Morphology and Phylogeny of Pestalotiopsis (Sporocadaceae, Amphisphaeriales) from Fagaceae Leaves in China

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ABSTRACT Fagaceae is a family of flowering plants widely distributed in the Northern Hemisphere, including deciduous and evergreen trees and shrubs. Species of Pestalotiopsis are well-known agents of leaf spot diseases, but targeted sampling on Fagaceae is still missing. To determine the diversity of Pestalotiopsis species associated with Fagaceae leaf spot in China, investigations were conducted in the main areas of Fagaceae distribution from 2016 to 2021. Diseased leaf tissues were collected, and fungal isolates were obtained from leaf spots. In the present study, 43 isolates of Pestalotiopsis were studied based on combined morphology and phylogeny. As a result, 10 new species were identified, viz., Pestalotiopsis anhuiensis, Pestalotiopsis castanopsidis, Pestalotiopsis changjiangensis, Pestalotiopsis cyclobalanopsidis, Pestalotiopsis foliicola, Pestalotiopsis guangxiensis, Pestalotiopsis guizhouensis, Pestalotiopsis lithocarpi, Pestalotiopsis shaanxiensis, and Pestalotiopsis silvicola, and six new host records were recognized.

IMPORTANCE Pestalotiopsis is a common fungal genus inhabiting plant tissues as endophytes, pathogens, and saprophytes. Fagaceae is a plant family including many important tree species, such as Castanea mollissima and Quercus spp. In this study, diseased leaves of Fagaceae in China were investigated, and 16 Pestalotiopsis species were identified based on morphology and phylogeny of combined loci of internal transcribed spacers (ITS), the translation elongation factor 1-α (tef1), and the beta-tubulin (tub2) genes. Among these, 10 new species were found, and six new host records were revealed. Our study significantly updates the taxonomy of Pestalotiopsis and enhances our understanding of leaf diseases of Fagaceae hosts.

KEYWORDS new species, phylogeny, plant disease, taxonomy

Fagaceae is an ecologically important family of flowering plants including eight genera and about 927 species worldwide (1). Most species of Fagaceae are deciduous trees or shrubs in temperate regions, and some species are evergreen distributed in subtropical to tropical regions. As we know, chestnuts (Castanea spp.) provide delicious natural foods, and oaks (Quercus spp.) and beeches (Fagus spp.) are commonly used as timbers. Many fagaceous species in temperate forests are ecologically highly important as main components of various forest types and provide an important food source for wildlife, and some of them are prominent ornamental trees (2).

More than 320 Fagaceae species have been recorded from China, including Chinese chestnut (Castanea mollissima), which provides tree crops, and oriental cork oak (Quercus variabilis), which is widely used as a shade, street, or ornamental tree in China. Leaf spot diseases are common on Fagaceae hosts in China, from which several fungal species were revealed based on morphology and phylogeny in recent years (3). For example, Diaporthe eres and Ophiognomonia castaneae cause Castanea mollissima brown margin leaf blight in Shandong Province of China (4). Botryosphaeria qinlingensis causes oak frogeye leaf spot disease in China (5). Monochaetia castaneae and 25 other species were reported to be associated with C. mollissima leaf diseases in chestnut plantations in China (6).
Pestalotioid fungi are easily characterized by multiseptate and more or less fusiform conidia with appendages at one or both ends, frequently with some melanized cells (7–9). Fungi currently known as pestalotioid fungi are classified in the family Sporocadaceae, with 30 accepted genera based on multiple-locus phylogeny and conidial characters (8).

The classification of pestalotioid genera is complicated and has undergone substantial rearrangements in the past decades. The genus Pestalotia, originally described by De Notaris (10), contains almost 600 species epithets, the majority of which were over time transferred to separate genera. More than 100 years after its description, in his pioneering revision, Steyaert (11) restricted Pestalotia to the generic type species, Pestalotia pezizoides, and separated Pestalotiopsis and Truncatella based on cell numbers in the conidium: 4 cells in Truncatella, 5 cells in Pestalotiopsis, and 6 cells in Pestalotia. However, Steyaert (11) did not accept Monochaetia as a distinct genus but placed its species into Pestalotiopsis or Truncatella based on cell numbers of the conidium. In contrast, in his revision of Pestalotia, Guba (12) did not accept Pestalotiopsis and Truncatella as distinct genera but re-established Monochaetia for species having a single apical and basal appendage, which he placed in three sections based on the number of conidial cells (4, 5, or 6). Subsequently, a hybrid classification scheme was established recognizing all four genera (Pestalotia, Pestalotiopsis, Truncatella, and Monochaetia), which was primarily based on the cell numbers per conidium in combination with the number of apical appendages (one versus several). Monochaetia was restricted to species with five-celled conidia, while species with four-celled conidia were transferred to Truncatella or Seimatosporium and species with six-celled conidia to Seiridium (13).

Molecular phylogenetic analysis largely confirmed the morphological generic classification of Sutton (13), and it was subsequently further refined. Phylogenetically, Monochaetia sensu stricto, Pestalotiopsis, Seiridium, and Truncatella were shown to form distinct clades in Sporocadaceae (8, 14), while Pestalotia was shown to be synonymous with the older genus Seiridium (15). Based on phylogeny of multiple genes and conidial morphology, Pestalotiopsis sensu lato was further split into Pestalotiopsis sensu stricto, Neopestalotiopsis, and Pseudopestalotiopsis (16). While Neopestalotiopsis can be distinguished from the other genera by a versicolorous medium part of the conidia, viz., a lighter brown second cell and darker brown third and fourth cells, conidia of Pestalotiopsis and Pseudopestalotiopsis are morphologically indistinguishable but differ molecularly, e.g., by the lengths of their internal transcribed spacer (ITS) sequences (489 to 495 bp in Pestalotiopsis versus 536 to 540 bp in Pseudopestalotiopsis) (16). Ecologically, species of Pestalotiopsis sensu lato are common leaf pathogens infecting various hosts worldwide (17–20).

As Pestalotiopsis species are known as leaf spot pathogens on Fagaceae, typical spotted leaves were collected to obtain fungal isolates, which were subsequently identified based on both morphological and phylogenetic approaches. The aims of the present study were to reveal hidden species diversity of Pestalotiopsis from diseased fagaceous leaves and to evaluate the practicability of host association for species distinction.

RESULTS

The combined sequence data set of ITS, tef1, and tub2 comprised 1,552 characters (524 for the ITS, 529 for tef1, and 499 for tub2) from 162 isolates, including one outgroup taxon, Neopestalotiopsis magna (MFLUCC 12-0652). Of the 1,552 characters included in the phylogenetic analyses, 457 were parsimony informative (84 from the ITS, 200 from tef1, and 173 from tub2). The best maximum-likelihood (ML) tree (lnL = −12,981.92) revealed by RAxML is shown as a phylogram in Fig. 1. The topologies resulting from ML and Bayesian inference (BI) analyses of the concatenated data set were congruent. Isolates from the present study formed 16 individual clades representing 16 species of Pestalotiopsis, including 10 new species (Pestalotiopsis anhuiensis, P. castanopsidis, P. changjiangensis, P. cyclobalanopsidis, P. foliicola, P. guangxiensis, P. guizhouensis, P. lithocarpis, P. shaanxiensis, and P. silvicola) and six known species (P. chamaeropis, P. kenyana, P. lushanensis, P. nanjingensis, P. neolitseae, and P. rhodomyrtus).
**FIG 1** Phylogram of Pestalotiopsis resulting from a maximum-likelihood analysis based on a combined matrix of ITS, tef1, and tub2 loci. Numbers above the branches indicate ML bootstrap values (left; values of ≥50% are shown) and Bayesian posterior probabilities (right; values of ≥0.9 are shown). The tree is rooted with Neopestalotiopsis magna (MFLUCC 12–0652). Isolates from the present study are marked in blue.
New Species and Records of *Pestalotiopsis* in China

FIG 1 (Continued)
**Pestalotiopsis anhuiensis** Ning Jiang, sp. nov. (Fig. 2). MycoBank number MB843387.

Etymology: named after the collection site of the type specimen, Anhui Province. Typus: China, Anhui Province, Hefei City, Shushan District, Dashushan Forest Park, on diseased leaves of *Cyclobalanopsis glauca*, 2 November 2019, Dan-ran Bian (holotype CAF 800044; ex-holotype culture CFCC 54791).

Conidiomata in culture sporodochial, aggregated or solitary, erumpent, pulvinate, black, 50 to 300 μm in diameter, exuding black conidial masses. Conidiophores indistinct, usually reduced to conidiogenous cells. Conidiogenous cells hyaline, smooth, cylindrical to spherical, annelidic, 3.5 to 13.5 by 2 to 3.5 μm, mean ± standard deviation (SD) = 8.2 ± 2.6 by 3.1 ± 1.1 μm. Conidia fusoid, straight or slightly curved, 4-septate, smooth, slightly constricted at the septa, (18.5)20.5 to 23.5(25) by (6)6.5 to 7.5(8) μm (measurements of conidia are reported as maximum and minimum in parentheses and the range representing the

**FIG 2**. Morphology of *Pestalotiopsis anhuiensis* (CFCC 54791). (A) Colony on PDA after 10 days at 25°C; (B) colony on MEA after 10 days at 25°C; (C) conidiomata formed on PDA; (D and E) conidiogenous cells giving rise to conidia; (F and G) conidia. Bars, 300 μm (C) and 10 μm (D to G).

**TAXONOMY**

*Pestalotiopsis anhuiensis* Ning Jiang, sp. nov. (Fig. 2). MycoBank number MB843387. Etymology: named after the collection site of the type specimen, Anhui Province. Typus: China, Anhui Province, Hefei City, Shushan District, Dashushan Forest Park, on diseased leaves of *Cyclobalanopsis glauca*, 2 November 2019, Dan-ran Bian (holotype CAF 800044; ex-holotype culture CFCC 54791).

