, Wood | Hong Kong | Ho 1998; Ho et al. 1997 |
| Savoryella lignicola E.B.G. Jones & R.A. Eaton | Submerged wood | 1. Yunnan | 1. Cai et al. 2002 |
| Savoryella variisepata (G.L. Stout) Shoemaker & C.E. Babc. | Submerged wood | 2. Hong Kong | 2. Tsui and Hyde 2004 |
Savoryella limnetica H.S. Chang & S.-Y. Hsieh
Submerged wood
Taiwan
Chang et al. 1998

Savoryella paucispora (Cribb & J.W. Cribb) Koch
Submerged wood
Hong Kong
Tsui and Hyde 2004

Savoryella verrucosa Minoura & T. Muroi
Submerged wood
Hong Kong
Tsui et al. 2000

Stigmatomyces stili Thaxt.
Insects
Fujian
Thaxter 1931

Submersisphaeria bambusicola D.Q. Zhou & K.D. Hyde
Bamboo
Hong Kong
Zhou and Hyde 2000

Submersisphaeria labiosa S.W. Wong, K.D. Hyde, W.H. Ho & S.J. Stanley
Submerged wood
Hong Kong
Ho 1998

Thalassogena sphaerica Kohlm. & Volkm.-Kohlm.
Submerged wood
Hong Kong
Tsui and Hyde 2004

Torrentispora fibrosa K.D. Hyde, W.H. Ho, E.B.G. Jones, K.M. Tsui & S.W. Wong
Submerged wood
Hong Kong
Tsui et al. 2000

Vaginatispora aquatica K.D. Hyde
Submerged wood
Hong Kong
Tsui et al. 2000

Verruculina enalia (Kohlm.) Kohlm. & Volkm.-Kohlm.
Submerged wood
Hong Kong
Ranghoo et al. 2000

Verticicolacaudatus V.M. Ranghoo and K.D. Hyde
Submerged wood
Hong Kong
Ranghoo and Hyde 1998

Verticilocalignicola V.M. Ranghoo and K.D. Hyde
Submerged wood
Guizhou
Ho 1998

Vibrissa truncorum (Alb. & Schwein.) Fr.
Submerged wood
Guizhou
Ho 1998

Acremonium kiliense Grütz
Leaves
Hong Kong
Au et al. 1992

Acremonium strictum W. Gams
Leaves
Hong Kong
Au et al. 1992

Acrodactys erecta (Ellis & Everh.) M.B. Ellis
Submerged wood
Yunnan
Tsui 1999

Acrodactys globulosa (Tōth) M.B. Ellis
Submerged wood
Hong Kong
Tsui 1999

Acrodactys oblique M.B. Ellis
Submerged wood
Ho 1998

Acrogenospora ellipsoida D.M. Hu, L. Cai & K.D. Hyde
Submerged wood
Yunnan
Hu et al. 2010

Acrogenospora ovalia Goh, K.D. Hyde & K.M. Tsui
Submerged wood
Hong Kong
Goh et al. 1998b

Acrogenospora sphaerocephala (Berk. & Broome) M.B. Ellis
Submerged wood
Hong Kong
Goh et al. 1998b; Ho 1998; Tsui et al. 2000

Acrogenospora subprolata Goh, K.D. Hyde & K.M. Tsui
Submerged wood
Hong Kong
Goh et al. 1998b

Acrogenospora verrucosa Hong Zhu, L. Cai & K.Q. Zhang
Submerged wood, bamboo
Yunnan
Zhu et al. 2005

Alatospora acuminata Ingold
Leaves
Sichuan
Yu et al. 1988

Alatospora constricta Dyko
Foam
Beijing
Zhu and Yu 1992

Alatospora pulchella Marvanová
Leaves
Hong Kong
An et al. 1992

Alternaria alternata (Fr.) Keissl.
Grass
Hong Kong
Wong and Hyde 2001a

Anavigra dendeomorpha Descals & B. Sutton
Submerged wood
Hong Kong
Tsui 1999

Anguillospora crassa Ingold
Foam
Beijing
Liu et al. 1992

Anguillospora curvula Iqbal
Foam, leaves
Beijing, Anhui
Zhu and Yu 1992

Anguillospora furtiva Descals
Foam
Beijing
Zhu and Yu 1992

Anguillospora gigantea Ranzoni
Leaves
Beijing
Zhu and Yu 1992

Anguillospora longissima (Sacc. & Syd.) Ingold
1. leaves
1. Sichuan
1. Yu et al. 1988
2. Leaves/Twigs
2. Taiwan
2. Chao 2006

(Continued)
Table 5. (Continued).

| Species                               | Substrata | Distribution | References          |
|---------------------------------------|-----------|--------------|---------------------|
| Anguillospora pseudolongissima        | Foam      | Hong Kong    | Chan et al. 2000    |
| Aquaphila albicans                    | Submerged wood | Yunnan  | Luo et al. 2004a    |
| Aquaticola ellipsoidea                | Submerged wood | Hong Kong  | Ho et al. 1999c    |
| Arachnophora hughesii                | Submerged wood | Hong Kong  | Tsui et al. 2000   |
| Arthrobotrys arthrobotryoides (Berl.)| Grass     | Hong Kong    | Wong and Hyde 2001a |
| Arthrobotrys cladodes                 | Sediment, Leaves | Yunnan  | Tsui et al. 2007   |
| Arthrobotrys cystospora (Oudd.)       | Sediment  | Yunnan, Guizhou | Tsui et al. 2007 |
| Arthrobotrys dianchiensis             | Sediment  | Yunnan       | Tsui et al. 2007   |
| Arthrobotrys elegans (Oudem.)         | Sediment  | Yunnan, Guizhou | Tsui et al. 2007 |
| Arthrobotrys eudermata (Drechsler)    | Sediment  | Yunnan, Guizhou | Tsui et al. 2007 |
| Arthrobotrys gephyropaga (Drechsler)  | Sediment, Leaves | Yunnan, Guizhou | Tsui et al. 2007 |
| Arthrobotrys guizhouensis (K.Q. Zhang | Sediment, Leaves | Yunnan, Guizhou | Tsui et al. 2007 |
| Arthrobotrys kuankuoshuiense         | Sediment  | Yunnan, Guizhou | Tsui et al. 2007 |
| Arthrobotrys longiphora (Xing Z. Liu & | Sediment  | Yunnan, Guizhou | Tsui et al. 2007 |
| & A. Rubner                           | Sediment  | Yunnan, Guizhou | Tsui et al. 2007 |
| Arthrobotrys megalospora (Drechsler)  | Sediment  | Yunnan, Guizhou | Tsui et al. 2007 |
| Arthrobotrys microsphoides (X.Z. Liu & | Sediment  | Yunnan, Guizhou | Tsui et al. 2007 |
| B.S. Lu) M. Scholler, Hagedorn & A. Rubner | Sediment  | Yunnan, Guizhou | Tsui et al. 2007 |
| Arthrobotrys musiformis Drechsler     | Sediment, Leaves | Yunnan, Guizhou | Tsui et al. 2007 |
| Arthrobotrys oligospora Fresen        | Sediment, Leaves | Yunnan, Guizhou | Tsui et al. 2007 |
| Arthrobotrys psychrophila (Drechsler) | Sediment  | Yunnan       | Tsui et al. 2007   |
| Arthrobotrys pyriformis (Juniper)     | Sediment  | Yunnan       | Tsui et al. 2007   |
| Arthrobotrys reticulata (Peach)       | Sediment  | Yunnan       | Tsui et al. 2007   |
| Arthrobotrys straminicola Pidopl.     | Leaves    | Yunnan       | Tsui et al. 2007   |
| Arthrobotrys superba Corda            | Sediment, Leaves | Yunnan, Guizhou | Tsui et al. 2007 |
| Arthrobotrys thaumasia (Drechsler)    | Sediment, Leaves | Yunnan, Guizhou | Tsui et al. 2007 |
| Arthrobotrys vermicula (R.C. Cooke & Satchuth.) Rifai | Sediment, Leaves | Yunnan, Guizhou | Tsui et al. 2007 |
| Articulospora inflata Ingold          | Foam      | Beijing      | Liu et al. 1992    |
| Articulospora moniliforma Ranzoni     | Leaves    | Hong Kong    | Au et al. 1992     |
| Articulospora tetracida Ingold        | Foam      | Beijing      | Liu et al. 1992    |
| Aspergillus flavus Link               | Leaves    | Hong Kong    | Au et al. 1992     |
| Aspergillus awamori Nakaz             | Water     | Heilongjiang | Song and Wu 2010   |
| Aspergillus flavipes (Bainier & Sartory) Thom & Church | Leaves   | Hong Kong    | Au et al. 1992     |
| Aspergillus niger Tiegh               | 1. Water  | 1. Heilongjiang | 1. Song and Wu 2010 |
|                                       | 2. Leaves | 2. Hong Kong  | 2. Au et al. 1992  |
|                                       | Water     | Heilongjiang | Song and Wu 2010   |
| Aspergillus tubingensis Mosenay       | Submerged wood | Hong Kong  | Tsui 1999          |
| Bactrodesmium betulicola M.B. Ellis   |           |              |                     |
| Species                                      | Habitat                  | Location  | Authors                          |
|----------------------------------------------|--------------------------|-----------|----------------------------------|
| *Bactrodesmium longisporum* M.B. Ellis       | Grass                    | Hong Kong | Wong and Hyde 2001a              |
| *Bactrodesmium longisporum* M.B. Ellis       | Submerged wood           | Hong Kong | Tsui et al. 2001b               |
| *B. longisporum*                             | Submerged wood, Foam     | Hong Kong | Tsui 1999                        |
| *Beltrania moriforme* (Peck) R.T. Moore      | Submerged wood           | Hong Kong | Cai et al. 2002                  |
| *B. moriforme*                               | Submerged wood, Foam     | Hong Kong | Tsui et al. 2000                 |
| *B. moriforme*                               | Submerged wood           | Hong Kong | Ho 1998                          |
| *B. moriforme*                               | Submerged wood, Foam     | Hong Kong | Tsui and Hyde 2004               |
| *B. moriforme*                               | Submerged wood           | Hong Kong | Cai et al. 2002                  |
| *B. moriforme*                               | Submerged wood           | Hong Kong | Tsui et al. 2001b               |
| *B. moriforme*                               | Submerged wood           | Hong Kong | Tsui et al. 2000                 |
| *Canalisporium caribense* (Hol.-Jech. and Mercado) Nawawi & Kuthub | Submerged wood, Foam     | Hong Kong | Wu 2004a; Tsui et al. 2000       |
| *Canalisporium pulchrum* (Hol.-Jech. & Mercado) Nawawi & Kuthub | Submerged wood, Foam     | Hong Kong | Wong and Hyde 2001a              |
| *Can. pulchrum*                               | Submerged wood, Foam     | Hong Kong | Wu 2004a; Tsui et al. 2000       |
| *Can. pulchrum*                               | Submerged wood, Foam     | Hong Kong | Tsui and Hyde 2004               |
| *Can. pulchrum*                               | Submerged wood, Foam     | Hong Kong | Cai et al. 2003b                 |
| *Can. pulchrum*                               | Submerged wood, Foam     | Hong Kong | Tsui 1999                        |
| *Centrospora aquatica* S.H. Iqbal            | Leaves                   | Hong Kong | Goh et al. 1998; Ho 1998          |
| *Ceratospora compacta* R.F. Castañeda, Guaran & Cano | Grass                  | Hong Kong | Li et al. 2004a; Yin 2003        |
| *Ceratosporium verrucosum* R. Kirschner & C.-J. Chen | Grass                  | Hong Kong | Wong and Hyde 2001a              |
| *Ceratosporium hyalocoronata* Inderbitzin     | Submerged wood           | Guangdong | Inderbitzin 2000                 |
| *Ceuthospora gaeumannii* Nag Raj              | Machilus sp.             | Hong Kong | Ho 1998                          |

(Continued)
Table 5. (Continued).

