

()

QTL

*

(// : // :)

QTL

QTL

(Yudal)

(Darmor-Bzh)

RAPD RFLP

SNP SSR

DY6 DY13

QTL

QTL

QTL

:

بوسيله

(*Brassica napus* L.)

(1999) Butruille et al. . (Chen et al., 2007)

N12 N3 N2

QTL

Yi et al. .

N13

(QTL)

(2006)

QTL

QTL

(Javidfar et al., 2006)

(2006) Udall et al. .

QTL

(2006) Quijada et al.

(Liu, 1998)

QTL

QTL (2007) Chen et al. .

QTL

(Liu, 1998;

.Kato et al., 2000)

F2

QTL

(2007) Ramchiaryet al. .

QTL

RFLP

() :

QTL

()

()

QTL

QTL

()

(Snowdon & Friedt, 2004)

QTL

(Mayerhofer et al., 1978; Pilet et al., 1998; Somers et al., 1993; Ferreira et al., 1993; Osborn et al., 1997; (Howell et al., Javidfar et al., 2006) 2003; Samizade Lahiji, 2003; Delourme et al., (Somers et al., 2001) 2006)

INRA Darmor-Bzh×Yudal

(Foisset et al., 1996; Pilet et al., 1998;

Delourme et al., 2006)

INRA

(Chen et al., 2007)

Darmor (Delourme et al., 2006)

Samizade .

Yudal

(2003) Lahiji

(Delourme et al., 2006)

Bzh .

Darmor

Darmor-Bzh

1. Quantitative trait loci

2. marker assisted selection

... QTL :

INRA

Primor

()

Mapmaker/Exps3.0

(Foisset et al., 1996)

LOD=4

(Haldane, 1919)

Wang RGS003 Hyola401)

QTL

(Dante Zarfam Modena Okapi

QTLcartographer

QTL

(Basten et al., 1994; Zeng, 1994)

(Zeng, 1994)

/

()

QTL

LOD

QTL

(Kim & Riesenber, 1999)

QTL

QTL

QTL

QTL

LOD

LOD

QTL

QTL

(Lander & Botstein, 1989)

()

()

(2001) Lombard & Delurme (1996) Foisset et al.

()

(2006) Delourme et al.

SSR SNP RAPD RFLP

-
- 4. composite interval mapping
 - 5. Windows size
 - 6. Permutation

-
- 1. Dwarfism
 - 2. Blackleg
 - 3. Light leaf spot

F2

(Mutschler, 1996)

QTL

QTL

()

(Falconer, 1996)

()

h²

/	/	/	**	
/	/	/	**	()
/	/	/	**	()
/	/	/	*	()
/	/	/	**	
/	/	/	**	

** *

2n=4x=38

/

QTL

Foisset .

(Ferreira, 1995)

(1996) et al

Bzh

W02.1110

DY_{1b} DY_{1a}

()

DY₇

DY₇₁₇

DY₁₇

QTL

QTL

R²

()

()

