

New Phytologist Supporting Information

Article title: Desert plant Phoenix dactylifera close stomata via nitrate-regulated SLAC1 anion channel

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The following Supporting Information is available for this article:

Fig. S1 Subsidiary cells are the sites of epicular wax production to form chimneys around stomatal complexes.

Fig. S2 Diffusion of solutes in excised date palm leaves is faster than in *Arabidopsis*.

Fig. S3 Phylogenetic analysis of PdSLAC1 and PdOST1 using the online tool “One Click” at <http://www.phylogeny.fr/> with default settings.

Fig. S4 PdSLAC1 is 20 times more permeable for nitrate than for chloride

Fig. S5 KCl does not influence stomatal performance of date palms.

Table S1 RNAseq data: ABA treatment affects 153 date palm genes (see separate file).

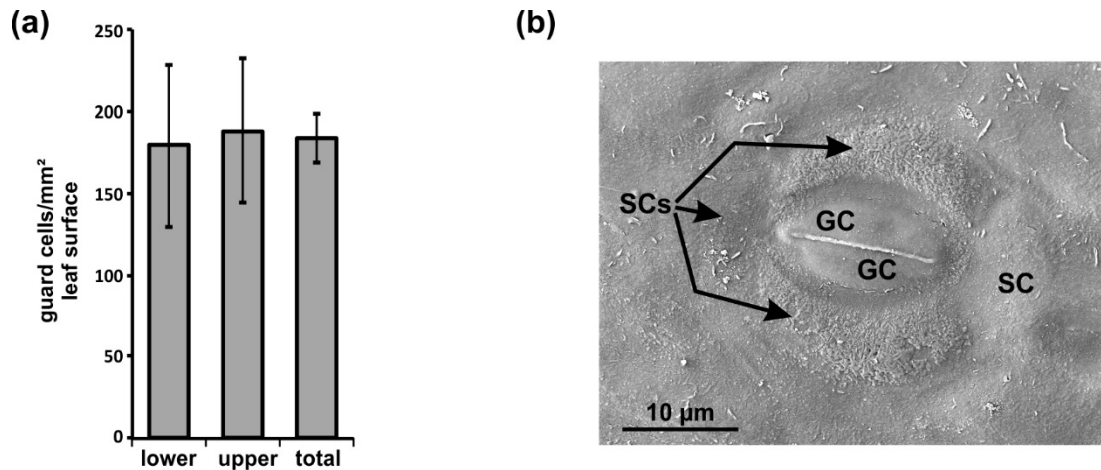


Fig. S1 Subsidiary cells are the sites of epicular wax production to form chimneys around stomatal complexes. (a) Stomata are equally distributed on the upper and lower leaf surface. From each leaf ($n = 10$), the third pinna from the bottom up and the third from the top of the plant were used. Stomata were counted on the upper and lower leaf surface at three different areas ($n > 5500 \pm SD$ for each surface). (b) Following partial removal of epicular waxes by acetone treatments of young date palm pinnae, electron scanning microscopy revealed that epicular waxes remained only on subsidiary cells (SCs) but not on guard cells (GCs).

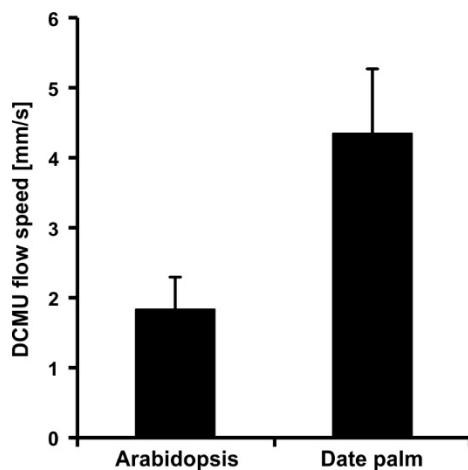


Fig. S2 Diffusion of solutes in excised date palm leaves is faster than in *Arabidopsis*. To calculate the diffusion velocity, we measured the inhibition of photosystemII by DCMU. An Imaging-PAM Chlorophyll Fluorometer (Walz, Effeltrich, Germany) was used to monitor the current fluorescence yield F in the presence of actinic illumination as described (Berger *et al.*, 2004). The

diffusion velocity was calculated from the change in fluorescence over time between two points of the individual leaf ($n = 9$, mean \pm SE for Arabidopsis; $n = 10$, mean \pm SE for date palm).

Reference: Berger S, Papadopoulos M, Schreiber U, Kaiser W, Roitsch T. 2004. Complex regulation of gene expression, photosynthesis and sugar levels by pathogen infection in tomato. *Physiologia plantarum* 122(4): 419-428.

