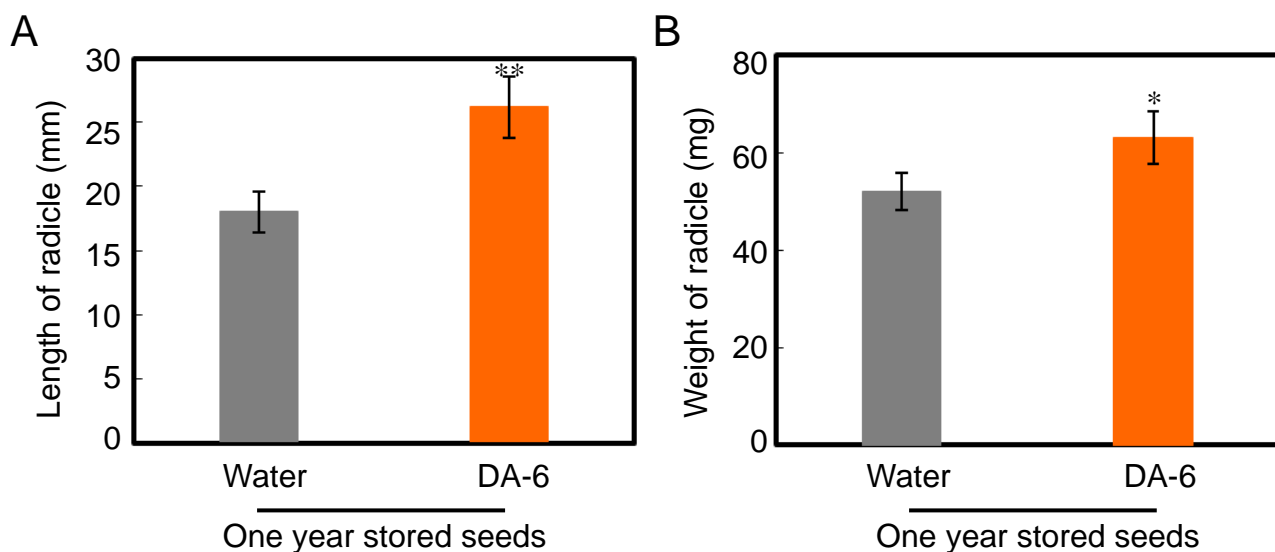


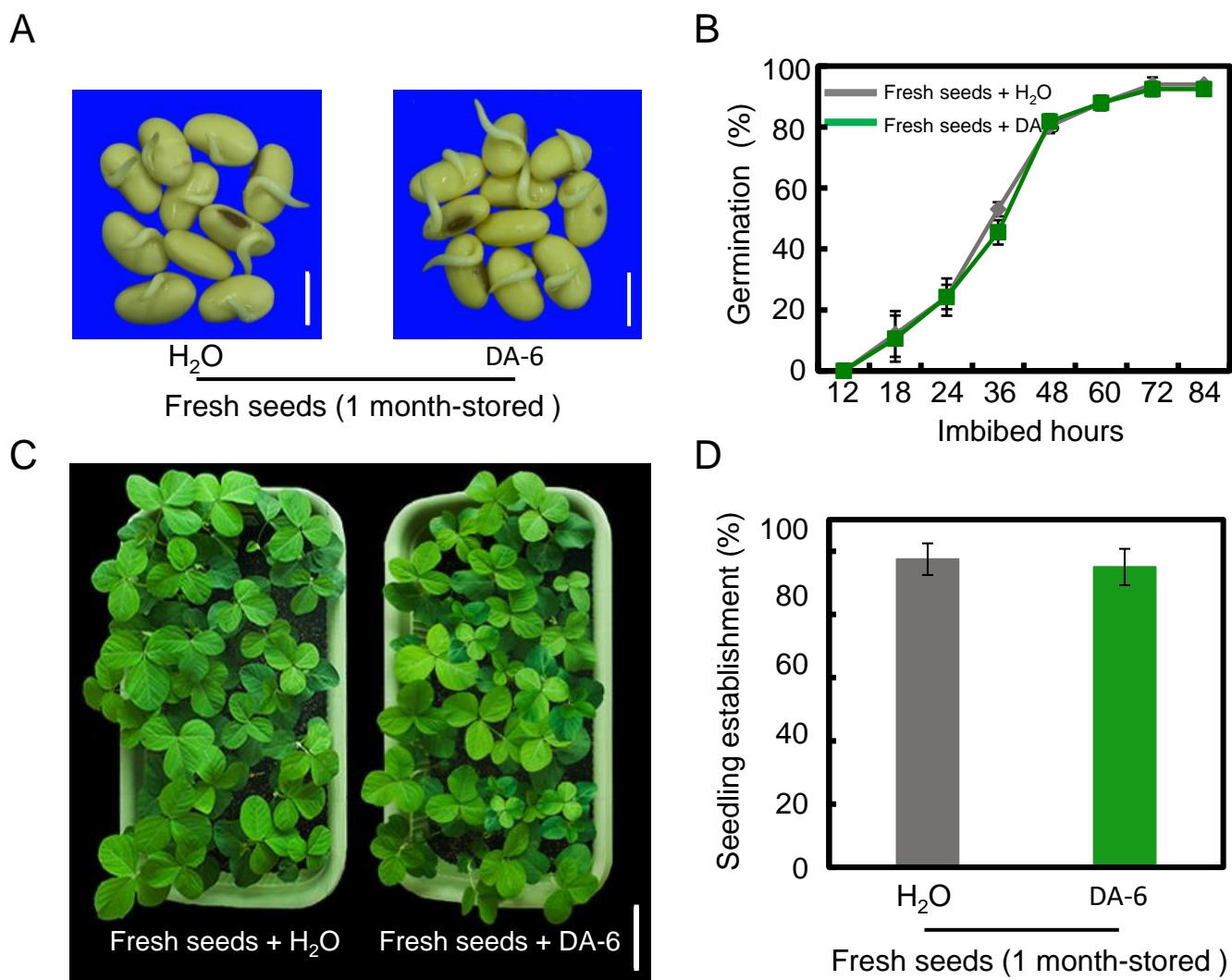
**Supplemental Figure S1. Natural aging significantly decreases soybean seed germination ability.**

(A) The radical length of germinated soybean seeds were measured (48 hours after sowing). (B) The fresh weight of germinated soybean seeds were quantified (48 hours after sowing). The soybean seeds were stored for 5, 10, 22 or 34 months after harvest and