| Species                                                      | Substrata     | Distribution | References       |
|--------------------------------------------------------------|---------------|--------------|------------------|
| Chaetopsina hongkongensis Goh & K.D. Hyde                   | Submerged wood| Hong Kong    | Ho 1998          |
| Chalara aestuanae Nag Raj & Hughes                          | Submerged wood| Hong Kong    | Tsui 1999        |
| Chalara ungeri Sacc                                        | Grass         | Hong Kong    | Wong and Hyde 2001a|
| Cheiromyces lignicola W.H. Ho, K.D. Hyde & I.J. Hodgkiss    | Submerged wood| Hong Kong    | Ho et al. 2000   |
| Cheirosporium triseriale L. Cai & K.D. Hyde                 | Submerged wood| Yunnan       | Cai et al. 2008  |
| Chloridium botryoidenum (Corda) Hughes                      | Submerged wood| Hong Kong    | Tsui et al. 2000 |
| Chloridium marsushmaw W. Gams & Hol.-Jech                  | Submerged wood| Hong Kong    | Tsui et al. 2000 |
| Chloridium pachytrachelum W. Gams & Hol.-Jech.              | Submerged wood| Hong Kong    | Ho 1998          |
| Chloridium reniforme Matsush.                               | Grass         | Hong Kong    | Wong and Hyde 2001a|
| Chloridium virescens (Pers.) W. Gams & Hol.-Jech.           | Submerged wood| Hong Kong    | Ho 1998          |
| Cladophrinum foecundissimum Sacc. & Marchal                 | Submerged wood| Hong Kong    | Tsui et al. 2000 |
| Cladophorium cladosporioides (Fresen.) G.A. de Vries        | 1. Water      | 1. Heilongjiang| Song and Wu 2010 |
|                                                            | 2. Grass      | 2. Hong Kong | Wong and Hyde 2001a|
| Clavariopsis aquaticus De Wildeman                          | Foam          | Hong Kong    | Chan et al. 2000 |
|                                                            | 1. Leave      | 1. Sichuan   | Yu et al. 1988   |
|                                                            | 2. Leaves/Twigs| 2. Taiwan   | Chao 2006        |
|                                                            | 3. Leaves, Foam| 3. Hong Kong| Au et al. 1992; Chan et al. 2000 |
| Clavariopsis azlanii Nawawi                                 | Leaves/Twigs  | Taiwan       | Chao 2006        |
| Clavariopsis brachycladia Tubaki                            | Foam          | Hong Kong    | Chan et al. 2000 |
| Clavatospora longibrachiata (Ingold) Nilsson & Marvanov     | Leaves        | Beijing, Anhui| Zhu and Yu 1992  |
|                                                            | 1. Leaves     | 1. Sichuan   | Yu et al. 1988   |
|                                                            | 2. Leaves/Twigs| 2. Taiwan   | Chao 2006        |
| Cladoxyomyces aquaticus K.D. Hyde                           | Submerged wood| Hong Kong    | Ho 1998          |
| Coleadityospora microsacca (Matsush.) Matsush                | Submerged wood| Hong Kong    | Ho 1998          |
| Condylospora spumigena Nawawi                               | Foam          | Hong Kong    | Chan et al. 2000 |
| Conioscyphus lignicola Höhn.                                | Submerged wood| Hong Kong    | Wongsawas et al. 2009b |
| Cordana abramovii Seman & Davydina                          | Submerged wood| Hong Kong    | Ho 1998          |
| Cordana ellipoidea de Hoog                                  | Submerged wood| Hong Kong    | Tsui 1999        |
| Cordana musae (Zimm.) Höhn                                  | Submerged wood| Hong Kong    | Wong and Hyde 2001a|
| Cordana pauciseptata Preuss                                 | Grass         | Hong Kong    | Wong and Hyde 2001a|
| Cordana uniseptata L. Cai, E. Mckenz & K.D. Hyde            | Bamboo        | Yunnan       | Cai et al. 2004  |
| Costantinella phragmites M.K.M. Wong, Yanna, Goh & K.D. Hyde | Grass         | Hong Kong    | Wong and Hyde 2001a|
| Cryptophialae iriomocana Matsush.                           | Submerged wood| Hong Kong    | Ho 1998          |
| Cryptophialae udagawae Piroz                                 | Submerged wood| Hong Kong    | Whiton 1999      |
| Culcidospora gravisda Petersen                              | Leaves        | Sichuan      | Yu et al. 1988   |
| Cumulospora marina I. Schmidt                               | Grass         | Hong Kong    | Wong and Hyde 2001a|
| Curvalaria lunata (Bat., J.A. Lima & C.T. Vasconce.) M.B. Ellis| Grass         | Hong Kong    | Wong and Hyde 2001a|
| Cylindrocladium parvum P.J. Anderson                        | Submerged wood| Hong Kong    | Ho 1998          |
| Dactylaria aspirensis R.F. Castañeda & W.B. Kendr.          | Grass         | Hong Kong    | Wong and Hyde 2001a|
| Dactylaria biguttulata | Submerged wood | Hong Kong | Goh and Hyde 1999a |
|------------------------|----------------|-----------|-------------------|
| Dactylaria ficundissima | Submerged wood | Hong Kong | Tsui 1999 |
| Dactylaria hoogi | Submerged wood | 1. Hong Kong | 1. Tsui et al. 2000 |
| Dactylaria hyalotunicata | Submerged wood | 2. Yunnan | 2. Cai et al. 2002; Luo et al. 2004a |
| Dactylaria irreglaris | Submerged wood, Grass | Hong Kong | Tsui et al. 2000; Tsui et al. 1997a |
| Dactylaria longidentata | Submerged wood | Hong Kong | Ho 1998 |
| Dactylaria mucronulata | Submerged wood | Hong Kong | Goh and Hyde 1999a |
| Dactylaria obscuriseptata | Submerged wood | Hong Kong | Goh and Hyde 1999a |
| Dactylaria plovercovensis | Submerged wood, Grass | Yunnan | Luo et al. 2004a |
| Dactylaria splendida | Submerged wood | 1. Yunnan | 1. Luo et al. 2004a |
| Dactylaria triseptata | Submerged wood | 2. Hong Kong | 2. Tsui et al. 2000c |
| Dactylella dianchiensis | Submerged wood, Grass | Yunnan | Hao et al. 2004 |
| Dactylella ellipsospora | Grass | Hong Kong | Wong and Hyde 2001a |
| Dactylella intermedia | Grass | Yunnan | Luo et al. 2004a |
| Dactylella oxyspora | Submerged wood | Yunnan | Luo et al. 2004a |
| Dactylella parvicolle | Submerged wood, Grass | Yunnan | Tsui et al. 2007 |
| Dactylella phymatopaga | Submerged wood, Grass | Yunnan, Guizhou | Tsui et al. 2007 |
| Dactylella tentaculatum | Grass | Yunnan, Guizhou | Tsui et al. 2007 |
| Dendrospora erecta | Leaves | Yunnan | Tsui et al. 2007 |
| Dendrospora fuca | Leaves | Yunnan | Tsui et al. 2007 |
| Dictyochaeta coffeae | Leaves | Yunnan | Tsui et al. 2007 |
| Dictyosporium alatum | Leaves | Yunnan | Tsui et al. 2007 |
| Dictyosporium atroapicis | Leaves | Yunnan | Tsui et al. 2007 |
| Dictyosporium australiensis | Leaves | Yunnan | Tsui et al. 2007 |

(Continued)
| Species | Substrata | Distribution | References |
|---------|-----------|--------------|------------|
| *Dictyosporium biseriale* D.M. Hu, L. Cai & K.D. Hyde | Submerged wood | Yunnan | Hu et al. 2010 |
| *Dictyosporium brahmuswaroopii* M.D. Mehrotra | Submerged wood | Hong Kong | Goh et al. 1998a; Tsui 1999 |
| *Dictyosporium canisporum* L. Cai & K. D. Hyde | Submerged wood | Yunnan | Cai et al. 2003a |
| *Dictyosporium digitatum* J.L. Chen, C.H. Hwang & S.S. Tzean | 1. Submerged wood | Taiwan | Chen et al. 1991 |
| 2. Twigs | 2. Zhejiang | Jiang et al. 2008 |
| 3. Submerged wood | 3. Hong Kong | Tsui et al. 2001c |
| *Dictyosporium elegans* Corda | 1. Submerged wood | 1. Hong Kong | Ho 1998 |
| 2. Submerged wood | 2. Zhejiang | Tsui and Hyde 2004; |
| 3. Submerged wood | 3. Hong Kong | Tsui et al. 2001c |
| *Dictyosporium heptasporum* (Garov.) Damon | Submerged wood | Yunnan | Cai et al. 2002; Luo et al. 2004a |
| *Dictyosporium lakefuxianensis* L. Cai, K.D. Hyde & Mckenzie | Submerged wood | Yunnan | Cai et al. 2002 |
| *Dictyosporium musae* Photica, McKenzie & K.D. Hyde | Submerged wood, Bamboo | Yunnan | Luo et al. 2004a; Yin 2003 |
| *Dictyosporium nigraoaece* Goh, W.H. Ho & K.D. Hyde | Submerged wood | Hong Kong | Goh et al. 1999 |
| *Dictyosporium polystichum* (Hohn.) Damon | Submerged wood, Grass | Yunnan | Luo et al. 2004a |
| *Dictyosporium tetraploides* L. Cai & K.D. Hyde | Submerged wood | Yunnan | Cai et al. 2003a |
| *Dictyosporium tetrasporum* L. Cai & K.D. Hyde | Submerged wood | Yunnan | Cai and Hyde 2007a |
| *Dictyosporium toruloides* (Corda) Guég | Submerged wood | Hong Kong | Goh et al. 1999; Ho 1998 |
| *Digitodesmium heptasporum* L. Cai & K.D. Hyde & Mckenzie | Submerged wood | Yunnan | Cai et al. 2003b |
| *Digitodesmium recurvum* Wongsawas, H.K. Wang, K.D. Hyde & F.C. Lin | Submerged wood | Zhejiang | Wongsawas et al. 2009a |
| *Digitodesmium heptasporum* L. Cai & K.D. Hyde | Submerged wood | Yunnan | Cai et al. 2003a |
| *Digitodesmium recurvum* W.H. Ho, K.D. Hyde & I.J. Hodgkiss | Submerged wood | Hong Kong | Ho et al. 1999a |
| *Dinemasporium strigosum* (Pers.) Sacc. | Grass | Hong Kong | Wong and Hyde 2001a |
| *Diplocladiella alta* R. Kirschner & C.-J. Chen | Submerged wood | Taiwan | Kirschner and Chen 2004 |
| *Diplocladiella scalaroides* Arnaud | Foam | 1. Hong Kong | 1. Chan et al. 2000 |
| 2. Beijing | 2. Liu et al. 1992 |
| *Drechslerella aphrobrocha* (Drechsler) M. Scholler, Hagedorn & A. Rubner | Sediment | Yunnan, Guizhou | Tsui et al. 2007 |
| *Drechslerella bembicodes* (Drechsler) M. Scholler, Hagedorn & A. Rubner | Sediment | Guizhou | Tsui et al. 2007 |
| *Drechslerella coelobrocha* (Drechsler) M. Scholler, Hagedorn & A. Rubner | Sediment, Leaves | Yunnan, Guizhou | Tsui et al. 2007 |
| *Drechslerella dactyloide* (Drechsler) M. Scholler, Hagedorn & A. Rubner | Sediment | Yunnan | Tsui et al. 2007 |
| *Elegantimyces sporidesmiopsis* Goh, K.M. Tsui & K.D. Hyde | Submerged wood | Hong Kong | Goh et al. 1998c; Tsui et al. 2000 |
| *Ellisembia adscendens* (Berk.) Subram. | Submerged wood | 1. Yunnan | 1. Cai et al. 2002; Luo et al. 2004a |
| 2. Hong Kong | 2. Goh and Hyde 1999a |
| Species                           | Type                | Location          | References                                      |
|----------------------------------|---------------------|-------------------|-------------------------------------------------|
| *Ellisembia lenonense* (M.B. Ellis) McKenzie | Submerged wood      | Hong Kong         | Tsui et al. 2000                               |
| *Ellisembia opaca* (Cooke & Harkn.) Subram. | Submerged wood      | Hong Kong         | Ho 1998; Tsui et al. 2000; Tsui and Hyde 2004   |
| *Ellisembia paravaginata* McKenzie | Submerged wood      | Hong Kong         | Tsui 1999                                       |
| *Ellisembia plovercoensis* Goh & K.D. Hyde | Submerged wood      | Hong Kong         | Goh and Hyde 1999a                             |
| *Ellisembia repentioriunda* Goh & K.D. Hyde | Submerged wood      | Hong Kong         | Wong and Hyde 2001a                             |
| *Ellisembia vaga* (Nees & T. Nees) Subram | Grass              | Yunnan            | Song and Wu 2010                               |
| *Endophragmiella dimorphospora* (Awao & Udagawa) S. Hughes | Submerged wood      | Hong Kong         | Cai and Hyde 2007a                             |
| *Endophragmiella mexicana* Mena, Heredia & Mercado | Submerged wood      | Hong Kong         | Ma et al. 2007                                 |
| *Endophragmiella occidentalis* R.F. Castañeda & W.B. Kendr. | Submerged wood      | Hong Kong         | Tsui et al. 2001a                              |
| *Endophragmiella triseptata* K.M. Tsui, Goh, K.D. Hyde & Hodgkiss | Submerged wood      | Hong Kong         | Ho 1998                                        |
| *Epicoccum nigrum* Link           | Grass               | Hong Kong         | Tsui 1999                                       |
| *Exserticlava globosa* V.Rao & de Hoog | Submerged wood      | Hong Kong         | Tsui et al. 2001a                              |
| *Flabellospora acuminata* Descala  | Foam                | Hong Kong         | Wong 2000; Wong and Hyde 2001a                  |
| *Flabellospora crassa* Alasoada  | Leaves/Twigs        | Taiwan            | Chao 2006                                      |
| *Flagellospora curvula* Ingold    | Foam                | Hong Kong         | Chan et al. 2000                               |
| *Flagellospora penicillioides* Ingold | Leaves, Foam       | Sichuan           | Au et al. 1992                                  |
| *Fusariella sarniensis* M.B. Ellis | Submerged wood      | Gansu             | Chen et al. 2011                               |
| *Fusarium oxysporum* Schltd.:Fr. | Leaves              | Hong Kong         | Au et al. 1992                                  |
| *Fusarium pseudomygmae* O’Donnell & Nirenberg | Water              | Heilongjiang       | Song and Wu 2010                               |
| *Fusarium semitectum* Berk. & Ravenel | Grass              | Hong Kong         | Wong and Hyde 2001a                             |
| *Fusarium sporotrichioides* Sherb | Water               | Heilongjiang       | Song and Wu 2010                               |
| *Geniculosporium sporochiale* K.D. Hyde & Goh | Submerged wood      | Hong Kong         | Hyde and Goh 1998                             |
| *Geotrichum candidum* Link:Léman | Leaves              | Hong Kong         | Au et al. 1992                                  |
| *Gibberella avenacea* R.J. Cook   | Water               | Heilongjiang       | Song and Wu 2010                               |
| *Gliocladium cylindrosporum* Matsush. | Submerged wood      | Hong Kong         | Au et al. 1992                                  |

