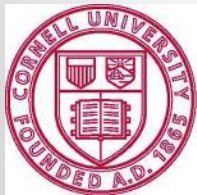


SWD management in tart cherry



Juliet Carroll
NYS IPM Program



Cornell University
Cooperative Extension





- In 2017, SWD infested tart and sweet cherry.
- Numerous tart cherry blocks near Lake Ontario were infested; loads were rejected; fruit was dumped.
- Will the IPM approach used in Michigan tart cherries work in New York?

Cherry IPM Research on SWD

1. The MSU IPM program

- Monitor for SWD
- Monitor fruit ripening
- If 1 SWD caught and fruit is ripening, initiate SWD spray program

2. Tailor the insect spray program to keep SWD populations down

- Plum curculio
- Rhagoletis fruit flies

3. Understand why cherries are now at risk.

- Is the Lake Ontario microclimate involved?



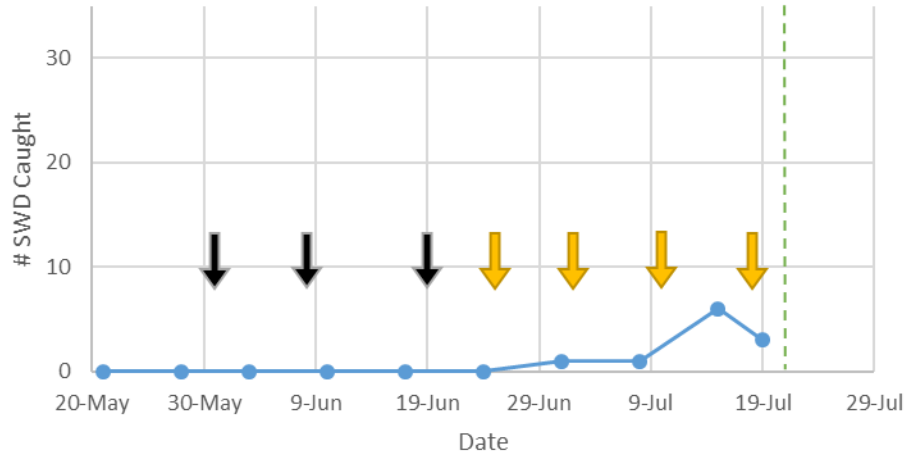
Orchard Results - 2019

Orchard	Distance to Lake	First Catch	# SWD	Weeks to Harvest	Salt Float	Rearing
Inland 3	4.4	July 1	1	3	0	0
Inland 4	5.2	July 9	2	2	0	0
Inland 5	2.9	July 8	1	2	0	0
Lake 1*	0.1	May 21	1	10	13	8
Lake 2*	0.2	May 21	1	9	1	0
Lake 3	0.6	May 28	1	8	0	1

- Significantly earlier trap catch occurred in orchards within a mile of Lake Ontario, compared to those 2 to 5 miles further inland.
- *At two lake sites, zero trap catch of SWD was not obtained.
- Longer time intervals between trap catch and harvest occurred in orchards closer to Lake Ontario.
- Severe pressure from SWD caused the IPM Program to fail in one lake site orchard.
- Few to no SWD-targeted sprays were needed in inland orchards.

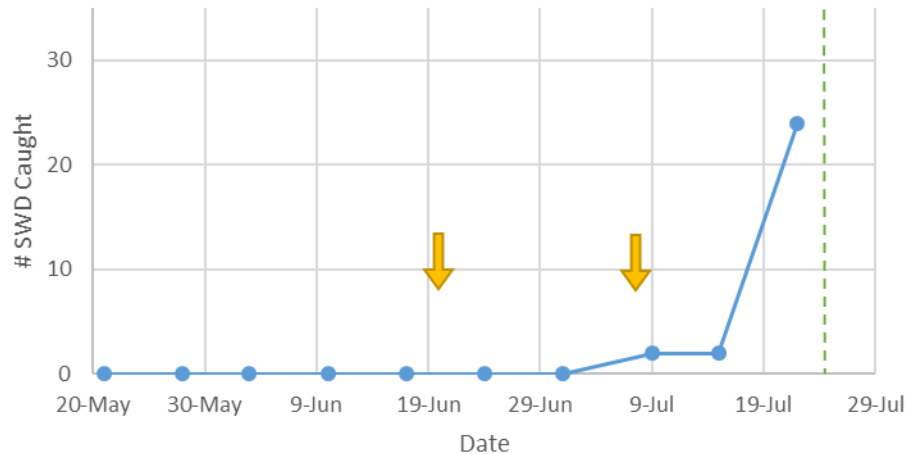
SWD trap catch & sprays – 2019 inland sites

