

Investigating Options for Seed Corn Maggot in Snap Beans

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Vegetable Grower's Meeting
NWREC – March 9th, 2023

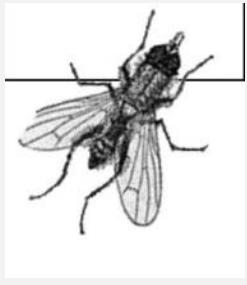


Oregon State University
Oregon IPM Center

JUSTIFICATION

- *Delia*: less well-known
- Wide host range (40+)
- Pupae overwinter
- “Too late”
- Recent / incorporated OM
- Wet, cool soils





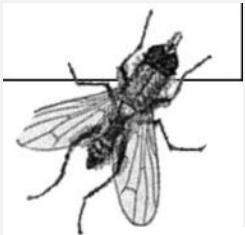
PHENOLOGY

*Online Phenology and Degree-day Models
for agricultural and pest management decision making in the US*

Peak Fly Emergence (50%)	DD (base 39°F)	Date (Keizer, OR 2021)
OW	360	March 3 rd
Gen 1	1080	May 3 rd
Gen 2	1800	June 4 th

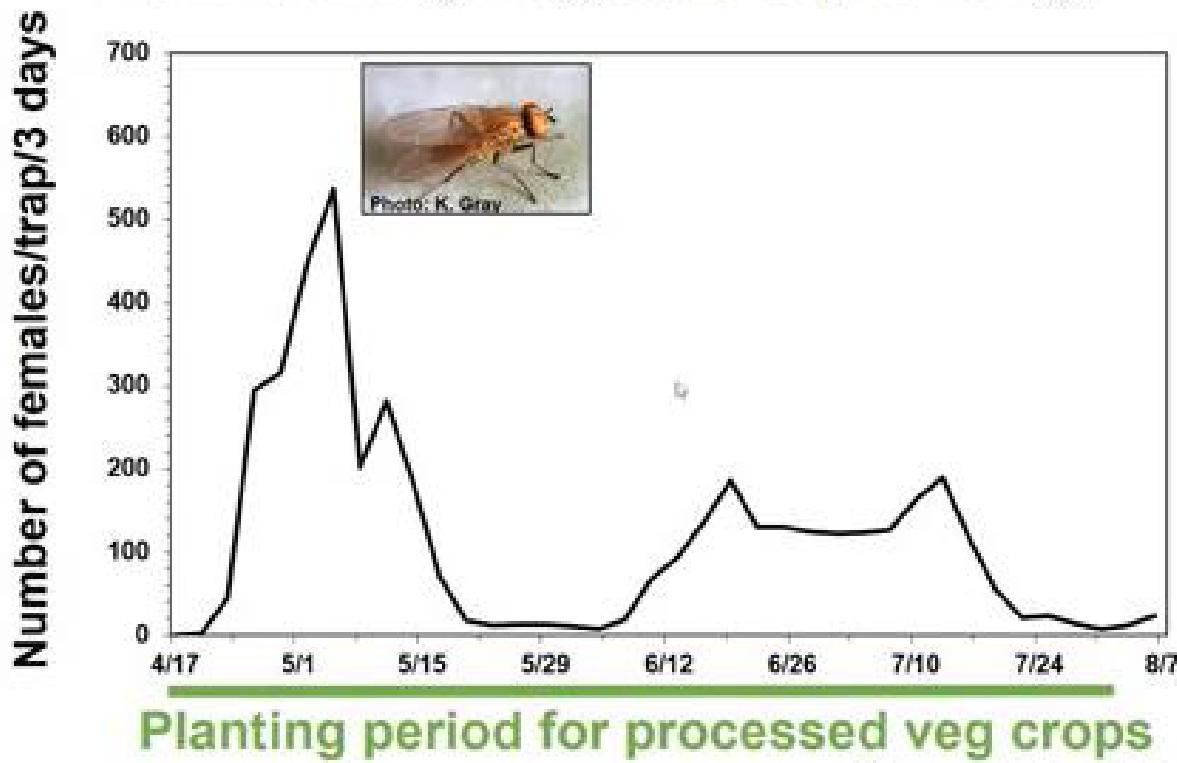
39° F = early start

3-5 generations /yr



PHENOLOGY

Seasonal activity of SCM adults in New York during vegetable planting



A recording of Dr. Nault's presentation on SCM can be accessed [here](#)... well worth the 38 minutes!

