

## Crown rot initiative – South Australia

SARDI first round crosses (2010)

First crosses	Top crosses			
	HPGladius	HPWyalkatchem	Mace	Scout
LPB2461/FS41	1408 (2)		1407 (1)	1410 (4)
LPB2461/AUS29529			1374 (1)	1377 (1)
LPB2461/Q1		1404 (1)		1405 (4)
LPB2461/Q2		1386 (1)		1387 (2)
LPB2461/Q4		1413 (1)		
AUS29529/FS41			1368 (3)	1372 (1)
AUS29529/Q1				1364 (1)
AUS29529/Q2	1379 (2)	1380 (1)	1378 (3)	1381 (9)
AUS29529/Q4				1391 (1)

### Donors

FS41 = Frame/Sentinel DH41

LPB2461 = LPB05-2461 (Kukri\*Strzelecki)

AUS29529 = SABUF/7/ALTAR 84/AE.SQUARROSA(224)/YACO/6/CROC\_1/AE.SQUARROSA(205)/5/BR12\*3/4/IAS55\*4/C114123/3/IAS55\*4/EG,AUS/IAS55\*4/ALD

Q1 = GW95-703\*C15 = CPI-133814 /Janz (From DEEDI, QLD)

Q2 = QT10162\*W21MMT70 (From DEEDI, QLD)

Q4 = 2-49/W21MMT70 F3 (3-29) (4-33) (FT35) (12) (from DEEDI, QLD)

The green shaded boxes are the crosses that survived CR selection on the terraces in 2011. The numbers in brackets are the number of families in each cross that survived CR and agronomic selection in 2011. HP stands for High Protein. These are backcross lines developed by SARDI/UA with improved stripe rust resistance and protein level over the recurrent parents.

1360 F5 lines from these crosses / families were screened on the Terraces and at Roseworthy in 2012 and evaluated for resistance to crown rot and stripe rust and for agronomic performance.

236 F6 lines that appeared promising were retained for replicated evaluation in 2013. Of these 29 were sent to breeders in 2013.

From the 236 lines evaluated in 2013, 101 F7 selections survived and 19 lines were sent to breeders for trials in 2014. The surviving lines selected for testing in 2014 are represented in brackets in the table below.

First crosses	Top crosses			
	HPGladius	HPWyalkatchem	Mace	Scout
LPB2461/FS41			1407 (8)	1410 (6)
LPB2461/AUS29529			1374 (5)	
LPB2461/Q1		1404 (1)		1405 (22)
LPB2461/Q2		1386 (1)		1387 (6)
LPB2461/Q4		1413 (2)		
AUS29529/FS41			1368 (15)	1372 (8)
AUS29529/Q1				1364 (5)
AUS29529/Q2		1380 (1)	1378 (5)	1381 (14)
AUS29529/Q4				

## SARDI second round crosses (2011)

	FS41	EGA Wylie	Kukri
AUS29529*G48 DH110	1444 <b>DH</b>	1446	1448

F4 lines from these 3 crosses were evaluated on the Terraces in 2012 and F5 selections screened as replicates on the terraces and at Roseworthy in 2013.

AUS29529\*G48 DH110 is a transgressive segregant DH line from this cross that has been mapped by the AWBMMP. The line performed very well in 2010, 2011 and 2012. Cross no 1444 was also been developed into a new DH population with 300 lines and was evaluated for CR resistance in 2013.

52 F6 re-selections from these crosses (cross 1444 = 25, 1446 = 19, 1448 = 8) and 13 DH lines (1444) were retained for testing in 2014.

## SARDI third round crosses (2012)

	FS41	DH110	Yandanooka	LPB07-0486	Spitfire
Yandanooka	1464	1467 <b>DH</b>			
LPB06-0919	1465 <b>DH</b>	1468	1470	1471/1473	1474 <b>DH</b>
LPB07-0486		1469	1472		

From these crosses 3 were selected for development into DH populations for phenotyping in 2014. They were also developed for genetic studies for potential novel resistance. The new parents were identified from NVT screening trials and possess the advantage of being well adapted lines.