Tart Cherry Orchard Inland 3 - 2019

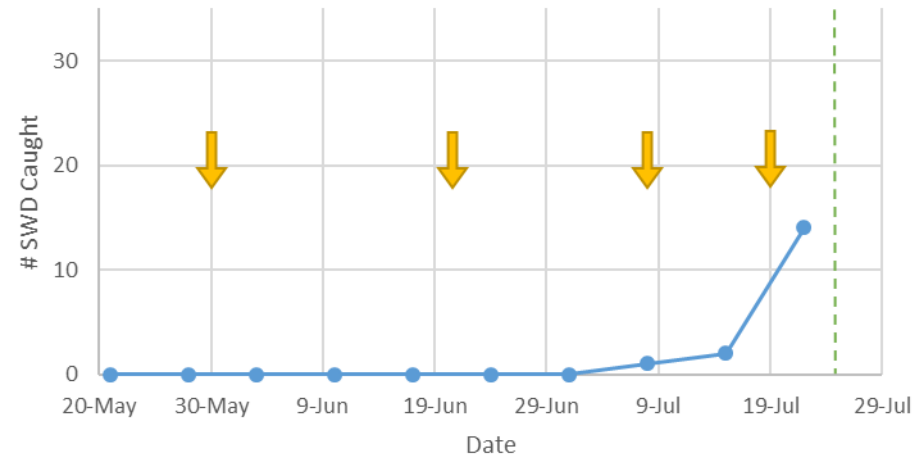


- ↓ - Non-SWD-effective spray
- ↓ - SWD-effective spray
- Dotted line - Harvest date

