**Appendix. PC-ORD Matrix of North American *Melapsilea* specimens examined including type material of *M. demissa* and *M. gibberulosa* (the latter from Europe).**

 Specimens are coded with the following scheme: collector’s initials followed by the last three letters of the specimen barcode or if not available the collection year followed by herbarium acronym. Traits are categorized as either C (category) or Q (quantitative). Measurements are expressed as sample mean SD with the sample size in parenthesis, but are analyzed using PC-ORD by the mean only.

|  |  |  |
| --- | --- | --- |
| Specimens | Characters\* | Region |
|  | C | C | C | Q | C | C | C | C | Q | Q | C |
|  | HABIT | CONTLN | ASCTYP | ASCLEN | ASCEMR | HYMINS | PARAPH | SPOSEP | SPOLEN | SPOWID | REGION† |
| HW323FH | 1 | 0 | 2 | 0.650.26(*n* = 8) | 3 | 1 | 1 | 1 | 19.41.5 (*n* = 5) | 8.20.8 (*n* = 5) | 1 |
| HW322FH | 1 | 1 | 2 | 0.700.17(n = 8) | 3 | 1 | 1 | 1 | 20.41.7(*n* = 5) | 8.51.2(*n* = 5) | 1 |
| HW321FH | 1 | 0 | 2 | 0.730.13(*n* = 8) | 3 | 1 | 2 | 1 | 19.82.3(*n* = 7) | 9.41.0(*n* = 7) | 1 |
| HW318FH | 1 | 0 | 2 | 0.500.12(*n* = 8) | 3 | 1 | 2 | 1 | 17.32.6(*n* = 8) | 8.90.9(n = 8) | 1 |
| HW319FH | 1 | 1 | 2 | 0.650.16(*n* = 8) | 3 | 1 | 2 | 1 | 19.01.9(*n* = 5) | 8.51.2(*n* = 5) | 1 |
| HW320FH | 1 | 1 | 2 | 0.650.20(*n* = 8) | 3 | 1 | 2 | 1 | 21.11.5(*n* = 5) | 8.51.2(*n* = 5) | 1 |
| TW163FH | 1 | 0 | 2 | 0.40.13(*n* = 8) | 3 | 1 | 2 | 1 | 18.41.4(*n* = 5) | 8.30.4(*n* = 5) | 2 |
| BF164FH | 1 | 0 | 2 | 0.400.08(*n* = 8) | 3 | 1 | 1 | 1 | 14.80.8(*n* = 5) | 5.80.9(*n* = 5) | 14 |
| AN317FH | 1 | 0 | 2 | 0.680.15(*n* = 8) | 3 | 1 | 2 | 1 | 18.01.5(*n* = 5) | 9.20.9(*n* = 5) | 1 |
| TW162FH | 1 | 0 | 2 | 0.530.16(*n* = 8) | 3 | 1 | 2 | 1 | 20.41.7(*n* = 5) | 8.20.8(*n* = 5) | 2 |
| HW969US | 1 | 1 | 2 | 0.740.21(*n* = 7) | 3 | 0 | 1 | 1 | 19.81.8(*n* = 6) | 8.51.5(*n* = 6) | 1 |
| HW972US | 1 | 1 | 2 | 0.760.19(*n* = 7) | 3 | 1 | 1 | 1 | 18.71.7(*n* = 5) | 8.20.8(*n* = 5) | 1 |
| HW970US | 1 | 0 | 2 | 0.700.20(*n* = 7) | 3 | 1 | 1 | 1 | 17.81.4(*n* = 6) | 8.50.0(*n* = 6) | 1 |
| HW974US | 1 | 0 | 2 | 0.800.32(n = 7) | 3 | 1 | 1 | 1 | 19.80.9(n = 6) | 8.80.7(n = 6) | 1 |
| HW973US | 1 | 0 | 2 | 0.580.19(*n* = 8) | 3 | 1 | 1 | 1 | 19.62.9(*n* = 4) | 8.11.6(*n* = 4) | 1 |
| GP362NCU | 1 | 0 | 2 | 0.750.21(*n* = 6) | 3 | 0 | 2 | 1 | 17.92.9(*n* = 5) | 7.40.8(*n* = 5) | 3 |
| GP363NCU | 1 | 1 | 2 | 0.500.10(*n* = 5) | 3 | 0 | 1 | 1 | 21.01.6(*n* = 8) | 10.20.9(*n* = 8) | 3 |
| GP364NCU | 1 | 0 | 2 | 1.10.5(*n* = 7) | 3 | 0 | 2 | 1 | 17.02.1(*n* = 9) | 7.70.9(*n* = 9) | 3 |
| GP377NCU | 1 | 0 | 2 | 0.460.09(*n* = 5) | 3 | 1 | 2 | 1 | 17.21.8(*n* = 8) | 8.51.2(*n* = 8) | 4 |