Conidiomata in culture sporodochial, aggregated or solitary, erumpent, pulvinate, black, 50 to 300 μm in diameter, exuding black conidial masses. Conidiophores indistinct, usually reduced to conidiogenous cells. Conidiogenous cells hyaline, smooth, cylindrical to spherical, annelidic, 3.5 to 13.5 by 2 to 3.5 μm, mean ± standard deviation (SD) = 8.2 ± 2.6 by 3.1 ± 1.1 μm. Conidia fusoid, straight or slightly curved, 4-septate, smooth, slightly constricted at the septa, (18.5)20.5 to 23.5(25) by (6)6.5 to 7.5(8) μm (measurements of conidia are reported as maximum and minimum in parentheses and the range representing the
mean ± standard deviation of the number of measurements given in parentheses), mean ± SD = 2.18 ± 1.4 μm; length/width ratio (L/W) = 2.7 to 3.8; basal cell obconic with a truncate base, thin-walled, hyaline or pale brown, (3.5)4.5 to 5.5(6) μm; median cells 3, trapezoid or subcylindrical, concolorous, pale brown to brown, thick-walled, the first median cell from base (4)5 to 6 μm long, the second cell 4 to 5 μm long, the third cell (3.5)4 to 5(5.5) μm long, together (12)13 to 15.5(17) μm long; apical cell conic with an acute apex, thin-walled, hyaline, (2.5)3 to 4(4.5) μm long; basal appendage single, unbranched, tubular, centric, straight or slightly bent, (4.5)4 to 6.5(7) μm long, mean ± SD = 5.4 ± 0.9 μm; apical appendages, 2 or 3, unbranched, tubular, centric, straight or bent, (7.5)12.5 to 17.5(20) μm long, mean ± SD = 14.9 ± 2.6 μm. Sexual morph unknown.

Colonies on malt extract agar (MEA) flat, spreading, with flocculent aerial mycelium and entire edge, white, reaching a 70-mm diameter after 10 days at 25°C, forming black conidiomata with black conidial masses; on potato dextrose agar (PDA), flat, spreading, with flocculent aerial mycelium forming concentric rings and entire edge, white, reaching a 70-mm diameter after 10 days at 25°C, forming black conidiomata with black conidial masses; on PDA, aerial mycelium forming concentric rings and entire edge, pale luteous to fawn, reaching a 70-mm diameter after 10 days at 25°C, forming black conidiomata with black conidial masses. Conidiomata in culture sporodochial, aggregated or solitary, erumpent, pulvinate, black, 8 to 23(24.5) μm long, together (12)13 to 15.5(17) μm long; apical cell conic with an acute apex, thin-walled, hyaline, (2.5)3 to 4(4.5) μm long; basal appendage single, unbranched, tubular, centric, straight or slightly bent, (4.5)4 to 6.5(7) μm long, mean ± SD = 5.4 ± 0.9 μm; apical appendages, 2 or 3, unbranched, tubular, centric, straight or bent, (7.5)12.5 to 17.5(20) μm long, mean ± SD = 14.9 ± 2.6 μm. Sexual morph unknown.

Notes: Pestalotiopsis anhuiensis from Cycllobalanopsis glauca is phylogenetically close to Pestalotiopsis abietis, P. disseminata, and P. guangxiensis (Fig. 1). Morphologically, P. anhuiensis shares similar conidial sizes with P. abietis and P. disseminata (18.5 to 25 by 6 to 8 μm in P. anhuiensis versus 19.9 to 31.2 by 5.8 to 8 μm in P. abietis and 18 to 25 by 6.5 to 8 μm in P. disseminata) (21–23) and has narrower conidia than P. guangxiensis (6 to 8 μm versus 7.5 to 9.5 μm in P. guangxiensis) (Table 1). However, P. anhuiensis can be distinguished by sequence data (nucleotide differences from P. abietis: in the ITS, 1/506 [0.2%]; in tef1, 4/470 [0.85%]; in tub2, 1/442 [0.23%]; nucleotide differences from P. disseminata: in the ITS, 3/506 [0.59%], 1 insertion; in tef1, 8/470 [1.7%]; in tub2, 1 or 2/406 [0.25 to 0.5%]; nucleotide differences from P. guangxiensis: in the ITS, 1/506 [0.2%], 1 insertion; in tef1, 12/470 [2.55%], 1-bp gap; in tub2, 2 or 3/442 [0.45 to 0.68%]).

Pestalotiopsis castanopsidis Ning Jiang, sp. nov. (Fig. 3). MycoBank number MB841308. Etyymology: named after the host genus, Castanopsis. Typus: China, Guangdong Province, Qingyuan City, Yangshan County, Guangdong Nanling Nature Reserve, on diseased leaves of Castanopsis lamontii, 4 December 2019, Shang Sun (holotype CAF 800021; ex-holotype culture CFCC 54430).

Conidiomata in culture sporodochial, aggregated or solitary, erumpent, pulvinate, black, 50 to 350 μm in diameter, exuding black conidial masses. Conidiophores indistinct, usually reduced to conidiogenous cells. Conidiogenous cells hyaline, smooth, cylindrical to spherical, annelidic, 5 to 11.5 by 2.5 to 7 μm, mean ± SD = 7.2 ± 2.5 by 4.4 ± 1.4 μm. Conidia fusoid, straight or slightly curved, 4-septate, smooth, slightly constricted at the septa, (23) 24 to 27.5(29) by (7)8 to 11(11.5) μm, mean ± SD = 25.7 ± 1.8 by 9.3 ± 1.4 μm, L/W = 2.3 to 4; basal cell obconic with a truncate base, thin-walled, hyaline or pale brown, 4 to 5 μm; median cells, 3, trapezoid or subcylindrical, concolorous, brown, thick-walled, the first median cell from base (5)5 to 7 μm long, the second cell (5.5)6 to 7.5(8) μm long, the third cell 3.5 to 6.5 (7) μm long, together (16)17 to 20(20.5) μm long; apical cell conic with an acute apex, thin-walled, hyaline, (2.5)3 to 4.5(5) μm long; basal appendage single, unbranched, tubular, centric, straight or slightly bent, (8.5)9.5 to 14(15) μm long, mean ± SD = 11.7 ± 2.4 μm; apical appendages, 3 or 4, unbranched, tubular, knobbed, centric, straight or slightly bent, (17)17.5 to 23(24.5) μm long, mean ± SD = 20.3 ± 2.7 μm. Sexual morph unknown.

Colonies on MEA flat, spreading, with flocculent aerial mycelium forming concentric rings and entire edge, off-white to sienna, reaching 60 mm diameter after 10 days at 25°C, forming black conidiomata with black conidial masses; on PDA, flat, spreading, with flocculent aerial mycelium forming concentric rings and undulate edge, pale luteous to fawn, reaching a 70-mm diameter after 10 days at 25°C, forming black conidiomata with black conidial masses. Additional materials, China, Guangdong Province, Shaoguan City, Lechang City, Dayaoshan Forest Farm, on diseased leaves of Castanopsis hystrix, 4 December 2019, Dan-ran Bian (CFCC 54305 and CFCC 54384).

Notes: Three isolates of Pestalotiopsis castanopsidis from Castanopsis hystrix and C. lamontii clustered into a distinct clade phylogenetically close to P. jesteri (Fig. 1). However, P. castanopsidis...
| Species             | Host(s)                                                                 | Length of conidia (μm) | Width of conidia (μm) | Length of 3 median cells (μm) | Length of apical appendage (μm) | Length of basal appendage (μm) | Reference     |
|---------------------|--------------------------------------------------------------------------|------------------------|------------------------|-------------------------------|--------------------------------|-------------------------------|---------------|
| P. anhuiensis       | Cyclobalanopsis glauca                                                   | 18.5–25                | 6–8                    | 12–17                         | 7.5–20                         | 4–7                           | This study    |
| P. castanopsidis    | Castanopsis hystrix, C. lamontii                                         | 23–29                  | 7–11.5                 | 16–20.5                       | 17–24.5                        | 8.5–15                        | This study    |
| P. chamaerops       | C. fissa, Quercus acutissima, Q. aliena, Q. variabilis                   | 20.5–31.5              | 6.5–9                  | 13–20                         | 8.5–27.5                       | 2.5–12                        | This study    |
| P. changiangensis   | Castanopsis hainanensis, C. tonkinensis                                  | 19–24                  | 7–8.5                  | 13.5–16.5                     | 1.5–7                          | absent                        | This study    |
| P. cyclobalanopsidis| Cyclobalanopsis glauca                                                   | 18.5–25.5              | 6–8.5                  | 13–16                         | 5.5–14.5                       | 2–6.5                         | This study    |
| P. folicola         | Castanopsis faberi                                                       | 19.5–24                | 7–9.5                  | 10.5–16                        | 10.5–37                        | 3–5                           | This study    |
| P. guangxiensis     | Quercus griffithi                                                       | 17.5–21                | 7.5–9.5                | 12–14                         | 14–19                          | 3–4.5                         | This study    |
| P. guzhauensis      | Cyclobalanopsis glauca                                                   | 21–26.5                | 7–9.5                  | 13–18                         | 7–15                           | 2–8                           | This study    |
| P. kenyana          | Castanea henryi, Ca. mollissima, Castanopsis fissa, C. hystrix,          | 20.5–28                | 6–8                    | NA                            | 3.5–15                         | 1.5–3.5                       | 6; this study |
|                     | Cyclabalanopsis glauca, Cy. fleuryi, Quercus aliena, Q. aliena var. acutiserrata |                      |                        |                               |                                |                               |               |
| P. lithocarpi       | Lithocarpus chiungchungensis                                             | 17–23                  | 5.5–8                  | 12.5–14.5                     | 9–24                           | 2.5–5                         | This study    |
| P. lusshenensis     | Quercus serrata                                                         | 19.5–26.5              | 7–9.5                  | 13–17.5                       | 10.5–26.5                      | 2.5–0.5                       | This study    |
| P. monoeca          | Quercus robur                                                           | 25–42                  | 7–11.5                 | 17–26                         | 40–75                          | 6–14                          | 16            |
| P. ningiensis       | Quercus aliena                                                          | 17.5–23.5              | 6.5–9                  | 13–7.5                        | 8.5–20.5                       | 2–6.5                         | This study    |
| P. neolitseae       | Lithocarpus amygdalifolius                                               | 19–23.5                | 5.5–7                  | 13–14.5                       | 9.5–14.5                       | 2–3.5                         | This study    |
| P. rhodomyrtus      | Cyclobalanopsis augustinii, Quercus aliena                              | 20–27                  | 6–8                    | 13.5–18                       | 8–17.5                         | 2–7                           | This study    |
| P. shaanensis       | Quercus variabilis                                                      | 21–25                  | 7–9                    | 13.5–17.5                     | 13–22                          | 1.5–7.5                       | This study    |
| P. silvicola        | Cyclobalanopsis kernii                                                  | 20–26                  | 6–8.5                  | 12–16                         | 12–22.5                        | 3.5–8                         | This study    |

*NA, not available.*
differs from *P. jesteri* by obviously larger conidia (23 to 29 by 7 to 11.5 μm in *P. castanopsidis* versus 19 to 23 by 5 to 7 μm in *P. jesteri*) (24). In addition, *P. castanopsidis* can be distinguished from *P. jesteri* by sequence data (nucleotide differences: in the ITS, 4/364 [1.1%]; in tub2, 14 or 15/438 [3.2 to 3.42%]).

