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# Potato Molecular Consortium

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Research Centre, Lethbridge, AB



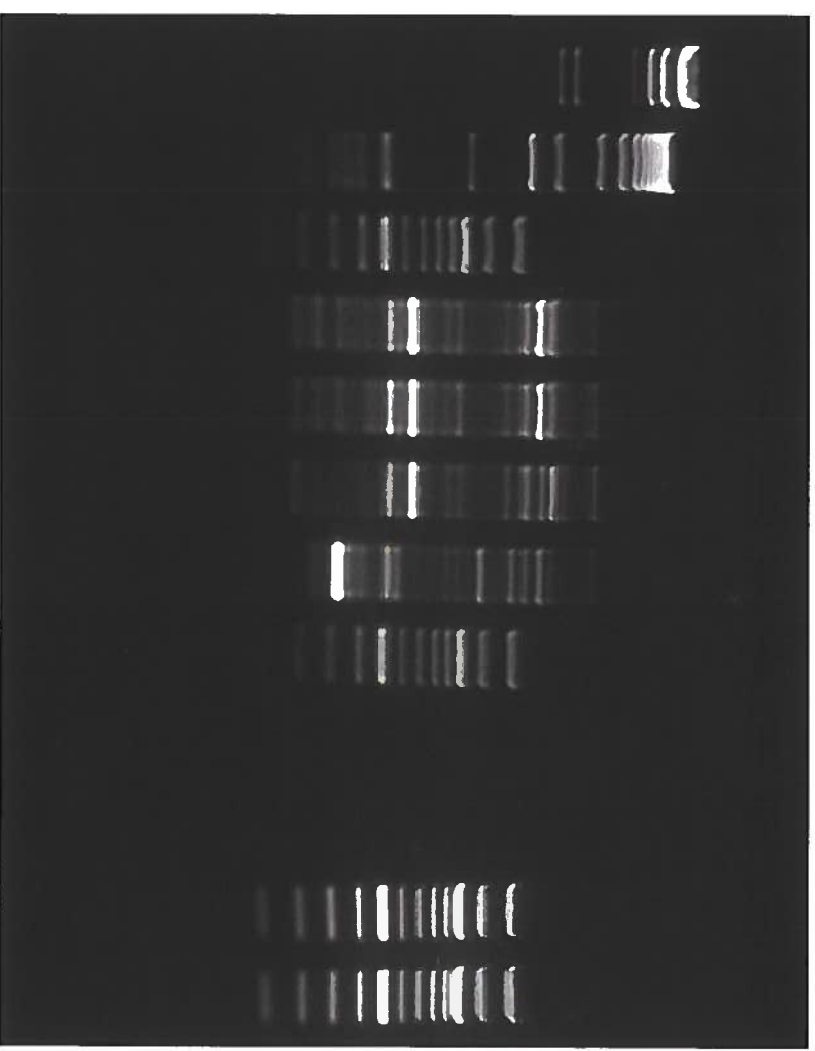
Canada

## Variety DNA Fingerprinting 2009

CFIA

Seed producers

Processors



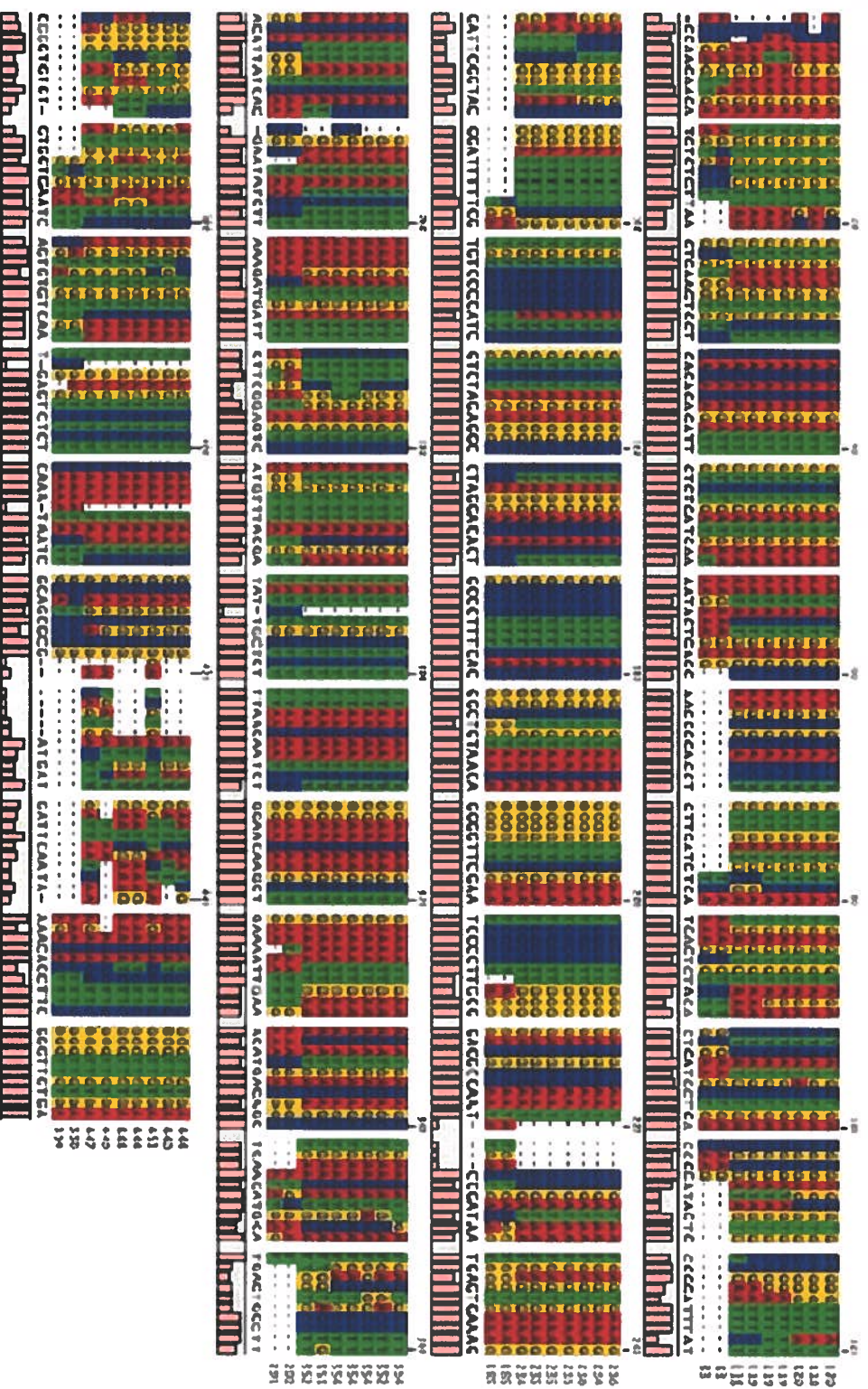
Any tissue and results available in a day.

Every variety is unique.



# Barcoding DNA

*Erwinia* species rDNA ITS



The first 3 sequences represent *E. brazilensis*, the following 4 sequences are from *E. carotovora*, and the last 2 sequences are from *E. chrysanthemi*.

# Marker assisted selection

Overall chipping ability

Verticillium wilt resistance

Late blight resistance

Little disease development

Effective against aggressive isolates

Foliage not tubers

Some LB isolates may infect



Potato plants survive inoculation with the aggressive isolate of US8.

