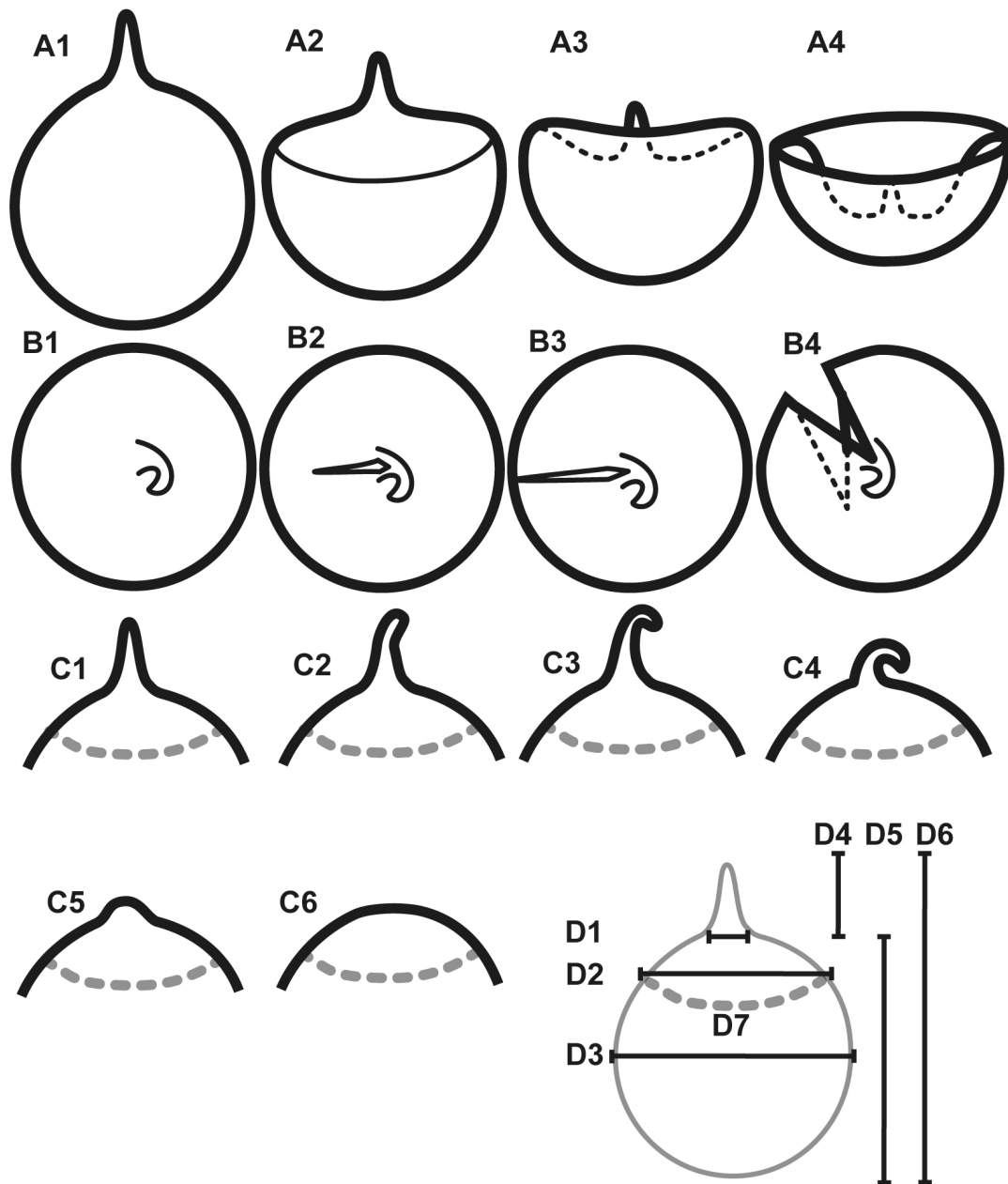


**Supplementary Figure S1 – Schematic drawings of morphological characters**



**Supplementary Figure S1.** Schematic drawings of papillate pollen to illustrate hydration levels, papilla configuration, hiatus development, and measurements of morphological characters.