**Pestalotiopsis chamaeropis** S. S. Maharachch, K. D. Hyde & P. W. Crous, Studies in Mycology 79:158 (2014).

Conidiomata in culture sporodochial, solitary, erumpent, pulvinate, black, 150 to 450 μm in diameter, exuding black conidial masses. Conidiophores indistinct, usually reduced to conidiogenous cells. Conidiogenous cells hyaline, smooth, cylindrical to subcylindrical, annelidic, 4.5 to 12 by 2.5 to 4.5 μm, mean ± SD = 6.9 ± 1.5 by 3.6 ± 0.7 μm. Conidia fusoid, straight or slightly curved, 4-septate, smooth, slightly constricted at the septa, (20.5)23 to 28.5(31.5) by (6.5)7.5 to 8.5(9) μm, mean ± SD = 25.8 ± 2.6 by 8 ± 0.7 μm, L/W = 2.5 to 4.4; basal cell obconic with a truncate base, thin-walled, hyaline or pale brown, (3.5)4.5 to 7(8) μm; median cells 3, trapezoid or subcylindrical, concolorous, brown, thick-walled, the first median cell from base (4)4.5 to 6(7) μm long, the second cell (4.5)5 to 6.5(7) μm long, the third cell (4)5 to 6(6.5) μm long, together (13)15 to 18(20) μm long; apical cell conic with an acute apex,
thick-walled, hyaline, (3)3.5 to 5(5.5) μm long; basal appendage unbranched, tubular, centric, straight or slightly bent, (2.5)3 to 8.5(12) μm long, mean ± SD = 6.3 ± 2.2 μm; apical appendages, 2 or 3, unbranched, tubular, centric, straight or slightly bent, (8.5)12 to 21.5(27.5) μm long, mean ± SD = 16.8 ± 4.8 μm. Sexual morph unknown.

Colonies on MEA flat, spreading, with flocculent aerial mycelium forming concentric rings and entire edge, white, reaching a 70-mm diameter after 10 days at 25°C, forming black conidiomata with black conidial masses; on PDA, flat, spreading, with flocculent aerial mycelium forming concentric rings and entire edge, white to buff, reaching a 70-mm diameter after 10 days at 25°C, forming black conidiomata with black conidial masses.

Materials examined, China, Anhui Province, Hefei City, Shushan District, Dashushan Forest Park, on diseased leaves of Quercus aliena, 2 November 2019, Dan-ran Bian (CFCC 55019 and CFCC 55122); Anhui Province, Hefei City, Shushan District, Dashushan Forest Park, on diseased leaves of Quercus acutissima, 2 November 2019, Dan-ran Bian (CFCC 54977); Anhui Province, Hefei City, Shushan District, Dashushan Forest Park, on diseased leaves of Quercus variabilis, 2 November 2019, Dan-ran Bian (CFCC 54776); Guangdong Province, Shaoguan City, Lechang City, Dayaoshan Forest Farm, on diseased leaves of Castanopsis fissa, 4 December 2019, Shang Sun (CFCC 55023); Shaanxi Province, Xian City, Zhouzhi County, Heihe Forest Park, on diseased leaves of Quercus variabilis, 6 September 2019, Yong Li (CFCC 55338); Sichuan Province, Yaan City, Shimian County, on diseased leaves of Quercus acutissima, 10 September 2020, Ning Jiang (CFCC 55124).

Notes: Seven new isolates of Pestalotiopsis chamaeropis were collected from four fagaceous hosts, forming a well-supported clad with the ex-type strain CBS 186.71 (Fig. 1). In addition, samples from the present study agree well with the ex-type strain in conidial dimension and morphological characters (21 to 28 by 6 to 9.5 μm in CBS 186.71) (16). Hence, Castanopsis fissa, Quercus acutissima, Q. aliena, and Q. variabilis become new hosts for Pestalotiopsis chamaeropis, which was originally described from Chamaerops humilis (16).

Pestalotiopsis changjiangensis Ning Jiang, sp. nov. (Fig. 4). MycoBank number MB841309. Etymology: named after the collection site of the type specimen, Changjiang Li Autonomous County. Type: China, Hainan Province, Changjiang Li Autonomous County, Bawangling National Forest Park, on diseased leaves of Castanopsis tonkinensis, 16 November 2018, Yong Li (holotype CAF 800024; ex-holotype culture CFCC 54314).

Conidiomata in culture sporodochial, aggregated or solitary, erumpent, pulvinate, dark brown, 300 to 850 μm in diameter, exuding black conidial masses. Conidiophores indistinct, usually reduced to conidiogenous cells. Conidiogenous cells hyaline, smooth, cylindrical to spherical, annelidic, 3.5 to 6 by 2 to 5.5 μm, mean ± SD = 4.7 ± 1.1 by 3.4 ± 1 μm. Conidia fusoid, straight, 4-septate, smooth, not constricted or slightly constricted at the septa, (19)20 to 22.5(24) by 7 to 8(8.5) μm, mean ± SD = 21.2 ± 1.4 by 7.7 ± 0.4 μm, L/W = 2.4 ± 0.2 by 1.1; basal cell obconic with a truncate base, thin-walled, hyaline or pale brown, (2)3 to 4 μm; median cells 3, trapezoid or subcylindrical, pale brown to brown, thick-walled, the first median cell from base 4.5 to 5.5 μm long, the second cell (4.5)5 to 5.5 μm long, the third cell (4)5 to 6 μm long, together (13.5)14.5 to 16(16.5) μm long; apical cell conic with an acute apex, thin-walled, hyaline or pale brown, (2)2.5 to 4(5) μm long; basal appendage indistinct or absent; apical appendage indistinct, tubular, bent, 1.5 to 4.5(7) μm long, mean ± SD = 3 ± 1.1 μm. Sexual morph unknown.

Colonies on MEA flat, spreading, with flocculent aerial mycelium and undulate edge, pale luteous, reaching a 70-mm diameter after 10 days at 25°C, sterile; on PDA, flat, spreading, with flocculent aerial mycelium forming concentric rings and undulate edge, white, reaching a 65-mm diameter after 10 days at 25°C, forming black conidiomata with black conidial masses.

Additional materials examined, China, Hainan Province, Changjiang Li Autonomous County, Bawangling National Forest Park, on diseased leaves of Castanopsis hainanensis, 14 November 2018, Yong Li (CFCC 54433); Hainan Province, Changjiang Li Autonomous County, Bawangling National Forest Park, on diseased leaves of Cyclobalanopsis austrocochinensis, 16 November 2018, Yong Li (CFCC 52803).

Notes: Three isolates of Pestalotiopsis collected from Castanopsis hainanensis, C. tonkinensis, and Cyclobalanopsis austrocochinensis clustered into a distinct and well-supported
clade, which is newly described as *P. changjiangensis* here (Fig. 1). Its conidia are characterized by the lack of a basal appendage and an indistinct apical appendage, which is unique within the genus *Pestalotiopsis*.

*Pestalotiopsis cyclobalanopsidis* Ning Jiang, sp. nov. (Fig. 5). MycoBank number MB841310.

Etymology: named after the host genus, *Cyclobalanopsis*. Typus: China, Guangdong Province, Shaoguan City, Lechang City, Dayaoshan Forest Farm, on diseased leaves of *Cyclobalanopsis glauca*, 4 December 2019, Shang Sun (holotype CAF 800022; ex-holotype culture CFCC 54328).

Conidiomata in culture sporodochial, solitary, erumpent, pulvinate, dark brown, 250 to 700 μm in diameter, exuding black conidial masses. Conidiophores indistinct, usually reduced to conidiogenous cells. Conidiogenous cells hyaline, smooth, cylindrical to spherical, annelidic, 6 to 8 by 2 to 4.5 μm, mean ± SD = 7.2 ± 0.9 by 3.6 ± 0.8 μm. Conidia fusoid, curved, 4-septate, smooth, slightly constricted at the septa, (18.5)20 to 24.5(25.5) by (6)6.5 to 8(8.5) μm, mean ± SD = 22.3 ± 1.3 by 7.3 ± 0.5 μm, L/W = 2.6 to 3.6; basal cell obconic with a truncate base, thin-walled, hyaline to pale brown, 4 to 6(6.5) μm; median cells 3, trapezoid or...
subcylindrical, concolorous, brown, thick-walled, the first median cell from base 4.5 to 6(6.5) μm long, the second cell (3.5)4 to 5 μm long, the third cell (4)4.5 to 5.5 μm long, together 13 to 15.5(16) μm long; apical cell conic with an acute apex, thin-walled, hyaline to pale brown, 3 to 4 μm long; basal appendage unbranched, tubular, centric, straight, (2)2.5 to 5.5 (6.5) μm long, mean ± SD = 3.8 ± 1.5 μm; apical appendages, 2 to 5, unbranched, tubular, bent, (5.5)7 to 13(14.5) μm long, mean ± SD = 10.1 ± 3 μm. Sexual morph unknown.

Colonies on MEA flat, spreading, with flocculent aerial mycelium forming concentric rings and entire, hazel to off-white, reaching a 70-mm diameter after 10 days at 25°C, sterile; on PDA, flat, spreading, with flocculent aerial mycelium forming concentric rings and undulate edge, white to luteous, reaching a 50-mm diameter after 10 days at 25°C, forming dark brown conidiomata with black conidial masses.

Additional material examined, China, Guangdong Province, Shaoguan City, Lechang City, Dayaoshan Forest Farm, on diseased leaves of Cyclobalanopsis glauca, 4 December 2019, Shang Sun (CFCC 55891).

Notes: Pestalotiopsis cyclobalanopsidis is closely related to P. castanopsidis, P. guizhouensis, and P. jesteri (Fig. 1). However, P. cyclobalanopsidis differs from them by distinctly curved conidia (24).
Pestalotiopsis foliicola Ning Jiang, sp. nov. (Fig. 6). MycoBank number MB843388.

Etymology: folium = “leaf” and -cola = “inhabiting”; in reference to substrate origin of the type strain, leaves. Typus: China, Jiangxi Province, Xinyu City, Fengyi County, Dagangshan Nature Reserve, on diseased leaves of Castanopsis faberi, 13 November 2019, Shang Sun (holotype CAF 800045; ex-holotype culture CFCC 54440).