subjected to analysis. The average percentages of three repeats  $\pm$  standard error are shown. The germination experiment were performed under 25 ° C and 60% relative humidity conditions. The asterisk (\*) indicates a significant difference at the  $P < 0.05$  level by Student's *t*-test analysis.



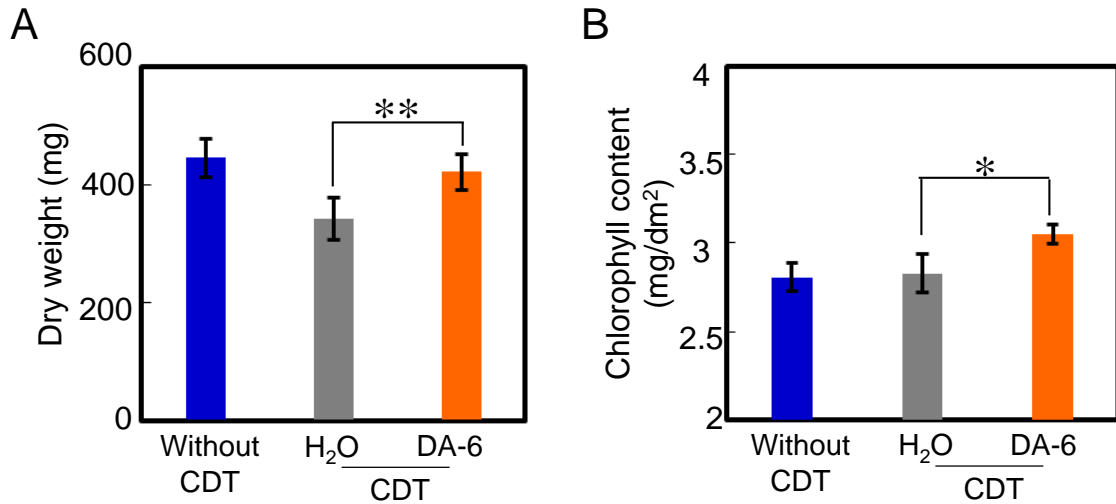
**Supplemental Figure S2. DA-6 promotes germination ability of natural aged soybean seeds.**