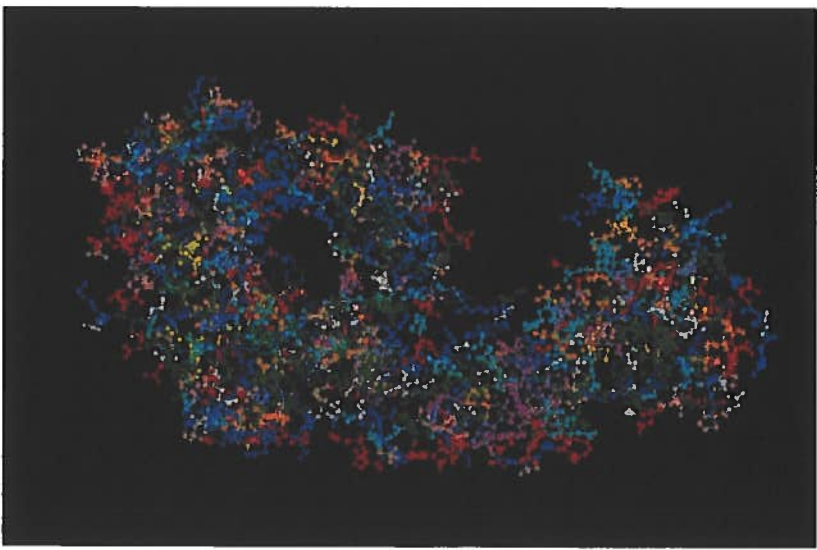




# Early dying



Soil probiotics



Resistance protein selection

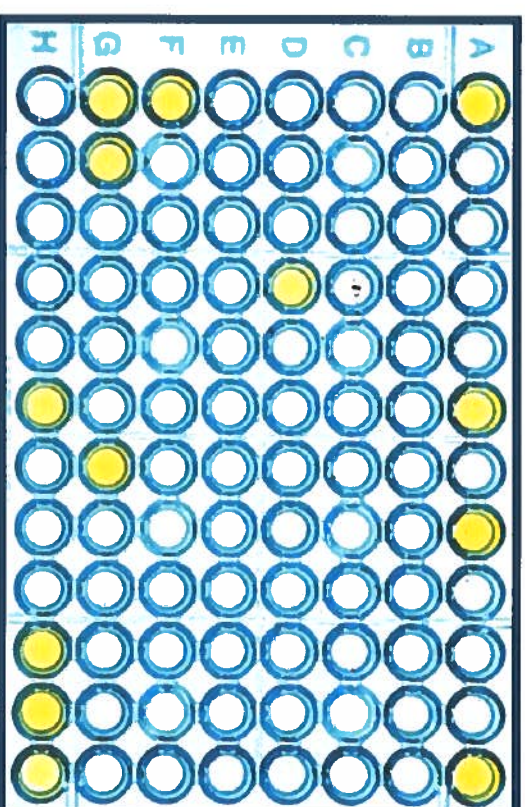
# Virus diagnostics

- PLRV
- PVY
- PVX
- PVS
- other viruses

Seed virus free status confirmed

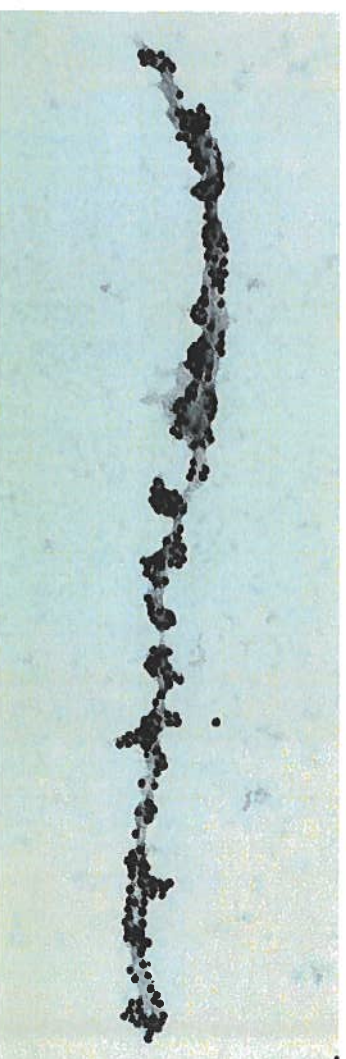
A regulatory misidentification resolved

New improved diagnostics developed



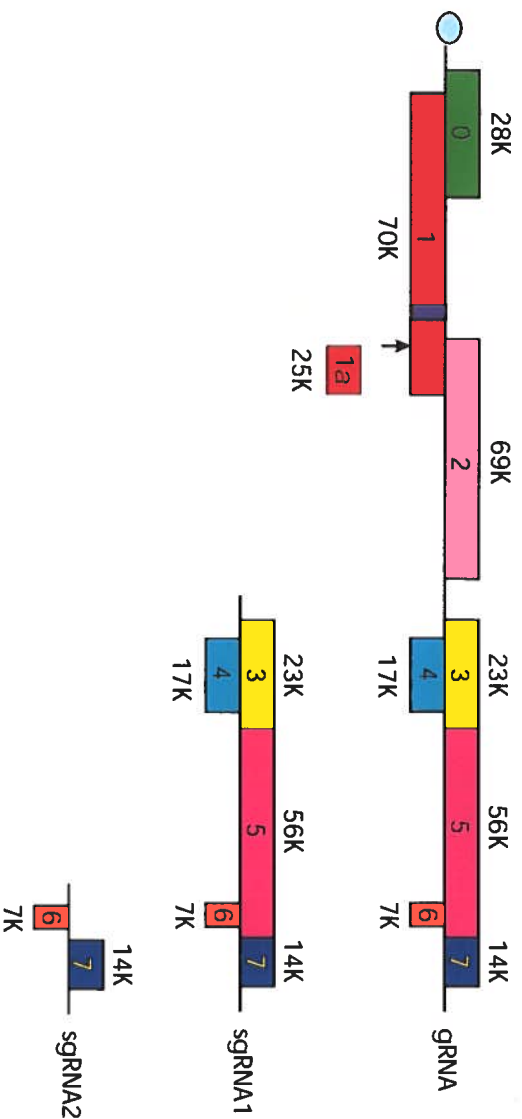
Quantitative TAS PLRV ELISA

Electron photomicrograph of PVS





# PLRV field assay

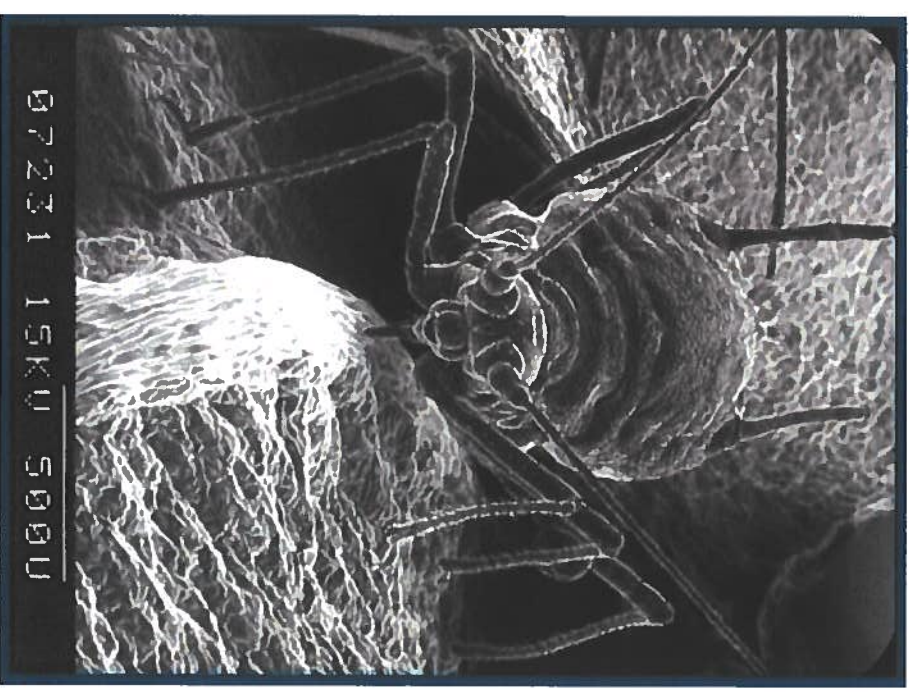


- PLRV

+ PLRV



## Myzus persicae





# Probiotics



- Seed 20 to 40 lbs request
- Blackleg or soft rot
- Field trials in AB, BC, SK, and MB
- PMRA approval and registration



# Probiotic formulations



BRR foliar symptoms

## Blackleg



Blackleg+Probiotic



Soft rot /  
blackleg  
24h assay

# BRR severity

## BRR AAFC



Predicting Ring Rot Severity in Potatoes at Stavely, AB

**Temperatures**

Please enter the specified average min or max temperatures (in Celsius) for the periods shown below:

Avg Min Temp May 16-31 (21 - 7.6 C)	<input type="text" value="7"/>
Avg Max Temp Jul 1-15 (16.6 - 26.2 C)	<input type="text" value="25"/>
Avg Max Temp Jul 16-31 (20.9 - 28.1 C)	<input type="text" value="27"/>
Avg Max Temp Aug 1-15 (20.5 - 27.9 C)	<input type="text" value="27"/>

**Precipitation**

Please enter the total precipitation (in mm) for the periods specified below:

May 16-31 (6.4 - 110.0 mm)	<input type="text" value="99"/>
June 1-15 (1 - 91.0 mm)	<input type="text" value="77"/>
June 16-31 (6.1 - 123.0 mm)	<input type="text" value="99"/>

Ring Rot Predictor

A Severity Rating of 4.1 is expected. (Scale 0-5)  
(Avg Abs Error 0.5)