Conidiomata in culture sporodochial, aggregated or solitary, erumpent, pulvinate, black, 100 to 450 μm in diameter, exuding black conidial masses. Conidiophores indistinct, usually reduced to conidiogenous cells. Conidiogenous cells hyaline, smooth, cylindrical to ampulliform, annelidic, 6.5 to 20 by 2.5 to 6.5 μm, mean ± SD = 12.7 ± 4.2 by 3.1 ± 1.2 μm. Conidia fusoid, straight or slightly curved, 4-septate, smooth, slightly constricted at the septa, (19.5)20 to 23(24) by (7)7.5 to 9(9.5) μm, mean ± SD = 21.5 ± 1.5 by 8.5 ± 0.5 μm, L/W = 2.1 to 2.9; basal cell obconic with a truncate base, thin-walled, hyaline or pale brown, (3)3.5 to 5(6) μm; median cells 3, trapezoid or subcylindrical, concolorous, pale brown to brown, thick-walled, the first median cell from base (4)4.5 to 5.5(6) μm long, the second cell (4)4.5 to 5.5(6) μm long, the third cell (3)4.5 to 5.5(6) μm long, together (10.5)13.5 to 15.5(16) μm long; apical cell conic with an acute apex, thin-walled, hyaline or pale brown, (2.5)3 to 4.5(4.5) μm long; basal appendage single, unbranched, tubular, centric, straight or slightly bent, (3)3.5 to 4.5(5) μm long, mean ± SD = 3.7 ± 0.7 μm; apical
appendages, 2 or 3, unbranched, tubular, centric, straight or bent, (10.5)14 to 26(37) μm long, mean ± SD = 20 ± 5.8 μm. Sexual morph unknown.

Colonies on MEA flat, with flocculent aerial mycelium and crenate edge, white, reaching a 35-mm diameter after 10 days at 25°C, sterile; on PDA, flat, spreading, with flocculent aerial mycelium and irregular edge, white to isabelline, reaching a 40-mm diameter after 10 days at 25°C, forming black conidiomata with black conidial masses.

Additional materials examined, China, Jiangxi Province, Xinyu City, Fenyi County, Dagangshan Nature Reserve, on diseased leaves of Castanopsis faberi, 13 November 2019, Shang Sun (CFCC 57359 and CFCC 57360).

Notes: Three isolates of Pestalotiopsis foliicola from Castanopsis faberi clustered into a distinct clade phylogenetically close to P. pinicola and P. rosea (Fig. 1). However, P. foliicola differs from P. pinicola and P. rosea by wider conidia (7 to 9.5 μm in P. foliicola versus 5 to 7 μm in P. pinicola and 5.7 to 7 μm in P. rosea) (25, 26).

Pestalotiopsis guangxiensis Ning Jiang, sp. nov. (Fig. 7). MycoBank number MB841311. Etymology: named after the collection site of the type specimen, Guangxi Zhuang Autonomous Region. Typus: China, Guangxi Zhuang Autonomous Region, Nanning City, Qingxiushan District, Qingxiushan Park, on diseased leaves of Quercus griffithii, 4 December 2019, Dan-ran Bian (holotype CAF 800023; ex-holotype culture CFCC 54308).

Conidiomata in culture sporodochial, aggregated or solitary, erumpent, pulvinate, black, 350 to 800 μm in diameter, exuding black conidial masses. Conidiophores indistinct, usually
reduced to conidiogenous cells. Conidiogenous cells hyaline, smooth, cylindrical to subcyllindrical, annelidic, 8.5 to 17.5 by 2 to 5 \( \mu \)m, mean \( \pm SD = 11.4 \pm 2.7 \) by 3.1 \( \pm 1.3 \) \( \mu \)m. Conidia fusoid, straight or slightly curved, 4-septate, smooth, slightly constricted at the septa, (17.5)18 to 20.5(21) by (7.5)8 to 99.5 \( \mu \)m, mean \( \pm SD = 19.2 \pm 1.2 \) by 8.3 \( \pm 0.5 \) \( \mu \)m, \( L/W = 1.9 \) to 2.6; basal cell obconic with a truncate base, thin-walled, hyaline, 2.5 to 4.5 \( \mu \)m; median cells 3, trapezoid or subcyllindrical, concolorous, brown, thick-walled, the first median cell from base 4 to 4.5 \( \mu \)m long; the second cell 4 to 5(5.5) \( \mu \)m long; the third cell 4 to 5 \( \mu \)m long, together (12)12.5 to 13.5(14) \( \mu \)m long; apical cell conic with an acute apex, thin-walled, hyaline, (2)2.5 to 3(3.5) \( \mu \)m long; basal appendage unbranched, tubular, centric, straight, (3)3.5 to 4(4.5) \( \mu \)m long, mean \( \pm SD = 4 \pm 0.5 \) \( \mu \)m; apical appendages, 2 or 3, unbranched, tubular, centric, straight or slightly bent, (14)15 to 18.5(19) \( \mu \)m long, mean \( \pm SD = 16.8 \pm 1.9 \) \( \mu \)m. Sexual morph unknown.

Colonies on MEA flat, spreading, with flocculent aerial mycelium forming radially folded surface and undulate edge, isabelline, reaching a 55-mm diameter after 10 days at 25°C, producing yellow droplet, sterile; on PDA, flat, spreading, with flocculent aerial mycelium and crenate edge, white to fawn, reaching a 65-mm diameter after 10 days at 25°C, forming black conidiomata with black conidial masses.

Additional material examined, China, Guangxi Zhuang Autonomous Region, Nanning City, Qingxiushan District, Qingxiushan Park, on diseased leaves of *Quercus griffithii*, 4 December 2019, Dan-ran Bian (CFCC 54300).

Notes: Two isolates of *P. guangxiensis* from *Quercus griffithii* formed a well-supported clade phylogenetically close to *P. disseminata* (Fig. 1). *P. guangxiensis* can be distinguished from *P. disseminata* by wider conidia (7.5 to 9.5 \( \mu \)m in *P. guangxiensis* versus 6.5 to 8 \( \mu \)m in *P. disseminata*) (21, 23). Additionally, *P. guangxiensis* differs from *P. disseminata* by sequence data (nucleotide differences: in the ITS, 4/506 [0.8%], 1 insertion; in *tef1*, 7/471 [1.49%], 6 insertions; in *tub2*, 1 to 3/406 [0.25 to 0.74%]).

*Pestalotiopsis guizhouensis* Ning Jiang, sp. nov. (Fig. 8). MycoBank number MB843389. Etymology: named after the collection site of the type specimen, Guizhou Province. Typus: China, Guizhou Province, Zunyi City, Suiyang County, Kuankuoshui Natural Reserve, on diseased leaves of *Cyclobalanopsis glauca*, 23 November 2019, Dan-ran Bian (holotype CAF 800046; ex-holotype culture CFCC 54803).

Conidiomata in culture sporodochial, aggregated or solitary, erumpent, pulvinate, black, 100 to 400 \( \mu \)m in diameter, exuding black conidial masses. Conidiophores indistinct, usually reduced to conidiogenous cells. Conidiogenous cells hyaline, smooth, ampulliform to spheroid, fusoid, straight or slightly curved, 4-septate, smooth, slightly constricted at the septa, 22.5 to 25.5(26.5) by (7)7.5 to 8.5(9.5) \( \mu \)m; basal cell obconic with a truncate base, thin-walled, hyaline, (2)2.5 to 3(3.5) \( \mu \)m long; the first median cell from base (4)4.5 to 5.5(6) \( \mu \)m long, the second cell 4 to 5(5.5) \( \mu \)m long, the third cell (4)4.5 to 5.5(6) \( \mu \)m long, together (12)12.5 to 13.5(14) \( \mu \)m long; apical cell conic with an acute apex, thin-walled, hyaline, (2)2.5 to 3(3.5) \( \mu \)m long; basal appendage unbranched, tubular, centric, straight, (3)3.5 to 4(4.5) \( \mu \)m long, mean \( \pm SD = 4 \pm 0.5 \) \( \mu \)m; apical appendages, 2 or 3, unbranched, tubular, centric, straight or slightly bent, (14)15 to 18.5(19) \( \mu \)m long, mean \( \pm SD = 16.8 \pm 1.9 \) \( \mu \)m. Sexual morph unknown.

Colonies on MEA flat, spreading, with flocculent aerial mycelium and entire edge, sienna, reaching a 55-mm diameter after 10 days at 25°C, producing yellow droplet, sterile; on PDA, flat, spreading, with flocculent aerial mycelium and crenate edge, white to fawn, reaching a 65-mm diameter after 10 days at 25°C, forming black conidiomata with black conidial masses.

Additional material examined, China, Guizhou Province, Zunyi City, Suiyang County, Kuankuoshui Natural Reserve, on diseased leaves of *Cyclobalanopsis glauca*, 23 November 2019, Dan-ran Bian (holotype CAF 800046; ex-holotype culture CFCC 54803).

Notes: Two isolates of *Pestalotiopsis guizhouensis* from *Cyclobalanopsis glauca* clustered into a distinct clade phylogenetically close to *P. cyclobalanopsidis* (Fig. 1). However, *P. guizhouensis*
differs from *P. cyclobalanopsidis* by conidial shape (straight or slightly curved conidia in *P. guizhouensis* versus distinctly curved conidia in *P. cyclobalanopsidis*).

**Pestalotiopsis kenyana** S. S. Maharachch, K. D. Hyde & P. W. Crous, *Studies in Mycology* 79:158 (2014).

Conidiomata in culture sporodochial, solitary, erumpent, pulvinate, black, 150 to 650 μm in diameter, exuding black conidial masses. Conidiophores indistinct, usually reduced to conidiogenous cells. Conidiogenous cells hyaline, smooth, cylindrical to subcylindrical, annelidic, 5.5 to 15.5 by 2 to 4.5 μm, mean ± SD = 8.9 ± 1.4 by 3.3 ± 0.9 μm. Conidia fusoid, straight or slightly curved, 4-septate, smooth, slightly constricted at the septa, (21)24 to 28(30) μm, mean ± SD = 26.1 ± 2.3 by 7.3 ± 0.5 μm, L/W = 2.6 to 4.9; basal cell obconic with a truncate base, thin-walled, hyaline or pale brown, (4)4.5 to 6.5(8.5) μm; median cells 3, trapezoid or subcylindrical, concolorous, brown, thick-walled, the first median cell from base (4.5)5 to 6(6.5) μm long, the second cell (4.5)5 to 6(8) μm long, the third cell

**FIG 8** Morphology of *Pestalotiopsis guizhouensis* (CFCC 54803). (A) Colony on PDA after 10 days at 25°C; (B) colony on MEA after 10 days at 25°C; (C) conidioma formed on PDA; (D and E) conidiogenous cells giving rise to conidia; (F and G) conidia. Bars, 300 μm (C) and 10 μm (D to G).
(4.5)5 to 6(6.5) μm long, together (13.5)15 to 17.5(19) μm long; apical cell conic with an acute apex, thin-walled, hyaline, (3)4 to 5.5(6.5) μm long; basal appendage unbranched, tubular, centric, straight or slightly bent, (2.5)4 to 6.5(8.5) μm long, mean ± SD = 5.2 ± 1.5 μm; apical appendages, 2 or 3, unbranched, tubular, centric, straight or slightly bent, (4)9 to 15(20) μm long, mean ± SD = 12.2 ± 3.1 μm. Sexual morph unknown.

