Supplemental Figures

Figure S1

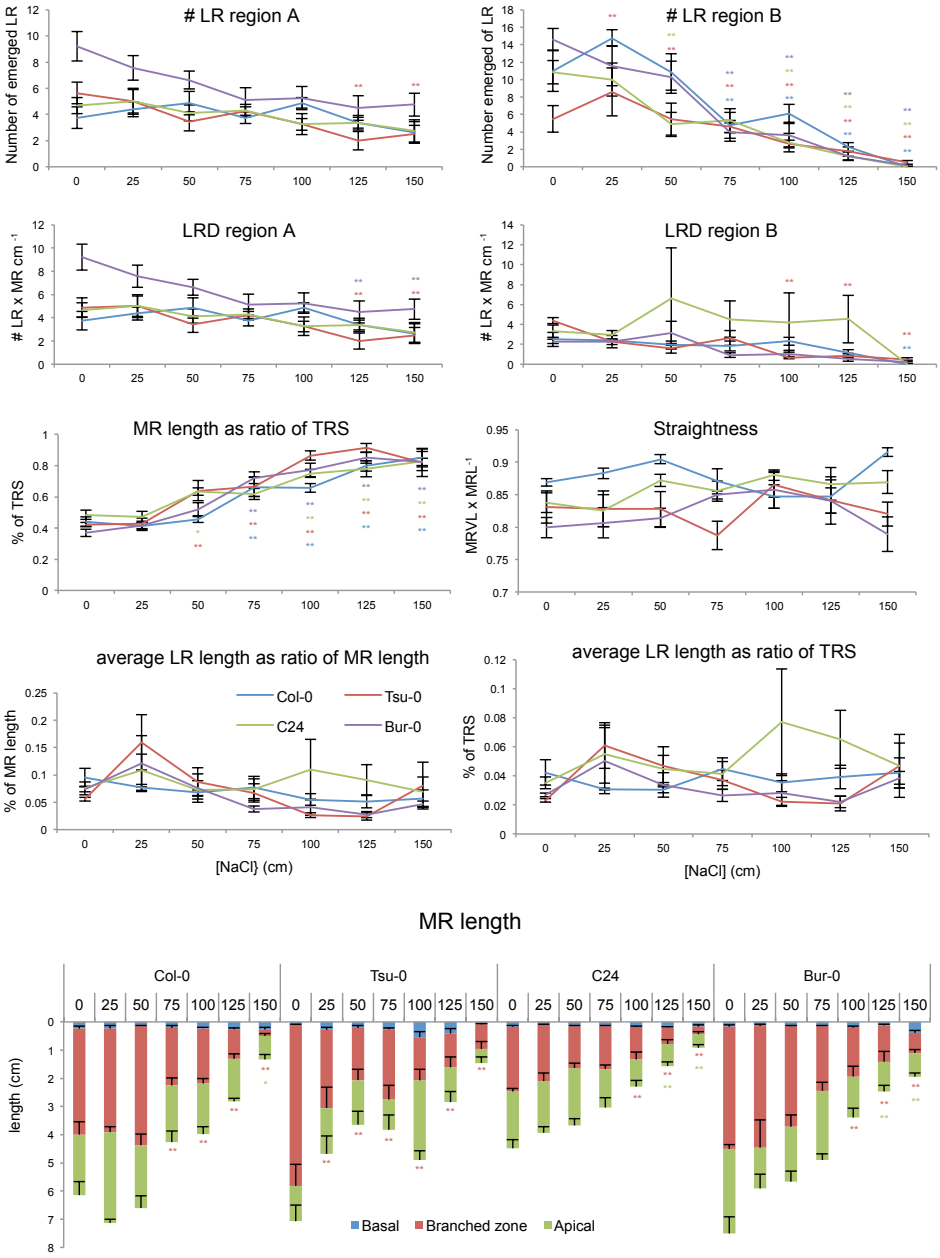

Figure S 1. Salt treatment has a different effect on emerged LR number above and below the transfer point but does not affect LR density, straightness or MR zonation of 11 days old seedlings of Col-0, Tsu-0, C24 and Bur-0 Arabidopsis accessions. Four days old seedlings of four Arabidopsis accessions (Col-0, Tsu-0, C24 and Bur-0) were transferred to media supplemented with different NaCl concentrations ranging from 0 to 150mM. 11 days after germination the RSA of the seedlings grown at different conditions was phenotypes and quantified using EZ-Rhizo software. The individual points represent the average trait value of 8 replicates. The error bars represent standard errors. The effect of salt stress was defined as significant when the RSA trait value in salt stress conditions was tested significantly different from control conditions with Tuckey's post-hoc test with significance of 0.05 (*) or 0.01 (**). The significant differences are indicated with asterisks in colours corresponding to those of the individual accessions.

