Supplemental Table 2. ANOVAs of the log concentration of *Foa* race 4 and *Foa* race 2 in celery crowns of plants that were grown in the greenhouse in infested soil. Independent variables in the model were genotype, days post-transplantation and the genotype * days post-transplantation interaction.

Part I: FoaR4

Effect Tests:FoaR4

Source	Nparm	DF	Sum of Squares	F Ratio	Prob > F
Cultivar	2	2	9.784757	10.7086	0.0005
dpt	1	1	11.200085	24.5151	<.0001
Cultivar*dpt	2	2	22.162465	24.2549	<.0001

Least Squares Means Table FoaR4

Level	Least Sq Mean, log conc FoaR4	Std Error	Mean
76-8-36-124	0.0839724	0.21374415	0.08397
Challenger	1.3802331	0.21374415	1.38023
PI181714	0.276587	0.21374415	0.27659

Least Squares Means Table FoaR4

Level	Least Sq Mean, log conc FoaR4	Std Error	Mean
10	-0.030748	0.17452136	-0.0307
20	1.191277	0.17452136	1.1913

Least Squares Means Table FoaR4

Level	Least Sq Mean, log conc FoaR4	Std Error
76-8-36-124,10 dpi	0.195526	0.30227987
76-8-36-124,20 dpi	-0.027582	0.30227987
Challenger,10 dpi	-0.438553	0.30227987
Challenger,20 dpi	3.199019	0.30227987
PI181714,10	0.150782	0.30227987
PI181714,20	0.402392	0.30227987

Part II: FoaR2

Effect Tests FoaR2

Source	Nparm	DF	Sum of Squares	F Ratio	Prob > F
Cultivar	2	2	1.4420061	2.3966	0.1125
10 or 20 dpi	1	1	0.1242825	0.4131	0.5265
Cultivar*dpi	2	2	0.9388037	1.5603	0.2306

Least Squares Means Table

Level	Least Sq Mean, log conc FoaR2	Std Error	Mean
76-8-36-124	1.289816	0.17344755	1.28982
Challenger	1.5464935	0.17344755	1.54649
PI181714	1.8266746	0.17344755	1.82667

Least Squares Means Table

Level	Least Sq Mean, log conc FoaR2	Std Error	Mean
10 dpi	1.6186922	0.14161933	1.61869
20 dpi	1.4899639	0.14161933	1.48996

Least Squares Means Table

Level	Least Sq Mean, log conc FoaR2	Std Error
76-8-36-124,10 dpi	1.4458211	0.24529188
76-8-36-124,20 dpi	1.133811	0.24529188
Challenger,10 dpi	1.3634395	0.24529188
Challenger,20 dpi	1.7295475	0.24529188
PI181714,10 dpi	2.0468161	0.24529188
PI181714,20 dpi	1.606533	0.24529188

Supplemental Table 3. The parents, F1S1 76-8, and F1S2 in the 76-8 lineage: vascular discoloration-based symptoms, celery vs. non-celery habit, and solid vs. non-solid petioles in *Foa* race 4-infested soil in greenhouse trials[a]

		Plants in each category, %						Types of surviving plants, %[b]							
		Vascular discoloration (vd)-based score from 0 (asymptomatic) to 5 (dead)[c]						Celery vs. non-celery growth habit		Petiole type					
Generation[d]	Plant ID	0	1	2	3	4	5	Celery	Non-celery	Solid	Non-solid	Selection[e]	n (no. trials if >1)	Fraction resistant (vd score ≤ 2)	Comments
Parent of F1	PI 181714	25	40	35	0	0	0	0	100	0	100	NA[f]	20	1.00	
Parent of F1	PI 181714	95	0	0	0	5	0	0	100	0	100	NA	20	0.95	
Parent of F1	PI 181714	90	0	5	5	0	0	0	100	0	100	NA	20	0.95	
Parent of F1	PI 181714	90	0	10	0	0	0	0	100	0	100	NA	29	1.00	
F1S2	76-8-36	76	2	2	18	2	0	68	2	98	0	FS	50 (2)	0.80	
F1S2	76-8-4	65	0	0	25	5	5	80	15	95	0	FS	20	0.65	
F1S2	76-8-27	58	0	2	12	16	12	64	18	88	0	FS	50 (2)	0.60	
F1S1	76-8	35	10	15	0	15	25	65	10	15	60	NA	20	0.60	
F1S2	76-8-15	80	0	0	20	0	0	100	0	100	0	FS	20	0.80	lower vigor in race 2 and race 4 field trials
F1S2	76-8-29	75	0	0	5	15	5	20	70	90	5	FS	20	0.75	too much celeriac
F1S2	76-8-110	72	0	2	14	12	0	20	48	100	0	GH	50 (2)	0.74	too much celeriac but used in the race 4 field trial as a positive control for *Foa* race 4 disease resistance
F1S2	76-8-20	51	0	0	13	8	28	13	0	39	32	FS	120 (2)	0.51	