(Continued)
Table 5. (Continued).

| Species                        | Substrata       | Distribution               | References                      |
|-------------------------------|-----------------|-----------------------------|---------------------------------|
| Gliocladium penicillioides    | Grass           | Hong Kong                   | Wong and Hyde 2001a             |
| Gliocladium roseum Bainier    | Leaves          | Hong Kong                   | Au et al. 1992                  |
| Gliocladium solani (Hartin)   | Submerged wood  | Hong Kong                   | Ho 1998                         |
| Gnatobryopsis simplex Corda   | Leaves          | Hong Kong                   | Au et al. 1992                  |
| Gonothyrium chlorosporium     | Submerged wood  | Hong Kong; Ho 1998; Tsui et al. 2000 |
| Haplochalaris angulosa         | Submerged wood  | Hong Kong; Ho 1998; Tsui et al. 2000 |
| Helicoma ambiens Morgan       | Submerged wood  | Hong Kong                   | Ho 1998                         |
| Helicoma sympodiopora Matsush.| Submerged wood  | Hong Kong                   | Ho 1998                         |
| Helicomyces colligatus R.T. Moore | Foam            | Hong Kong                   | Chan et al. 2000                |
| Helicomyces lilliputus R.T. Moore | Grass          | Hong Kong; Ho 1998; Tsui et al. 2000 |
| Helicomyces roseus Link        | 1. Submerged wood | 1. Hong Kong              | 1. Ho 1998; Tsui et al. 2000    |
|                               | 2. Submerged wood | 2. Yunnan                 | 2. Cai et al. 2002; Luo et al. 2004a |
| Helicomyces torquatus L.C. Lane & Shearer | Submerged wood | Hong Kong               | Chan et al. 2000; Ho 1998; Tsui et al. 2001b; Tsui and Hyde 2004; Tsui et al. 2000 |
| Helicosporemium griseum Berk. & Curt. | Submerged wood | Hong Kong                   | Tsui et al. 2001c               |
| Helicosporemium guianenses Linder | Submerged wood | Hong Kong                   | Ho 1998; Tsui et al. 2000       |
| Helicosporemium hongkongense K.M. Tsui Goh, K.D. Hyde & Hodgkins | Submerged wood | Hong Kong                   | Tsui et al. 2001b               |
| Helicosporemium lumbicoides Sacc. | Submerged wood | Hong Kong                   | Ho 1998                         |
| Helicosporemium pallidum Ces. | Submerged wood  | Hong Kong                   | Tsui et al. 2000                |
| Heliscella stellata (Ingold & Cox) Morvanova | Foam        | Beijing                     | Liu et al. 1992                 |
| Heliscus lugdunensis Saccardo & Therry | Foam        | Beijing                     | Liu et al. 1992                 |
| Heliscus submersus Hudson      | Leaves          | Beijing, Anhui              | Zhu and Yu 1992                 |
| Humicola grisea Traen          | Leaves          | Hong Kong; Ho 1998; Tsui et al. 2000 |
| Humicola insolenus Cooney & R. Emers. | Leaves      | Hong Kong                   | Ho 1998                         |
| Isthmolongispora intermedi Marvanova | Submerged wood | Hong Kong                   | Tsui et al. 2000                |
| Janetia curviapicis Goh & K.D. Hyde | Submerged wood | Hong Kong                   | Ho 1998; Tsui et al. 2000       |
| Janettia synematosa Sivan & W.H. Hsieh | Grass       | Hong Kong                   | Wong and Hyde 2001a             |
| Kameshwaromyces globosus Kamal, R.V. Verma & Morgan-Jones | Submerged wood | Hong Kong                   | Ho 1998                         |
| Kylindria ellisi (Morgan-Jones) DiCosmo, S.M. Berch & W.B. Kendr. | Submerged wood, Grass | Hong Kong                   | Ho 1998; Wong and Hyde 2001a     |
| Laurioniomyces pulcro R.F. Cañada & W.B. Kendr. | Submerged wood | Hong Kong                   | Ho 1998                         |
| Lemonniera abalamesis Sinclair & Morgan-Jones | Foam        | Beijing                     | Liu et al. 1992                 |
| Lemonniera aquatica De Wildeman | Leaves        | Sichuan                     | Yu et al. 1988                  |
| Lemonniera centrophaera Marvanova | Leaves      | Anhui                      | Zhu and Yu 1992                 |
| Lemonniera cornuta Ranzoni     | Leaves          | Beijing                     | Zhu and Yu 1992                 |
| Lemonniera filiformis Petersen | 1. Leaves      | 1. Anhui                    | 1. Zhu and Yu 1992              |
|                               | 2. Leaves/Twigs | 2. Taiwan                  | 2. Chao 2006                    |
| Lemonniera terrestris Tubaki   | Leaves          | Sichuan                     | Yu et al. 1988                  |
| Leucostoma persoontii (Nitschke) Höhn | Water       | Heilongjiang                | Song and Wu 2010                |
| Listeromyces insignd Penz.and Sacc. | Submerged wood | Hong Kong                   | Ho 1998                         |
| Species Name                  | Habitat            | Location 1 | Location 2 | Location 3                                      |
|------------------------------|--------------------|------------|------------|------------------------------------------------|
| Lophiostoma bipolare (K.D. Hyde) Liew, Aptroot & K.D. Hyde | Submerged wood     | Hong Kong  | Hyde 1995; Tsui and Hyde 2004; Tsui et al. 2000 |                                                |
| Lophiostoma ingoldianum (Shearer & K.D. Hyde) Liew, Aptroot & K.D. Hyde | Submerged wood     | Yunnan     | Luo et al. 2004a                                 |                                                |
| Lophiostoma proprietunicatum K.M. Tsui, K.D. Hyde & Hodgkiss | Submerged wood     | Hong Kong  | Tsui & Hyde 2004                                 |                                                |
| Lunulospora curvula Ingold   | Leaves             | Hong Kong  | Au et al. 1992                                   |                                                |
| Lunulospora cymbiformis Miura | Leaves             | Anhui      | Zhu and Yu 1992                                  |                                                |
| Monosporopsis multisetaulata Tsui, Goh, K.D. Hyde & I.J. Hodgkiss | Submerged wood     | Hong Kong  | Au et al. 1992                                   |                                                |
| Monochaetopsis lakefuxianensis L. Cai, R. Jeewon & K.D. Hyde | Submerged wood     | Yunnan     | Jeewon et al. 2003                               |                                                |
| Monodictys levis Hughes      | Leaves             | Hong Kong  | Goh and Hyde 1999a                               |                                                |
| Monodictys melanoceppaloides Goh & K.D. Hyde          | Submerged wood     | Hong Kong  | Wong and Hyde 2001a                               |                                                |
| Monodictys paradoxa (Corda) S. Hughes         | Grass              | Hong Kong  | Tsui et al. 2000; Wong 2000; Wong and Hyde 2001a  |                                                |
| Monodictys putredinis (Wallr) S. Hughes         | Submerged wood, Grass | Hong Kong  | Tsui et al. 2000                                 |                                                |
| Monodictys sessilis Hol.-Jech., Mercado & Mean | Submerged wood     | Hong Kong  | Tsui et al. 2000                                 |                                                |
| Monodictys striata (Petch) V.G. Rao & de Hoog | Submerged wood     | Hong Kong  | Goh and Hyde 1999a                               |                                                |
| Monotosporella rhizoidea V.G. Rao & de Hoog     | Submerged wood     | Hong Kong  | Ranghoo et al. 1999; Tsui et al. 2001b            |                                                |
| Mycocentrospora angulata (Petersen) Iqbal       | Submerged wood     | Hong Kong  | Tsui and Hyde 2004; Tsui et al. 2000              |                                                |
| Nagawia filiformis (Nawawa) Marvanová           | Submerged wood     | Hong Kong  | Zhu and Yu 1992                                  |                                                |
| Neottiosporina australiensis B. Sutton & Alcorn | Grass              | Hong Kong  | Au et al. 1992, 1997                             |                                                |
| Neottiosporina paspali (G.F. Atk.) B. Sutton & Alcorn | Grass              | Hong Kong  | Au et al. 1992, 1997                             |                                                |
| Neta lignicola Shearer         | Submerged wood     | Hong Kong  | Tsui et al. 2000                                 |                                                |
| Nigrospora state of Khuska oryzae H.J. Huds.    | Grass              | Hong Kong  | Wong and Hyde 2001a                               |                                                |
| Oidiodendron griseum Robak     | Grass              | Hong Kong  | Wong and Hyde 2001a                               |                                                |
| Paecilomyces variotii Bainier  | Leaves             | Hong Kong  | Au et al. 1992                                   |                                                |
| Penicillium aculeatum Raper & Fennell          | Water              | Heilongjiang Song and Wu 2010                     |                                                |
| Penicillium canescens Sopp     | Leaves             | Hong Kong  | Song and Wu 2010                                 |                                                |
| Penicillium crustosum Thom     | Water              | Heilongjiang Song and Wu 2010                     |                                                |
| Penicillium funiculosum Thom   | 1. Leaves          | Hong Kong  | Au et al. 1992                                   |                                                |
| Penicillium glabrum (Wehmer) Westling         | Water              | Heilongjiang Song and Wu 2010                     |                                                |
| Penicillium jancezewskii K.M. Zalessky           | Water              | Heilongjiang Song and Wu 2010                     |                                                |
Table 5. (Continued).

| Species                                          | Substrata          | Distribution | References                          |
|--------------------------------------------------|--------------------|--------------|-------------------------------------|
| *Penicillium ochrochloron* Biourge                | Water              | Heilongjiang | Song and Wu 2010                    |
| *Penicillium simplicissimum* (Oudem.)Thom         | Leaves             | Hong Kong   | Au et al. 1992                      |
| *Penicillium thomii* Maire                       | Water              | Heilongjiang | Song and Wu 2010                    |
| *Periconia atra* Corda                           | Grass              | Hong Kong   | Wong and Hyde 2001a                 |
| *Periconia byssoides* Pers. ex. Schw.             | Submerged wood     | Yunnan      | Luo et al. 2004a                    |
| *Periconia digitata* (Cooke) Sacc.                | Submerged wood     | Yunnan      | Luo et al. 2004a                    |
| *Periconia echinochloae* (Bat.) M.B. Ellis        | Grass              | Hong Kong   | Wong and Hyde 2001a                 |
| *Periconia minutissima* Corda                     | 1. Submerged wood   | 1. Yunnan   | 1. Cai et al. 2002; Luo et al. 2004b|
| *Periconia atra* Corda                           | 2. Submerged wood, Grass, | 2. Hong Kong | 2. Leung 1998; Wong 2000; Wong and  |
| *Peyronelina glomerulata* G. Arnaud              | Submerged wood     | Zhejiang    | Hyde 2001a                          |
| *Phaeoisaria clematidis* (Fuckel) S. Hughes      |                    | 1. Submerged wood | 1. Goh and Hyde 1999a; Tsui and Hyde|
| *Physalidium elegans* Mosca                      | Grass              | Hong Kong   | Wong and Hyde 2001a                 |
| *Pleurophragmium recurvatum* (Morgan)Höhn         | Submerged wood     | Hong Kong   | Tsui 1999                           |
| *Pleurophragmium simplex* (Berk. & Broome) S. Hughes | Grass              | Hong Kong   | Wong and Hyde 2001a                 |
| *Pseudosphaeria deformis* Sivan. & H.S. Chang     | Submerged wood     | Yunnan      | Cai and Hyde 2007a                  |
| *Pyramidospora fluminea* Miura & K.I. Kudo       | 1. Leaves/Twigs    | 1. Taiwan   | Chao 2006                           |
| *Ramichloridium lignicola* K.M. Tsui, Goh, K.D. Hyde & Hodgkiss | Submerged wood | Hong Kong   | Tsui et al. 2001a                   |
| *Sagenomella striatispora* W. Gams                | Leaves             | Hong Kong   | Tsui et al. 1992                    |
| *Sarcopodium cinnatum* Ehrenb.:Schlecht          | Submerged wood     | Hong Kong   | Tsui et al. 2000                    |
| *Setosynema isthmoporum* Shaw & Sutton           | Leaves/Twigs       | Taiwan      | Chao 2006                           |
| *Sporidiobolus deightonii* S. Hughes Subram.     | Leaves             | Hong Kong   | Au et al. 1992                      |
| *Sirothecium triseriale* D.M. Hu, H. Zhu, K.Q. Zhang, L. Cai & K.D. Hyde | Submerged wood | Yunnan      | Hu et al. 2007                      |
| *Spadicoides americana* C.J.K. Wang               | Submerged wood     | Zhejiang    | Wongsawas et al. 2008               |
| *Spadicoides argentae* W.H. Ho, Yamma & K.D. Hyde | Submerged wood     | Hong Kong   | Ho et al. 2002                      |
| *Spadicoides atra* (Corda) S. Hughes              | Submerged wood     | Hong Kong   | Tsui et al. 2000                    |
| *Spadicoides hodgkissa* W.H. Ho, Yamma & K.D. Hyde | Submerged wood     | Hong Kong   | Ho et al. 2002                      |
| *Spadicoides minuta* L. Cai, E. Mckenz & K.D. Hyde | Submerged wood     | Yunnan      | Cai et al. 2004                     |
| *Spadicoides obovata* (Cooke & Ellis) S. Hughes  | Submerged wood     | Hong Kong   | Tsui et al. 2000                    |
| *Spegazzinia deightonii* (S. Hughes) Subram.     | Grass              | Hong Kong   | Wong and Hyde 2001a                 |
| *Speirospis scopiformis* Kuthub. & Nawawi         | *Pinus massoniana* Lamb. | Hong Kong   | Ho 1998                            |
| *Spirophaera fliformis* Beverw.                  | Submerged wood     | Hong Kong   | Tsui and Hyde 2004; Tsui et al. 2000|
**Sporendonema pururascens** (Bonord) E.W. Mason & S. Hughes
- Leaves
- Hong Kong
- Au et al. 1992

