Agriculture and Agri-Food Canada | Agriculture et Agroalimentaire Canada

Research Update –New varieties and other related research

MOGA Annual General Meeting

July 10, 2012

Canada

Oat cultivars released recently by CRC

2005 Leggett (OT2021)

2006 Jordan (OT2027)

2008 Stainless (OT2040)

2008 Summit (OT2046)

2011 Stride (OT2069)

Stride Yield (kg/ha)

	ZONE 1								ZONE 2			
Entry	BRA	INH	MEL	MOR	POR	UMP	Mean		BVR	FTV	LAC	Mean
Stn-Yrs →	1	1	2	1	2	1	8		1	2	2	5
CDC Dancer	5424.3	7789.1	7848.8	6374.9	7643.4	5376.0	6993.6		4784.5	5972.4	8698.6	7228.3
AC Morgan	5577.8	8122.9	10030.1	5028.5	7137.3	2903.5	6996.0		5345.8	6283.3	9463.9	7864.0
Leggett	5684.0	7186.7	8298.2	6724.7	7119.3	6124.5	7069.4		4759.7	5627.0	8686.9	7071.8
Stride	5342.4	7175.5	9754.8	6616.5	7713.1	6627.8	7587.2		5213.7	5579.9	9334.9	7631.1

		ZONE 3					ZONE 4		OVERALL MEAN			Overall
Entry	KER	REG	SWC	WAT	Mean		LET		2009	2010		2-yr Mean
Stn-Yrs →	1	2	2	2	7		2		12	10		22
CDC Dancer	7271.6	6469.7	4410.8	8065.6	6459.7		6898.0		7053.1	6544.2		6798.7
AC Morgan	8015.7	6925.7	4530.5	9805.5	7191.9		8415.5		7793.7	6814.5		7304.1
Leggett	7343.8	6322.3	4184.0	8558.4	6514.4		7091.9		6897.6	6799.1		6848.3
Stride	6104.9	6466.6	4320.6	9497.7	7070.5		7379.4		7366.3	7337.3		7351.8

Stride Heading (days)

identity	ZONE 1 mel10	ZONE2 lac10	ZONE3 means	OVERALL 2010 means	2009	2 Year Average
CDC Dancer	63	62	62	62	59	60.5
AC Morgan	62	61	61	61	61	61
Leggett	62	60	60	61	60	60.5
Stride	66	64	63	64	63	63.5
GRAND MEAN	63.0	61.9	61.7	62.1	61.2	

Stride Maturity (days)

identity	ZONE 1 means	ZONE 2 lac10	ZONE 3 means	ZONE 4 let10	OVERALL means	2009	2 Year Average
CDC Dancer	92	114	92	105	96	100	98
AC Morgan	91	116	96	108	97	104	100.5
Leggett	96	118	97	113	101	104	102.5
Stride	94	114	93	105	98	103	100.5
GRAND MEAN	94.2	116.8	96.2	111.1	99.6	103.2	

Stride Height (cm)

identity	ZONE 1 means	ZONE 2 lac10	ZONE 3 means	ZONE 4 let10	OVERALL means	2009	2 Year Average
CDC Dancer	114.3	120.3	112.7	111.7	114.3	102.1	108.2
AC Morgan	112.4	115.3	108.2	105	110.8	100.6	105.7
Leggett	107.2	110.3	102.7	97	105.2	98	101.6
Stride	113.1	117.7	111.3	107.7	112.5	103.7	108.1
GRAND MEAN	109.3	111.6	107.4	103.5	108.4	101	

Stride Lodging (1-9)

identity	ZONE 1 mel10	ZONE 3 wat10	ZONE 4 let10	OVERALL means	2009	2 Year Average
CDC Dancer	3.3	2	2	2.4	2.4	2.4
AC Morgan	1.7	2	2	1.9	1.5	1.7
Leggett	1.3	1.3	1.7	1.4	2.5	1.95
Stride	1	1.3	1.3	1.2	2.9	2.05
GRAND MEAN	1.8	2.4	1.9	2.0	2.1	

