***Supplemental tables***

**Different nitrogen acquirement and utilization strategies might determine the ecological competition results between ferns and angiosperms**

**Running title: Differences in nutrient characteristics between ferns and angiosperms**

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Table S1. Fern species analyzed in this study

|  |  |  |
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| Order (ferns) | Family | Species |
| Cyatheales | Cyatheaceae | *Cyathea mertensiana* (Kunze) Copel. |
| Cyatheales | Cyatheaceae | *Cyathea metteniana* (Hance) C. Chr. & Tardieu |
| Cyatheales | Cyatheaceae | *Cyathea spinulosa* Wall. ex Hook. |
| Equisetales | Equisetaceae | *Equisetum arvense* L. |
| Equisetales | Equisetaceae | *Equisetum hyemale* L. |
| Isoёtales | Isoёtaceae | *Isoëtes japonica* A.Br. |
| Marattiales | Marattiaceae | *Angiopteris lygodiifolia* Rosenst. |
| Osmundales | Osmundaceae | *Osmunda japonica* Thunb. |
| Polypodiales | Aspleniaceae | *Asplenium antiquum* Makino |
| Polypodiales | Aspleniaceae | *Asplenium scolopendrium* L. |
| Polypodiales | Athyriaceae | *Athyrium brevifrons* Nakai ex Kitag. |
| Polypodiales | Blechnaceae | *Woodwardia orientalis*　Sw. |
| Polypodiales | Dennstaedtiaceae | *Pteridium aquilinum* (L.) Kuhn |
| Polypodiales | Dryopteridaceae | *Dryopteris crassirhizoma* Nakai |
| Polypodiales | Dryopteridaceae  | *Polystichum tripteron* (Kunze) C. Presl. |
| Polypodiales | Nephrolepidaceae | *Nephrolepis exaltata* (L.) Schott |
| Polypodiales | Onocleaceae | *Matteuccia struthiopteris* (L.) Tod. |
| Polypodiales | Polypodiaceae | *Aglaomorpha coronans* (Wall. ex Mett.) Copel. |
| Polypodiales  | Polypodiaceae | *Lepisorus boninensis* (Christ) Ching |
| Polypodiales | Polypodiaceae | *Platycerium bifurcatum* (Cav.) C. Chr. |
| Polypodiales | Polypodiaceae | *Pyrrosia lingua* (Thunb.) Farw. |
| Polypodiales | Polypodiaceae | *Selliguea hastata* (Thunb.) H. Ohashi & K. Ohashi |
| Polypodiales | Pteridaceae | *Adiantum pedatum* L. |
| Polypodiales | Pteridaceae | *Pellaea falcata* R. Br. Fée |
| Polypodiales | Pteridaceae | *Pteris cretica* L. |
| Polypodiales | Pteridaceae | *Pteris nipponica* Shieh. |
| Polypodiales | Pteridaceae | *Pteris vittata* L. |
| Polypodiales | Thelypteridaceae | *Thelypteris dentata* (Forsk.) St. John |
| Polypodiales | Thelypteridaceae | *Thelypteris* sp. |
| Polypodiales | Woodsiaceae | *Woodsia polystichoides* Eaton |
| Salviniales | Salviniaceae | *Salvinia molesta* D. S. Mitch. |
| Schizaeales | Lygodiaceae | *Lygodium japonicum* (Thumb.) Sw. |
| Selaginellales | Selaginellaceae | *Selaginella involens* (Sw.) Spring |
| Selaginellales | Selaginellaceae | *Selaginella* sp. |

Table S2. Angiosperms species analyzed in this study

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| Order (angiosperms) | Family | Species |
| Alismatales | Araceae | *Philodendron hastatum* K. Koch & Sello |
| Arecales | Arecaceae | *Butia yatai* Becc |
| Asparagales | Amaryllidaceae | *Crinum moorei* Hook. f. var. *variegatum* |
| Asparagales | Ruscaceae | *Nolina recurvata Hemsl.* |
| Asterales | Asteraceae | *Gymnaster savatieri* (Makino) Kitamura |
| Asterales | Campanulaceae | *Platycodon grandiflorum* (Jacq.) A. DC. |
| Boraginaceae | Boraginaceae | *Myosotis arvensis* (L.) Hill |
| Brassicales | Caricaceae | *Carica papaya* L. |
| Buxales | Buxaceae | *Buxus microphylla* Sieb. et Zucc. |
| Caryophyllales | Cactaceae | *Epiphyllum oxypetalum* Haw. |
| Caryophyllales | Montiaceae | *Lewisiopsis tweedyi* (A. Gray) Govaerts |
| Caryophyllales | Polygonaceae | *Bistorta major* S. F. Gray var. *japonica* Hara |
| Cornales | Cornaceae | *Davidia involucrata* Baill. |
| Dipsacales | Caprifoliaceae | *Patrinia villosa* (Thunb.) Juss |
| Ericales | Ericaceae | *Leucothoe grayana* Maxim. |
| Ericales | Polemoniaceae | *Polemonium acutiflorum* Willd. |
| Ericales | Primulaceae | *Primula japonica* A. Gray |
| Fabales | Fabaceae | *Lathyrus japonicus* Willd. |
| Fagales | Juglandaceae | *Pterocarya rhoifolia* Sieb.et Zucc. |
| Gunnerales | Gunneraceae | *Gunnera* sp. |
| Lamiales | Gesneriaceae | *Sinningia cardinalis* (Lehm.) H. E. Moore |
| Lamiales | Oleaceae | *Syringa velutina* Kom. |
| Lamiales | Plantaginaceae | *Penstemon hirsutus* (L.) Willd. var. *pygmaeus* Benn. |
| Lamiales | Scrophulariaceae | *Veronicastrum sachalinense* (Boriss.) Yamazaki |
| Magnoliales | Magnoliaceae | *Magnolia liliiflora* Desr. |
| Malpighiales | Euphorbiaceae | *Manihot esculenta* Crantz. |
| Nymphaeales | Nymphaeaceae | *Nymphaea tetragona* Georgi |
| Piperales | Aristolochiaceae | *Asarum canadensis* L.  |
| Poales | Bromeliaceae | *Puya mirabilis* (Mez) L.B. Smith |
| Poales | Bromeliaceae | *Tillandsia usneoides* L. |
| Poales | Cyperaceae | *Carex siderosticta* Hance |
| Poales | Cyperaceae | *Scirpus sylvaticus* L. subsp. *maximowiczii* (Regel) T. Koyama  |
| Poales | Juncaceae | *Juncus tenuis* Willden. |
| Poales | Poaceae | *Miscanthus sinensis* Andersson |
| Poales | Poaceae | *Saccharum officinarum* L. |
| Ranunculales | Papaveraceae | *Sanguinaria canadensis* L. |
| Ranunculales | Ranunculaceae | *Caltha palustris* L. var. *enkoso* Hara |
| Rosales | Rosaceae | *Rhodotypos scandens* (Thunb.) Makino |
| Sapindales | Rutaceae | *Skimmia japonica* Thunb. var. *intermedia* Komatsu f. *repens* Hara |
| Solanales | Convolvulaceae | *Ipomoea cairica* L. |
| Solanales | Solanaceae | *Lycium chinense* Miller |
| Vitales | Vitaceae | *Vitis coignetiae* Pulliat |
| Zingiberales | Musaceae | *Musa acuminata* Colla |