## Supporting Information

Developmental control and plasticity of fruit and seed dimorphism in the annual Brassicaceae *Aethionema arabicum*

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The following Supporting Information is available for this article:

**Fig. S1** MrBayes tree of the Aethionemeae.

**Fig. S2** RaxML tree of the Aethionemeae.

**Fig. S3** Fruits of *Aethionema arabicum* fall into two discrete clusters.

**Fig. S4** Phylogenies of *Ae. arabicum* orthologs of *A. thaliana* fruit developmental genes

**Fig. S5** The temperature-induced shift in fruit morph ratio is brought about by changes throughout the whole plant.

**Table S1** Geographic origin of Aethionemeae species used for the phylogeny.

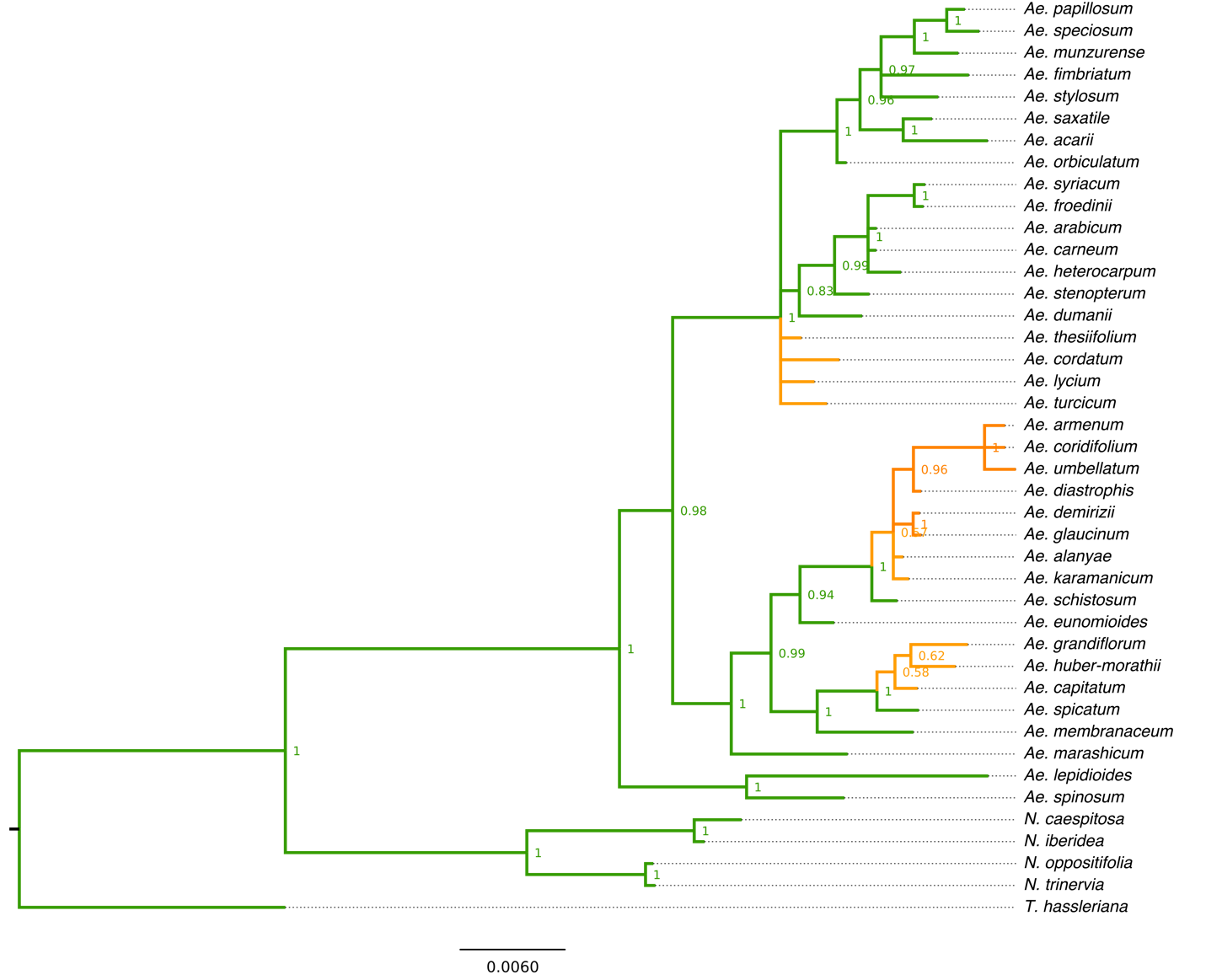
**Table S2** List of species and respective sequences used for gene phylogeny reconstruction.