Minitab

Darmor

QTL

Yudal

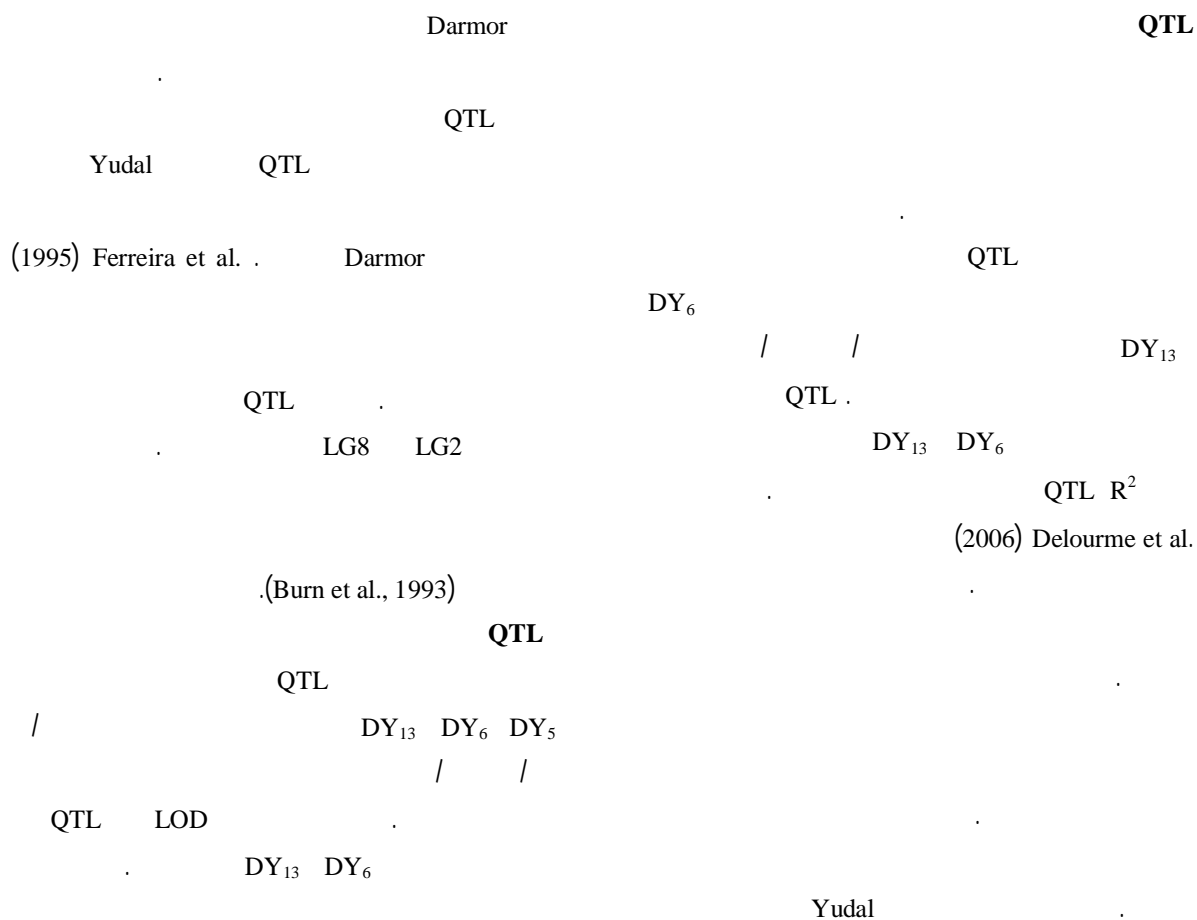
... QTL :

/	/	/	/	/		
/	/	/	/	/		()
/		/	/		/	()
/	/	/	/	/	/	()
/	/	/	/	/		
/	/	/	/	/	/	

()	()	()	()	()	()
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				/	**
			/	/	*
	/	**	/	**	**
/	**	/	/	**	**

** *



2. Vernalization
3. Ecotype

1. QTL with major effects

QTL

b	R ² a	LOD			
/	/	/	/	<i>Bzh-W09.CD1</i>	DY ₆
/	/	/	/	<i>Na10C06- a4NE6</i>	DY ₁₃
/	/		/	<i>Y04.1510- A16.550</i>	DY ₅
/	/	/	/	<i>Bzh-W09.CD1</i>	DY ₆
/	/	/	/	<i>Na10C06- a4NE6</i>	DY ₁₃
/	/	/	/	<i>Bzh-W09.CD1</i>	DY ₆
/	/	/	/	<i>Bras068 - O113C12</i>	DY ₇₁₇
/	/	/	/	<i>H12.1300- Na10C06</i>	DY ₁₃
/	/	/	/	<i>PFM319 - N01.800</i>	DY ₁₆
/	/	/	/	<i>Na10C06- a4NE6</i>	DY ₁₃
/	/	/	/	<i>P11.715 - Na10D07</i>	DY ₁₅
/	/	/	/	<i>Na12D08- O20.1100</i>	DY ₆
/	/	/	/	<i>Bras068 - O113C12</i>	DY ₇₁₇
/	/	/	/	<i>E11.1850- CB10526</i>	DY ₁₃

QTL :a

$$\left(\frac{\text{Darmor} - \text{Yudal}}{2} \right) \text{Yudal} \quad \text{Darmor} \quad \text{:b}$$

/ DY6 QTL R² *Bzh*
 (Foisset et al., 1996)
 QTL Darmor-Bzh
 QTL QTL Darmor-Bzh
 QTL DY13 DY6 DY6
 DY13 DY6 *Bzh*
 QTL
 (r= / **) QTL
 QTL
 QTL (2007) Chen et al.
 (2007) Chen et al. .
 QTL QTL
 (LMI) QTL (HPB)
 QTL QTL
 QTL DY16 QTL
 QTL DY6 QTL
 / / / DY13 DY717

... QTL :

DY₆ / / QTL R² QTL

QTL (2006) Delourme et al. / QTL DY₁₅ DY₁₃ QTL
DY₁₃ DY₆ /

QTL

DY₆

DY₆

Bzh

QTL

Darmor

Yudal

QTL

(Diepenbrock, 2000)

