

Title: Variation in arbuscular mycorrhizal status among cordate fern gametophytes in relation to phylogeny, habitat, and gametophyte structure

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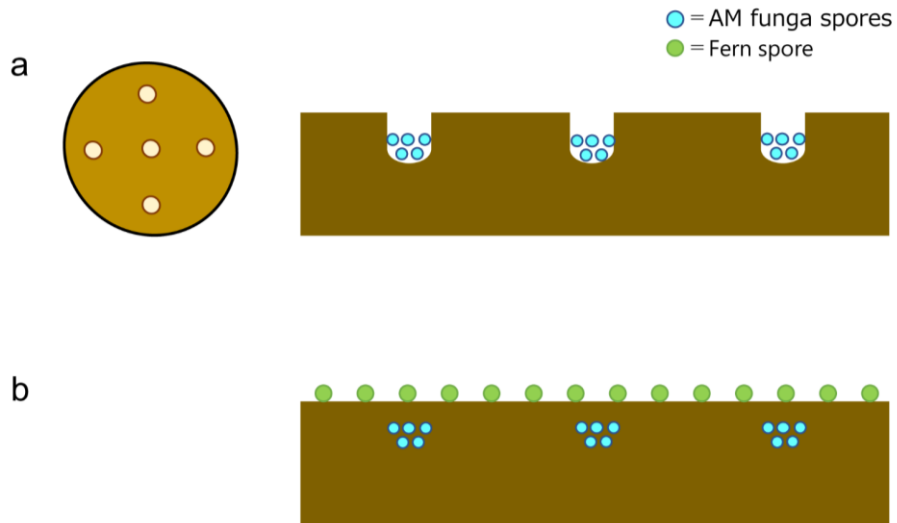


Fig. S1 Sowing method for AM fungal spores and fern spores

a. Soil was placed in each well of the plate, and five evenly spaced holes (approximately 1 mm deep) were made. AM fungal spores (150 spores from three species) were added to each well and covered with soil. b. Fern spore suspension (75 μ L; approximately 15 spores per 10 μ L) was evenly distributed over the soil surface

