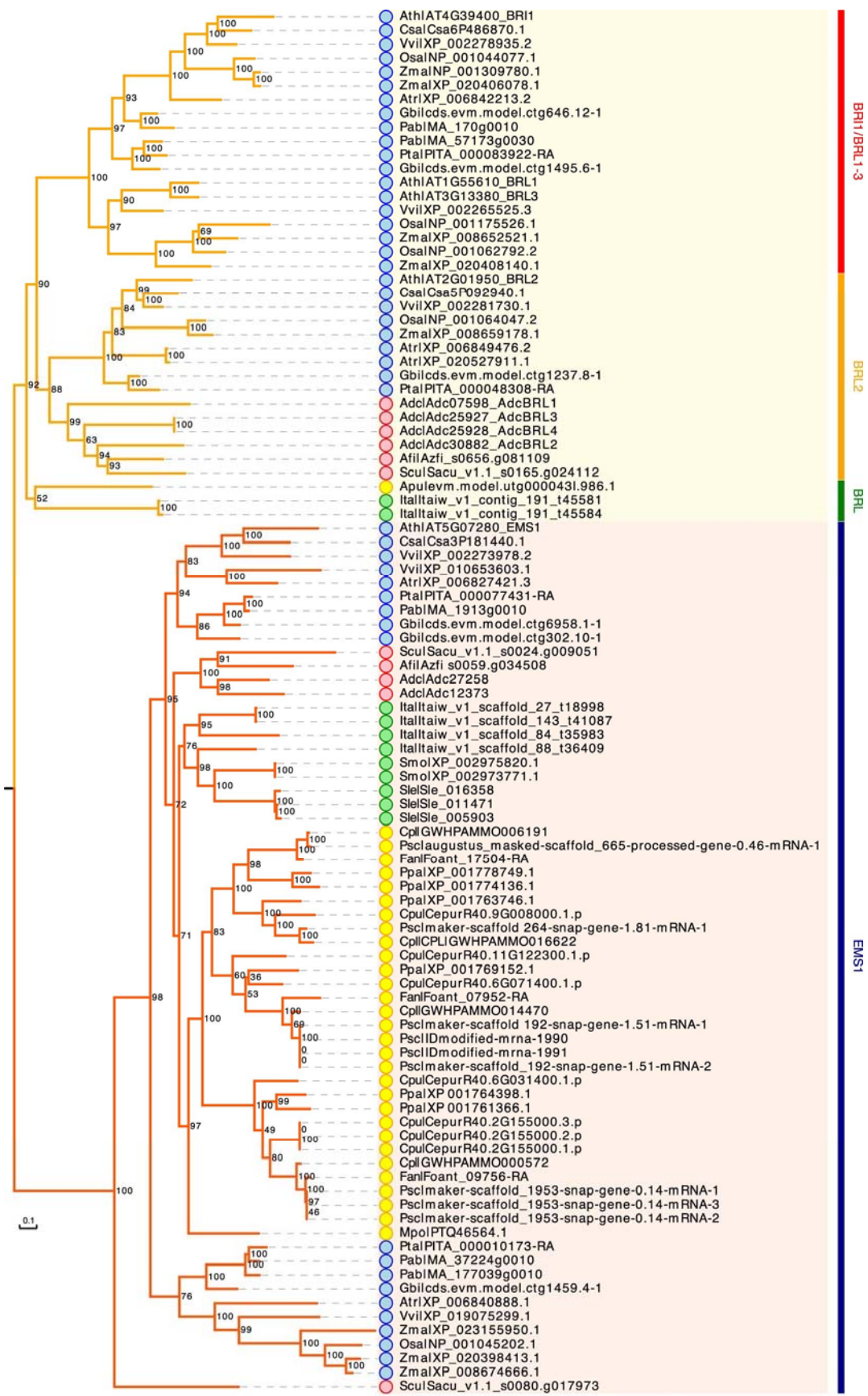


**Extended Data Fig. 4: The maximum-likelihood tree of the *BRI1-BRL* and *EMS1* gene family in land plants.**

From: The genome of homosporous maidenhair fern sheds light on the euphyllophyte evolution and defences



