DEPARTMENT OF
PRIMARY INDUSTRIES

National *Brassica* Germplasm Improvement Program –

Single Spore Isolate screening of novel *sylvestris* resistant lines from AgCanada (AAFC)




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Aims and background

- *To* screen 19 AgCanada lines (from the late Roger Rimmer) containing known *LepR* genes against characterised polygenic and *sylvestris* attacking isolates.
  - Lines provided as part of blackleg consortium (NBGIP involved in phenotyping this original material)
  - Molecular markers are available for *LepR* genes
- To determine if any of these novel resistance sources would be useful for incorporation into Australian breeding programs
  - *LepR1*, *LepR2* and LepR*4* genes currently not used in Australia

Materials and methods

- 19 AAFC lines containing known *LepR* genes were screened against 1 polygenic and 2 *sylvestris*-attacking isolates with assistance of MGP and Denise B.
- Isolates used were –
  - Polygenic (04MGPP031)
  - *Sylvestris* (04MGPS002 and MGPS010)
- After spray innoculation, plants were grown to maturity in polyhouse conditions and then assessed for survival and internal infection


TOOL
BOX

2004 and 2008 Average internal infection score

(parenthesis = 2008 scores), Juncea was different cultivar

	Beacon	Juncea	Surpass400
04MGP031	74 (80)	20 (70)	0 (0)
04MGPS002	32 (63)	56 (13)	96 (99)
04MGPS010	56 (8)	52 (28)	98 (96)

Line	R gene	04MGPP031 Internal infection %	04MGPS002 Internal infection %	04MGPS010 Internal infection %
DM11237198-18S-106-5	LepR1	14	20	19
DM11237198-18S-116-1	LepR1	25	13	21
DM11237198-18S-68-3	LepR1	11	4	14
DM11237198-19S-21-2	LepR1	28	25	24
DM11237198-19S-40-2	LepR1	23	28	3
DM11237198-19S-8-1	LepR1	19	16	40
DM12342s-2	LepR1	38	20	18
DM12343s-5	LepR1	20	6	37
DM12346s-4	LepR1	29	5	13
DM12349s-2	LepR1	15	29	29
m625912-11-1-4	LepR2	0	58	100
m625912-11-14-5	LepR2	17	99	100
m625912-11-28-5	LepR2	11	81	100
m625912-11-35-4	LepR2	10	83	90
m625912-11-42-2	LepR2	20	100	100
m625912-11-55-3	LepR2	2	92	85
Surpass400	LepR3	0	99	96
16S3-102-2	LepR4	36	36	24
16S3-107-1	LepR4	48	16	17
Q2		100	94	100
Dune		7	13	28
ATR-Beacon		80	63	8
AV-Garnet		0	44	14

Average internal infection for selected *LepR* lines (AgCanada) against polygenic and *slyvestris* attacking isolates