(A) The radical length of germinated soybean aged seeds were measured (48 hours after sowing), in the absence or presence of DA-6 treatment. (B) The fresh weight of germinated soybean aged seeds were quantified (48 hours after sowing), with or without DA-6 application. The soybean seeds were stored for 12 months after harvest and then subjected to analysis. The average percentages of three repeats  $\pm$  standard error are shown. The germination experiment were performed under 25 ° C and 60% relative humidity conditions. The asterisk (\*) indicates a significant difference at the  $P < 0.05$  level by Student's *t*-test analysis. 200  $\mu$ M exogenous DA-6 was employed.



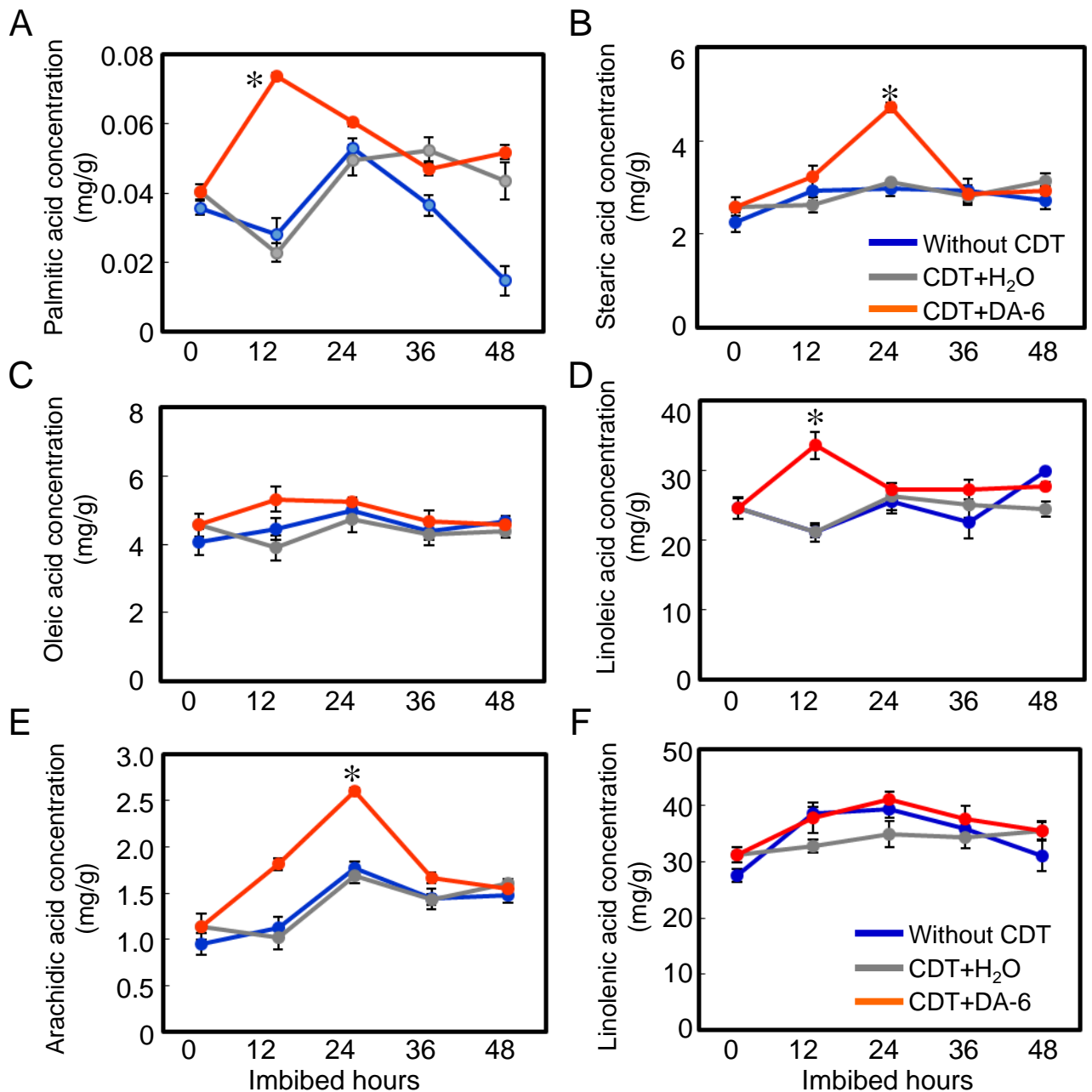
**Supplemental Figure S3. DA-6 have no effect on germination and seedling establishment of the fresh soybean seeds.**

