Table.S1. Candidate genes in 2018-2020 years

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Year | chromosome | Gene | Predicted Function |  | Length | Contribution rate |
| 2018 | Chr03 | *Glyma.03G144500.1* | 3PREDICTED: fatty acid desaturase-2, FAD2 |  | 1217 | 0.10 |
|  | Chr04 | *Glyma.04G191100.1* | 3PREDICTED: Glycine max probable pectate lyase 18-like (LOC100814679), mRNA |  | 1657 | 0.32 |
|  |  | *Glyma.04G116500.1 (GmWRI14)* | 3PREDICTED: plant WRI1 protein family |  | 1820 | 0.63 |
|  |  | *Glyma.04G203200.1* | 3PREDICTED: Glycine max respiratory burst oxidase homolog protein C-like (LOC100800248), mRNA |  | 2440 | 0.08 |
|  |  | *Glyma.04G084200.1* | 5PREDICTED: Glycine max probable transcriptional regulatory protein At2g25830-like (LOC100818936), transcript variant X2, mRNA |  | 1213 | 0.11 |
|  | Chr07 | *Glyma.07G033100.1* | 3PREDICTED: Glycine max ADP,ATP carrier protein 1, chloroplastic-like (LOC100793284), mRNA |  | 2317 | 0.12 |
|  |  | *Glyma.07G089000.1* | 3PREDICTED: Glycine max VIN3-like protein 1-like (LOC100780157), transcript variant X2, mRNA |  | 2756 | 0.10 |
|  | Chr08 | *Glyma.08G019700.1* | 3PREDICTED: Glycine max calcium-dependent protein kinase 3-like (LOC100777096), transcript variant 1, mRNA |  | 1877 | 0.16 |
|  |  | *Glyma.08G185000.2* | 3PREDICTED: Glycine max probable plastid-lipid-associated protein 4, chloroplastic-like (LOC100803367), transcript variant 1, mRNA |  | 979 | 0.15 |
|  | Chr11 | *Glyma.11G229600.1* | 3PREDICTED: Glycine max DNA replication complex BAG protein，transcript variant 2, mRNA， |  | 1257 | 0.47 |
|  | Chr13 | *Glyma.13G163400.1* | 3PREDICTED: Glycine max protein S-acyltransferase 24-like (LOC100777470), misc\_RNA |  | 2490 | 0.32 |
|  | Chr15 | *Glyma.15G117700.1* | 3PREDICTED: Glycine max uncharacterized LOC102666654 (LOC102666654), mRNA |  | 693 | 0.17 |
|  |  | *Glyma.15G120100.1* | 3PREDICTED: Glycine max tRNA methyltransferase 10 homolog A-like (LOC100779099), mRNA |  | 1337 | 0.10 |
|  |  | *Glyma.15G120200.2* | 3PREDICTED: Glycine max uncharacterized LOC102665381 (LOC102665381), mRNA |  | 1227 | 0.08 |
|  |  | *Glyma.15G127500.1* | 3PREDICTED: Glycine max polygalacturonase-like (LOC100785701), mRNA |  | 1551 | 0.10 |
|  |  | *Glyma.15G201700.1* | 3PREDICTED: Glycine max uncharacterized LOC100814752 (LOC100814752), mRNA |  | 1945 | 0.11 |
|  |  | *Glyma.15G244000.1* | 3PREDICTED: Glycine max uncharacterized LOC100814749 (LOC100814749), mRNA |  | 1213 | 0.10 |
| 2019 | Chr19 | *Glyma.19G110600.1* | 3PREDICTED: Glycine max uncharacterized LOC102659858 (LOC102659858), mRNA |  | 1709 | 0.10 |
|  | Chr02 | *Glyma.02G220300.1* | 2PREDICTED: Glycine max ataxin-2-like (LOC100788042), mRNA |  | 1135 | 0.18 |
|  | Chr03 | *Glyma.03G144500.1* | 3PREDICTED: fatty acid desaturase-2, FAD2 |  | 1217 | 0.30 |
|  | Chr04 | *Glyma.04G116500.1 (GmWRI14)* | 2PREDICTED: Glycine max uncharacterized LOC102660202 (LOC102660202), mRNA |  | 1820 | 0.40 |
|  |  | *Glyma.04G110500.1* | 5PREDICTED: Glycine max uncharacterized LOC100500088 (LOC100500088), transcript variant X1, mRNA |  | 979 | 0.33 |
|  | Chr08 | *Glyma.08G071600.1* | 2PREDICTED: Glycine max metacaspase-3-like (LOC100796113), transcript variant X2, mRNA |  | 1839 | 0.12 |
|  | Chr11 | *Glyma.11G229600.1* | 3PREDICTED: Glycine max DNA replication complex BAG protein，transcript variant 2, mRNA， |  | 1257 | 0.47 |
|  | Chr12 | *Glyma.12G224000.1* | 2PREDICTED: Glycine max uncharacterized LOC102660202 (LOC102660202), mRNA |  | 2799 | 0.17 |
|  |  | *Glyma.12G227300.1* | 2PREDICTED: Glycine max DNA ligase 1-like (LOC100818049), mRNA |  | 2728 | 0.17 |
|  | Chr20 | *Glyma.20G111000.7* | 2PREDICTED: Fatty acid desaturase-2, FAD2 |  | 896 | 0.08 |
| 2020 | Chr03 | *Glyma.03G054100.1* | 3PREDICTED: Glycine max pleiotropic drug resistance protein 1-like (LOC100791601), mRNA |  | 4662 | 0.41 |
|  |  | *Glyma.03G163500.1* | 3PREDICTED: Glycine max probable pectate lyase 18-like (LOC100814679), mRNA |  | 1657 | 0.23 |
|  |  | *Glyma.03G168200.3* | 3PREDICTED: Glycine max respiratory burst oxidase homolog protein C-like (LOC100800248), mRNA |  | 2440 | 0.38 |
|  | Chr04 | *Glyma.04G191100.1* | 3PREDICTED: Glycine max serine/threonine-protein phosphatase PP2A catalytic subunit-like (LOC100782279), mRNA |  | 1655 | 0.33 |
|  |  | *Glyma.04G203200.1* | 3PREDICTED: Glycine max ADP,ATP carrier protein 1, chloroplastic-like (LOC100793284), mRNA |  | 2317 | 0.21 |
|  | Chr04 | *Glyma.04G116500.1 (GmWRI14)* | 2PREDICTED: Glycine max uncharacterized (LOC102660202) (LOC102660202), mRNA |  | 1820 | 0.50 |
|  | Chr05 | *Glyma.05G155300.1* | 3PREDICTED: Glycine max DNA replication complex GINS protein PSF3-like (LOC100797609), transcript variant 2, mRNA |  | 979 | 0.42 |
|  | Chr07 | *Glyma.07G033100.1* | 3PREDICTED: Glycine max protein S-acyltransferase 24-like (LOC100777470), misc RNA |  | 1257 | 0.41 |
|  |  | *Glyma.07G089000.1* | 3PREDICTED: Glycine max abscisic-aldehyde oxidase-like (LOC100812604), mRNA |  | 2490 | 0.45 |
|  | Cho19 | *Glyma.19G110600.1* | 3PREDICTED: Glycine max tRNA methyltransferase 10 homolog A-like (LOC100779099), mRNA |  | 1337 | 0.29 |