Figure S2

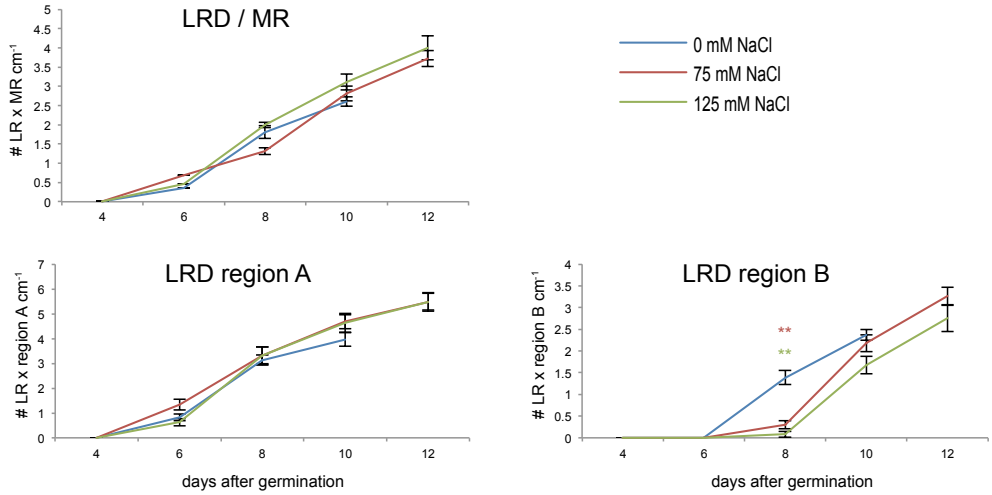

Figure S 2. Dynamics of emerged Lateral Root Density development calculated per entire MR as well as for the region above and below the transfer point. Dynamics in Lateral Root Density was calculated for the entire MR region as well as region above (region A) and below (region B) transfer point. The individual data points for observed growth are representing the average value of 24 replicates. Error bars represent the standard error. The effect of salt stress was defined as significant when the RSA trait value in salt stress conditions was tested significantly different from control conditions with Tuckey's post-hoc test with significance of 0.05 (*) or 0.01 (**). The significant differences are indicated with asterisks in colours corresponding to those of the salt stress treatments.