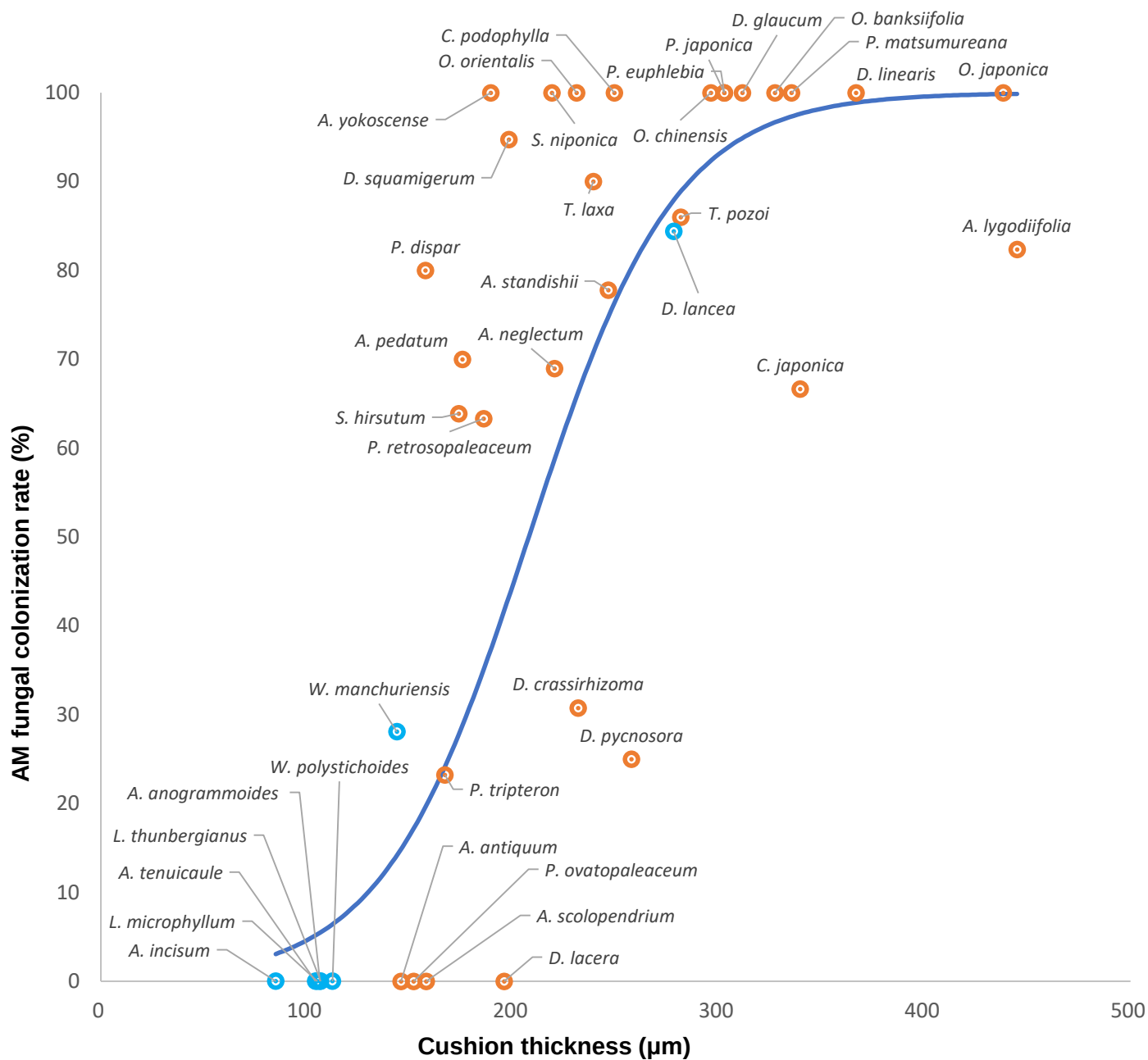


Fig. S2 Relationship between AM fungal colonization rate and mean cushion thickness in wild cordate gametophyte species

Orange circles indicate terrestrial species, and blue circles indicate non-terrestrial species

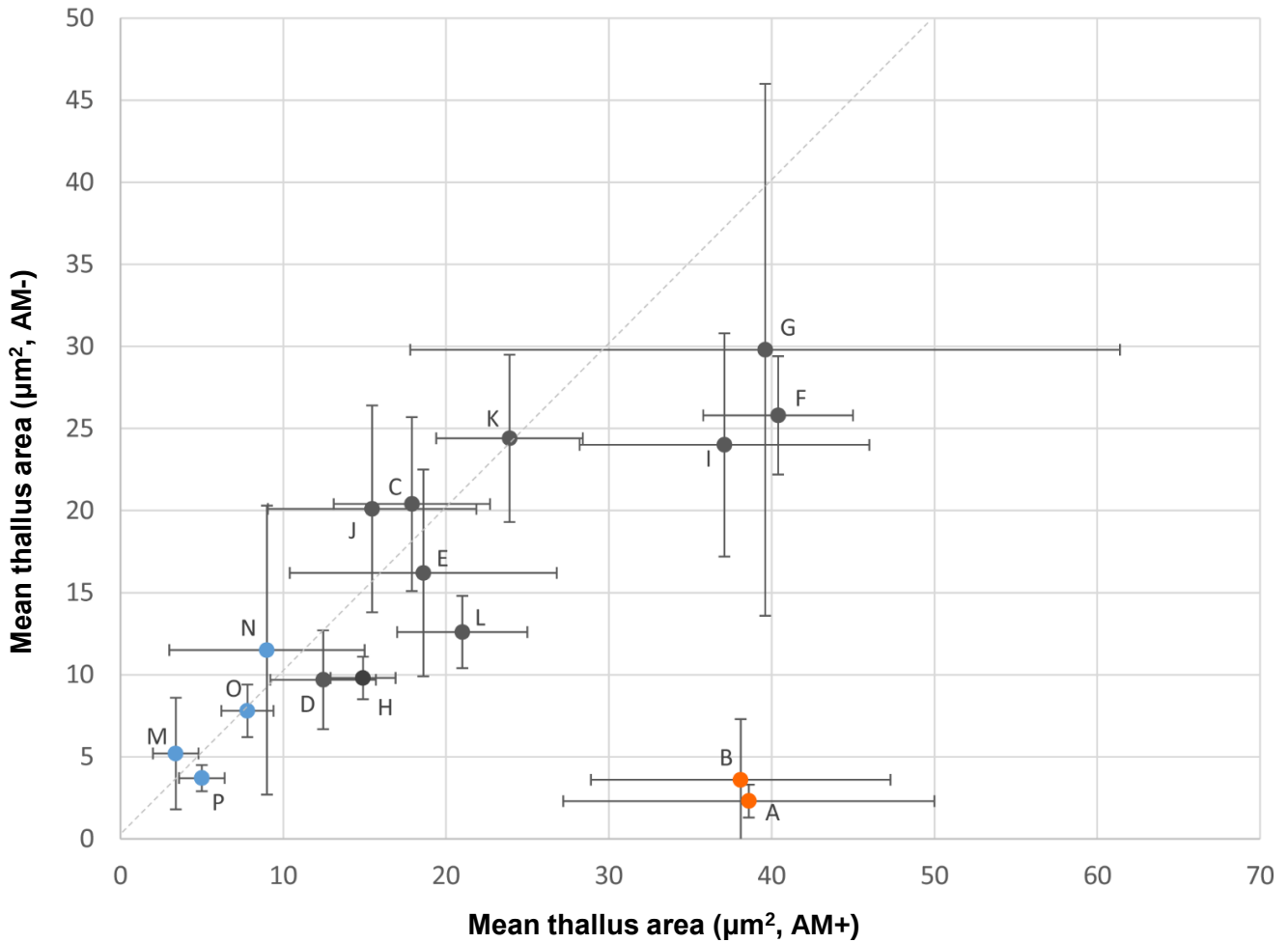


Fig. S3 Comparison of mean thallus area in 16 species of cordate gametophytes grown with and without AM inoculation in soil co-culture experiments