F1S2	76-8-19	40	0	10	25	25	0	100	0	95	5	FS	20	0.50
F1S2	76-8-10	36	2	2	26	24	10	56	28	88	0	FS	50 (2)	0.40
F1S2	76-8-28	40	0	0	25	25	10	70	10	80	5	FS	20	0.40
F1S2	76-8-24	38	0	0	6	6	50	NR[f]	NR	50	0	FS	50	0.38
F1S2	76-8-22	35	0	0	15	25	25	45	30	50	25	FS	20	0.35
F1S2	76-8-119	24	0	3	22	12	40	33	21	51	73	GH	78 (2)	0.27
F1S2	76-8-35	22	0	4	2	6	66	26	6	32	0	FS	50 (2)	0.26
F1S2	76-8-24	10	10	0	25	15	40	30	30	60	0	FS	20	0.20
F1S2	76-8-109	15	0	0	40	20	25	25	50	10	65	GH	20	0.15
F1S2	76-8-26	5	0	5	35	25	30	50	20	65	5	FS	20	0.10
F1S2	76-8-21	0	0	0	5	35	60	0	0	20	15	FS	20	0.00
F1S2	76-8-33	0	0	0	5	25	70	0	0	30	0	FS	20	0.00
Parent of F1	Challenger	0	0	15	10	15	60	40	0	40	0	NA	20	0.15
Parent of F1	Challenger	0	0	0	0	5	95	NA[f]	NA	NA	NA	NA	20	0.00
Parent of F1	Challenger	0	0	0	0	0	100	NA	NA	NA	NA	NA	20	0.00
Parent of F1	Challenger	0	0	0	0	3	97	NA	NA	NA	NA	NA	30	0.00

[a]Each trial also had 10 uninfested plants/family; all of the uninfested plants had a vd rating of 0 (data not shown). Families indicated in green, along with the two parents, were included in the CCRAB field trial in *Foa*-race 4 infested soil in Camarillo, CA in 2021 (see Table 1 in the main manuscript).

[b]Only includes plants from the infested treatments (vd $\leq$ 4). For both type classifications, plants could be scored as a mixed type; mixed types can be calculated. Celery petioles are wider and fewer than non-celery petioles, which are more numerous and less wide. NA, segregants were not recorded when there were fewer than 5 survivors/family.

[c]Disease scores are as follows: 0, asymptomatic; 1, some Foa-characteristic discoloration in the fine roots, but none elsewhere; 2, some characteristic discoloration in the main roots but none in the crown; 3, discoloration in the crown but on < 1/4 of the vascular ring; 4, discoloration in the crown vasculature on > 1/4 of the vascular ring; and 5, plant dead. Plants with scores of 3 to 5 can be considered debilitated by the pathogen.

[d]The F1 seeds produced by one cv Challenger X *A. graveolens* PI 181714 were designated "76-." One of the F1 plants that was selfed was 76-8. All the F1S2 families shown here were derived from F1S1 76-8.

[e]FS, were selected for celery type and solid petioles from the F1S1 76-8 family in a race 4-infested field. Vegetative clones that passed a screening in the greenhouse were used to produce the F1S2. Although the F1S1 families were observed in a field trial(s), the individual greenhouse (GH) plants were only screened in the greenhouse in an assay in race 4-infested soil.

[f]NR, not recorded; NA, not applicable

Supplemental Table 4. The parents, F1S2 76-8-36 and F1S3 from nine selfed 76-8-36: vascular discoloration-based symptoms, and celery vs. non-celery-type in *Foa* race 4-infested soil in the greenhouse[a]

		Plants in each category, %									
		Vascular discoloration (vd)-based score from 0 (asymptomatic) to 5 (dead)[b]								Resistant, % (vd score ≤ 2)[d]	
Generation	Plant ID	0	1	2	3	4	5	Celery type[c]	Non-celery type[c]		n
Parent of F1	PI 181714	95	0	2	2	0	0	0	100	98	44
F1S2	76-8-36	89	0	2	9	0	0	71	0	91	45
F1S3	76-8-36-124	96	0	2	2	0	0	82	0	98	45
F1S3	76-8-36-133	96	0	0	4	0	0	73	0	96	45
F1S3	76-8-36-151	84	0	2	14	0	0	93	0	86	44
F1S3	76-8-36-103	30	55	5	10	0	0	100	0	90	20
F1S3	76-8-36-127	91	0	0	9	0	0	54	0	91	35
F1S3	76-8-36-139	89	9	0	2	0	0	42	0	98	45
F1S3	76-8-36-146	95	5	0	0	0	0	35	0	100	20
F1S3	76-8-36-105	83	10	0	8	0	0	25	0	93	40
F1S3	76-8-36-148	93	0	2	4	0	0	98	0	98	44
Parent of F1	cv. Challenger	0	0	0	2	18	80	100	0	0	45

[a]Each trial also had 5 uninfested plants/family; all of the uninfested plants had a vd rating of 0 (data not shown). All plants in both the uninfested and infested treatments had solid petioles, expcept for all the plants in the *A. graveolens* PI 181714 parent, which had non-solid petioles.