QTL

Bzh W09.CD1

QTL

DY₆

QTL

Bzh

DY₇₁₇ DY₆

/ / /

QTL

DY₁₃

QTL

(Chen et al., 2007)

DY₁₃

QTL

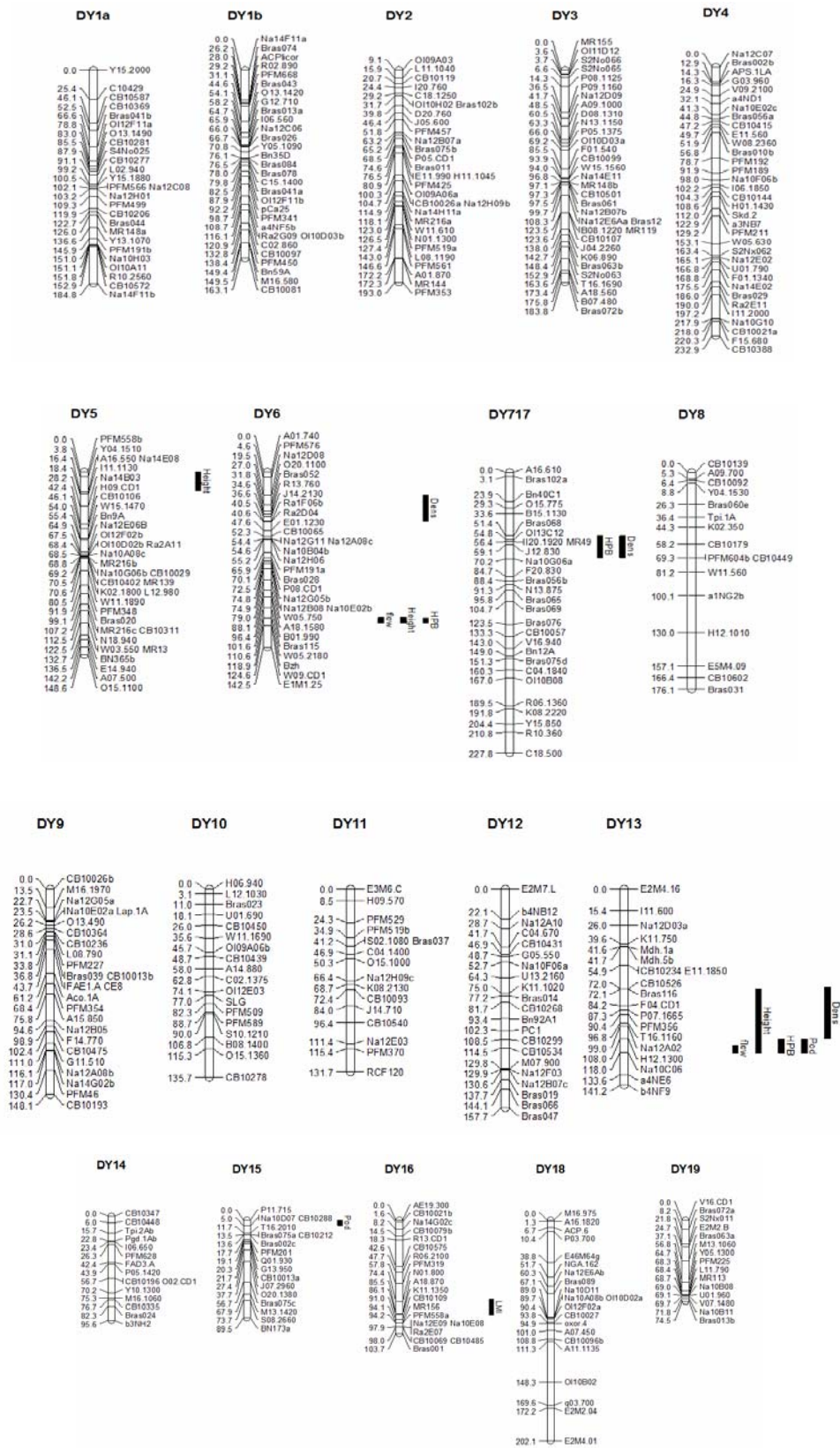
QTL

QTL

DY₁₃

QTL

QTL .



QTL Darmor-Bzh x Yudal : Dens LMI POD HPB Height flow

INRA

(Pilet et al., 1998)

3. Cabbage aphid

1. Blackleg
2. Light leaf spot

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