Neostagonosporella sichuanensis gen. et sp. nov. (Phaeosphaeriaceae, Pleosporales) on Phyllostachys heteroclada (Poaceae) from Sichuan Province, China

Chun-Lin Yang¹³, Xiu-Lan Xu¹², Dhanushka N. Wanasinghe³⁴, Rajesh Jeewon⁵, Rungtiwa Phookamsak³⁴, Ying-Gao Liu¹, Li-Juan Liu¹, Kevin D. Hyde³

¹ College of Forestry, Sichuan Agricultural University, Wenjiang District, Huiming Road 211, Chengdu 611130, Sichuan, China ² Forestry Research Institute, Chengdu Academy of Agricultural and Forestry Sciences, Nongke Road 200, Chengdu 611130, Sichuan, China ³ Center of Excellence in Fungal Research, Mae Fah Luang University, Chiang Rai, 57100, Thailand ⁴ Key Laboratory for Plant Diversity and Biogeography of East Asia, Kunming Institute of Botany, Chinese Academy of Science, Kunming 650201, Yunnan, China ⁵ Department of Health Sciences, Faculty of Science, University of Mauritius, Reduit, Mauritius

Corresponding author: Ying-Gao Liu (lyg927@263.net)

Academic editor: Imke Schmitt | Received 15 December 2018 | Accepted 5 February 2019 | Published 18 February 2019

Citation: Yang C-L, Xu X-L, Wanasinghe DN, Jeewon R, Phookamsak R, Liu Y-G, Liu L-J, Hyde KD (2019) Neostagonosporella sichuanensis gen. et sp. nov. (Phaeosphaeriaceae, Pleosporales) on Phyllostachys heteroclada (Poaceae) from Sichuan Province, China. MycoKeys 46: 119–150. https://doi.org/10.3897/mycokeys.46.32458

Abstract

Neostagonosporella sichuanensis sp. nov. was found on Phyllostachys heteroclada collected from Sichuan Province in China and is introduced in a new genus Neostagonosporella gen. nov. in this paper. Evidence for the placement of the new taxon in the family Phaeosphaeriaceae is supported by morphology and phylogenetic analysis of a combined LSU, SSU, ITS and TEF 1-α DNA sequence dataset. Maximum-likelihood, maximum-parsimony and Bayesian inference phylogenetic analyses support Neostagonosporella as a distinct genus within this family. The new genus is compared with related genera of Phaeosphaeriaceae and full descriptions and illustrations are provided. Neostagonosporella is characterised by its unique suite of characters, such as multiloculate ascostromata and cylindrical to fusiform, transversely multisepitated, straight or curved ascospores, which are widest at the central cells. Conidiostromata are multiloculate, fusiform to long fusiform or rhomboid, with two types conidia; macroconidia vermiform or subcylindrical to cylindrical, transversely multisepitated, sometimes curved, almost equidistant between septa and microconidia oval, ellipsoidal or long ellipsoidal, aseptate, rounded at both ends. An updated phylogeny of the Phaeosphaeriaceae based on multigene analysis is provided.

Keywords

2 new taxa, bambusicolous fungi, phylogeny, stem spot, taxonomy

Copyright Chun-Lin Yang et al. This is an open access article distributed under the terms of the Creative Commons Attribution License (CC BY 4.0), which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.
Introduction

The family Phaeosphaeriaceae is a large and important family of Pleosporales, initially introduced by Barr (1979) with *Phaeosphaeria oryzae* I. Miyake as the type species (Miyake 1909). The taxonomy of members within this family has often been confused with those of the Leptosphaeriaceae (Müller 1950, Holm et al. 1957, Munk 1957, Zhang et al. 2009, Phookamsak et al. 2014) and it is sometimes difficult to distinguish species. Criteria which have previously been used to differentiate species have been based mostly on the morphology of the peridial wall, asexual characteristics and host association (Eriksson 1967, 1981, Lucas and Webster 1967, Leuchtmann 1984, Shoemaker 1984, Barr 1987, Shoemaker and Babcock 1989, Shearer et al. 1990, Khashnobish and Shearer 1996, Câmara et al. 2002) and taxonomic schemes followed are those of Kirk et al. (2008), Zhang et al. (2009), Hyde et al. (2013), Phookamsak et al. (2014a) and Abd-Elsalam et al. (2016). However, this delimitation of taxa in Phaeosphaeriaceae and Leptosphaeriaceae, based solely on the above-mentioned features, is not feasible. Recent studies showed that it is very difficult to discriminate them only by such characters, because numerous new members have been introduced to these two families and these species are not significantly different in these features, but they can be differentiated by phylogenetic analysis (Zhang et al. 2012, Hyde et al. 2013, Ahmed et al. 2014, Ariyawansa et al. 2015a, 2018, Bakhshi et al. 2018). Hence there is a need to use the multigene sequence data analyses to infer relationships.

Barr (1979) originally introduced 15 genera in this family and subsequent researchers have revised this number (Barr 1992, Eriksson and Hawksworth 1993, Kirk et al. 2001, 2008, Lumbsch and Huhndorf 2007, 2010). The taxonomic placement of genera within this family has been changed in recent years based on phylogenetic analyses (Zhang et al. 2012, Hyde et al. 2013, Wijayawardene et al. 2014, Phookamsak et al. 2014a, 2017, Wanasinge et al. 2018). Taxonomic revision of the genera in Phaeosphaeriaceae resulted in 28 genera based on morphology and phylogenetic evidence (Phookamsak et al. 2014a). Since 2014, many new genera have been introduced based on molecular data (Ariyawansa et al. 2015b, Ertz et al. 2015, Crous et al. 2015a, 2015b, 2017a, Jayasiri et al. 2015, Li et al. 2015, Phukhamsakda et al. 2015, Rossman et al. 2015, Tibpromma et al. 2015, 2017, Abd-Elsalam et al. 2016, Hernández-Restrepo et al. 2016, Hyde et al. 2016, 2017, Tennakoon et al. 2016, Wijayawardene et al. 2016, Ahmed et al. 2017, Huang et al. 2017, Karunarathna et al. 2017, Phookamsak et al. 2017, Bakhshi et al. 2018, Senanayake et al. 2018, Wanasinge et al. 2018). The placement of some older genera has been reconfirmed with DNA sequence (Phookamsak et al. 2017, Senanayake et al. 2018). However, there are still a few genera lacking molecular data, such as *Bricookea*, *Dothideopsella*, *Eudarluca*, *Phaeostagonospora* and *Tiarospora*. At present, this family includes more than 800 species in 61 genera (25 genera are known only from asexual morphs) (Index Fungorum 2018, Wijayawardene et al. 2017, 2018). Many genera were introduced to accommodate a single or a few species in Phaeosphaeriaceae. Only 14 genera in the Phaeosphaeriaceae
Neostagonosporella sichuanensis gen. et sp. nov. on Phyllostachys heteroclada from China.

121

contained 10–50 species, while Ophiobolus and Phaeosphaeria comprised more than 150 species. However, most species in Ophiobolus and Phaeosphaeria lack molecular data to confirm their phylogenetic affinities.

We are studying fungi on bamboo which is the main food for panda in Sichuan Province of China (Tang et al. 2007, Wang et al. 2017). The purpose of this paper is to introduce a new genus with one species in Phaeosphaeriaceae recovered from Phyllostachys heteroclada Oliv. Combined multigene (LSU, SSU, ITS and TEF 1-α) analyses confirm its phylogenetic position in Phaeosphaeriaceae. A comprehensive comparison with similar genera and detailed descriptions and illustrations are provided.

Materials and methods

Sampling and morphological study

The specimens were collected from Ya’an City of Sichuan Province in China, on living to near dead stems and branches of Phyllostachys heteroclada. The samples were kept in Ziplock plastic bags and brought to the laboratory. Fresh materials were examined by using stereo and compound microscopes. Vertical free-hand sections were made by using a razor blade and placed on a droplet of sterilised water on a glass slide (Gupta and Tuohy 2013). Lactate cotton blue reagent was used to observe the number of septa. Micro-morphological characters were examined by using a Nikon ECLIPSE Ni compound microscope fitted to a Cannon 600D digital camera. Fruiting tissues were observed by stereomicroscopy using NVT-GG (Shanghai Advanced Photoelectric Technology Co. Ltd, China) and photographed by VS-800C (Shenzhen Weishen Times Technology Co. Ltd, China). Measurements were taken using Tarosoft® Image Frame Work v.0.9.7.

Isolation

Single ascospore and conidium isolation was carried out following the method described by Dai et al. (2017). Germinated ascospores and conidia were separately transferred to Potato Dextrose Agar media plates (PDA) and incubated at 25°C and the colonies were observed after 10 days and as outlined by Vijaykrishna et al. (2004) and Liu et al. (2010). Specimens are deposited in Mae Fah Luang University Herbarium (MFLU), Chiang Rai, Thailand and Sichuan Agricultural University Herbarium (SICAU), Chengdu, China. Living cultures are deposited at the Culture Collection at Mae Fah Luang University (MFLUCC) and the Culture Collection at Sichuan Agricultural University (SICAUCC). Facesoffungi and Index Fungorum numbers were registered as in Jayasiri et al. (2015) and Index Fungorum (2018), respectively. New species are established following the recommendations of Jeewon and Hyde (2016).
DNA extraction, PCR amplification and sequencing

Fungal isolates were grown on PDA for seven days at 25°C and genomic DNA was extracted from fresh mycelia, following the protocols of Plant Genomic DNA Kit (Tian-gen, China). If cultures were unavailable, fungal DNA was directly extracted from fruiting tissues according to Yang et al. (2017), Wanasinghe et al. (2018) and Zeng et al. (2018). The primers, LR0R and LR5 (Vilgalys and Hester 1990), NS1 and NS4, ITS5 and ITS4 (White et al. 1990) and EF1-983F and EF1-2218R (Rehner 2001) were used for the amplification of the 28S large subunit rDNA (LSU), 18S small subunit rDNA (SSU), internal transcribed spacers (5.8S, ITS) and translation elongation factor 1-α gene region (TEF 1-α), respectively. The amplification reactions were performed as stated by Phukhamsakda et al. (2015). Amplified PCR fragments were purified and sequenced at TsingKe Biological Technology Co., Ltd. (Chengdu, China). Newly generated sequences of LSU, SSU, ITS and TEF 1-α regions are deposited in GenBank.

Molecular phylogenetic analysis

Sequence data, mainly from recent publications (Phookamsak et al. 2017, Wanasinghe et al. 2018), were downloaded for analyses (Table 1). Four Massarineae taxa Cyclothyriella rubronotata (CBS 121892), C. rubronotata (CBS 141486), Didymosphaeria rubi-ulmifolii (MFLUCC 14-0024) and D. variabile (CBS 120014) were chosen as outgroup taxa based on Tanaka et al. (2015) and Jaklitsch and Voglmayr (2016). DNA alignments were performed by using MAFFT v.7.407 online service (Katoh and Standley 2013) and ambiguous regions were excluded with BioEdit version 7.0.5.3 (Hall 1999). Multigene sequences were concatenated by Mesquite version 3.11 (build 766) (Maddison and Maddison 1997–2016). Multigene phylogenetic analyses of the combined LSU, SSU, ITS and TEF 1-α sequence data were obtained from maximum likelihood (ML), maximum parsimony (MP) and Bayesian inference (BI) analyses. The alignments were converted to NEXUS file (.nxs) by using ClustalX version 1.81 (Thompson et al. 1997) for MP and BI analyses. The symbols “ABCDEFGHIKLMNOPQRSTU-VWXYZ” was deleted in PAUP v. 4.0b10 (Swofford 2002) for preparing data matrix of evaluated evolutionary model by MrModeltest v. 2.2 (Nylander 2004). The best nucleotide substitution model was determined by MrModeltest v. 2.2 (Nylander 2004) and the best-fit model for BI is GTR+I+G under the Akaike Information Criterion (AIC).

Maximum likelihood analysis was generated by using the CIPRES Science Gateway web server (Miller et al. 2010) and chosen RAxML-HPC BlackBox (8.2.10) (Stamatakis 2014). Maximum parsimony analysis was performed by PAUP v. 4.0b10 (Swofford 2002) with the heuristic search option with 1,000 random sequence additions and tree-bisection reconnection (TBR) as branch-swapping algorithm. All characters were unordered and of equal weight and gaps were regarded as missing data. Maxtrees were set up to 1,000, a zero of maximum branches length was collapsed and all multiple parsimonious trees were saved. Tree length [TL], consistency index [CI], retention index [RI], rela-
Table 1. Molecular data used in this study and GenBank accession numbers.

