

()

Blumeria graminis f. sp. tritici

//

(*Blumeria graminis f. sp. tritici*)

()

7.7.7.2.5

1.1.6.0.0

Pm1

Pm2+4b+8

Pm6 Pm3a, Pm3b, Pm4a, Pm8, Pm3c, Pm5

Pm7,

Pm1+2+9 Pm2, Pm3d

(%)

Pm2+6 Pm17

Blumeria graminis f. sp. tritici

Blumeria

graminis (DC.) E. O. Speer f. *sp. tritici* Em. Marchal (syn. *Erysiphe graminis f.sp. tritici*) (*Triticum*

aestivum L.)

Pm4b

Pm3

()

()

()

Pm3

Pm4b

B. graminis f. sp. *tritici*

(race specific resistance)

()

()

()

()

()

(Selection pressure)

()

(Pyramiding resistance genes)

Archive of SID

B. graminis f. sp. *tritici*

()

(Triplet code)

(

)

B. graminis f. sp. *tritici*

Pm3, Pm 8

Pm4b

Pm3b

B. graminis f. sp.

()

tritici

... *Blumeria graminis* f. sp. *tritici* :

B. graminis f. sp. *tritici*

()
()

()
(Namuco *et al.*, 1987)

()
()
Pm4b (Ronos)

°C

()

()

(L) - °C

(H) -

-) ()

- () -

- ())

) - (

Pm

Blumeria graminis f. sp. *tritici*

		Is.1	Is.2	Is.3	Is.4	Is.5	Is.6	Is.7	Is.8	Is.9	Is.10	Is.11	Is.12	Is.13	Is.14	Is.15	Is.16	Is.17
Axminster/8Cc*	Pm1	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H
Ulka/8Cc	Pm2	L	H	H	H	L	H	L	H	H	H	L	L	H	L	H	L	H
Asosan/8Cc(DH)	Pm3a	H	H	H	H	H	H	H	H	H	H	L	H	H	H	H	H	H
Chul/8Cc	Pm3b	H	H	H	H	L	H	H	H	H	H	H	H	H	H	H	H	H
Sonora/8Cc	Pm3c	H	H	H	H	H	H	H	H	H	H	L	H	L	H	H	H	H
Khapli/8Cc	Pm4a	H	H	H	H	H	H	H	H	H	H	L	H	H	H	H	H	H
Rektor(DH)	Pm5	H	H	H	H	H	H	H	H	H	H	L	H	H	H	L	H	H
NK-747	Pm6	H	H	H	H	H	H	H	H	H	H	H	H	L	L	H	H	H
Disponent(DH)	Pm8	H	H	H	H	L	H	H	H	H	H	H	H	H	H	H	H	H
Amigo	Pm17	L	L	L	L	L	L	L	L	L	L	L	L	L	H	L	L	L
M. Huntsman(DH)	Pm2+6	L	L	L	L	L	L	L	H	H	H	L	L	H	L	L	L	H
Apollo	Pm2+4b+8	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L
Rolle	Pm3d	L	H	H	H	H	H	L	H	H	H	L	L	L	H	L	L	H
Transec	Pm7	L	H	H	H	L	H	L	L	L	L	L	L	L	L	L	L	L
Normandie	Pm1+2+9	L	L	L	L	H	L	L	H	H	H	L	L	L	H	H	L	H

(Chancellor) = Cc . *

() = H () = L

... *Blumeria graminis* f. sp. *tritici* :

/ / / /

()

() (/)

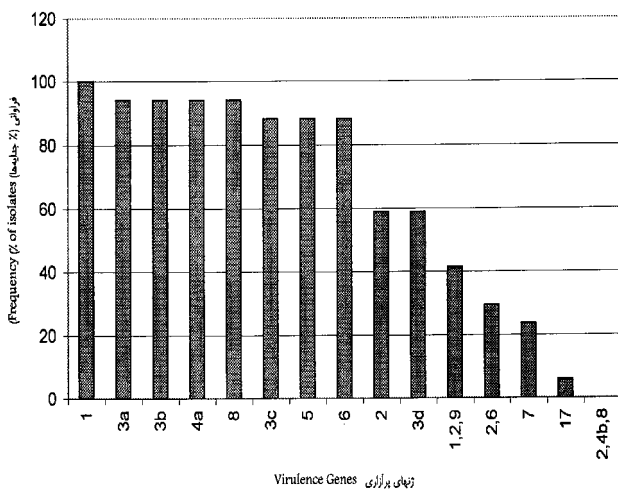
Pm7 Pm17, Pm2+4b+8

7.7.7.2.5

1.1.6.0.0

(gene for gene)

()



7.7.7.2.5,

1.1.6.0.0,

5.7.5.1.5

) Pm2+4b+8

(0)

