

Table S3 The co-located result of enriched genes and reported QTLs related to resistance.

Gene ID	QTL	References
<i>Glyma.03G043600</i>	<i>SCN 4-3</i>	Concibido et al. 1997
	<i>Phytoph 14-5</i>	Lee et al. 2013
	<i>Sclero 2-21</i>	Arahana et al. 2001
	<i>Sclero 3-15</i>	Arahana et al. 2001
	<i>Sclero 4-9</i>	Arahana et al. 2001
	<i>Sclero 5-13</i>	Arahana et al. 2001
<i>Glyma.03G075200</i>	<i>Sclero 6-10</i>	Arahana et al. 2001
	<i>SCN 44-15</i>	Jiao et al. 2015
	<i>SDS 13-10</i>	Abdelmajid et al. 2012
<i>Glyma.06G261400</i>	<i>Phytoph 6-8</i>	Li et al. 2010
	<i>Bean pyralid 1-4</i>	Xing et al. 2012
	<i>Phytoph 6-8</i>	Li et al. 2010
<i>Glyma.06G265400</i>	<i>SDS 16-6</i>	Swaminathan et al. 2016
	<i>Bean pyralid 1-4</i>	Xing et al. 2012
<i>Glyma.07G065000</i>	<i>Phytoph 14-8</i>	Lee et al. 2013
<i>Glyma.07G065600</i>	<i>Rag 3-1</i>	Zhang et al. 2009
<i>Glyma.07G065500</i>	<i>Common cutworm 1-2</i>	Komatsu et al. 2005
<i>Glyma.08G319300</i>	<i>Sclero 9-2</i>	Guo et al. 2008
	<i>SCN 50-3</i>	Swaminathan et al. 2018
<i>Glyma.12G239200</i>	<i>SCN 10-4</i>	Qiu et al. 1999
	<i>SCN 11-1</i>	Qiu et al. 1999
	<i>Phytoph 8-4</i>	Tucker et al. 2010
<i>Glyma.13G190000</i>	<i>Peanut root-knot nematode 1-5</i>	Tamulonis et al. 1997a
	<i>Peanut root-knot nematode 2-1</i>	Tamulonis et al. 1997a
	<i>Jav root-knot nematode 1-7</i>	Tamulonis et al. 1997b
<i>Glyma.15G247600</i>	<i>SCN 25-1</i>	Yue et al. 2001
	<i>Peanut root-knot nematode 2-2</i>	Tamulonis et al. 1997a
	<i>SDS disease index 21-2</i>	Luckew et al. 2017
<i>Glyma.16G136900</i>	<i>Asian Soybean Rust 2-4</i>	Harris et al. 2015
	<i>SCN 40-3</i>	Ferreira et al. 2011
	<i>Sclero 2-19</i>	Arahana et al. 2001
<i>Glyma.19G055000</i>	<i>Sclero 3-13</i>	Arahana et al. 2001
	<i>Sclero 4-8</i>	Arahana et al. 2001
	<i>Sclero 6-8</i>	Arahana et al. 2001
<i>Glyma.19G137200</i>	<i>SDS 13-3</i>	Abdelmajid et al. 2012

References

- Arahana V S, Graef G L, Specht J E, Steadman J R, Eskridge K M. 2001. Identification of QTLs for resistance to *Sclerotinia sclerotiorum* in Soybean. *Crop Science*, **41**, 180-188.
- Abdelmajid K M, Ramos L, Mbofung G, Hyten D L, Kantartzi S K, Leandro L, IV R L G, Njiti V N, Cianzio S, Meksem K. 2012. The 'PI 438489B' by 'Hamilton' SNP-based genetic linkage map