Colonies on MEA flat, spreading, with flocculent aerial mycelium forming concentric rings and entire edge, white to pale luteous, reaching a 70-mm diameter after 10 days at 25°C, forming black conidiomata with black conidial masses; on PDA, flat, spreading, with flocculent aerial mycelium and entire edge, white to luteous, reaching a 70-mm diameter after 10 days at 25°C, forming black conidiomata with black conidial masses.

Materials examined: China, Henan Province, Xinyang City, Shihe District, Jigong Mountain, on diseased leaves of *Cyclobalanopsis fleuryi*, 7 August 2019, Yong Li (CFCC 55330); Henan Province, Xinyang City, Shihe District, Jigong Mountain, on diseased leaves of *Cyclobalanopsis neglecta*, 7 August 2019, Yong Li (CFCC 54732); Henan Province, Xinyang City, Shihe District, Jigong Mountain, on diseased leaves of *Castanopsis fissa*, 7 August 2019, Yong Li (CFCC 55088); Guangdong Province, Qingyuan City, Yangshan County, Guangdong Nanling Nature Reserve, on diseased leaves of *Castanopsis hystrix*, 4 December 2019, Shang Sun (CFCC 54742); Guangdong Province, Qingyuan City, Yangshan County, Guangdong Nanling Nature Reserve, on diseased leaves of *Cyclobalanopsis glauca*, 4 December 2019, Shang Sun (CFCC 54805); Guizhou Province, Zunyi City, Suiyang County, Kuankuoshui Natural Reserve, on diseased leaves of *Quercus aliena*, 23 November 2019, Dan-ran Bian (CFCC 54962); Guizhou Province, Zunyi City, Suiyang County, Kuankuoshui Natural Reserve, on diseased leaves of *Quercus aliena* var. *acutiserrata*, 23 November 2019, Dan-ran Bian (CFCC 54621 and CFCC 54618).

Notes: Eight new isolates of *Pestalotiopsis kenyana* were collected from six species and a variety of *Fagaceae*, which agree well with the ex-type strain CBS 442.67 in conidial dimension and characters (22 to 29 by 7 to 9 μm) (16). Hence, *Castanopsis fissa*, *C. hystrix*, *Cyclobalanopsis fleuryi*, *C. glauca*, *Cy. neglecta*, *Quercus aliena*, and *Q. aliena* var. *acutiserrata* become new hosts for *Pestalotiopsis kenyana*, which was originally described from *Coffea* species (16).

*Pestalotiopsis lithocarpi* Ning Jiang, sp. nov. (Fig. 9). MycoBank number MB841312. Etyymology: named after the host genus, *Lithocarpus*. Typus: China, Hainan Province, Changjiang Li Autonomous County, Bawangling National Forest Park, on diseased leaves of *Lithocarpus chiungchungensis*, 30 March 2019, Yong Li (holotype CAF 800025; ex-holotype culture CFCC 55100).

Conidiomata in culture sporodochial, solitary, erumpent, pulvinate, black, 450 to 1,100 μm in diameter, exuding black conidial masses. Conidiophores indistinct, usually reduced to conidiogenous cells. Conidiogenous cells hyaline, smooth, cylindrical to subcylindrical, anellidic, 4 to 10 by 3 to 5.5 μm, mean ± SD = 5.9 ± 2.8 by 4.2 ± 0.8 μm. Conidia fusoid, straight or slightly curved, 4-septate, smooth, slightly constricted at the septa, (17)18.5 to 21.5(23) by (5.5)6 to 7(8) μm, mean ± SD = 20.2 ± 1.4 by 6.6 ± 0.6 μm, L/W = 2.5 to 3.7; basal cell obconic with a truncate base, thin-walled, hyaline or pale brown, (3.5)4 to 5 μm; median cells 3, trapezoid or subcylindrical, concolorous, brown, thick-walled, the first median cell from base (3.5)4 to 5 μm long, the second cell 4 to 4.5(5) μm long, the third cell 4 to 5 μm long, together 12.5 to 14(14.5) μm long; apical cell conic with an acute apex, thin-walled, hyaline, (2.5)3 to 3.5 μm long; basal appendage unbranched, tubular, centric, straight or slightly bent, 2.5 to 4.5(5) μm long, mean ± SD = 3.6 ± 0.8 μm; apical appendages, 2 to 4 (mostly 3), unbranched, tubular, centric, straight or slightly bent, (9)12.5 to 21(24) μm long, mean ± SD = 16.7 ± 4.1 μm. Sexual morph unknown.

Colonies on MEA flat, spreading, with flocculent aerial mycelium forming concentric rings and entire edge, umber, reaching a 70-mm diameter after 10 days at 25°C, forming black conidiomata with black conidial masses; on PDA, flat, spreading, with flocculent aerial mycelium and feathery edge, white to pale luteous, reaching a 65-mm diameter after 10 days at 25°C, forming black conidiomata with black conidial masses.

Additional material examined, China, Hainan Province, Changjiang Li Autonomous County, Bawangling National Forest Park, on diseased leaves of *Lithocarpus chiungchungensis*, 30 March 2019, Yong Li (CFCC 55893).
Notes: Two isolates from leaf spots of Lithocarpus chiungchungensis clustered into a well-supported clade newly described here as Pestalotiopsis lithocarpi (Fig. 1). Phylogenetically, P. lithocarpi is close to P. dracontomelonis from diseased leaves of Dracontomelon dao (Anacardiaceae) collected in Thailand. Pestalotiopsis lithocarpi is similar to P. dracontomelonis in conidial size (17 to 23 by 5.5 to 8 μm in Pestalotiopsis lithocarpi versus 18 to 23 by 5.5 to 7.5 μm in P. dracontomelonis) (27). However, they can be distinguished by the length of the three median cells (12.5 to 14.5 μm in P. lithocarpi versus 13 to 17 μm in P. dracontomelonis) (27). In addition, P. lithocarpi can be distinguished from P. dracontomelonis by sequence data (nucleotide differences: in the ITS, 2/505 [0.4%], 1 insertion; in tef1, 5/457 [1.2%], 7 insertions).

Pestalotiopsis lushanensis F. Liu & L. Cai, Scientific Reports 7(no. 866):9 (2017).

Conidiomata in culture sporodochial, solitary, erumpent, pulvinate, black, 150 to 750 μm in diameter, exuding black conidial masses. Conidiophores indistinct, usually reduced to conidiogenous cells. Conidiogenous cells hyaline, smooth, cylindrical to subcylindrical, annelidic, 5.5 to 26.5 by 2.5 to 4.5 μm, mean ± SD = 13.6 ± 3.1 by 3.6 ± 0.9 μm. Conidia fusoid, straight or slightly curved, 4-septate, smooth, slightly constricted at the septa, (19.5)21 to 25

**FIG 9** Morphology of Pestalotiopsis lithocarpi (CFCC 55100). (A) Colony on PDA after 10 days at 25°C; (B) colony on MEA after 10 days at 25°C; (C) conidioma formed on PDA; (D and E) conidiogenous cells giving rise to conidia; (F and G) conidia. Bars, 500 μm (C) and 10 μm (D to G).
Conidiomata in culture sporodochial, solitary, erumpent, pulvinate, black, 50 to 500 μm in diameter, exuding black conidial masses. Conidiophores indistinct, usually reduced to conidiogenous cells. Conidiogenous cells hyaline, smooth, cylindrical to subcylindrical, anellidic, 8.5 to 19 by 2 to 4.5 μm, mean ± SD = 13.4 ± 1.7 by 2.9 ± 0.9 μm. Conidia fusoid, straight or slightly curved, 4-septate, smooth, slightly constricted at the septa, (17.5)20 to 22(23.5) by (6.5)7 to 8.5(9) μm, mean ± SD = 20.8 ± 1 by 7.6 ± 0.7 μm, L/W = 2.2 to 3.5; basal cell obconic with a truncate base, thin-walled, hyaline or pale brown, (2.5)3 to 4.5(5) μm; median cells 3, trapezoid or subcylindrical, concolorous, brown, thick-walled, the first median cell from base (4)4.5 to 5.5(6) μm long, the second cell (4)4.5 to 5.5(6) μm long, the third cell (4.5) 5 to 6(6.5) μm long, together (13)14 to 16.5(17.5) μm long; apical cell conic with an acute apex, thin-walled, hyaline, (2.5)3.5 to 4.5(5.5) μm long; basal appendage unbranched, tubular, centric, straight or slightly bent, (5.5)6 to 9(11) μm long, mean ± SD = 7.5 ± 1.4 μm; apical appendages, 3, unbranched, tubular, centric, straight or slightly bent, (10.5)15 to 22.5(26.5) μm long, mean ± SD = 18.6 ± 3.7 μm. Sexual morph unknown.

Colonies on MEA flat, spreading, with flocculent aerial mycelium forming concentric rings, radially folded surface and entire edge, white to isabelline, reaching a 70-mm diameter after 10 days at 25°C, forming black conidiomata with black conidial masses; on PDA, flat, spreading, with flocculent aerial mycelium forming concentric rings and entire edge, white to pale luteous, reaching a 70-mm diameter after 10 days at 25°C, forming black conidiomata with black conidial masses.

Materials examined: China, Guizhou Province, Zunyi City, Suiyang County, Kuankuoshui Natural Reserve, on diseased leaves of Quercus serrata, 23 November 2019, Dan-ran Bian (CFCC 54894).

Notes: A new isolate of Pestalotiopsis lushanensis was collected from Quercus serrata, which agrees well with the ex-type strain LC4344 in conidial dimension and characters (20 to 27 by 7.5 to 10 μm in LC4344) (18). Hence, Quercus serrata becomes a new host for Pestalotiopsis lushanensis, which was originally described from Camellia sp. (18).

Pestalotiopsis nanjingensis Qin Yang & He Li, Journal of Fungi 7(12, no. 1080):21 (2021).