In 2014 200 lines from LPB06-0919\*Spitfire, 100 lines from LPB06-0919\*Frame/Sentinel DH41 and 100 lines from Yandanooka\* AUS29529\*G48 DH110 were phenotyped on the terraces. Data is not yet available for these crosses.

## SARDI fourth round crosses (2013)

16 crosses were made between selected lines from the 1<sup>st</sup> round of crosses to merge the minor gene resistances in a common elite parent background. After detailed evaluation 9 of these crosses (listed below) were selected for taking to the F2 stage where they remain as seed in store. They were not pursued further as it was decided to make new more promising crosses in 2014 which would take priority.

Parent 1	Pedigree	Parent 2	Pedigree
1410-10-10	LPB/FS//Scout	1405-4-28	LPB/FS*Scout
1407-13-8	LPB/FS//Mace	1368-13-13	AUS/FS*Mace
1386-14-17	Q2/LPB//hpWyal	1404-6-14	LPB/Q1//hpWyal
1404-6-14	LPB/Q1//hpWyal	1407-13-8	LPB/FS//Mace
1413-10-33	Q4/LPB* hpWyal	1407-13-8	LPB/FS//Mace
1408-8-28	LPB/FS*hpGlad	1379-1-40	AUS/Q2*hpGlad
1408-8-2	LPB/FS*hpGlad	1379-1-40	AUS/Q2*hpGlad
1405-5-27	LPB/FS*Scout	1410-10-15	LPB/FS//Scout
1405-5-27	LPB/FS*Scout	1405-4-28	1405-5-27

## SARDI fifth round crosses (2014)

A new set of crosses were designed in 2014 based on 2013 data and it was decided to use these in place of the 2013 crosses for any further development. These lines are now also at the F2 seed stage.

Parent 1	Pedigree		Cross 1	Cross 2	Cross 3	Cross Nos
1364-4-10-2	AUS/Q1*Scout	*	Scout	1410-10-10-4	1410-10-28-3	1556-58
1368-4-12-1,2,3,4	AUS/FS*Mace	*	Mace	WB4-9-4	1380-13-11S-3	1559-61
1368-13-16-1	AUS/FS*Mace	*		1380-13-11S-3	WB4-9-4	1562-63
1380-13-11S-3	AUS/Q2*hpWyal (WB4-9-4)	*	WB4-9-4	Mace		1564-65
1386-14-26-2	Q2/LPB*hpWyal (WB4-9-4)	*	WB4-9-4	Mace		1566-67
1405-5-22-1,2	LPB/Q1*Scout	*	Scout			1568
1407-13-22-1	LPB/FS*Mace	*	Mace	WB4-9-4	1380-13-11S-3	1569-71
1410-10-10-2,4	LPB/FS*Scout	*	Scout	1405-5-2-1		1572-73
1410-10-28-1,3,4	LPB/FS*Scout	*	Scout	1405-5-2-1		1574-75
1410-10-30-1	LPB/FS*Scout	*	Scout			1576
1444-089-1,2,4	FS/AUS*G48-110	*	WB4-9-4	Mace	Scout	1577-79
1446-070-3,4	Wylie/AUS*G48-110	*	Mace	WB4-9-4	Scout	1580-82
1446-078-1,2,4	Wylie/AUS*G48-110	*	Mace	WB4-9-4	Scout	1583-86
HW1464 (F1)	FS#41/Yandanooka	*	Mace	WB4-9-4	Scout	1587-89
HW1465 (F1)	FS#41/LPB06-0919	*	Mace	WB4-9-4	Scout	1590-92
HW1468 (F1)	AUS*G48-110/LPB06-0919	*	Mace	WB4-9-4	Scout	1593-5