Figure S3

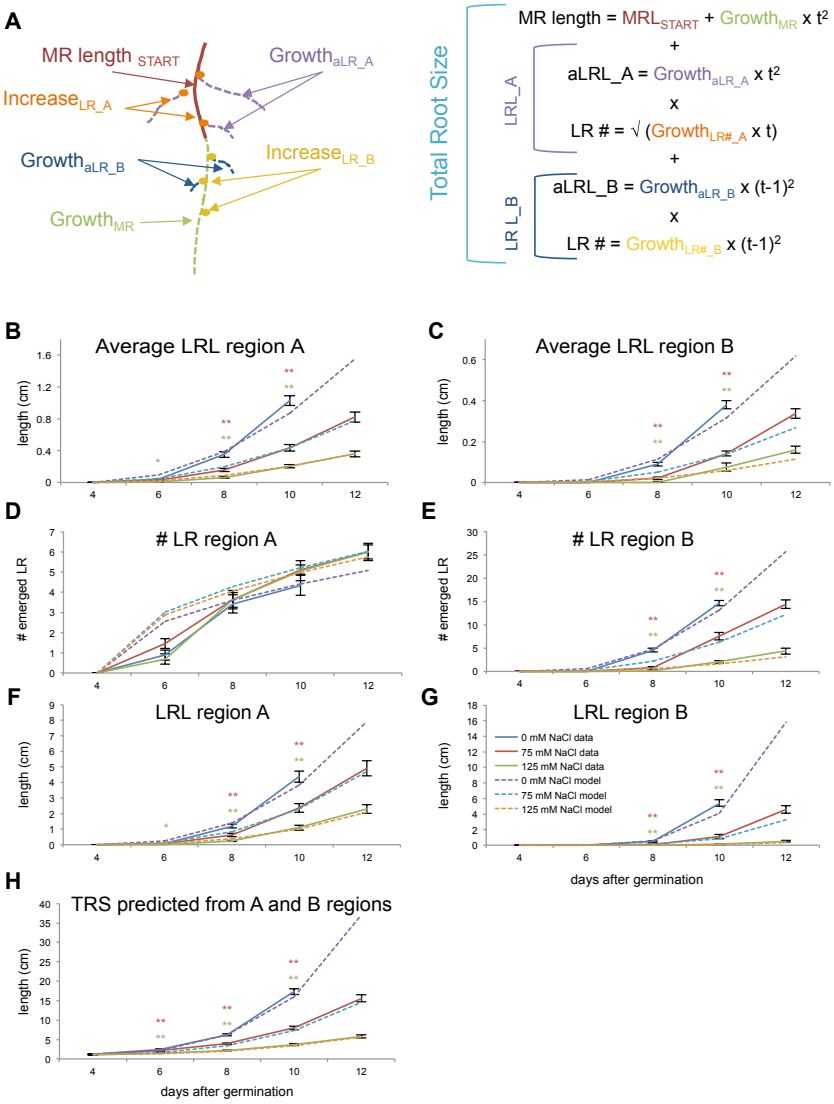

Figure S 3. Describing RSA dynamics of Lateral Root development above and below the transfer point yield similar predictions of Total Root Size as the simplified (ROOT-FIT) model. (A) TRS is defined by the combination of MR length and emerged LR length in the root segment above the transfer point (region A) and below the transfer point (region B). The LR length above the transfer point is determined by average LR length (aLRL_A) and number of LR (LR#_A). The $INCREASE_{LR\#\_A}$ is best described with a square root function as the length of the root is not increasing and the #LR is saturated at some point. The LR length below the transfer point is determined like described above but with one day of delay and using a quadratic function for $INCREASE_{\#LR\_B}$. The descriptive quadratic growth models for individual parameters (dashed lines) were compared with the observed growth rates (solid lines) at growth conditions. The models describing individual RSA parameters were tested for fitting the data of average LR length in region above **(B)** and below **(C)** the transfer point as well as #LR in region above **(D)** and below **(E)** the transfer point. The individual models of $INCREASE_{\#LR\_A}$ and $GROWTH_{aLR\_A}$ as well as $INCREASE_{\#LR\_B}$ and $GROWTH_{aLR\_B}$ were combined for describing the increase of cumulative LR length increase in MR region **(F)** above (LRL region A) and **(G)** below (LRL region B) the transfer point. The models were further combined for describing **(H)** Total Root Size. The individual data points for observed growth are representing the average value of 24 replicates. Error bars represent the standard error. The r^2 values for for curve fit are presented in Table SII. The effect of salt stress was defined as significant when the RSA trait value in salt stress conditions was tested significantly different from control conditions with Tuckey's post-hoc test with significance of 0.05 (*) or 0.01 (**). The significant differences are indicated with asterisks in colours corresponding to those of the salt stress treatments.