**Table S3** List of primers used for quantitative RT-PCR analysis.

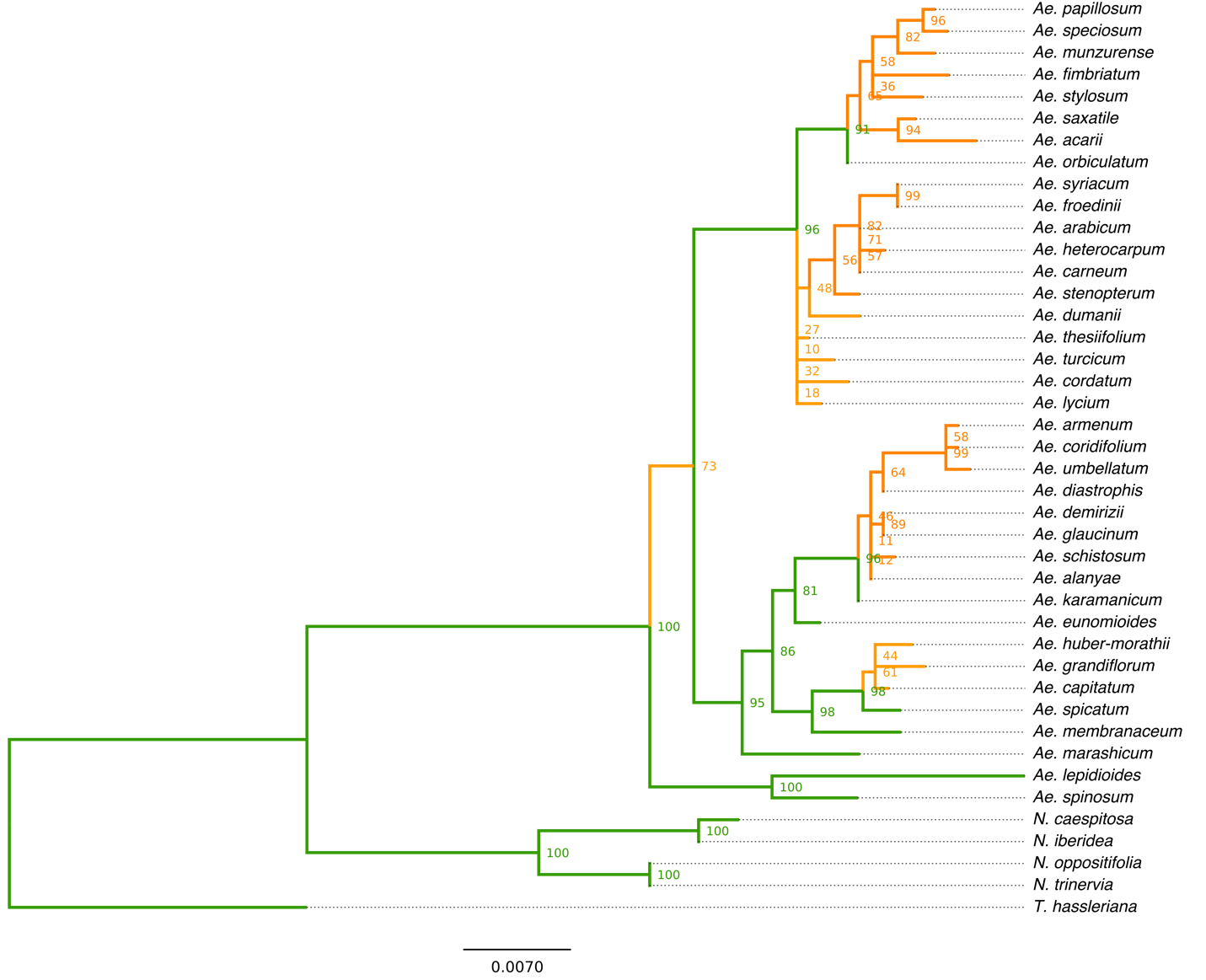
**Data S1** Sequence alignment underlying species phylogeny.

**Video/Movie S1** Moisture induced pedicel movement of an *Aethionema arabicum* infructescence.

**Fig. S1** MrBayes tree of the Aethionemeae. Green edges: posterior probability > 0.8. Orange edges: posterior probability < 0.5.

