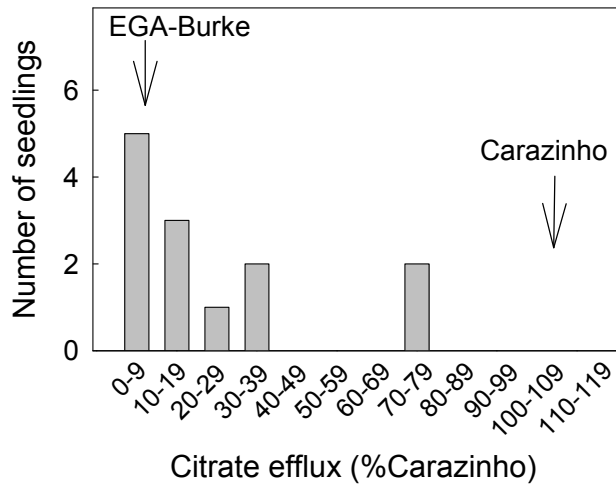


Supplemental Figure 1

Supplemental Figure 1: Time course of malate and citrate efflux from excised root apices

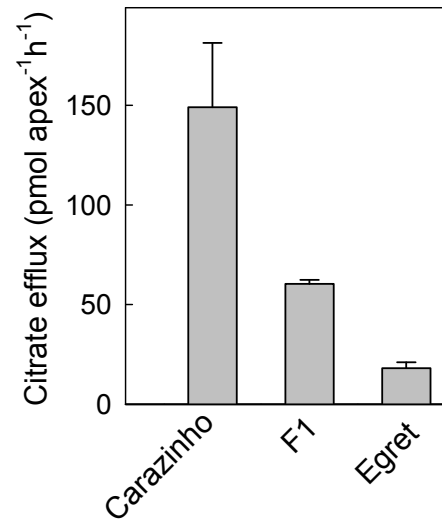
Excised root apices from six-day-old seedlings were washed in a glass vial on a shaker with 1 mL of 0.2 mM CaCl₂ (pH 4.3). After washing the solution was replaced with a control solution (○) or a similar solution containing 50 μM AlCl₃ (●). The solutions were replaced every 60 minutes and assayed for malate (A) and citrate (B) efflux assays. Data show the mean and standard error (n=3 to 4).



Supplemental Figure 2

Supplemental Figure 2: Frequency distribution of citrate efflux in BC₁F₁ seedlings derived from EGA-Burke/Carazinho

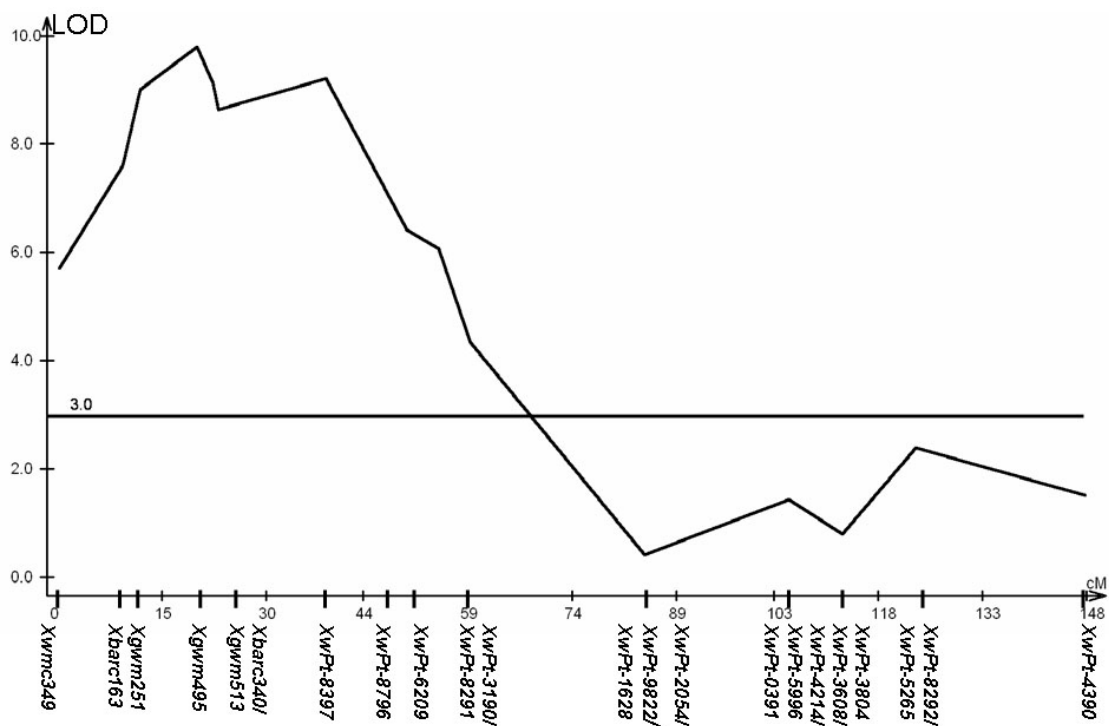
Citrate efflux was measured from the excised root apices of 13 individual BC₁F₁ seedlings. Data are presented as the percentage of the Carazinho parental line. Mean values for the parental lines are indicated by the arrows.