Figure S4

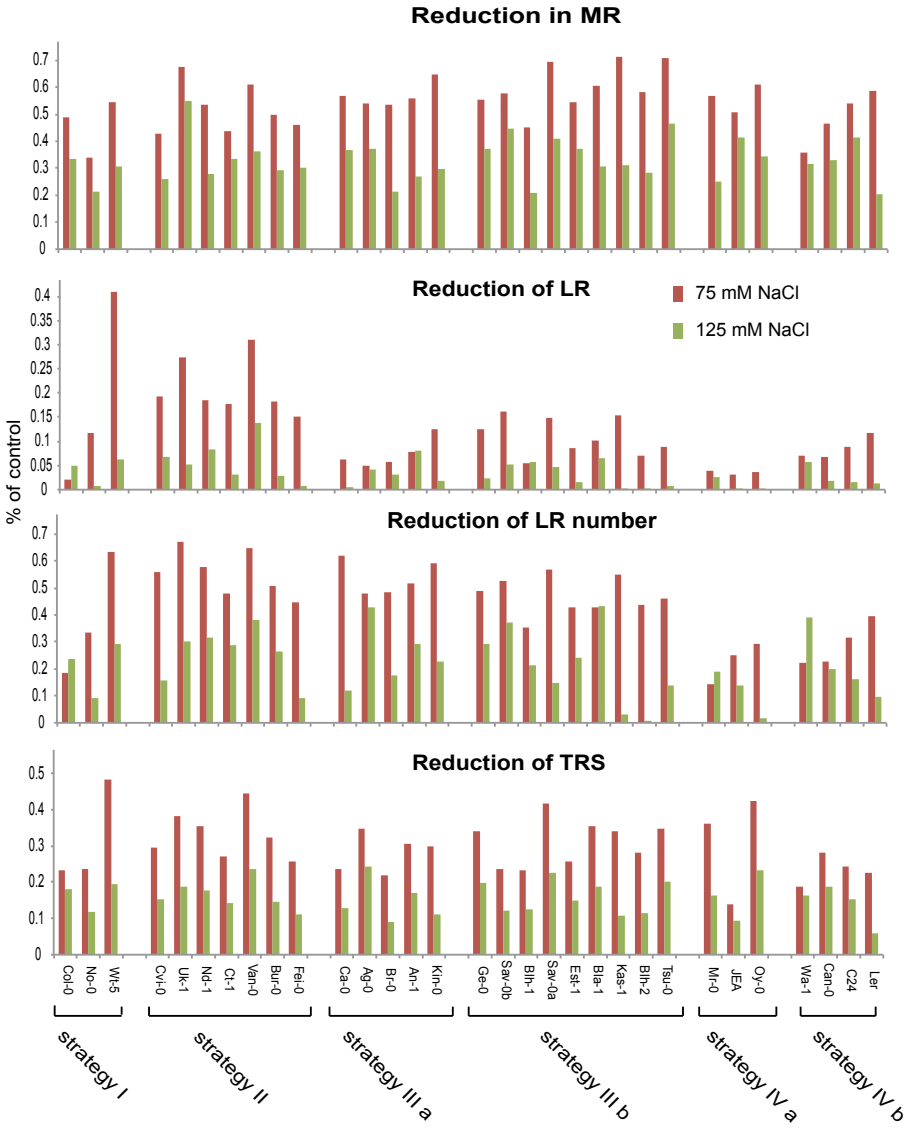

Figure S 4. Reduction in MR, LR number and average LR length by salt stress for the individual Arabidopsis accessions clustered into four distinct responses. Four days old seedlings of 32 Arabidopsis accessions (Table SII) were transferred to media supplemented with 0, 75 or 125 mM NaCl concentrations. Root growth was measured between 4th and 12th day after germination using EZ-Rhizo software and the growth rates for individual RSA component were described with quadratic growth functions. The growth rates of individual parameters were calculated based on average of 4 seedlings per accession per growth conditions. The reduction in MR, LR length, LR number and Total Root Size was calculated based on the quadratic growth function predicted values (Fig. 2 A) for 12 days old seedlings in both conditions.