IDENTIFICATION



Savage et al. 2016

July 1984

KIM AND ECKENRODE: SEED MAGGOT SEPARATION

415

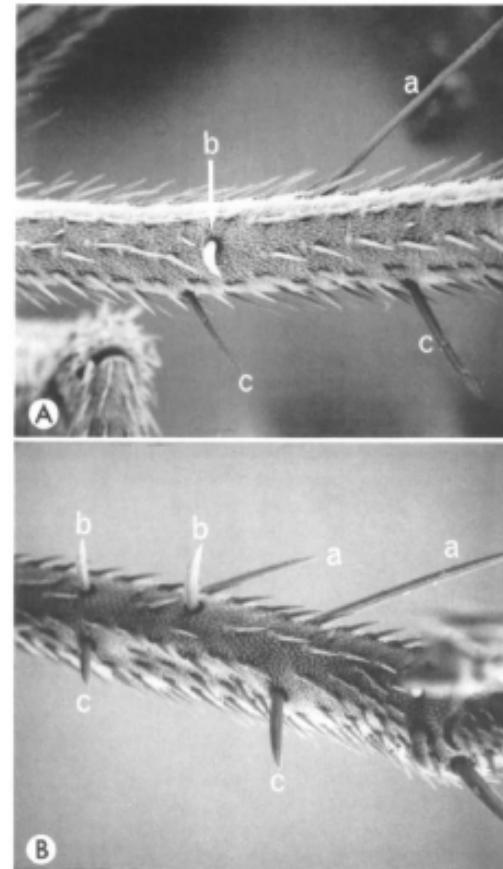


Fig. 1. Mesotibia of female *Delia* species. (A) Mesotibia of female *D. florilega* bearing (a) one anterodorsal, (b) one posterodorsal, and (c) two posterovenital bristles, 223 \times . (B) Mesotibia of female *D. platura* bearing (a) two anterodorsal, (b) two posterodorsal, and (c) two posterovenital bristles, 225 \times .

thousand newly emerged females of each species

Kim and Eckenrode (1984)

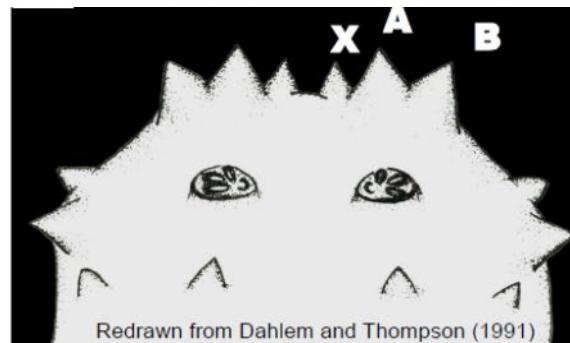
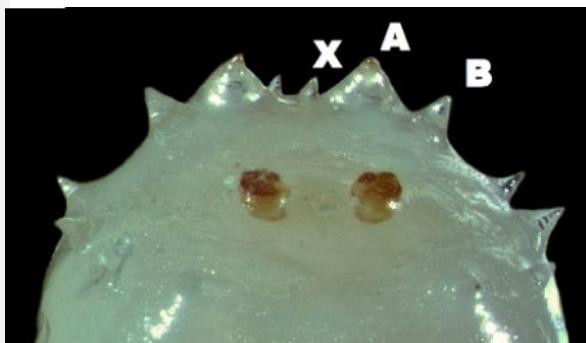
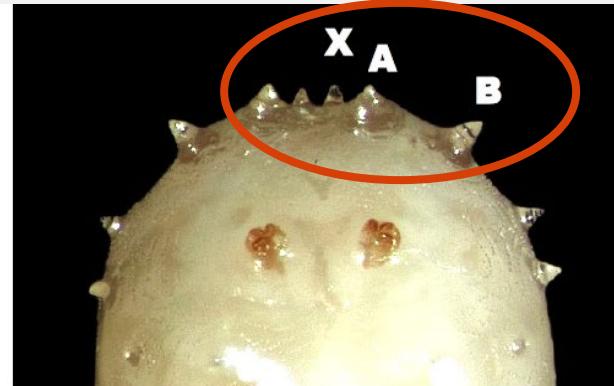
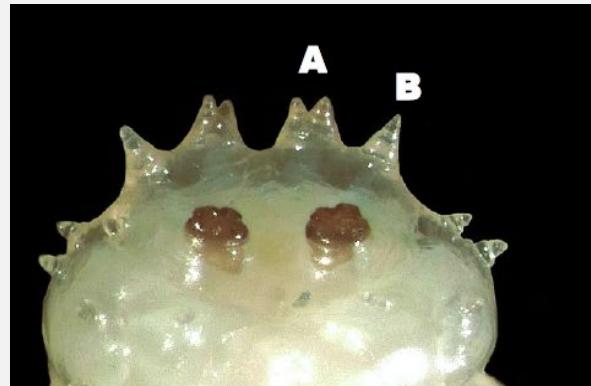
a typical female *D. florilega* bears one bristle each on the anterodorsal and posterodorsal surfaces