| Species                              | Strain/Voucher No.       | GenBank Accession No. | References                      |
|--------------------------------------|--------------------------|-----------------------|---------------------------------|
| Acericola italica                    | MFLUCC 13-0609           | MF167429 MF167430 MF167428 | Hyde et al. 2017                |
| Allephyaomenia muriformia            | MFLUCC 13-0277           | KX910089 KX954000 KX926415 | Liu et al. 2015                 |
| Allephyaomenia muriformia            | MFLUCC 13-0349           | KP756061 KP756062 KP756080 | Liu et al. 2015                 |
| Amentriephiophaema amorphophila      | MFLUCC 16-0296           | KU848197 KU848198 KU848196 MG520894 | Wijayawardene et al. 2016, Phookamsak et al. 2017 |
| Amentriemmesys dactylidis            | MFLUCC 14-0207           | KY775575 KY775577       | Hyde et al. 2017                |
| Ampelomyces quisquisi               | CBS 131.31 JX81066       | AF035781              | Kiss and Nakasone 1998, Verkley et al. 2014 |
| Ampelomyces quisquisi               | CBS 133.32 JX81067       |                      | Verkley et al. 2014             |
| Banksiophoma australiens            | CBS 142163 KY797794      |                        | Crous et al. 2017               |
| Bhatiella rosae                     | MFLUCC 17-0664           | MG828989 MG829101 MG828873 | Wanasinghe et al. 2018          |
| Boreania rogua                      | CBS 431.74 EU754183      | EU754084 FJ270001 GU349080 | Aveskamp et al. 2009, de Gruyter et al. 2009, Schoch et al. 2009 |
| Camarosporioides phragmitis         | MFLUCC 13-0365           | KX572345 KX572350 KX572340 KX572354 | Hyde et al. 2016               |
| Chaetosphaeronema achilleae         | MFLUCC 16-0476           | KX765266 -            | Hyde et al. 2016                |
| Chaetosphaeronema bipidulum         | CBS 216.75 KF251652      | EU754045 KF251148     | de Gruyter et al. 2009, Quaedvlieg et al. 2013 |
| Cyclothyriella rubronotata           | CBS 121.892 KX650541     | KX650541 KX650516     | Jaklitsch and Voglmayr 2016    |
| Cyclothyriella rubronotata           | CBS 141.486 KX650544     | KX650507 KX650544 KX650519 | Jaklitsch and Voglmayr 2016 |
| Daetyledina shoenneri               | MFLUCC 14-0963           | MG829003 MG829114 MG828887 MG829200 | Wanasinghe et al. 2018 |
| Dematiopleospora cirri              | MFLUCC 13-0615           | KX274250 KX274243 KX284708 | Hyde et al. 2016               |
| Dematiopleospora furciformis        | MFLUCC 15-2133           | KY239030 KY239028 KY239029 | Huang et al. 2018              |
| Dematiopleospora mariae             | MFLUCC 13-0612           | KJ749653 KJ749652 KJ749654 KJ749655 | Wanasinghe et al. 2014 |
| Didymocyrtis caloplaca              | CBS 129338 JQ238643     | JQ238641             | Lawrey et al. 2012             |
| Didymocyrtis fieuzaceae             | CBS 128019 JQ238616     | K170647              | Lawrey et al. 2012, Trakunyingcharoen et al. 2014 |
| Didymocyrtis xanthomendozae         | CBS 129666 JQ238634     | K170651              | Lawrey et al. 2012, Trakunyingcharoen et al. 2014 |
| Didymocyrtis rubi-ulmifolii         | MFLUCC 14-0024           | KJ436585 KJ436587     | -                              |
| Didymocyrtis variabilis             | CBS 120014 KJ496139     | JX496026             | Verkley et al. 2014             |
| Didymocyrtis variabilis             | CBS 120014 KJ496139     | JX496026             | -                              |
| Dlhamosporothrix alliiaric          | MFLUCC 13-0070           | KX494777 KX494878 KX494876 | Hyde et al. 2016               |
| Dlhamosporothrix clavatifolia       | MFLUCC 14-0910           | MG829011 MG829120 MG8288901 MG829202 | Wanasinghe et al. 2018 |
| Dlhamosporothrix lucivera           | MFLUCC 14-0955           | MG829012 MG829121 MG8288902 MG829203 | Wanasinghe et al. 2018 |
| Dactylophora aspa                    | CPC 12933 EU673276 EU673228 - - | Phillips et al. 2008 |
| Dactylophora symphoricarpri         | CPC 12929 EU673273 EU673224 - - | Phillips et al. 2008 |
| Edenia gomezpampae                  | AM04 KM246015 -          KM246160           | Gonzalez et al. 2007         |
| Elenia gomezpampae                  | CBS 124106 FJ37954       | FJ387231             | Crous et al. 2009               |
| Edenia sp.                           | UTHSC: DI16-264 LN907407 - LT796858 LT797098 | Valenzuela-Lopez et al. 2017 |
| Edenia sp.                           | UTHSC: DI16-260 LN907403 - LT796855 LT797095 | Valenzuela-Lopez et al. 2017 |
| Embarria clavatiaric                | MFLUCC 14-0652           | KT306953 KT306956 KT306949 | Ariyawansa et al. 2015a         |
| Species                          | Strain/Voucher No.     | GenBank Accession No. | References                        |
|---------------------------------|------------------------|-----------------------|-----------------------------------|
| *Embarria clematidis*           | MFLUCC 14-0976         | LSU: MG828987, SSU: MG829099, ITS: MG828871, TEF 1-α: MG829194 | Wanasinghe et al. 2018           |
| *Equisetica fusispora*          | MFLUCC 14-0522         | LSU: KU987669, SSU: KU987670, ITS: KU987668, TEF 1-α: MG208895 | Abdel-Elslam et al. 2016, Phookamsak et al. 2017 |
| *Foliobolus falleni*            | CBS 16.1.78            | LSU: GU238074, SSU: GU238215, ITS: KY299147, TEF 1-α: - | Avekamp et al. 2010, Crous and Groenewald 2017 |
| *Foliobolus falleni*            | CBS 28.4.70            | LSU: GU238078, SSU: GU238218, ITS: KY299148, TEF 1-α: - | Avekamp et al. 2010, Crous and Groenewald 2017 |
| *Gaericola pseudosphaerica*     | MFLU 14-0524           | LSU: KT326693, SSU: - | Phookamsak et al. 2017           |
| *Italica achilleae*             | MFLUCC 14-0959         | LSU: MG829013, SSU: MG829122, ITS: MG828903, TEF 1-α: MG829204 | Wanasinghe et al. 2018           |
| *Juncaceicola italicus*         | MFLUCC 13-0750         | LSU: KX500107, SSU: KX500108, ITS: KX500110, TEF 1-α: MG208897 | Phookamsak et al. 2017           |
| *Juncaceicola luzulae*           | MFLUCC 13-0780         | LSU: KX449530, SSU: KX449531, ITS: KX449529, TEF 1-α: MG208898 | Tennakoon et al. 2016, Phookamsak et al. 2017 |
| *Leptospora galii*              | KUMCC 15-0521          | LSU: KX599548, SSU: KX599549, ITS: - | Phookamsak et al. 2017           |
| *Leptospora rubella*            | CPC 11.006             | LSU: DQ195792, SSU: DQ195803, ITS: - | Crous et al. 2006                |
| *Leptospora thailandica*        | MFLUCC 16-0385         | LSU: KX655549, SSU: KX655554, ITS: KX655564, TEF 1-α: - | Hyde et al. 2016                 |
| *Lomatia aurantiaca*            | JK 5353B              | LSU: GU301838, SSU: GU296168, ITS: - | Schoch et al. 2009               |
| *Malnikia ambuxanthii*          | MFLUCC 14-1010         | LSU: KU848204, SSU: KU848205, ITS: - | Wijayawardene et al. 2016        |
| *Muriaphaeosphaeria* "ambrosiae"| MFLU 15-1971           | LSU: KX765264, SSU: KX765267, ITS: - | Hyde et al. 2016                 |
| *Muriaphaeosphaeria galatellae*  | MFLUCC 14-0614         | LSU: KT438329, SSU: KT438331, ITS: KT438332, TEF 1-α: - | Phookamsak et al. 2015           |
| *Muriaphaeosphaeria galatellae*  | MFLUCC 14-0570         | LSU: KT438330, SSU: KT438332, ITS: - | Phookamsak et al. 2015           |
| *Neocamarosporium lamiacearum*  | MFLUCC 13-560          | LSU: MF434279, SSU: MF434367, ITS: MF434191, TEF 1-α: MF434454 | Wanasinghe et al. 2017           |
| *Neosetophoma clematidis*       | MFLUCC 13-540          | LSU: KP684153, SSU: KP684154, ITS: KP744550, TEF 1-α: - | Liu et al. 2015                  |
| *Neosetophoma rosae*            | MFLUCC 17-0844         | LSU: MG829035, SSU: MG829141, ITS: MG828926, TEF 1-α: MG829219 | Wanasinghe et al. 2018           |
| *Neosetophoma rosae*            | MFLUCC 15-1073         | LSU: MG829034, SSU: MG829140, ITS: MG828925, TEF 1-α: MG829218 | Wanasinghe et al. 2018           |
| *Neophytophleboptilus thailandica*| CPC 21.0659          | LSU: KP170721, SSU: KP170652, ITS: - | Trakunyingcharoen et al. 2014    |
| *Neostagonospora arrhenatheri*   | MFLUCC 15-0464         | LSU: KX910091, SSU: KX950402, ITS: KX926417, TEF 1-α: MG209091 | Phookamsak et al. 2017, Thambugala et al. 2017 |
| *Neostagonospora carici*        | CBS 135092             | LSU: K251567, SSU: K251163, ITS: - | Quadévlieg et al. 2013          |
| *Neostagonospora phragmitis*    | MFLUCC 16-0493         | LSU: KX91090, SSU: KX950401, ITS: KX926416, TEF 1-α: MG209092 | Phookamsak et al. 2017, Thambugala et al. 2017 |
| *Neostagonosporella sicamunensis*| MFLUCC 18-1228        | LSU: MH368073, SSU: MH368079, ITS: MH368088, TEF 1-α: MK313851 | Tham study                       |
| *Neostagonosporrella sicamunensis*| MFLUCC 18-1231        | LSU: MH368074, SSU: MH368080, ITS: MH368089, TEF 1-α: - | Tham study                       |
| *Neostagonosporrella sicamunensis*| MFLUCC 18-1223        | LSU: MH394690, SSU: MH394687, ITS: MK296469, TEF 1-α: MK313854 | Tham study                       |
| *Neosulcatispora agaves*        | CPC 26.047             | LSU: KT399087, SSU: KT399083, ITS: - | Crous et al. 201b 5b             |
| *Nodulosphaeria guttulatum*     | MFLUCC 15-0069         | LSU: KY496726, SSU: KY501115, ITS: KY496746, TEF 1-α: KY514394 | Tibpromma et al. 2017           |
| *Nodulosphaeria multisepata*    | MFLUCC 15-0078         | LSU: KY496728, SSU: KY501116, ITS: KY496748, TEF 1-α: KY514396 | Tibpromma et al. 2017           |
| *Nodulosphaeria scabiosae*      | MFLUCC 14-1111         | LSU: KU708846, SSU: KU708842, ITS: KU708850, TEF 1-α: - | Mapook et al. 2016               |
| *Ophiobolopsis italicus*        | MFLUCC 17-1791         | LSU: MG520959, SSU: MG520977, ITS: MG520939, TEF 1-α: MG520903 | Phookamsak et al. 2017           |
| *Ophiobolus armata*             | MFLUCC 14-1156         | LSU: KT315509, SSU: KT315508, ITS: KT315506, TEF 1-α: - | Phookamsak et al. 2017           |
| *Ophiobolus artemisiae*         | MFLUCC 15-1966         | LSU: MG520960, SSU: MG520978, ITS: MG520940, TEF 1-α: MG520904 | Phookamsak et al. 2017           |
| *Ophiobolus artemisiae*         | MFLUCC 17-1787         | LSU: MG520961, SSU: MG520980, ITS: MG520941, TEF 1-α: MG520906 | Phookamsak et al. 2017           |
| *Ophiobolus diseminans*         | MFLUCC 14-0526         | LSU: KY496727, SSU: - | Tibpromma et al. 2017           |
| Species                                      | Strain/Voucher No. | GenBank Accession No. | TEF 1.4 |
|---------------------------------------------|--------------------|-----------------------|---------|
| Neostagonosporella sichuanensis gen. et sp. nov. on Phyllostachys heteroclada from China. | | | |
| Phookamsak et al. 2014a | KJ522477 | Schoch et al. 2006, Andrie et al. 2008, Woudenberg et al. 2013 | |
| | MG529890 | KY824769 | |
| | MG529894 | KJ522481 | |
| | MFLUCC 13-0265 | MFLUCC 17-1493 | |
| | KU058714 | MFLUCC 17-1494 | |
| | MFLUCC 17-1495 | MFLUCC 17-1496 | |
| | MFLUCC 17-1497 | MFLUCC 17-1498 | |
| | MFLUCC 17-1499 | MFLUCC 17-1500 | |
| | MFLUCC 17-1501 | MFLUCC 17-1502 | |
| | MFLUCC 17-1503 | MFLUCC 17-1504 | |
| | MFLUCC 17-1505 | MFLUCC 17-1506 | |
| | MFLUCC 17-1507 | MFLUCC 17-1508 | |
| | MFLUCC 17-1509 | MFLUCC 17-1510 | |
| | MFLUCC 17-1511 | MFLUCC 17-1512 | |
| | MFLUCC 17-1513 | MFLUCC 17-1514 | |
| | MFLUCC 17-1515 | MFLUCC 17-1516 | |
| | MFLUCC 17-1517 | MFLUCC 17-1518 | |
| | MFLUCC 17-1519 | MFLUCC 17-1520 | |
| | MFLUCC 17-1521 | MFLUCC 17-1522 | |
| | MFLUCC 17-1523 | MFLUCC 17-1524 | |
| | MFLUCC 17-1525 | MFLUCC 17-1526 | |
| | MFLUCC 17-1527 | MFLUCC 17-1528 | |
| | MFLUCC 17-1529 | MFLUCC 17-1530 | |
| | MFLUCC 17-1531 | MFLUCC 17-1532 | |
| | MFLUCC 17-1533 | MFLUCC 17-1534 | |
| | MFLUCC 17-1535 | MFLUCC 17-1536 | |
| | MFLUCC 17-1537 | MFLUCC 17-1538 | |
| | MFLUCC 17-1539 | MFLUCC 17-1540 | |
| | MFLUCC 17-1541 | MFLUCC 17-1542 | |
| | MFLUCC 17-1543 | MFLUCC 17-1544 | |
| | MFLUCC 17-1545 | MFLUCC 17-1546 | |
| | MFLUCC 17-1547 | MFLUCC 17-1548 | |
| | MFLUCC 17-1549 | MFLUCC 17-1550 | |
| | MFLUCC 17-1551 | MFLUCC 17-1552 | |
| | MFLUCC 17-1553 | MFLUCC 17-1554 | |
| | MFLUCC 17-1555 | MFLUCC 17-1556 | |
| | MFLUCC 17-1557 | MFLUCC 17-1558 | |
| | MFLUCC 17-1559 | MFLUCC 17-1560 | |
| | MFLUCC 17-1561 | MFLUCC 17-1562 | |
| | MFLUCC 17-1563 | MFLUCC 17-1564 | |
| | MFLUCC 17-1565 | MFLUCC 17-1566 | |
| | MFLUCC 17-1567 | MFLUCC 17-1568 | |
| | MFLUCC 17-1569 | MFLUCC 17-1570 | |
| | MFLUCC 17-1571 | MFLUCC 17-1572 | |
| | MFLUCC 17-1573 | MFLUCC 17-1574 | |
| | MFLUCC 17-1575 | MFLUCC 17-1576 | |
| | MFLUCC 17-1577 | MFLUCC 17-1578 | |
| | MFLUCC 17-1579 | MFLUCC 17-1580 | |
| | MFLUCC 17-1581 | MFLUCC 17-1582 | |
| | MFLUCC 17-1583 | MFLUCC 17-1584 | |
| | MFLUCC 17-1585 | MFLUCC 17-1586 | |
| | MFLUCC 17-1587 | MFLUCC 17-1588 | |
| | MFLUCC 17-1589 | MFLUCC 17-1590 | |
| | MFLUCC 17-1591 | MFLUCC 17-1592 | |
| | MFLUCC 17-1593 | MFLUCC 17-1594 | |
| | MFLUCC 17-1595 | MFLUCC 17-1596 | |
| | MFLUCC 17-1597 | MFLUCC 17-1598 | |
| | MFLUCC 17-1599 | MFLUCC 17-1600 | |
| | MFLUCC 17-1601 | MFLUCC 17-1602 | |
| | MFLUCC 17-1603 | MFLUCC 17-1604 | |
| | MFLUCC 17-1605 | MFLUCC 17-1606 | |
| | MFLUCC 17-1607 | MFLUCC 17-1608 | |
| | MFLUCC 17-1609 | MFLUCC 17-1610 | |
| | MFLUCC 17-1611 | MFLUCC 17-1612 | |
| | MFLUCC 17-1613 | MFLUCC 17-1614 | |
| | MFLUCC 17-1615 | MFLUCC 17-1616 | |
| | MFLUCC 17-1617 | MFLUCC 17-1618 | |
| | MFLUCC 17-1619 | MFLUCC 17-1620 | |
| | MFLUCC 17-1621 | MFLUCC 17-1622 | |
| | MFLUCC 17-1623 | MFLUCC 17-1624 | |
| | MFLUCC 17-1625 | MFLUCC 17-1626 | |
| | MFLUCC 17-1627 | MFLUCC 17-1628 | |
| | MFLUCC 17-1629 | MFLUCC 17-1630 | |
| | MFLUCC 17-1631 | MFLUCC 17-1632 | |
| | MFLUCC 17-1633 | MFLUCC 17-1634 | |
| | MFLUCC 17-1635 | MFLUCC 17-1636 | |
| | MFLUCC 17-1637 | MFLUCC 17-1638 | |
| | MFLUCC 17-1639 | MFLUCC 17-1640 | |
| | MFLUCC 17-1641 | MFLUCC 17-1642 | |
| | MFLUCC 17-1643 | MFLUCC 17-1644 | |
| | MFLUCC 17-1645 | MFLUCC 17-1646 | |
| | MFLUCC 17-1647 | MFLUCC 17-1648 | |
| | MFLUCC 17-1649 | MFLUCC 17-1650 | |
| | MFLUCC 17-1651 | MFLUCC 17-1652 | |
| | MFLUCC 17-1653 | MFLUCC 17-1654 | |
| | MFLUCC 17-1655 | MFLUCC 17-1656 | |
| | MFLUCC 17-1657 | MFLUCC 17-1658 | |
| | MFLUCC 17-1659 | MFLUCC 17-1660 | |
| | MFLUCC 17-1661 | MFLUCC 17-1662 | |
| | MFLUCC 17-1663 | MFLUCC 17-1664 | |
| | MFLUCC 17-1665 | MFLUCC 17-1666 | |
| | MFLUCC 17-1667 | MFLUCC 17-1668 | |
| | MFLUCC 17-1669 | MFLUCC 17-1670 | |
| | MFLUCC 17-1671 | MFLUCC 17-1672 | |
| Species                        | Strain/Voucher No. | LSU          | SSU          | ITS          | TEF 1-α    | References                              |
|-------------------------------|--------------------|--------------|--------------|--------------|-----------|-----------------------------------------|
| *Populocrescentia forlicesenensis* | MFLUCC 14-0651     | KT306952     | KT306955     | KT306948     | MG520925  | Ariyawansa et al. 2015a, Phookamsak et al. 2017 |
| *Populocrescentia rosea*       | TASM 6125          | MG829060     | MG829165     | -            | MG829232  | Wanasinge et al. 2018                   |
| *Pseudoophiobolus aichelae*    | MFLU 17-0925       | MG520966     | -            | MG520946     | -         | Phookamsak et al. 2017                  |
| *Pseudoophiobolus gahi*        | MFLUCC 17-2257     | MG520967     | MG520989     | MG520947     | MG520926  | Phookamsak et al. 2017                  |
| *Pseudoophiobolus articulosa*  | KUMCC 17-0168      | MG520975     | MG520996     | MG520959     | MG520933  | Phookamsak et al. 2017                  |
| *Pseudophalesoaperia rubi*     | MFLUCC 14-0259     | KX765299     | KX765300     | KX765298     | -         | Hyde et al. 2016                        |
| *Pyrenochaeta nobilis*         | CBS 407,76         | DQ678096     | -            | EU930011     | DQ677936  | Ferrer et al. 2006, Schoch et al. 2006  |
| *Pyrenochaeta bromi*           | DAOM 127414        | JN940074     | JN940954     | JN943666     | -         | Schoch et al. 2012                      |
| *Pyrenochaeta dactylidu*       | DAOM 92161         | JN940087     | -            | JN943667     | -         | Schoch et al. 2012                      |
| *Sclerotagonospora lathyri*    | MFLUCC 14-0958     | MG829066     | MG829170     | MG828955     | MG829235  | Wanasinge et al. 2018                   |
| *Sclerotagonospora sp.*        | CBS 118152         | JX517292     | -            | JX517283     | -         | Crous et al. 2012                       |
| *Sclerospora minkeviciusii*    | MFLUCC 12-0089     | KF663838     | KF66383     | -            | -         | Wijayawardene et al. 2013               |
| *Septoria phragmitis*          | CPC 24118          | KR873279     | KR873251     | -            | -         | Crous et al. 2015c                      |
| *Sulcispora bolmei*            | CBS 110217         | GQ387633     | GQ387572     | KT389542     | GU349028  | Schoch et al. 2009, de Gruyter et al. 2010, Chen et al. 2015 |
| *Septophaenoma chromolaena*    | CBS 135105         | KE251747     | KE251244     | -            | -         | Quaedvlieg et al. 2013                  |
| *Setophoma sacchari*           | CBS 33.3-39        | GQ387586     | GQ387525     | KE251245     | -         | de Gruyter et al. 2010                  |
| *Setophoma sacchari*           | MFLUCC 12-0241     | KJ76147      | KJ76149      | KJ76145      | KJ461318  | Phookamsak et al. 2014b                 |
| *Setophoma sacchari*           | MFLUCC 11-0154     | KJ76146      | KJ76148      | KJ76144      | KJ461319  | Phookamsak et al. 2014b                 |
| *Setophoma vernoniae*          | CPC 23123          | KJ869198     | KJ869141     | -            | -         | Crous et al. 2014                       |
| *Sulcispora rhamnicola*        | MFLUCC 17-0813     | MF434288     | MF434376     | MF434200     | MF434462  | Wanasinge et al. 2017                   |
| *Staurosphaeria rhamnicola*    | MFLUCC 17-0814     | MF434289     | MF434377     | MF434201     | MF434463  | Wanasinge et al. 2017                   |
| *Staurosphaeria plicatapora*   | CBS 460.84         | -            | -            | AF439498     | -         | Câmara et al. 2002                      |
| *Staurosphaeria rhamnicola*    | MFLUCC 17-0959     | KP271444     | KP271445     | KP271443     | -         | Senanyake et al. 2018                   |
| *Tintelnotia destructans*      | CBS 127273         | KY090864     | KY090868     | KY090652     | -         | Ahmed et al. 2016                      |
| *Tintelnotia opuntiae*         | CBS 376.91         | GU238123     | GU238226     | KY090651     | -         | Aveskamp et al. 2010, Ahmed et al. 2016 |
| *Vagicola chlorospora*         | MFLUCC 15-0177     | KU163654     | KU163655     | KU163658     | -         | Jayasiri et al. 2015                    |
| *Vrystaatia aloeicola*         | CBS 135107         | KE251778     | KE251278     | -            | -         | Quaedvlieg et al. 2013                  |
| *Wojnowicziella italica*       | MFLUCC 13-0447     | KX430001     | KX430002     | KX432923     | KX430003  | Hyde et al. 2016                        |
| *Wojnowicziella koniceae*      | MFLUCC 13-0737     | KP684151     | KP684152     | KP744471     | -         | Liu et al. 2015                         |
| *Wojnowicziella dactylidis*    | MFLUCC 13-0735     | KP684149     | KP684150     | KP744470     | -         | Liu et al. 2015                         |
| *Wojnowicziella eucalypti*     | CPC 25024          | KR76774      | KR767641     | -            | -         | Crous et al. 2015a                      |
| *Wojnowicziella sp*            | MFLUCC 13-0402     | KU058729     | MG520998     | KU058719     | MG520937  | Li et al. 2015; Phookamsak et al. 2017  |
| *Xenoseptoria neosaccardoi*    | CBS 120.43         | KE251783     | -            | KE251280     | -         | Quaedvlieg et al. 2013                  |
| *Xenoseptoria neosaccardoi*    | CBS 128665         | KE251784     | -            | KE251281     | -         | Quaedvlieg et al. 2013                  |
| *Yunnanensis phragmitis*       | MFLUCC 17-0315     | MF684863     | MF684867     | MF684862     | MF683624  | Karunarathna et al. 2017                |
| *Yunnanensis phragmitis*       | MFLUCC 17-1361     | MF684865     | MF684864     | MF684869     | -         | Karunarathna et al. 2017                |
Neostagonosporella sichuanensis gen. et sp. nov. on *Phyllostachys heteroclada* from China.

