

**Supplementary Datafile 2.** Allelic and protein variation in the PLC candidate gene (LOC111901278) among 21 accessions.

**Integrating growth physiology and calcium status to reveal the genetic basis of lettuce tipburn via GWAS**

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Running title: Lettuce tipburn resistance

This datafile details the sequence analysis of the LOC111901278 gene (Phosphoinositide phospholipase C 6, PLC) based on available sequences for 21 accessions from the diversity diversity panel. The analysis identified six distinct SNP haplotypes ('Salinas' and Haplo-2 through Haplo-6), which translate into four unique protein variants.

**Part A: NCBI SRA accessions grouped by SNP haplotype**

This table lists the NCBI SRA accessions assigned to each of the six identified SNP haplotypes.

Haplotype Name	Haplotype Description	Number of Accessions	SRA Accession ID(s)
Salinas	Identical to the cv. Salinas reference sequence (0 SNPs)	12	SRX5529508, SRX5529507, SRX5529485, SRX5529482, SRX5529471, SRX5529467, SRX5529466, SRX5529461, SRX5529440, SRX5529432, SRX5529430, plus reference genome of cv. Salinas
Haplo-2	2 SNPs relative to Salinas	1	SRX5529509
Haplo-3	3 SNPs relative to Salinas	5	SRX5529503, SRX5529491, SRX5529475, SRX5529446, SRX5529428
Haplo-4	4 SNPs relative to Salinas	1	SRX5529449
Haplo-5	4 SNPs relative to Salinas	1	SRX5529506
Haplo-6	8 SNPs relative to Salinas	1	SRX5529426

Salinas	1	TTCTTCTCGAGTAAGTCAAGTCTGATATATACATGTACCATGGTAAATGCAAACTGGGA	60
Haplo-2	1	.....	60
Haplo-3	1	.....	60
Haplo-4	1	.....	60
Haplo-5	1	.....	60
Haplo-6	1	.....	60
Salinas	61	GGTAAGAAGGGATCTGTnnnnnnnnnnnnnnnnnnnnnnnnnnnnTTATGATTACTACAA	120
Haplo-2	61	.....	120
Haplo-3	61	.....	120
Haplo-4	61	.....	120
Haplo-5	61	.....	120
Haplo-6	61	.....	120
Salinas	121	AGTGTTGGGCTTTAATCGGAAGTTCAAGATTACTGAACGGCGGCCACCGCCGGACGTGAT	180
Haplo-2	121	.....	180
Haplo-3	121	.....	180
Haplo-4	121	.....	180
Haplo-5	121	.....	180
Haplo-6	121	.....	180
Salinas	181	CGAAGCATTTAGTTTGTGCACAAACCGAGAGTCAGAGATGTCGCCGGATCAGTTCCGGCG	240
Haplo-2	181	.....T.....	240
Haplo-3	181	.....A.....	240
Haplo-4	181	.....A.....	240
Haplo-5	181	...C.....A.....	240
Haplo-6	181	.....	240
Salinas	241	GTTCTTGATCGAGTTTCAGGGAGAAGACGAGGTCGCGATCGATGATGCGAAGCTGAAAAT	300
Haplo-2	241	.....	300
Haplo-3	241	.....	300
Haplo-4	241	.....	300
Haplo-5	241	.....	300
Haplo-6	241	.....	300
Salinas	301	GGATCAAGTGCTGCTCCACTTCCGACCCAACCTTTACACGCTGCTCTTTCACTGTTGATGA	360
Haplo-2	301	.....	360
Haplo-3	301	.....A.....	360
Haplo-4	301	.....A.....	360
Haplo-5	301	.....A.....	360
Haplo-6	301	.....	360
Salinas	361	TTTCTTCAAATACCTGTTCTCGATGACCTCAATGGACCCATCACATCTCAGGTACACCA	420
Haplo-2	361	.....	420
Haplo-3	361	.....	420
Haplo-4	361	.....G.....	420
Haplo-5	361	.....	420
Haplo-6	361	.....	420
Salinas	421	TGATATGACTGCACCCTTGCAACATTACTTCATATATACAGGCCACAACCTCCTACCTTAC	480
Haplo-2	421	.....	480
Haplo-3	421	.....A.....	480
Haplo-4	421	.....A.....	480
Haplo-5	421	.....A.....	480
Haplo-6	421	.....	480

