

APPENDIX A. Supplemental results: list of tree species and their estimated functional trait values

Table A1. List of species sampled in this study and their estimated functional trait values using the developed PLSR models. Data are presented as mean (\pm standard deviation) values for each species, all canopy positions, and needle age classes.

Species	N_{mass} (%)	C_{mass} (%)	M_{area} (gDW m ⁻²)	ADF (%)	ADL (%)	Cell. (%)	$\delta^{15}\text{N}$
American basswood (<i>Tilia americana</i>)	3.40 (0.45)	46.11 (0.89)	35.63 (21.41)	32.05 (4.10)	18.42 (2.85)	15.73 (1.89)	-2.40 (0.79)
American beech (<i>Fagus grandifolia</i>)	2.63 (0.52)	50.71 (0.91)	43.89 (26.82)	52.11 (3.41)	29.69 (2.84)	21.36 (2.63)	-6.12 (1.11)
American elm (<i>Ulmus americana</i>)	2.85 (0.37)	46.43 (0.91)	44.71 (26.44)	32.44 (6.46)	18.18 (4.19)	15.40 (2.79)	-3.09 (0.89)
American hazelnut (<i>Corylus americana</i>)	2.74 (0.21)	47.58 (0.69)	50.24 (22.03)	38.54 (1.99)	20.54 (2.09)	16.60 (1.59)	-3.06 (0.81)
Balsam fir (<i>Abies balsamea</i>)	1.47 (0.21)	51.87 (0.90)	161.04 (28.11)	39.81 (4.00)	23.57 (3.26)	15.19 (2.00)	-3.94 (1.41)
Bigtooth aspen (<i>Populus grandidentata</i>)	3.46 (0.18)	51.71 (1.11)	79.40 (10.20)	38.18 (10.56)	27.21 (4.33)	19.25 (0.74)	-3.24 (1.38)
Bitternut hickory (<i>Carya cordiformis</i>)	3.48 (-)	47.50 (-)	69.43 (-)	30.10 (-)	20.66 (-)	13.04 (-)	-2.42 (-)
Black ash (<i>Fraxinus nigra</i>)	3.20 (0.29)	46.51 (0.68)	36.25 (16.30)	33.31 (7.35)	20.00 (3.57)	13.76 (3.59)	0.12 (0.99)
Black cherry (<i>Prunus serotina</i>)	2.81 (0.29)	46.92 (1.12)	59.65 (18.98)	30.30 (3.70)	19.10 (2.80)	13.33 (2.11)	-1.67 (1.29)
Black locust (<i>Robinia pseudoacacia</i>)	3.31 (0.34)	47.58 (1.27)	37.81 (18.78)	38.93 (6.90)	26.27 (5.86)	18.25 (1.36)	-1.98 (0.68)
Black spruce (<i>Picea mariana</i>)	1.00 (0.11)	50.18 (0.72)	190.27 (20.52)	44.40 (6.09)	24.21 (3.09)	19.79 (3.35)	-6.26 (0.62)
Black walnut (<i>Juglans nigra</i>)	2.96 (0.35)	46.48 (2.05)	89.52 (14.74)	27.28 (9.54)	11.73 (6.17)	13.98 (3.50)	-4.18 (1.58)
Boxelder (<i>Acer negundo</i>)	2.46 (-)	46.60 (-)	69.54 (-)	34.17 (-)	19.16 (-)	15.46 (-)	4.04 (-)
Bur oak (<i>Quercus macrocarpa</i>)	3.02 (0.34)	49.14 (1.01)	76.64 (25.35)	35.60 (2.65)	19.93 (2.53)	16.21 (1.25)	-3.82 (0.55)
Common buckthorn (<i>Rhamnus cathartica</i>)	4.67 (0.43)	47.52 (1.34)	39.48 (15.63)	26.36 (2.81)	18.91 (3.10)	9.47 (0.32)	1.20 (0.54)
Common hackberry (<i>Celtis occidentalis</i>)	2.99 (0.40)	44.05 (1.02)	52.26 (17.74)	18.03 (5.42)	8.23 (2.77)	10.57 (2.07)	0.39 (1.08)
Eastern cottonwood (<i>Populus deltoides</i>)	2.99 (0.45)	48.18 (1.39)	68.34 (16.50)	29.68 (2.91)	19.06 (1.21)	13.25 (1.87)	-2.55 (0.85)
Eastern hemlock (<i>Tsuga canadensis</i>)	1.55 (0.25)	50.20 (0.84)	115.44 (33.88)	30.36 (7.13)	15.32 (4.20)	13.50 (4.22)	-4.84 (1.40)
Eastern redcedar (<i>Juniperus virginiana</i>)	1.92 (0.13)	48.56 (0.75)	143.27 (8.27)	42.86 (0.46)	28.02 (0.73)	17.66 (0.14)	-2.50 (0.66)
Green ash (<i>Fraxinus pennsylvanica</i>)	2.88 (0.48)	46.86 (0.53)	50.91 (23.0)	40.14 (5.54)	23.46 (2.95)	19.31 (3.06)	-2.95 (0.76)
Hophornbeam (<i>Ostrya virginiana</i>)	2.63 (0.22)	47.26 (0.81)	37.09 (11.19)	47.36 (3.64)	27.25 (2.84)	20.34 (2.10)	-3.20 (0.71)
Jack pine (<i>Pinus banksiana</i>)	1.52 (0.24)	51.06 (1.16)	164.44 (23.44)	53.29 (2.29)	30.46 (1.33)	21.92 (2.64)	-4.68 (0.63)
Leatherleaf (<i>Chamaedaphne calyculata</i>)	1.55 (0.14)	52.70 (1.19)	116.64 (8.68)	33.09 (5.11)	16.74 (2.96)	14.75 (2.31)	-5.99 (0.01)