Each point represents one species. Error bars represent $\pm$ SD. The diagonal line indicates a 1:1 relationship between thallus area of gametophytes with and without AM inoculation. (A) *Angiopteris lygodiifolia*; (B) *Osmunda japonica*; (C) *Dryopteris crassirhizoma*; (D) *Woodsia polystichoides*; (E) *Arachniodes standishii*; (F) *Thelypteris laxa*; (G) *Athyrium yokoscense*; (H) *Dicranopteris linearis*; (I) *Onoclea orientalis*; (J) *Polystichum tripterum*; (K) *Sitobolium hirsutum*; (L) *Odontosoria chinensis*; (M) *Asplenium tenuicaule*; (N) *Asplenium anogrammoides*; (O) *Lepisorus microphyllum*; (P) *Lepisorus thunbergianus*

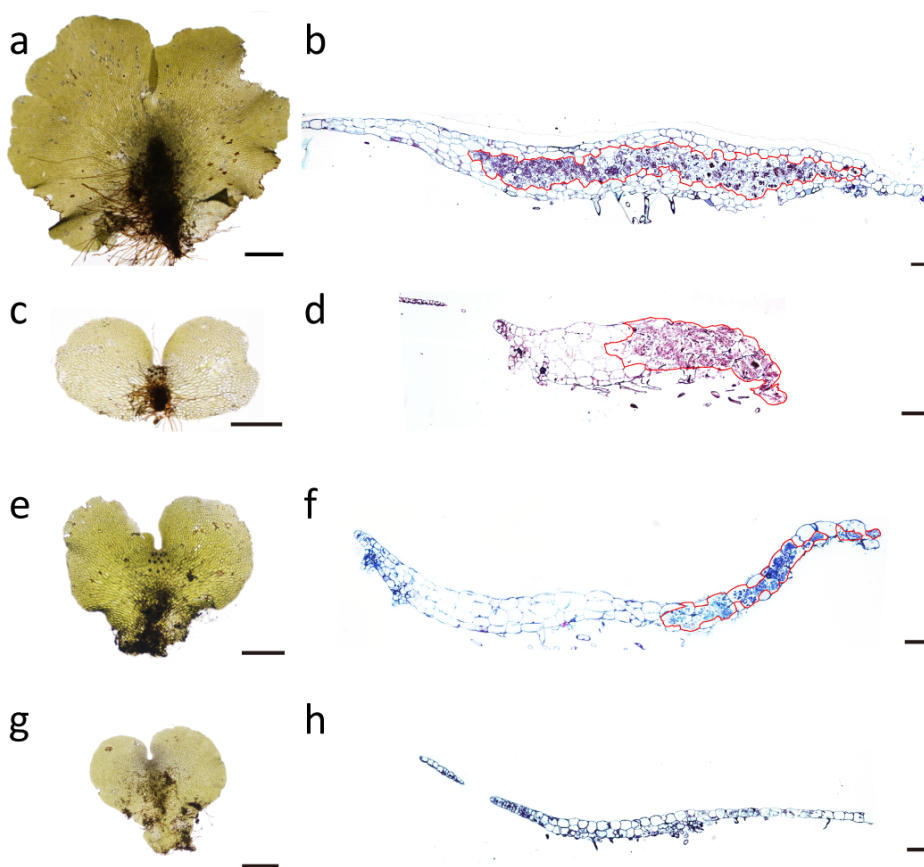


Fig. S4 Growth and arbuscular mycorrhizal colonization in wild cordate gametophytes
Osmunda japonica (a, b), *Onoclea orientale* (c, d), *Arachnioides standishii* (e, f), and
Lepisorus microphyllum (g, h). Scale bars: 1 mm (a, c, e, g); 100 μ m (b, d, f, h)