Salinas	481	AGGAAATCAGCTCAACAGCGATTGTAGTGATGTACCAATCATAAAAGCTCTTAGAAGAGG	540
Haplo-2	481	.....	540
Haplo-3	481	.....	540
Haplo-4	481	.....	540
Haplo-5	481	.....	540
Haplo-6	481	.....	540
Salinas	541	CGTGAGGGTGATAGAGCTCGATTTATGGCCAAATAGTTCAAAAGACGGAATTCATGTTCT	600
Haplo-2	541	.....	600
Haplo-3	541	.....	600
Haplo-4	541	.....	600
Haplo-5	541	.....	600
Haplo-6	541	.....	600
Salinas	601	TCATGGGAGGACTATGACAACCTCCGGTAGATCTATACAAATGTTTGAAGTCCATCCATGA	660
Haplo-2	601	.....A.....	660
Haplo-3	601	.....	660
Haplo-4	601	.....	660
Haplo-5	601	.....	660
Haplo-6	601	.....	660
Salinas	661	GCATGCTTTTGTGAGTTCTCCTTATCCAGTAATCATAACTTTAGAAGATCATCTTACACC	720
Haplo-2	661	.....	720
Haplo-3	661	.....	720
Haplo-4	661	.....	720
Haplo-5	661	.....	720
Haplo-6	661	.....	720
Salinas	721	GGATCTTCAGGCTAAAGTTGCAGAGATGGTGACGAAATTTTGGAGATGTACTIONTACTG	780
Haplo-2	721	.....	780
Haplo-3	721	.....	780
Haplo-4	721	.....	780
Haplo-5	721	.....	780
Haplo-6	721	.....	780
Salinas	781	CCCCGAGGCCGAGATAATGATGAATTCCTTTCGCCTGATGCATTAAAGCATCGTATCAT	840
Haplo-2	781	.....	840
Haplo-3	781	.....	840
Haplo-4	781	.....	840
Haplo-5	781	.....	840
Haplo-6	781	.....	840
Salinas	841	TCTTCAACAAAGCAACCAAAAGAGTACCTCGAATCTAAGCAAGATTCGAGCTCAAGTGA	900
Haplo-2	841	.....	900
Haplo-3	841	.....	900
Haplo-4	841	.....	900
Haplo-5	841	.....	900
Haplo-6	841	.....	900
Salinas	901	AGAAGATTTGTTGGTTGTGGGGAAAGCGACACCATCTGACATAAAAAACAGGACGGCAGC	960
Haplo-2	901	.....	960
Haplo-3	901	.....	960
Haplo-4	901	.....	960
Haplo-5	901	.....	960
Haplo-6	901	.....	960

Salinas	961	TGATGAAGCGTCGTCCCGCTTCTTGTCGTTGACTCTGAAGATGAATCTGATGAAGAAGC	1020
Haplo-2	961	.....	1020
Haplo-3	961	.....	1020
Haplo-4	961	.....	1020
Haplo-5	961	.....	1020
Haplo-6	961	.....	1020
Salinas	1021	TGAAGATGATGAAGATGTGGAAAATAAGAAGTCTGGACAGAAAGCAGTTCTTGAGTACAA	1080
Haplo-2	1021	.....	1080
Haplo-3	1021	.....	1080
Haplo-4	1021	.....	1080
Haplo-5	1021	.....	1080
Haplo-6	1021	.....	1080
Salinas	1081	GCAACTGATAGGAATTCATGCAATAAAAGCAAAGAATGGATTAAAGAAAGCGTTAATGGT	1140
Haplo-2	1081	.....	1140
Haplo-3	1081	.....	1140
Haplo-4	1081	.....	1140
Haplo-5	1081	.....	1140
Haplo-6	1081	.....	1140
Salinas	1141	GGGATCTGGGAGAGGCAAACGCTTAGTTTGTAGTGAACAAACTCTTGAAAGAGCTGCGTC	1200
Haplo-2	1141	.....	1200
Haplo-3	1141	.....	1200
Haplo-4	1141	.....	1200
Haplo-5	1141	.....	1200
Haplo-6	1141	.....	1200
Salinas	1201	TCTTTATGGAAGTATTTAGTCAGGTTTACTCAAAAGAATATTCTTAGGGTTTTCCCTAA	1260
Haplo-2	1201	.....	1260
Haplo-3	1201	.....	1260
Haplo-4	1201	.....	1260
Haplo-5	1201	.....	1260
Haplo-6	1201	.....	1260
Salinas	1261	AGGAACACGGGTTACCTCAACGAATTTTAGACCACTTGAGGCATGGATGCATGGTGCTCA	1320
Haplo-2	1261	.....	1320
Haplo-3	1261	.....	1320
Haplo-4	1261	.....	1320
Haplo-5	1261	.....	1320
Haplo-6	1261	.....	1320
Salinas	1321	GATGGTCGCGTTCAATATGCAGGGTTATGACAAATCACTTTGGATGATGCATGGAATGTT	1380
Haplo-2	1321	.....	1380
Haplo-3	1321	.....	1380
Haplo-4	1321	.....	1380
Haplo-5	1321	.....	1380
Haplo-6	1321	.....	1380
Salinas	1381	TCGATCCAATGGAGGGTGTGGTTATGTTAAGAAACCTGATTTTCTGATAGGTAGAGATCC	1440
Haplo-2	1381	.....	1440
Haplo-3	1381	.....	1440
Haplo-4	1381	.....	1440
Haplo-5	1381	.....	1440
Haplo-6	1381	...T.....G.....	1440

