

FIGURE S2. Phylogenetic analysis of plant multifunctional (MFP) proteins. Almost without exception, land plants (including “mosses”) encoded two MFP isoforms, that grouped into clades corresponding to AIM1 and MFP2. In contrast, Chlorophytes (green algae) had only one MFP protein per genome, indicated below as ancestral “aMFP”. These observations suggest that the duplication occurred early in land plant evolution and has been selected ever since. Poales (grasses) have maintained an additional MFP duplication in the MFP2 grouping. As noted by Arent et al. (2010, cited in the main text), AIM1-like sequences appear to be primarily distinguished by conservation of residues in the binding pocket of the enoyl-CoA hydratase domain. However, such conservation is not seen in the AIM1 representatives from the “mosses”.

The *Arabidopsis thaliana* MFP2 protein sequence was used as a BLAST query to retrieve MFP protein sequences from the Phytozome database (v9.1) of sequenced plant genomes (<http://www.phytozome.org/>). Genious v6.1.6 (<http://www.geneious.com/>) was used to perform multiple sequence alignment (with the MAFFT plugin) and a maximum likelihood phylogenetic tree was calculated using the PHYML plugin with the WAG substitution model and 1000 bootstrap replicates. Numbers at nodes are percent bootstrap agreement. Major clades are named after similarity to *Arabidopsis thaliana* AIM1 (At4g29010) and MFP2 (At3g06860), highlighted with red boxes. The taxonomic order of the selected groups of species is annotated to the right (“mosses” is shorthand for Bryophyta/ Lycopodiophyta). The scale bar indicates substitutions per site.