**Sporidesmiella hyalosperma** (Corda) P.M. Kirk
- Submerged wood
- 1. Yunnan
- 2. Hong Kong
- 1. Cai et al. 2002

**Sporidesmiella incrassata** Kuthub. and Nawi
- Submerged wood
- Hong Kong
- Tsui et al. 2000

**Sporidesmiella macrarum** M.B. Ellis
- Submerged wood
- Hong Kong
- Tsui et al. 2000

**Sporidesmiopsis zhejiangensis** Wongsawas, H.K. Wang, K.D. Hyde & F.C. Lin
- Submerged wood
- Zhejiang
- Wongsawas et al. 2008

**Sporidesmium altum** (Preuss) M.B. Ellis
- Submerged wood
- Hong Kong
- Goh and Hyde 1999a

**Sporidesmium hyalospermum** (Corda) S. Hughes
- Submerged wood, Bamboo
- Yunnan
- Luo et al. 2004a

**Sporidesmium palulosum** M.B. Ellis
- Submerged wood, Grass
- Yunnan
- Luo et al. 2004a; Yin 2003

**Sporidesmium socium** M.B. Ellis
- Wood
- Hunan
- Ma et al. 2007

**Sporormiella minimoides** St. Ahmad & Cain
- Submerged wood
- Yunnan
- Luo et al. 2004a

**Sporoschisma saccardoi** E.W. Mason & S. Hughes
- Submerged wood
- 1. Hong Kong
- 2. Yunnan
- 2. Cai et al. 2002; Luo et al. 2004a

**Sporoschisma uniseptatum** Bhat & W.B. Kendr.
- Submerged wood
- Hong Kong
- Dalisay 1998; Whitton 1999

**Stachybotry parvispora** S. Hughes
- Leaves
- Hong Kong
- Au et al. 1992

**Stachybotrys kampalensis** Hansf.
- Submerged wood
- Hong Kong
- Wong and Hyde 2001a

**Taeniolella rudis** (Sacc.) S. Hughes
- Submerged wood, Grass
- Yunnan
- Tsui et al. 2000

**Tetracladium elegans** Ingold
- 1–3. Leaves
- 4. Submerged wood
- 1. Hong Kong
- 2. Sichuan
- 3. Taiwan
- 4. Yunnan
- 1. Au et al. 1992
- 2. Yu et al. 1988
- 3. Chao 2006
- 4. Yang and Ding (1986)

**Tetracladium marchalianum** De Wild.
- 1. Leaves
- 2. Leaves/Twigs
- 1. Hong Kong
- 2. Sichuan
- 1. Chan et al. 2000
- 2. Yu et al. 1988

(Continued)
| Species | Substrata | Distribution | References |
|---------|-----------|--------------|------------|
| *Tetracladium setigerum* (Grove) Ingold | 1. Foam 2. Water | 1. Hong Kong 2. Yunnan | Chan et al. 2000 2. Yang and Ding (1986) |
| *Tetranacrium gramineum* H.J. Huds. & B. Sutton | Grass | Hong Kong | Wong and Hyde 2001a |
| *Tetraploa aristata* Berkeley & Broome | 1. Leaves 2. Grass | 1. Anhui 2. Hong Kong | 1. Zhu and Yu 1992 2. Wong and Hyde 2001a |
| *Tetraploasporium ravenelii* (Cooke) S. Hughes | Grass | Hong Kong | Wong and Hyde 2001a |
| *Thozetella eflusa* B. Sutton & G.D. Cole | Submerged wood | Hong Kong | Tsui et al. 2000 |
| *Thozetella nivea* (Berk. & F. Mull.) O. Kuntze | Submerged wood | Hong Kong | Tsui and Hyde 2004 |
| *Thozeporella paludosa* (Sacc. & Fiori) Höhn | Submerged wood | 1. Hong Kong 2. Yunnan | 1. Goh and Hyde 1999b 2. Luo et al. 2004a |
| *Torula graminis* Desm. | Grass | Hong Kong | Wong and Hyde 2001a |
| *Torula herbarum* (Pers.) Link | 1. Submerged wood 2. Grass | 1. Yunnan 2. Hong Kong | 1. Cai et al. 2002; Luo et al. 2004a 2. Tsui et al. 2001c; Wong 2000; Wong and Hyde 2001a |
| *Torulomyces macrosporus* Matsush. | Grass | Hong Kong | Wong and Hyde 2001a |
| *Tricellula aquatica* webster | Foam | Beijing | Zhu and Yu 1992 |
| *Tricellula curvatis* Haskins | Pine needles | Anhui | Zhu and Yu 1992 |
| *Trichocladium lignicola* I. Schmidt | Submerged wood | Yunnan | Cai et al. 2002 |
| *Trichocladium medullare* Kohlm. & Volkm.-Kohl. | Grass | Hong Kong | Wong and Hyde 2001a |
| *Trichocladium uniseptatum* Berk. & Broome | Submerged wood | Hong Kong | Ranghoo 1998 |
| *Trichoderma album* Preuss | Water | Heilongjiang | Song and Wu 2010 |
| *Trichoderma atroviride* Bissett | Water | Heilongjiang | Song and Wu 2010 |
| *Trichoderma aureoviride* Rifai | Water | Heilongjiang | Song and Wu 2010 |
| *Trichoderma citrinoviride* Bissett | Water | Heilongjiang | Song and Wu 2010 |
| *Trichoderma glaucum* Abboott | Leaves | Hong Kong | Au et al. 1992 |
| *Trichoderma hamatum* (Bonord.) Bainier | Water | Heilongjiang | Song and Wu 2010 |
| *Trichoderma harzianum* Rifai | 1. Leaves 2. Water | 1. Hong Kong 2. Heilongjiang | 1. Au et al. 1992 2. Song and Wu 2010 |
| *Trichoderma koningii* Oudem. | Water | Heilongjiang | Song and Wu 2010 |
| *Trichoderma lignorum* (Tode) Harz | Leaves | Hong Kong | Au et al. 1992 |
| *Trichoderma piluliferum* J. Webster & Rifai | Water | Heilongjiang | Song and Wu 2010 |
| *Trichoderma viride* Pers | Water | Heilongjiang | Song and Wu 2010 |
| *Trichothecium roseum* (Pers.) Link | Grass | Hong Kong | Wong and Hyde 2001a |
| *Tricladium angulatum* Ingold | Leaves | Sichuan | 1. Yu et al. 1988 2. Beijing 3. Zhu and Yu 1992 |
| *Tricladium anomalous* Ingold | Leaves | Beijing | Zhu and Yu 1992 |
| *Tricladium attenuatum* Inqal | Leaves, Submerged wood, Foam | Hong Kong | Au et al. 1992; Tsui et al. 2000 |
| *Tricladium chaetocladium* Ingold | 1–2. Leaves 3. Leaves/Twigs | 1. Hong Kong 2. Anhui 3. Taiwan | 1. Au et al. 1992 2. Zhu and Yu 1992 3. Chao 2006 |
| *Tricladium fuscum* Nawawi | Leaves/Twigs | Taiwan | Chao 2006 |
| *Tricladium gracile* Ingold | Foam | Beijing | Liu et al. 1992 |
| Species                          | Genus/Author            | Locality/Regions       | References                          |
|---------------------------------|-------------------------|------------------------|-------------------------------------|
| *Tricladium splendens*          | Ingold                  | Beijing                | Liu et al. 1992                     |
| *Trimmatostroma betulinum*      | Corda                   | Beijing                | Au et al. 1992                       |
| *Tripospermum camelopardus*     | Ingold, Dann & McDougall| Sichuan                | Yu et al. 1988                       |
| *Tripospermum myriti*           | Corda                   | Anhui                  | Zhu & Yu 1992                        |
| *Tripospermum porosporiferum*   | Matsush.                | Hong Kong              | Chan et al. 2000                     |
| *Triposperma aphanopaga*        | Drechsler               | Yunnan                 | Tsi et al. 2007                      |
| *Tripospermum elegans*          | Corda                   | Hong Kong              | Tsi et al. 2000                      |
| *Triscelophorous acuminatus*    | Nawawi                  | Foam                   | Chan et al. 2000                     |
| *Vananripa mengensis*           | D. M. Hu, L. Cai & K. D. Hyde | Submerged wood       | Hu et al. 2010                        |
| *Varicosporium delictatum*      | Ingold                  | Leaves                 | Au et al. 1992                       |
| *Varicosporium elodeae*         | kegel                   | Foam                   | Li et al. 1992                       |
| *Varicosporium giganteum*       | Crane                   | Leaves                 | Zhu & Yu 1992                        |
| *Virgariella atrata*            | S. Hughes               | Submerged wood         | Tsi 1999                             |
| *Volucrispora aurantiaca*       | Haskins                 | Submerged wood         | Hong Kong                            |
| *Volucrispora ornithomorpha*    | (Trotter) Haskins       | Foam                   | Au et al. 1992                       |
| *Veronaea oblongispora*         | Morgan-Jones            | Leaves                 | Li et al. 1992                       |
| *Verticillium atro-album*       | Reinke & Berthold       | Submerged wood         | Zhu & Yu 1992                        |
| *Xylomyces chlamydosporus*      | Goos, R. D. Brooks & Lamore | Submerged wood       | Tsui et al. 2000                     |
| *Xylomyces elegans*             | Goh, W. H. Ho, K. D. Hyde & K. M. Tsui | Submerged wood   | Tsui et al. 1998; Ho 1998; Tsi et al. 2001d |
| *Xylomyces giganteus*           | Goh, W. H. Ho, K. D. Hyde & K. M. Tsui | Twigs             | Jiang et al. 2008                    |
| *Xylomyces punctatus*           | Goh, W. H. Ho, K. D. Hyde & K. M. Tsui | Submerged wood   | Ho et al. 1997a                      |
| *Xylomyces pusillus*            | Goh, W. H. Ho, K. D. Hyde & K. M. Tsui | Submerged wood   | Goh et al. 1997a                     |
| *Yinmingella mitriformis*       | Goh, K. M. Tsui & K. D. Hyde | Submerged wood       | Cai et al. 2002                      |
| *Zanclospora brevispora*        | S. Hughes & W. B. Kendr. | Submerged wood         | Goh et al. 1998d                     |

**Freshwater chytridiomycetes**

| Species                          | Genus/Author            | Locality/Regions       | References                          |
|---------------------------------|-------------------------|------------------------|-------------------------------------|
| *Rhizophyllum pollinis-pini*    | (A. Braun) Zopf         | 1. Water samples       | Yang and Ding (1986)                 |
|                                 |                         | 2. Pollen grains       | Shen & Xiang (1948)                  |

(Continued)
Table 5. (Continued).