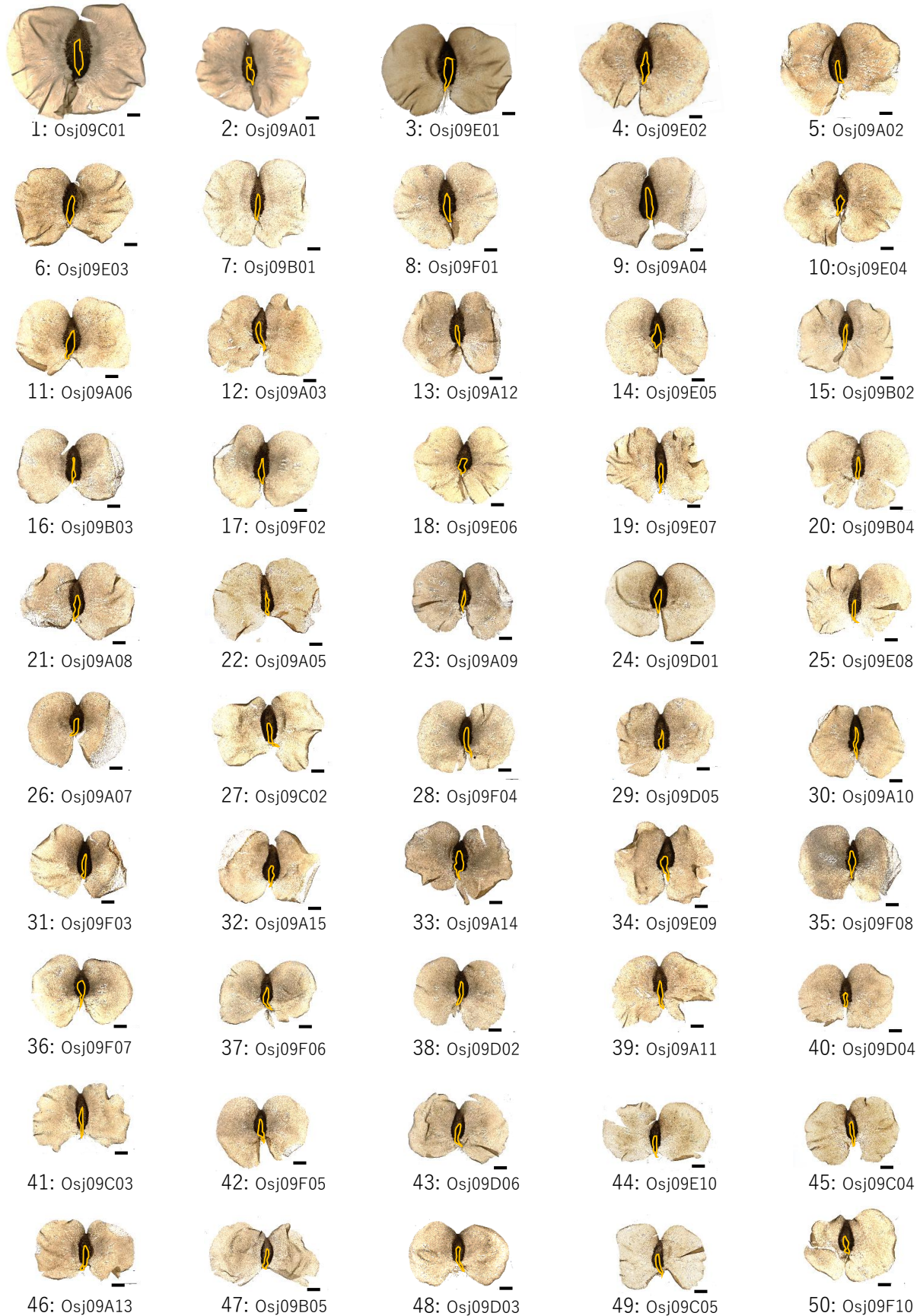


Fig. S5 Whole-mount images of all mature *Osmunda japonica* gametophytes grown under AM+ conditions in the soil co-culture experiment Scale bars = 1 mm

For Figs. S5–S12 Gametophytes are arranged in descending order of thallus area.

The first number indicates the size rank, followed by the individual identification number. Orange boxes indicate the regions colonized by AM fungi