Bayesian inference analysis was conducted with MrBayes v. 3.2.2 (Ronquist et al. 2012) and a Bayesian posterior probability (BYPP) was determined by Markov Chain Monte Carlo sampling (MCMC). The Bayesian parameters were set up to “Lset applyto= (all) nst=6 rates=invgamma; prset applyto= (all) statefreqpr=dirichlet (1,1,1,1)”.

Six simultaneous Markov chains were set up to 10,000,000 generations and trees were sampled every 100th generation. The programme was automatically terminated when the average standard deviation of split frequencies reached below 0.01 (Maharachkumbura et al. 2015). The distribution of log-likelihood scores were examined to determine the stationary phase for each search and to decide if extra runs were required to achieve convergence, using Tracer v.1.6 program (Rambaut et al. 2013). The first 10% of generated trees representing the burn-in phase were discarded and the remaining trees were used to calculate posterior probabilities of the majority rule consensus tree.

The tree was made in FigTree v. 1.4.3 (Rambaut 2016) and edited in Adobe Illustrator CS6 (Adobe Systems Inc., United States). The finalised alignment and tree were submitted in TreeBASE, submission ID: 23697 (http://www.treebase.org).

**Notes.** Ex-type strains are given in bold and the new species in this study is in red. “-” means that the sequence is missing or unavailable.

**Abbreviations.** AFTOL: Assembling the Fungal Tree of Life; CBS: Westerdijk Fungal Biodiversity Institute, Utrecht, Netherlands; CCTU: Culture Collection of Tabriz University, Tabriz, Iran; CPC: Culture Collection of P.W. Crous; DAOM: Plant Research Institute, Department of Agriculture (Mycology), Ottawa, Canada; JK: J. Kohlmeyer; KUMCC: Kunming Institute of Botany Culture Collection, Chinese Academy of Sciences, Kunming, China; MFLU: Herbarium of Mae Fah Luang University, Chiang Rai, Thailand; MFLUCC: Mae Fah Luang University Culture Collection, Chiang Rai, Thailand; TASM: Tashkent Mycological Herbarium, Institute of Botany and Zoology, Uzbek Academy of Science, Uzbekistan; UTHSC: Fungus Testing Laboratory of the University of Texas Health Science Center at San Antonio, San Antonio, Texas, USA.

**Results**

**Phylogenetic analyses**

In this phylogenetic analysis, we include all representative sequences of genera in Phaeosphaeriaceae and other representative genera and species in Pleosporineae and Massarineae. The final concatenated dataset containing 138 ingroup taxa within the suborder Pleosporineae, included 56 currently existing genera in Phaeosphaeriaceae, with 3559 characters including gaps (917 characters for LSU, 1046 for SSU, 681 for ITS and 915 for TEF 1-α). Single gene datasets of LSU, SSU, ITS and TEF 1-α were
Figure 1. Phylogram generated from maximum likelihood analysis (RAxML) based on combined LSU, SSU, ITS and TEF 1-α sequenced data of taxa from the family Phaeosphaeriaceae and other representative species in Pleosporineae and Massarineae. The tree is rooted to Cyclothyriella rubronotata (CBS 121892), C. rubronotata (CBS 141486), Didymosphaeria rubi-ulmifolii (MFLUCC 14-0024) and D. variabile (CBS 120014).
Neostagonospherella sichuanensis gen. et sp. nov. on Phyllostachys heteroclada from China.

Figure 1. (Continued) Bootstrap support values of maximum parsimony and maximum likelihood (MPBP, left; MLBP, middle) equal to or greater than 70% and Bayesian posterior probabilities (BYPP, right) equal to or greater than 0.95 are provided. The type strains were highlighted in bold and the newly generated sequences are highlighted in red.
initially analysed and checked for topological congruence but these were not significantly different (data not shown). Support values of MP, ML and BI analyses (equal to or higher than 70% for MPBP and MLBP and 0.95 for BYPP) are shown in Fig. 1 which is the best scoring tree generated from ML. The phylogenetic trees generated from ML analyses were similar to previous phylogenies including Phaeosphaeriaceae (Phookamsak et al. 2014a, b, 2017, Jayasiri et al. 2015, Li et al. 2015, Liu et al. 2015, Phukhamsakda et al. 2015, Tibpromma et al. 2015, 2016, 2017, Hyde et al. 2016, Mapook et al. 2016, Ahmed et al. 2017, Huang et al. 2017, Karunarathna et al. 2017, Thambugala et al. 2017, Ariyawansa et al. 2018, Bakhshi et al. 2018, Senanayake et al. 2018, Wanasinghe et al. 2018).

The best scoring RAxML tree with the final optimisation had a likelihood value of -32702.569414. The matrix had 1387 distinct alignment patterns and 32.39% in this alignment is the gaps and completely undetermined characters. Estimated base frequencies were as follows: A=0.244424, C=0.233850, G=0.265929, T=0.255797, with substitution rates AC=1.171601, AG=2.805496, AT=2.145028, CG=0.771605, CT=6.035018 and GT=1.000000. The gamma distribution shape parameter $\alpha=0.167161$ and the Tree-Length=5.334112. The maximum parsimony dataset con-
sisted of 3559 characters, of which 2580 characters were constant, 217 were parsimony-uninformative and 762 were parsimony-informative. All characters were of type ‘unord’ with equal weight. The parsimony analysis resulted in a thousand equally most parsimonious trees with a length of 5829 steps (CI = 0.270, RI = 0.654, RC = 0.177, HI = 0.730). Bayesian posterior probabilities were determined by MCMC and the final average standard deviation of split frequencies was 0.009939.

Neostagonosporella sichuanensis clusters in the family Phaeosphaeriaceae with strong support (100% MLBP/100% MPBP/1.00 BYPP) and nucleotide sequences from all strains are the same and it confirms that our three collections are the same species. The multigene analyses show that *N. sichuanensis* is phylogenetically close to the genus *Setophoma* and *Edenia* and separated from the remaining genera of the family in a distinct clade with moderate bootstrap support.

**Taxonomy**

*Neostagonosporella* C.L. Yang, X.L. Xu & K.D. Hyde, gen. nov.

Index Fungorum number: IF555713
Facesoffungi number: FoF 05490

**Type species.** *Neostagonosporella sichuanensis* C.L. Yang, X.L. Xu & K.D. Hyde

**Etymology.** Name reflects the morphological similarity to the genus *Stagonospora*.

**Description.** *Parasitic* on living to nearly dead stems and branches of bamboo. **Sexual morph:** *Ascostromata* coriaceous, visible as raised to superficial on host, gregarious, multi-loculate, ellipsoidal, globose to subglobose or irregular in shape, dark brown to black, glabrous. *Locules* globose to subglobose, with a centrally located ostiole, lacking periphyses. *Peridium* multi-layered, of brown to dark brown, pseudoparenchymatous cells of *textura angularis*. *Hamathecium* comprising trabeculate, anastomosed pseudoparaphyses. *Asci* 8-spored, bitunicate, fissitunicate, cylindrical to cylindric-clavate, short pedicellate, apically rounded with an ocular chamber. *Ascospores* overlapping biserial, hyaline, cylindrical to fusiform, septate, smooth-walled, surrounded by a distinct mucilaginous sheath.