while that of *D. platura* bears one or two on the anterodorsal and two on the posterodorsal surfaces

posterior



anterior



Redrawn from Dahlem and Thompson (1991)

Tubercl e X	Tubercl e A	
Absent	Forked but can be variable	<i>D. radicum</i> or <i>D. planipalpis</i>
Present	Simple, small	<i>D. platura</i> or <i>D. florilega</i>
Present	Simple, wide at base	<i>D. antigua</i>
Present	Appears merged with tub. B	<i>D. floralis</i>

Savage et al. (2016)

OPTIONS – SNAP BEAN

(IN 2021, PLEASE CONSULT HANDBOOK OR PICOL FOR CURRENT INFO)

**Insect
MANAGEMENT HANDBOOK**

2021
PACIFIC NORTHWEST

IN CASE OF EMERGENCY, CALL YOUR POISON CENTER: 1-800-222-1222
If the patient has collapsed or is not breathing, call 9-1-1.
See last two pages of book for poison safety information.

A Pacific Northwest Extension Publication
Oregon State University • Washington State University • Cornell
Reviewed annually.

Dow AgroSciences

Entrust®
SC
NATURALYTE® INSECT CONTROL

F

A Naturalyte® insect control product formulated for control of lepidopterous larvae (worms or caterpillars), leafminers, thrips, and red imported fire ants.

Group	5	INSECTICIDE
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Active Ingredient:
spinosad (a mixture of spinosyn A and spinosyn D) 22.5%
Other Ingredients 77.5%
Total 100.0%

Contains 2 lb of active ingredient per gallon.

OMRI LISTED

Listed by the Organic Materials Review Institute (OMRI) for use in organic production.

Agricultural Use Requirements
Use this product only in accordance with its labeling and with the Worker Protection Standard, 40 CFR Part 170. Refer to label booklet under "Agricultural Use Requirements" in the Directions for Use section for information about this standard.

Notice: Read the entire label before using. Use only according to label directions. Before using this product, read Warranty Disclaimer, Inherent Risks of Use, and Limitation of Remedies at end of label booklet. If terms are unacceptable, return at once unopened.

In case of emergency endangering health or the environment involving this product, call 1-800-992-5994.
Shake Well Before Use -- Avoid Freezing

EPA Reg. No. 62719-621 EPA Est. 5905-GA-01
97017821

VERIMARK®
INSECT CONTROL
WITH THE ACTIVE INGREDIENT CYAZPYR®

In-Furrow

GROUP 28 **INSECTICIDE**

BRIGADE® WSB
INSECTICIDE / MITICIDE

EPA Reg. No. 279-3108 EPA Est. 279-NY-1

Active Ingredient:
Bifenthrin 10.0%
(2-methyl-1-(4-phenoxy)-3-yl) methyl 3-(2-chloro-3,3-difluoro-1-propoxy)-dimethyl-cyclopropanecarboxylate* 90.0%