A1–4. Stages of hydration (redrawn after VanCampo 1951). A1. Fully hydrated pollen in EV. A2–3. Stages of desiccation. A4. Fully dehydrated pollen.

B1–4. Stages of radial splitting, pollen PV (redrawn after VanCampo 1951).

C1–6. Papilla configuration in EV. C1. Papilla straight. C2–3. Papilla weakly bent. C4. Papilla sharply bent. C5–6. Papilla indistinct (very small or not detectable).

D1–7. Measurements of morphological characters. D1. Papilla width. D2. Leptoma width.

D3. Equatorial diameter. D4. Papilla length. D5. Polar axis excluding papilla. D6. Polar axis.

Abbreviation: polar view (PV), equatorial view (EV).

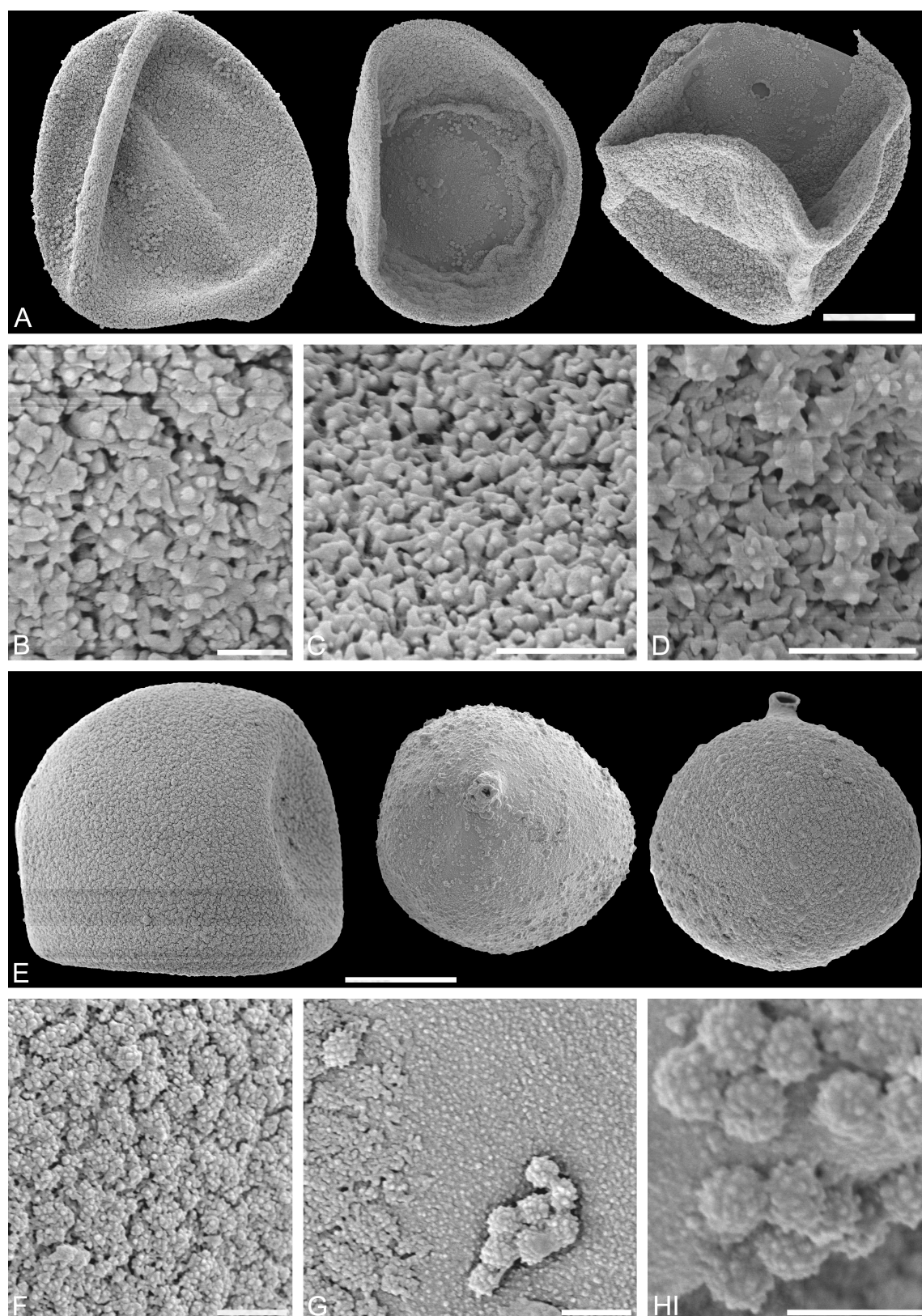
## Supplementary Figure S2 – Additional Figures