**Asexual morph:** *Coelomycetous*. *Conidiostromata* pycnidial, coriaceous, superficial, dark brown to black, fusiform to long fusiform or rhomboid, multi-loculate, solitary, glabrous. *Pycnidia* globose to subglobose, ostiolate. *Pycnidial wall* comprising multi-layered, of dark brown to black, pseudoparenchymatous cells of *textura angularis*. *Conidiophores* reduced to conidiogenous cells. *Conidiogenous cells* ampulliform to subcylindrical, smooth, hyaline, enteroblastic, phialidic, arising from inner layer of pycnidial wall. *Macroconidia* hyaline, subcylindrical to cylindrical, septate, nearly equidistant between septa, smooth-walled, sometimes surrounded by a mucilaginous sheath when immature. *Microconidia* hyaline, varied in shape, asceptate, smooth-walled, with small guttulate.

**Notes.** *Stagonospora* resembles *Neostagonosporella* in asexual status, but *Stagonospora* differs in having generally uni-loculate conidiomata, a thick-walled pycnidial wall, doliiform, holoblastic conidiogenous cells with several percurrent proliferations at the
apex and mostly smooth to verruculose conidia (Quaedvlieg et al. 2013, Hyde et al. 2016). Phylogenetic analyses based on a concatenated LSU, SSU, ITS and TEF 1-α sequence data (Fig. 1) show that Neostagonosporella is closely related to Setophoma and Edenia within Phaeosphaeriaceae. There are some significant differences in morphology between these genera and these are summarised in Table 2. Six species are currently accepted in Setophoma and two species in Edenia and both of them occur on different grasses but only our new collections are parasitic on bamboo. Comparison of DNA sequence data across four gene regions reveals base pair differences as shown in Table 3. Phylogenetic analyses also clearly differentiate these taxa (Fig. 1). It is the first time that species with massarineae-like morphology occurring on bamboo, were found in the Phaeosphaeriaceae. Based on molecular phylogeny, the new genus is introduced in Phaeosphaeriaceae to accommodate a massarineae-like taxon.

Table 2. Morphological comparison of Neostagonosporella, Setophoma and Edenia.

| Morphology | Neostagonosporella (Type: N. sichuanensis) | Setophoma (Type: S. terrestris) | Edenia (Type: E. gomezpompae) |
|------------|------------------------------------------|--------------------------------|-----------------------------|
| Ascostromata | Multi-loculate, globose to subglobose or irregular | Uni-loculate, globose | |
| Locules | Globose to subglobose, with a central ostiole, lacking periphyses | Globose, with a central ostiole | |
| Pseudoparaphyses | Narrow, septate, trabecular, longer than asci | Broad, septate, prominently branched, constricted at septa, sometimes anastomosing | |
| Asci | Cylindrical to cylindric-clavate, short-pedicellate | Cylindrical or subcylindrical, fasciculate, pedicellate | |
| Ascospores | Bi-seriate, hyaline, cylindrical to fusiform, smooth-walled, transversely multi-septate | Uni- to multi-seriate, light brown or red brown, fusiform, sometimes verruculose, 2–3-septate | |
| Conidiostromata | Multi-loculate | Uni-loculate | |
| Pycnidia | Globose to subglobose, smooth, ostiolate | Globose to subglobose, setose, with papillate ostiolate | |
| Conidia | Two types. Macroconidia subcylindrical to cylindrical, transversely multi-septate, hyaline. Microconidia oval, ellipsoidal or long ellipsoidal, aspetate, hyaline | One type. Ellipsoidal to subcylindrical to subfusoid, aseptate, hyaline | One type. Ellipsoidal or slightly narrowed at base, aseptate, subhyaline |
| Others | On PDA, grey white, reverse dark brown. Hyphae developing by different angle branched and without forming rope-like strands | On PDA, iron-grey-olivaceous, reverse same. Hyphae undescribed | On PDA, pinkish-white, reverse reddish-brown, velvety to floccose. Hyphae frequently developing by 90° angle branched and forming rope-like strands |
| References | This study | de Gruyter et al. 2010, Quaedvlieg et al. 2013, Phookamsak et al. 2014a, b, Crous et al. 2016, Thambugala et al. 2017 | González et al. 2007, Sun et al. 2015 |

Table 3. Comparison of DNA sequence data Parastagonosporella vs Edenia and Setophoma.

| Gene region | Parastagonosporella vs Edenia | Parastagonosporella vs Setophoma |
|-------------|-----------------------------|---------------------------------|
| LSU         | 12/819 (1.47%)              | 13/818 (1.6%)                  |
| SSU         | NA*                         | 4/981 (0.4%)                   |
| TEF         | 47/869 (5.41%)              | 43/868 (5%)                    |
| ITS         | 89/515 (17.28%)             | 66/515 (12.8%)                 |

*SSU is not available for Edenia
Neostagonosporella sichuanensis gen. et sp. nov. on Phyllostachys heteroclada from China.

**Index Fungorum number:** IF555714  
**Facesoffungi number:** FoF 05491  
**Figs 2–3**

**Type.** CHINA, Sichuan Province, Ya’an City, Yucheng District, Kongping Township, Alt. 1133 m, 29°50.14’N 103°03’E, on living to nearly dead branches of *Phyllostachys heteroclada* Oliv. (Poaceae), 8 April 2016, C.L. Yang and X.L. Xu, YCL201604001 (MFLU 18-1212/SICAU 16-0001, holotype), ex-type living culture, MFLUCC 18-1228/SICAUCC 16-0001; Sichuan Province, Ya’an City, Yucheng District, Yanchang Township, Alt. 951 m, 29°43.57’N 103°04.74’E, on nearly dead stems of *Phyllostachys heteroclada* Oliv. (Poaceae), 9 April 2017, C.L. Yang and X.L. Xu, YCL201704001 (MFLU 18-1220/SICAU 17-0001, paratype), ex-type living culture, MFLUCC 18-1231/SICAUCC 17-0001; Sichuan Province, Ya’an City, Lushan County, Longmen Township, Alt. 949 m, 30°15.74’N 102°59.27’E, on nearly dead branches of *Phyllostachys heteroclada* Oliv. (Poaceae), 12 September 2017, C.L. Yang and X.L. Xu, YCL201709002 (MFLU 18-1223, paratype).

**Etymology.** in reference to Sichuan Province where the specimens were collected.

**Description.** Associated with stem spot disease on living to nearly dead stems and branches of *Phyllostachys heteroclada* (Poaceae). **Sexual morph:** Asciotromata (0.5–) 1–2 (–4.5) × 0.8–1.3 mm long (̄x = 1.9 × 1 mm, n = 50), 230–340 μm high (̄x = 290 μm, n = 20), ellipsoidal, globose to subglobose or irregular in shape, immersed in host epidermis, becoming raised to superficial, coriaceous, solitary to gregarious, multiloculate, erumpent through host tissue, with dark brown to black, glabrous, ostiole, usually generating subrhombic to rhombic pale yellow stripes at asciotromatal fringe. Locules 230–300 μm high (̄x = 264 μm, n = 20), 330–460 μm diam. (̄x = 393 μm, n = 20), clustered, gregarious, globose to subglobose, with a centrally located ostiole, lacking periphyses. Peridium 18–35 μm wide (̄x = 27 μm, n = 20), composed of several layers of small, brown to dark brown pseudoparenchymatous cells of textura angularis, with inner hyaline layer, slightly thin at base, thick at sides towards apex, upper part fused with host tissue. Hamathecium composed of 1–2 μm (̄x = 1.59 μm, n = 50) wide, filiform, septate, trabeculate, anastomosed pseudoparaphyses, embedded in a hyaline gelatinous matrix. Asci 90–125 × 12.5–14 μm (̄x = 108.1 × 13.3 μm, n = 40), 8-spored, bitunicate, fissitunicate, cylindrical to cylindric-clavate, short pedicellate, 7.8–14 μm long (̄x = 11 μm, n=20), apically rounded with an ocular chamber. Ascospores 30–35 × 6–7 μm (̄x = 31.9 × 6.6 μm, n = 50), overlapping bi-seriate, hyaline, cylindrical to fusiform or subcylindric-clavate, with rounded to acute ends, narrower towards end cells, sometimes narrower at lower end cell, straight or slightly curved, 5–8 transversely septal, mostly 7-septate, slightly constricted at septa, nearly equidistant between septa, guttulate, smooth-walled, surrounded by a mucilaginous sheath, 5–9 μm thick (̄x = 6.9 μm, n = 30). **Asexual morph:** Coelomycetous. Conidiostromata 9–13 × 1–2 mm long (̄x = 11.2 × 1.6 mm, n = 10), 320–350 μm high (̄x = 332 μm, n=10), fusiform to long fusiform or rhomboid, coriaceous, superficial, dark brown to black, multiloculate, solitary, scattered, glabrous. Pycnidia 180–240 μm high (̄x = 209 μm, n = 20),
Figure 2. Neostagonosporella sichuanensis (MFLU 18-1212, holotype). a appearance of ascostromata on host b ascostroma c, d vertical section of ascostroma e, f close up of ascoma g peridium h trabeculate pseudoparaphyses and asci i–k asci l bitunicate asci, note ocular chamber m, n, q, r ascospores with mucilaginous sheath o, s germinated ascospores in lactate cotton blue reagent p, t colonies on PDA (p–from above, t–from below). Scale bars: 1 cm (a); 1 mm (b); 200 μm (c, d); 100 μm (e, f); 20 μm (g–k); 10 μm (l–o, q–s).
Neostagonosporella sichuanensis gen. et sp. nov. on Phyllostachys heteroclada from China.

Figure 3. Neostagonosporella sichuanensis (MFLU 18-1220, paratype). a appearance of conidiomata on host b, c vertical section of conidioma d pycnidia e peridium f, g conidiogenous cells and developing conidia h–l conidia m germinated conidium. Scale bars: 1 cm (a); 200 μm (b–d); 20 μm (e, f); 10 μm (g–m).
170–240 μm diam. (x̄ = 210 μm, n = 20), globose to subglobose, ostiolate. Pycnidal wall 12–18 (–23) μm wide (x̄ = 15 μm, n = 20), comprising multi-layered, brown to dark brown pseudoparenchymatous cells, of textura angularis, paler towards inner layers, slightly thin at base, thick at sides towards apex, upper part fused with host tissue. Conidiophores reduced to conidiogenous cells. Conidiogenous cells 3–5.5 (–7) × 3–4 μm (x̄ = 4.17 × 3.29 μm, n = 20), ampulliform to subcylindrical, smooth, hyaline, enteroblastic, phialidic, formed from inner layer of pycnidial wall. Macroconidia (32.5–)33.5–40 (–44) × (5–) 5.5–7 (–7.5) μm (x̄ = 37.5 × 6.2 μm, n = 40), subcylindrical to cylindrical, narrowly rounded at both ends, sometimes curved, 7–13 transversely septa, nearly equidistant between septa, hyaline, smooth-walled, guttulate, sometimes surrounded by a mucilaginous sheath when immature. Microconidia (3–) 3.5–4 (–5) × (1–) 1.5–2 (–3) μm (x̄ = 3.9 × 1.9 μm, n = 50), oval, ellipsoidal or elongate-ellipsoidal, aseptate, rounded at both ends, hyaline, smooth-walled, with small guttulate.

Culture characteristics. Ascospores germinating in sterilised water within 24 hours at 25°C, with germ tubes developed from each cell of ascospores, mostly from middle and end of spores. Colonies on PDA circular, with concentric circles, grey white in outer side, fawn in reverse side, grey in inner side, dark brown on back side. Conidial germination similar to ascospores. Conidiomata formed on PDA at 25°C after 75 days, pycnidial, solitary to gregarious, raised on agar, black dots, pyriform, globose to subglobose, or irregular, uniloculate, covered by white or grey hyphae. Conidia two types, macroconidia and microconidia and both longer than ones on host. Macroconidia (30–)40–48(–60.5) × (4–) 5–6 μm (x̄ = 43.8 × 5.2 μm, n = 50), hyaline, 4–7-septate, occasionally 3-septate, hyaline. Microconidia (3.5–)4–6(–12) × (1–) 1.5–2(–3) μm (x̄ = 5.3 × 1.9 μm, n = 50), aseptate, hyaline.

Discussion

Neostagonosporella has a unique suite of characters that differentiate it from other genera in Phaeosphaeriaceae, such as multi-loculate ascostromata and trabeculate pseudoparaphyses. Trabeculate pseudoparaphyses have been shown to be uninformative at the higher taxonomic levels (Liew et al. 2000), but appear to be informative at the genus level. Neostagonosporella is the only genus of Phaeosphaeriaceae with this type of pseudoparaphyses. Phaeosphaeriaceous taxa have diverse morphological characteristics and the familial placement of some genera could not be resolved based on a concatenated phylogeny of three to four loci, because some genera contain only 1-2 described species (Crous et al. 2015a, 2015b, 2017a, Jayasiri et al. 2015, Phukhamsakda et al. 2015, Tippromma et al. 2015, 2017, Abd-Elsalam et al. 2016, Hernández-Restrepo et al. 2016, Hyde et al. 2016, 2017, Wijayawardene et al. 2016, Ahmed et al. 2017, Karunarathna et al. 2017, Phookamsak et al. 2017, Bakhshi et al. 2018, Wanasinghe et al. 2018).

Species of Phaeosphaeriaceae have been found on various hosts and substrates, including plants, lichens, mushrooms, algae, human, soil and air (Saccardo 1883, Berlese and Voglino 1886, Phookamsak et al. 2014a, Ahmed et al. 2016, Karunarathna et al.
Neostagonosporella sichuanensis gen. et sp. nov. on Phyllostachys heteroclada from China.

However, most Phaeosphaeriaceous genera occur on plants of more than 65 host families, the majority of them being monocotyledons and herbaceous plants, such as Arecaceae, Asparagaceae, Compositae, Juncaceae, Leguminosae, Poaceae, Ranunculaceae, Restionaceae and Rosaceae etc. (Taylor and Hyde 2003, Quaedvlieg et al. 2013, Crous et al. 2015b, Hyde et al. 2016, Tibpromma et al. 2016a, Karunarathna et al. 2017, Phookamsak et al. 2017, Wanasinghe et al. 2018). Our new genus exists on Poaceae and at least 30 genera are reported within this family. Currently, 11 genera are observed only on Poaceae: Amarenomyces, Bricookea, Camarosporioides, Dactylidina, Embaria, Melnikia, Neosphaerellopsis, Phaeopoacea, Sulcispora, Vagicola and Yunnanensis, all of them being recently established except for Amarenomyces, Bricookea and Sulcispora (Eriksson 1981, Barr 1982, Shoemaker and Babcock 1989, Trakunyingcharoen et al. 2014, Ariyawansa et al. 2015b, Hyde et al. 2016, Wijayawardene et al. 2016, Karunarathna et al. 2017, Thambbugala et al. 2017, Wanasinghe et al. 2018). Amongst them, all hosts are short herbaceous plants and there are no bamboo plants recorded so far, with the exception of a few species of Ophiobolus and Phaeosphaeria in the old literature (Penzig and Saccardo 1897, Miyake and Hara 1910). A large number of bamboo forests (more than 130 species) are distributed throughout Sichuan (Yi 1997) and, most likely, many Phaeosphaeriaceous species are waiting for exploration and discovery.