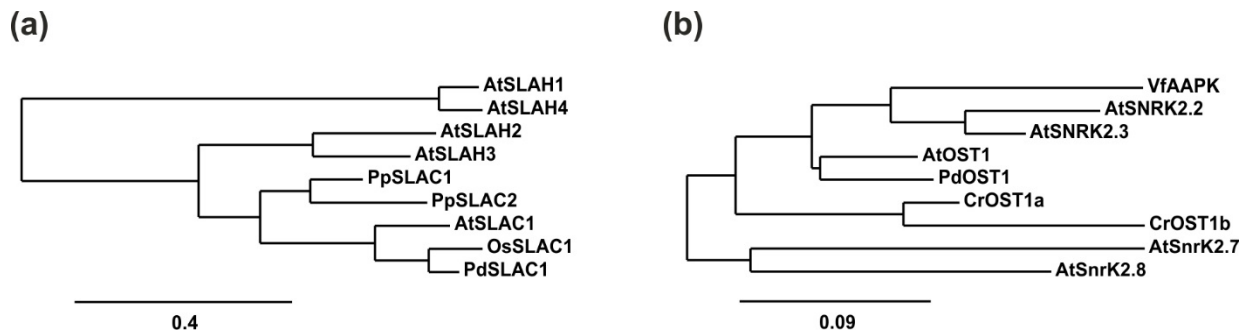


Fig. S3 Phylogenetic analysis of PdSLAC1 and PdOST1 using the online tool “One Click” at <http://www.phylogeny.fr/> with default settings. (a) PdSLAC1, just like AtSLAC1 and OsSLAC1, groups into the SLAC1 subgroup of the SLAC/SLAH anion channel family. (b) PdOST1 represents a member of the ABA-dependent SnRK2 protein kinase family. In *Arabidopsis*, OST1, SnRK2.2 and 2.3 represent the major ABA-dependent protein kinases involved in ABA-signalling. Phylogenetic analyses revealed that PdOST1 is closely related with AtOST1.

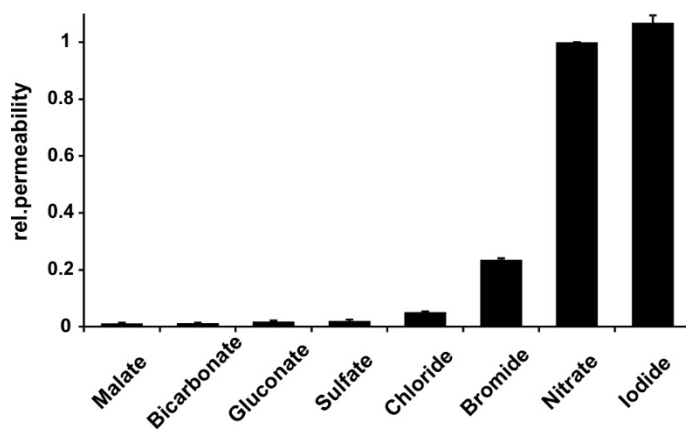


Fig. S4 PdSLAC1 is 20 times more permeable for nitrate than for chloride. Relative permeability (rel. permeability) of PdSLAC1 co-expressed with PdOST1 in *Xenopus* oocytes (permeability for

NO_3^- was set to 1). Standard bath solution contained 50 mM of the indicated anion (pH 5.6). The reversal potentials used for the calculation of the relative permeability were recorded in the current-clamp modus ($n \geq 6$ experiments, mean \pm SE).

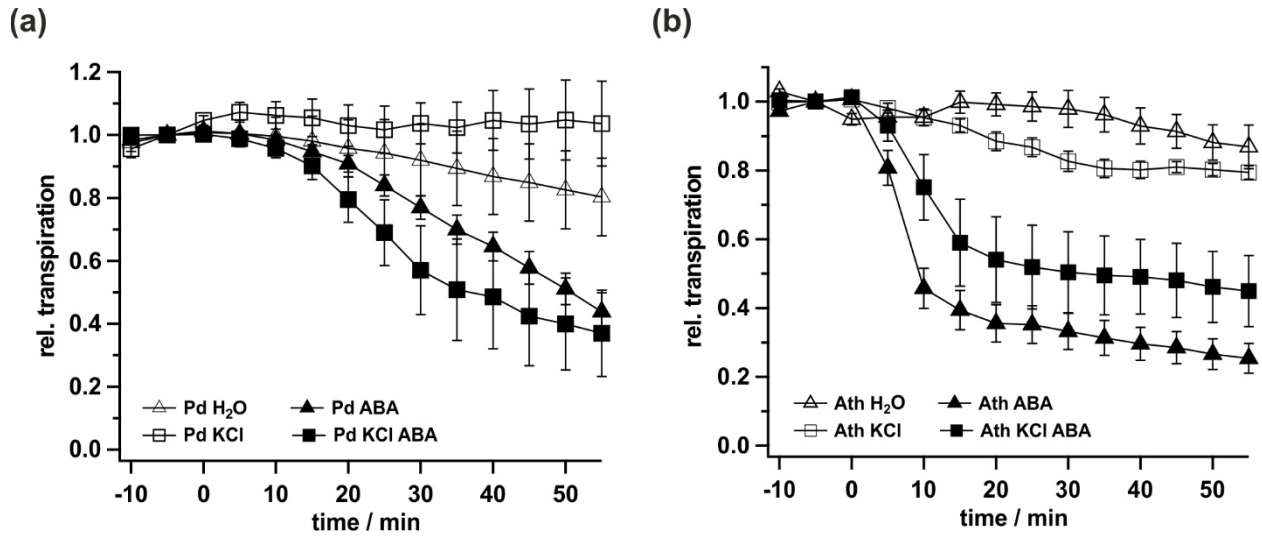


Fig. S5 KCl does not influence stomatal performance of date palms. (a, b) Infrared gas exchange experiments revealed that neither date palm nor *Arabidopsis* ABA-dependent stomatal closure is influenced by feeding chloride (5 mM) together with ABA via the petiole (relative transpiration is shown, $n \geq 5$ experiments for Arabidopsis and $n = 8$ for date palm, mean \pm SE).