2008 severity high at 4.1

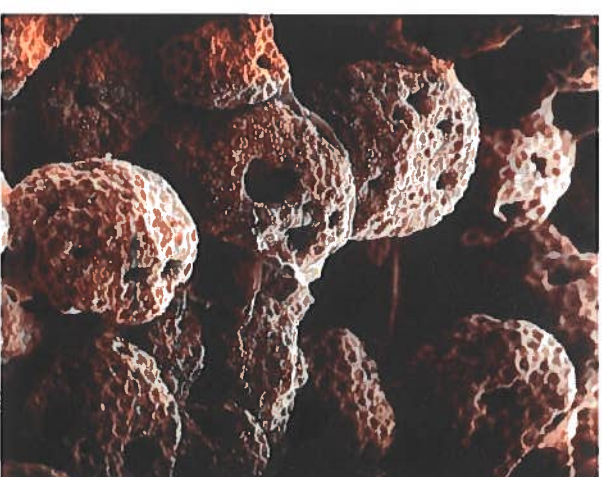


# Clubroot

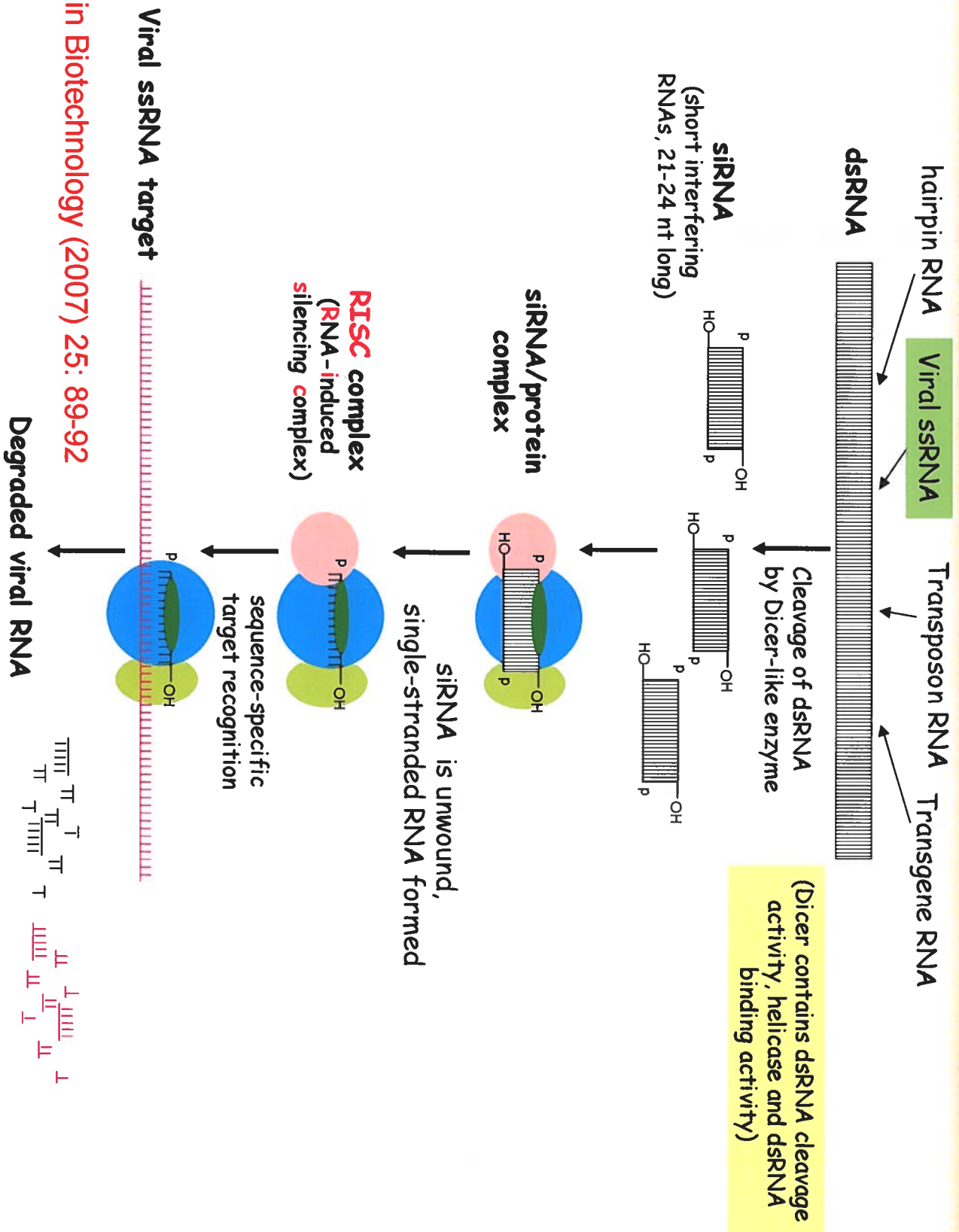
Related to powdery scab

Trade impediment

Immunological diagnostics



# RNA silencing pathway in plants - precision breeding



Trends in Biotechnology (2007) 25: 89-92





# Late Blight - Tuber 2008

Cultivar or Line	CN #	Control	0	1	2	3	4	5	Rating	Std Error
C192005-1		3	0	0	0	4	0	1	2.5	0.28
C195723		3	0	8	4	0	0	3	1.4	0.17
W1270-1		3	0	0	8	0	0	3	2.2	0.14
W1274-2		3	0	0	3	0	0	3	2.2	0.51
W19229-1		3	0	0	0	3	8	3	2.2	0.24
C195734		3	0	0	3	0	0	3	2.5	0.24
C192011-2		3	0	0	0	4	5	1	2.7	0.22
W192472-1		3	0	0	0	2	3	4	4.0	0.25
W18115-1		3	0	0	2	4	2	3	2.2	0.28
C192008-2		3	0	0	2	0	0	2	2.2	0.28
C192008-2		3	0	0	2	0	2	3	2.0	0.22
W18155-2		3	0	0	5	0	0	3	2.5	0.18
Fused B. Blank	Check	3	0	0	0	4	2	4	4.2	1.10
Kc-2-3	Check	3	0	0	0	8	3	3	2.6	0.27
Sherosy	Check	3	0	0	0	0	5	2	4.7	0.24
Sanfire	Check	3	0	0	2	0	3	1	2.8	0.21

0 = no infection      5 = 100% infection



# Fusarium Dry Rot 2008

Taxi Line	Customer Line	CH#	Contc	€%	35%	55%	75%	100%	Pctng	StdErr
1	OV20061		0	0	0	0	4	5	4.6	0.172133
2	OV20062		0	0	0	0	1	3	4.0	0.103403
3	V-2701		0	0	0	0	5	5	4.5	0.173382
4	V-2742		0	0	0	0	3	2	4.4	0.172133
5	WV42934		0	0	0	0	1	3	4.0	0.103403
3	OV200734		0	0	0	0	4	3	4.8	0.172133
7	OV200112		0	0	0	0	0	10	5	3
3	WV42734		0	0	0	0	3	7	4.7	0.161735
2	V-211851		0	0	0	0	0	10	5	3
3	OV20082		0	0	0	0	0	10	5	3
1	OV20082		0	0	0	0	2	5	3.3	0.155205
2	V-201812		0	0	0	0	5	5	4.5	0.173382
3	Revised Butent		0	0	0	0	3	1	4.1	0.103403
4	Range R. seat		0	0	0	0	2	5	4.4	0.281201