| Species | Substrata | Distribution | References |
|---------|-----------|--------------|------------|
| **Blyttionyces spinulosus** (A. Blytt) A.F. Bartsch | Algae | Heibei, Yunnan | Shen and Xiang 1948 |
| **Chytridium olla** A. Braun | Algae | Heibei, Sichuan, Yunnan | Shen and Xiang 1948 |
| **Dangeardia mamillata** Schröd. | Algae | Northeast China | Tai (1979) |
| **Entophlyctis bulligera** (Zopf) A. Fisch. | Algae | Yunnan | Shen and Xiang (1948) |
| **Harpochytrium hedenii** Wille | Algae | Sichuan, Tibet | Tai (1979); Wille 1900 |
| **Harpochytrium intermediate** G.F. Atk. | Algae | Sichuan | Tai (1979) |
| **Olpidium endogenus** (Braun) Schrot | Algae | Heilongjiang | Skvortzow 1927; Tai (1979) |
| **Olpidium entophyllum** (Braun) Rabenh. | Algae | Yunnan, Heilongjiang | Shen and Xiang (1948); Skvortzow 1927 |
| **Olpidium hantzschiiae** Skvortsov | Algae | Heilongjiang | Skvortzow 1927; Tai (1979) |
| **Olpidium mougeotia** Skvortsov | Algae | Heilongjiang | Skvortzow 1927; Tai (1979) |
| **Olpidium spiragyræa** Skvortsov | Algae | Heilongjiang | Skvortzow 1927; Tai (1979) |
| **Polyphagus euglenæ** (Bail) J. Schröt. | Algae | Heilongjiang | Skvortzow 1927; Tai (1979) |
| **Rhizophyllum hormidii** Skvortsov | Algae | Heilongjiang | Skvortzow 1927; Tai (1979) |
| **Rhizophyllum minutum** G.F. Atk. | Algae | Sichuan | Tai (1979) |
| **Rhizophyllum parasiticum** S.C. Shen & Siang | Algae | Yunnan | Shen and Xiang (1948) |
| **Rhizophyllum sphaerocarpum** (Zopf) A. Fisch. | Algae | Heilongjiang | Skvortzow 1927; Tai (1979) |
| **Snychytrium spiragyræa** (Skvortsov) Karling | Algae | Heilongjiang, Fujian | Skvortzow 1927; Tai (1979) |
| **Monoblepharis polymorpha** Cornu | Fruit in water | Yunnan | Shen and Xiang (1948) |
| **Cladophyrella taianum** S.C. Shen & Siang | Grass | Yunnan | Shen and Xiang (1948) |
| **Diplophylletis intestina** (Schenk) J. Schröt. | Not recorded | Yunnan | Shen and Xiang (1948) |
| **Nowakowskiella elegans** (Nowak.) J. Schröt. | Not recorded | Yunnan | Shen and Xiang (1948) |
| **Rhizophlyctis rosea** (de Bary & Woronin) A. Fisch. | Algae | Heilongjiang | Shen and Xiang (1948) |
| **Olpidium luxurians** (Tom.) Fischer | Algae | Heilongjiang | Skvortzow 1927; Tai (1979) |
| **Gonapodya prolifera** Thaxt. | Wood | Yunnan | Shen and Xiang (1948) |

**Freshwater zygomycetes**

| Species | Substrata | Distribution | References |
|---------|-----------|--------------|------------|
| **Caudomyces japonicus** Lichtw., Kobayasi & Indoh | Freshwater insects | Shaanxi | Strongman and Xu 2006 |
| **Gauthieromyces indicus** J.K. Misra & V.K. Tiwari | Freshwater insects | Shaanxi | Strongman et al. 2010 |
| **Gloetia centroptilæ** M. Gauthier | Freshwater insects | Shaanxi | Strongman et al. 2010 |
| **Helicostylum elegans** Corda | Water | Heilongjiang | Song and Wu 2010 |
| **Legieromyces grandis** Juan Wang, Strongman & S.Q. Xu | Freshwater insects | Shaanxi | Strongman et al. 2010 |
| **Legieromyces ramosus** (L. Léger & M. Gauthier) Pouzar | Freshwater insects | Shaanxi | Strongman et al. 2010 |
| **Legieromyces similis** Strongman, Juan Wang & S.Q. Xu | Freshwater insects | Shaanxi | Strongman et al. 2010 |
| **Mucor hiemalis** Wehmer | Water | Heilongjiang | Song and Wu 2010 |
| **Mucor racemosus** Fresen. | Leaves | Hong Kong | Au et al. 1992 |
| **Mucor viride** L. | Water | Heilongjiang | Song and Wu 2010 |
**Mycology**

**Rhizopus oryzae** Went & Prins. Geerl

*Sinochiridium chironomidalum* Juan Wang, S.Q. Xu & Strongman

*Smittium chinense* Strongman & S.Q. Xu

*Smittium hecatei* L.G. Valle & Santam.

*Smittium nasiatis* Strongman & S.Q. Xu

*Smittium nodifixum* Strongman & S.Q. Xu

*Smittium rupestre* Lichtw.

*Smittium shaanxiense* Juan Wang, Strongman & S.Q. Xu

*Stachylina gravicaudata* Siri, M.M. White & Lichtw.

*Stachylina penetralis* Lichtw.

*Stachylina tianensis* Juan Wang, S.Q. Xu & Strongman

**Freshwater oomycetes**

*Achlya americana* Humphrey

*Achlya cambria* (Trow) W.R. Johnson

*Achlya debaryana* Humphrey

*Achlya flagellata* Coker

*Achlya hypogyna* Coker & Pemberton

*Achlya klebsiana* Pieters

*Achlya oblongata* de Bary

*Achlya oryzae* S. Ito & Nagai

*Achlya polyandra* Hildebr.

*Achlya prolifera* Nees

*Achlya proliferoides* Coker

*Achlya racemosa* Hildebr.

*Aphanomyces cladogamus* Drechsler

*Aphanomyces cochlioides* Drechsler

*Aphanomyces gordjevii* Skvortsov

*Aphanomyces laevis* de Bary

*Aphanomyces parasiticus* Coker

*Aphanomyces scaber* de Bary

*Aphanomyopsis entophyta* (Pringsh.) M.W. Dick

*Apodachlya brachynema* (Hildebr.) Pringsh.