Figure S5

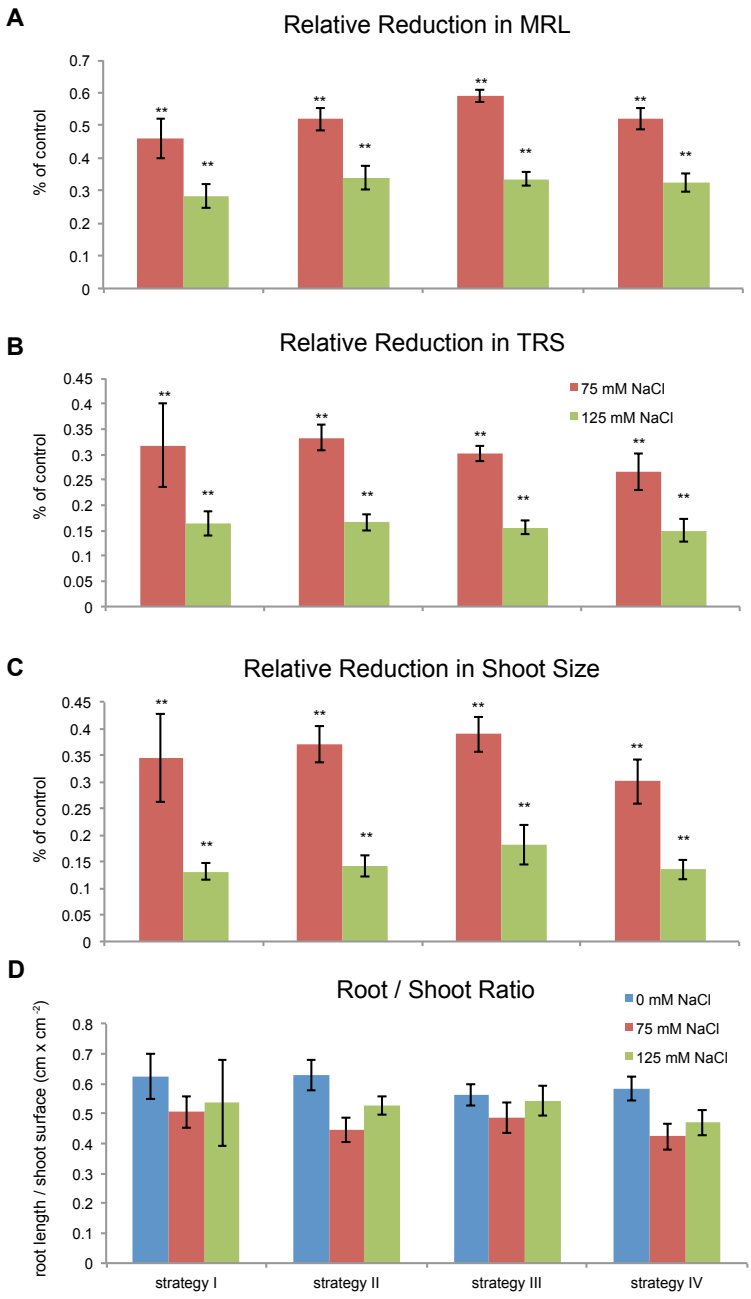

Figure S 5. Decrease in overall root and shoot mass does not vary between four different strategies identified. Accessions were categorized in groups representing different RSA strategies based on their relative decrease in different RSA parameters (Fig. 5). The differences between the strategies were examined in terms of reduction in **(A)** MRL and **(B)** TRS caused by salt stress as described with quadratic growth model for 12 days old plants **(C)** shoot surface reduction as observed in plate grown 12 days old plants and **(D)** and shifts in shoot to root ratio measured in 10 days old plants. The bars represent the average values of 31 accessions divided into four classes depending on their RSA strategy type. The error bars represent the standard error calculated for all accessions belonging to certain strategy type. The effect of salt stress was defined as significant when the RSA trait value in salt stress conditions was tested significantly different from control conditions with Tuckey's post-hoc test with significance of 0.05 (*) or 0.01 (**). No significant differences in the impact of salt on MRL, TRS, shoot surface or shoot to root ratio were detected between seedlings belonging to different RSA strategies.