**Supplementary Figure S2.** Light microscopy (LM) micrographs of acetolysed *Cunninghamia* and *Metasequoia* pollen. A–G. *Cunninghamia lanceolata* (W2010-10546), (A) EV, (B–F) PV, (G) hiatus form. H–S. *Metasequoia glyptostroboides* (W2009-08604), (H–P) EV, (Q) PV, (R, S) hiatus form. Scale bars 10µm.



# Supplementary Figure S3 – Additional Figures



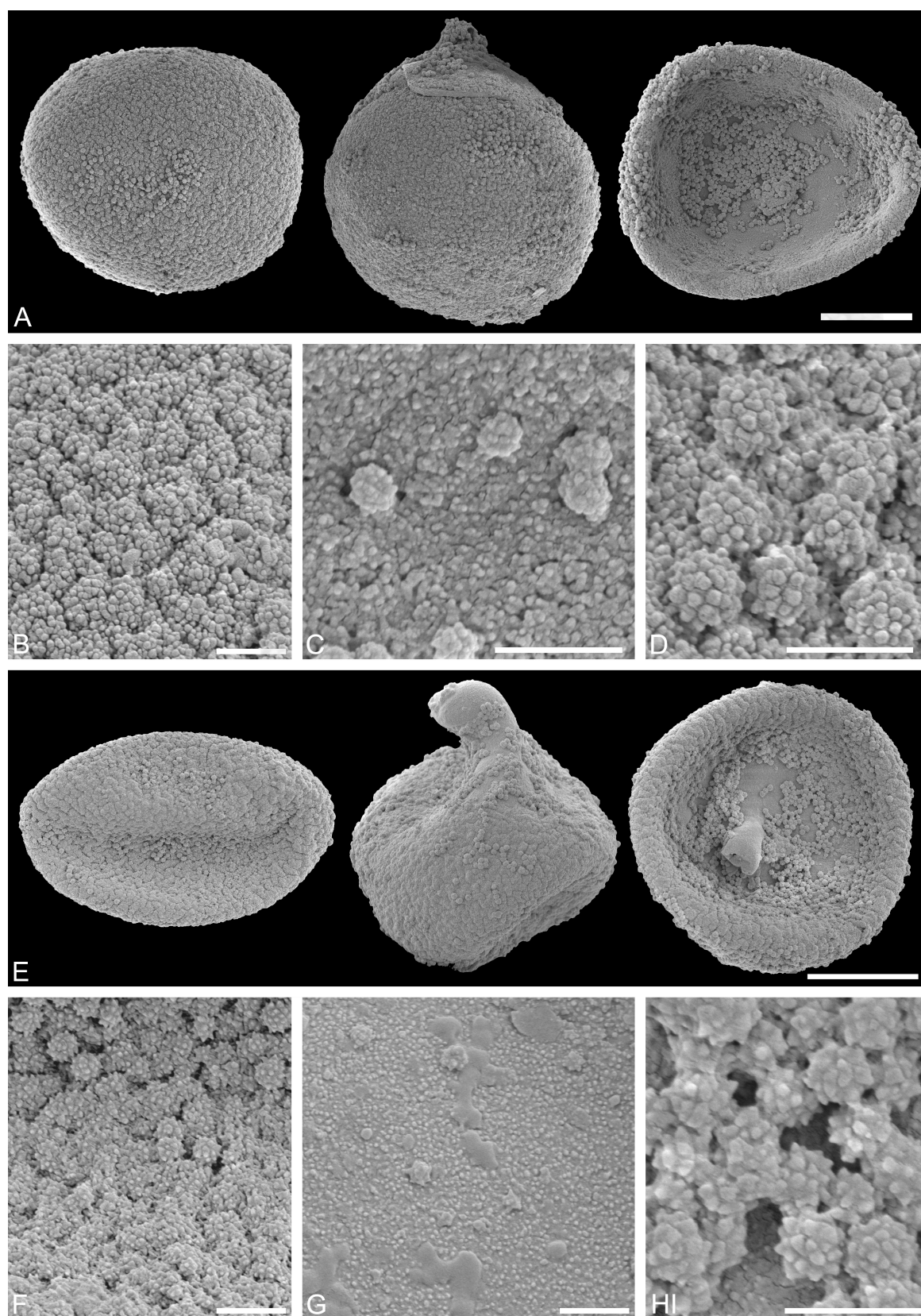
**Supplementary Figure S3.** Scanning electron microscopy (SEM) micrographs of acetolysed *Cunninghamhamia* and *Metasequoia* pollen. A–D. *Cunninghamhamia lanecolata* (W2010-10546). PRV, DV, EQ (A, left to right), PRV (B), DV (C), orbicule detail (D). E–H. *Metasequoia glyptostroboides* (W2009-08604), PRV, DV, EQ (E, left to right), PRV (F), DV (G), orbicule detail (H). Scale bars 10µm (A, B), 1µm (C–D, F–H).