Conidiomata in culture sporodochial, solitary, erumpent, pulvinate, black, 50 to 500 μm in diameter, exuding black conidial masses. Conidiophores indistinct, usually reduced to conidiogenous cells. Conidiogenous cells hyaline, smooth, cylindrical to subcylindrical, anellidic, 8.5 to 19 by 2 to 4.5 μm, mean ± SD = 13.4 ± 1.7 by 2.9 ± 0.9 μm. Conidia fusoid, straight or slightly curved, 4-septate, smooth, slightly constricted at the septa, (17.5)20 to 22(23.5) by (6.5)7 to 8.5(9) μm, mean ± SD = 20.8 ± 1 by 7.6 ± 0.7 μm, L/W = 2.2 to 3.5; basal cell obconic with a truncate base, thin-walled, hyaline or pale brown, (2.5)3 to 4.5(5) μm; median cells 3, trapezoid or subcylindrical, concolorous, brown, thick-walled, the first median cell from base 4 to 5(5.5) μm long, the second cell (4)4.5 to 5.5(6) μm long, the third cell (4)4.5 to 5.5(7) μm long, together (13)14 to 16.5(17.5) μm long; apical cell conic with an acute apex, thin-walled, hyaline, (2.5)3 to 4(4.5) μm long; basal appendage unbranched, tubular, centric, straight or slightly bent, (2.5)3 to 5(6.5) μm long, mean ± SD = 4.3 ± 0.9 μm; apical appendages, 2 or 3, unbranched, tubular, centric, straight or slightly bent, (8.5)11.5 to 16.5(20.5) μm long, mean ± SD = 14 ± 2.7 μm. Sexual morph unknown.

Colonies on MEA flat, spreading, with flocculent aerial mycelium and undulate edge, white to pale luteous, reaching a 60-mm diameter after 10 days at 25°C, forming black conidiomata with black conidial masses; on PDA, flat, spreading, with flocculent aerial mycelium forming concentric rings and undulate edge, white to pale gray, reaching a 70-mm diameter after 10 days at 25°C, forming black conidiomata with black conidial masses.

Material examined, China, Henan Province, Xinyang City, Shihe District, Jigong Mountain, on diseased leaves of Quercus aliena, 7 August 2019, Yong Li (CFCC 53882).

Notes: A new isolate of Pestalotiopsis nanjingensis was collected from Quercus aliena, which has ITS, tef1, and tub2 sequences identical to those of the ex-type strain CSUFTCC16 (28). Hence, Quercus aliena becomes a new host for Pestalotiopsis nanjingensis, which was originally described from Camellia oleifera (28).

Pestalotiopsis neolitsea H. A. Ariyaw & K. D. Hyde, Mycosphere 9(5):1005 (2018).

Conidiomata in culture sporodochial, solitary, erumpent, pulvinate, black, 250 to 800 μm in diameter, exuding black conidial masses. Conidiophores indistinct, usually reduced to conidiogenous cells. Conidiogenous cells hyaline, smooth, cylindrical to subcylindrical, anellidic, 6 to 10 by 2.5 to 4 μm, mean ± SD = 7.7 ± 1.3 by 3.4 ± 0.6 μm. Conidia fusoid, straight or slightly curved, 4-septate, smooth, slightly
constricted at the septa, (19)20 to 22.5(23.5) by 5.5 to 6.5(7) μm, mean ± SD = 21.2 ± 1.3 by 6.1 ± 0.4 μm, L/W = 2.8 to 4.1; basal cell obconic with a truncate base, thin-walled, hyaline or pale brown, 3.5 to 5(6) μm; median cells 3, trapezoid or subcylindrical, concolorous, brown, thick-walled, the first median cell from base 4.5 to 5 μm long, the second cell 4 to 5(5.5) μm long, the third cell 4.5 to 5 μm long, together 13 to 14.5 μm long; apical cell conic with an acute apex, thin-walled, hyaline, (2.5)3 to 4.5 μm long; basal appendage unbranched, tubular, centric, straight or slightly bent, (2)2.5 to 3.5 μm long, mean ± SD = 2.9 ± 0.6 μm; apical appendages, 2 or 3, unbranched, tubular, centric, straight or slightly bent, (9.5)11 to 14 (14.5) μm long, mean ± SD = 12.6 ± 1.6 μm. Sexual morph unknown.

Colonies on MEA flat, spreading, with flocculent aerial mycelium forming concentric rings and undulate edge, white to pale gray, reaching a 30-mm diameter after 10 days at 25°C, sterile; on PDA, flat, spreading, with flocculent aerial mycelium and entire edge, white, reaching a 70-mm diameter after 10 days at 25°C, forming black conidiomata with black conidial masses.

Material examined, China, Hunan Province, Changsha City, Changsha Forest Botanical Garden, on diseased leaves of Lithocarpus amygdaIifolius, 9 November 2020, Cheng-ming Tian and Ning Jiang (CFCC 54590).

Notes: A new isolate of Pestalotiopsis neolitseae was collected from Lithocarpus amygdaIifolius, which agrees well with the type specimen in conidial dimension and characters (29). Hence, Lithocarpus becomes a new host genus for Pestalotiopsis neolitseae, which was originally described from Neolitsea villoSa (Lauraceae).

Pestalotiopsis rhodomyrtus Yu Song, K. Geng, K. D. Hyde & Yong Wang bis, Phytotaxa 126(1): 27 (2013).

Conidiomata in culture sporodochial, solitary, erumpent, pulvinate, black, to 450 μm in diameter, exuding black conidial masses. Conidiophores indistinct, usually reduced to conidiogenous cells. Conidiogenous cells hyaline, smooth, cylindrical to subcylindrical, annelidic, 2.5 to 6 by 2.5 to 4 μm, mean ± SD = 4.3 ± 1.1 by 2.9 ± 0.8 μm. Conidia fusoid, straight or slightly curved, 4-septate, smooth, slightly constricted at the septa, (20)21.5 to 24.5(27) by (6) 6.5 to 7.5(8) μm, mean ± SD = 23 ± 1.7 by 7 ± 0.5 μm, L/W = 2.6 to 3.8; basal cell obconic with a truncate base, thin-walled, hyaline or pale brown, (3)3.5 to 5(6) μm; median cells 3, trapezoid or subcylindrical, concolorous, brown, thick-walled, the first median cell from base (4)4.5 to 6(6.5) μm long, the second cell (4.5)5 to 5.5(6) μm long, the third cell (4)4.5 to 5.5(6) μm long, together (13.5)14.5 to 16.5(18) μm long; apical cell conic with an acute apex, thin-walled, hyaline, (2.5)3 to 4.5(5) μm long; basal appendage unbranched, tubular, centric, straight or slightly bent, (2)3 to 5.5(7) μm long, mean ± SD = 4.3 ± 1.3 μm; apical appendages, 2 or 3, unbranched, tubular, centric, straight or slightly bent, (8)9.5 to 14.5(17.5) μm long, mean ± SD = 12 ± 2.4 μm. Sexual morph unknown.

Colonies on MEA flat, spreading, with flocculent aerial mycelium forming concentric rings and undulate edge, white to amber, reaching a 65-mm diameter after 10 days at 25°C, forming black conidiomata with black conidial masses; on PDA, flat, spreading, with flocculent aerial mycelium forming concentric rings and undulate edge, pale gray, reaching a 70-mm diameter after 10 days at 25°C, forming black conidiomata with black conidial masses.

Materials examined: China, Guizhou Province, Zunyi City, Suiyang County, Kuankuoshui Natural Reserve, on diseased leaves of Cyclobalanopsis augustinii, 23 November 2019, Dan-ran Bian (CFCC 55052); Shaanxi Province, Hanzhong City, Foping County, Dongshan Mountain, on diseased leaves of Quercus aliena, 7 September 2019, Yong Li (CFCC 54733).

Notes: Two new isolates of Pestalotiopsis rhodomyrtus were collected from Cyclobalanopsis augustinii and Quercus aliena, which agree with the type specimen in conidial dimension and characters (30). Hence, Cyclobalanopsis augustinii and Quercus aliena become new hosts for Pestalotiopsis rhodomyrtus, which was originally described from Rhodomyrtus tomentosa (Myrtaceae) (30).

Pestalotiopsis shaanxiensis Ning Jiang, sp. nov. (Fig. 10). MycoBank number MB843390. Etymology: named after the collection site of the type specimen, Shaanxi Province. Typus: China, Shaanxi Province, Hanzhong City, Foping County, Dongshan Mountain, on diseased leaves of Quercus variabilis, 7 September 2019, Yong Li (holotype CAF 800047; ex-holotype culture CFCC 54958).
Conidiomata in culture sporodochial, aggregated or solitary, erumpent, pulvinate, black, 100 to 550 \( \mu m \) in diameter, exuding black conidial masses. Conidiophores indistinct, usually reduced to conidiogenous cells. Conidiogenous cells hyaline, smooth, cylindrical to spherical, annelidic, 7 to 15 by 2 to 5.5 \( \mu m \), mean ± SD = 10.5 ± 3 by 4.3 ± 1.1 \( \mu m \). Conidia fusoid, straight or slightly curved, 4-septate, smooth, slightly constricted at the septa, (21)22 to 24.5(25) by (7)7.5 to 8.5(9) \( \mu m \), mean ± SD = 23.1 ± 1.3 by 8 ± 0.4 \( \mu m \), L/W = 2.5 to 3.3; basal cell obconic with a truncate base, thin-walled, hyaline or pale brown, (3.5)4 to 5(5.5) \( \mu m \); median cells 3, trapezoid or subcylindrical, concolorous, pale brown to brown, thick-walled, the first median cell from base (4)4.5 to 5.5(6) \( \mu m \) long, the second cell (4.5)5 to 5.5(6) \( \mu m \) long, the third cell (4.5)5 to 5.5(6) \( \mu m \) long, together (13.5)14.5 to 16.5(17.5) \( \mu m \) long; apical cell conic with an acute apex, thin-walled, hyaline or pale brown, (3)3.5 to 4.5(5) \( \mu m \) long; basal appendage single, unbranched, tubular, centric, straight or slightly bent, (1.5)2.5 to 6(7.5) \( \mu m \) long, mean ± SD = 4.2 ± 1.6 \( \mu m \); apical appendages, 3, unbranched, tubular, centric, straight or slightly bent, (13)13.5 to 18(22) \( \mu m \) long, mean ± SD = 15.6 ± 2.3 \( \mu m \). Sexual morph unknown.

**FIG 10** Morphology of *Pestalotiopsis shaanxiensis* (CFCC 54958). (A) Colony on PDA after 10 days at 25°C; (B) colony on MEA after 10 days at 25°C; (C) conidiomata formed on PDA; (D and E) conidiogenous cells giving rise to conidia; (F and G) conidia. Bars, 200 \( \mu m \) (C) and 10 \( \mu m \) (D to G).
Colonies on MEA flat, spreading, with flocculent aerial mycelium forming concentric rings and undulate edge, white to pale luteous, reaching a 40-mm diameter after 10 days at 25°C, forming black conidiomata with black conidial masses; on PDA, flat, spreading, with flocculent aerial mycelium forming concentric rings and entire edge, white, reaching a 70-mm diameter after 10 days at 25°C, forming black conidiomata with black conidial masses.