*Apodachlya pirifera* Zopf

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**Water**

**Heilongjiang**

Song and Wu 2010

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**Freshwater insects**

**Xinjiang**

Wang et al. 2010

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**Freshwater insects**

**Shaanxi**

Strongman and Xu 2006

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**Freshwater insects**

**Xinjiang**

Wang et al. 2010

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**Freshwater insects**

**Shaanxi**

Strongman et al. 2010

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**Freshwater insects**

**Shaanxi**

Strongman et al. 2010

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**Freshwater insects**

**Xinjiang**

Wang et al. 2010

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1. Water

2. Hempseed baits

3. Rice

4. Dead insect

5. Rice

6. Rice

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1. Beijing

2. Hebei, Hubei

3. Liaoning

4. Sichuan

5. Sichuan

6. Liaoning, Taiwan

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1. Rice

2. Water

3. Rice

4. Rice

5. Rice

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1. Water

2. Flies in water

3. Rice

4. Water

5. Rice

6. Water

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1. Water

2. Beijng

3. Liaoning

4. Sichuan

5. Liaoning

6. Sichuan

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1. Rice

2. Water

3. Rice

4. Water

5. Rice

6. Rice

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1. Plant

2. Termite larvae corpse baits

3. Wood

4. Rice stem

5. Algae

6. Oomycetes

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1. Beijing

2. Hebei, Zhejiang, Yunnan

3. Hebei

4. Hebei, Zhejiang, Yunnan

5. Hebei

6. Hebei, Zhejiang, Yunnan

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1. Yu and Liang 1983

2. Shen and Xiang (1948)

3. Song and Zhang 1983

4. Teng 1963

5. Teng 1963

6. Song and Zhang 1983; Wei 1957

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1. Yu and Liang 1983

2. Shen and Xiang (1948)

3. Song and Zhang 1983

4. Yu and Liang 1983

5. Yu and Liang 1983

6. Tai (1979)

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1. Yu and Liang 1983

2. Shen and Xiang (1948)

3. Shen and Xiang (1948)

4. Shen and Xiang (1948)

5. Shen and Xiang (1948)

6. Shen and Xiang (1948)

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(Continued)
| Species                                | Substrata                      | Distribution        | References          |
|----------------------------------------|--------------------------------|---------------------|---------------------|
| *Brevilegnia subclavata* Couch         | Wet soil                       | Beijing             | Yu and Liang 1983   |
| *Calyptralegnia ripariensis* Höhnk     | Wet soil                       | Beijing             | Yu and Liang 1983   |
| *Dictyuchus monosporus* Leitg.         | 1. Wet soil; 2. Soil, Rotting rice, wood 3. Water | 1. Beijing 2. Hebei 3. Guangdong, Yunnan | 1. Yu and Liang 1983; 2. Tai (1979); 3. Yang and Ding (1986) |
| *Dictyuchus polysporus* Lindst.        | Rice                           | Liaoning            | Song and Zhang 1983 |
| *Dictyuchus sterile* Coker             | Rice                           | Liaoning            | Song and Zhang 1983 |
| *Lagenidium eneans* Zopf               | Algae                          | Heilongjiang        | Ito, 1936; Skvortzow, 1925|
| *Leptolegnia subteranea* Coker and Harvey | Water                        | Yunnan              | Yang and Ding (1986);
| *Leptomitus lacteus* C. Agardh         | Not record                     | Heilongjiang        | Tai (1979)          |
| *Mycotrium megasotum* De Wild.         | Algae                          | Heilongjiang        | Ito, 1936; Skvortzow, 1925 |
| *Mycotrium navenhorsti* (Zopf) M.W. Dick | Algae                        | Yunnan              | Shen and Xiang (1948) |
| *Olpidiopsis aphanomycis* Cornu         | Oomycetes                      | Hebei               | Shen and Xiang (1948) |
| *Olpidiopsis fusiformis* Cornu          | Oomycetes                      | Taiwan, Sichuan, Yunnan | Ito, 1936; Teng 1963; Shen and Xiang (1948) |
| *Olpidiopsis saprolegniae* Cornu        | Oomycetes                      | Hebei, Yunnan, Taiwan | Shen and Xiang (1948); Ito, 1936 |
| *Olpidiopsis schenkiana*                | Algae                          | Yunnan              | Shen and Xiang (1948) |
| *Peronospora aquatica* Gäum.           | Plant                          | Sichuan             | Tai (1979)          |
| *Phytophthora gonapodyides* (H.E. Petersen) Buisman | Wood, fruit                  | Hebei               | Shen and Xiang (1948) |
| *Pythiogeton autossytyum* Drechsler     | Rice                           | Taiwan              | Yu et al. 1998      |
| *Pythiogeton ramosum* Minden            | Wood, grass, rice, fruit       | Sichuan, Yunnan, Beijing, Taiwan | Yu et al. 1998 |
| *Pythiogeton uniforme* A. Lund          | Soil                           | Taiwan              | Yu et al. 1998      |
| *Pythium aquatile* Hoehnk               | Wood                           | Beijing             | Ma & Yu, 1988; Yu et al. 1998 |
| *Pythium carolinum* Matthews           | Soil                           | Beijing             | Yu et al. 1998      |
| *Pythium dissotocum* Drechsler          | 1. Wood 2. Soil                | 1. Beijing, Jiangsu 2. Shaanxi, Jiangsu, Zhejiang, Guangdong, Guizhou | 1. Ma & Yu, 1988; 2. Tai (1979); Yu et al. 1998 |
| *Pythium elongatum* Matthews           | Soil, rice, lotus              | Beijing, Taiwan, Shaanxi | Yu et al. 1998 |
| *Pythium graminicola* Subramanian       | Wheat, soil                    | Beijing             | Yu et al. 1998      |
| *Pythium guiyangense* X.Q. Su           | Mosquito larvae                | Guizhou             | Su 2006             |
| *Pythium hypoandrum* Yu & Y. L. Wang   | Soil                           | Yunnan              | Yu et al. 1998      |
| *Pythium intermedium* de Bary            | Wood                           | Beijing, Hubei      | Ma & Yu, 1988; Yu et al. 1998 |
Pythium middletonii Sparrow
1. Wood
2. Termite corpses, Soil
1. Jiangsu
2. Yunnan, Guangdong
1. Ma & Yu, 1988
2. Tai (1979); Yu et al. 1998
Pythium myriotylum Drechsler
1. Wood
1. Beijing
Ma & Yu, 1988; Yu et al. 1998
Pythium periplocum Drechsler
2. Termite corpses, Soil
2. Yunnan, Guangdong
2. Tai (1979); Yu et al. 1998
2. Hebei, Yunnan
2. Tai (1979); Yu et al. 1998
2. Hebei
2. Ma & Yu, 1988
Pythium rostratum Butler
1. Water
1. Beijing
1. Ma & Yu, 1988
2. Hebei
2. Tai (1979)
Pythium torulosum Coker & Patterson
1. Water
1. Jiangsu
1. Ma & Yu, 1988
2–3. Soil
2. Heilongjiang, Sichuan, Guangdong, Guizhou, Yunnan
2. Tai (1979)
2. Hubei
3. Yu et al. 1998
Resticularia oedogonii Skvortsov
1. Algae
1. Heilongjiang
Ito, 1936; Skvortzow, 1925
2. Hebei, Yunnan
2. Shen and Xiang (1948)
Rhipidium thaxteri Minden
1. Fruit
1. Hebei
Shen and Xiang (1948)
Rozellopsis septigena Karling
1. Oomycetes
1. Sichuan
Tai (1979)
2. Yunnan
2. Shen and Xiang (1948)
2. Yang and Ding (1986)
Saprolegnia delica Coker
1. Dead flies
1. Sichuan
Tai (1979)
2. Yunnan
2. Ti
3. Hubei
3. Yu et al. 1998
Saprolegnia mixla de Bary
1. Dead flies and Hempseed
1. Sichuan
Tai (1979)
2. Yunnan
2. Ti (1979)
3. Yunnan
3. Shen and Xiang (1948)
Saprolegnia monoica Pringsh.
1. Dead flies and termite
1. Sichuan, Yunnan
Shen and Xiang (1948)
Marine ascomycetes
Aniptodera chesapeakeensis Shearer & M.A. Mill.
1. Drift wood
1. Shandong
1. Diao et al., 2009
2. Acanthus ilicifolius culms, Mangrove wood, Phragmites australis
2. Hong Kong
2. Jones and Vrijmoed, 2003
Aniptodera haispora Vrijmoed, K.D. Hyde & E.B.G. Jones
Mangrove
Hong Kong
Vrijmoed et al., 1994a; Abdel-Wahab, 2000
Aniptodera haispora Vrijmoed, K.D. Hyde & E.B.G. Jones
Acanthus ilicifolius culms, Hong Kong
Jones and Vrijmoed, 2003
Mangrove wood
Aniptodera lignatilis K.D. Hyde
Mangrove wood
Hong Kong
Jones and Vrijmoed, 2003
Aniptodera lignicola K.D. Hyde, W.H. Ho & K.M. Tsui
Mangrove wood
Hong Kong
Jones and Vrijmoed, 2003
Aniptodera limnetica Shearer
Mangrove wood
Hong Kong
Jones and Vrijmoed, 2003
Aniptodera longispora K.D. Hyde
Mangrove wood
Hong Kong
Jones and Vrijmoed, 2003
(Continued)
| Species | Substrata | Distribution | References |
|---------|-----------|--------------|------------|
| Aniptodera mangrovei | Mangrove wood | Hong Kong | Jones and Vrijmoed, 2003 |
| Aniptodera salsuginosa | Mangrove wood | Hong Kong | Jones and Vrijmoed, 2003 |
| Annullatascus triseptatus | Mangrove wood | Hong Kong | Jones and Vrijmoed, 2003 |
| Antennospora salsuginosa | Mangrove wood | Hong Kong | Jones and Vrijmoed, 2003 |
| Antennospora salina | Mangrove wood | Hong Kong | Jones and Vrijmoed, 2003 |
| Apiospora montagnei | Mangrove wood | Hong Kong | Jones and Vrijmoed, 2003 |
| Arenariomyces trifurcata | Drift wood | Shandong | 1. Jin et al., 2004 |
| Ascocraetera manglicola | Mangrove wood | Hong Kong | Jones and Vrijmoed, 2003 |
| Bactrodiesmium microleucurum | Bamboo | Hong Kong | Leung, 1998 |
| Bathyascus grandisporus | Mangrove wood | Hong Kong | Jones and Vrijmoed, 2003 |
| Bathyascus vermisporus | Mangrove wood | Hong Kong | Jones and Vrijmoed, 2003 |
| Belizeana lignicola | Mangrove wood | Hong Kong | Jones and Vrijmoed, 2003 |
| Belizeana tuberculata | Mangrove wood | Hong Kong | Jones and Vrijmoed, 2003 |
| Buergenerula spartinae | Drift wood | Shandong | Sun et al., 2008b |
| Catabotrys deciduum | Mangrove wood | Hong Kong | Jones and Vrijmoed, 2003 |
| Ceriosporopsis halina | Sand; wood | Hong Kong | Vrijmoed et al., 1982a, 1986a; Leung, 1998; Sun et al., 2008a |
| Chaetomium globosum | Drift wood; | Shandong | 1. Jin et al., 2004; |
| Cirrenalia macrocephala (Kohlm.) Meyers and R.T. Moore | 1. Drift wood; 2. Phragmites australis | 1. Hong Kong 2. | 2. Jones and Vrijmoed, 2003 |
| Corollospora cinnamomea | Sand | Hong Kong | Jones and Vrijmoed, 2003 |
| Corollospora gracilis | Sand | Hong Kong | Jones and Vrijmoed, 2003 |
| Corollospora maritima | Drift wood | Shandong | 1. Jin et al., 2004; |
| Corollospora pulchella | Mangrove wood | Sand; Drift attached wood | 2. Jones and Vrijmoed, 2003 |
| Cryptosalva mangrovei | Mangrove wood | Hong Kong | Jones and Vrijmoed, 2003 |
| Dactylospora halotethra (Kohlm. & E. Kohlm) Hafellner | Mangrove wood | Hong Kong | Jones and Vrijmoed, 2003 |
| Dactylospora mangrovei | Mangrove wood | Hong Kong | Jones and Vrijmoed, 2003 |
| Diaporthe salsuginosa | Mangrove wood | Hong Kong | Jones and Vrijmoed, 2003 |
| Didymosphaeria lignomaris | Mangrove wood | Hong Kong | Jones and Vrijmoed, 2003 |
| Dryosphaera navigans | Drift wood | Shandong | Jin et al., 2005 |
| Eutypa bathurstensis | Mangrove wood | Hong Kong | Jones and Vrijmoed, 2003 |
| Gnomonia salina | Mangrove wood | Hong Kong | Jones and Vrijmoed, 2003 |
| Haematonectria haematococca (Berk. & Broome) Samuela & Nirenberg | Phragmites australis, Drift and attached wood | Hong Kong | Jones and Vrijmoed, 2003 |
| Halonectria milfordensis | Mangrove wood, Drift and attached wood | Hong Kong | Jones and Vrijmoed, 2003 |
| Species                                      | Support                   | Location        | Author(s), Year |
|----------------------------------------------|---------------------------|-----------------|-----------------|
| *Halorosellinia oceanica* (Schatz)           | Whalley, Jones, Hyde & Laessoe | Mangrove wood, Drift and attached wood | Hong Kong, Jones and Vrijmoed, 2003 |
| *Halosarpehia abonnis* Kohlm.                |                           | Mangrove wood   | Hong Kong, Jones and Vrijmoed, 2003 |
| *Halosarpehia cinclautula* Shearer & Crane   |                           | *Acanthus ilicifolius* culms. | Hong Kong, Jones and Vrijmoed, 2003 |
| *Halosarpehia fibrosa* Kohlm. & E. Kohlm.    |                           | Mangrove wood, Drift and attached wood | Hong Kong, Jones and Vrijmoed, 2003 |
| *Halosarpehia hamata* (Hohnk) Kohlm.         |                           | *Acanthus ilicifolius* culms, *Phragmites australis* | Hong Kong, Jones and Vrijmoed, 2003 |
| *Halosarpehia kandeliae* Abdel-Wahab & Jones |                           | Mangrove wood   | Hong Kong, Jones and Vrijmoed, 2003 |
| *Halosarpehia marina* (Cribb & J.W. Cribb) Kohlm. |                           | Mangrove wood   | Hong Kong, Jones and Vrijmoed, 2003 |
| *Halosarpehia minuta* Leong                  |                           | Mangrove wood   | Hong Kong, Jones and Vrijmoed, 2003 |
| *Halosarpehia phragmiticola* O.K. Poon & K.D. Hyde |                           | *Phragmites australis* | Hong Kong, Jones and Vrijmoed, 2003 |
| *Halosarpehia ratnagiriensis* Patil & Borse  |                           | Mangrove wood   | Hong Kong, Jones and Vrijmoed, 2003 |
| *Halosarpehia retorquens* Shearer & Crane    |                           | *Acanthus ilicifolius* culms, *Phragmites australis* | Hong Kong, Jones and Vrijmoed, 2003 |
| *Halosarpehia trullifera* (Kohlm.) Jones & Moss & Cuomo | Mangrove wood, Drift and attached wood | Hong Kong, Jones and Vrijmoed, 2003 |
| *Halosarpehia unicaudata* (E.B.G. Jones & Lecampion Alsumard) R.G. Johnson, E.B.G. Jones & S.T. Moss | *Phragmites australis* | Hong Kong, Jones and Vrijmoed, 2003 |
| *Halosarpehia visticula* (Kohlm.) Shearer & Crane | Mangrove wood, *Kandelia kandel* Droppers | Hong Kong, Jones and Vrijmoed, 2003 |
| *Halosarpehia viscosa* (I. Schmidt) Shearer & Crane | *Acanthus ilicifolius* culms, | Mangrove wood | Hong Kong, Jones and Vrijmoed, 2003 |
| *Halosphaeriotis mediaoergera* (A.B. Cribb & J.W. Cribb) T.W. Johnson | Drift wood | Shandong, Sun et al., 2008a | Hong Kong, Jones and Vrijmoed, 2003 |
| *Helicascus kanaloanus* Kohlm.                |                           | Mangrove wood   | Hong Kong, Jones and Vrijmoed, 2003 |
| *Hypophloeda rhizophorae* K.D. Hyde & Jones  |                           | Mangrove wood, Droppers of *Kandelia kandel* | Hong Kong, Jones and Vrijmoed, 2003 |
| *Hypoxylon oceranicum* Bull.                 |                           | Mangrove wood   | Pointing et al., 1999 |
| *Hysterium angustatum* Alth. & Schwein       |                           | Mangrove wood, Droppers of *Kandelia kandel* | Hong Kong, Jones and Vrijmoed, 2003 |
| *Kallichroma glabrum* (Kohlm. & E. Kohlm) Kohlm. & Volkman-Kohlm. | Mangrove wood | Hong Kong, Jones and Vrijmoed, 2003 |
| *Kallichroma tethys* (Kohlm. & E. Kohlm.) Kohlm. & Volkman-Kohlm. | Mangrove wood | Hong Kong, Jones and Vrijmoed, 2003 |
| *Kirschsteiniothelia maritima* (Linder) D. Hawks. | Mangrove wood | Hong Kong, Jones and Vrijmoed, 2003 |
| *Lanceispora amphibia* Nakagiri, I. Okane, Tad. Ito & Katumoto | Mangrove leaves | Hong Kong, Jones and Vrijmoed, 2003 |
| *Leptosphaeria australiensis* (Cribb & J.W. Cribb) G.C. Hughes | bamboo, mangrove | Hong Kong, Vrijmoed et al., 1994a,b, Leung, 1998 |
| *Leptosphaeria avicenniae* Kohlm. & E. Kohlm. | Mangrove wood | Hong Kong, Jones and Vrijmoed, 2003 |
| *Leptosphaeria obtione* (P. Crouan and H. Crouan) Sacc | Mangrove wood | Hong Kong, Vrijmoed et al., 1982a,b |
| *Leptosphaeria peruviana* Spec.               |                           | Mangrove wood   | Hong Kong, Jones and Vrijmoed, 2003 |