# Supplementary Figure S4 – Additional Figures



**Supplementary Figure S4.** Light microscopy (LM) micrographs of acetolysed *Sequoia* and *Sequoiadendron* pollen. A–F. *Sequoia sempervirens*, (W1955-4142), (A–D) EV, (E) PV, (F) hiatus form. G–P. *Sequoiadendron giganteum*, (W2011-01010), (G–M) EV, (N–P) PV. Scale bars 10μm.

# Supplementary Figure S5– Additional Figures



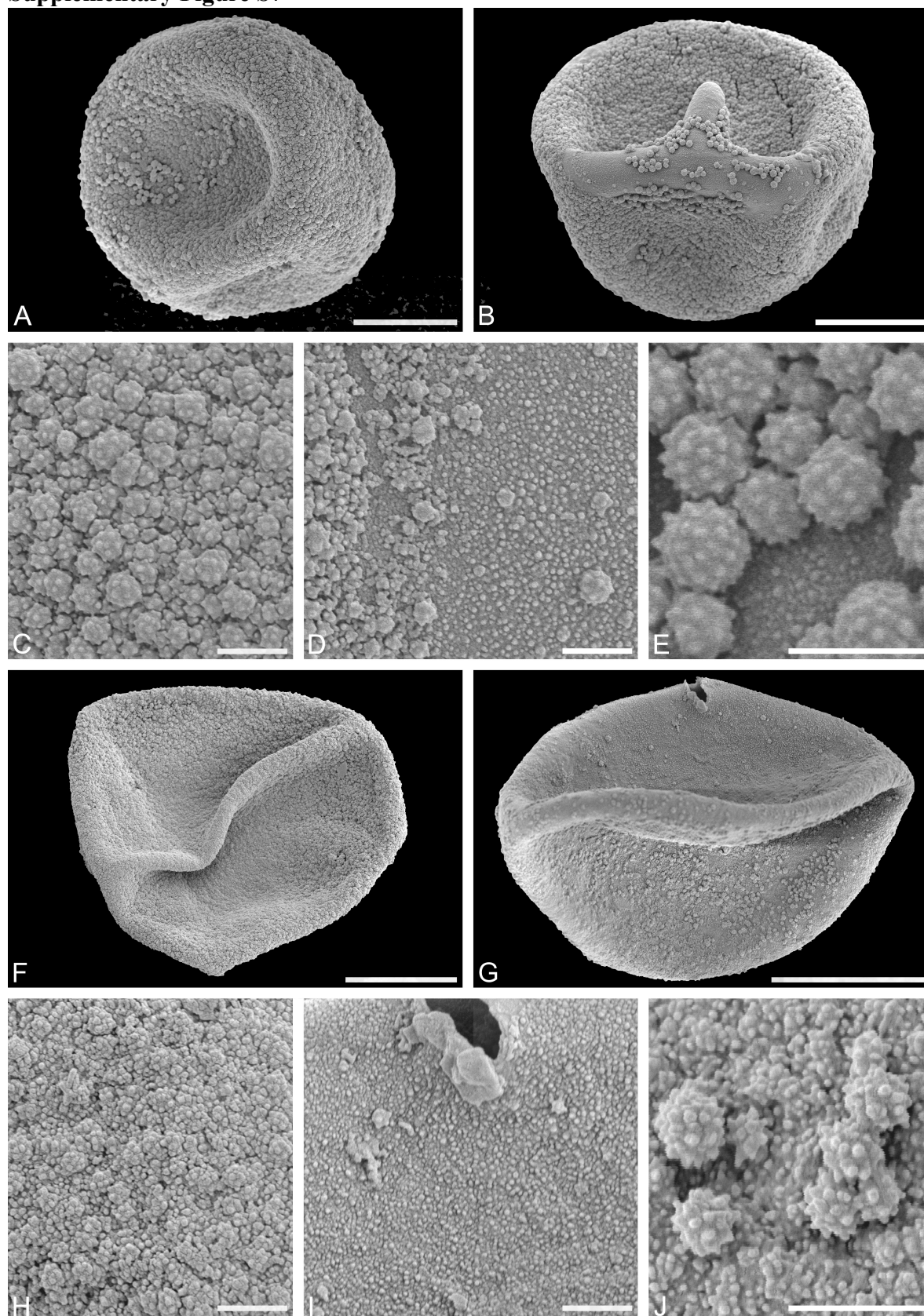
**Supplementary Figure S5.** Scanning electron microscopy (SEM) micrographs of acetolysed *Sequoia* and *Sequoiadendron* pollen. A–D. *Sequoia sempervirens*, (W1955-4142), PRV, EQ, DV (A, left to right), PRV (B), DV (C), orbicule detail (D). E–H. *Sequoiadendron giganteum* (W2011-01010), PRV, EQ, DV (E, left to right), PRV (F), DV (G), orbicule detail (H). Scale bars 10µm (A, E), 1µm (B–D, F–H).

# Supplementary Figure S6



**Supplementary Figure S6.** Light microscopy (LM) micrographs of acetolysed *Cryptomeria* and *Glyptostrobus* pollen. A–H. *Cryptomeria japonica* (W1992-16476), (A–E) EV, (F, G) PV, (H) hiatus form. I–O. *Glyptostrobus pensilis*, (S-C-4244), (I–M) EV, (N) PV, (O) hiatus form. Scale bars 10µm.