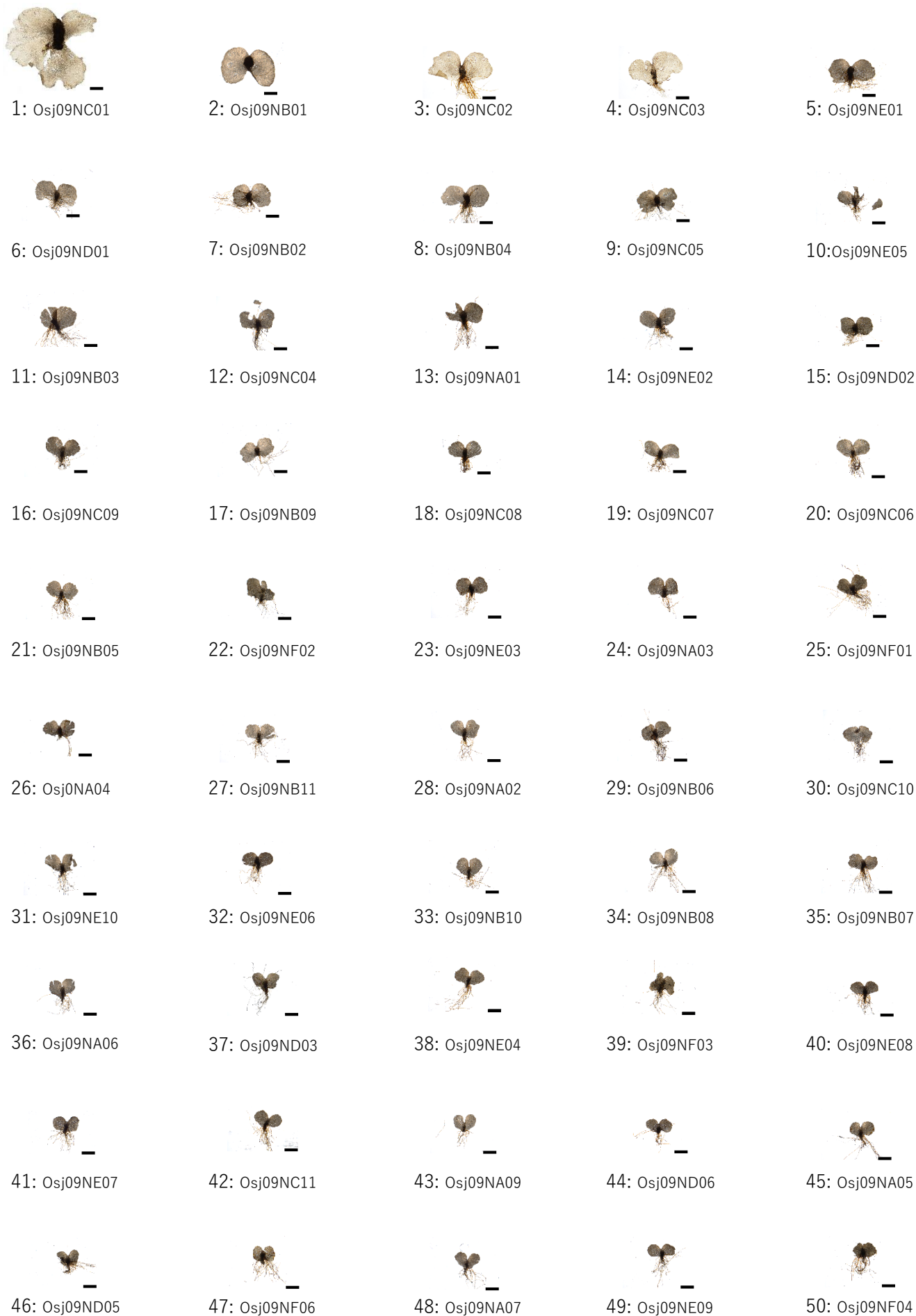


Fig. S6 Whole-mount images of all mature *Osmunda japonica* gametophytes grown under AM- conditions in the soil co-culture experiment Scale bars = 1 mm