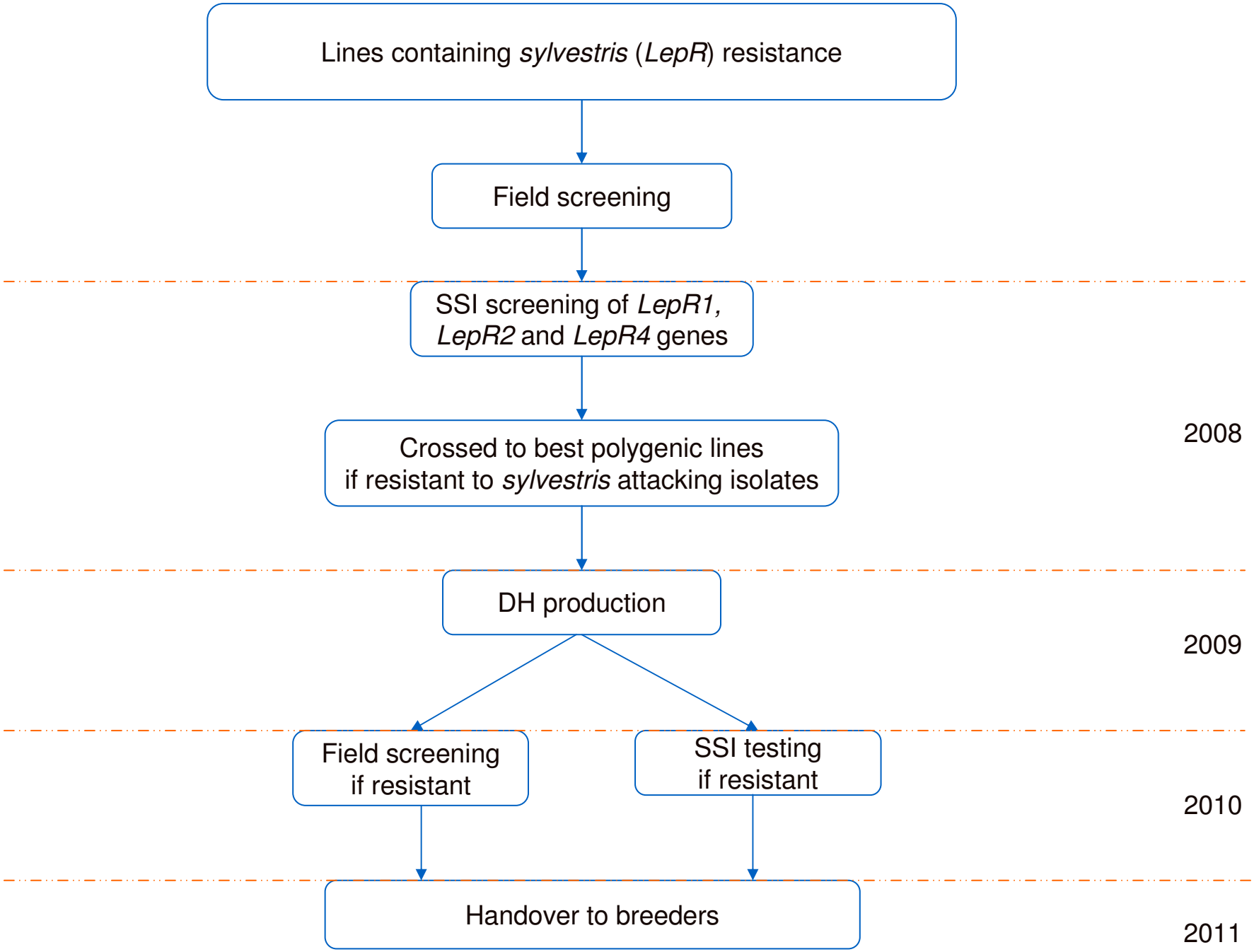
Line	R gene	04MGPP031 Internal infection %	04MGPS002 Internal infection %	04MGPS010 Internal infection %
DM11237198-18S-106-5	*LepR1*	14	20	19
DM11237198-18S-68-3	*LepR1*	11	4	14
DM11237198-19S-40-2	*LepR1*	23	28	3
DM12346s-4	*LepR1*	29	5	13
m625912-11-14-5	*LepR2*	17	99	100
m625912-11-42-2	*LepR2*	20	100	100
m625912-11-55-3	*LepR2*	2	92	85
Surpass400	*LepR3*	0	99	96
16S3-102-2	*LepR4*	36	36	24
16S3-107-1	*LepR4*	48	16	17
Q2		100	94	100
Dune		7	13	28
ATR-Beacon		80	63	8
AV-Garnet		0	44	14

Conclusions

- Good differentiation between different lines with different LepR genes as classified by AgCanada
- It appears *LepR2* is similar to *LepR3* and no longer useful in Australia
- There are some *LepR1* and *LepR4* lines that appear to have resistance to these 2 *sylvestris* attacking isolates and they may be useful if deployed carefully in Australia
- Molecular markers are available for *RepR1*, *LepR2* and *LepR4* and there are isolates that can differentiate
- NBGIP has crosses of *sylvestris* lines to ellite germplasm for further parental inbred development

Acknowlegements

- GRDC / DPI for funding
- AgCanada for provided lines as part of consortium
- DPI - Victorian Oilseed Breeding Program and Staff (including past staff – Angela Agius)
- Marcroft Grains Pathology and Melbourne Uni


Lines containing *sylvestris* (*LepR*) resistance
Field screening
SSI screening of *LepR1*, *LepR2* and *LepR4* genes
Crossed to best polygenic lines if resistant to *sylvestris* attacking isolates
2008
DH production
2009
Field screening if resistant
SSI testing if resistant
2010
Handover to breeders
2011