5.7.7.0.0

7.7.7.0.3

5.6.3.0.5, 7.5.5.2.0, 7.7.6.0.4

/

(2)

Blumeria graminis f. sp

tritici

()

Pm1

(7-9)

Pm3a, Pm3b,

/

Pm8

Pm4a

Axminster

/

Pm6

Pm3c, Pm5

Pm1

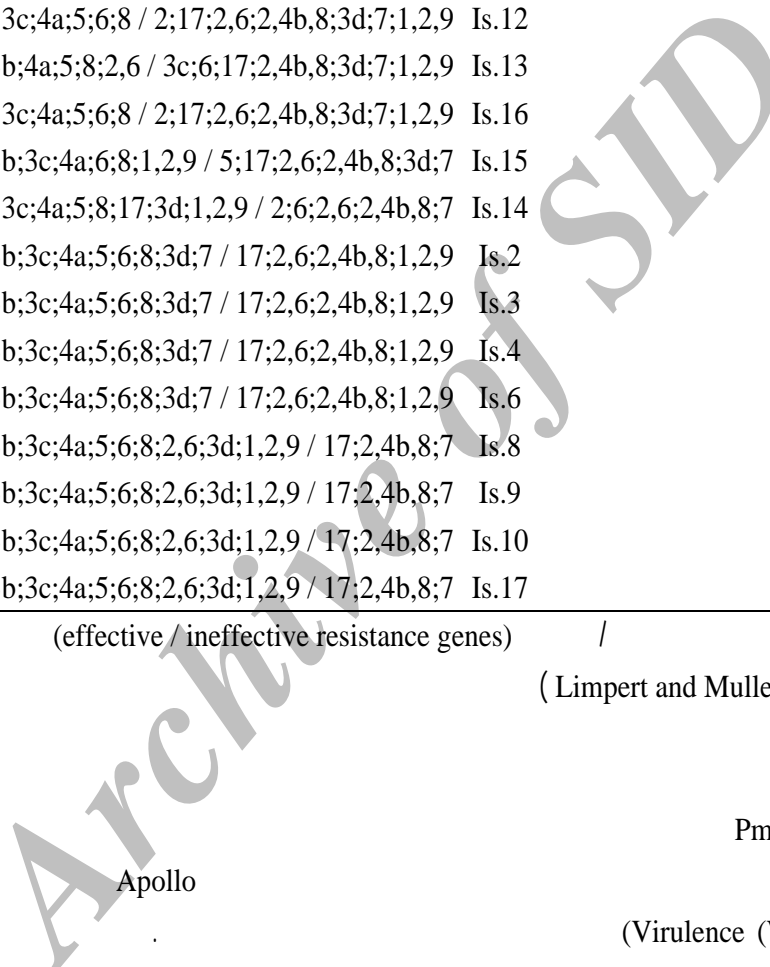
Pm3d

Pm2

(/)

Pm17 Pm1+2+9, Pm2+6, Pm7

*	/	**
1;3b;6;8 / 2;3a;3c;4a;5;17;2,6;2,4b,8;3d;7;1,2,9	Is.11	/ 1.1.6.0.0
1;3a;3b;3c;4a;5;6;8 / 2;17;2,6;2,4b,8;3d;7;1,2,9	Is.1	/ 5.7.7.0.0
1;3a;3c;4a;5;6;3d;1,2,9 / 2;3b;8;17;2,6;2,4b,8;7	Is.5	/ 5.6.3.0.5
1;3a;3b;3c;4a;5;6;8 / 2;17;2,6;2,4b,8;3d;7;1,2,9	Is.7	/ 5.7.7.0.0
1;3a;3b;3c;4a;5;6;8 / 2;17;2,6;2,4b,8;3d;7;1,2,9	Is.12	/ 5.7.7.0.0
1;2;3a;3b;4a;5;8;2,6 / 3c;6;17;2,4b,8;3d;7;1,2,9	Is.13	/ 7.5.5.2.0
1;3a;3b;3c;4a;5;6;8 / 2;17;2,6;2,4b,8;3d;7;1,2,9	Is.16	/ 5.7.7.0.0
1;2;3a;3b;3c;4a;6;8;1,2,9 / 5;17;2,6;2,4b,8;3d;7	Is.15	/ 7.7.6.0.4
1;3a;3b;3c;4a;5;8;17;3d;1,2,9 / 2;6;2,6;2,4b,8;7	Is.14	/ 5.7.5.1.5
1;2;3a;3b;3c;4a;5;6;8;3d;7 / 17;2,6;2,4b,8;1,2,9	Is.2	/ 7.7.7.0.3
1;2;3a;3b;3c;4a;5;6;8;3d;7 / 17;2,6;2,4b,8;1,2,9	Is.3	/ 7.7.7.0.3
1;2;3a;3b;3c;4a;5;6;8;3d;7 / 17;2,6;2,4b,8;1,2,9	Is.4	/ 7.7.7.0.3
1;2;3a;3b;3c;4a;5;6;8;3d;7 / 17;2,6;2,4b,8;1,2,9	Is.6	/ 7.7.7.0.3
1;2;3a;3b;3c;4a;5;6;8;2,6;3d;1,2,9 / 17;2,4b,8;7	Is.8	/ 7.7.7.2.5
1;2;3a;3b;3c;4a;5;6;8;2,6;3d;1,2,9 / 17;2,4b,8;7	Is.9	/ 7.7.7.2.5
1;2;3a;3b;3c;4a;5;6;8;2,6;3d;1,2,9 / 17;2,4b,8;7	Is.10	/ 7.7.7.2.5
1;2;3a;3b;3c;4a;5;6;8;2,6;3d;1,2,9 / 17;2,4b,8;7	Is.17	/ 7.7.7.2.5
(effective / ineffective resistance genes)		/ *
(Limpert and Muller, 1994)		**