(Continued)
| Species | Substrata | Distribution | References |
|---------|-----------|--------------|------------|
| Leptosphaerulina mangrovei Inderb. & E.B.G. Jones | Acanthus ilicifolius culms; straw, bamboo, drift wood; mangrove; drift wood | Hong Kong; Shandong | Jones and Vrijmoed, 2003 |
| Lignincola laevis Höhnk | | | |
| Lignincola longirostris (Cribb & J.W. Cribb) Kohlm. | Mangrove wood | Hong Kong | Jones and Vrijmoed, 2003 |
| Lignincola tropica Kohlm. | Mangrove wood | Hong Kong | Jones and Vrijmoed, 2003 |
| Lophiostoma mangrovei Kohlm. & Vittal | Mangrove wood | Hong Kong | Jones and Vrijmoed, 2003 |
| Lulworthia grandispora Meyers | Mangrove wood, Drift and attached wood | Hong Kong | Jones and Vrijmoed, 2003 |
| Marinospaera mangrovei K.D. Hyde | Mangrove wood | Hong Kong | Jones and Vrijmoed, 2003 |
| Massarina armatispora K.D. Hyde, Vrijmoed, Chinnaraj & E.B.G. Jones | Mangrove wood | Hong Kong | Jones and Vrijmoed, 2003 |
| Massarina phragmiticola O.K. Poon & K.D. Hyde | Phragmites australis | Hong Kong | Jones and Vrijmoed, 2003 |
| Massarina ramunculicola K.D. Hyde | Mangrove wood | Hong Kong | Jones and Vrijmoed, 2003 |
| Massarina thalassiae Kohlm. & Volkm.-Kohlm. | Phragmites australis, Mangrove wood | Hong Kong | Jones and Vrijmoed, 2003 |
| Massarina velatospora K.D. Hyde & Borse | Mangrove wood | Hong Kong | Jones and Vrijmoed, 2003 |
| Melaspidea magrovi Vrijmoed, K.D. Hyde & E.B.G. Jones | Mangrove wood | Hong Kong | Jones and Vrijmoed, 2003 |
| Monosporascus cannonballus Pollack & Uecker | Drift wood | Shandong | Jian and Huang, 2009 |
| Nais glitra J.L. Crane & Shearer | Mangrove wood | Hong Kong | Jones and Vrijmoed, 2003 |
| Nais inornata Kohlm. | 1. Drift wood; 2. Mangrove wood, Drift and attached wood | Shandong; Hong Kong | 1. Diao et al., 2009; 1. Jones and Vrijmoed, 2003 |
| Natantispora retorquens (C.A. Shearer & J.L. Crane) J. Campb., J.L. Anderson & C.A. Shearer | Drift wood | Shandong | Diao et al., 2009 |
| Nemania mangrovei | Mangrove wood | Hong Kong | Jones and Vrijmoed, 2003 |
| Paralomyces lentiferus Kohlm. | Mangrove wood | Hong Kong | Jones and Vrijmoed, 2003 |
| Paraphaeosphaeria schoenoplecti M.K.M. Wong, Goh & K.D. Hyde | Schoenoplectus litoralis culms | Hong Kong | Jones and Vrijmoed, 2003 |
| Passeriniella obiones (P. Crouan & H. Crouan) K.D. Hyde & Mouzouras | 1. straw; 2. Acanthus ilicifolius culms, Mangrove wood, Phragmites australis | 1. Shandong; 2. Hong Kong | 1. Yang et al., 2009; 2. Jones and Vrijmoed, 2003 |
| Petriella setifera (Schm.) Curzi | Mangrove wood | Hong Kong | Jones and Vrijmoed, 2003 |
| Petriellidium ellipsoidum Arx & Fassat. | Drift wood | Hong Kong | Vrijmoed et al., 1982a,b, 1986a,b, 1994a,b; Vrijmoed, 1986; Sadaba et al., 1995; Leung, 1998; Poon & Hyde, 1998a,b; Jones, 2000; 刁立功等, 2009 |
| Phomatospora kandelae | Mangrove wood | Hong Kong | Jones and Vrijmoed, 2003 |
| Phomatospora phragmiticola O.K. Poon & K.D. Hyde | Phragmites australis | Hong Kong | Jones and Vrijmoed, 2003 |
| Phragmitensis eltipsoideae M.K.M. Wong, O.K. Poon & K.D. Hyde | Phragmites australis | Hong Kong | Jones and Vrijmoed, 2003 |
| Phragmitensis marina M.K.M. Wong, O.K. Poon & K.D. Hyde | Drift wood | Shandong | Yang et al., 2009 |
| Pleospora betae Björkl. | Drift wood | Shandong | Yang et al., 2009 |
| Pleospora pelvetiae G.K. Sutherl. | | | |
Pleospora spartinae (J. Webster & M.T. Lucas) Apinis & Chesters 1. Drif wood 1. Shandong 1. Yang et al., 2009
   2. Acanthus ilicifolius culms 2. Hong Kong 2. Jones and Vrijmoed, 2003
Pleospora vitalbae (De Not.) Berl. Drif wood Shandong Yang et al., 2009
Pseudohalonectria falcata Shearer Mangrove wood Hong Kong Jones and Vrijmoed, 2003
Quintaria lignicola (Kohlm. & Volkm.-Kohlm.) Kohlm. Mangrove wood Hong Kong Jones and Vrijmoed, 2003
Remispora quadrirēmis (Hohnk) Kohlm. Mangrove wood, Drift and attached wood Hong Kong Jones and Vrijmoed, 2003
Saccardoëlla mangrovei K.D. Hyde Mangrove wood, Drift and attached wood Hong Kong Jones and Vrijmoed, 2003
Saccardoëlla marinospora K.D. Hyde Mangrove wood, Drift and attached wood Hong Kong Jones and Vrijmoed, 2003
Savoryella lignicola E.B.G. Jones & R.A. Eaton Mangrove wood, Drift and attached wood Hong Kong Jones and Vrijmoed, 2003
Savoryella paucispora (Cribb & J. Cribb) Jorgen Koch Mangrove wood, Drift and attached wood Hong Kong Jones and Vrijmoed, 2003
Swampomyces armeniacus Kohlm. & Volkm.-Kohlm. Mangrove wood, Drift and attached wood Hong Kong Jones and Vrijmoed, 2003
Swampomyces clavaïspora Abdel-Wahab, El-Sharouny & E.B.G. Jones Mangrove wood, Drift and attached wood Hong Kong Jones and Vrijmoed, 2003
Tetraploa aristata Berk. & Broome Mangrove wood, Drift and attached wood Hong Kong Jones and Vrijmoed, 2003
Tirispora unicaudata E.B.G. Jones & Vrijmoed Acanthus ilicifolius culms, Mangrove wood, Phragmites australis Hong Kong Jones and Vrijmoed, 2003
Torpedospora radiata Meyers Drif wood, Drif bamboo, wood Hong Kong; Shandong Vrijmoed et al., 1982a,b; Leung, 1998; Jin et al., 2005
Torula herbarum (Pers.) Link Drif wood Shandong Sun et al., 2008a
Trematosphaerula lineolatispora K.D. Hyde Mangrove wood Shandong Jones and Vrijmoed, 2003
Trichocladium achrsporum Meyers & R.T. Moore) M. Dixon ex Shearer & H.L. Crane Drif wood Shandong Jin et al., 2004
Verruculina enalia (Kohlm. & E. Kohlm.) Kohlm. & Volkm.-Kohlm. Mangrove wood, Phragmites australis, Drift and attached wood Hong Kong Jones and Vrijmoed, 2003
Zalerion maritimum (Linder) Anastasiou Drif wood Shandong Sun et al., 2008a
Zalerion varium Anastasiou Phragmites australis Shandong Sun et al., 2008a
Zopfella latipes (Lundq.) Malloch & Cain Mangrove wood Hong Kong Jones and Vrijmoed, 2003
Marine basidiomycetes
Calathella mangrovei E.G.B. Jones & Agerer Mangrove wood Hong Kong Jones and Vrijmoed, 2003
Halocyphina villosa Kohlm. & E. Kohlm. Mangrove wood Hong Kong Jones and Vrijmoed, 2003
Nia vibrissa R.T. Moore & S. P. Meyers Drif wood Shandong Jin et al., 2004
Physalacria maipoensis Inderb. & Desjardin Acanthus ilicifolius culms Hong Kong Jones and Vrijmoed, 2003

(Continued)
| Species | Substrata | Distribution | References |
|---------|-----------|--------------|------------|
| **Marine Hyphomycetes** | | | |
| *Alternaria alternata* (Fr.) Keissel | *Acanthus ilicifolius* culms, *Phragmites australis*, *Schoenoplectus littoralis* culms | Hong Kong | Jones and Vrijmoed, 2003 |
| *Alternaria maritima* G.K. Sutherl. | 1. Drift wood | 1. Shandong | 1. Jin et al., 2004 |
| | 2. *Acanthus ilicifolius* culms, Drift and attached wood | 2. Hong Kong | 2. Jones and Vrijmoed, 2003 |
| *Arthrobotrys consides* Drechsler. | Mangrove wood | Hong Kong | Jones and Vrijmoed, 2003 |
| *Bactrodesmium microleucurum* (Speg.) M.B. Ellis | Bamboo | Hong Kong | Jones and Vrijmoed, 2003 |
| *Beltrania rhombica* Penz. | Mangrove wood | Hong Kong | Jones and Vrijmoed, 2003 |
| *Byssoclamys fulva* Olliver & G. Smith | Drift and attached wood | Hong Kong | Jones and Vrijmoed, 2003 |
| *Camarosporium paliatum* Kohlm. & E. Kohlm. | Mangrove wood | Hong Kong | Jones and Vrijmoed, 2003 |
| *Chaetosporum camelliae* Agnihoths. | *Phragmites australis* | Hong Kong | Jones and Vrijmoed, 2003 |
| *Cirrenalia basiminuta* Raghu-Kumar & Zainal | *Acanthus ilicifolius* culms | Hong Kong | Jones and Vrijmoed, 2003 |
| *Cirrenalia fusca* I. Schmidt | Mangrove wood | Hong Kong | Jones and Vrijmoed, 2003 |
| *Cirrenalia macrocephala* (Kohlm.) Meyers & R.T. Moore | Mangrove wood, Drift and attached wood | Hong Kong | Jones and Vrijmoed, 2003 |
| *Cirrenalia pseudomacrocephala* (Kohlm.) Meyers & R.T. Moore | Mangrove wood, Drift and attached wood | Hong Kong | Jones and Vrijmoed, 2003 |
| *Cirrenalia pygmea* Kohlm. | Mangrove wood, Drift and attached wood | Hong Kong | Jones and Vrijmoed, 2003 |
| *Cirrenalia tropicalis* Kohlm. | Mangrove wood, Drift and attached wood | Hong Kong | Jones and Vrijmoed, 2003 |
| *Cladosporium cladosporiodes* (Fresn.) de Vries | Sand, Mangrove wood | Hong Kong | Jones and Vrijmoed, 2003 |
| *Clavatospora bulbosa* (Anast.) Nakagiri & Tubaki | Mangrove wood, Drift and attached wood | Hong Kong | Jones and Vrijmoed, 2003 |
| *Corynespora cassincola* (Berk. & Curt.) C.T. Wei | *Phragmites australis* | Hong Kong | Jones and Vrijmoed, 2003 |
| *Cumulospora marina* I. Schmidt | Mangrove wood | Hong Kong | Jones and Vrijmoed, 2003 |
| *Cytoplacosphaeria phragmiticola* O.K. Poon & K.D. Hyde | *Phragmites australis* | Hong Kong | Jones and Vrijmoed, 2003 |
| *Cytospora rhizophorae* Kohlm. & E. Kohlm. | Mangrove wood | Hong Kong | Jones and Vrijmoed, 2003 |
| *Dictyosporium strigosum* Pers. ex Fr. | *Phragmites australis*, *Schoenoplectus littoralis* culms | Hong Kong | Jones and Vrijmoed, 2003 |
| *Dictyosporium auriculae* (Cord) Gueguen | Mangrove wood | Hong Kong | Jones and Vrijmoed, 2003 |
| *Dinemasporium strigosum* Pers. ex Fr. | *Phragmites australis*, *Schoenoplectus littoralis* culms | Hong Kong | Jones and Vrijmoed, 2003 |
| *Diplodia ore-maris* Linder | Drift and attached wood | Hong Kong | Jones and Vrijmoed, 2003 |
| *Drechslera hawaiensis* (Bugnicourt) Subsam. & Jain ex M.B. Ellis | Mangrove wood | Hong Kong | Jones and Vrijmoed, 2003 |
| *Hermatomyces tucumanensis* Speg. | Mangrove wood | Hong Kong | Jones and Vrijmoed, 2003 |
| Species                                    | Habitat                  | Location          | Authors          |
|--------------------------------------------|--------------------------|-------------------|-----------------|
| *Monodictys paradoxa* (Corda) G.C. Hughes  | Mangrove wood, Drift and attached wood | Hong Kong         | Jones and Vrijmoed, 2003 |
| *Monodictys pelagica* (T.W. Johnson) E.B.G. Jones | Mangrove wood, Drift and attached wood | Hong Kong         | Jones and Vrijmoed, 2003 |
| *Papulaspora halima* Anastasiou            | Drift and attached wood  | Hong Kong         | Jones and Vrijmoed, 2003 |
| *Periconia prolifica* Anastasiou           | *Acanthus ilicifolius* culms, Bamboo, Mangrove wood, Drift and attached wood | Hong Kong         | Jones and Vrijmoed, 2003 |
| *Phaeoisaria oraemaris* (Linder) Khashnobish & Shearer | Mangrove wood, *Phragmites australis* | Hong Kong         | Jones and Vrijmoed, 2003 |
| *Phialophoraphoma litoralis* Linder        | Mangrove wood            | Hong Kong         | Jones and Vrijmoed, 2003 |
| *Polyschema congolensis* Reisinger & Kiffer | Mangrove wood            | Hong Kong         | Jones and Vrijmoed, 2003 |
| *Pseudorobillardia phragmitis* (Cunnell) Morelet. | *Phragmites australis*    | Hong Kong         | Jones and Vrijmoed, 2003 |
| *Phipomyces maydis* (Sacc.) M.B. Ellis    | *Phragmites australis*    | Hong Kong         | Jones and Vrijmoed, 2003 |
| *Spegazzinia tessartra* (Berk. & Curtis) Sacc. | *Phragmites australis*    | Hong Kong         | Jones and Vrijmoed, 2003 |
| *Stachylidium bicolor* Link ex Gray        | *Acanthus ilicifolius* culms | Hong Kong         | Jones and Vrijmoed, 2003 |
| *Tetraploa aristata* Berk. & Gray          | *Acanthus ilicifolius* culms | Hong Kong         | Jones and Vrijmoed, 2003 |
| *Trichocladium achrasporum* (Meyers & Moore) Dixon in Shearer & J.L. Crane | *Acanthus ilicifolius* culms, Bamboo, Mangrove wood | Hong Kong         | Jones and Vrijmoed, 2003 |
| *Trichocladium alepallonnellum* (Meyers & Moore) Kohlm. & Volkm.-Kohlm | *Acanthus ilicifolius* culms, Bamboo, Mangrove wood, Drift and attached wood | Hong Kong         | Jones and Vrijmoed, 2003 |
| *Trichocladium constrictum* I. Schmidt    | Mangrove wood            | Hong Kong         | Jones and Vrijmoed, 2003 |
| *Trichocladium lindertii* Shearer          | Mangrove wood            | Hong Kong         | Jones and Vrijmoed, 2003 |
| *Trichocladium melhiae* E.B.G. Jones, Abde-Wahab & Vrijmoed | Sand, Drift and attached wood | Hong Kong         | Jones and Vrijmoed, 2003 |
| *Trichocladium opacum*                     | Mangrove wood            | Hong Kong         | Jones and Vrijmoed, 2003 |
| *Zalerion maritimum* (Linder) Anastasiou   | Bamboo, Drift and attached wood | Hong Kong         | Jones and Vrijmoed, 2003 |
| *Zalerion varium* Anastasiou               | Drift and attached wood  | Hong Kong         | Jones and Vrijmoed, 2003 |

**Marine oomycetes**

| Species                                    | Habitat                  | Location          | Authors          |
|--------------------------------------------|--------------------------|-------------------|-----------------|
| *Halophytophthora elongate* H.H. Ho & H.S. Chang | Decay leaves            | Taiwan            | Ho et al. 2003  |
| *Halophytophthora epiostomium* (Fell & Master) H.H. Ho & S.C. Jong | Decay leaves            | Taiwan            | Ho and Jong 1990 |
| *Halophytophthora kandelae* H.H. Ho, S.Y. Hsieh & H.S. Chang | Decay leaves            | Taiwan            | Ho et al. 1991  |
| *Halophytophthora spinosa var lobata* (Fell & Master) Ho & Jong | Decay leaves            | Hainan            | Zeng et al. 2001 |
| *Halophytophthora vesicula* (Anastasiou & Churchland) Ho & Jong | Decay wood              | Hong Kong, Hainan | Ho and Jong 1990; Zeng et al. 2001 |