- of soybean [*Glycine max* (L.) Merr.] identified quantitative trait loci that underlie seedling SDS resistance. *Journal of Plant Genome Sciences*, **1**, 18-30.
- Concibido V C, Lange D A, Denny R L, Orf J H, Young N D. 1997. Genome mapping of soybean cyst nematode resistance genes in 'Peking', PI 90763, and PI 88788 using DNA markers. *Crop Science*, **37**, 258-264.
- Ferreira M F D S, Cervigni G D L, Ferreira A, Schuster I, Moreira M A, Santana F A, Pereira W D, Barros E G D, Moreira M A. 2011. QTLs for resistance to soybean cyst nematode, races 3, 9, and 14 in cultivar Hartwig. *Pesquisa Agropecuária Brasil*, **46**, 420-428.
- Guo X M, Wang D C, Gordon S G, Helliwell E, Smith T, Berry S A, St. Martin S K, Dorrance A E. 2008. Genetic mapping of QTLs underlying partial resistance to *Sclerotinia sclerotiorum* in soybean PI 391589A and PI 391589B. *Crop Science*, **48**, 1129-1139.
- Harris D K, Hussein A H, Buck J W, Phillips D V, Li Z L, Boerma H R. 2015. Soybean quantitative trait loci conditioning soybean rust-induced canopy damage. *Crop science*, **55**, 2589-2597.
- Jiao Y Q, Vuong T D, Liu Y, Meinhardt C, Liu Y, Joshi T, Cregan P B, Xu D, Shannon J G, Nguyen H T. 2015. Identification and evaluation of quantitative trait loci underlying resistance to multiple HG types of soybean cyst nematode in soybean PI 437655. *Theoretical and Applied Genetics*, **128**, 15-23.
- Komatsu K, Okuda S, Takahashi M, Matsunaga R, Nakazawa Y. 2005. QTL mapping of antibiosis resistance to common cutworm (*Spodoptera litura Fabricius*) in soybean. *Crop Science*, **45**, 2044-2048.
- Lee S, Mian M A R, McHale L K, Wang H, Wijeratne A J, Sneller C H, Dorrance A E. 2013. Novel quantitative trait loci for partial resistance to *Phytophthora sojae* in soybean PI 398841. *Theoretical and Applied Genetics*, **126**, 1121-1132.
- Li X P, Han Y P, Teng W L, Zhang S Z, Yu K F, Poysa V, Anderson T, Ding J J, Li W B. 2010. Pyramided QTL underlying tolerance to *Phytophthora* root rot in mega-environments from soybean cultivars 'Conrad' and 'Hefeng 25'. *Theoretical and Applied Genetics*, **121**, 651-658.
- Luckew A S, Swaminathan S, Leandro L F, Orf J H, Cianzio S R. 2017. 'MN1606SP' by 'Spencer' filial soybean population reveals novel quantitative trait loci and interactions among loci conditioning SDS resistance. *Theoretical and Applied Genetics*, **130**, 2139-2149.
- Qiu B X, Arelli P R, Sleper D A. 1999. RFLP markers associated with soybean cyst nematode resistance and seed composition in a 'Peking'×'Essex' population. *Theoretical and Applied Genetics*, **98**, 356-364.
- Swaminathan S, Abeysekara N S, Liu M, Cianzio S R, Bhattacharyya M K. 2016. Quantitative trait loci underlying host responses of soybean to *Fusarium virguliforme* toxins that cause foliar sudden death syndrome. *Theoretical and Applied Genetics*, **129**, 495-506.
- Swaminathan S, Abeysekara N S, Knight J M, Liu M, Dong J, Hudson M E, Bhattacharyya M K, Cianzio S R. 2018. Mapping of new quantitative trait loci for sudden death syndrome and soybean cyst nematode resistance in two soybean populations. *Theoretical and Applied Genetics*, **131**, 1047-1062.
- Tucker D M, Maroof M A S, Mideros S, Skoneczka J A, Nabati D A, Buss G R, Hoeschele I, Tyler B M, St. Martin S K, Dorrance A E. 2010. Mapping quantitative trait loci for partial resistance to *Phytophthora sojae* in a soybean interspecific cross. *Crop science*, **50**, 628-635.

- Tamulonis J P, Luzzi B M, Hussey R S, Parrott W A, Boerma H R. 1997a. DNA marker analysis of loci conferring resistance to peanut root-knot nematode in soybean. *Theoretical and Applied Genetics*, **95**, 664-670.
- Tamulonis J P, Luzzi B M, Hussey R S, Parrott W A, Boerma H R. 1997b. DNA markers associated with resistance to javanese root-knot nematode in soybean. *Crop science*, **37**, 783-788.
- Xing G N, Zhou B, Wang Y F, Zhao T J, Yu D Y, Yu S Y, Gai J Y. 2012. Genetic components and major QTL confer resistance to bean pyralid (*Lamprosema indicata Fabricius*) under multiple environments in four RIL populations of soybean. *Theoretical and Applied Genetics*, **125**, 859-875.
- Yue P, Sleper D A, Arelli P R. 2001. Mapping resistance to multiple races of *Heterodera glycines* in soybean PI 89772. *Crop science*, **41**, 1589-1595.
- Zhang G R, Gu C H, Wang D C. 2009. Molecular mapping of soybean aphid resistance genes in PI 567541B. *Theoretical and Applied Genetics*, **118**, 473-482.