[b]Disease scores are as follows: 0, asymptomatic; 1, some discoloration characteristic of *Foa* in the fine roots, but none elsewhere; 2, some characteristic discoloration in the main roots but none in the crown; 3, characteristic discoloration in the crown vasculature but on < 1/4 of the vascular ring; 4, characteristic discoloration in the crown vasculature on > 1/4 of the vascular ring; and 5, plant dead.

[c]Except for the dead plants (vd=5) in the cv. Challenger treatment, all plants were scored as either celery-type, non-celery-type, or an intermediate type. Celery petioles are wider and fewer than non-celery petioles, which are more numerous and less wide. The number of plants in the intermediate type can be calculated.

[d]The non-parametric two sample Kolmogorov-Smirnov test of the fraction of the population of the nine F1S3 with race 4 resistance versus Challenger has P=0.009.

Supplemental Table 5. The parents, F1S1 76-8, three F1S2, and F1S3 76-8-36-124: vascular discoloration-based symptoms in *Foa* race 2-infested soil in a greenhouse trial[a]

		Vascular discoloration (vd)-based score from 0 (asymptomatic) to 5 (dead)[b]						Asymp-tomatic above-ground	Resistant, (vd score ≤ 2)
		0	1	2	3	4	5		
Generation		Plants in each category, %							
Parent of F1	PI181714	100	0	0	0	0	0	100	100
Parent of F1	cv. Challenger	95	0	0	5	0	0	100	95
F1S3	76-8-36-124	100	0	0	0	0	0	100	100
F1S2	76-8-36	95	0	0	5	0	0	100	95
F1S2	76-8-4	90	10	0	0	0	0	100	100
F1S2	76-8-27	100	0	0	0	0	0	100	100
F1S1	76-8	95	0	0	5	0	0	100	95

[a]The trial had three soil-infestation treatments; results from the *Foa* race 4-infestation are shown in Table 2 in the main manuscript. For each genotype, there were 10 and 20 plants/genotype in uninfested and *Foa* race 2-infested soil, respectively. Pots were arranged in a completely randomized design. After 35 days post-transplantation, plants were evaluated. All of the uninfested plants had a vd rating of 0 (data not shown).

[b]Disease scores are as follows: 0, asymptomatic; 1, characteristic discoloration in the fine roots, but none elsewhere; 2, characteristic discoloration in the main root but none in the crown; 3, discoloration in the crown but on < 1/4 of the vascular ring; 4, discoloration in the crown on > 1/4 of the vascular ring; and 5, plant dead.

Supplemental Table 6. Statistical analysis of whether the selfed progeny of a Challenger X PI181714 have the desired phenotypes: resistance to *Foa* races 4 and 2, solid petioles and a celery-type habit†.

		Comparison to the PI 181714 phenotype		Comparison to the indicated Challenger phenotype			
		Resistance to *Foa* race 4				Resistance to *Foa* race 2‡	
Generation	Plant ID	Absence of vascular discoloration ‡	Asymptomatic above-ground	Solid petioles	Celery growth habit	Absence of vascular discoloration ‡	Asymptomatic above-ground
		P-value§					
F1S1	76-8	<0.0001	<0.0001	<0.0001	<0.0001	1.0	1.0
F1S2	76-8-4	<0.0001	<0.0001	1.0	0.007	0.54	1.0
F1S2	76-8-27	0.0001	<0.0001	1.0	0.0001	0.23	1.0
F1S2	76-8-36	0.09	1.00	1.0	<0.0001	1.0	1.0
F1S3	76-8-36-124	0.74	0.36	1.0	0.0004	0.23	1.0

†Data are from the greenhouse trial shown in Table 2 and Supplemental Table 5.

‡Both parents are resistant to Foa race 2; comparisons with PI 181714 result in the same conclusions.

‡Corresponds to an asymptomatic vascular discoloration score of 0.

§*P*-values were computed using count data in 2 X 2 tables with the Likelihood Ratio Test. A *P*-value of $P<0.05$ indicates that the progeny value differs from the desired parental value.