Stride Physical Quality

identity	Groat % 2 Year Average	%Plump 2 Year Average	%Thins 2 Year Average	TWT 2 Year Average	KWT 2 Year Average
CDC Dancer	76.7	91.4	2.3	53.2	35.6
AC Morgan	71.2	88.1	4.0	50.4	37.2
Leggett	72.9	86.3	2.9	52.7	36.8
Stride	72.4	85.5	3.6	53.5	33.2

Stride Nutritional Quality

	NIR-GROAT		ANALYTICAL FIBRE ANALYSES	
	PROTEIN	OIL	β-GLUCAN	TDF
	2-YEAR	2-YEAR	2-YEAR	2-YEAR
Entry	MEAN	MEAN	MEAN	MEAN
CDC Dancer	13.6	6.9	4.3	8.30
AC Morgan	13.9	6.9	4.3	8.98
Leggett	16.0	7.5	5.0	9.75
Stride	16.2	7.9	5.2	10.26
Stn-Yrs →	12	12	12	6

Stride
Disease Reactions

identity	smut	bydv	ocr_1	osr	DON ppm
CDC Dancer	0	5.8	5-20MSS	15mss	7.6 mrms
AC Morgan	45	6.4	40S	15mss	6.2 mrms
Leggett	0	3.8	tr	20mss	5.1 mr
Stride	0	5.4	tr	15s	2.8 mr

ECORC Oat Breeding as part of the POGA DIAP

Weikai Yan and
Nick Tinker

2012

Pedigrees of Oat Lines

- **MSc student working part time to research and update pedigrees**
- **Has researched all recent Canadian varieties, and all experimental germplasm in CORE and NWOT.**
- **Is developing a set of markers to validate pedigree status and perform diagnostics**
- **Her academic project will be to follow inheritance of QTL candidates in highly adapted varieties.**

- **Look up your favourite oat variety at: avena.agr.gc.ca**

Nationwide Oat Test

45 ECORC lines + 45 CRC lines + 6 checks representing both eastern and western Canada were grown at 7 locations in three replications:

- **Ottawa, ON**
- **New Liskeard ON**
- **Normandin, QC**
- **Harrington, PE**
- **Portage, MB**
- **Saskatoon, SK**
- **Lacombe, AB**

Preliminary Observations

- **Across locations, a few ECORC lines were found to have higher or comparable yield to AC Morgan with improved rust resistance and milling quality**

CORE (Collaborative Oat Research Enterprise)

- **Three nurseries of AFRI-CORE were grown in 2011**
  - **Spring nursery: 480 plots**
  - **Winter nursery: 170 plots**
  - **CORE collection: 128 plots**

Activities for AFRI-CORE

At Winnipeg, Lacombe and Ottawa

Disease Nurseries grown near Winnipeg

- **Disease reactions recorded**

- **Agronomic data, disease reactions and postharvest data will be sent to Aberdeen, ID to Project Director, Dr. Eric Jackson**

CORE progress

- International collaboration
- Completed 4th pilot SNP array
- Final selection of 1536 of the best SNPs
- Completed first complete oat map
- Planning experiments with breeders to genotype active germplasm and tag QTL
- Evaluating an alternate “super-high-throughput” marker based on direct sequencing
- Developing a 6000-SNP Chip

