# Agronomic News and Views

SASKMUSTARD ANNUAL GENERAL MEETING SASKATOON, SASKATCHEWAN 12 JANUARY 2017

MATTHEW BERNARD, MSC, AAG PROVINCIAL SPECIALIST, OILSEED CROPS MINISTRY OF AGRICULTURE



# Agenda

- ➢ Introduction
- Industry Overview
- ➢ Insect Updates
- Major Disease Updates
- Post-(wet) Harvest
  - Storage, risks, considerations
  - Overwintered crop
- Future developments





# 2016 RECAP [Weather & Harvest]

Government

Saskatchewan

### Cumulative Rainfall

from April 1 to October 24, 2016

NOTE: Since techniques used to smooth the transition between zones can affect the values in localized areas,

### **Cumulative Rainfall**

From: April 1, 2013 To: October 21, 2013



NOTE: Since techniques used to smooth the transition between zones can affect the values in localized areas, this map should be used for regional analysis only.



http://www.agriculture.gov.sk.ca/crop-report



Saskatchewan Harvest October 10, 2016						
Winter wheat	100					
Fall rye*	100					
Spring wheat	79					
Durum	76					
Oats*	75					
Barley**	87					
Canaryseed	46					
Flax	49					
Canola	77					
Mustard	78					
Soybeans	66					
Lentils**	95					
Peas	100					
Chickpeas	25					
*includes five per of **includes one per	ent 'other' cent 'other'					
	Governmen of Saskatchewa					
http://www.agriculture.go	vsk ca/cron-reno					

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# INDUSTRY OVERVIEW [2016]



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Saskatchewan

# INDUSTRY OVERVIEW [2016]

- Acres seeded (74% of Canada's)
- 364,819 Acres harvested (94% of seeded in SK)
  162,300 tonnes production (69% of Canada's)
  1,100 kg/ha average yield



# Insects

# [REVIEW & UPDATES]



# CABBAGE SEEDPOD WEEVIL





# CABBAGE SEEDPOD WEEVIL [LIFE CYCLE]



# CABBAGE SEEDPOD WEEVIL [SURVEYS

4 (k) 6 (k)

 First found in
 Saskatchewan in 2000
 Gradual expansion in last 16 years





2004



2005

# CABBAGE SEEDPOD MERVIL

- East nearingManitoba border
- North Outlook area (RM 284) in central Sask.
- Survey results for
   2016 being
   processed –
   available soon



# FLEA BEETLES [A REVIEW]

### Primary Flea Beetle (FB) species:

- crucifer black (CFB)
- striped (SFB)
- Species composition varies on region in province.
- SFB tend to be active earlier in the spring and into hibernation earlier in the fall compared to CFB
- Difficult to predict infestations in fall





## RELATIVE ABUNDANCE OF CRUCIFER, STRIPED AND HOP FLEA BEETLES EMERGING FROM CANOLA AT AAFC (SASKATOON) 2004-2015

crucifer striped hop



### FLEA BEETLES [COUNTS ON STICKY CARDS IN CL CANOLA, AAFC, 2015]



# CUTWORMS

Severe infestations of cutworms reported in 2016 – various crops

### **Management considerations**

- Species life histories vary
- Significant time spent below ground, not feeding – molting, etc. – control with foliar insecticides
- control may take up to 10
   days because not all come to
   the surface to feed each night



# SEASONAL VARIATION OF CUTWORM SPECIES

	Species	Lanval feeding	WINTER SPRING		IG	S	UMMER		FALL	
common name		Larvarieeung	Oct-Mar	Apr	May	Jun	Jul	Aug	Sep	Oct
Army	Euxoa auxiliaris	Above-ground			100		~ ~			
Armyworm	Mythimna unipuncta	Climbing								
Black	Agrotis ipsilon	Above-ground (tunneling)		1						
Bristly	Lacinipolia renigera	Climbing						1		
Bronze	Nephelodes minians	Above-ground, climbing								
Clover	Discestra trifolii	Climbing								
Darksided	Euxoa messoria	Climbing								
Dingy	Feltia jaculifera, F. herilis, F. subgothica	Climbing								
Dusky	Agrotis venerabilis	Above-ground								
Glassy	Apamea devastator	Subterranean								
Pale western	Agrotis orthogonia	Subterranean		11 A						
Redbacked	Euxoa ochragaster	Above-ground					0.0			
									-	

# CUTWORMS [INFO BOOKLET]

- Result of three year CARP cutworm project
- Expected release prior to 2017 growing season

Agricative and Agrication of Agrication Carlo Cutworm Pests of Crops

on the Canadian Prairies IDENTIFICATION AND MANAGEMENT FIELD GUIDE

Canada

# CUTWORMS [BIOLOGY]

Army cutworm pupa cc-by Whitney Cranshaw, <u>bugwood.org</u>

#### feedIng daMage

aBove-ground cut Wor M: Young larvae chew holes in leaves and notch leaf margins while older larvae will consume entire leaves.