Pm1

Apollo

(Avirulence (Avir))

(Virulence (Vir))

Asosan, Chul, Khapli

Pm2+4b+8

Apollo

Disponent

NK-747 Sonora, Rektor

Pm3a, Pm3b,

Pm3c, Pm5, Pm6

Pm4a, Pm8

... *Blumeria graminis* f. sp. *tritici* :

Pm4b

Pm4b

(Pyramiding resistance genes)

.()

Pm2+4b+8

Pm4b

()

() Pm7 Pm17

B. graminis f. sp. *tritici*

Pm3, Pm3b

(

)

Pm8

Pm4b

Weihenst.M1

Pm4b

Pm4b

REFERENCES

Blumeria graminis f. sp. *tritici*

()

Blumeria graminis f. sp. *tritici*

()

()

4. Briggie, L. W. 1966. Three loci in wheat involving resistance to *Erysiphe graminis* f. sp. *tritici*. *Crop Sci.* 6: 461-465.
5. Briggie, L. W. 1969. Near isogenic lines of wheat with genes for resistance to *Erysiphe graminis* f. sp. *tritici*. *Crop Sci.* 9: 70-72.
6. Imani, Y., A. Ouassou, & C. A. Griffey. 2002. Virulence of *Blumeria graminis* f. sp. *tritici* populations in Morocco. *Plant Dis.* 86:383-388.
7. Leath, S., & M. Heun. 1990. Identification of powdery mildew resistance genes in cultivars of soft red winter wheat. *Plant Dis.* 74:747-752.
8. Limpert, E. & K. Muller. 1994. Designation of pathotypes of plant pathogen. *J. Phytopathology* 140:346-358.
9. Limpert, E., B. Clifford, A. Dreiseitl, R. Johnson, K. Muller, A. Roelfs and C. Wellings. 1994. Systems of Designation of Pathotypes of Plant Pathogen. *J. Phytopathology* 140: 359-362.

10. Menzies, J. G., & B. H. MacNeill. 1986. Survey of virulence genes in *Erysiphe graminis* f. sp. *tritici* in southern Ontario for 1983 and 1984. *Phytopathology* 76: 656.
11. Namuco, L. O., W. R. Coffman, G. C. Bergstrom, & M. E. Sorrells. 1987. Virulence spectrum of the *Erysiphe graminis* f. sp. *tritici* population in New York. *Plant Dis.* 71:539-541.
12. Niewoehner, A. S., & S. Leath. 1998. Virulence of *Blumeria graminis* f. sp. *tritici* on winter wheat in the eastern United States. *Plant Dis.* 82:64-68.
13. Persuad, R. R. & E. P. Lipps. 1995. Virulence genes and virulence gene frequencies of *Blumeria graminis* f. sp. *tritici* in Ohio. *Plant Dis.* 76: 494-499.
14. Svec, M., L. Szunics, M. Miklovicova, T. Slovakova, V. Tisova, & P. Hauptvogel. 2002. Identification of genes for resistance to wheat powdery mildew in Hungarian, Polish and Slovak wheat cultivars. *Plant protect. Sci.*, 38: 64-72.
15. Zeller, F. J., X. Huang, E. V. Paderina, A. Collaku, K. Kowalczyk, M. Aslam, H. Peusha, & S. L. K. Hesam. 1998. Identification of powdery mildew resistance genes in common wheat (*Triticum aestivum*). XII. Cultivars and land races grown in Mediterranean countries. *Plant Genet. Res. Newsl.* 116:5-8.
16. Zeller, F. J., N. Petrova, P. Spetsov & S. L. K. Hsam. 2001. Identification of powdery mildew and leaf rust resistance genes in common wheat (*Triticum aestivum* L. em. Thell.) cultivars grown in Bulgaria and Russia, *Plant Genet. Res. Newsl.* 122:32-35.

Archive of SID