- AthlAT4G39400\_BR11
- CsalCsa6P486870.1
- VviiXP\_002278935.2
- OsaINP\_001044077.1
- ZmalNP\_001309780.1
- ZmalXP\_020406078.1
- AtriXP\_006842213.2
- Gbilcds.evm.model.ctg646.12-1
- PabIMA\_170g0010
- PabIMA\_57173g0030
- PtalPITA\_000083922-RA
- Gbilcds.evm.model.ctg1495.6-1
- AthlAT1G55610\_BRL1
- AthlAT3G13380\_BRL3
- VviiXP\_002265525.3
- OsaINP\_001175526.1
- ZmalXP\_008652521.1
- OsaINP\_001062792.2
- ZmalXP\_020408140.1
- AthlAT2G01950\_BRL2
- CsalCsa5P092940.1
- VviiXP\_002281730.1
- OsaINP\_001064047.2
- ZmalXP\_008659178.1
- AtriXP\_006849476.2
- AtriXP\_020527911.1
- Gbilcds.evm.model.ctg1237.8-1
- PtalPITA\_000048308-RA
- AdclAdc07598\_AdcBRL1
- AdclAdc25927\_AdcBRL3
- AdclAdc25928\_AdcBRL4
- AdclAdc30882\_AdcBRL2
- AfilAzi\_s0656.g081109
- SculSacu\_v1.1\_s0165.g024112
- Apulevm.model.utg0000431.986.1
- Italltaiw\_v1\_contig\_191\_t45581
- Italltaiw\_v1\_contig\_191\_t45584
- AthlAT5G07280\_EMS1
- CsalCsa3P181440.1
- VviiXP\_002273978.2
- VviiXP\_010653603.1
- AtriXP\_006827421.3
- PtalPITA\_000077431-RA
- PabIMA\_1913g0010
- Gbilcds.evm.model.ctg6958.1-1
- Gbilcds.evm.model.ctg302.10-1
- SculSacu\_v1.1\_s0024.g009051
- AfilAzi\_s0059.g034508
- AdclAdc27258
- AdclAdc12373
- Italltaiw\_v1\_scaffold\_27\_t18998
- Italltaiw\_v1\_scaffold\_143\_t41087
- Italltaiw\_v1\_scaffold\_84\_t35983
- Italltaiw\_v1\_scaffold\_88\_t36409
- SmolXP\_002975820.1
- SmolXP\_002973771.1
- SlelSle\_016358
- SlelSle\_011471
- SlelSle\_005903
- CpilGWHPAMMO006191
- Psclaugustus\_masked-scaffold\_665-processed-gene-0.46-mRNA-1
- FanlFoant\_17504-RA
- PpalXP\_001778749.1
- PpalXP\_001774136.1
- PpalXP\_001763746.1
- CpulCepurR40.9G008000.1.p
- Psclmaker-scaffold\_264-snap-gene-1.81-mRNA-1
- CpilCPLI\_GWHPAMMO016622
- CpulCepurR40.11G122300.1.p
- PpalXP\_001769152.1
- CpulCepurR40.6G071400.1.p
- FanlFoant\_07952-RA
- CpilGWHPAMMO014470
- Psclmaker-scaffold\_192-snap-gene-1.51-mRNA-1
- PsclIDmodified-mrna-1990
- PsclIDmodified-mrna-1991
- Psclmaker-scaffold\_192-snap-gene-1.51-mRNA-2
- CpulCepurR40.6G031400.1.p
- PpalXP\_001764398.1
- PpalXP\_001761366.1
- CpulCepurR40.2G155000.3.p
- CpulCepurR40.2G155000.2.p
- CpulCepurR40.2G155000.1.p
- CpilGWHPAMMO000572
- FanlFoant\_09756-RA
- Psclmaker-scaffold\_1953-snap-gene-0.14-mRNA-1
- Psclmaker-scaffold\_1953-snap-gene-0.14-mRNA-3
- Psclmaker-scaffold\_1953-snap-gene-0.14-mRNA-2
- MpolPTQ46564.1
- PtalPITA\_000010173-RA
- PabIMA\_37224g0010
- PabIMA\_177039g0010
- Gbilcds.evm.model.ctg1459.4-1
- AtriXP\_006840888.1
- VviiXP\_019075299.1
- ZmalXP\_023155950.1
- OsaINP\_001045202.1
- ZmalXP\_020398413.1
- ZmalXP\_008674666.1
- SculSacu\_v1.1\_s0080.g017973

● Seed plants ● Ferns ● Lycophytes ● Bryophytes

The domains of *BRII-BRL* (TM, LRR, ID, and KD) and its closest gene family *EMSI* (TM, LRR, and KD) were identified from all main land plant groups (in different colours). Maximum-likelihood tree was constructed with parameters: WAG + F + R6 model and 1,000 bootstrap replicates. Whole genome assemblies from 24 species were used for identification of *BRII-BRL* and *EMSI* homologs, including 9 bryophytes (Mpo, *Marchantia polymorpha*; Cpl, *Calohypnum plumiforme*; Fan, *Fontinalis antipyretica*; Cpu, *Ceratodon purpureus*; Ppa, *Physcomitrella patens*; Psc, *Pleurozium schreberi*; Aan, *Anthoceros angustus*; Aag, *Anthoceros agrestis*; Apu, *Anthoceros punctatus*), 3 lycophytes (Ita, *Isoetes taiwanensis*; Smo, *Selaginella moellendorffii*; Sle, *Selaginella lepidophylla*), 3 ferns (Adc, *Adiantum capillus-veneris*; Afi, *Azolla filiculoides*; Scu, *Salvinia cucullata*), and 9 seed plants (Pab, *Picea abies*; Pta, *Pinus taeda*; Gbi, *Ginkgo biloba*; Ath, *Arabidopsis thaliana*; Atr, *Amborella trichopoda*; Csa, *Cucumis sativus*; Osa, *Oryza sativa*; Vvi, *Vitis vinifera*; Zma, *Zea mays*). The detailed information is provided in Supplementary Data 19.