5	Steppor		0	0	0	0	4	2	3.8	0.282237
3	Asvaf		0	0	0	0	4	3	3.9	0.391473

0 = no infection      5 = 100% infection

# BRR 2008

Foliar Symptoms

Incidence

Severity

Treatment	with BRR	total hills	% infection	MeanRep 1	MeanRep 2	MeanRep 3	Mean	Std Dev
Alpha	0	14	0	0.00	0.00	0.00	0.00	0.00
Russet Burbank	15	15	100	2.80	2.40	2.20	2.47	0.31
Norland	15	15	100	4.00	3.80	3.40	3.73	0.31
Red Pontac	15	15	100	4.80	4.60	4.00	4.47	0.42
CV98022-3	14	15	93	2.00	2.20	1.80	2.00	0.20
CV98053-4	11	15	73	1.60	1.20	1.00	1.27	0.31
CV97085-1	15	15	100	3.40	3.00	3.80	3.40	0.40
CV97112-5	11	13	85	2.25	1.80	1.75	1.92	0.28
CV97192-1	14	14	100	4.00	4.40	4.80	4.43	0.40
FV12488-2	15	15	100	4.00	3.20	4.00	3.73	0.46
V1002-2	15	15	100	4.20	4.00	4.00	4.07	0.12
V1102-1	15	15	100	2.80	2.40	2.80	2.80	0.20

Tuber Symptoms

Incidence

Severity

Treatment	MeanR1	MeanR2	MeanR3	Mean	Std Dev	S.E. of Mean	Avr Sev	Std Dev	S.E. of Avr Sev
Alpha	4.1	0.0	2.9	2.33	0.703	0.406	0.23	0.21	0.12
Russet Burbank	7.0	33.3	13.3	17.87	4.577	2.643	2.77	2.16	1.25
Norland	10.2	38.2	28.1	25.50	4.727	2.729	4.48	2.47	1.42
Red Pontac	50.0	88.2	35.1	51.10	5.526	3.180	8.65	2.51	1.45
CV98022-3	13.6	17.4	15.2	15.40	0.636	0.367	1.76	0.23	0.13
CV98053-4	14.3	15.2	5.0	11.50	1.882	1.087	1.42	0.58	0.34
CV97085-1	15.2	5.1	7.0	9.10	1.789	1.033	1.28	0.75	0.43
CV97112-5	3.0	3.2	0.0	2.07	0.598	0.345	0.21	0.18	0.10
CV97192-1	21.1	42.9	43.5	35.83	4.254	2.458	7.31	3.83	2.21
FV12488-2	6.3	23.9	11.1	13.77	3.033	1.751	1.83	1.06	0.61
V1002-2	23.9	45.0	17.0	28.63	4.863	2.807	4.93	3.12	1.80
V1102-1	16.7	7.1	6.5	10.10	1.908	1.102	1.08	0.51	0.30