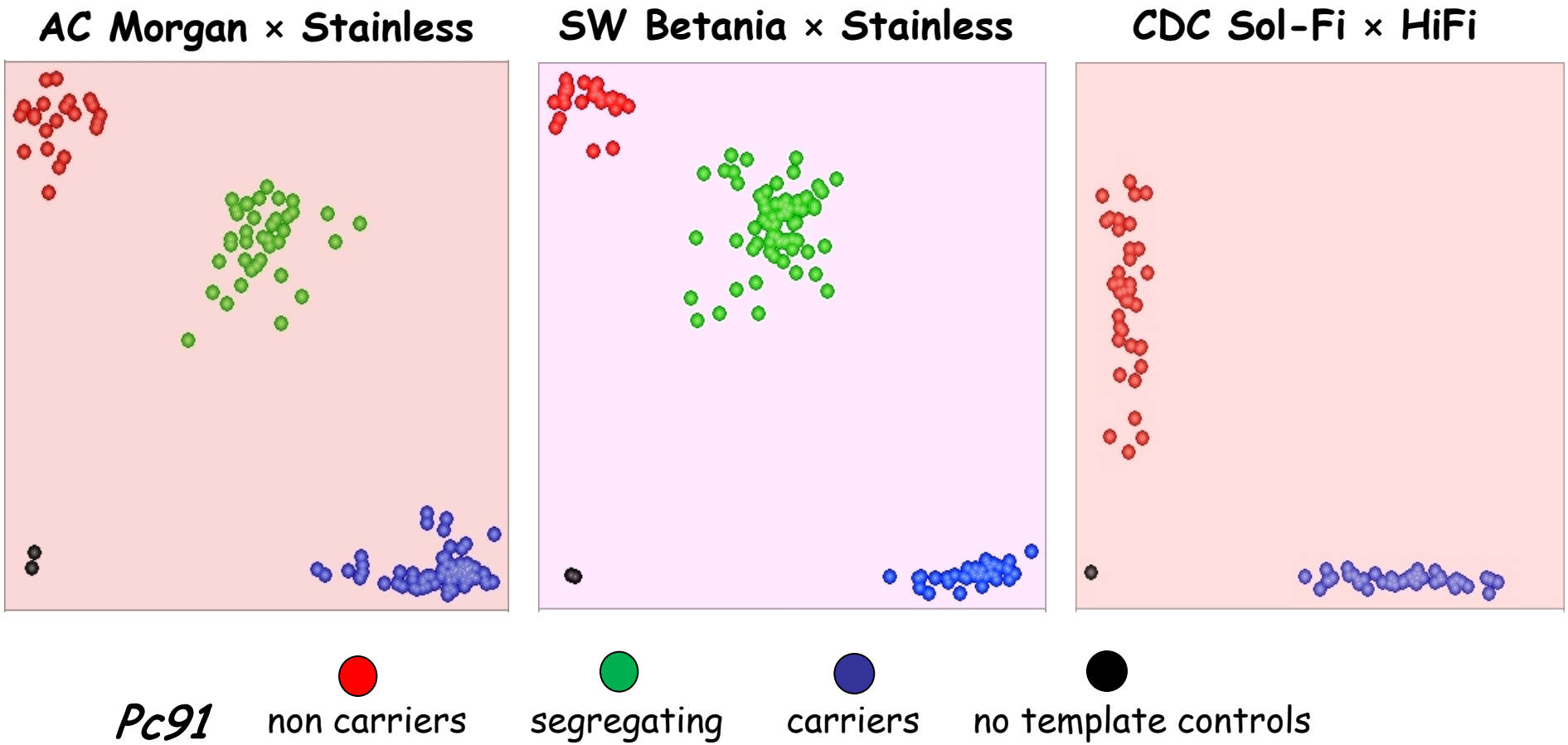
Activities for POGA-DIAP CORE Project

Dr. Gnanesh Nanjappa

NSERC Visiting Fellow

at AAFC-CRC Winnipeg

Genotyping data from the oPt-0350-KOM4c2 KASPar SNP assay



Conclusions

- The KASPar SNP assay accurately postulated the Pc91 status of 16 North American oat breeding lines.
- Three populations segregating for *Pc91* were validated using an KASPar SNP assay and were subsequently implemented in oat marker-assisted breeding program.
- The co-dominant KASP marker oPt-0350-KOM4c2 can be efficiently used by oat breeders for selection of *Pc91*.
- This is the first report of localization of the crown rust resistance gene *Pc91* to the oat chromosome 3C.