### MonItorIng/Control

Monitor forage crops and pastures closely in April and early may for feeding damage. Count the number of larvae in a 50 cm by 50 cm area of the crop;multiply by four to esti- mate the number of larvae per m<sup>2</sup>. Repeat this process 5 to 10 times at 50 m intervals.

Insecticide treatments may be warranted if economic thresholds are exceeded, but take steps to minimize effects on natural enemies; see 'General Control Options' (p. 27).

### econoMIc thresholds

Cereal crops: 5–6 larvae/m<sup>2</sup>. Canola: thresholds not established; however, a density of 5 larvae/m<sup>2</sup> was reported to destroy a field of mustard (Jacobson 1962a).

#### Notes

When food is scarce, larvae will move aboveground as a group in the same direction to locate more host plants. Hence the nickname 'army' cutworm.

Crops are at greatest risk to damage by overwintered larvae in early spring. Crops seeded later in spring are at a lower risk of dam- age; crops seeded in autumn (e.g., winter wheat, winter triticale) and alfalfa are at a higher risk of dam- age in the following spring.

Larvae are similar in appearance to armyworm (p. 40) and fall army-worm.

Outbreak years are often preceded by a year with an abnormally dry July and wet autumn.

Most important as a potential pest of crops in southern Alberta, of lesser importance in southern Saskatchewan, and only rarely of importance in Manitoba (Beirne 1971).



Army cutworm adult cc-by-nc, Mark Dreiling, <u>bugwood.org</u>



# CUTWORM [IDENTIFICATION]



Darksided cutworm page 40



Dingy cutworm page 42 *E. herilis* 



Pale-western cutworm



Redbacked cutworm



Dingy cutworm page 42

F. jaculifera

- 1. cc-by-nc Mark Dreiling, <u>Bugwood.org</u>
- 2. cc-by-sa Luis Miguel Bugallo Sanchez
- 3. cc-by Andy Reago and Chrissy McClarren
- 4. cc-by Andy Reago and Chrissy McClarren
- 5. cc-by-nc Mark Dreiling
- 6. cc-by-nc-sa Ilona Loser
- 7. cc-by-nc-sa Phil Meyers
- 8. cc-by-ns-sa David Reed
- 9. Carl D. Berrentine
- 10. cc-by-nc-sa Phil Meyers





Army cutworm page 30



Bronzed cutworm page 35







Clover cutworm page 37



Spotted cutworm page 54



Variegated cutworm page 56

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Glassy cutworm page 47

R. Bercha, Insects of Alberta cc-by Whitney Cranshaw

- cc-by Whitney Cransh
   cc-by Joseph Berger
- Bee Inventory and Monitoring Lab
- 5. John Gavloski, Manitoba Agriculture
- 6. cc-by-nc Canadian National Collection
- 7. © Canadian National Collection

cc-by Joseph Berger





# DIAMONDBACK MOTH



# DIAMONDBACK MOTH

- AAFC Monitoring winds originating from the south
- Pheromone traps on the ground to capture adult moths
- No serious infestations in 2016
- Wind currents also being tested to monitor for leafhoppers.





# Bertha Armyworm





# DISEASE SURVEYS [canola]



# 2016 CANOLA DISEASE SURVEY

## > 224 canola crops were surveyed

- Prevalence
- Incidence of disease
- Severity for some diseases
- Fields are either volunteered by growers or selected randomly.
- Thanks to everyone who helps out with this survey each year!





# DISEASE SCOUTING: HOW TO SCOUT

- Inspect five to ten sites
  - If the field is < 100 acres check a minimum of five sites
  - If the field is >100 acres check a minimum of 10 sites
- Inspect multiple plants at each site











http://www.saskatchewan.ca/business/agriculture-natural-resources-and-industry/agribusiness-farmers-and-ranchers/agricultural-programsand-services/information-services-for-agribusiness-farmers-and-ranchers/sask-ag-now/crops/plant-diseases



# Sclerotinia Stem Rot Severity rating scale: 0-5





Rating = 2

Rating = 1



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# Sclerotinia Stem Rot

- Prevalence: 92% of crops surveyed in SK in 2016 had at least trace levels of sclerotinia stem rot
  - 66% in 2015 and 79% in 2014
- Incidence: an average of 26% of plants in infected fields had sclerotinia stem rot symptoms
  - 11% in 2015 and 18% in 2014