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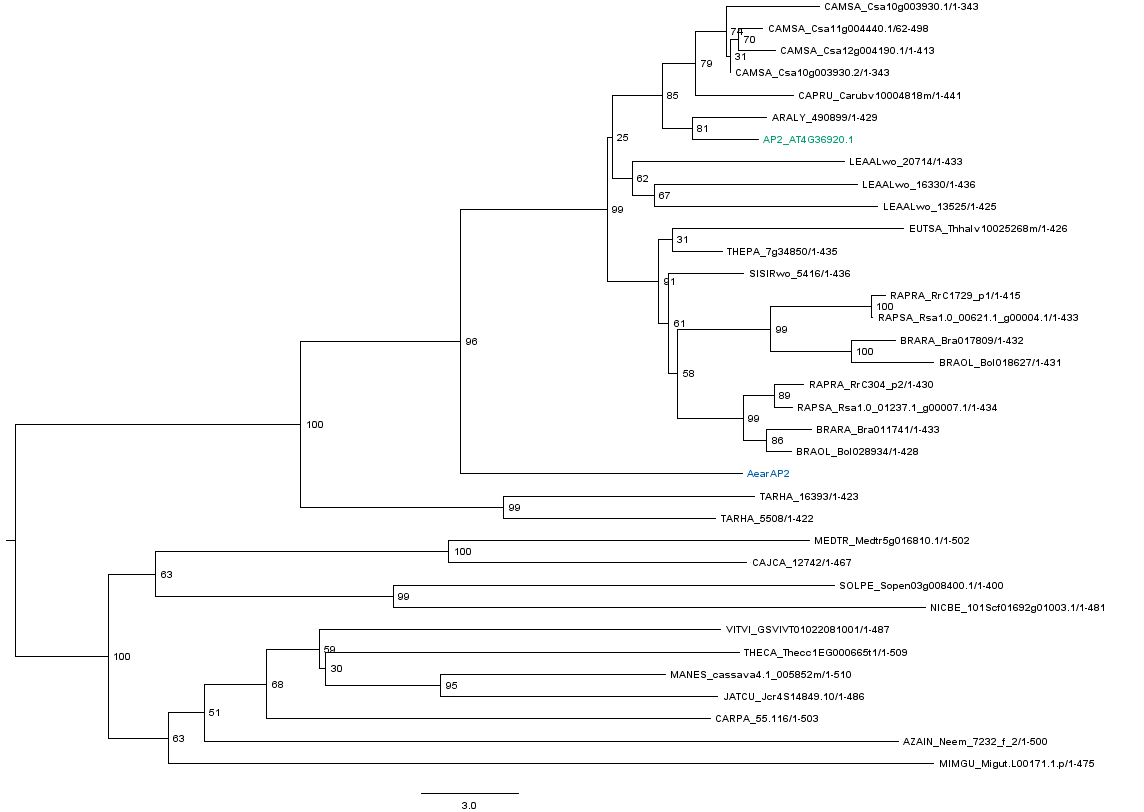
**Fig. S2** RaxML tree of the Aethionemeae. Green edges: bootstrap > 80%. Orange edges: bootstrap <80%.