Supplemental Figure 3

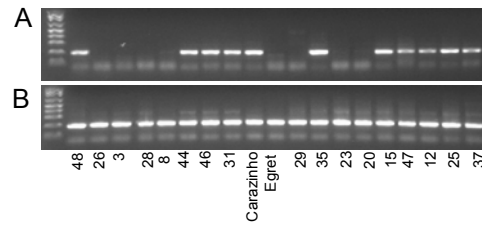
Supplemental Figure 3: Comparison of citrate efflux from Carazinho, Egret and their F₁ progeny

Citrate efflux was measured from the excised root apices of six-day-old seedlings in the presence of 50 μ M Al. Data show the mean and standard error (n=3).



Supplemental Figure 4: A major QTL for citrate efflux maps to chromosome 4B

A major quantitative trait locus (QTL) for citrate efflux maps on the chromosome 4B in the F₂ population derived from EGA-Burke/Carazinho. The data plots the mapping distances of markers versus LOD scores (logarithm of the odds). A critical LOD threshold of 3 was used to determine significant association between molecular markers and the citrate efflux phenotype. QTL analysis was performed with Cartographer software version 2.5 (Wang et al 2007; <http://statgen.ncsu.edu/qtlcart/WQTLCart.htm>).



Supplementary Figure 4

Supplemental Figure 5: Endpoint products from qRT-PCR used to measure *TaMATE1* expression in F_{2:3} families derived from Egret/Carazinho

Data show a subset of the products from the qRT-PCR described in Figure 10 after separation by gel electrophoresis. Numbers identify the families shown Supplemental Figure 1. (A) *TaMATE1* products and (B) *PT-1* (reference gene) products. All samples with undetectable *TaMATE1* expression also showed low citrate efflux.

Supplemental Table I Malate and citrate efflux in 50 μ M AlCl₃ from 45 F₃ families. Data show fluxes from excised root apices and values relative to Carazinho. *TaMATE1* expression is scored as the presence or absence of a band from quantitative RT-PCR reactions.

Citrate Efflux	F ₃ family # or genotype	Citrate efflux pmol/apex/h	Citrate Efflux %Carazinho	Malate Efflux nmol/apex/h	Malate efflux %Carazinho	<i>TaMATE1</i> expression
Low	3	1.3	4	2	101	no
	5	1.5	3	1.3	118	no
	8	1.8	6	0.65	32	no
	13	4.3	7	0.28	25	no
	17	7.0	7	0.39	35	no
	20	10.0	15	0.08	23	no
	22	0.8	1	0.84	75	no
	23	5.5	7	0.29	83	no
	26	0.0	0	1.5	75	no
	27	3.0	5	0.29	26	no
	28	1.8	6	1	50	no
	29	2.3	4	0.23	26	no
		Egret	2.3	5	0.2	16
Med-High	1	22.9	31	0.07	19	yes
	2	24.0	46	0.96	113	yes
	6/7	21.0	36	0.91	82	yes
	9	27.5	48	0.15	13	yes
	10	17.8	59	1.38	69	yes
	11	26.5	51	0.40	48	yes
	12	18.5	36	0.08	10	yes
	14	49.0	95	0.74	87	yes
	15	49.8	96	0.82	113	yes
	16	38.3	74	0.83	97	yes
	18	20.0	38	0.65	75	yes
	19	23.5	44	0.92	108	yes
	21	15.0	26	0.86	101	yes
	24	17.5	33	0.74	87	yes
	25	57.0	76	0.27	79	yes
	30	61.5	107	0.20	18	yes
	31	12.3	41	0.80	40	yes
	32	15.0	22	0.23	26	yes
	33	35.0	60	1.10	100	yes
	35	65.0	133	0.35	41	yes
	36	30.0	40	0.20	57	yes
	37	39.5	53	0.30	85	yes
	39	58.0	101	0.16	14	yes
	40	32.8	57	0.79	71	yes
	41	11.0	37	0.30	15	yes
	42	17.5	59	0.47	24	yes
	43A	14.0	47	1.48	74	yes
	43B	31.0	41	0.04	11	yes
44	18.3	61	0.40	20	yes	
45	28.3	38	0.29	82	yes	
46	20.8	69	1.98	99	yes	
47	49.8	36	0.13	37	yes	
48	18.0	60	1.47	74	yes	