Additional material examined, China, Shaanxi Province, Hanzhong City, Foping County, Dongshan Mountain, on diseased leaves of *Quercus variabilis*, 7 September 2019, Yong Li (CFCC 57356).

Notes: Two isolates of *Pestalotiopsis shaanxiensis* from *Quercus variabilis* formed a distinct clade phylogenetically close to *P. biciliata* and *P. camelliae-oleiferae* (Fig. 1). Morphologically, *P. shaanxiensis* has obviously wider conidia than *P. camelliae-oleiferae* (7 to 9 μm in *P. shaanxiensis* versus 5 to 7 μm in *P. camelliae-oleiferae*) (28). *P. shaanxiensis* can be distinguished from *P. biciliata* by one versus two basal appendages in the latter (16).

*Pestalotiopsis silvicola* Ning Jiang, sp. nov. (Fig. 11). MycoBank number MB843391. Etymology: *silva* = “forest” and *-cola* = “inhabiting”; in reference to its woody host. Typus: China, Hainan Province, Changjiang Li Autonomous County, Bawangling National Forest Park, on diseased leaves of *Cyclobalanopsis kerrii*, 30 March 2019, Yong Li (holotype CAF 800048; ex-holotype culture CFCC 55296).

Conidiomata in culture sporodochial, aggregated or solitary, erumpent, pulvinate, black, 50 to 450 μm in diameter, exuding black conidial masses. Conidiophores indistinct, usually reduced to conidiogenous cells. Conidiogenous cells hyaline, smooth, cylindrical to spherical, annelidic, 7.5 to 15 by 3 to 6 μm, mean ± SD = 10 ± 2.2 by 4 ± 1 μm. Conidia fusoid, straight or slightly curved, 4-septate, smooth, slightly con-stricted at the septa, (20)21 to 24(26) by (6)6.5 to 7.5(8.5) μm, mean ± SD = 22.5 ± 1.8 by 7 ± 0.7 μm, L/W = 2.6 to 3.8; basal cell obconic with a truncate base, thin-walled, hya-line or pale brown, (2.5)4 to 5.5(6) μm; median cells 3, trapezoid or subcylindrical, concolorous, brown, thick-walled, the first median cell from base (4)4.5 to 5 μm long, the second cell (3.5)4 to 5(6) μm long, the third cell 4 to 4.5(5.5) μm long, together (12)13 to 15(16) μm long; apical cell conic with an acute apex, thin-walled, hyaline, (3)4 to 5(5.5) μm long; basal appendages, 1 to 2, unbranched, tubular, centric, straight or slightly bent, (3.5)4.5 to 7(8) μm long, mean ± SD = 5.6 ± 1.1 μm; apical appendages, 3, unbranched, tubular, centric, straight or bent, (12)12.5 to 18.5(22.5) μm long, mean ± SD = 15.6 ± 2.9 μm. Sexual morph unknown.

Colonies on MEA flat, spreading, with flocculent aerial mycelium forming concentric rings and entire edge, white, reaching a 60-mm diameter after 10 days at 25°C, forming black conidiomata with black conidial masses; on PDA, flat, spreading, with flocculent aerial mycelium and undulate edge, white, reaching a 60-mm diameter after 10 days at 25°C, forming black conidiomata with black conidial masses.

Additional materials examined, China, Hainan Province, Changjiang Li Autonomous County, Bawangling National Forest Park, on diseased leaves of *Cyclobalanopsis kerrii*, 30 March 2019, Yong Li (CFCC 54915 and CFCC 57363).

Notes: Three isolates of *Pestalotiopsis silvicola* from *Cyclobalanopsis kerrii* clustered into a distinct clade phylogenetically close to *P. aggestorum*, *P. colombiensis*, and *P. jinchanghensis* (Fig. 1). Morphologically, they share similar conidial characters. However, *P. silvicola* can be distinguished by sequence data (nucleotide differences from *P. aggestorum*: in the ITS, 1/505 [0.2%]; in *tef1*, 1/464 [0.22%]; in *tub2*, 1/441 [0.23%]; from *P. colombiensis*: in the ITS, 2/505 [0.4%]; in *tef1*, 8/464 [1.72%]; in *tub2*, 2/441 [0.45%]; from *P. jinchanghensis*: in the ITS, 1/500 [0.2%]; in *tef1*, 18/464 [3.88%], 4-bp insertions; in *tub2*, 1/441 [0.23%]).

**DISCUSSION**

In the present study, 43 isolates from *Fagaceae* leaf spots in China belonging to 16 *Pestalotiopsis* species were characterized. However, we investigated only 20 *Fagaceae*
hosts of more than 320 reported species in China, and several provinces were not deeply investigated. Based on morphology and phylogeny, 10 of the 16 species described here have been proven to be new, indicating that many hidden Pestalotiopsis species may remain to be discovered from Fagaceae in the future.

Species of Pestalotiopsis are usually isolated from plant leaves (7, 8, 16, 18, 25). Two plurivorous species, Pestalotiopsis kenyana and P. monochaeta, were previously recorded from Castanea henryi and C. mollissima in China and from Quercus robur in the Netherlands, respectively (6, 16). These two species are not host-specific as they have been reported from various unrelated hosts, such as Camellia sinensis (Theaceae), Coffea sp. (Rubiaceae), and Taxus baccata (Taxaceae) (6, 16, 18). In the present study, 15 additional species are newly recorded from leaves of Fagaceae (Table 1), of which 10 are so far known only from fagaceous hosts.

FIG 11. Morphology of Pestalotiopsis silvicola (CFCC 55296). (A) Colony on PDA after 10 days at 25°C; (B) colony on MEA after 10 days at 25°C; (C) conidiomata formed on PDA; (D and E) conidiogenous cells giving rise to conidia; (F and G) conidia. Bars, 300 μm (C) and 10 μm (D to G).
Among pestalotioid species, appendages vary in number, origin, position, numbers of branches and the branching patterns (8). These characters have been proven appropriate and useful in delineating certain genera (8). For example, Seimatosporium is different from Sporocadus in that it forms appendages (9). However, Pestalotiopsis changjiangensis discovered in the present study is characterized by having only a single short, indistinct apical appendage, which is unique in Pestalotiopsis (Fig. 4).

This study revealed 16 Pestalotiopsis species associated with Fagaceae leaf spot symptoms in China. Further studies are now required, however, to confirm their pathogenicity.

MATERIALS AND METHODS

Sample collection and isolation. Fresh specimens of diseased fagaceous leaves were collected from Anhui, Guangdong, Guangxi, Guizhou, Hainan, Henan, Hunan, Jiangxi, Shaanxi, and Sichuan Provinces in China from 2016 to 2021. A total of four host genera, 18 species, and one variety were investigated in the present study, viz., Castanopsis fuzibei, C. fusa, C. hainanensis, C. hystrix, C. lamortii, C. tonkinensis, Cyclobalanopsis augustinii, Cy. austrocochinchinensis, Cy. Reurji, Cy. glaucus, Cy. kentii, Cy. neglecta, Lithocarpus amygdalifolius, L. chinghungen-sis, Quercus aleno, Q. aleno var. acutiserrata, Q. griffithii, Q. semata, and Q. variabilis. The leaf samples were packed in paper bags and transferred to the laboratory for fungal isolation.

The leaf samples with typical spot symptoms were first surface sterilized for 1 min in 75% ethanol, 3 min in 1.25% sodium hypochlorite, and 1 min in 75% ethanol, then rinsed for 2 min in distilled water, and blotted on dry sterile filter paper. Then, the diseased areas of the leaves were cut into 0.5- by 0.5-cm pieces using an aseptic razor blade, transferred onto the surface of potato dextrose agar (PDA; 20 g potatoes, 20 g dextrose, 20 g agar per L) and malt extract agar (MEA; 30 g malt extract, 5 g mycological peptone, 15 g agar per L) plates, and incubated at 25°C to obtain fungal hyphae. Hyphal tips were then removed to new PDA plates to obtain pure cultures. The cultures were deposited in the China Forestry Culture Collection Center (CFCC; http://cfcc.caf.ac.cn/)

DNA extraction, sequencing, and phylogenetic analyses. Genomic DNA was extracted from colonies grown on cellophane-covered PDA using a CTAB (cetyltrimethylammonium bromide) method (31). The amount of DNA was estimated by electrophoresis in 1% agarose gels, and the quality was measured using a NanoDrop 2000 instrument (Thermo Scientific, Waltham, MA, USA) following the user manual. The following primers were used for amplification of the gene regions sequenced in the present study: ITS1/ITS4 for the 5.8S nuclear ribosomal DNA gene with the two flanking internally transcribed spacer (ITS1 and ITS2) regions (32), EF1-72BF/E2F2 for the translation elongation factor 1-α (tef1) gene (33, 34), and T1/Bt2b and Bt2a/Bt2b for the beta-tubulin (tub2) gene (35, 36). The PCR conditions were set as follows: an initial denaturation step of 5 min at 94°C, followed by 35 cycles of 30 s at 94°C, 50 s at 52°C (ITS) or 54°C (tef1 and tub2), and 1 min at 72°C, and a final elongation step of 7 min at 72°C. PCR amplification products were checked via electrophoresis in 2% agarose gels. DNA sequencing was performed using an ABI Prism 3730XL DNA analyzer with a BigDye Terminator kit v.3.1 (Invitrogen, USA) at the Shanghai Invitrogen Biological Technology Company Limited (Beijing, China).

The nucleotide sequence data from the present study were deposited in GenBank, and the specimens in the herbarium of the Chinese Academy of Forestry (CAF; http://museum.caf.ac.cn/).

The quality of the amplified nucleotide sequences was checked and the sequences assembled using SeqMan v.7.1.0. Reference sequences were retrieved from the National Center for Biotechnology Information (NCBI). Sequences were aligned using MAFFT v.6.377 and corrected manually using MEGA 6.38. The phylogenetic analyses of the combined matrices were performed using maximum-likelihood (ML) and Bayesian inference (BI) methods. ML was implemented on the CIPRES Science Gateway portal (https://www.phylo.org) using RAxML-HPC BlackBox 8.2.10 (39), employing a GTR+GAMMA substitution model with 1,000 bootstrap replicates, while BI was performed using a Markov chain Monte Carlo (MCMC) algorithm in MrBayes v. 3.0 (40). Two MCMC chains were run, starting from random trees, for 1,000,000 generations, and trees were sampled every 100th generation, resulting in a total of 10,000 trees. The first 25% of trees were discarded as burn-in of each analysis. Branches with significant Bayesian posterior probabilities (BPP) were estimated in the remaining 7,500 trees. Phylogenetic trees were viewed with FigTree v.1.3.1 and graphically processed by Adobe Illustrator CS5.