Acknowledgements

Chun-Lin Yang thanks Ming Liu, Xue Wang and Ren-Hua Chen for their help and support in field sampling and laboratory work. K.D. Hyde would like to acknowledge The Thailand Research Fund, grant number: RDG6130001, Impact of climate change on fungal diversity and biogeography in the Greater Mekong Subregion.

References

Abd-Elsalam KA, Tibpromma S, Wanasinghe DN, Camporesi E, Hyde KD (2016) Equisetica gen. nov. (Phaeosphaeriaceae), from Equisetum sp. in Italy. Phytotaxa 284: 169–180. https://doi.org/10.11646/phytotaxa.284.3.2

Ahmed SA, van de Sande WWJ, Stevens DA, Fahal A, van Diepeningen AD, Menken SBJ, de Hoog GS (2014) Revision of agents of black-grain eumycetoma in the order Pleosporales. Persoonia 33: 141–154. https://doi.org/10.3767/003158514X684744

Ahmed SA, Hofmüller W, Seibold M, de Hoog GS, Harak H, Tammer I, Diepeningen AD, Behrens-Baumann W (2017) Tintelnotia, a new genus in Phaeosphaeriaceae harbouring agents of corneal and nail infections in humans. Mycoses 60: 244–253. https://doi.org/10.1111/myc.12588

Andrie RM, Schoch CL, Hedges R, Spatafora JW, Ciuffetti LM (2008) Homologs of ToxB, a host-selective toxin gene from Pyrenophora tritici-repentis, are present in the genome of
sister-species *Pyrenophora bromi* and other members of the Ascomycota. Fungal Genetics and Biology 45: 363–377. https://doi.org/10.1016/j.fgb.2007.10.014

Ariyawansa HA, Camporesi E, Thambugala KM, Mapook A, Kang J-C, Alias SA, Chukeattirote E, Thines M, Mckenzie EHC, Hyde KD (2014) Confusion surrounding *Didymosphaeria*—phylogenetic and morphological evidence suggest Didymosphaeriaceae is not a distinct family. Phytotaxa 176: 102–119. https://doi.org/10.11646/phytotaxa.176.1.12

Ariyawansa HA, Phukhamsakda C, Thambugala KM, Bulgakov TS, Wanasinghe DN, Perera RH, Mapook A, Camporesi E, Kang J-C, Jones EBG, Bahkali AH, Jayasiri SC, Hyde KD, Liu ZY, Bhat JD (2015a) Revision and phylogeny of Leptosphaeriaceae. Fungal Diversity 74: 19–51. https://doi.org/10.1007/s13225-015-0349-2

Ariyawansa HA, Hyde KD, Jayasiri SC, Buyck B, Chethana KWT, Dai D-Q, Dai Y-C, Daranagama DA, Jayawardena RS, Lücking R, Ghoasad-Nejad M, Niskanen T, Thambugala KM, Voigt K, Zhao R-L, Li G-J, Doilm M, Boonmee S, Yang Z-L, Cai Q, Cui Y-Y, Bahkali AH, Chen J, Cui B-K, Chen J-J, Dayarathe MC, Dissanayake AJ, Ekanayaka AH, Hashimoto A, Hongsanan S, Jones EBG, Larsson E, Li W-J, Li Q-R, Liu J-K, Luo Z-L, Maharachchikumbura SSN, Mapook A, McKenzie EHC, Norphanphoun C, Konta S, Pang K-L, Perera RH, Phookamsak R, Phukhamsakda C, Pinruan U, Randrianjohany E, Singtrippop C, Tanaka K, Tian C-M, Tønbrova S, Abdel-Wahab MA, Wanasinghe DN, Wijayawardene NN, Zhang J-F, Zhang H, Abdel-Aziz FA, Wedin M, Westberg M, Ammirati JF, Bulgakov TS, Lima DX, Callaghan TM, Callac P, Chang C-H, Coca LF, Dalforno M, Dollhofer V, Fliegerová K, Greiner K, Griffith GW, Höftetter HMH, Jeewon R, Kang J-C, Wen T-C, Kytövuori PMK, Lawrey JD, Xing J, Li H, Liu Z-Y, Liu X-Z, Liimatainen K, Lumbsch HT, Matsumura M, Moncada B, Nuankaew S, Parnmen S, de Azevedo Santiago ALCM, Sommai S, Song Y, de Souza CAF; de Souza-Motta CM, Su H-Y, Suerstron S, Wang Y, Wei S-F, Wen T-C, Yuan H-S, Zhou L-W, Réblová M, Fournier J, Camporesi E, Luangsaraard JJ, Tasanathai K, Khonsanit A, Thanakitpipattana D, Somrithipol S, Diederich P, Millanes AM, Common RS, Stadler M, Yan J-Y, Li X-H, Lee HW, Nguyen TTT, Lee HB, Battistin E, Marsico O, Vizzini A, Vila J, Ercole E, Eberhardt U, Simonini G, Wen H-A, Chen X-H, Miettinen O, Spirin V, Hernawati (2015b) Fungal diversity notes 111–252: taxonomic and phylogenetic contributions to fungal taxa. Fungal Diversity 75: 27–274. https://doi.org/10.1007/s13225-015-0346-5

Ariyawansa HA, Phillips AJL, Chuang W-Y, Tai I (2018) Tzananiaceae, a new pleosporalean family associated with *Ophiocordyceps macroacicularis* fruiting bodies in Taiwan. MycoKeys 37: 1–17. https://doi.org/10.3897/mycokeys.37.27265

Aveskamp MM, Verkley GJM, de Gruyter J, Muraue MA, Perelló A, Woudenberg JHC, Groenewald JZ (2009) DNA phylogeny reveals polyphyly of *Phoma* section *Peyronellaea* and multiple taxonomic novelties. Mycologia 101: 363–382. https://doi.org/10.3852/08-199

Aveskamp MM, de Gruyter J, Woudenberg JHC, Verkley GJM, Crous PW (2010) Highlights of the Didymellaceae: A polyphasic approach to characterise *Phoma* and related pleosporalean genera. Studies in Mycology 65: 1–60. https://doi.org/10.3114/sim.2010.65.01

Bakhshi M, Arzanlou M, Groenewald JZ, Quadrvlieg W, Crous PW (2018) *Parastagonosporella fallipiae* gen. et sp. nov. (Phaeosphaeriaceae) on *Fallopia convolvulus* from Iran. Mycological Progress. https://doi.org/10.1007/s11557-018-1428-z
Neostagonosporella sichuanensis gen. et sp. nov. on Phyllostachys heteroclada from China.

Barr ME (1979) A classification of Loculoascomycetes. Mycologia 71: 935–957. https://doi.org/10.2307/3759283
Barr ME (1982) Leptosphaeria sepalorum. Mycotaxon 15: 345–348.
Barr ME (1987) Prodomus to class Loculoascomycetes. Amherst, Massachusetts: Hamilton I. Newell, Inc. 168 pp.
Barr ME (1992) Additions to and notes on the Phaeosphaeriaceae (Pleosporales, Loculoascomycetes). Mycotaxon 43: 371–400.
Berlese AN, Voglino P (1886) Sylloge fungorum. Additamenta ad Volumina I–IV. 484 pp.
Câmara MPS, Palm ME, van Berkum P, O’Neill NR (2002) Molecular phylogeny of Leptosphaeria and Phaeosphaeria. Mycologia 94: 630–640. https://doi.org/10.1080/15572536.2003.11833191
Chen Q, Jiang J-R, Zhang G-Z, Cai L, Crous PW (2015) Resolving the Phoma enigma. Studies in Mycology 82: 137–217. https://doi.org/10.1016/j.simyco.2015.10.003
Crous PW, Verkley GJM, Groenewald JZ (2006) Eucalyptus microfungi known from culture. 1. Cladoriella and Fulvoflamma genera nova, with notes on some other poorly known taxa. Studies in Mycology 55: 53–63. https://doi.org/10.3114/sim.55.1.53
Crous PW, Braun U, Wingfield MJ, Wood AR, Shin HD, Summerell BA, Alfenas AC, Cuma-gun CJR, Groenewald JZ (2009) Phylogeny and taxonomy of obscure genera of microfungi. Persoonia 22: 139–161. https://doi.org/10.3767/003158509X461701
Crous PW, Groenewald JZ, Lombard L, Wingfield MJ (2012) Homortomyces gen. nov., a new dothidealean pycnidial fungus from the Cradle of Humankind. IMA Fungus 3: 109–115. https://doi.org/10.5598/imafungus.2012.03.02.02
Crous PW, Shivás RG, Quaedvlieg W, van der Bank M, Zhang Y, Summerell BA, Guarro J, Wingfield MJ, Wood AR, Alfenas AC, Braun U, Cano-Lira JF, García D, Marin-Felix Y, Alvarado P, Andrade JP, Armengol J, Assefa A, den Breejen A, Camele I, Cheewangkoon R, De Souza JT, Duong TA, Esteve-Raventós F, Fournier J, Frisullo S, García-Jiménez J, Gardiennet A, Gené J, Hernández-Restrepo M, Hirooka Y, Hospenthal DR, King A, Lechat C, Lombard L, Mang SM, Marbach PAS, Marincowitz S, Marin-Felix Y, Montaño-Mata NJ, Moreno G, Perez CA, Pérez Sierra AM, Robertson JL, Roux J, Rubio E, Schumacher RK, Stchigel AM, Sutton DA, Tan Y-P, Thompson EH, van der Linde E, Walker AK, Walker DM, Wick BL, Wong PTW, Groenewald JZ (2014) Fungal Planet description sheets: 214–280. Persoonia 32: 184–306. https://doi.org/10.3767/003158514X682395
Crous PW, Wingfield MJ, Guarro J, Hernández-Restrepo M, Sutton DA, Acharya K, Barber PA, Bockhout T, Dimitrov RA, Dueñas M, Dutta AK, Gené J, Gouliamova DE, Groenewald M, Lombard L, Morozova OV, Sarkar J, Smith MT, Stchigel AM, Wiederhold NP, Alexandrova AV, Antelmi I, Armengol J, Barnes I, Cano-Lira JF, Castañeda Ruiz RF, Contu M, Courtecuisse PR, da Silveira AL, Decock CA, de Goes A, Edathodu J, Ercole E, Firmino AC, Fourie A, Fournier J, Furtado EL, Geering AD, Gershenzon J, Giraldo A, Gramaje D, Hammerbacher A, He X-L, Haryadi D, Khemmuk W, Kovalenko AE, Krawczynski R, Laich F, Lechat C, Lopes UP, Madrid H, Malysheva EF, Marín-Felix Y, Martín MP, Mostert L, Nigro F, Pereira OL, Picillo B, Pinho DB, Popov ES, Rodas Peláez CA, Rooney-Latham S, Sandoval-Denis M, Shivás RG, Silva V, Stoiolova-Disheva MM, Tellera MT, Ullah C, Unsicker SB, van der Merwe NA, Vizzini A, Wagner HG, Wong PT, Wood
Chun-Lin Yang et al.  /  MycoKeys 46: 119–150 (2019)

AR, Groenewald JZ (2015a) Fungal Planet description sheets: 320–370. Persoonia 34: 167–266. https://doi.org/10.3767/003158515X688433

Crous PW, Wingfield MJ, Le Roux JJ, Richardson DM, Strasberg D, Shivas RG, Alvarado P, Edwards J, Moreno G, Sharma R, Sonawane MS, Tan Y-P, Altés A, Barasubiye T, Barnes CW, Blanchette RA, Boertmann D, Bogo A, Carlavilla JR, Cheewangkoon R, Daniel R, de Beer ZW, de Jesús Yáñez-Morales M, Duong TA, Fernández-Vicente J, Geering ADW, Guest DI, Held BW, Heykoop M, Hubka V, Ismail AM, Kajale SC, Khemmuk W, Kolařík M, Kurl R, Lebeuf R, Lévesque CA, Lombard L, Magista D, Manjón JL, Marincowitz S, MohedANO JM, Nováková A, Oberlies NH, Otto EC, Pauigian ND, Pascoe IG, Pérez-Butrón JL, Perrone G, Rahi P, Raja HA, Rintoul T, Sanhueza RMV, Scarlett K, Shouche YS, Shuttleworth LA, Taylor PWJ, Thorn RG, Vawdrey LL, Vidal RS, Voitk A, Wong PTW, Wood AR, Zamora JC, Groenewald JZ (2015b) Fungal Planet Description Sheets: 371–399. Persoonia 35: 264–327. https://doi.org/10.3767/003158515X690269

Crous PW, Carris LM, Giraldo A, Groenewald JZ, Hawksworth DL, Hernández-Restrepo M, Jaklitsch WM, Lebrun M-H, Schumacher RK, Stielow JB, van der Linde EJ, Vilcāne J, Voglmayr H, Wood AR (2015c) The Genera of Fungi – fixing the application of the type species of generic names – G2: Allantophomopsis, Latorua, Macrodiplodiopsis, Macrohilum, Milospium, Protostegia, Pyricularia, Rotula, Septoria, and Wojnowicia. IMA Fungus 6: 163–198. https://doi.org/10.5598/imafungus.2015.06.01.11

Crous PW, Wingfield MJ, Richardson DM, Le Roux JJ, Strasberg D, Edwards J, Roets F, Hubka V, Taylor PWJ, Heykoop M, Martín MP, Maoreno G, Sutton DA, Wiederhold NP, Barnes CW, Carlavilla JR, Gené J, Giraldo A, Guarnacci V, Guarro J, Hernandez-Restrepo M, Kolařík M, Manjón JL, Pascoe IG, Popov ES, Sandoval-Denis M, Woudenberg JHC, Acharya K, Alexandrova AV, Alvarado P, Barbosa RN, Bascia IG, Blanchette RA, Boekhout T, Burgess TI, Cano-Lira JF, Čmoková A, Dimitrov RA, Dyakov MYu, Dueñas M, Dutta AK, Esteve-Raventós F, Fedosova AG, Fournier J, Gamboa P, Goulamova DE, Grebenc T, Groenewald M, Hanse B, Hardy GEstJ, Held BW, Jurjević Ž, Kaewgrajang T, Latha KPD, Lombard L, Luangsa-ard JJ, Lysková P, Mallátová N, Manimohan P, Miller AN, Mirabolfathy M, Morozova OV, Obodai M, Oliveira NT, Ordóñez ME, Otto EC, Paloi S, Peterson SW, Phosri C, Roux J, Salazar WA, Sánchez A, Sarria GA, Shin H-D, Silva BDB, Silva GA, Smith MTh, Souza-Motta CM, Stchigel AM, Stoilova-Dishева MM, Sulzbacher MA, Telleria MT, Toapanta C, Traba JM, Valenzuela-Lopez N, Watling R, Groenewald JZ. (2016) Fungal Planet description sheets: 400–468. Persoonia 36: 316–458. 10.3767/003158516X692185

Crous PW, Groenewald JZ (2017) The Genera of Fungi – G4: Camarosporium and Dothiara. IMA Fungus 8: 131–152. https://doi.org/10.5598/imafungus.2017.08.01.10

Crous PW, Wingfield MJ, Burgess TI, Hardy GEstJ, Barber PA, Alvarado P, Barnes CW, Buchanan PK, Heykoop M, Moreno G, Thangavel R, van der Spuy S, Barili A, Barrett S, Cacciola SO, Cano-Lira JF, Crane C, Decock C, Gibertoni TB, Guarro J, Guevara-Suarez M, Hubka V, Kolařík M, Lira CRS, Ordóñez ME, Padamsee M, Ryvarden L, Soares AM, Stchigel AM, Sutton DA, Vizzini A, Weir BS, Acharya K, Aloj F, Bascia IG, Blanchette RA, Bordallo JJ, Bratek Z, Butler T, Cano-Canals J, Carlavilla JR, Chander J, Cheewangkoon
Neostagonosporella sichuanensis gen. et sp. nov. on *Phyllostachys heteroclada* from China.