| GP365NCU | 1 | 1 | 2 | 0.640.31(*n* = 7) | 3 | 0 | 2 | 1 | 16.72.0(*n* = 6) | 7.80.8(*n* = 6) | 3 |
| GP366NCU | 1 | 0 | 2 | 0.730.21(*n* = 7) | 3 | 1 | 2 | 1 | 16.31.2(*n* = 3) | 7.31.3(*n* = 3) | 3 |
| GP375NCU | 1 | 0 | 2 | 0.420.12(*n* = 6) | 3 | 1 | 2 | 1 | 18.41.6(*n* = 10) | 9.71.3(n = 10) | 2 |
| GP376NCU | 1 | 0 | 2 | 0.40(*n* = 1) | 3 | 1 | 1 | 1 | 19.81.7(*n* = 10) | 9.71.4(*n* = 10) | 2 |
| GP370NCU | 1 | 0 | 2 | 0.350.09(*n* = 8) | 3 | 1 | 1 | 1 | 18.53.6(*n* = 9) | 8.91.3(*n* = 9) | 3 |
| GP371NCU | 1 | 0 | 2 | 0.540.26(*n* = 7) | 3 | 0 | 1 | 1 | 18.53.0(*n* = 9) | 9.51.3(*n* = 9) | 3 |
| GP372NCU | 1 | 0 | 2 | 0.450.13(n = 4) | 3 | 0 | 1 | 1 | 19.43.0(*n* = 9) | 9.32.1(*n* = 9) | 3 |
| EP368NCU | 1 | 0 | 2 | 0.680.19(*n* = 6) | 3 | 1 | 1 | 1 | 19.61.8(*n* = 6) | 9.61.6(*n* = 6) | 3 |
| EP367NCU | 1 | 0 | 2 | 0.530.13(n = 4) | 3 | 0 | 1 | 1 | 19.81.4(n = 6) | 8.80.7(*n* = 6) | 3 |
| EP369NCU | 1 | 0 | 2 | 0.480.15(*n* = 5) | 3 | 0 | 1 | 1 | 19.72.6(*n* = 5) | 10.50.8(*n* = 5) | 3 |
| ST381NCU | 2 | 0 | 2 | 0.330.13(*n* = 8) | 3 | 0 | 1 | 1 | 13.11.5(*n* = 4) | 7.00.4(*n* = 4) | 9 |
| SW052MSC | 1 | 0 | 2 | 0.250.07(*n* = 2) | 3 | 0 | 1 | 1 | 11.81.2(n = 4) | 5.80.8(*n* = 4) | 6 |
| LS511G | 1 | 0 | 1 | 0.640.21(*n* = 5) | 2 | 0 | 1 | 1 | 15.01.7(*n* = 6) | 6.50.7(*n* = 6) | 12 |
| LS512G | 1 | 0 | 1 | 0.58-0.08(*n* = 5) | 2 | 0 | 1 | 1 | 12.80.9(*n* = 6) | 6.50.7(*n* = 6) | 12 |
| AL1892US | 1 | 1 | 1 | 0.550.12(n = 8) | 2 | 1 | 1 | 1 | 16.81.0(*n* = 6) | 8.50.3(*n* = 6) | 9 |
| AL1895US | 1 | 1 | 1 | 0.580.09(*n* = 8) | 2 | 1 | 1 | 1 | 16.12.5(*n* = 6) | 8.50.3(*n* = 6) | 9 |
| AL1896US | 1 | 1 | 1 | 0.580.15(*n* = 8) | 2 | 1 | 1 | 1 | 18.71.4(n = 4) | 8.90.8(*n* = 4) | 9 |
| ST1969US | 1 | 0 | 1 | 0.880.16(*n* = 8) | 2 | 0 | 1 | 1 | 23.01.7(n = 4) | 11.50.8(*n* = 4) | 9 |
| SR1909US | 1 | 0 | 1 | 1.180.26(*n* = 8) | 2 | 0 | 1 | 1 | 22.52.6(*n* = 4) | 11.11.0(*n* = 4) | 10 |
| BF1899US | 1 | 0 | 1 | 0.540.09(*n* = 8) | 3 | 1 | 1 | 1 | 11.90.00(n = 3) | 6.81.7(*n* = 3) | 8 |
| ET1857US | 1 | 0 | 1 | 0.60.06(n = 6) | 2 | 1 | 1 | 1 | 16.21.0(n = 4) | 7.71.0(*n* = 4) | 1 |
| BF1894US | 1 | 0 | 1 | 0.560.10(*n* = 7) | 2 | 0 | 1 | 1 | 17.81.0(n = 4) | 8.50.0(*n* = 4) | 7 |
| HK1921US | 1 | 1 | 1 | 2.080.38(*n* = 6) | 2 | 0 | 1 | 1 | 22.12.4(*n* = 4) | 9.80.8(*n* = 4) | 11 |
| SR1921US | 1 | 0 | 1 | 1.08-0.30(*n* = 8) | 2 | 0 | 1 | 1 | 17.40.8(*n* = 4) | 8.90.8(*n* = 4) | 10 |
| L1895US1 | 1 | 1 | 2 | 0.740.24(*n* = 8) | 3 | 0 | 1 | 1 | 13.20.8(*n* = 4) | 6.01.0(*n* = 4) | 9 |
| GD1939US | 1 | 0 | 2 | 0.450.05(*n* = 6) | 3 | 0 | 1 | 1 | 19.11.6(n = 4) | 8.10.8(*n* = 4) | 4 |