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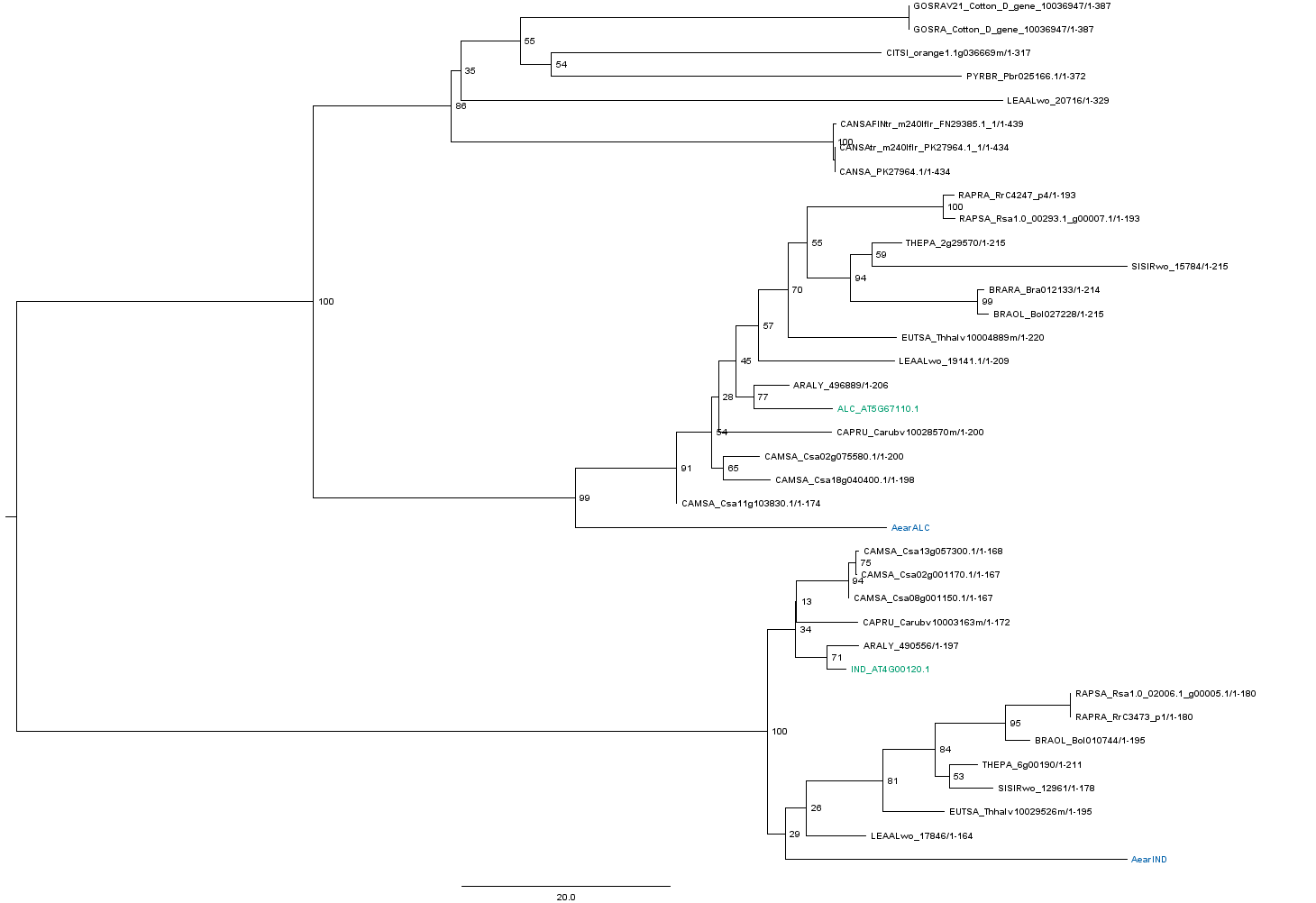
**Fig. S3** Fruits of *Aethionema arabicum* fall into two discrete clusters. Dendrogram of the hierarchical cluster analysis based on length, width and seed number of 140 *Ae. arabicum* fruits. The cluster analysis was performed with SPSS 20 applying average between-group linkage method using squared Euclidean distance measurement. All fruits clustering in group 1 (light brown) developed no septum and produced non-mucilaginous seeds (indehiscent fruits), whereas all fruits clustering in group 2 (dark brown) developed a septum and produced mucilaginous seeds (dehiscent fruits).