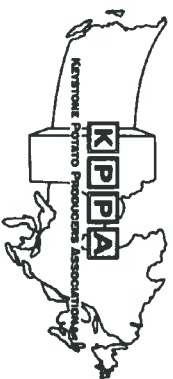
Alpha = symptomless carrier

# Genome Canada - Potato 2020

A \$10M project and 1 of 27 selected from 58 invited proposals for Toronto



GenomeCanada



GenomeAlberta



Agriculture and Agri-Food Canada



## **Acknowledgements**

### ■ **Canada**

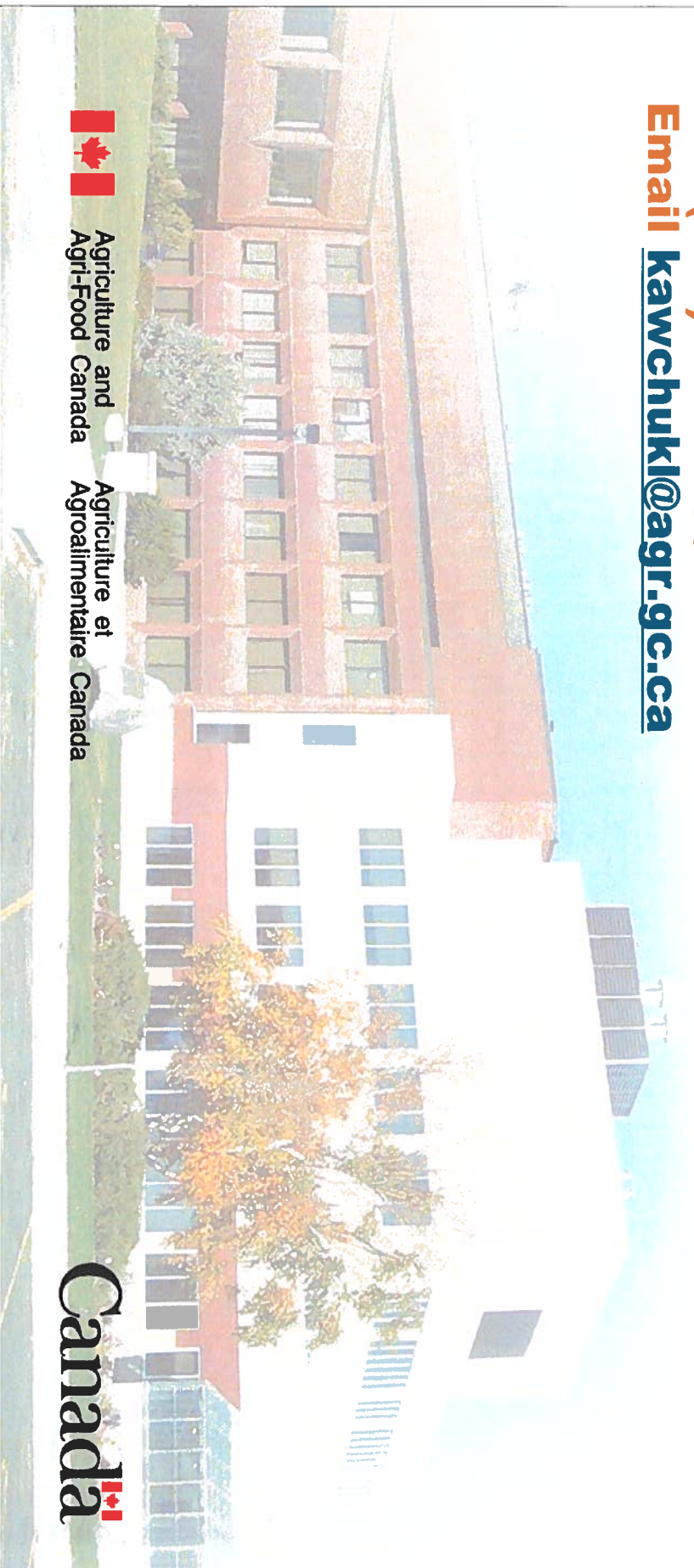
- **BC Potato & Vegetable Growers Association**
- **Conagra Limited, Lamb-Weston Division**
- **Keystone Vegetable Producers Association Inc.**
- **Maple Leaf Potatoes**
- **Potato Growers of Alberta**
- **Saskatchewan Seed Potato Growers Association**
- **Agriculture and Agri-Food Canada**

