**Appendix 1.** Voucher information for taxa cultured in this study. Letters in brackets at the end of voucher information indicate the publications where the genomic data for this sample appeared (see Table 1 for more details): a. Miadlikowska et al. (in prep.), b. McDonald (2011), c. Armaleo and May (2009), and Armaleo et al. (2011).

*Acarospora schleicheri*: USA, Arizona, Coronado National Forest, near Tuscon, Molino Canyon Vista, along the trail, N32°19'62" W110°42'04", on large acidic boulders in semi-desert grassland, 03.09.2005, leg. Francois Lutzoni, Emily Fraker, Jolanta Miadlikowska, Frank Kauff, Cecile Gueidan, and Valerie Hoffstetter, AZ11 (DUKE). (a) (b)

*Acarospora socialis*: USA, California, San Bernadino County, San Bernardino Mts., in a curve where on the outside of the curve the road is much wider, downhill from the road, N34°09'23.22" W116°57'52.74", 1797 m elev., forest of oak and conifers, N exposure, 70-75° slope, on top of a small boulder (granite) in the shade of a larger boulder, 23.02.2010, leg. F. Lutzoni and E. Gaya 02.23.10-3 (DUKE). (b)

*Acarospora strigata*: USA, California, San Jacinto Mts. End of Morris Ranch Road above Cedar Springs trail, N33°39'22.38" W116°35'3.36", 1559 m elev., Chaparral and *Yucca*, slope on hill, completely open, dry, 50° slope, on limestone, 24.02.2010, leg. F. Lutzoni, E. Gaya 02.24.10-24, and K. Knudsen (DUKE). (a) (b)

*Astrothelium galbineum*: USA, Florida, first right after the main entrance of Archibald Biological Station, along the sandy road, N27°11'04.7" W81°20'52.0", 12 m, on *Carya*
floridana, leg. E. Gaya 14.03.08-1 EGB7, F. Lutzoni, and J. Miadlikowska, LDB2980 (DUKE). (a)

*Cladonia cristatella*: USA, North Carolina, Iredell County, Union Grove, 5260 Somers Rd.,
N36°5' 8.49", W 80°53'54.25", 08.07.2011, leg. L. Dow s/n (DUKE). (a) (b)

*Cladonia grayi*: USA, North Carolina, Durham County, on Mount Sinai road near Durham, 29.07.2003, leg. D. Armaleo s/n (DUKE). (a) (b)

*Cladonia peziziformis*: USA, Virginia, Appomatax County, Appomatax-Buckingham W78°41'11", 2005, leg. T. McDonald 1411. (b)

*Graphis handelii*: USA, South Carolina, Georgetown County, Huntington Beach State Park, on the south side of Alligator Alley path, N33°30'1" W79°04'1", collected on a small oak near forest swamp, 29.07.2011, leg. Mark Green GR4BH (DUKE). (b)

*Graphis scripta*: USA, North Carolina, Durham County, Duke Forest gate across Mt. Sinai Road from Mt. Sinai Baptist Church at 5222 Mount Sinai Rd, shaded path in hardwood forest, N 35°59'40.5774" W 79°0'31.1436", on bark of beech (*Fagus*), leg. McDonald 1518. (a) (b)
Graphis sp.  USA. South Carolina, Georgetown County, Huntington Beach State Park. On the west side of the walking trail wooden bridge, N33°30′16″, W79°04′45″, Maple tree, 29.07.2011, leg. Mark Green GR8AH (DUKE). (b)

Ionaspis alba. USA. North Carolina, Durham County, Duke Forest, woods behind Deerfield apartment complex, N36°0′38.8188″, W78°58′7.0746″, 20.11.2005, leg. T McDonald 1430. (b)

Leiorreuma sericeum 1: USA, South Carolina, Georgetown County, Huntington Beach State Park, on the east side of the walking trail before the wooden bridge, N 33°30′14 W 79°04′49″, Holly tree, 29.07.2011, leg. M. Green GR1H. (b)