R, Cruz RHSF, da Silva M, Dutta AK, Ercole E, Escobio V, Esteve-Raventós F, Flores JA, Gené J, Góis JS, Haines L, Held BW, Jung MH, Hosaka K, Jung T, Jurjević Ž, Kautman V, Kautmanova I, Kiyashko AA, Kozanek M, Kubátová A, Lafourcade M, La Spada F, Latha KPD, Madrid H, Malysheva EF, Manimohan P, Manjón JL, Martín MP, Mata M, Merényi Z, Morte A, Nagy I, Normand AC, Paloi S, Pattison N, Pawlowska J, Pereira OL, Petterson ME, Picillo B, Raj KNA, Roberts A, Rodríguez A, Rodríguez-Campo FJ, Romański M, Ruszkiewicz-Michalska M, Scanu B, Schena L, Semelbauer M, Sharma R, Shouche YS, Silva V, Staniszek-Kik M, Stielow JB, Tapia C, Taylor PWJ, Toome-Heller M, Vàbeikokheji JMC, van Diepeningen AD, Van Hoa N, Van Tri M, Wiederhold NP, Wrzosek M, Zoanthanza J, Groenewald JZ (2017) Fungal Planet description sheets: 558–624. Persoonia 38: 240–384. https://doi.org/10.3767/003158517X698941

Dai D-Q, Phookamsak R, Wijayawardene NN, Li W-J, Bhat DJ, Xu J-C, Taylor JE, Hyde KD, Chukeatirote E (2017) Bambusicolous fungi. Fungal Diversity 82: 1–105. https://doi.org/10.1007/s13225-016-0367-8

de Gruyter J, Aveskamp MM, Woudenberg JHC, Verkley GJM, Groenewald JZ, Crous PW (2009) Molecular phylogeny of *Phoma* and allied anamorph genera: Towards a re-classification of the *Phoma* complex. Mycological Research 113: 508–519. https://doi.org/10.1016/j.mycres.2009.01.002

de Gruyter J, Woudenberg JHC, Aveskamp MM, Verkley GJM, Groenewald JZ, Crous PW (2010) Systematic reappraisal of species in *Phoma* section *Paraphoma*, *Pyrenochaeta* and *Pleurophoma*. Mycologia 102: 1066–1081. https://doi.org/10.3852/09-240

Eriksson OE (1967) On graminicolous pyrenomycetes from Fennoscandia II. Phragmosporous and scolecosporous species. Arkiv för Botanik 6: 381–440.

Eriksson OE (1981) The families of bitunicate ascomycetes. Opera Botanica 60: 1–220. https://doi.org/10.1111/j.1756-1051.1981.tb01167.x

Eriksson OE, Hawksworth DL (1993) Outline of the Ascomycetes. Systema Ascomycetum 12: 51–257.

Ertz D, Diederich P, Lawrey JD, Berger F, Freebury CE, Coppins B, Gardiennet A, Hofellner J (2015) Phylogenetic insights resolve Dacampiaceae (Pleosporales) as polyphyletic: *Didymocyrtis* (Pleosporales, Phaeosphaeriaceae) with *Phoma*-like anamorphs resurrected and segregated from *Pycnococcus* (Trypetheliales, Polycoccaceae fam. nov.). Fungal Diversity 74: 53–89. https://doi.org/10.1007/s13225-015-0345-6

Ferrer C, Pérez-Santonja JJ, Rodríguez AE, Colom MF, Gené J, Alio JL, Verkley GJM, Guarro J (2009) A new species of *Pyrenochaeta* causing keratitis. Journal of Clinical Microbiology. https://doi.org/10.1128/JCM.01912-08

González MC, Anaya AL, Glenn AE, Saucedo-García A, Macías-Rubalcava ML, Hanlin RT (2007) A new endophytic ascomycete from El Eden Ecological Reserve, Quintana Roo, Mexico. Mycotaxon 101: 251–260.

Gupta VK, Tuohy MG (2013) Laboratory Protocols in Fungal Biology. Springer, New York and London, 114–115. https://doi.org/10.1007/978-1-4614-2356-0

Hall TA (1999) BioEdit: a user-friendly biological sequence alignment editor and analysis program for Windows 95/98/NT. Nucleic Acids Symposium Series 41: 95–98. https://doi.org/10.1021/bk-1999-0734.ch008
Hernández-Restrepo M, Schumacher RK, Wingfield MJ, Ahmad I, Cai L, Duong TA, Edwards J, Gené J, Groenewald JZ, Jabeen S, Khalid AN, Lombard L, Madrid H, Marin-Felix Y, Marincowitz S, Miller AN, Rajeshkumar KC, Rashid A, Sarwar S, Stchigel AM, Taylor PWJ, Zhou N, Crous PW (2016) Fungal systematics and evolution: FUSE 2. Sydowia 68: 193–230.

Hillis DM, Bull JJ (1993) An empirical test of bootstrapping as a method for assessing confidence in phylogenetic analysis. Systematic Biology 42: 182–192. https://doi.org/10.1093/sysbio/42.2.182

Huang S-K, Jeewon R, Wanasinghe DN, Manawasinghe IS, Bulagkov TS, Hyde KD, Kang J-C (2017) Phylogenetic taxonomy of *Dematiopleospora fusiformis* sp. nov. (Phaeosphaeriaceae) from Russia. Phytotaxa 316: 239–249. https://doi.org/10.11646/phytotaxa.316.3.3

Hyde KD, Jones EBG, Liu J-K, Ariyawansa HA, Boehm E, Boonme S, Braun U, Chomnunti P, Crous PW, Dai D-Q, Diederich P, Dissanayake AJ, Doilom M, Doveri F, Hongsanan S, Jayawardena R, Lawrey JD, Li Y-M, Liu Y-X, Lücking R, Monkai J, Muggia L, Nelsen MP, Pang K-L, Phookamsak R, Senanayake I, Shearer CA, Seutrong S, Tanaka K, Thambugala KM, Wijayawardene NN, Wikee S, Wu H-X, Zhang Y, Aguirre-Hudson B, Aliás SA, Aptroot A, Bahkali AH, Bezerra JHL, Bhat JD, Camporesi E, Chukeatirote E, Gueidan C, Hawksworth DL, Hirayama K, De Hoog S, Kang J-C, Knudsen K, Li W-J, Li X, Liu Z-Y, Mapook A, McKenzie EHC, Miller AN, Mortimer PE, Phillips AJL, Raja HA, Scheuer C, Schumm F, Taylor JE, Tian Q, Tibpromma S, Wanasinghe DN, Wang Y, Xu J-C, Yan J-Y, Yacharoen S, Zhang M (2013) Families of Dothideomycetes. Fungal Diversity 63: 1–313. https://doi.org/10.1007/s13225-013-0263-4

Hyde KD, Hongsanan S, Jeewon R, Bhat DJ, McKenzie EHC, Jones EBG, Phookamsak R, Ariyawansa HA, Boonme S, Zhao Q, Abdel-Aziz FA, Abdel-Wahab MA, Banmai S, Chomnunti P, Cui BK, Daranagama DA, Das K, Dayarathne MC, de Silva NI, Dissanayake AJ, Doilom M, Ekanayaka AH, Gibertoni TB, Góes-Neto A, Huang S-K, Jayasiri SC, Jayawardena RS, Konta S, Lee HB, Li W-J, Lin C-G, Liu J-K, Lu Y-Z, Luo Z-L, Manawasinghe IS, Manimohan P, Mapook A, Niskanen T, Norphanphoun C, Papizadeh M, Perera RH, Phukhamsakda C, Richter C, de A. Santiago ALCM, Drechsler-Santos ER, Senanayake IC, Tanaka K, Tennakoon TMDS, Thambugala KM, Tian Q, Tibpromma S, Thongbai B, Vizzini A, Wanasinghe DN, Wijayawardene NN, Wu H-X, Yang J, Zeng X-Y, Zhang H, Zhang J-F, Bulagkov TS, Camporesi E, Bahkali AH, Amoozegar MA, Arauojo-Neta LS, Ammirati JF, Baghela A, Bhatt RP, Bojantchev D, Buyck B, da Silva GA, de Lima CLF, de Oliveira RJV, de Souza CAF, Dai Y-C, Dima B, Duong TT, Ercole E, Mafalda-Freire F, Ghosh A, Hashimoto A, Kamolhan S, Kang J-C, Karunarathne SC, Kirk PM, Kytövuori I, Lantiere I, Limatainen K, Liu Z-Y, Liu X-Z, Lücking R, Medardi G, Mortimer PE, Nguyen TTT, Promputtha I, Anil Raj KN, Reck MA, Lumyong S, Shahzadeh-Fazeli SA, Stadler M, Soudi MR, Su H-Y, Takahashi T, Tangthirasunun N, Uniyal P, Wang Y, Wen T-C, Xu J-C, Zhang Z-K, Zhao Y-C, Zhou J-L, Zhu L (2016) Fungal diversity notes 367–490: taxonomic and phylogenetic contributions to fungal taxa. Fungal Diversity 80: 1–270. https://doi.org/10.1007/s13225-016-0373-x

Hyde KD, Norphanphoun C, Abreu VP, Bazzicalupo A, Chethana KWT, Clericuzio M, Dayaratne MC, Dissanayake AJ, Ekanayaka AH, He M-Q, Hongsanan S, Huang S-K, Jayasiri
Neostagonosporella sichuanensis gen. et sp. nov. on Phyllostachys heteroclada from China.

SC, Jayawardena RS, Karunarathna A, Konta S, Kušan I, Lee H, Li J-F, Lin C-G, Liu N-G, Lu Y-Z, Luo Z-L, Manawasinghe IS, Mapook A, Perera RH, Phookamsak R, Phukhamsakda C, Siedlecki I, Mayra Soares A, Tennakoon DS, Tian Q, Tibpromma S, Wanasinghe DN, Xiao Y-P, Yang J, Zeng X-Y, Abdel-Aziz FA, Li W-J, Senanayake IC, Shang Q-J, Daranagama DA, de Silva NI, Thambugala KM, Abdel-Wahab MA, Bahkali AH, Berbee ML, Boonmee S, Bhat DJ, Bulgakov TS, Buyck B, Camporesi E, Castañeda-Ruiz RF, Chomnunti P, Doilom M, Dovana F, Gibertoni TB, Jadon M, Jeewon R, Jones EBG, Kang J-C, Karunarathna SC, Lim YW, Liu J-K, Liu Z-Y, Plautz Jr. HL, Lumyong S, Maharachchikumbura SSN, Matočec N, McKenzie EHC, Mešić A, Miller D, Pawlowska J, Pereira OL, Promputtha I, Romero AI, Ryvarden L, Su H-Y, Suetrong S, Tkalčec Z, Vizzini A, Wen T-C, Wisitrassameewong K, Wrzosek M, Xu J-C, Zhao Q, Zhao R-L, Mortimer PE (2017) Fungal diversity notes 603–708: taxonomic and phylogenetic notes on genera and species. Fungal Diversity 87: 1–235. https://doi.org/10.1007/s13225-017-0391-3

Jaklitsch WM, Voglmayr H (2016) Hidden diversity in Thyridaria and a new circumscription of the Thyridariaceae. Studies in Mycology 85: 35–64. https://doi.org/10.1016/j.mycot.2016.09.002

Jayasiri SC, Wanasinghe DN, Ariyawansa HA, Jones EBG, Kang J-C, Promputtha I, Bahkali AH, Bhat J, Camporesi E, Hyde KD (2015) Two novel species of Vagicola (Phaeosphaeriaceae) from Italy. Mycosphere 6: 716–728. https://doi.org/10.5943/mycosphere/6/6/7

Jeewon R, Hyde KD (2016) Establishing species boundaries and new taxa among fungi: recommendations to resolve taxonomic ambiguities. Mycosphere 7: 1669–1677. https://doi.org/10.5943/mycosphere/7/11/4

Joshi Y, Tripathi M, Bish K, Upadhyay S, Kumar V, Pal N, Gaira A, Pant S, Rawat KS, Bisht S, Bajpai R, Halda JP (2018) Further contributions to the documentation of lichenicolous fungi from India. Kavaka 50: 26–33.

Karunarathna A, Papizadeh M, Senanayake IC, Jeewon R, Phookamsak R, Goonasekara ID, Wanasinghe DN, Wijayarawardene NN, Amoozegar MA, Shahzadeh Fazeli SA, Camporesi E, Hyde KD, Weerahewa HLD, Lumyong S, McKenzie EHC (2017) Novel fungal species of Phaeosphaeriaceae with an asexual/sexual morph connection. Mycosphere 8: 1818–1834. https://doi.org/10.5943/mycosphere/8/10/8

Katoh K, Standley DM (2013) MAFFT multiple sequence alignment software version 7: improvements in performance and usability. Molecular Biology and Evolution 30: 772–780. https://doi.org/10.1093/molbev/msr010

Khashnobish A, Shearer CA (1996) Reexamination of some Leptosphaeria and Phaeosphaeria species, Passeriniella obiones and Melanomma radicans. Mycological Research 100: 1341–1354. https://doi.org/10.1016/S0953-7562(96)80062-1

Kirk PM, Cannon PF, David JC, Stalpers JA (2001) Dictionary of the Fungi (9th edn). CABI, Wallingford.