# Sclerotinia incidence in Saskatchewan (1999-2016)









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# BLACKLEG

- Prevalence: 61% of the crops surveyed in 2016 had at least trace levels of blackleg
  - 59% in 2015 and 55% in 2014
- Incidence: an average of 12% of plants surveyed in infected field had symptoms of blackleg
  - 15% in 2015 and 15% in 2014





# **BLACKLEG SEVERITY RATING SCALE**

00000	0	No diseased tissue visible in the cross section
100000	1	Diseased tissue occupies 25% or less of cross section
tobbe	2	Diseased tissue occupies 26-50% of cross section
30000	3	Diseased tissue occupies 51-75% of cross section
tole/000	4	Diseased tissue occupies >75% of cross section with little or no constriction of affected tissues
5 Peng, AAFC Saskatoon	5	Diseased tissue occupies 100% of cross section with significant constriction of affected tissues; tissue dry and brittle, plant dead
saskatchewan.ca		Saskatchewan

saskalcnewan.ca

	Prevalence (%)	Average Incidence Infected	Severity infected Fields	
		Fields (%)	(0-5 scale)	
Northwest (44)	91	13	1.4	
Northeast (23)	52	14	1.2	
West-central (24)	71	19	1.3	
East-central (64)	58	10	1.7	
Southwest (36)	44	3	1.2	
Southeast (33)	45	12	1.3	
Overall mean (224)	61	12	1.4	

# CLUBROOT

- Look for visible symptoms in the field (all 224 fields)
- Collect soil from the field entrance and test for the presence of *Plasmodiophora brassicae* DNA using qPCR





### **Timeline of Clubroot in Saskatchewan Activities** Year Canola Disease Survey - 130 fields surveyed - soil samples collected from 30 fields - One positive field (no 2008 symptoms, positive PCR test, positive bioassay) 2009 Declared a pest under The Pest Control Act (PCA) Ministry formed the SK Clubroot Initiative (SCI) 2009 Canola Disease Survey - 158 fields surveyed - soil samples collected from 60 fields – No positive fields 2009 Canola Disease Survey - 265 fields surveyed - soil samples collected from 76 fields – No positive fields 2010 Canola Disease Survey - 241 fields surveyed - soil samples collected from 99 fields – No positive fields 2011 2011 Two fields confirmed positive outside of the Canola Disease Survey Canola Disease Survey - 253 fields surveyed - soil samples collected from 91 fields – One positive field (no 2012 symptoms, positive PCR test, positive bioassay) Soil samples collected from 12 fields in the surrounding area from the positive field in 2012. 2013 Canola Disease Survey - 268 fields surveyed - soil samples collected from 122 fields – No positive fields 2014 Canola Disease Survey - 271 fields surveyed - soil samples collected from 98 fields – No positive fields Canola Disease Survey - 253 fields surveyed – soil samples collected from 134 fields – no positive fields 2015 Canola Disease survey – 224 fields – soil samples collected from 127 fields – no positive fields 2016



# Aster Yellows



## ASTER YELLOWS





2011 2012 2013 2014 2015 2016

Year

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# WHITE RUST





# DOWNY MILDEW



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Photos by Lawrence Barany

## Alternaria Black Spot

Rating scale for

Alternaria black spot on canola >> Alternaria spp. are ubiquitous saprophytes

A. brassicae and A. raphani cause black spots on canola leaves, stems, and pods.

Often found on every plant but only at trace levels.



# **PRODUCT UPDATES**

### > New:

- Insecticide:
  - Group 3A: Poleci (Sharda Cropchem; deltamethrin)
  - Group 28: Coragen (DuPont)
- Herbicide:
  - Group 14: Authority (FMC: low rate, kochia burndown)
  - Group 14: Authority Charge (Authority + Aim)
  - Group 2: Solo ADV (BASF, 25g/L liquid with built-in adjuvant)

Clearfield B. juncea -

• Group 1&2: Solo Ultra copack (BASF, Solo ADV + Poast Ultra) Group 2: Odyssey NXT (BASF: Odyssey + Merge adj)

- $\succ$  No longer available:
  - Insecticide

• Sevin (Bayer: carbaryl) saskatchewan.ca



# 2016 POST-HARVEST [CONDITIONING & CONSIDERATIONS]



# CONDITIONING [TEMPERATURE & MOISTURE]

- >Monitor closely first 6 weeks; regularly until delivery
- Aerate: soon as bin floor is covered, and till dry, or till 0°C outside temperature
- ➢ Heated air drying:
  - Wetter the seed, longer the process/lower the temp
  - Must be cooled after
- ➢ Bags: monitor twice/week with probes
- Caution: Overdrying (<6%) can cause cracking, increases FFA