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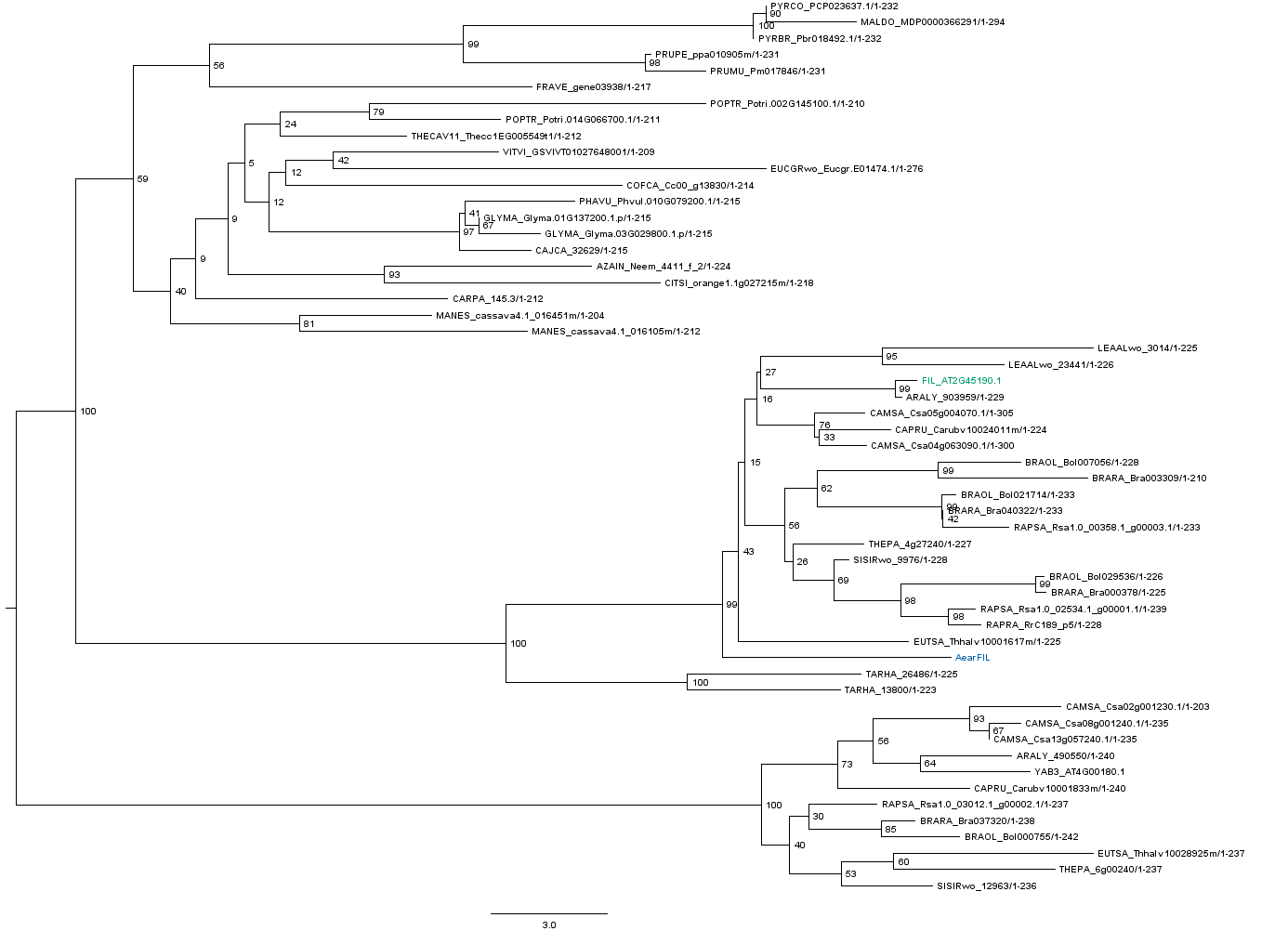
**Fig. S4** Phylogenies of *Ae. arabicum* orthologs of *A. thaliana* fruit developmental genes. *A. thaliana* query sequences are labeled in green. Identified *Ae. arabicum*orthologs are labeled in blue. Each tree was constructed using Quicktree-SD (neighbor joining) with 1,000 bootstrap replicates. A. AP2-like proteins including AP2. B. bHLH transcription factors (TFs) including ALC and IND. C. YABBY TFs including FIL. D. MADS-domain TFs including SHP1, SHP2, and FUL. E. Homeo-domain TFs including RPL. A list of all species and sequences used for gene phylogeny reconstruction is provided in Table S2.

