

Table S1. GenBank accession numbers involved in this study. Ex-type strains are in bold. The newly generated sequences are indicated in blue.

| Taxon | Strain Number | GenBank accession Number | | |
|--------------------------------|---------------|--------------------------|----------------|----------|
| | | ITS | TEF1- α | RPB2 |
| <i>Arthrobotrys amerospora</i> | CBS 268.83 | NR_159625 | — — | — — |
| <i>A. anomala</i> | YNWS02-5-1 | AY773451 | AY773393 | AY773422 |
| <i>A. arthrobotryoides</i> | AOAC | MF926580 | — — | — — |
| <i>A. blastospora</i> | CGMCC 3.20940 | OQ332405 | OQ341651 | OQ341649 |
| <i>A. botryospora</i> | CBS 321.83 | NR_159626 | — — | — — |
| <i>A. cibiensis</i> | DLUCC 109 | OR880379 | OR882792 | OR882797 |
| <i>A. cibiensis</i> | EY10 | OR902195 | OR882787 | OR882802 |
| <i>A. cladodes</i> | 1.03514 | MH179793 | MH179616 | MH179893 |
| <i>A. clavispora</i> | CBS 545.63 | MH858353 | — — | — — |
| <i>A. conoides</i> | 670 | AY773455 | AY773397 | AY773426 |
| <i>A. cookedickinson</i> | YMF 1.00024 | MF948393 | MF948550 | MF948474 |
| <i>A. cystosporia</i> | CBS 439.54 | MH857384 | — — | — — |
| <i>A. dendroides</i> | YMF 1.00010 | MF948388 | MF948545 | MF948469 |
| <i>A. dianchiensis</i> | 1.00571 | MH179720 | — — | MH179826 |
| <i>A. elegans</i> | 1.00027 | MH179688 | — — | MH179797 |
| <i>A. eryuanensis</i> | CGMCC 3.19715 | MT612105 | OM850307 | OM850301 |
| <i>A. eudermata</i> | SDT24 | AY773465 | AY773407 | AY773436 |
| <i>A. flagrans</i> | 1.01471 | MH179741 | MH179583 | MH179845 |
| <i>A. gampsospora</i> | CBS 127.83 | U51960 | — — | — — |
| <i>A. globospora</i> | 1.00537 | MH179706 | MH179562 | MH179814 |
| <i>A. gongshanensis</i> | CGMCC 3.23753 | OM801277 | OM809162 | OM809163 |
| <i>A. guizhouensis</i> | YMF 1.00014 | MF948390 | MF948547 | MF948471 |
| <i>A. heihuiensis</i> | DLUCC 108-1 | OR880378 | OR882791 | OR882796 |
| <i>A. heihuiensis</i> | Y710 | OR902194 | OR882786 | OR882801 |
| <i>A. hengjiangensis</i> | CGMCC 3.24983 | OQ946587 | OQ989312 | OQ989302 |
| <i>A. hyrcanus</i> | IRAN 3650C | MH367058 | OP351540 | — — |
| <i>A. indica</i> | YMF 1.01845 | KT932086 | — — | — — |
| <i>A. iridis</i> | 521 | AY773452 | AY773394 | AY773423 |
| <i>A. janus</i> | 85-1 | AY773459 | AY773401 | AY773430 |
| <i>A. javanica</i> | 105 | EU977514 | — — | — — |
| <i>A. jindingensis</i> | CGMCC 3.20895 | OP236810 | OP272511 | OP272515 |
| <i>A. jinpingensis</i> | CGMCC 3.20896 | OM855569 | OM850311 | OM850305 |
| <i>A. jinshaensis</i> | DLUCC 133 | OR880381 | OR882794 | OR882799 |
| <i>A. jinshaensis</i> | MA142 | OR902197 | OR882789 | OR882804 |
| <i>A. koreensis</i> | C45 | JF304780 | — — | — — |
| <i>A. lanpingensis</i> | CGMCC 3.20998 | OM855566 | OM850308 | OM850302 |
| <i>A. latispora</i> | H.B. 8952 | MK493125 | — — | — — |