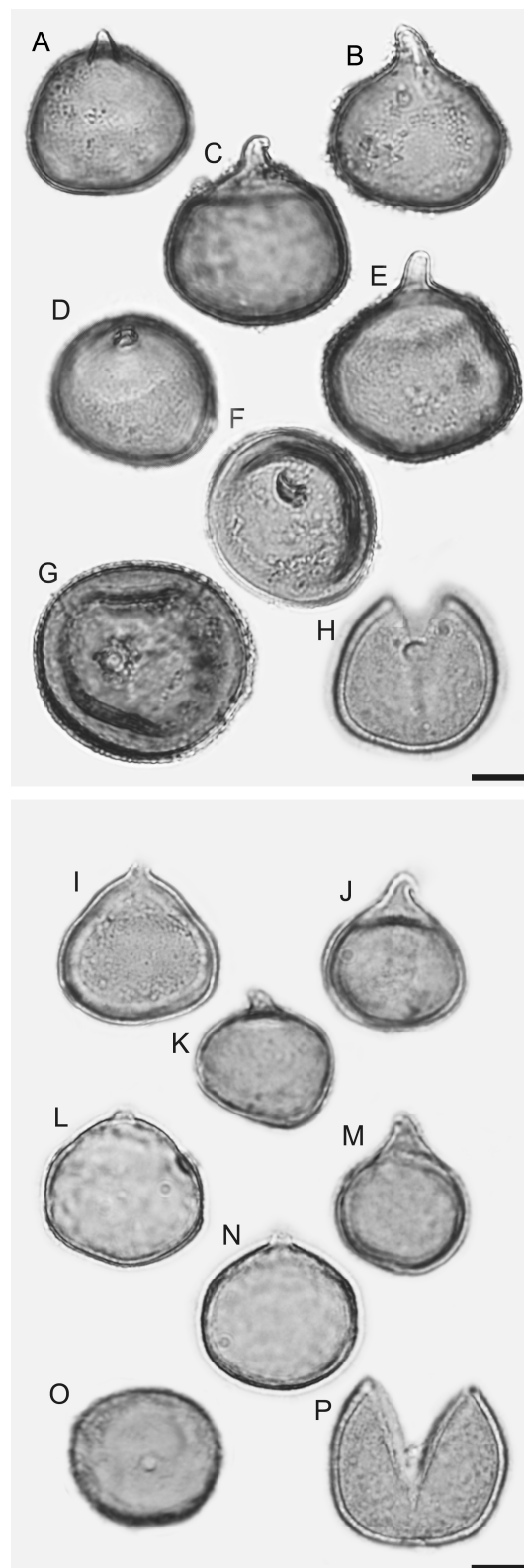
Supplementary Figure S7



Supplementary Figure S7. Scanning electron microscopy (SEM) micrographs of acetolysed *Cryptomeria* and *Glyptostrobus* pollen. A–E. *Cryptomeria japonica* (W1992-16476), PRV (A), DV (B), PRV (C), DV (D), orbicule detail (E). F–J. *Glyptostrobus pensilis* (S-C-4244), PRV (F), EQ (G), PRV (H), DV (I), orbicule detail (J). Scale bars 10µm (A, B, F, G), 1µm (C–E, H–J).