Figure S6

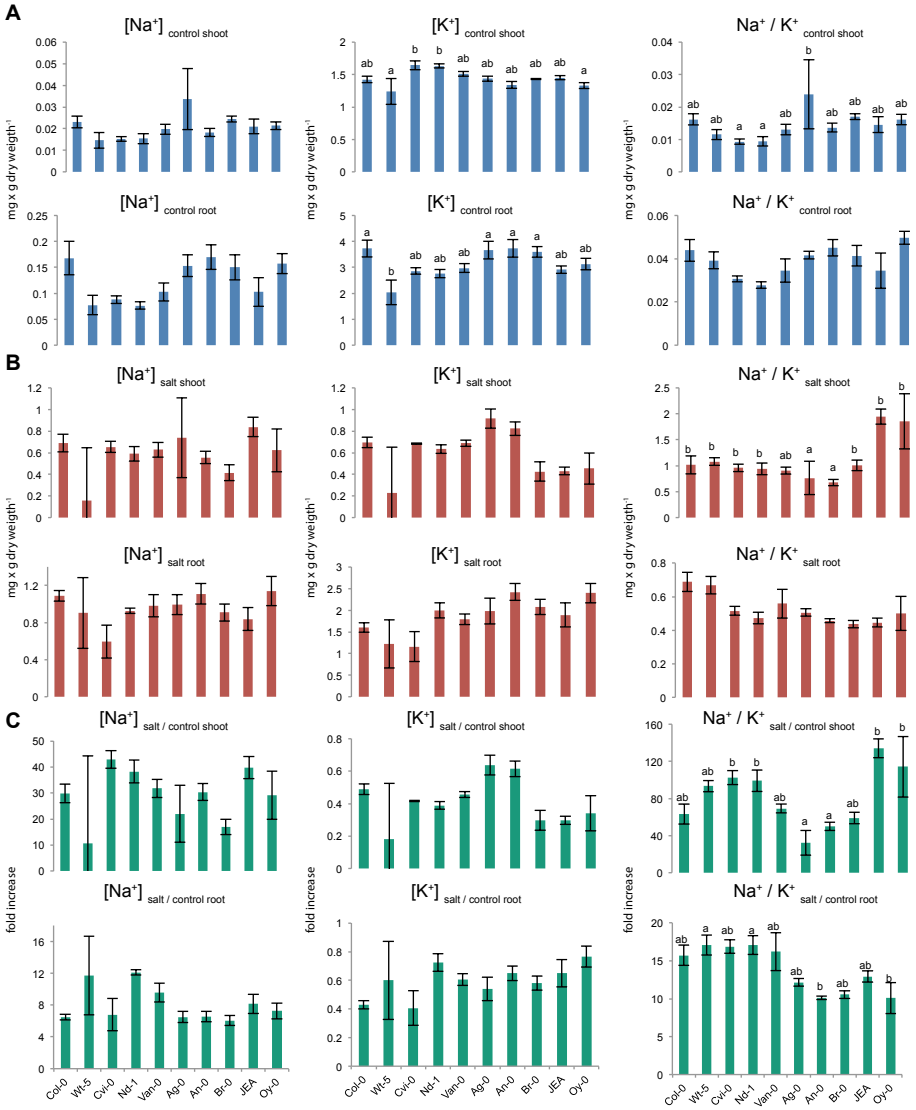

Figure S 6. Accumulation of Na^+ and K^+ in root and shoot tissue of 10 individual Arabidopsis accessions exhibiting different RSA strategies grown in standard and mild salt stress conditions. Four days old seedlings of 10 Arabidopsis accessions were transferred to standard media supplemented with 0 and 75 mM NaCl. Ten 12-days old seedlings were pooled and divided into shoot and root samples. The Na^+ and K^+ contents were determined for plants grown at **(A)** control and **(B)** 75 mM NaCl conditions as well as the **(C)** ratio's of ion accumulation between control and salt stress conditions. Bars represent the average ion accumulation of 4 samples. Error bars represent standard error. Differences between relative growth rates were tested with one-way ANOVA with Tuckey's post-hoc test of significance. Different letter codes represent groups differing from each other with significance level of 0.05.

Supplemental Tables

Table S1. Values of RSA growth parameters and r^2 values as used in the descriptive growth model. Root growth rate coefficients were calculated on data collected from 22 replicates by using LINEST function in excel. The fitting of descriptive models was tested on average value per RSA trait per condition by calculating the coefficient of determination (r^2).

Quadratic growth model (as in Fig. 2)					
	[NaC] (mM)	**MRL**	**#LR**	**aLRL**	**TRS**
Growth rates	**0**	0.1899	0.4855	0.0133	
	75	0.0842	0.3180	0.0077	
	125	0.0318	0.1585	0.0054	
r^2	**0**	0.9562	0.9850	0.9887	0.9934
	75	0.8048	0.9857	0.9979	0.9573