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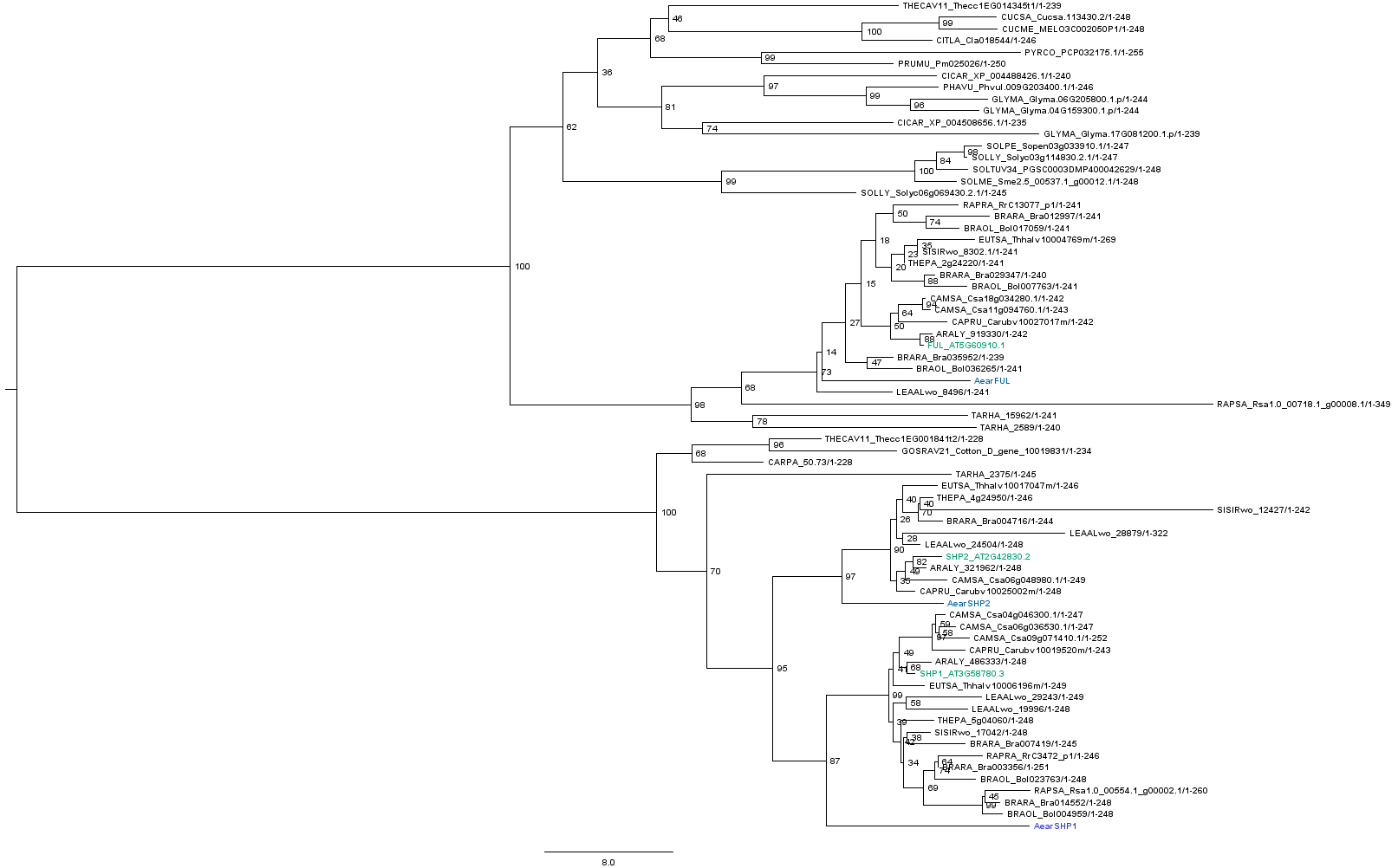
**A**



