Table S1. The three comprehensive FNP marker systems for deeper allele mining, and the primers and markers for transformation test of the *Pid* family.

Gene (accession number) / Marker name / Primer sequence (5′→3′) [a]	**Annealing temp (°C)** [b]	**Restriction enzyme (°C)** [c]	**Expected size (bp)** [d]
Set I. *Pid2* (FJ915121.1)			
Pid2-F/N^{C1022T}	62	*Taq* I (65)	109/85
F: acagttccggcagactcttgtgacat			
R: agtttgcaaacgagccgagggtc			
Pid2-F/N^{A1383G}	56	*Mlu* I (37)	126/104
F: ggaatacaactcgtttcgcatct			
R: ctatgatagccaaagttacgcg			
Pid2-DIG^{T2058C}	58	*Hha* I (37)	226/174
F: agttgatgaccagggagcaga			
R: ccttcctccagcttcttgaa			
Pid2-ZS^{A555G}	53	*Hpa* II (37)	111/88
F: gccacctctatgcaactactg			
R: accagacagaagagtgtctgc			
Set II. *Pid3* (FJ745364.1)			
Pid3-F/N^{G2009A}	58	*Bsl* I (55)	138/104
F: gcagtcgttgtttctaagcaatttg			
R: cacaagagagcctaggtgatgaac			
Pid3-F/N^{C2209T}	62	*Bam* HI (37)	216/145
F: aaggtgcgaagttgccattgt			
R: cgtgaggttattcagattgcttacag			
Pid3-DIG^{G775A}	56	*Bsr* I (65)	138/102
F: aagagtttcgcaagaatgatcgg			
R: cattccatacatcatctaggacaagg			
Pid3-DIG^{G2695A}	58	*Hpy* 99I (37)	148/121
F: atctgaagttcctgctctgtccaa			
R: acgtcacaaatcattcgctct			
Pid3-TTP^{C1136T}	57	*Apa* LI (37)	110/85
F: aatgagataaggaattgtccgccg			
R: aatgacagaaggcgtccaatgtgc			
Pid3-TTP^{C1623G}	60	*Dde* I (37)	120/102
F: agcacgccgtttatcaactca			
R: ggtaatgactgaagcgaactg			
Pid3-ZS^{G477A}	60	*Mse* I (37)	145/125
dF: gayrgcgggaaggaggagctt			
R: cacactgaccaccatgcggc			
Pid3-ZS^{C525T}	62	*Hpa* II (37)	125/104

F: caagagggaggatgagcttgc			
R: ccgtcttgccgattccac			
Set III. *Pid4* (MG839283.1)			
Pid4-F/N^{C1217G}	57	*Mnl* I (37)	107/73
F: cataattcaaaactgtgcttatccct			
R: cctcataacttttatttgattttctca			
Pid4-F/N^{A1452G}	60	*Bsp* HI (37)	115/97
F: gcagctatcttcagggctcat			
R: gctaaggtacagaaaacatggct			
Pid4-DIG^{A1149T}	53	*Xba* I (37)	160/136
F: ttaatgaatctgtttttcctgactctag			
R: gattttctcagcagcaaatgtttagc			
Pid4-DIG^{A1898G}	62	*Bsr* I (65)	114/72
dF: gggagacaggaktcawacctaagc			
R1: gagcatccttagctgtggtgaac			
R2: gatcatccttagttgggacggac			
Pid4-NPB^{G1362A}	59	*Aci* I (37)	130/82
F: aggctgagaaggtgtttgata			
R: gaagatagctgcagagacagt			
Pid4-NPB^{C1554A}	53	*Aci* I (37)	118/97
F1: tttctgtaccttagcattttccg			
F2: tttctgtatcttagcgttttccg			
R: caacatcctccatagccattcca			
Pid4-SN/CO^{T1841A}	57	*Hph* I (37)	195/161
F: catcaatagaagcatgattcaacc			
R: tcctgtctcccatcaatagaaag			
Pid4-SN/CO^{C2250G}	56	*Apa* I (25)	120/92
F1: gtcacttcgaatttactacccgtgg			
F2: gatactccgatttcaatatctatgg			
dR: ggaactcygccaccaccwscga			
Set IV. Transformation test			
***Pid2* cloning**	62	*Asc* I (37)	6,259
F: attggcgcgccgcatcaacatagacgtagcgtgg			
R: attggcgcgccctagttacagatcactgtgccat			
***Pid3* cloning**	62	*Asc* I (37)	6,237
F: attggcgcgcccacacattgtacacctacgaccac			
R: attggcgcgccgaacgacaagtgcgacatgattg			
HYG	58	*n/a*	879
F: cttctgcgggcgatttgt			
R: cagcgtctccgacctgat			

Vector_F/Pid2_R	56	*n/a*	4,738
F: aattaattcctaggccaccatgttg			
R: ctatgatagccaaagttacgcg			
Pid2_F/Vector_R	56	*n/a*	2,114
F: ggaatacaactcgtttcgcatct			
R: gtctggaccgatggctgtgtag			
Vector_F/Pid3_R	60	*n/a*	4,209
F: aattaattcctaggccaccatgttg			
R: aatgacagaaggcgtccaatgtgc			
Pid3_F/Vector_R	60	*n/a*	2,919
F: aagagtttcgcaagaatgatcgg			
R: gtctggaccgatggctgtgtag			

[a] F, forward; R, reverse; PCR with multiple primers was designed with F1, F2, or R1, R2, if any; and degenerate primer sequences were labelled dF and dR, where r=a/g; w=a/t; k=g/t; s=c/g; and y=c/t. For transformation test, sequence unlined was responding to the common restriction enzyme *Asc* I for ligating fragments (resistance genes) into the binary vectors, pYLTAC380H.

[b] Each PCR was initiated by a 94°C/3 min denaturation, followed by 35 cycles of 94°C/30 s, 50-62°C/30 s (temperature dependent on choice of primers), 72°C/25-30 s (time dependent on amplicon size) and a final extension step of 72°C/5 min. Amplicons were electrophoresed through a 10-12% polyacrylamide gel. For transformation test, each PCR was initiated by a 95°C/3 min denaturation, followed by 35 cycles of 95°C/15 s, 50-62°C/15 s, 72°C/2-8 min and a final extension step of 72°C/5 min. Amplicons were electrophoresed through a 1% agarose gel.

[c] The number shown in parentheses refers to the temperature at which the restriction digestion reaction was run.

[d] Only the critical bands were sized.