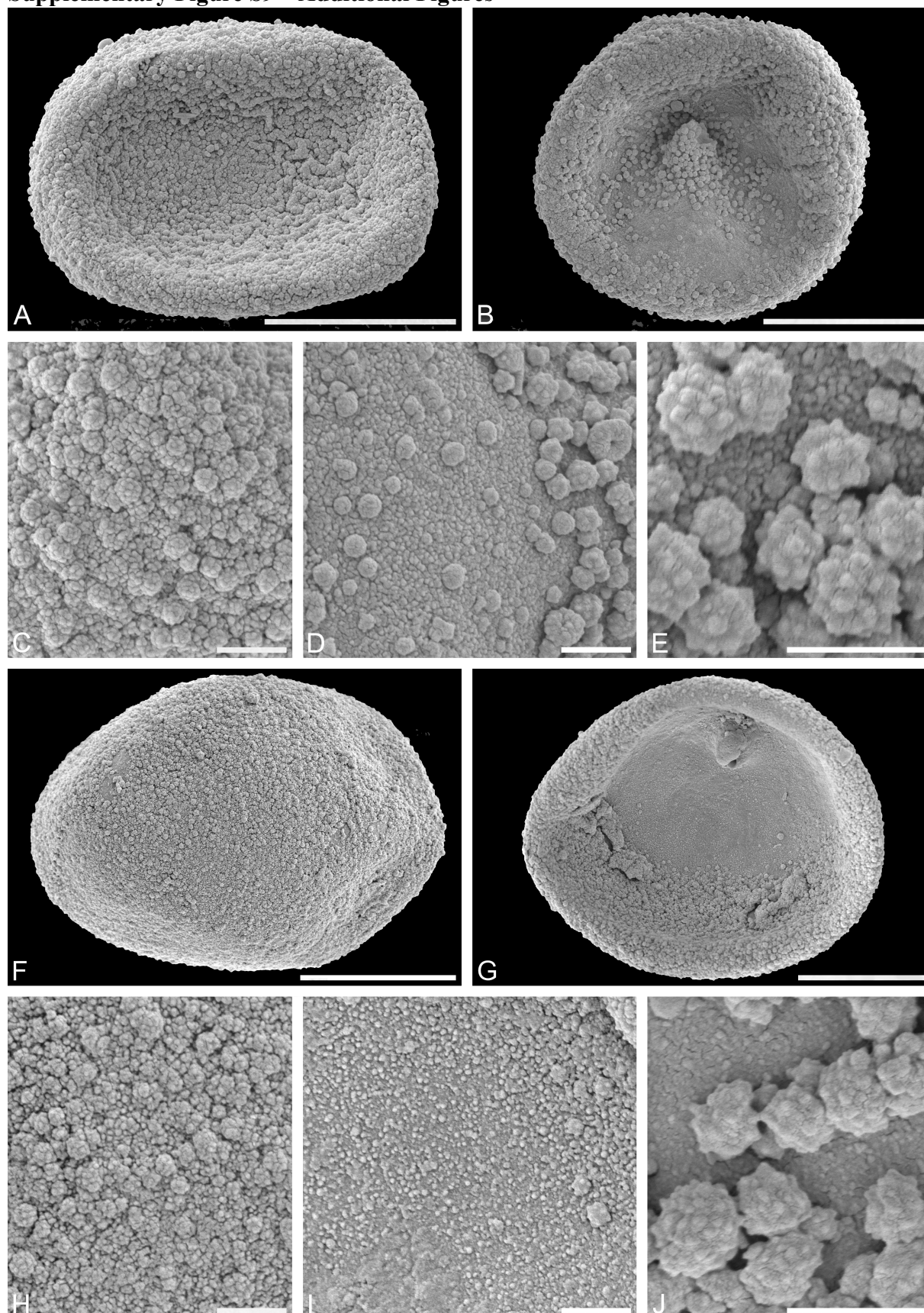


# Supplementary Figure S8 – Additional Figures



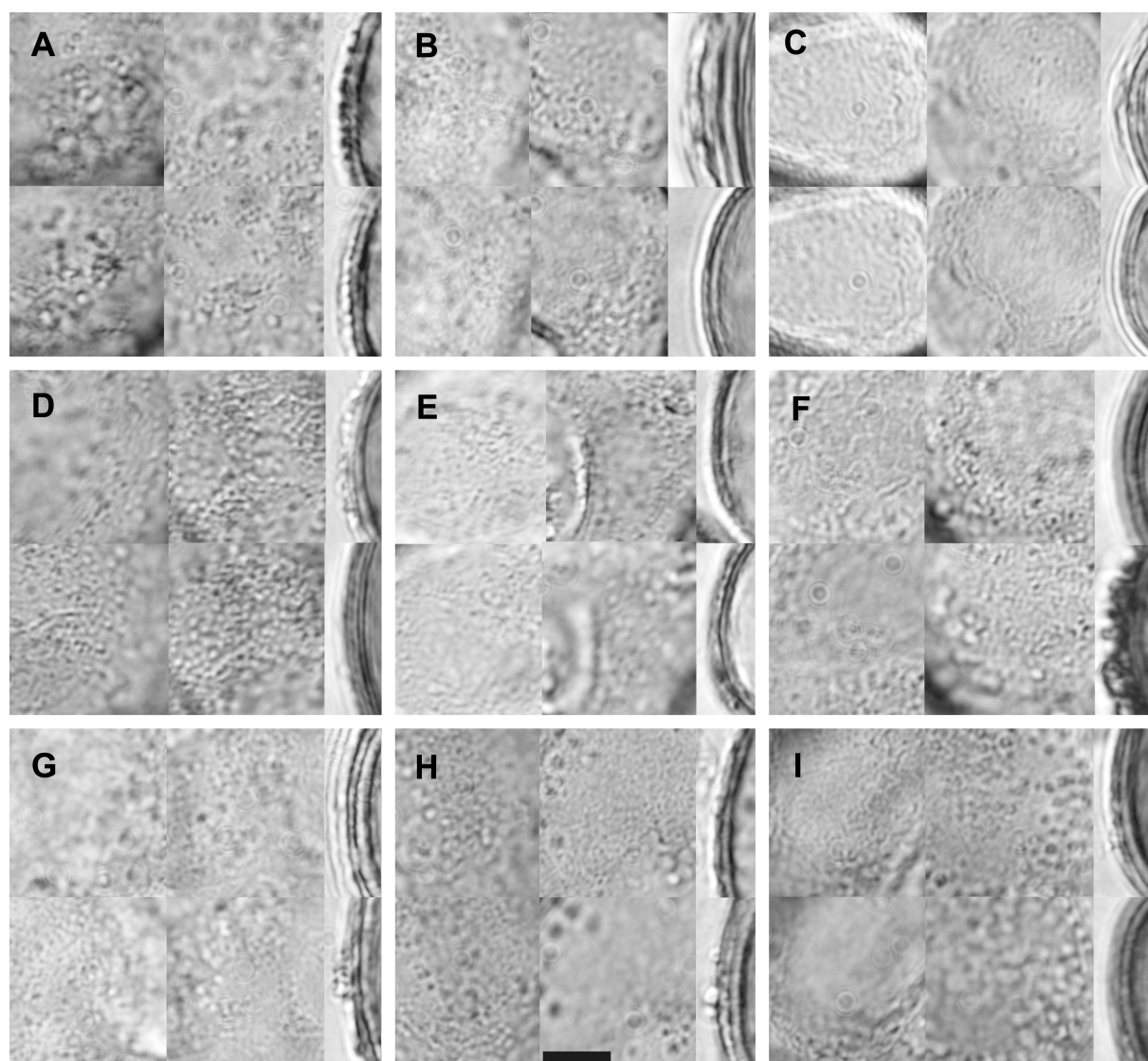
**Supplementary Figure S8.** Light microscopy (LM) micrographs of acetolysed *Taxodium* pollen. A–H. *Taxodium distichum* (S-C-4370, W2012-12013), (A–C, E) EV, (D–G) PV, (H) hiatus form. I–P. *Taxodium mucrunatum*, (W2000-05875), (I–N) EV, (O) PV, (P) hiatus form. Scale bars 10µm.

# Supplementary Figure S9 – Additional Figures



**Supplementary Figure S9.** Scanning electron microscopy (SEM) micrographs of acetolysed *Taxodium* pollen. A–E. *Taxodium distichum* (W2012-12013), PRV (A), DV (B), PRV (C), DV (D), orbicule detail (E). F–J. *Taxodium mucronatum* (S-C-4341), (F) PRV, EQ (G), PRV (H), DV (I), orbicule detail (J). Scale bars 10µm (A, B, F, G), 1µm (C–E, H–J).

# Supplementary Figure S10 – LO-pattern comparison



**Supplementary Figure S10.** Light microscopy (LM) detail micrographs of exine sculpture and pollen wall architecture of acetolysed Atrotaxidoideae, Cunninghamioideae, Sequoioideae, and Taxodioideae pollen.

A. *Athrotaxis cupressoides*. B. *Cunninghamia lanceolata* (P01632932). C. *Metasequoia glyptostroboides* (W2009-08604). D. *Sequoia sempervirens* (W2011-01010). E. *Sequoiadendron giganteum* (W1952-15491). F. *Cryptomeria japonica* (W2010-10830). G. *Glyptostrobus pensilis* (P01642576). H. *Taxodium distichum* (S-C-4370). I. *Taxodium mucronatum* (S-C-4341).

Scale bar 5µm.