**Supplemental Table S1.** Resistance standard for wheat leaf rust resistance at the adult plant stage.

|  |  |  |
| --- | --- | --- |
| **Infection type** | **Disease index (LRS)** | **Evaluation of resistance** |
| 0 | － | Immune (I) |
| ; | － | Nearly immune (NIM) |
| 1 | － | Highly Resistant (HR) |
| 2 | － | Moderately resistant (MR) |
| 3～4 | ≦30 | Slow rusting (SR) |
| 3 | ＞30 | Moderately susceptible (MS) |
| 4 | ＞30 | Highly Susceptible (HS) |

Note: 0, immune response, no sign of infection; ;, hypersensitive chlorotic or necrotic flecks; 1, small uredinia surrounded by necrosis; 2, small uredinia surrounded by chlorosis; 3, moderate size uredinia without necrosis or chlorosis; 4, large uredinia without necrosis or chlorosis.

**Supplemental Table S2**. Sequences for primer combinations used in the test.

|  |  |  |
| --- | --- | --- |
| **Gene** | **Marker name** | **Primer sequence** |
| *Lr1* | WR003F/R | F:GGGACAGAGACCTTGGTGGA R:GACGATGATGATTTGCTGCTGG |
| *Lr9* | J13/1/2 | F:TCCTTTTATTCCGCACGCCGG R:CCACACTACCCCAAAGAGACG |
| *Lr9* | SCS5-550 | F:TGCGCCCTTCTGAACTGTAT R: TGCGCCCTTCAAAGGAAG |
| *Lr10* | Fl.2245/Lr10-6/r2 | F:GTGTAATGCATGCAGGTTCC R: AGGTGTGAGTGAGTTATGTT |
| *Lr19* | SCS265-F/R | F:GGCGGATAAGCAGAGCAGAG R:GGCGGATAAGTGGGTTATG |
| *Lr19* | SCS253736-F/R | F:GCTGGTTCCACAAAGCAAA R:GCTGGTTCCTTAGATAGGTG |
| *Lr20* | STS638-L/R | F:ACAGCGATGAAGCAATGAA R:GTCCAGTTGGTTGATGGAAT |
| *Lr21* | D14-L/R | F:CGCTTTTACCGAGATTGGTC R: TCTGGTATCTCACGAAGCCTT |
| *Lr24* | J09/1/2 | F:TCTAGTCTGTACATGGGGG R:TGGCACATGAACTCCATACG |
| *Lr24* | S1302-609 | F:CGCAGGTTCCAAATACTTTTC R:CGCAGGTTCTACCT AATGCAA |
| *Lr26* | ω-secalin | F: ACCTTCCTCATCTTTGTCCT R:CCGATGCCTATACCACTACT |
| *Lr26* | Glu-B3 | F: GGTACCAACAACAACAACCC R: GTTGCTGCTGAGGTTGGTTC |
| *Lr28* | SCS421570 | F:ACAAGGTAAGTCTCCAACCA R:AGTCGACCGAGATTTTAACC |
| *Lr28* | Xgwm160 | F:TTCAATTCAGTCTTGGCTTGG R: CTGCAGGAAAAAAAGTAGACCC |
| *Lr29* | OPY10/1/2 | F:GTGACCTCAGGCAATGCA R: GTGACCTCAGAACCGATG |
| *Lr34* | csLv34F/R | F:GTTGGTTAAGACTGGTGATGG R:TGCTTGCTATTGCTGAATAGT |
| *Lr34* | *cssfr5* | L34SPE-GGGAGCATTATTTTTTTCCATCATG  L34DIN9F- TTGATGAAACCAGTTTTTTTTCTA  L34DINT13R2- ACTTTCCTGAAAATAATACAAGCA  L34MINUSR- TATGCCATTTAACATAATCATGAA |
| *Lr35* | Sr39 F2/R3 | F:AGAGAGAGTAGAAGAGCTGC R:AGAGAGAGAGCATCCACC |
| *Lr37* | VENTRIUP/LN2 | F:AGGGGCTACTGACCAAGGCT R:TGCTAAACCTCTAGCGTAAG |
| *Lr38* | P3/p4 | F:GCTGAATCTGCGTATCGTCCC R: GACTTGTTCTTCGGCGTGTTG |
| *Lr47* | PS10L/PS10R | F:GCTACTGGGACAAAATCTCC R:CACGACAGACGGACCAAATG |