# Conditioning [Temperature & Moisture]

- 'Sweating' up to 6 weeks post-harvest
- Bin height vs. diameter affects fan size needed (and, static pressure needed is 2-3 times greater than for cereals)
- 11%+ moisture: should aerate as well as dry







https://www.grainscanada.gc.ca/storageentrepose/jmills/shsap-depae-11-eng.htm

# CONDITIONING [TEMPERATURE & MOISTURE]

## > Temperature outside of bin affects inside:

- Temperature
- Moisture
- Distribution of both



# CONDITIONING [CANOLA]

Equilibrium Moisture Content (EMC): predicts how ambient air will affect moisture content of grain during Natural Air Drying (NAD)

Temp	Relative Humidity (%)										
°C	35	40	45	50	55	60	65	70	75	80	85
-2	6.7	7.5	8.2	8.9	9.7	10.5	11.3	12.2	13.2	14.3	15.7
2	6.4	7.0	7.7	8.4	9.1	9.9	10.7	11.6	12.5	13.6	14.9
5	6.1	6.8	7.4	8.1	8.8	9.5	10.3	11.1	12.0	13.1	14.3
8	5.9	6.5	7.1	7.8	8.5	9.2	9.9	10.7	11.6	12.6	13.8
10	5.7	6.3	7.0	7.6	8.3	8.9	9.7	10.5	11.3	12.3	13.5
13	5.5	6.1	6.7	7.3	8.0	8.6	9.4	10.1	11.0	11.9	13.1
15	5.4	6.0	6.6	7.2	7.8	8.5	9.2	9.9	10.7	11.7	12.8
18	5.2	5.8	6.4	7.0	7.6	8.2	8.9	9.6	10.4	11.3	12.4
22	5.0	5.6	6.1	6.7	7.3	7.9	8.5	9.3	10.0	10.9	12.0
26	4.8	5.4	5.9	6.5	7.0	7.6	8.2	8.9	9.7	10.5	11.6
28	4.8	5.3	5.8	6.3	6.9	7.5	8.1	8.8	9.5	10.4	11.4

Prairie Agricultural Machinery Institute (PAMI)



# CONDITIONING [MUSTARD]

Fewer days of safe storage



**≻** 9.5% = dry

- > 9.5-15% must be dried:
  - Dry to 13%. Allow seed temp to reach outside temp
  - Dry to 9%. Allow to cool before binning
  - Don't exceed 65°C (air) or 45°C (seed) during drying process

# STORAGE [PESTS]

- Several different types of molds (fungi), each has different ideal moisture conditions to grow
  - Clumping can precede visible mold (~10 days later)
  - Germination is eventually negatively affected (~40 days later)
- Insect spoilage in bins is minimal for oilseeds, especially <18°C and dry seed
  - Mites feed on seed; can carry fungal spores, also attract predatory insects
  - Minimize chance of infestation by keeping temp. and moisture low
- Do not use malathion; do not store in bins treated with it for 6 months



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# **OVERWINTERED CROPS** [CONSIDERATIONS]

- Likely some quality loss (oil degradation producing higher free fatty acid content)
- Double check with your buyer
- If they are not taking any off-grade seed, line up a Plan B



## **Mustard Production Manual**

### SASKATCHEWAN MUSTARD DEVELOPMENT COMMISSION

## http://saskmustard.com/production-manual/













Mustard Growers

Share This





How to grow mustard in Saskatchewan: Seeding, pest control, harvest and more.





SASKATCHEWAN MUSTARD DEVELOPMENT COMMISSION

#### **Table of Contents**

Download Mustard Production Manual as a PDF

#### Home

Plant Description Types of mustards and their uses

Growth stages How to distinguish mustard from canola

Adaptation, field selection and rotational characteristics

Adaptation

# FUTURE DEVELOPMENTS [MRLS]

- Maximum Residue Limits (MRLs): the upper limit of residue of a particular pesticide that is "tolerated" in a particular food commodity
  - i. Only use approved pesticides (no quinclorac)
  - ii. Use pesticides correctly (PHI)
  - iii. Optimize rotation
  - iv. Proper storage
  - v. Do not grow de-registered varieties

## keepingitclean.ca

## Spraytoswath.ca

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# FUTURE DEVELOPMENTS [TOOLS]

## App-based, real-time reporting (surveys)?



# FUTURE DEVELOPMENTS [VARIETIES]

## ≥2 new lines...

- Higher yield, larger seed size, brown
- Higher yield, oriental



## SUMMARY

- Disease levels were high in 2016, mainly due to favorable environmental conditions
- Understanding the pest will enable most effective management
- Rotations, good management practices are crucial locally as well as for well-being of the industry
- Proper storage and conditioning in bins is essential this year
- Stay informed about regulatory changes or how international decisions will influence us
- Stay tuned for 2017 developments



# Thank You

# matthew.bernard@gov.sk.ca

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