Salinas 1441 TAATGACGAGGTGTTTCGATCCAAAAGCAACATTAGAAGTGAAGAAAATTTGAGGGTGAA 1500  
Haplo-2 1441 ..... 1500  
Haplo-3 1441 ..... 1500  
Haplo-4 1441 ..... 1500  
Haplo-5 1441 ..... 1500  
Haplo-6 1441 ..... 1500

Salinas 1501 AGTATATATGGGTGATGGGTGGCGCATGGATTTTAGCCAAACTCATTTTGATGCATTCTC 1560  
Haplo-2 1501 ..... 1560  
Haplo-3 1501 ..... 1560  
Haplo-4 1501 ..... 1560  
Haplo-5 1501 ..... 1560  
Haplo-6 1501 ..... 1560

Salinas 1561 CCCACCGGATTTCTACACAAAGATGTACATGGTTGGAGTCCCAACGGATGACACCAAGAA 1620  
Haplo-2 1561 ..... 1620  
Haplo-3 1561 ..... 1620  
Haplo-4 1561 ..... 1620  
Haplo-5 1561 ..... 1620  
Haplo-6 1561 .....G.....T..... 1620

Salinas 1621 AAAGACGAGAATAATCAAAGATGATTGGATACCGATTTGGGATGAAGAGTTTACATTCCC 1680  
Haplo-2 1621 ..... 1680  
Haplo-3 1621 ..... 1680  
Haplo-4 1621 ..... 1680  
Haplo-5 1621 ..... 1680  
Haplo-6 1621 ..... 1680

Salinas 1681 ATTAACAGTCCCTGAGTTGGCTTTATTGAAGATTGTTGTACGAGACTATAATATATCTGA 1740  
Haplo-2 1681 ..... 1740  
Haplo-3 1681 ..... 1740  
Haplo-4 1681 ..... 1740  
Haplo-5 1681 ..... 1740  
Haplo-6 1681 .....T.....G..... 1740

Salinas 1741 GAAAGATGACTTTGGTGGTCAAACATGTTTGCCTGTGTCAGAAATTGAACTGGGATTCG 1800  
Haplo-2 1741 ..... 1800  
Haplo-3 1741 ..... 1800  
Haplo-4 1741 ..... 1800  
Haplo-5 1741 ..... 1800  
Haplo-6 1741 .....A..... 1800

Salinas 1801 AACAGTTCCTACTCCATAACAAGAAAGGGAAGAAATTTGAACATGTCAAGCTTCTTATGCG 1860  
Haplo-2 1801 ..... 1860  
Haplo-3 1801 ..... 1860  
Haplo-4 1801 ..... 1860  
Haplo-5 1801 ..... 1860  
Haplo-6 1801 ..... 1860

Salinas 1861 ATTTCACTTCGAATAAAGGATTTCTTCATATAAAAATACATTTATATGTTGTCCCATCCAT 1920  
Haplo-2 1861 ..... 1920  
Haplo-3 1861 ..... 1920  
Haplo-4 1861 ..... 1920  
Haplo-5 1861 ..... 1920  
Haplo-6 1861 .....A.....C..... 1920

Salinas	1921	TGTGTTTTATTTCTTAAAGGATTTGGATTTGGATATGATCATCGTAACAAACAAAACCTT	1980
Haplo-2	1921	.....	1980
Haplo-3	1921	.....	1980
Haplo-4	1921	.....	1980
Haplo-5	1921	.....	1980
Haplo-6	1921	.....	1980

Salinas	1981	GATTGTTGATTACATTTTATAGTATTTTACCACCTTTAAAA	2020
Haplo-2	1981	.....	2020
Haplo-3	1981	.....	2020
Haplo-4	1981	.....	2020
Haplo-5	1981	.....	2020
Haplo-6	1981	.....	2020

## Part B: Protein variants

The six SNP haplotypes translated into four unique protein variants, all 593 amino acids (AA) in length. The AA sequence for each unique protein variant is compared to the cv. Salinas reference.