| AL1891US | 1 | 0 | 2 | 0.420.42(*n* = 5) | 3 | 0 | 1 | 1 | 19.01.4(*n* = 2) | 7.50.7(n – 2) | 10 |
| JE1886US | 1 | 0 | 2 | 0.560.14(n = 8) | 3 | 1 | 1 | 1 | 19.72.6(n = 5) | 9.90.8(*n* = 5) | 5 |
| AZ7992US | 1 | 0 | 1 | 0.510.11(*n* = 8) | 3 | 0 | 1 | 1 | 13.61.4(*n* = 4) | 6.80.0(n = 4) | 12 |
| E1886US1 | 1 | 0 | 1 | 0.570.10(*n* = 7) | 3 | 0 | 1 | 1 | 16.91.0(*n* = 5) | 7.70.9(*n* = 5) | 3 |
| SR1914US | 1 | 0 | 1 | 1.190.3(*n* = 7) | 1 | 0 | 1 | 2 | 22.12.4(n = 4) | 5.50.8(n = 4) | 10 |
| AL1893US | 1 | 0 | 2 | 1.050.14(n = 8) | 2 | 0 | 1 | 1 | 20.01.6(*n* = 4) | 10.72.5(n = 4) | 9 |
| AL1898US | 1 | 1 | 1 | 1.340.35(*n* = 8) | 2 | 0 | 1 | 1 | 18.72.4(n = 4) | 8.11.6(n = 4) | 9 |
| ST1980US | 1 | 0 | 1 | 1.150.25(*n* = 8) | 2 | 0 | 1 | 1 | 19.03.3(*n* = 5) | 9.91.4(*n* = 5) | 9 |
| AL1894US | 1 | 0 | 1 | 0.880.41(*n* = 6) | 3 | 1 | 1 | 2 | 32.30.0(*n* = 2) | 6.01.2(*n* = 2) | 9 |
| CP1879US | 1 | 0 | 1 | 0.340.05(*n* = 7) | 3 | 0 | 1 | 1 | 20.52.5(*n* = 3) | 10.54.8(*n* = 3) | 1 |
| HW1883US | 1 | 0 | 1 | 0.250.06(*n* = 4) | 3 | 0 | 1 | 1 | 14.62.3(*n* = 6) | 6.41.6(n = 6) | 1 |
| SR1927US | 2 | 0 | 2 | 0.600.17(*n* = 7) | 3 | 0 | 1 | 1 | 16.21.2(*n* = 2) | 8.50.0(*n* = 2) | 10 |
| MC1879US | 2 | 0 | 2 | 0.500.14(*n* = 6) | 3 | 0 | 1 | 1 | 17.51.6(*n* = 6) | 8.21.4(*n* = 6) | 13 |
| MC1876US | 2 | 0 | 2 | 0.470.16(*n* = 6) | 3 | 0 | 1 | 1 | 17.12.6(*n* = 8) | 6.81.4(*n* = 8) | 10 |

\* Characters are as follows: HABIT = lichenized (1) or lichenicolous fungus (2), CONTLN = contact lines absent (0) or present (1), ASCTYP = ascomatal type (1 = arthonioid, 2 = opegraphoid), ASCLEN = ascomatal length or diameter (mm), ASCEMR = ascoma emergence (1 = immersed, 2 = erumpent, 3 = sessile), HYMINS = hymenium inspesion (0 = not inspersed, 1 = inspersed), PARAPH = paraphyses (1 = not thickened, 2 = thickened), SPORSEP = spore septation (1 = one-septate, 2 = multiseptate), SPOLEN = spore length (μm), SPOWID = spore width (μm), REGION = EPA Level III ecoregion.

† Ecoregions are numbered as follows: 1 = Northeastern Coastal Zone (Massachusetts), 2 = Southeastern Plains (South Carolina), 3 = Piedmont (North Carolina), 4 = Blue Ridge (Tennnessee, Virginia), 5 = Ridge and Valley (Pennsylvania), 6 = Northern Lakes and Forests (Michigan), 7 = Driftless Area, 8 = Glaciated Plains (Minnesota), 9 = Mississippi Alluvial Plain (Louisiana), 10 = South Coastal Plain (Alabama, Florida), 11 = South Florida Coastal Plain (Florida), 12 = European Broadleaf Forest (Switzerland, Slovakia), 13 = Northeastern Highlands (New Hampshire, Vermont), 14 = Mid Atlantic Coastal Plain (North Carolina).