Kirk PM, Cannon PF, Minter DW, Stalpers JA (2008) Ainsworth & Bisby’s Dictionary of the Fungi, 10th edn. CABI, Wallingford. https://doi.org/10.1079/9780851998268.0000

Kishino H, Hasegawa M (1989) Evaluation of the maximum likelihood estimate of the evolutionary tree topologies from DNA sequence data, and the branching order in hominoida. Journal of Molecular Evolution 29: 170–179. https://doi.org/10.1007/BF02100115
Kiss L, Nakasone KK (1998) Ribosomal DNA internal transcribed spacer sequences do not support the species status of Ampelomyces quisqualis, a hyperparasite of powdery mildew fungi. Current Genetics 33: 362–367. https://doi.org/10.1007/s002940050348

Lawrey JD, Diederich P, Nelsen MP, Freebury C, van den Broeck D, Sikaroodi M, Ertz D (2012) Phylogenetic placement of lichenicolous Phoma species in the Phaeosphaeriaceae (Pleosporales, Dothideomycetes). Fungal Diversity 55: 195–213. https://doi.org/10.1007/s13225-012-0166-9

Leuchtmann A (1984) Uber Phaeosphaeria Miyake und andere bitunicate Ascomyceten mit mehrfach querseptierten Ascosporen. Sydowia 37: 75–194. https://doi.org/10.3929/ethz-a-000320965

Li W-J, Bhat D, Camporesi E, Tian Q, Wijayawardene NN, Dai D-Q, Phookamsak R, Chomnunti P, Bahkali AH, Hyde KD (2015) New asexual morph taxa in Phaeosphaeriaceae. Mycosphere 6: 681–708. https://doi.org/10.5943/mycosphere/6/6/5

Liew ECY, Aptroot A, Hyde KD (2000) Phylogenetic significance of the pseudoparaphyses in Loculoascomycete taxonomy. Molecular Phylogenetics and Evolution 16: 392–402. https://doi.org/10.1006/mpev.2000.0801

Liu A-R, Chen S-C, Wu S-Y, Xu T, Guo L-D, Jeewon R, Wei J-G (2010) Cultural studies coupled with DNA based sequence analyses and its implication on pigmentation as a phylogenetic marker in Pestalotiopsis taxonomy. Molecular Phylogenetic Evolution 57: 528–535. https://doi.org/10.1016/j.mpev.2010.07.017

Liu J-K, Hyde KD, Jones EBG, Ariyawansa HA, Bhat DJ, Boonmee S, Maharachchikumbura SSN, McKenzie EHC, Phookamsak R, Phukhamsakda C, Shenoy BD, Abdel-Wahab MA, Buyck B, Chen J, Chethana KWT, Singtripop C, Dai D-Q, Dai Y-C, Daranagama DA, Dissanayake AJ, Doilom M, D’souza MJ, Fan X-L, Goonasekara ID, Hirayama K, Hongsanan S, Jayasiri SC, Jayawardena RS, Karunaratna SC, Li W-J, Mapook A, Norphanphoun C, Pang K-L, Perera RH, Peršoh D, Pinruan U, Senanayake IC, Somrithipol S, Suevrong S, Tanaka K, Thambbugala KM, Tian Q, Tighbromma S, Udayanga D, Wijayarwardene NN, Wanasinghe D, Wisitrassameewong K, Zeng X-Y, Abdel-Aziz FA, Adamčík S, Bahkali AH, Boonyuen N, Bulgakov T, Callac P, Chomnunti P, Greiner K, Hashimoto A, Hofstetter V, Kang J-C, Lewis D, Li X-H, Liu X-Z, Liu Z-Y, Matsumura M, Mortimer PE, Rambold G, Randrianjohany E, Sato G, Sri-Indrasutdhi V, Tian C-M, Verbeken A, von Brackel W, Wang Y, Wen T-C, Xu J-C, Yan J-Y, Zhao R-L, Camporesi E (2015) Fungal diversity notes 1–110: taxonomic and phylogenetic contributions to fungal species. Fungal Diversity 72: 1–197. https://doi.org/10.1007/s13225-015-0324-y

Lucas MT, Webster J (1967) Conidial states of British species of Leptosphaeria. Transactions of the British Mycological Society 50: 85–121. https://doi.org/10.1016/S0007-1536(67)80067-6

Lumbsch HT, Huhndorf SM (2007) Outline of Ascomycota-2007. Myconet 13: 1–58. https://doi.org/10.3158/1557.1

Lumbsch HT, Huhndorf SM (2010) Outline of Ascomycota-2009. Fieldiana Life Earth Sci 1: 1–60.

Maddison W, Maddison D (1997–2016) Mesquite, version 3.11 (build 766) Copyright (c).
Neostagonosporella sichuanensis gen. et sp. nov. on Phyllostachys heteroclada from China.

Maharachchikumbura SSN, Hyde KD, Jones EBG, McKenzie EHC, Huang S-K, Abdel-Wahhab MA, Daranagama DA, Dayarathne M, D’souza MJ, Goonasekara ID, Hongsanan S, Jayawardena RS, Kirk PM, Konta S, Liu J-K, Liu Z-Y, Norphanphoun C, Pang K-L, Perera RH, Senanayake IC, Shang Q-J, Shenoy BD, Xiao Y-P, Bahkali AH, Kang J-C, Somrothipol S, Suetrong S, Wen T-C, Xu J-C (2015) Towards a natural classification and backbone tree for Sordariomycetes. Fungal Diversity 72: 199–301. https://doi.org/10.1007/s13225-015-0331-z

Mapook A, Boonmee S, Ariyawansa HA, Tibpromma S, Campesori E, Jones EG, Bahkali AH, Hyde KD (2016) Taxonomic and phylogenetic placement of Nodulosphaeria. Mycological Progress 15: 34. https://doi.org/10.1007/s11557-016-1176-x

Miller MA, Pfeiffer W, Schwartz T (2010) "Creating the CIPRES Science Gateway for inference of large phylogenetic trees" in Proceedings of the Gateway Computing Environments Workshop (GCE), 14 Nov. 2010, New Orleans, 1–8. https://doi.org/10.1109/GCE.2010.5676129

Miyake I (1909) Studies on the parasitic fungi of rice in Japan. Botanical Magazine Tokyo 23: 85–97. https://doi.org/10.15281/jplantres1887.23.266_85

Miyake I, Hara K (1910) Fungi on Japanese bamboos. Botanical Magazine Tokyo 24: 331–341. https://doi.org/10.15281/jplantres1887.24.286_331

Müller E (1950) Die schweizerischen Arten der Gattung Leptosphaeria und ihrer Verwandten. Sydowia 4: 185–319. https://doi.org/10.3929/ethz-a-000096214

Munk A (1957) Danish pyrenomycetes. A preliminary flora. Dansk Bot Arkiv, Kjøbenhavn 17: 1–491.

Nylander JAA (2004) MrModeltest v2.2 Program distributed by the author. Evolutionary Biology Centre, Uppsala University, Uppsala.

Penzig AJO, Saccardo PA (1897) Diagnoses fungorum novorum in insula Java collectorum. Ser. I. Malpighia. 11: 387–409.

Phillips AJL, Alves A, Pennycook SR, Johnston PR, Ramaley A, Akulov A, Crous PW (2008) Resolving the phylogenetic and taxonomic status of dark-spored teleomorph genera in the Botryosphaeriaceae. Persoonia 21: 29–55. https://doi.org/10.3767/003158508X340742

Phookamsak R, Liu J-K, McKenzie EHC, Manamgoda DS, Ariyawansa H, Thambugala KM, Dai D-Q, Camporesi E, Chukeatirote E, Wijayawardene NN, Bahkali AH, Mortimer PE, Xu J-C, Hyde KD (2014a) Revision of Phaeosphaeriaceae. Fungal Diversity 68: 159–238. https://doi.org/10.1007/s13225-014-0308-3

Phookamsak R, Liu J-K, Manamgoda DS, Chukeatirote E, Mortimer PE, Mckenzie EHC, Hyde KD (2014b) The sexual state of Setophoma. Phytotaxa 176: 260–269. https://doi.org/10.11646/phytotaxa.176.1.25

Phookamsak R, Wanasinghe DN, Hongsanan S, Phukhamsakda C, Huang S-K, Tennakoon DS, Norphanphoun C, Camporesi E, Bulgakov TS, Promputtha I, Mortimer PE, Xu J-C, Hyde KD (2017) Towards a natural classification of Ophiobolus and ophiobolus-like taxa; introducing three novel genera Ophiobolopsis, Paraophiobolus and Pseudoophiobolus in Phaeosphaeriaceae (Pleosporales). Fungal Diversity 87: 299–339. https://doi.org/10.1007/s13225-017-0393-1
Phukhamsakda C, Ariyawansa HA, Phookamsak R, Chomnunti P, Bulgakov TS, Yang J-B, Bhat DJ, Bahkali AH, Hyde KD (2015) Muriphaeospheria galatellae gen. et sp. nov. in Phaeosphaeriaceae (Pleosporales). Phytotaxa 227: 55–65. https://doi.org/10.11646/phytotaxa.227.1.6

Quaedvlieg W, Verkley GJM, Shin H-D, Barreto RW, Alfenas AC, Swart WJ, Groenewald JZ, Crous PW (2013) Sizing up Septoria. Studies in Mycology 75: 307–390. https://doi.org/10.3114/sim0017

Rambaut A, Suchard M, Drummond AJ (2013) Tracer v. 1.6. Institute of Evolutionary Biology, University of Edinburgh. Accessed May 2018. http://tree.bio.ed.ac.uk/software/tracer/

Rambaut A (2016) FigTree v. 1.4.3. Accessed May 2018. http://tree.bio.ed.ac.uk/software/figtree/

Rehner S (2001) Primers for elongation factor 1-α (EF1-α). http://ocid.NACSE.ORG/research/deephyphae/EF1primer.pdf

Ronquist F, Teslenko M, Mark PVD, Ayres DL, Darling A, Höhna S, Larget B, Liu L, Suchard MA, Huelsenbeck JP (2012) MrBayes 3.2: Efficient Bayesian Phylogenetic Inference and Model Choice Across a Large Model Space. Systematic Biology 61: 539–542. https://doi.org/10.1093/sysbio/sys029

Rossman AY, Crous PW, Hyde KD, Hawksworth D L, Aptroot A, Bezerra JL, Bhat JD, Boehm E, Braun U, Boonmee S, Camporesi E, Chomnunti P, Dai D-Q, D’souza MA, Dissanayake A, Jones EBG, Groenewald JZ, Hernández-Restrepo M, Hongsanan S, Jaklitsch WM, Jayawardena R, Li W-J, Kirk PM, Lawrey JD, Mapook A, McKenzie EHC, Monkai J, Phillips AJL, Phookamsak R, Raja HA, Seifert KA, Senanayake I, Slippers B, Sueterong S, Taylor JE, Thambugala KM, Tian Q, Tibpromma S, Wanasinge DN, Wijayawardene NN, Wikee S, Woudenberg JHC, Wu HX, Yan J-Y, Yang T, Zhang Y (2015) Recommended names for pleomorphic genera in Dothideomycetes. IMA fungus 6: 507–523. https://doi.org/10.5598/imafungus.2015.06.02.14

Saccardo PA (1883) Sylloge Pyrenomycetum, Vol. II. Sylloge Fungorum 2: 1–813.

Schoch CL, Shoemaker RA, Seifert KA, Hambleton S, Spatafora JW, Crous PW (2006) A multigene phylogeny of the Dothideomycetes using four nuclear loci. Mycologia 98: 1041–1052. https://doi.org/10.1080/15572536.2006.11832632

Schoch CL, Crous PW, Groenewald JZ, Boehm EWA, Burgess TI, de-Gruyter J, de Hoog GS, Dixon LJ, Grube M, Guéidan C, Harada Y, Hatakeyama S, Hirayama K, Hosoya T, Huhndorf SM, Hyde KD, Jones EBG, Kohlmeyer J, Kruys Á, Li Y-M, Lücking R, Lumbsch HT, Marvanová L, Mbatchou JS, Mcvay AH, Miller AN, Mugambi GK, Muggia L, Nelsen MP, Nelson P, Owensby CA, Phillips AJL, Phongpaichit S, Pointing SB, Pujade-Renaud V, Raja HA, Rivas PE, Robberties B, Ruibal C, Sakayaraj J, Sano T, Selbmann L, Shearer CA, Shirouzu T, Slippers B, Sueterong S, Tanaka K, Volkmann-Kohlmeier B, Wingfield MJ, Wood AR, Woudenberg JHC, Yonezawa H, Zhang Y, Spatafora JW (2009) A class-wide phylogenetic assessment of Dothideomycetes. Studies in Mycology 64: 1–15. https://doi.org/10.3114/sim.2009.64.01

Schoch CL, Seifert KA, Huhndorf S, Robert V, Spouge JL, Levesque CA, Chen W (2012) Nuclear ribosomal internal transcribed spacer (ITS) region as a universal DNA barcode marker for Fungi. PNAS 109: 6241–6246. https://doi.org/10.1073/pnas.1117018109
Neostagonosporella sichuanensis gen. et sp. nov. on Phyllostachys heteroclada from China.

147

Senanayake IC, Jeewon R, Camporesi E, Hyde KD, Zeng Y-J, Tian S-L, Xie N (2018) Sulcispora supratumida sp. nov. (Phaeosphaeriaceae, Pleosporales) on Anthoxanthum odoratum from Italy. MycoKeys 38: 35–46. https://doi.org/10.3897/mycokeys.38.27729

Shearer CA, Crane JL, Chandra Reddy KR (1990) Studies in Leptosphaeria. Lectotypification of Sphaeria doliolum. Mycologia 82: 496–500. https://doi.org/10.1080/00275514.1990.12025913

Shoemaker RA (1984) Canadian and some extralimit Leptosphaeria species. Canadian Journal of Botany 62: 2688–2729. https://doi.org/10.1139/b84-366

Shoemaker RA, Babcock CE (1989) Phaeosphaeria. Canadian Journal of Botany 67: 1500–1599. https://doi.org/10.1139/b89-199

Spatafora JW, Sung G-H, Johnson D, Hesse C, O’Rourke B, Serdani M, Spotts R, Lutzoni F, Hofstetter V, Miadlikowska J, Reeb V, Gueidan C, Fraker E, Lumbsch T, Lücking R, Schmitt I, Hosaka K, Aptroot A, Roux C, Miller AN, Geiser DM, Hafellner J, Hestmark G, Arnold AE, Büdel B, Rauhut A, Hewitt D, Untereiner WA, Cole MS, Scheidegger C, Schultz M, Sipman H, Schoch CL (2006) A five-gene phylogeny of Pezizomycotina. Mycologia 98: 1018–1028. https://doi.org/10.1080/15572536.2006.11832630

Stamatakis A (2014) RAxML Version 8: A tool for Phylogenetic Analysis and Post-Analysis of Large Phylogenies. Bioinformatics 30: 1312–1313. https://doi.org/10.1093/bioinformatics/btu033

Sun B-D, Chen A-J, Gao W-W, Zhou Y-G, Ghazanfar MU, Wakil AW (2013) A new endophytic ascomycete associated with the medicinal plant, achyranthes Bidentata blume (Amaranthaceae). Pakistan Journal of Botany 45: 319–323. https://doi.org/10.5897/AJMR12.1461

Swofford DL (2002) PAUP: phylogenetic analysis using parsimony, version 4.0 b10. Sinauer Associates, Sunderland.