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|---------------------------|---------------|----------|----------|----------|
| <i>A. longiphora</i> | 1.00538 | MH179707 | — — | MH179815 |
| <i>A. lunzhangensis</i> | CGMCC 3.20941 | OK643973 | OM621809 | OM621810 |
| <i>A. luquanensis</i> | CGMCC 3.20894 | OM855567 | OM850309 | OM850303 |
| <i>A. mangrovispora</i> | MGDW17 | EU573354 | — — | — — |
| <i>A. megalospora</i> | TWF800 | MN013995 | — — | — — |
| <i>A. microscaphoides</i> | YMF 1.00028 | MF948395 | MF948552 | MF948476 |
| <i>A. multiformis</i> | CBS 773.84 | MH861834 | — — | — — |
| <i>A. musiformis</i> | SQ77-1 | AY773469 | AY773411 | AY773440 |
| <i>A. musiformis</i> | 1.03481 | MH179783 | MH179607 | MH179883 |
| <i>A. nonseptata</i> | YMF 1.01852 | FJ185261 | — — | — — |
| <i>A. obovata</i> | YMF 1.00011 | MF948389 | MF948546 | MF948470 |
| <i>A. oligospora</i> | 920 | AY773462 | AY773404 | AY773433 |
| <i>A. paucispora</i> | ATCC 96704 | EF445991 | — — | — — |
| <i>A. polycephala</i> | 1.01888 | MH179760 | MH179592 | MH179862 |
| <i>A. pseudoclavata</i> | 1130 | AY773446 | AY773388 | AY773417 |
| <i>A. psychrophila</i> | 1.01412 | MH179727 | MH179578 | MH179832 |
| <i>A. pyriformis</i> | YNWS02-3-1 | AY773450 | AY773392 | AY773421 |
| <i>A. reticulata</i> | CBS 550.63 | MH858355 | — — | — — |
| <i>A. robusta</i> | nefuA4 | MZ326655 | — — | — — |
| <i>A. salina</i> | SF 0459 | KP036623 | — — | — — |
| <i>A. scaphoides</i> | 1.01442 | MH179732 | MH179580 | MH179836 |
| <i>A. shizishanna</i> | YMF 1.00022 | MF948392 | MF948549 | MF948473 |
| <i>A. shuifuensis</i> | CGMCC 3.19716 | MT612334 | OM850306 | OM850300 |
| <i>A. sinensis</i> | 105-1 | AY773445 | AY773387 | AY773416 |
| <i>A. sphaeroides</i> | 1.01410 | MH179726 | MH179577 | MH179831 |
| <i>A. superba</i> | 127 | EU977558 | — — | — — |
| <i>A. thaumasia</i> | 917 | AY773461 | AY773403 | AY773432 |
| <i>A. tongdianensis</i> | CGMCC 3.20942 | OP236809 | OP272509 | OP272513 |
| <i>A. vermicola</i> | 629 | AY773454 | AY773396 | AY773425 |
| <i>A. weixiensis</i> | CGMCC 3.24984 | OQ946585 | OQ989310 | OQ989300 |
| <i>A. xiangyunensis</i> | YXY10-1 | MK537299 | — — | — — |
| <i>A. yangbiensis</i> | DLUCC 36-1 | OR880382 | OR882795 | OR882800 |
| <i>A. yangbiensis</i> | Y678 | OR902198 | OR882790 | OR882805 |
| <i>A. yangjiangensis</i> | DLUCC 124 | OR880380 | OR882793 | OR882798 |
| <i>A. yangjiangensis</i> | YB19 | OR902196 | OR882788 | OR882803 |
| <i>A. yunnanensis</i> | YMF 1.00593 | AY50993 | — — | — — |
| <i>A. zhaoyangensis</i> | CGMCC 3.20944 | OM855568 | OM850310 | OM850304 |
| <i>Dactylellina</i> | | | | |
| <i>cangshanensis</i> | CGMCC 3.19714 | MK372062 | MN915115 | MN915114 |
| <i>Da. copepodii</i> | CBS 487.90 | U51964 | DQ999835 | DQ999816 |
| <i>Da. mammillata</i> | CBS 229.54 | AY902794 | DQ999843 | DQ999817 |
| <i>Da. yushanensis</i> | CGMCC 3.19713 | MK372061 | MN915113 | MN915112 |
| <i>Drechslerella</i> | | | | |
| <i>coelobrocha</i> | FWY03-25-1 | AY773464 | AY773406 | AY773435 |

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| <i>Dr. dactyloides</i> | expo-5 | AY773463 | AY773405 | AY773434 |
| <i>Dr. daliensis</i> | CGMCC 3.20131 | MT592896 | OK556701 | OK638157 |
| <i>Dr. heterospora</i> | YMF 1.00550 | MF948400 | MF948554 | MF948480 |
| <i>Dr. stenobrocha</i> | YNWS02-9-1 | AY773460 | AY773402 | AY773431 |
| <i>Dr. xiaguanensis</i> | CGMCC 3.20132 | MT592900 | OK556699 | OK638159 |
| <i>Orbilina</i> | | | | |
| <i>jesu-laurae</i> | LQ59a | MN816816 | — — | — — |
| <i>O. tonghaiensis</i> | YMF 1.03006 | NR_172397 | MF948570 | MF948496 |
| <i>Vermispora fusarina</i> | YXJ02-13-5 | AY773447 | AY773389 | AY773418 |
| <i>V. leguminacea</i> | CGMCC 6.0291 | NR_173249 | — — | — — |