For closely related species with similar morphology, ITS, tef1, and tub2 sequences of the respective species were compared and transposed. For this, the sequences of species pairs were aligned and the parts containing leading/trailing gaps were removed. Sequence differences of this alignment are recorded in the following way: number of nucleotide substitutions (excluding insertions and gaps)/total number of nucleotide characters, percent of sequence substitutions (in brackets), and the number of base pair insertions and gaps.

Morphology. The morphological data of the isolates collected in the present study were obtained from sporulating pure cultures grown on PDA or MEA at the dark at 25°C. The conidiomata were observed and photographed using a dissecting microscope (M205 C; Leica, Wetzlar, Germany). Microscope slides of conidiogenous cells and conidia were prepared in tap water, and the slides were examined and photographed with an Axio Imager 2 microscope (Zeiss, Oberkochen, Germany) equipped with an AxioCam 506 color camera or a Nikon Eclipse 80i microscope (Nikon, Tokyo, Japan) equipped with a Nikon digital sight DS-R2 camera, using differential interference contrast (DIC) illumination. For measurements, 50 conidia were randomly selected. Measurement of the conidial size included maximum and minimum in parentheses and the range representing the mean ± standard deviation of the measurements given in parentheses. Culture characteristics were recorded from 9-cm PDA or MEA plates after 10 days incubation at 25°C in the dark. To enable comparison of species growing on fagaceous hosts, available measurement data and sequence data are summarized in Table 1.

Data availability. The nucleotide sequence data from the present study were deposited in GenBank, and the accession numbers are listed in Table 2.
| Species | Isolate | Host/substrate | Origin | ITs | tub2 | tef1 |
|---------|---------|----------------|--------|-----|------|------|
| Neopestalotioptis magna | MFLUCC 12-0652<sup>b</sup> | Pteridium sp. | France | KF582795 | KF582793 | KF582791 |
| Pestalotioptis abietis | CFCC 53011<sup>b</sup> | Abies fargesii | China | MK397013 | MK622280 | MK622277 |
| | CFCC 53012 | Abies fargesii | China | MK397014 | MK622281 | MK622278 |
| P. adusta | ICMP 6088<sup>b</sup> | Refrigerator door | Fiji | JX399006 | JX399037 | JX399070 |
| P. agestorum | MFLCC 10-146<sup>b</sup> | Syzygium sp. | Thailand | JX399007 | JX399038 | JX399071 |
| P. anacardiacearum | IFRDCC 2397<sup>b</sup> | Mangifera indica | China | KC247154 | KC247155 | KC247156 |
| P. anhuensis | CFCC 54791<sup>b</sup> | Cyclobalanopsis glauca | China | ON007028 | ON005056 | ON005045 |
| P. arceuthobii | CBS 434.65<sup>b</sup> | Arceuthobium campylopodum | USA | KM199341 | KM199427 | KM199516 |
| P. arenga | CBS 331.92<sup>b</sup> | Aragena undulatifolia | Singapore | KM199340 | KM199426 | KM199515 |
| P. australasiae | CBS 114126<sup>b</sup> | Knightia sp. | New Zealand | KM199297 | KM199409 | KM199499 |
| P. australis | CBS 111503<sup>b</sup> | Protea sp. | New South Wales | KM199298 | KM199410 | KM199501 |
| P. biciliata | CBS 124463<sup>b</sup> | Platana × hispanica | Slovakia | KM199308 | KM199309 | KM199505 |
| P. brassicae | CBS 236.38<sup>b</sup> | Paeonia sp. | Italy | KM199309 | KM199401 | KM199506 |
| P. castanopsidis | CFCC 54340<sup>b</sup> | Castanopsis lamontii | China | KM399732 | OK385808 | OK384983 |
| | CFCC 54305 | Castanopsis hystrix | China | KM399733 | OK385809 | OK384984 |
| | CFCC 54384 | Castanopsis hystrix | China | KM399734 | OK385810 | OK384985 |
| P. chamaeops | CBS 186.71<sup>b</sup> | Chamaeops humilis | Italy | KM199326 | KM199391 | KM199473 |
| P. clavata | MFLUCC 12-0277<sup>b</sup> | Castanopsia japonica | China | JX399010 | JX399041 | JX399074 |
| P. camelliae-oleiferae | CSUFTCC08<sup>b</sup> | Castanopsia oleifera | China | OK459593 | OK562368 | OK507963 |
| | CSUFTCC09 | Castanopsia oleifera | China | OK459594 | OK562369 | OK507964 |
| P. changiangensis | CFCC 54314<sup>b</sup> | Castanopsis tonkinensis | China | OK399739 | OK385815 | OK385800 |
| | CFCC 54433 | Castanopsis hainanensis | China | OK399740 | OK385816 | OK385801 |
| P. clavigera | MFLUCC 12-0268<sup>b</sup> | Buchux sp. | China | JX398990 | JX399025 | JX399056 |
| P. colombiensis | CBS 118553<sup>b</sup> | Eucalyptus urograndis | Colombia | KM199307 | KM199421 | KM199488 |
| P. cyclobalanopsidis | CFCC 54328<sup>b</sup> | Cylobalanopsis gauca | China | OK399735 | OK385811 | OK384986 |
| | CFCC 55891 | Cylobalanopsis gauca | China | OK399736 | OK385812 | OK384987 |
| P. digitalis | MFLU 14-0208<sup>b</sup> | Digitalis purpurea | New Zealand | KP781879 | KP781883 | NA |
| P. dilicada | LC3232 | Camellia sinensis | China | KX894961 | KX895232 | KX895178 |
| P. dilicada | LC1818 | Camellia sinensis | China | KY641438 | KY641458 | KY641448 |
| P. diplocissiae | CBS 115449 | Psychotria tutcheri | China | KM199314 | KM199416 | KM199485 |
| P. disseminata | CBS 143904 | Persea americana | New Zealand | MH554152 | MH554225 | MH554587 |
| P. diversissima | MFLU 12-0278<sup>b</sup> | Rhododendron sp. | China | JX399009 | JX399040 | JX399073 |
| P. doitungensis | MFLU 14-0115<sup>b</sup> | Dendrobium sp. | Thailand | MK975374 | MK975837 | MK975832 |
| P. dracaenica | MFLU 18-0913<sup>b</sup> | Dracaena sp. | Thailand | MN962731 | MN962733 | MN962732 |
| P. dracantomelonis | MFLU 14-0207<sup>b</sup> | Dracantome melonis | Thailand | KP781877 | NA | KP781880 |
| P. ericaeacarum | IFRDCC 2439<sup>b</sup> | Rhododendron delavayi | Australia | KC537807 | KC537821 | KC537814 |
| P. etonensis | BRIP 66615<sup>b</sup> | Sporobolus jacquemontii | Mauritius | MK666339 | MK977634 | MK977635 |
| P. formosana | NTCCC 17-009<sup>b</sup> | Poaceae sp. | China | MH809381 | MH809385 | MH809389 |
| P. furcata | MFLUCC 12-0054<sup>b</sup> | Camellia sinensis | China | JX683724 | JX683708 | JX683740 |
| P. furcata | LC6691 | Camellia sinensis | China | KX895030 | KX895363 | KX895248 |
| P. follicola | CFCC 54440<sup>b</sup> | Castanopsis faberi | China | ON007029 | ON005057 | ON005046 |
| | CFCC 57359 | Castanopsis faberi | China | ON007030 | ON005058 | ON005047 |

(Continued on next page)
| Species               | Isolate       | Host/substrate          | Origin          | GenBank access no. |
|----------------------|---------------|-------------------------|-----------------|-------------------|
| P. guangxiensis      | CFCC 54308    | Quercus griffithii      | China           | OK339737          |
| P. guizhouensis      | CFCC 54803    | Cyclobalanopsis glauca  | China           | OK339735          |
| P. hawaiiensis       | CBS 114491    | Leucospermum sp.        | USA             | KM199339          |
| P. hispanica         | CBS 115391    | Protea sp.              | Spain           | KM199317          |
| P. hoonanensis       | CSUFTCC15     | Camellia oleifera       | China           | OK349759          |
| P. inexpecta         | MFLUCC 12-0270| Unidentified tree       | China           | JX399008          |
| P. intermedias       | MFLUCC 12-0259| Unidentified tree       | China           | JX399893          |
| P. italiana          | MFLU 14-0214  | Cupressus glabra        | Italy           | KP781878          |
| P. jesteri           | CBS 19350     | Fragaria bodenii        | Papua New Guinea| KM199380          |
| P. jiangchensis      | LC4399       | Camellia sp.            | China           | KBX895090         |
| P. jinliangensis     | LC6636       | Camellia sinensis       | China           | KBX895028         |
| P. kansuki           | LC6390       | Diospyros kaki          | Korea           | LC552953          |
| P. kandelicala       | NCUY 19-0355  | Kandelia candel         | China           | MT560723          |
| P. kenyana           | CBS 442.67    | Coffea sp.              | Kenya           | KM199302          |
| P. knightiae         | CBS 111963    | Knightia sp.            | New Zealand     | KM199311          |
| P. krahbiensis       | MFLUCC 16-0260| Pandanus sp.            | Thailand        | MH388360          |
| P. leucadendri       | CBS 121417    | Leucocadron sp.         | South Africa    | MH553987          |
| P. licagicala        | HGUP 4057     | Liagati grandis         | China           | KC492309          |
| P. ljiangensis       | CFCC 50738    | Castanopsis carlesi var. spinulosa | China | KUB60520     |
| P. linearis          | MFLUCC 12-0271| Trachelospermum sp.     | China           | JX399007          |
| P. lithocarpi        | CFCC 55100    | Lithocarpus chiungenchangus | China | OK339742        |
| P. luchanensis       | LC4344       | Camellia sp.            | China           | KBX895005         |
| P. macadamiae        | BRIP 6373B    | Macadamia integrifolia  | Australia       | X186588           |
| P. malayan            | CBS 102220    | Macaranga trifolia      | Malaysia        | KM199306          |
| P. macrochaeta       | CBS 144.97   | Quercus robur           | Netherlands     | KM199327          |
| P. nanjingensis      | CFCC 53882    | Quercus aliens          | China           | OK349759          |
| P. neolitaeae        | NTUCC 17-011  | Neolitae villosa        | China           | MH809383          |
| P. novae-Hollandiae  | CBS 130973    | Bankia grandis          | Australia       | KM199327          |
| P. oryzae            | CBS 111522    | Telopea sp.             | USA             | KM199294          |
| P. oryzae            | CBS 171.26    | NA                      | Italy           | KM199304          |
| P. oryzae            | CBS 353.69    | Orzyza sativa           | Denmark         | KM199299          |

(Continued on next page)
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