### ■ **Europe**

- **Saatzucht-Vertrieb Lange KG**

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**Agriculture et  
Agroalimentaire Canada**

**Canada**

5,000.00

ATB Main Account Western Potato Consortium B - Pymt #5

Receiver General for Canada  
 Date 07/26/2011 Bill Type Reference  
 83016150  
 Original Amt. 5,000.00  
 Balance Due 5,000.00  
 Discount  
 Cheque Amount 5,000.00  
 Payment 5,000.00  
 7/26/2011

008183

POTATO GROWERS OF ALBERTA

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008183

POTATO GROWERS OF ALBERTA

008183 08829 2191 9912592 0 1

MEMO

Western Potato Consortium B - Pymt #5

TO THE ORDER OF

Receiver General for Canada  
 Agriculture & Agri-Food Canada  
 Revenue Management  
 960 Carling Avenue  
 Building 74, Room 206D, CED  
 Ottawa, ON K1A 0G6

PAY

\*\*\*\*\*Five Thousand and 00/100



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AUTHORIZED SIGNATURE

PER

AUTHORIZED SIGNATURE

POTATO GROWERS OF ALBERTA  
General Account

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\$

DATE 07262011  
M M D D Y Y Y

6008 46th Avenue  
 Taber, AB T1G 2B1  
 Tel: (403) 223-2262  
 Fax: (403) 223-2268



ATB FINANCIAL  
 5317 - 48 AVE.  
 TABER, ALTA. T1G 1S7

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Canada

# Invoice - Facture

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 Potato Growers of Alberta  
 6008-46th Avenue  
 TABER AB T1G 2B1  
 CANADA

Originator-Expéditeur  
 Lethbridge Research Centre  
 Lethbridge, AB  
 ATTN: KATHLEEN MCLEAN  
 TEL: (403) 317-3386

Vendor's GST/HST Registration No. N° d'enregistrement de la TPS/TVH du vendeur  
 121491807R1T0002

Vendor's PST Registration No. N° d'enregistrement de la TVP du vendeur  
 BC R370818; MB 121491807MT0031; ON 1723-8420; PE 198342; QC 1006163749; SK 1973577

Description	Quantity	Unit Price	Amount
Western Potato Consortium - B "Introduction of Variety Production Tools for Potato and Other Crops" with Dr. Larry Kawchuk.	1 EA	5,000.00	5,000.00
Payment #5 as per executed agreement for project listed above.			
Sub-Total (CAD)			5,000.00
Total (CAD)			5,000.00

Document No. N° de document: 83016150  
 Quote this number on all correspondence  
 Numéro à mentionner sur toute correspondance  
 Date: 07/13/2011

Customer Reference Référence du client: 820269 - T.1206.UA

Customer No. N° du client: 100311  
 Business No. N° d'entreprise: 100311

Terms of Payment Conditions de paiement: Due on Receipt DU à la réception  
 If payment is not received by 08/12/2011 interest is charged on overdue amounts at the average Bank of Canada rate for the previous month plus 3%, compounded monthly.

Mail cheque or money order payable to Receiver General for Canada to: Envoyer votre chèque ou mandat à l'ordre du Receveur Général du Canada à: Agriculture and Agri-Food Canada  
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 960, avenue Carling Avenue  
 Building/Edifice 74, Room/Pièce 206D, CEF/FEC  
 Ottawa (ON) K1A 0C6

Date	07/26/2011	Bill	83016150
Type	Reference	Original Amt.	5,000.00
		Balance Due	5,000.00
		Discount	5,000.00
		Cheque Amount	5,000.00
		Payment	5,000.00

Canada

Cashed Aug 16/11 ~ advise had cleared bank - 7.00: extra fee  
 Cheque cashed before payment due date of Aug 12/11  
 Invoice # 83016150  
 Why 90 days past due?  
 Please reverse rate fees. Thank you

OTATO GRO... \*\*5,000...  
 M M O D D Y Y L L  
 6 2 0 1 1  
 010 - SEE REVERSE SIDE FOR  
 130011E - 10M