	125	0.6504	0.9602	0.9414	0.9075

Quadratic and square root functions used to describe parameter (as in Fig. S2)								
	[NaC] (mM)	**#LR region A**	**#LR region B**	**aLRL region A**	**aLRL region B**	**LRL region A**	**LRL region B**	**TRS**
Growth rates	**0**	3.2426	0.5236	0.0242	0.0126			
	75	4.5583	0.2493	0.0121	0.0055			
	125	4.1332	0.0632	0.0057	0.0023			
r^2	**0**	0.7813	0.9809	0.9622	0.9498	0.9722	0.8893	0.9890
	75	0.8293	0.9551	0.9882	0.9445	0.9863	0.8359	0.9957
	125	0.7283	0.8577	0.9668	0.7973	0.9191	0.4337	0.9645

Table S2. List of Arabidopsis thaliana accessions used for screening salt induced changes in RSA. Accessions were ordered from European Arabidopsis stock centre (NASC) and propagated under the same conditions in order to ensure comparable seed quality

ABRC identifier	Accession name	site	country
CS76113	Col-0	Col	USA
CS28090	Blh-2	Blh	CZE
CS28128	Ca-0	Ca	GER
CS28564	No-0	No	GER
CS28725	Sav-0	Slavice	CZE
CS28780	Tsu-0	Tsu	JPN
CS28787	Uk-1	Uk	GER
CS28804	Wa-1	Wa	POL
CS76087	Ag-0	Ag	FRA
CS76091	An-1	An	BEL
CS76097	Bla-1	Bla	ESP
CS76098	Blh-1	Blh	CZE
CS76101	Br-0	Br	CZE
CS76105	Bur-0	Bur	IRL
CS76106	C24	Co	POR
CS76109	Can-0	Can	ESP
CS76114	Ct-1	Ct	ITA
CS76116	Cvi-0	Cvi	CPV
CS76127	Est-1	Est	RUS
CS76129	Fei-0	Fei	POR
CS76135	Ge-0	Ge	SUI
CS76148	JEA	JEA	FRA
CS76150	Kas-1	Kas	IND
CS76153	Kin-0	Kin	USA
CS76164	Ler-1	Ler	GER
CS76190	Mr-0	Mr	ITA
CS76197	Nd-1	Nd	SUI
CS76203	Oy-0	Oy	NOR
CS76225	Sav-0	Slavice	CZE
CS76297	Van-0	Van	CAN
CS76304	Wt-5	Wt	GER
CS76305	Yo-0	Yo	USA

Table S3. Growth parameters for individual RSA traits calculated per accessions.