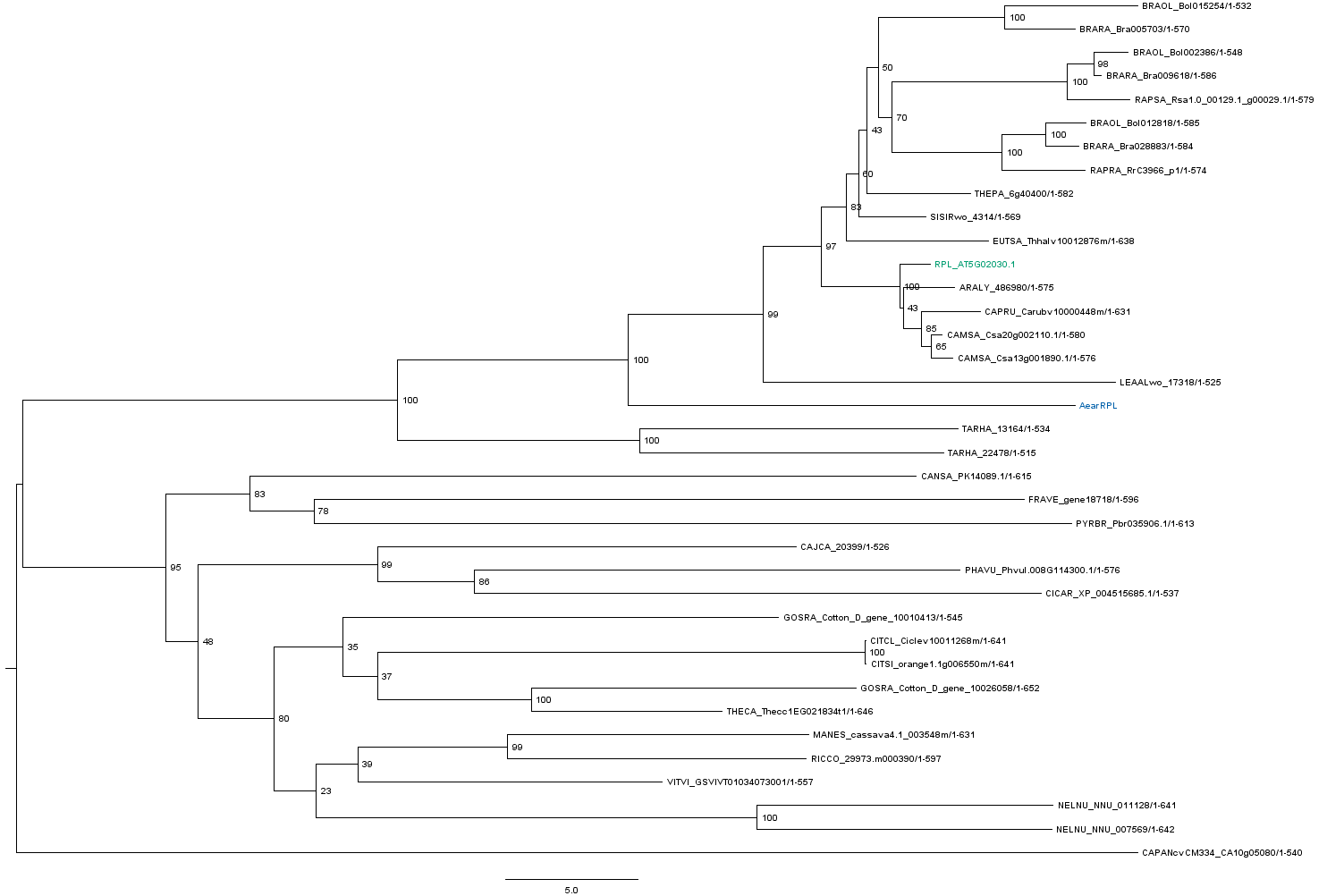
**B**



**C**

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**D**



**E**

**Fig. S5** The temperature-induced shift in fruit morph ratio is brought about by changes throughout the whole plant. The ratio (upper row) and total number (lower row) of fruits belonging to the dehiscent (grey bars) or indehiscent (black bars) fruit morph is reported for plants grown at a constant temperature of (a) 20°C or (b) 25°C. Fruits grown on the main stem, 1st, 2nd, or 3rd-order branches were scored individually. Bars represent means with standard deviation.

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**Table S1** Geographic origin of Aethionemeae species used for the phylogeny.