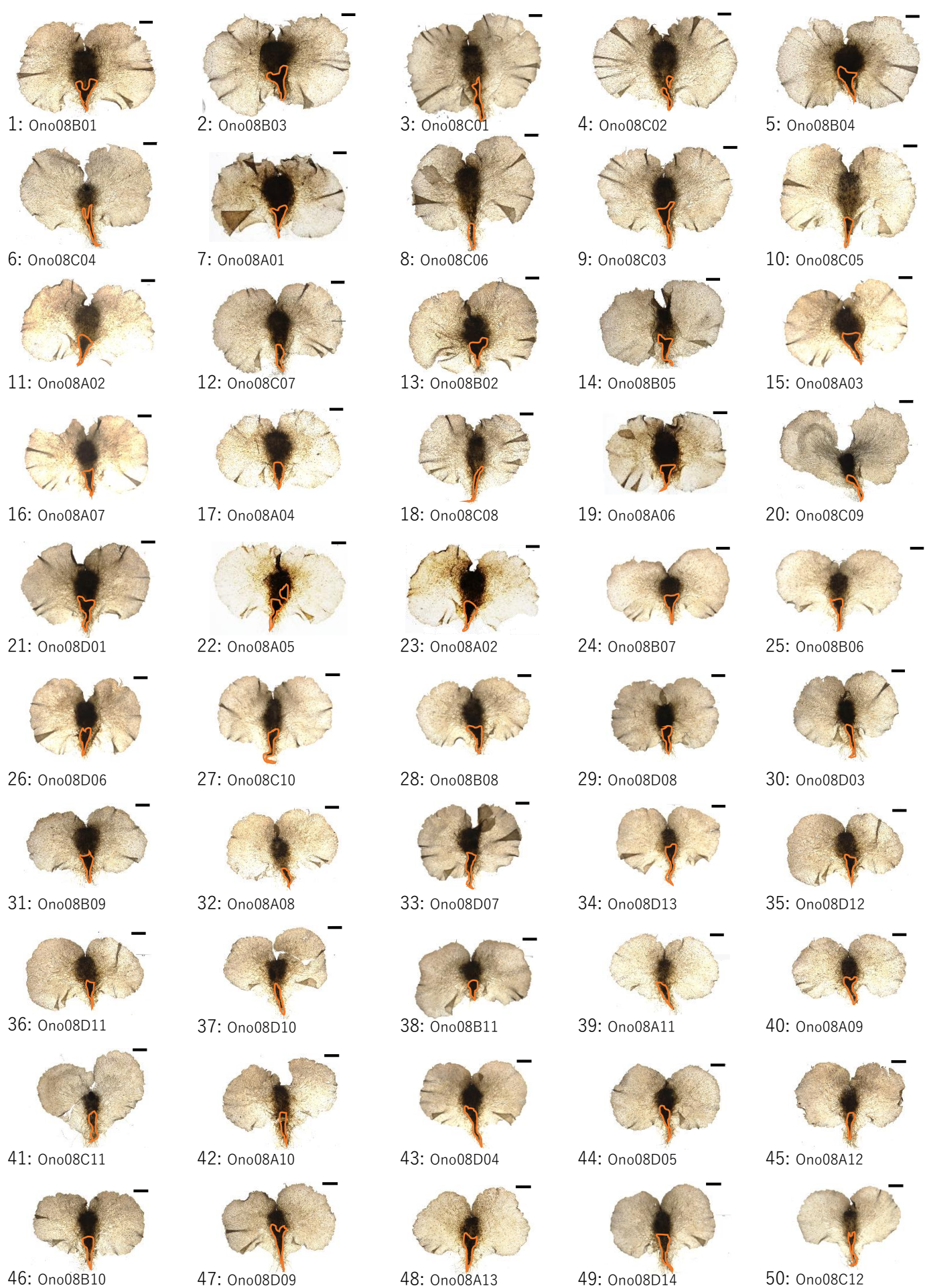


Fig. S7 Whole-mount images of all mature *Onoclea orientalis* gametophytes grown under AM+ conditions in the soil co-culture experiment Scale bars = 1 mm