**Marine yeasts**

| Species                                    | Habitat                  | Location          | Authors          |
|--------------------------------------------|--------------------------|-------------------|-----------------|
| *Aureobasidium pullulans* (de Bary) G. Arnaud | Sea water                | Bohai Sea         | Zhou et al. 1991 |
| *Candida azyma* (Van der Walt, Johannsen & Yarrow) S.A. Mey. & Yarrow | Sea water                | Bohai Sea         | Zhou et al. 1991 |

(Continued)
Table 5. (Continued).

| Species                          | Substrata | Distribution | References          |
|----------------------------------|-----------|--------------|---------------------|
| Candida curvata (Diddens & Lodder) | Sea water | Bohai Sea    | Zhou et al. 1991    |
| Candida edax Van der Walt & E.E. Nel | Sea water | Bohai Sea    | Zhou et al. 1991    |
| Candida famata (F.C. Harrison) E.K. Novák & Zsolt | Sea water | Bohai Sea    | Zhou et al. 1991    |
| Candida guilliermondii (Castell.) | Sea water | Bohai Sea    | Zhou et al. 1991    |
| Candida hemicola (Dasz.) Diddens & Lodder | Sea water | Bohai Sea    | Zhou et al. 1991    |
| Candida insectorum D.B. Scott, Van der Walt & Klift | Sea water | Bohai Sea    | Zhou et al. 1991    |
| Candida krusei (Castell.) Berkhout | Sea water | Bohai Sea    | Zhou et al. 1991    |
| Candida multis-gemmis (Buhagiar) S.A. Mey. & Yarrow | Sea water | Bohai Sea    | Zhou et al. 1991    |
| Candida parapsilosis (Ashford) Langeron & Talice | Sea water | Bohai Sea    | Zhou et al. 1991    |
| Candida pelliculosa Redaelli      | Sea water | Bohai Sea    | Zhou et al. 1991    |
| Candida sake (Saito & M. Ota) Uden & H.R. Buckley ex S.A. Mey. & Ahearn | Sea water | Bohai Sea    | Zhou et al. 1991    |
| Cryptococcus albidus (Saito) C.E. Skinner | Sea water | Bohai Sea    | Zhou et al. 1991    |
| Cryptococcus atro Castell.        | Sea water | Bohai Sea    | Zhou et al. 1991    |
| Cryptococcus hungaricus (Zsolt) Phaff & Fell | Sea water | Bohai Sea    | Zhou et al. 1991    |
| Cryptococcus infirmominutus (Okun.) Phaff & Fell | Sea water | Bohai Sea    | Zhou et al. 1991    |
| Cryptococcus laurentii (Kuff.) C.E. Skinner | Sea water | Bohai Sea    | Zhou et al. 1991    |
| Cryptococcus luteolus (Saito) C.E. Skinner | Sea water | Bohai Sea    | Zhou et al. 1991    |
| Cryptococcus magnus (Lodder & Kreger-van Rij) Baptist & Kurtzman | Sea water | Bohai Sea    | Zhou et al. 1991    |
| Cryptococcus uniguttulatus (Wolfram & Zach) Phaff & Fell | Sea water | Bohai Sea    | Zhou et al. 1991    |
| Debaryomyces hansenii (Zopf) Lodder & Kreger-van Rij | Sea water | Bohai Sea    | Zhou et al. 1991    |
| Debaryomyces polymorphus (Klöcker) C.W. Price & Phaff | Sea water | Bohai Sea    | Zhou et al. 1991    |
| Pichia burtonii Boidin, Pignal, Lehodey, Vey & Abadie | Sea water | Bohai Sea    | Zhou et al. 1991    |
| Pichia carsonii Phaff & E.P. Knapp | Sea water | Bohai Sea    | Zhou et al. 1991    |
| Pichia etchellsii Kreger-van Rij | Sea water | Bohai Sea    | Zhou et al. 1991    |
| Pichia guilliermondii Wick.       | Sea water | Bohai Sea    | Zhou et al. 1991    |
| Pichia heimii Pignal             | Sea water | Bohai Sea    | Zhou et al. 1991    |
| Pichia ohmeri (Etchells & T.A. Bell) Kreger-van Rij | Sea water | Bohai Sea    | Zhou et al. 1991    |
| Pichia philogaea Van der Walt & Johanssen | Sea water | Bohai Sea    | Zhou et al. 1991    |
| Pichia scolyti (Phaff & Yoney.) Kreger-van Rij | Sea water | Bohai Sea    | Zhou et al. 1991    |
| Rhodotorula aurantiaca (Saito) Lodder | Sea water | Bohai Sea    | Zhou et al. 1991    |
| Rhodotorula glutinis (Frenzen) F.C. Harrison | Sea water | Bohai Sea    | Zhou et al. 1991    |
| Rhodotorula graminis Di Menna | Sea water | Bohai Sea    | Zhou et al. 1991    |
| Rhodotorula minutia (Saito) F.C. Harrison | Sea water | Bohai Sea    | Zhou et al. 1991    |
| Rhodotorula rubra (Schimon) F.C. Harrison | Sea water | Bohai Sea    | Zhou et al. 1991    |
| Saccharomyces cerevisiae Meyen | Sea water | Bohai Sea    | Zhou et al. 1991    |
| Saccharomyces kluyveri Phaff, M.W. Mill. & Shifrine | Sea water | Bohai Sea    | Zhou et al. 1991    |
| Torulaspora delbrueckii (Linney) E.K. Novák & Zsolt | Sea water | Bohai Sea    | Zhou et al. 1991    |
Five species of Mucorales were isolated from water samples (Song and Wu 2010) and leaf litter (Au et al. 1992) and these may have been derived from propagules washed into the sampling site.

**Freshwater oomycetes**

The Oomycota are fungus-like heterotrophs which are ubiquitous in marine, freshwater, and terrestrial environments (Beakes et al. 2011). Sixty-three species of oomycetes have been recorded in freshwater habitats in China and belong to seven orders, i.e., Saprolegniales (31 spp.), Pythiales (20 spp.), Olpidiopsidales (4 spp.), Myzocytiopsidales (1 sp), Peronosporales (1 sp), Rhipidiales (1 sp), and Rozellopsidales (1 sp). The common genera were *Pythium* Pringsh. (13 spp.), *Achlya* Nees (12 spp.), *Aphanomycaceae* de Bary (6 spp.), and *Saprolegnia* Nees (6 spp.).

Most oomycetes reported in China were saprobes, which were very common in freshwater habitats and wet soil (Shen and Xiang 1948; Yu and Liang 1983; Liang and Yu 1985), while other species were parasitic on plants, arthropods, and oomycetes. *Achlya cambrica* Trow, *A. flagellate* Coker, *A. oblongata* de Bary, *A. oryzae* Ito et Nagai, *Dictyuchus polysporus*, *D. sterile* Coker, *Saprolegnia mixia* de Bary, and *S. thuretii* de Bary were reported as parasites of rice (*Oryza sativa* L.), causing rice seedling rot (Song and Zhang 1983). *Pythium guiyangense* X.Q. Su was described in China as a new species parasitic on mosquito (*Aedes albopictus*) larvae; and has the potential to be used as a biological agent to control mosquito population (Su 2006). *Aphanomyces parasiticus* Coker, *Olpidiopsis aphanomycis* Cornu, *O. fusiformis* Cornu, *O. sareptae* Cornu, and *Rozellopsis septigena* Karling were parasitic on oomycetes (Shen and Xiang 1948).

Twenty-seven oomycetes were reported from Yunnan province and 20 from Beijing (Table 3). Due to the lack of investigations, the current species distribution in different areas in China does not reflect their natural geographical distribution. Shearer et al. (2007) suggest that tropical countries appear to harbor a higher biodiversity. Therefore, the tropical areas in China, like Hong Kong, Hainan, and Guangdong, may present more oomycete species than Beijing and Yunnan province.

**Marine fungi**

Jones et al. (2009) summarized 530 marine fungi including 424 ascomycetes (251 genera), 94 asexual morphs (61 genera), and 12 basidiomycetes (9 genera). This figure reached 549 in 2011 (Jones 2011). Jones and Vrijmoed (2003) listed 166 fully and partially identified marine fungi for Hong Kong. To date, 213 fungal species have been reported in China (Tables 1 and 5), including 117 ascomycetes, 48 hyphomycetes, 1 basidiomycete, 5 oomycetes, and 42 yeasts. All these species were reported from driftwood, straw, mangrove, sea water, leaves, and bamboo. *Nia vibrissa* R.T. Moore & S.P. Meyers was reported on drift wood from the coast of Shandong province and is the only basidiomycetes known from Mainland China (Jin et al. 2004). Ho and Jong (1990) established a new marine genus in Oomycota (*Halophytophthora* H.H. Ho & S.C. Jong) by studying the culture at the American Type Culture Collection. Afterward, they reported five *Halophytophthora* species (with three novelties) in Taiwan in their successive study (Ho et al. 1990, 1991, 2003).

The 117 marine species of ascomycetes belong to 11 orders, i.e., Boliniales (1 sp.), Diaporthales (7 spp.), Hypocreales (4 spp.), Hypodiales (1 sp.), Lecanorales (2 spp.), Lulworthiales (3 spp.), Microascales (46 spp.), Pleosporales (24 spp.), Savoryellales (2 spp.), Sordariales (3 spp.) and Xylariales (8 spp.), and the 16 species referred to as *incertae sedis*. The most speciose genus was *Halosarpevia* Kohlm. & E. Kohlm., with 14 species. Twenty species are revealed to colonize both marine and freshwater habitats, i.e., *Aniptodera chesapeakensis* Shearer & M.A. Mill., *A. haispora* Vrijmoed, K.D. Hyde & E.B.G. Jones, *A. lignitilis* K.D. Hyde, *Anulatales trisepatus* S.W. Wong, K.D. Hyde & E.B.G. Jones, *Apiospora montagnae* Sacc., *Haematonecrae* haematococca (Berk. & Broome) Samuels & Nirenberg, *Halosarpevia abonnis* Kohlm., *Lignincola laevis* Hönk, *Lulworthia granispora* Meyers, *Marinosphaera mangrovei* K.D. Hyde, *Massarina phragmiticola* O.K. Poon & K.D. Hyde, *Nais inornata* Kohlm., *Natantispora retorquens* Shearer & J.L. Crane, *Paraphaenopsphaeria* schoenoplecti M.K.M. Wong, Goh & K.D. Hyde, *Phomatospora phragmiticola* Poon & K.D. Hyde, *Phragmitensis ellipsoidae* M.K.M. Wong, Goh & K.D. Hyde, *P. marina* M.K.M. Wong, Poon & K.D. Hyde, *Pseudothalanesthesia* falsa Shearer, *Savoryella lignicola* E.B.G. Jones & R.A. Eaton and *Zopfiella latipes* (N. Lundq.) Malloch & Cain.

Seventy-three species of ascomycetes were recorded on mangrove, 36 on driftwood, and 8 on bamboo. Most species were recorded on only one type of substratum, while *Lignincola laevis* Hönk has been recorded on straw, bamboo, drift wood, and mangrove (Vrijmoed et al. 1982a, 1982b, 1986; Diao et al. 2009). Twenty-three species were recorded from the coast of Shandong province, and 104 species were recorded from Hong Kong, with 10 overlaps in both areas.

Zhou et al. (1991) isolated 285 yeast strains from sea water in the Bohai Sea, China, with 40 species in 8 genera, i.e., *Candida* Berkhout (13 spp.), *Cryptococcus* Vuill. (8 spp.), *Picciococcus* E.C. Hansen (8 spp.), *Rhodotorula* F.C. Harrison (5 spp.), *Debaryomyces* Lodder & Kregervan Rij (2 spp.), *Saccharomyces* Meyen ex E.C. Hansen (2 spp.), *Aureobasidium* Viala & G. Boyer (1 sp.), and *Torulaspora* Lindner (1 sp.). The marine yeasts have a high
biodiversity (Araujo et al. 1995; Fell et al. 2011). Further studies are required to document the yeasts populations in China.

**Conclusions**

1. The most speciose group of aquatic fungi reported in China is freshwater hyphomycetes (416 spp.), followed by freshwater ascomycetes (256 spp.), marine ascomycetes (117 spp.), freshwater oomycetes (63 spp.), marine hyphomycetes (48 spp.), marine yeasts (42 spp.), freshwater chytridiomycetes (25 spp.), freshwater zygomycetes (22 spp.), marine oomycetes (5 spp.), and marine basidiomycetes (1 sp.). Freshwater yeasts, freshwater basidiomycetes, and marine chytridiomycetes have not been reported in China.

2. Most species were recorded on woody debris. Overlap is low among species recorded on different substrate types.

3. Hong Kong and Yunnan province have received much attention for surveys of aquatic fungi and thus provide the highest number of species. However, most areas in China have not been investigated for aquatic fungi, and many new taxa may await collection and description.

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