Other Ingredients 100.0%

In-Furrow

Personal Protective Equipment (PPE):
Respirator and other protection (other than rubber and leather) must

Nitro Shield® IV By WINFIELD

Insecticide For Treatment Of Labeled Crop Seed

ACTIVE INGREDIENTS:

Imidacloprid: 1-[6-Chloro-3-pyridinyl] methyl-

N-nitro-2-imidazolidinimine 40.7%

59.3%

OTHER INGREDIENTS:

TOTAL: 100.0%

Contains 4 lbs active per gallon (480 grams per liter)

ST

visiting the
properly in a
abrasion duri
weeds.
This product
terrestrial use

PULL HERE TO OPEN ►

Cruiser® 5FS

syngenta.

ST
(WA only)

Insecticide

A seed treatment product for protection against damage from, or insects on cereal grains including barley, buckwheat, corn, pearl millet, oats, popcorn, rice (dry-seeded), rye, sorghum, teffaine, triticale, wild rice, cotton, cucurbit vegetables, legume vegetables (including oilseed crops [black mustard seed, borage seed, crambe seed, flax seed, Indian mustard seed, Indian rapeseed seed, rapeseed (canola seed)], peanuts, postos, sugarbeets, and sunflower seed).

Active Ingredient:
Thiamethoxam* 47.6%
Other Ingredients 52.4%
Total 100.0%

*CAS No. 153719-23-4

Cruiser 5FS is a flowable seed treatment containing 5 pounds thiamethoxam per gallon.

It is highly recommended to use Cruiser 5FS with compatible and registered seed treatment **fungicides** proven to control seed and seedling diseases.

FIELD TRIAL METHODS



PRELIMINARY RESULTS OSU VEG FARM 2021

Insecticide	Rate	Stand count	Vigor of entire plot	Stand count	Snake heads	All maggot damaged seeds or seedlings	Maggots present	
		No./plot (200 seeded inn 20 ft)	10- dead, 0=no damage	-----no. in 1 m of affected row-----				
1	No insecticide on seed	111	1.1	17	0.3	2.5	0	
2	Entrust 0.125 mg ai/seed	120	0.1	18	0.7	0.7	0	
3	Tracer 0.25 mg ai/seed	101	0.3	14	0.3	2.7	0	
4	Capture LFR 8.5 fl oz/a	109	2.0	18	1.0	2.3	0	
ANOVA (P>F)		0.12	ns	ns	ns	ns	ns	
FPLSD (0.05)		26						

PRELIMINARY RESULTS KEIZER, OR. 2021



MAGGOTS



ID	Cultivar/Source of seed treatment	Seed treatment/ insecticide	Rate	Maggots visible on roots
1	Pierrotton/IR-4	Untreated^a	-	0.7
2	Pierrotton/IR-4	Entrust ^a	0.125 mg ai/seed	0.0
3	Pierrotton/IR-4	Tracer ^a	0.25 mg ai/seed	0.7
4	Pierrotton/Syn	Regard	0.15 mg ai/seed	0.0
5	Pierrotton/Syn	Untreated	-	2.3
6	Pierrotton/Syn	Regard	0.15 mg ai/seed	0.0
7	Pierrotton/Syn	Untreated^a	-	3.7
8	Pierrotton/Syn	Capture LFR ^a	16 oz/A, 4 inch band over row	0.3
9	SB4734/Syn	Untreated	-	1.0
10	SB4734/Syn	Untreated	-	2.0
11	SB4734/Syn	Regard	0.15 mg ai/seed	0.3
12	Rogue/Syn	Untreated	-	4.3
13	Rogue/Syn	Regard	0.15 mg ai/seed	0.7
14	Huntingdon/Syn	972 ^b		0.0
15	Huntingdon/Syn	333 ^c		1.7
16	Huntingdon/Syn	972 ^b + spinosad (Regard) @ 0.15 mg/seed		0.0
17	Outlaw/Syn	972 ^b		0.0
18	Outlaw/Syn	333 ^c		0.0
19	Outlaw/Syn	972 ^b + spinosad (Regard) @ 0.15 mg/seed		0.3
ANOVA (Pr>F) FPLSD (0.05)				0.13 2.9

Regard did seem to provide some protection compared to untreated control, “regardless” of var.