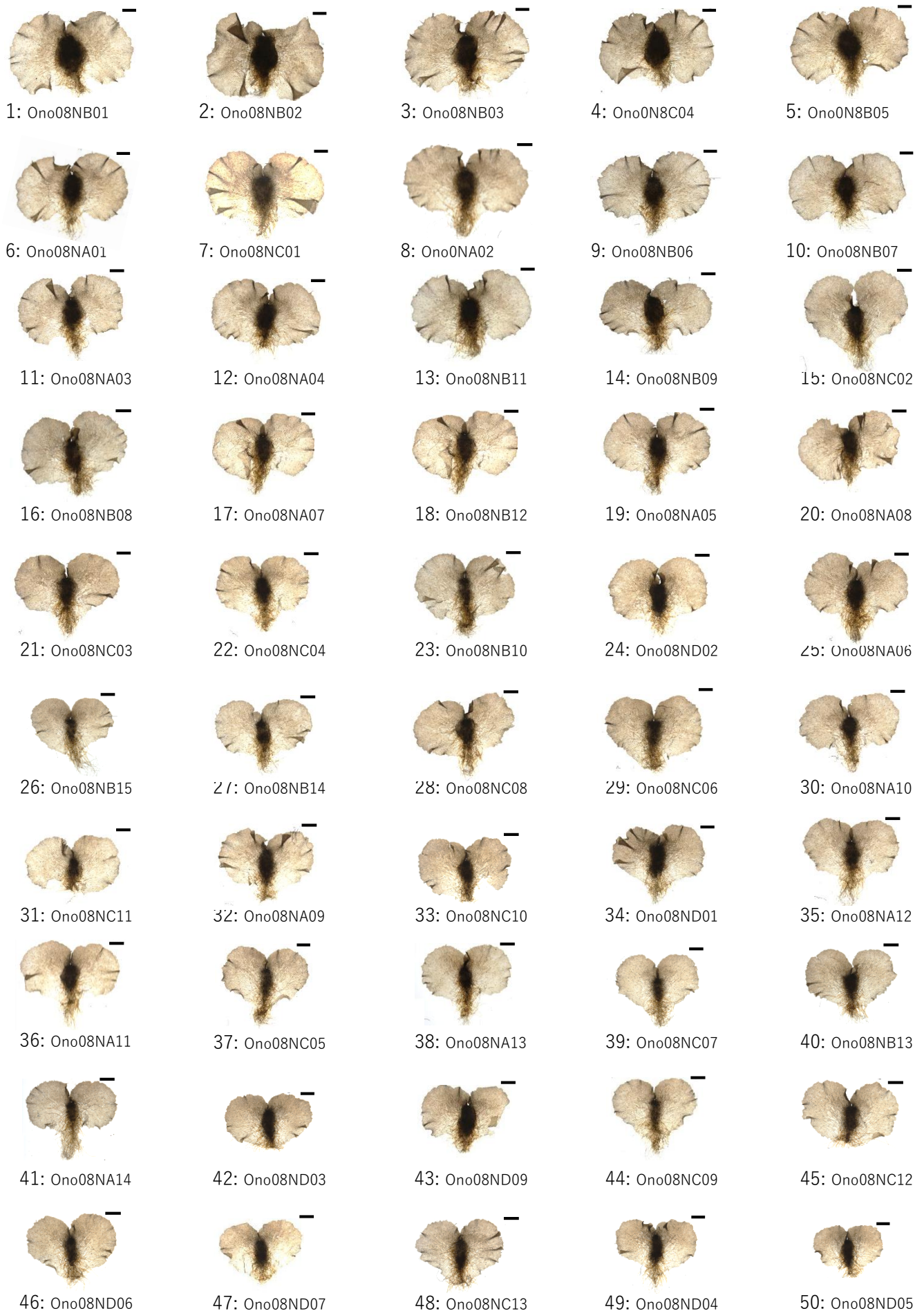


Fig. S8 Whole-mount images of all mature *Onoclea orientalis* gametophytes grown under AM- conditions in the soil co-culture experiment Scale bars = 1 mm



Fig. S9 Whole-mount images of all mature *Arachiniodes standishii* gametophytes grown under AM+ conditions in the soil co-culture experiment Scale bars = 1 mm



Fig. S10 Whole-mount images of all mature *Arachiniodes standishii* gametophytes grown under AM- conditions in the soil co-culture experiment Scale bars = 1 mm