|  |  |  |
| --- | --- | --- |
| Species | Collector and number | Location |
| *Ae. acarii* | Y. Gemici 7694 | Kütahya, Turkey |
| *Ae. arabicum* | - | Ankara, Turkey |
| *N. caespitosa* | B. Özüdoğru 1138 | Sivas, Turkey |
| *Ae. capitatum* | A.A. Dönmez 4494 | Mersin, Turkey |
| *Ae. carneum* | TNRC 2636 | - |
| *Ae. cordatum* | M.E. Schranz 20.1 | Ankara, Turkey |
| *Ae. coridifolium* | A.A. Dönmez 5371 | Erzincan |
| *Ae. demirizii* | N. Adıgüzel 3010 | İçel, Turkey |
| *Ae. diastrophis* | Ö. İnceoğlu | Ankara, Turkey |
| *Ae. dumanii* | M. Vural 4162 | Ankara, Turkey |
| *Ae. eunomioides* | H.D & Z.A 4300 | Kayseri, Turkey |
| *Ae. fimbriatum* | A.A. Dönmez 9707 | Hakkari, Turkey |
| *Ae. froedinii* | A.A. Dönmez14361 | Diyarbakır, Turkey |
| *Ae. glaucinum* | N. Adıgüzel 3131 | Niğde, Turkey |
| *Ae. grandiflorum* | E. Schranz 2.2 N. | Chalus, Iran |
| *Ae. heterocarpum* | A.A. Dönmez 5094 | Şanlıurfa, Turkey |
| *Ae. huber-morathii* | N. Adıgüzel 3007 | Seyhan, Turkey |
| *N. iberidea* | A.A. Dönmez 11989 | Bitlis, Turkey |
| *Ae. karaminicum* | K. Ertuğrul 1215 | Karaman, Turkey |
| *Ae. lepidioides* | N. Adıgüzel 4992 | Sivas, Turkey |
| *Ae. lycium* | N. Adıgüzel 3254 | Antalya, Turkey |
| *Ae. marashicum* | B. Yıldız 1037 | Kahramanmaraş, Turkey |
| *Ae. membranaceum* | N. Adıgüzel 3938 | Van, Turkey |
| *Ae. munzurense* | P.H. Davis 31296 | Tunceli, Turkey |
| *N. oppositifolia* | A.A. Dönmez 6119 | Erzincan, Turkey |
| *Ae. orbiculatum* | D. Phitos 1963 | Greece |
| *Ae. papillosum* | Balls 1096 A.A. | - |
| *Ae. saxatile* | AY122451 | NCBI Genbank |
| *Ae. speciosum* | B. Yıldız 1354 | KahramanMaraş, Turkey |
| *Ae. spicatum* | N. Adıgüzel 3135 | Niğde, Turkey |
| *Ae. schistosum* | A.A. Dönmez 13862 | Antalya, Turkey |
| *Ae. stenopterum* | E. Schranz 2.10 | Chalus, Iran |
| *Ae. stylosum* | N. Adıgüzel 3121 | Niğde, Turkey |
| *Ae. syriacum* | A.A. Dönmez 10742 | Siirt, Turkey |
| *N. trinervia* | A.A. Dönmez 11001 | Bitlis, Turkey |
| *Ae. thesiifolium* | N. Adıgüzel 5233 | Burdur, Turkey |
| *Ae. turcicum* | N. Adıgüzel 2789 | Ankara, Turkey |
| *Ae. umbellatum* | E. Schranz 20.5 | Chalus, Iran |
| *Ae. spinosum* | E. Schranz | - |
| *Tarenaya hassleriana* | DQ649093.1 | NCBI GenBank |

**Table S2** List of species and respective sequences used for gene phylogeny reconstruction. (Provided as an additional Excel file)

**Table S3** List of primers used for quantitative RT-PCR analysis.

|  |  |
| --- | --- |
| **Primer name** | **Primer sequence from 5’ to 3’** |
| AearACT2 for | AATTGAGCATGGTGTGGTCA |
| AearACT2 rev | GCTCTTCAGGAGCAATACGG |
| AearAPC2 for | TCTCCTGCAATCGAGGACTT |
| AearAPC2 rev | GCAGTGAGCAACCGGTATTT |
| AearUBQ10 for | GAGGATGGCCGAACATTG |
| AearUBQ10 rev | TGCCCGTTAGGGTTTTGA |
| AearIND for | TGAATTGGAGCAAAGGAGCTA |
| AearIND rev | AAAGGGGAAGTGTGGAGTGAT |
| AearSHP1 for | GAAAGGCATAAGTCGCGTTC |
| AearSHP1 rev | TGTTGCAACTCCATTTCTCG |
| AearSHP2 for | ACAAATCGGCAAGTTACGTTCT |
| AearSHP2 rev | GAGCAACTTCAGCATCACACA |
| AearALC for | CGGTTATGCAACCAACACAG |
| AearALC rev | TCATACTGATTGAGCTGCGAGT |
| AearFUL for | AGAACAAGATCAATCGGCAAG |
| AearFUL rev | GAGCAACTTCAGCATCACAAAG |
| AearRPL for | CTGAGCCGTTTCAGAGATTTG |
| AearRPL rev | CCCTTCATAACCTCCACCACT |
| AearAP2 for | ACAAAGGAGGAATTTGTTCACG |
| AearAP2 rev | CGGCCACATTTATGCAAAGTA |
| AearFIL for | TCCTGCTTCTAACCAGCTTCA |
| AearFIL rev | TTGTTGGTGCATCTCTCAGC |

**Data S1** Sequence alignment underlying species phylogeny. (Provided as an additional Nexus file)

**Video/Movie S1** Moisture induced pedicel movement of an *Aethionema arabicum* infructescence. For better overview, indehiscent fruits and fruit valves of dehiscent fruits have been removed. Maximal outward bending of pedicels occurs 20-30 minutes subsequent to water spraying. Pictures were taken every 30 sec.