(A) Representative photographs of fresh soybean seeds (stored for 1 month) during imbibition process (60 hours after sowing), with or without DA-6 treatment. Bar=10 mm. (B) The quantitative analysis of final germination rates of 1 month storage seeds in the absence or presence of DA-6 treatment are shown. (C) The early seedling establishment phenotype of 1 month storage seeds with or without DA-6 application. Bar =100 mm.



**Supplemental Figure S4. DA-6 treatment increases the total chlorophyll content and dry weight in seedlings which germinated from CDT-aged soybean seeds.**

(A) The dry weight of seedlings were measured with different types of soybean seeds (including the health seeds without CDT, CDT seeds with H<sub>2</sub>O, and CDT seeds with DA-6 treatment). (B) The total chlorophyll content of seedlings were quantified with different types of soybean seeds. Percentages are the average of three repeats  $\pm$  standard error. The seedling grown under 25 ° C and 16h light with 8h dark conditions. The asterisk (\*) indicates a significant difference at the  $P < 0.05$  level by Student's *t*-test analysis. 200  $\mu$ M exogenous DA-6 was used.



**Supplemental Figure S5. DA-6 treatment increase several types of fatty acids concentration in aged soybean seeds during imbibition.**

Different types of soybean seeds (including the health seeds without CDT, CDT seeds with H<sub>2</sub>O, and CDT seeds with DA-6 treatment) were employed, during seed imbibition process. (A) Palmitic acid concentration. (B) Stearic acid level. (C) Oleic acid concentration. (D) Linoleic acid level. (E) Arachidic acid concentration. (F) Linolenic acid level. The average percentages of three repeats  $\pm$  standard error are shown. The asterisks (\*) and (\*\*) indicate the significant difference at the  $P < 0.05$  and  $P < 0.01$  level, respectively, by student's *t*-test analysis. 200  $\mu$ M exogenous DA-6 was employed.

**Supplemental Table 1.** Primers for the qPCR in this study.

<b>Gene</b>	<b>Forward primer</b>	<b>Reverse primer</b>
<i>GmTubulin</i>	AACCTCCTCCTCATCGTACT	GACAGCATCAGCCATGTTCA
<i>GmSDP1</i>	TTCAAGGCACACAACACCTG	CATCCACCTCCTTCCCTTCAG
<i>GmSDP6</i>	CCAAGAAGGGAGTGACCTTCC	ACTGACCGTAGCAGCAATCC
<i>GmPCK1</i>	ACCTAAGTTACATGGTGCAGTG	CGTGCTCTGTTCCGTTTCCTT
<i>GmACX2</i>	TGCTCTGAAGCTCGTCTGTG	CGAGCTTGTGGATTGCCTTG
<i>GmMFP2</i>	GCTGCTGAGGTGAGTGAGTAG	GTATCACGGCCCCGTTGGAA
<i>GmCOMATOSE</i>	CACCTTTCAATAGGTTGATGTTCCA	GCAGTTCCACCAGCGATTAAG
<i>GmMDAR4</i>	TAGCCAGAAACCGGTGGTG	GCAATAATAACCCCGGCTGTG