**Supplemental Table S3.** PCR amplication programes for different primer combinations and the size of amplification fragments.

|  |  |  |  |
| --- | --- | --- | --- |
| **Gene** | **Marker name** | **Response procedures** | **Fragment size** |
| *Lr1* | WR003F/R | 94°C 5min；30cycles（94°C 1min；65°C 1min；72°C 2min）；72°C 10min；4°C，forever | 760bp |
| *Lr9* | J13/1/2 | 94°C 6min；35cycles（92°C 1min；66°C 1min；72°C 2min）；72°C 10min；4°C，forever | 1100bp |
| *Lr9* | SCS5-550 | 94°C 6min；35cycles（92°C 1min；65°C 1min；72°C 2min）；72°C 10min；4°C，forever | 550bp |
| *Lr10* | Fl.2245/Lr10-6/r2 | 94°C 3min；35cycles（94°C 45s；65°C 45s；72°C 30s）；72°C 10min；4°C，forever | 310bp |
| *Lr19* | SCS265-F/R | 94°C 5min；35cycles（94°C 1min；65°C 1min；72°C 2min）；72°C 10min；4°C，forever | 512bp |
| *Lr19* | SCS253736-F/R | 94°C 5min；35cycles（94°C 1min；62.2°C 1min；72°C 2min）；72°C 10min；4°C，forever | 736bp |
| *Lr20* | STS638-L/R | 94°C 3min；35cycles（94°C 1min；60°C 1min；72°C 2min）；72°C 10min；4°C，forever | 542bp |
| *Lr21* | D14-L/R | 94°C 3min；35cycles（94°C 1min；62°C 1min；72°C 2min）；72°C 10min；4°C，forever | 669bp |
| *Lr24* | J09/1/2 | 94°C 3min；35cycles（94°C 1min；54°C 1min；72°C 2min）；72°C 10min；4°C，forever | 607bp |
| *Lr24* | S1302-609 | 94°C 3min；35cycles（94°C 1min；60°C 1min；72°C 2min）；72°C 10min；4°C，forever | 350bp |
| *Lr26* | ω-secalin | 94°C 5min；35cycles（94°C 1min；65°C 1min；72°C 2min）；72°C 10min；4°C，forever | 636bp |
| *Lr26* | Glu-B3 | 94°C 5min；35cycles（94°C 1min；65°C 1min；72°C 2min）；72°C 10min；4°C，forever | 1076bp |
| *Lr28* | SCS421570 | 95°C 4min；35cycles（94°C 1min；60°C 1min；72°C 2min）；72°C 10min；4°C，forever | 196bp |
| *Lr28* | Xgwm160 | 94°C 3min；35cycles（94°C 1min；62°C 1min；72°C 2min）；72°C 10min；4°C，forever | 560bp |
| *Lr29* | OPY10/1/2 | 94°C 3min；35cycles（94°C 1min；65°C 1min；72°C 2min）；72°C 10min；4°C，forever | 1000bp |
| *Lr34* | csLv34F/R | 94°C 5min；35cycles（94°C 1min；55°C 1min；72°C 2min）；72℃ 10min；4℃，forever | 150 or 229bp |
| *Lr34* | *cssfr5* | 94°C 5min；35cycles（94°C 1min；58°C 1min；72°C 2min）；72°C 10min；4°C，forever | 751 or 523bp |
| *Lr35* | Sr39 F2/R3 | 94°C 3min；35cycles（94°C 1min；65°C 1min；72°C 2min）；72°C 10min；4°C，forever | 900bp |
| *Lr37* | VENTRIUP/LN2 | 94°C 3min；35cycles（94°C 1min；55°C 1min；72°C 2min）；72°C 10min；4°C，forever | 259bp |
| *Lr38* | P3/p4 | 94°C 3min；35cycles（94°C 1min；68°C 1min；72°C 2min）；72°C 10min；4°C，forever | 982bp |
| *Lr47* | PS10L/PS10R | 94°C 3min；35cycles（94°C 1min；60°C 1min；72°C 2min）；72°C 10min；4°C，forever | 282bp |