Leiorreuma sericeum 2: USA, South Carolina, Georgetown County, Huntington Beach State Park, on the south side of Alligator Alley path, N33°30′17″ W 79°04′17″, hardwood tree near old swampy forest, 29.07.2011, leg. M. Green GR3H. (b)

Phaeographis elliptica: USA, Florida, first right after the main entrance of Archibald Biological Station, along the sandy road, N27°11′04.7″, W81°20′52.0″, 12 m elev., on Quercus sp., leg. E. Gaya 16.03.08-8 EGB12, F. Lutzoni, and J. Miadlikowska, LDB1703 (DUKE). (a)

Platygramme sp.: USA, Florida, first right after the main entrance of Archibald Biological Station, along the sandy road, N27°11′04.7″ W81°20′52.0″, 12 m elev., on
Quercus sp., leg. E. Gaya 16.03.08-2 EGB17, F. Lutzoni, and J. Miadlikowska, LDB1698 (DUKE).

Polymeridium subcinereum: USA, Florida, first right after the main entrance of Archibald Biological Station, along the sandy road, N27°11'04.7", W81°20'52.0", 12 m elev., on Quercus sp., leg. E. Gaya 16.03.08-4 EGB2, F. Lutzoni, and J. Miadlikowska, LDB1699 (DUKE).

Pyrenula cruenta 1: USA, Alabama, Escambia Co., Andalusia Area, Solon-Dixon Forestry Center, montane rainforest, on Fagus americana, 14.4.2007, leg. E. Gaya 17 (DUKE). (a) (b)

Pyrenula cruenta 2: USA, South Carolina, Horry County, Myrtle Beach State Park, wooded areas, N33°39'04" W78°55'50", on holly tree, 06.2009, leg. Mark Green PYCR4-MG (DUKE).

Pyrenula cruenta 3: USA, South Carolina, Georgetown County, Huntington Beach State Park, wooded area, N33°30'29" W79°04'15", on holly tree, 06.2009, leg. Mark Green PYCR12-MG (DUKE).

Pyrenula cruenta 4: USA, South Carolina, Georgetown County, Huntington Beach State Park, wooded area, N33°30'29" W79°04'15", on holly tree, 06.2009, leg. Mark Green PYCR16-MG (DUKE).
*Pyrenula ochraceoflava*: USA, Florida, first right after the main entrance of Archibald Biological Station, along the sandy road, N27°11'04.7", W81°20'52.0", 12 m elev., on *Quercus* sp., leg. E. Gaya 16.03.08-12 EGB11, F. Lutzoni, and J. Miadlikowska, LDB1706 (DUKE).

*Trypethelium aeneum*: USA, Florida, first right after the main entrance of Archibald Biological Station, along the sandy road, N27°11'04.7", W81°20'52.0", 12 m elev., *Quercus* shrub with palmetto, leg. E. Gaya 16.03.08-6 EGB18, F. Lutzoni, and J. Miadlikowska, LDB1701 (DUKE). (b)

*Trypethelium eluteriae*: USA, Florida, first right after the main entrance of Archibald Biological Station, along the sandy road, N27°11'04.7", W81°20'52.0", 12 m elev., on *Carya floridana*, leg. E. Gaya 16.03.08-14 EGB8, F. Lutzoni, and J. Miadlikowska, LDB1708 (DUKE). (a)

*Trypethelium virens* 2: USA, North Carolina, Wake County, Raleigh, Blue Jay Point County Park, 3200 Pleasant Union Church Road, Lakeside forested patch with beech and holly, N 35°58'8.4", W78°38'33.68", 19.09.2005, leg. T. McDonald 1424. (b)

*Usnea strigosa*: USA, North Carolina, Durham County, Durham, 816 W Knox St, shaded urban street, N36°0'47.484", W78°54'16.1712", on branch of *Quercus phellos*, leg. T. McDonald s/n. (b)