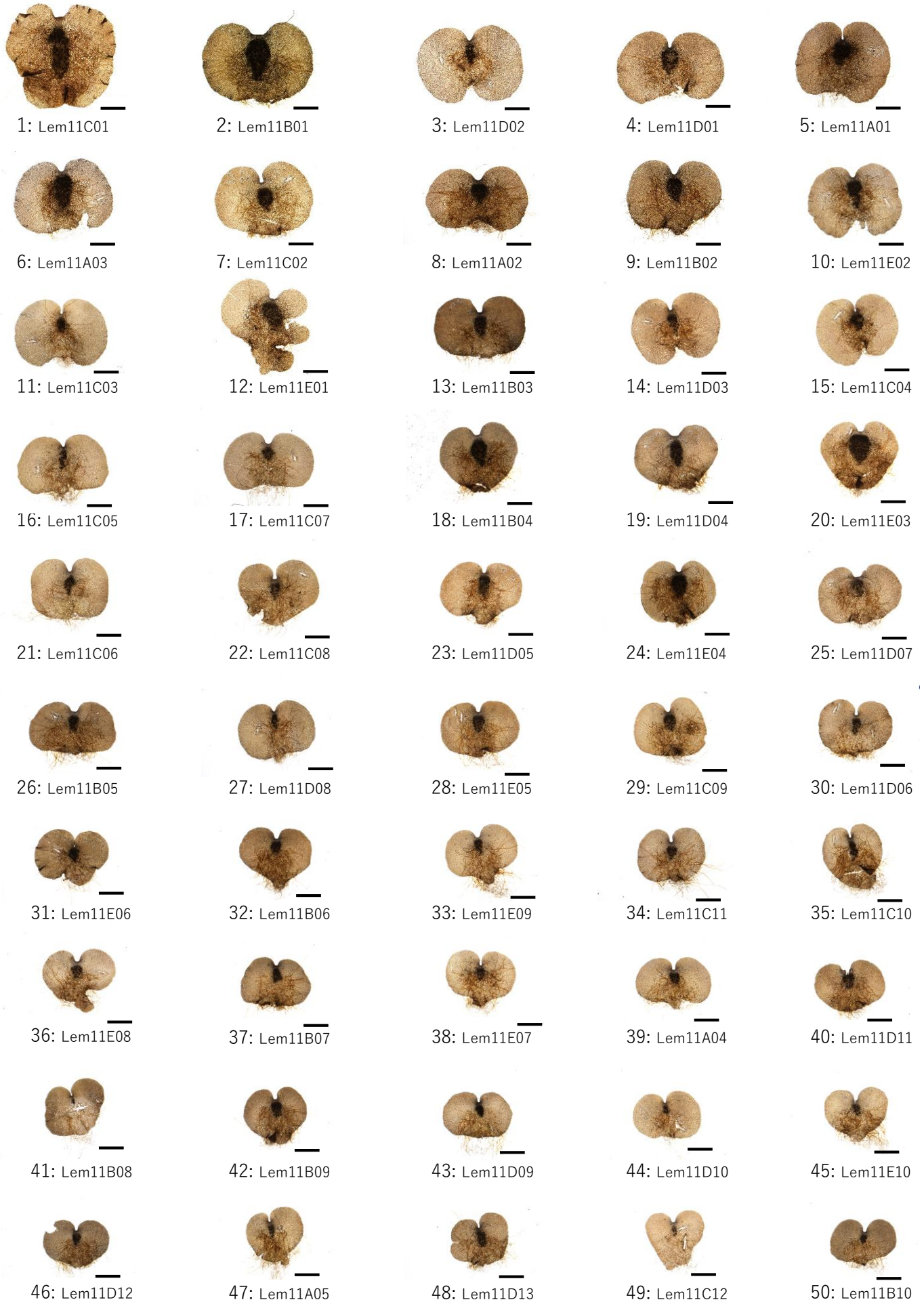


Fig. S11 Whole-mount images of all mature *Lepisorus microphyllum* gametophytes grown under AM+ conditions in the soil co-culture experiment Scale bars = 1 mm

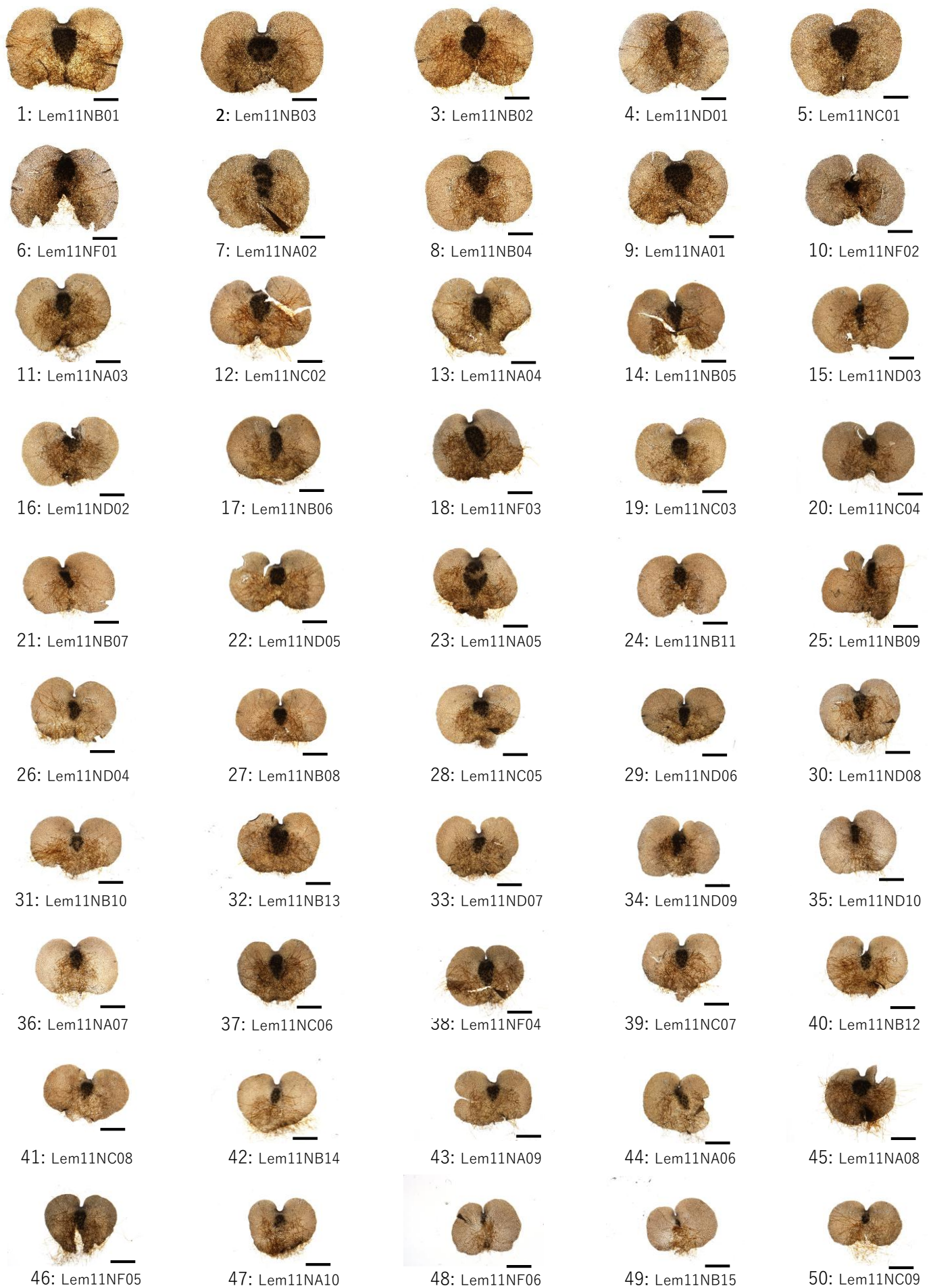


Fig. S12 Whole-mount images of all mature *Lepisorus microphyllum* gametophytes grown under AM- conditions in the soil co-culture experiment Scale bars = 1 mm