SYMPTOMS



ID	Cultivar/Source of seed treatment	Seed treatment/ insecticide	Rate	All maggot- damaged seeds or seedlings
1	Pierrotton/IR-4	Untreated ^a	-	3.0
2	Pierrotton/IR-4	Entrust ^a	0.125 mg ai/seed	2.3
3	Pierrotton/IR-4	Tracer ^a	0.25 mg ai/seed	2.7
4	Pierrotton/Syn	Regard	0.15 mg ai/seed	4.7
5	Pierrotton/Syn	Untreated	-	4.7
6	Pierrotton/Syn	Regard	0.15 mg ai/seed	3.7
7	Pierrotton/Syn	Untreated^a	-	7.0
8	Pierrotton/Syn	Capture LFR ^a	16 oz/A, 4 inch band over row	2.7
9	SB4734/Syn	Untreated	-	5.0
10	SB4734/Syn	Untreated	-	4.7
11	SB4734/Syn	Regard	0.15 mg ai/seed	2.0
12	Rogue/Syn	Untreated	-	7.0
13	Rogue/Syn	Regard	0.15 mg ai/seed	4.0
14	Huntingdon/Syn	972 ^b		3.0
15	Huntingdon/Syn	333 ^c		4.3
16	Huntingdon/Syn	972 ^b + spinosad (Regard) @ 0.15 mg/seed		1.3
17	Outlaw/Syn	972 ^b		2.7
18	Outlaw/Syn	333 ^c		0.3
19	Outlaw/Syn	972 ^b + spinosad (Regard) @ 0.15 mg/seed		0.7

ANOVA (Pr>F)
FPLSD (0.05)

0.04
3.7

SYMPTOMS # MAGGOTS

Table 2. Efficacy of Regard (spinosad) seed treatment on seed corn maggot in Pierrot and Rogue snap beans. Averaged over three sites with 3 to 4 replications per site.

Cultivar	Treatment	Obs	Stand in plot	Vigor	Seedling count	Snake heads	Maggot damage	Maggots visible
			Sseeded: 200 at 2 sites; 130 at 1 site	0=no injury; 10=death			----- no. in 1 m of affected row----	
Pier	Regard	10	109	1.4	17.2	0.8	1.9	0
Pier	Untreated	10	108	3.6	16.0	1.4	4	1.1
Rogue	Regard	10	117	0.8	17.8	0.8	2.1	0.2
Rogue	Untreated	10	119	1.3	21.3	1.6	4.6	1.3
ANOVA								
	site		<.0001	0.04	<.0001	0.01	<.0001	0.01
	Var		0.05	0.001	0.06	0.83	0.5	0.72
	Treat		0.86	0.02	0.46	0.14	0.001	0.05
	Var*Treat		0.76	0.15	0.14	0.83	0.74	1.000

STAND



ID	Cultivar/Source of seed treatment	Seed treatment/ insecticide	Rate	% stand (of 200 seeded)
1	Pierrotton/IR-4	Untreated ^a	-	29
2	Pierrotton/IR-4	Entrust ^a	0.125 mg ai/seed	19
3	Pierrotton/IR-4	Tracer ^a	0.25 mg ai/seed	39
4	Pierrotton/Syn	Regard	0.15 mg ai/seed	37
5	Pierrotton/Syn	Untreated	-	18
6	Pierrotton/Syn	Regard	0.15 mg ai/seed	38
7	Pierrotton/Syn	Untreated ^a	-	43
8	Pierrotton/Syn	Capture LFR ^a	16 oz/A, 4 inch band over row	55
9	SB4734/Syn	Untreated	-	22
10	SB4734/Syn	Untreated	-	26
11	SB4734/Syn	Regard	0.15 mg ai/seed	36
12	Rogue/Syn	Untreated	-	52
13	Rogue/Syn	Regard	0.15 mg ai/seed	49
14	Huntingdon/Syn	972 ^b		85
15	Huntingdon/Syn	333 ^c		83
16	Huntingdon/Syn	972 ^b + spinosad (Regard) @ 0.15 mg/seed		84
17	Outlaw/Syn	972 ^b		85
18	Outlaw/Syn	333 ^c		85
19	Outlaw/Syn	972 ^b + spinosad (Regard) @ 0.15 mg/seed		85
ANOVA (Pr>F)				0.001
FPLSD (0.05)				28