2012 OAT MCVET

Entry	Name
1	Leggett
2	CDC Big Brown
3	Stride (OT2069)
4	CDC Seabiscuit
5	OT3056
6	OT3054
7	Triactor
8	Furlong
9	Souris

Nursery at Portage May 31, 2011

Photo by Denis Green

Photo by Mike Shillinglaw

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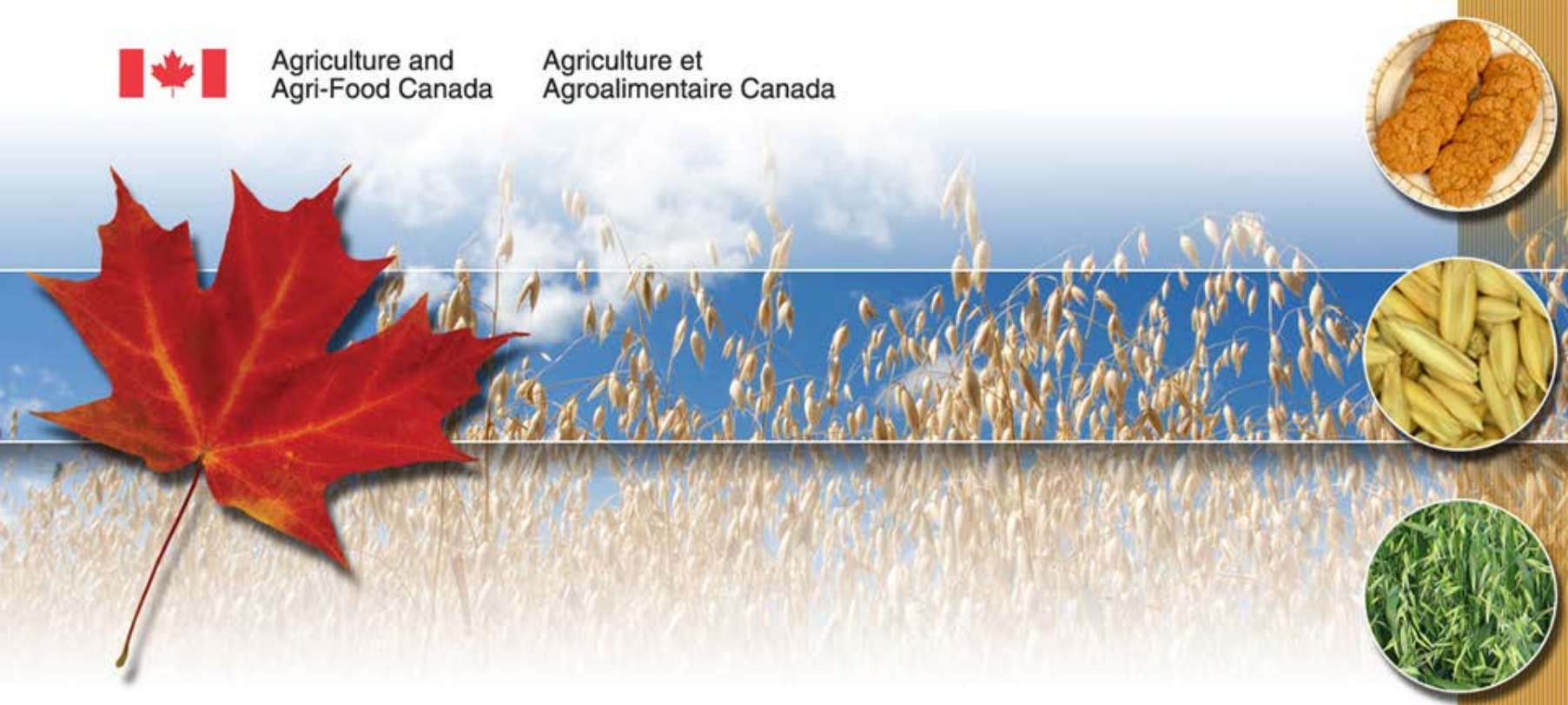

THANK YOU

Canada

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