Protein Variant Group	Constituent SNP Haplotype(s)	AA Differences from Salinas
Variant 1 (Reference genome)	Salinas, Haplo-2	0 AA changes
Variant 2	Haplo-3, Haplo-4	1 AA change
Variant 3	Haplo-5	2 AA changes
Variant 4	Haplo-6	3 AA changes

Salinas	1	MKGSYDYYKVLGFNRKFKITERRPPPDVIEAFSLCTNRESEMSPDQFRRFLIEFQGEDEV	60
Haplo-2	1	.....	60
Haplo-3	1	.....	60
Haplo-4	1	.....	60
Haplo-5	1	.....D.....	60
Haplo-6	1	.....	60
Salinas	61	AIDDAKMKMDQVLLHFRPNFTRCSFTVDDFFKYLFLDDLNGPITSQVHDMTAPLQHYFI	120
Haplo-2	61	.....	120
Haplo-3	61	.....I.....	120
Haplo-4	61	.....I.....	120
Haplo-5	61	.....I.....	120
Haplo-6	61	.....	120
Salinas	121	YTGHN SYLTGNQLNSDCSDVPIIKALRRGVRVIELDLWPNSSKDGIVLHGRTMTTPVDL	180
Haplo-2	121	.....	180
Haplo-3	121	.....	180
Haplo-4	121	.....	180
Haplo-5	121	.....	180
Haplo-6	121	.....	180
Salinas	181	YKCLKSIHEHAFVSSPYPVIIITLEDHLTPDLQAKVAEMVTEIFGDVLYCPEAGDNDEFLS	240
Haplo-2	181	.....	240
Haplo-3	181	.....	240
Haplo-4	181	.....	240
Haplo-5	181	.....	240
Haplo-6	181	.....	240
Salinas	241	PDALKHRIILSTKQPKEYLESKQDSSSEEDLLVVGKATPSDIKNRTAADEASSRFLVVD	300
Haplo-2	241	.....	300
Haplo-3	241	.....	300
Haplo-4	241	.....	300
Haplo-5	241	.....	300
Haplo-6	241	.....	300
Salinas	301	SEDESDEEAEDDEDVENKKSQGKAVLEYKQLIGIHAIAKAKNGLKKALMVGSGRGKRLSLS	360
Haplo-5	301	.....	360
Haplo-4	301	.....	360
Haplo-3	301	.....	360
Haplo-2	301	.....	360
Haplo-6	301	.....	360
Salinas	361	EQTLERAASLYGTDLVRFQKQNILRVFPKGTTRVTSTNFRPLEAWMHGAQMVAFNMQGYDK	420
Haplo-2	361	.....	420
Haplo-3	361	.....	420
Haplo-4	361	.....	420
Haplo-5	361	.....	420
Haplo-6	361	.....	420
Salinas	421	SLWMMHGMFRSNGGCGYVKKPDFLIGRDPNDEVFDPKATLEVKKILRVKVMYMGDGRMDF	480
Haplo-2	421	.....	480
Haplo-3	421	.....	480
Haplo-4	421	.....	480
Haplo-5	421	.....	480
Haplo-6	421	.....	480

Salinas	481	SQTHFDAFSPDFYTKMYMVGVPD	DDTKKKT	RIKDDW	PIWDEEFTFPLTVPELALLKI	540
Haplo-2	481	.....				540
Haplo-3	481	.....				540
Haplo-4	481	.....				540
Haplo-5	481	.....				540
Haplo-6	481	.....			L.....	540

Salinas	541	VVRDYNISEKDDFGGQTCLPVSEIETGIRTVPLHNKKGKKFEHVKLLMRFHFE	593
Haplo-2	541	.....	593
Haplo-3	541	.....	593
Haplo-4	541	.....	593
Haplo-5	541	.....	593
Haplo-6	541	.....V.....K.....	593