Acc	MR 0 mM	MR 75 mM	MR 125 mM	noLR 0 mM	noLR 75 mM	noLR 125 mM	aLR 0 mM	aLR 75 mM	aLR 125 mM
Uk-1	0,040	0,023	0,016	0,311	0,208	0,093	0,007	0,003	0,001
C24	0,077	0,036	0,025	0,321	0,102	0,053	0,008	0,002	0,001
Can-0	0,095	0,039	0,024	0,191	0,044	0,038	0,008	0,002	0,002
Kas-1	0,109	0,074	0,026	0,333	0,184	0,010	0,011	0,003	0,001
Ag-0	0,117	0,058	0,038	0,204	0,097	0,087	0,006	0,001	0,001
Br-0	0,124	0,062	0,017	0,306	0,148	0,054	0,014	0,002	0,003
Cvi-0	0,128	0,049	0,025	0,257	0,143	0,041	0,011	0,004	0,005
Mr-0	0,130	0,067	0,023	0,218	0,031	0,041	0,007	0,002	0,001
Fei-0	0,131	0,055	0,032	0,429	0,191	0,040	0,010	0,003	0,001
Wa-1	0,131	0,041	0,033	0,258	0,057	0,101	0,013	0,004	0,002
Ler	0,131	0,072	0,018	0,546	0,216	0,053	0,014	0,004	0,002
Sav-0a	0,140	0,094	0,050	0,358	0,203	0,053	0,007	0,002	0,002
Ge-0	0,140	0,072	0,044	0,319	0,156	0,093	0,008	0,002	0,001
No-0	0,142	0,043	0,021	0,356	0,120	0,033	0,006	0,002	0,001
Wt-5	0,144	0,072	0,036	0,347	0,220	0,102	0,006	0,004	0,001
Ct-1	0,149	0,059	0,041	0,383	0,183	0,111	0,012	0,004	0,001
Oy-0	0,149	0,085	0,044	0,232	0,068	0,004	0,005	0,001	0,000
Est-1	0,149	0,075	0,047	0,461	0,197	0,111	0,009	0,002	0,001
JEA	0,150	0,071	0,053	0,586	0,148	0,082	0,015	0,002	0,000
Tsu-0	0,151	0,104	0,063	0,419	0,192	0,058	0,009	0,002	0,000
Yo-0	0,153	0,059	0,033	0,434	0,159	0,093	0,010	0,012	0,001
Blh-2	0,155	0,084	0,035	0,349	0,152	0,002	0,011	0,002	0,000
Bla-1	0,155	0,088	0,038	0,267	0,115	0,116	0,010	0,002	0,001
Sav-0b	0,157	0,083	0,063	0,515	0,272	0,190	0,024	0,007	0,003
Kin-0	0,163	0,103	0,039	0,482	0,284	0,110	0,012	0,003	0,001
Van-0	0,166	0,095	0,051	0,372	0,241	0,142	0,010	0,005	0,004
An-1	0,166	0,086	0,035	0,330	0,170	0,096	0,009	0,001	0,003
Blh-1	0,169	0,069	0,027	0,432	0,152	0,092	0,008	0,001	0,002
Bur-0	0,173	0,079	0,043	0,384	0,195	0,102	0,009	0,003	0,001
Nd-1	0,181	0,090	0,040	0,396	0,229	0,125	0,008	0,003	0,002
Col-0	0,190	0,083	0,028	0,478	0,311	0,156	0,014	0,008	0,005
Ca-0	0,193	0,104	0,062	0,390	0,242	0,047	0,016	0,002	0,001