Tanaka K, Hirayama K, Yonezawa H, Sato G, Toriyabe A, Kudo H, Hashimoto A, Matsumura M, Harada Y, Kurihara Y, Shirouzu T, Hosoya T (2015) Revision of the Massarineae (Pleosporales, Dothideomycetes). Studies in Mycology 82: 75–136. https://doi.org/10.1016/j.simyco.2015.10.002

Tang C-X, Xu E-X, Tang Y, Wang P-Y, Zhang H-M (2007) Adaptability of giant panda to a new habitat in Bifengxia, Ya’an, Sichuan. Chinese Journal of Applied and Environmental Biology 13: 686–690.

Taylor JE, Hyde KD (2003) Microfungi of tropical and temperate palms. Fungal Diversity Research Series 12: 1–459.

Tennakoon DS, Hyde KD, Phookamsak R, Wanasinghe DN, Camporesi E, Promputtha I (2016) Taxonomy and Phylogeny of funcaecicola gen. nov. (Phaeosphaeriaceae, Pleosporinae, Pleosporales). Cryptogamie, Mycologie 37: 135–156. https://doi.org/10.7872/crym.v37.iss2.2016.135

Thambugala KM, Camporesi E, Ariyawansa HA, Phookamsak R, Liu Z-Y, Hyde KD (2014) Phylogeny and morphology of Phaeosphaeriopsis triseptata sp. nov., and Phaeosphaeriopsis glutcopunctata. Phytotaxa 176: 238–250. https://doi.org/10.11646/phytotaxa.176.1.23

Thambugala KM, Wanasinghe DN, Phillips AJL, Camporesi E, Bulgakov TS, Phukhamsakda C, Ariyawansa HA, Goonasekara ID, Phookamsak R, Dissanayake A, Tennakoon DS, Tib-
promma S, Chen Y-Y, Liu Z-Y, Hyde KD (2017) Mycosphere notes 1-50: grass (Poaceae) inhabiting Dothideomycetes. Mycosphere 8: 697–796. https://doi.org/10.5943/mycosphere/8/4/13

Thompson JD, Gibson TJ, Plewniak F, Jeanmougin F, Higgins DG (1997) The ClustalX windows interface: flexible strategies for multiple sequence alignment aided by quality analysis tools. Nucleic Acids Research 25: 4876–4882. https://doi.org/10.1093/nar/25.24.4876

Tibpromma S, Promputtha I, Phookamsak R, Boonmee S, Camporesi E, Yang J-B, Bhakali AH, McKenzie EH, Hyde KD (2015) Phylogeny and morphology of Premilcurensis gen. nov. (Pleosporales) from stems of Senecio in Italy. Phytotaxa 236: 40–52. https://doi.org/10.11646/phytotaxa.236.1.3

Tibpromma S, Liu JK, Promputtha I, Camporesi E, Bhakali AH, Hyde KD, Boonmee S (2016a) Ophiosimulans tanaceti gen. et sp. nov. (Phaeosphaeriaceae) on Tanacetum sp. (Asteraceae) from Italy. Mycological Progress 15: 46. https://doi.org/10.1007/s11557-016-1187-7

Tibpromma S, Boonmee S, Wijayawardene NN, Maharachchikumbura SSN, Mckenzie EHC, Bahkali AH, Gareth JEB, Hyde KD, Promputtha I (2016b) The holomorph of Parasarcopodium (Stachybotryaceae), introducing P. pandanicola sp. nov. on Pandanus sp. Phytotaxa 266: 250–260. https://doi.org/10.11646/phytotaxa.266.4.2

Tibpromma S, Hyde KD, Jeewon R, Maharachchikumbura SSN, Liu J-K, Bhat DJ, Jones EBG, McKenzie EHC, Camporesi E, Bulgakov TS, Doilom M, Santiago ALCMA, Das K, Manimohan P, Gibertoni TB, Lim YW, Ekanayaka AH, Thongbai B, Lee HB, Yang J-B, Kirk PM, Sysouphanthong P, Singh SK, Boonmee S, Dong W, Raj KNA, Latha KPD, Phookamsak R, Phukhamsakda C, Konta S, Jayasiri SC, Norphanphoun C, Tennakoon DS, Li J, Dayarathne MC, Perera RH, Xiao Y, Wanasinghe DN, Senanayake IC, Goonasekara ID, de Silva NI, Mapook A, Jayawardena RS, Dissanayake AJ, Manawasinghe IS, Chethana KW T, Luo Z-L, Hapuarachchi KK, Baghela A, Soares AM, Vizzini A, Meiras-Ottoni A, Mešić A, Dutta AK, de Souza CAF, Richter C, Lin C-G, Chakraborty D, Daranagama DA, Lima DX, Chakraborty D, Ercole E, Wu F, Simonini G, Vasquez G, da Silva GA, Plautz Jr. HL, Ariyawansa HA, Lee H, Kuslan I, Song J, Sun J, Karmaker J, Hu K, Semwal KC, Thambugala KM, Voigt K, Acharya K, Rajeshkumar KC, Ryvarden L, Jadan M, Hosen MI, Mikšik M, Samarakoon MC, Wijayawardene NN, Kim NK, Matočec N, Singh PN, Tian Q, Bhatt RP, de Oliveira RJV, Tulloss RE, Aamir S, Kaewchai S, Marathe SD, Khan S, Hongsanan S, Adhikari S, Mehmod T, Bandyopadhyay TK, Svetasheva TY, Nguyen TTT, Antonin V, Li W-J, Wang Y, Indoliya Y, Tkalčec Z, Elgornan AM, Bahkali AH, Tang AMC, Su H-Y, Zhang H, Promputtha I, Luangsa-arj J, Xu J-C, Yan J-Y, Kang J-C, Stadler M, Mortimer PE, Chomnunti P, Zhao Q, Phillips AJL, Nontachaiyapoom S, Wen T-C, Karunarathna SC (2017) Fungal diversity notes 491–602: taxonomic and phylogenetic contributions to fungal taxa. Fungal Diversity 83: 1–261. https://doi.org/10.1007/s13225-017-0378-0

Trakunyingcharoen T, Lombard L, Groenewald JZ, Cheewangkoon R, To-anun C, Alfenas AC, Crous PW (2014) Mycoparasitic species of Sphaerellopsis, and allied lichenicolous and other genera. IMA Fungus 5: 391–414. https://doi.org/10.5598/imafungus.2014.05.02.05

Valenzuela-Lopez N, Sutton DA, Cano-Lira JF, Paredes K, Wiederhold N, Guarro J, Stchigel AM (2017) Coelomycetous fungi in the clinical setting: morphological convergence and
Neostagonosporella sichuanensis gen. et sp. nov. on Phyllostachys heteroclada from China.

Verkley GJM, Dukik K, Renfurm R, Göker M, Stielow JB (2014) Novel genera and species of coniothyrium-like fungi in Montagnulaceae (Ascomycota). Persoonia 32: 25–51. https://doi.org/10.3767/003158514X679191

Vilgalys R, Hester M (1990) Rapid genetic identification and mapping of enzymatically amplified ribosomal DNA from several Cryptococcus species. Journal of Bacteriology 172: 4238–4246. https://doi.org/10.1128/JB.172.8.4238-4246.1990

Vijaykrishna D, Mostert L, Jeewon R, Gams W, Hyde KD, Crous PW (2004) Pleurostomophora, an anamorph of Pleurostoma (Calosphaeriales), a new anamorph genus morphologically similar to Phialaphora. Studies in Mycology 50: 387–395.

Wanasinghe DN, Jones EBG, Camporesi E, Boonmee S, Karunarathna SC, Thines M, Mortimer PE, Xu J-C, Hyde KD (2014) Dematiopleospora mariae gen. sp. nov., from Ononis spinosa in Italy. Cryptogamie, Mycologie 35: 105–117. https://doi.org/10.7872/crym.v35.iss2.2014.105

Wanasinghe DN, Hyde KD, Jeewon R, Crous PW, Wijayawardene NN, Jones EBG, Bhat DJ, Phillips AJL, Groenewald JZ, Dayarathne MC, Phukhamsakda C, Thambugula KM, Bulgakov TS, Camporesi E, Gafforov YS, Mortimer PE, Karunarathna SC (2017) Phylogenetic revision of Camarosporium (Pleosporinae, Dothideomycetes) and allied genera. Studies in Mycology 87: 207–256. https://doi.org/10.1016/j.simyco.2017.08.001

Wanasinghe DN, Phukhamsakda C, Hyde KD, Jeewon R, Lee HB, Jones EBG, Tibpromma S, Tennakoon DS, Dissanayake AJ, Jayasiri SC, Gafforov Y, Camporesi E, Bulgakov TS, Ekanayake AH, Perera RH, Samarakoon MC, Goonasekara ID, Mapook A, Li W-J, Senanayake IC, Li J-F, Norphanphoun C, Doilom M, Bahkali AH, Xu J-C, Mortimer PE, Tibell L, Tibell S, Karunarathna SC (2018) Fungal diversity notes 709–839: taxonomic and phylogenetic contributions to fungal taxa with an emphasis on fungi on Rosaceae. Fungal Diversity 89: 1–236. https://doi.org/10.1007/s13225-018-0395-7

Wang H-R, Zhong H-J, Hou R, Ayala J, Liu G-M, Yuan S-B, Yan Z, Zhang W-P, Liu Y-L, Cai K-L, Cai Z-G, Huang H, Zhang Z-H, Wu D (2017) A diet diverse in bamboo parts is important for giant panda (Ailuropoda melanoleuca) metabolism and health. Scientific reports 7: 3377. https://doi.org/10.1038/s41598-017-03216-8

White TJ, Bruns T, Lee S, Taylor J (1990) Amplification and direct sequencing of fungal ribosomal RNA genes for phylogenetics. In: Innis MA, Gelfand DH, Sninsky JJ, White TJ (Eds) PCR protocols: a guide to methods and applications. Academic, San Diego, pp 315–322.

Wijayawardene NN, Camporesi E, Song Y, Dai D-Q, Bhat DJ, Mckenzie EHC, Chukeatirote E, Mel'Nik VA, Wang Y, Hyde KD (2013) Multi-Gene analyses reveal taxonomic placement of Scolicosporium minkeviciutii in Phaeosphaeriaceae (Pleosporales). Cryptogamie, Mycologie 34: 357–366. https://doi.org/10.7872/crym.v34.iss2.2013.357

Wijayawardene NN, Crous PW, Kirk PM, Hawksworth DL, Boonmee S, Braun U, Chomnunti P, Dai D-Q, D’souza MJ, Diederich P, Dissanayake A, Doilom M, Hongsanan S, Jones EBG, Groenewald JZ, Jayawardena R, Lawrey JD, Liu J-K, Lücking R, Madrid H, Manamgoda DS, Muggia L, Nelsen MP, Phookamsak R, Suetrong S, Tanaka K, Thambu-
gala KM, Wikee S, Zhang Y, Aptroot A, Ariyawansa HA, Bahkali AH, Bhat JD, Gueidan C, de Hoog GS, Knudsen K, Mckenzie EHC, Miller AN, Mortimer PE, Wanasinghe DN, Phillips AJL, Raja HA, Slippers B, Shivas RS, Taylor JE, Wang Y, Woudenberg JHC, Piątek M, Cai L, Jaklitsch WM, Hyde KD (2014) Naming and outline of Dothideomycetes-2014 including proposals for the protection or suppression of generic names. Fungal Diversity 69: 1–55. https://doi.org/10.1007/s13225-014-0309-2

Wijayawardene NN, Hyde KD, Wanasinghe DN, Papizadeh M, Goonasekara ID, Camporesi E, Bhat DJ, McKenzie EHC, Phillips AJL, Diederich P, Tanaka K, Li W-J, Tangthirasunun N, Phookamsak R, Dai D-Q, Disanaayake Aj, Weerakoon G, Maharachchikumbura SSN, Hashimoto A, Matsumura M, Bahkali AH, Wang Y (2016) Taxonomy and phylogeny of dematiaceous coelomycetes. Fungal Diversity 77: 1–316. https://doi.org/10.1007/s13225-016-0360-2

Wijayawardene NN, Hyde KD, Tibpromma S, Wanasinghe DN, Thambugala KM, Tian Q, Wang Y (2017) Towards incorporating asexual fungi in a natural classification: checklist and notes 2012–2016. Mycosphere 8: 1457–1554. https://doi.org/10.5943/mycosphere/8/9/10

Wijayawardene NN, Hyde KD, Lumbsch T, Liu J-K, Maharachchikumbura SSN, Ekanayaka AH, Tian Q, Phookamsak R (2018) Outline of Ascomycota – 2017. Fungal Diversity 88: 167–263. https://doi.org/10.1007/s13225-018-0394-8

Woudenberg JHC, Groenewald JZ, Binder M, Crous PW (2013) Alternaria redefined. Studies in Mycology 75: 171–212. https://doi.org/10.3114/sim0015

Yang C-L, Xu X-L, Zhang Z-G, Liu Y-G (2017) Lirula sichuanensis sp. nov. on Picea likiangensis var. rubescens from Sichuan, China. Mycotaxon 132: 839–847. https://doi.org/10.5248/132.839

Yi T-P (1997) Bamboos Flora of Sichuan. China Forestry Publishing House 1–358.

Zeng X-Y, Jeewon R, Wen T-C, Hongsanan S, Boonmee S, Hyde KD (2018) Simplified and efficient DNA extraction protocol for Meliolaceae specimens. Mycological Progress 17: 403–415. https://doi.org/10.1007/s11557-017-1361-6

Zhang Y, Schoch CL, Fournier J, Crous PW, de Gruyter J, Woudenberg JHC, Hirayama K, Tanaka K, Pointing SB, Spatafora JW, Hyde KD (2009) Multi-locus phylogeny of Pleosporales: a taxonomic, ecological and evolutionary re-evaluation. Studied in Mycology 64: 85–102. https://doi.org/10.3114/sim.2009.64.04

Zhang Y, Crous PW, Schoch CL, Hyde KD (2012) Pleosporales. Fungal Diversity 53: 1–221. https://doi.org/10.1007/s13225-011-0117-x

Zhang Z-F, Liu F, Zhou X, Liu X-Z, Liu S-J, Cai L (2017) Culturable mycobiota from Karst caves in China, with descriptions of 20 new species. Persoonia 39: 1–31. https://doi.org/10.3767/persoonia.2017.39.01