^b 972 = **Captan**, 2.5 fluid oz; thiram 2.0 fl oz.; mefenoxam 0.45 fluid oz.; **thiamethoxam** 1.28 fluid oz.; streptomycin 0.3 oz; **sedaxane** (fungicide) 0.08 fl oz

^c 333 = **Captan**, 2.5 fluid oz; thiram 2.0 fl oz.; mefenoxam 0.45 fluid oz.; **thiamethoxam** 1.28 fluid oz.; streptomycin 0.3 oz

DISCUSSION

- Pest phenology
 - Sampling
 - Seed size
 - Seed treatments
 - Fungicide effect (Captan)
 - Biostimulant? (sedaxane)
 - Group 4A neonic (thiamethoxam)
 - all treatments resulting in >60% stand had thiamethoxam and fungicides included
- as part of the ST

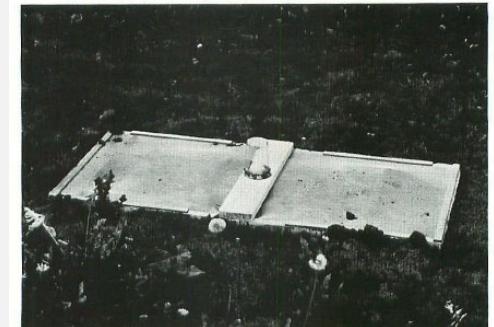


Fig. 1. Seedcorn maggot wood and screen emergence trap.

Higley and Pedigo (1984)

REFERENCES / QUESTIONS

- Broatch, J. S., et al. (2006). "Using Degree-Day and Logistic Models to Predict Emergence Patterns and Seasonal Flights of the Cabbage Maggot and Seed Corn Maggot (Diptera: Anthomyiidae) in Canola." *Environ. Ent.* 35(5): 1166-1177.
- Dal Cortivo, C., et al. (2017). "Biostimulant Effects of Seed-Applied Sedaxane Fungicide: Morphological and Physiological Changes in Maize Seedlings." *Frontiers in Plant Science* 8(2072).
- Dean, A. and Hodgson, E. Iowa State Ext. [Factsheet](#), good info/overview, example of how to use model.
- Higley, L. G. and L. P. Pedigo. (1984). "Seedcorn Maggot (Diptera: Anthomyiidae) Population Biology and Aestivation in Central Iowa". *Enviro. Ent.* 13(5):1436-1442.
- Kim, T. H. and C. J. Eckenrode (1984). "Separation of *Delia florilega* from *D. platura* (Diptera: Anthomyiidae)." *Annals of the Entomological Society of America* 77(4): 414-416.
- Savage, J., et al. (2016). "Identification of *Delia* pest species (Diptera: Anthomyiidae) in cultivated crucifers and other vegetable crops in Canada."

The screenshot shows the VegNet website, which is a regional insect pest monitoring resource. The header features the Oregon State University logo and the title "VegNet". Below the header, there are navigation links for "Recent Posts", "Pest Profiles", "How-to-use / FAQ's", and "Calls to Action". The main content area displays a post titled "Maggots: gross impact of a gross group" posted on January 25, 2021, by user "greenje". A yellow oval highlights this post, and a yellow arrow points from it to the URL "https://beav.es/Jmo" located on the right side of the page. The post content discusses the impact of seedcorn maggots after a speaker talk at the OPVC Annual Grower Meeting. It includes a list of links related to seedcorn maggot issues, pest profiles, temporal trends, scouting reports, research, and management tips.

<https://beav.es/Jmo>



Project #: PR No. P13101



DISCLAIMER

Please understand that these products are not currently registered for use in snap beans, we investigated them under an Experimental Use Permit , and Regard is labeled for commercial seed treatment of onions only.