Mountain maple (<i>Acer spicatum</i>)	2.40 (0.17)	47.50 (0.59)	42.77 (7.79)	20.65 (3.63)	7.52 (2.30)	10.36 (2.96)	-2.19 (0.55)
Northern pin oak (<i>Quercus ellipsoidalis</i>)	3.08 (0.15)	49.85 (0.20)	67.57 (9.92)	38.13 (2.93)	20.61 (1.67)	17.14 (1.38)	-4.46 (0.38)
Northern red oak (<i>Quercus rubra</i>)	2.97 (0.23)	49.95 (0.99)	79.55 (19.57)	37.18 (4.63)	22.23 (4.25)	16.86 (1.57)	-3.90 (0.76)
Northern white cedar (<i>Thuja occidentalis</i>)	1.24 (0.27)	49.08 (0.72)	172.75 (27.36)	40.37 (2.90)	25.27 (2.68)	15.77 (1.43)	-3.87 (0.94)
Norway maple (<i>Acer platanoides</i>)	2.70 (0.20)	47.74 (0.64)	61.00 (29.66)	34.79 (2.52)	17.65 (1.22)	16.16 (2.07)	-2.55 (0.72)
Paper birch (<i>Betula papyrifera</i>)	2.63 (0.23)	50.27 (1.13)	78.01 (12.93)	33.83 (3.12)	19.84 (1.90)	14.07 (1.74)	-4.92 (1.61)
Red maple (<i>Acer rubrum</i>)	2.33 (0.28)	49.74 (0.98)	49.60 (19.66)	29.92 (4.20)	16.94 (2.59)	13.92 (2.30)	-3.65 (1.06)
Red pine (<i>Pinus resinosa</i>)	1.34 (0.28)	50.76 (1.10)	170.12 (26.06)	48.67 (2.54)	27.27 (2.00)	20.05 (2.38)	-2.56 (0.93)
Red spruce (<i>Picea rubens</i>)	1.05 (0.30)	50.49 (0.72)	138.07 (26.70)	51.66 (5.52)	27.98 (1.47)	21.52 (4.69)	-6.40 (1.77)
Resin birch (<i>Betula glandulosa</i>)	2.55 (-)	49.60 (-)	67.58 (-)	34.48 (-)	22.30 (-)	16.38 (-)	-3.66 (-)
Scots pine (<i>Pinus sylvestris</i>)	1.96 (0.11)	51.41 (0.32)	179.69 (12.47)	45.68 (3.18)	25.69 (2.02)	19.14 (3.48)	-2.15 (1.48)
Shagbark hickory (<i>Carya ovata</i>)	3.18 (0.20)	45.70 (0.65)	65.18 (19.31)	39.89 (2.65)	20.21 (2.47)	19.17 (1.58)	-3.34 (1.01)
Silver maple (<i>Acer saccharinum</i>)	2.77 (0.41)	50.25 (0.49)	64.66 (17.64)	26.08 (4.69)	16.93 (3.90)	11.74 (1.94)	-2.76 (1.19)
Speckled alder (<i>Alnus incana</i>)	3.21 (0.27)	49.27 (0.79)	49.59 (9.67)	23.58 (2.01)	12.63 (3.23)	11.43 (0.64)	-1.50 (1.08)
Striped maple (<i>Acer pensylvanicum</i>)	2.72 (-)	48.37 (-)	75.09 (-)	37.65 (-)	23.64 (-)	16.77 (-)	-3.55 (-)
Sugar maple (<i>Acer saccharum</i>)	2.31 (0.49)	48.91 (0.85)	57.95 (27.71)	31.37 (4.34)	15.64 (3.22)	14.98 (2.74)	-4.57 (1.20)
Tamarack (<i>Larix laricina</i>)	1.84 (0.37)	50.37 (0.73)	135.36 (28.55)	51.50 (2.25)	32.26 (1.71)	19.90 (1.23)	-5.33 (0.93)
Trembling aspen (<i>Populus tremuloides</i>)	2.84 (0.27)	50.59 (0.71)	85.83 (14.09)	34.27 (4.19)	26.18 (3.63)	18.63 (1.43)	-2.09 (0.59)
Tulip poplar (<i>Liriodendron tulipifera</i>)	3.34 (0.17)	47.28 (0.73)	45.93 (21.31)	20.28 (3.63)	12.96 (3.08)	7.32 (1.50)	-0.46 (0.94)
White ash (<i>Fraxinus americana</i>)	2.91 (0.51)	46.90 (0.68)	54.64 (21.67)	41.24 (6.17)	24.13 (3.26)	19.69 (3.00)	-2.50 (1.03)
White pine (<i>Pinus strobus</i>)	1.59 (0.23)	50.16 (0.95)	150.30 (31.52)	44.37 (3.84)	26.33 (2.94)	18.24 (2.21)	-1.35 (1.31)
White oak (<i>Quercus alba</i>)	3.39 (0.35)	49.36 (0.83)	69.40 (20.41)	36.01 (2.79)	19.55 (3.39)	16.69 (1.91)	-3.90 (0.59)
Yellow birch (<i>Betula alleghaniensis</i>)	2.79 (0.37)	48.57 (0.90)	54.90 (16.83)	39.32 (4.07)	24.41 (2.80)	17.39 (2.09)	-4.14 (1.00)

Summary

Broadleaf	2.77 (0.56)	48.57 (1.77)	59.45 (26.09)	34.93 (7.42)	19.80 (5.42)	16.19 (3.35)	-3.50 (1.64)
Needleleaf	1.42 (0.30)	50.70 (1.23)	155.70 (35.32)	42.44 (8.46)	24.21 (5.51)	17.42 (4.08)	-4.01 (1.86)