Tart Cherry Orchard Inland 4 - 2019

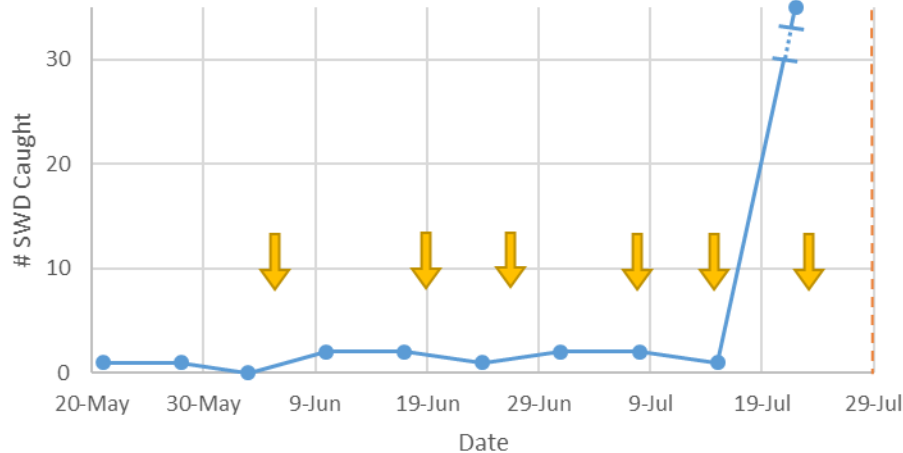


Tart Cherry Orchard Inland 5 - 2019



SWD trap catch & sprays – 2019 lake sites

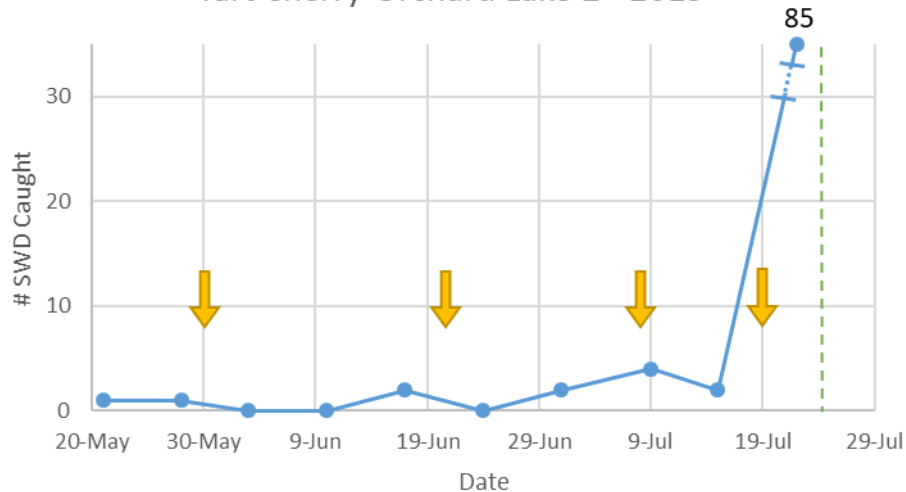
Tart Cherry Orchard Lake 1 - 2019



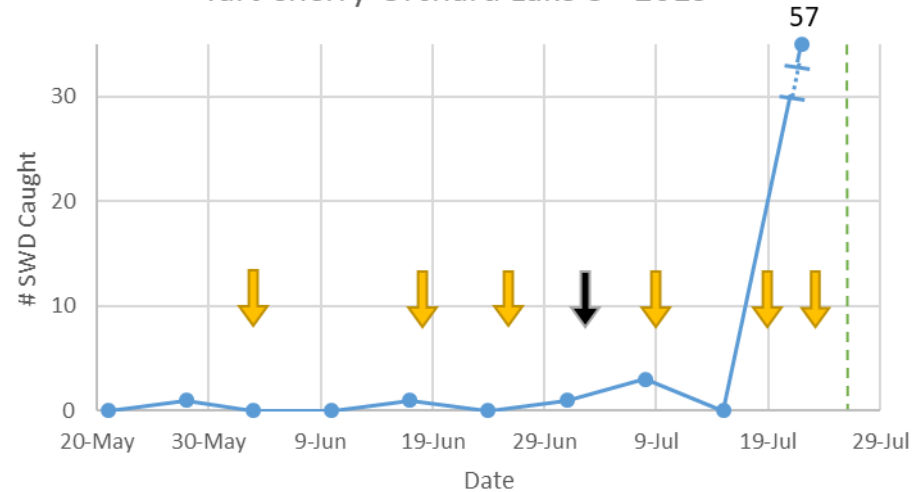
- ↓ - Non-SWD-effective spray
- ↓ - SWD-effective spray
- Dotted line - Harvest date

A huge increase in SWD trap catch occurred during the week ending on July 22, placing the crop at extreme risk prior to harvest.

Tart Cherry Orchard Lake 2 - 2019



Tart Cherry Orchard Lake 3 - 2019



Conclusions

- A significant microclimate effect near Lake Ontario delays crop ripening.
- In the lake microclimate, SWD arrives earlier and builds up to higher populations sooner.
- The combination of these factors places cherry orchards within 1 mile of Lake Ontario at extreme risk of SWD infestation.

Cherry infested with SWD.
Emerging larvae often pupate
partway out of the cherry.



Results

- The IPM approach for dealing with SWD in cherries can and does work.
- Tailor the insect spray program to keep SWD populations down prior to fruit ripening.
 - Choose plum curculio insecticides that also have activity against SWD.
 - Choose CFF, BCFF, and ECFF insecticides that also have activity against SWD.
- ***Once fruit is ripening, plan your SWD management strategy!***

SWD insecticide quick guide

Baythroid XL 2(ee) for SWD, 264-840, 7 day PHI.

SWEET & TART CHERRY										
PRODUCT	AI ¹	IRAC group ²	EPA#	RATE/A	REI ³	DTH ⁴	Max Prod/A/yr (ai)	Total applic's	Spray Interval	Probable efficacy
^@@Entrust 80WP Naturalyte (2ee) ^a	spinosad	5	62719-282	1.25-2.5 oz	4 hr	7 d	9 oz (0.45 lb)	refer to label	> 7 d	Good to Excellent [#]
^@@Entrust 2SC (2ee) ^a	spinosad	5	62719-621	4-8 fl oz	4 hr	7 d	29 fl oz (0.45 lb)	refer to label	> 7 d	Good to Excellent [#]
@@Delegate WG	spinetoram	5	62719-541	4.5-7 oz	4 hr	7 d	28 oz (0.438 lb)	4	> 7 d	Moderate [#]
*Exirel	cyazypyr	28	279-9615	13.5-20.5 fl oz	12 hr	3 d	61.5 fl oz (0.4 lb)	3	> 7 d	Excellent
*Verdepryn 100 SL	cyclaniliprole	28	71512-34-88783	11 fl oz.	4 hr	7 d	27 fl oz (0.18lb)	3	7 d	Excellent
*@Minecto Pro	cyantilaniliprole & abamectin	28, 6	100-1592	10-12 fl oz	12 hr	21 d	24 fl oz (0.21 lb, 0.044 lb)	refer to label	≥ 21 d	Excellent
*Asana XL (2ee)	esfenvalerate	3	352-515	4.8-14.5 fl oz	12 hr	14 d	72.7 fl oz (0.375 lb)	refer to label	-	Good to Excellent
*Danitol 2.4EC	fenpropathrin	3	59639-35	10.66-21.33 fl oz	24 hr	3 d	42.66 fl oz (0.8 lb)	2	> 10 d	Excellent
*Lambda-Cy EC (2ee)	lambda-cyhalothrin	3	70506-121	5.12 fl oz	24 hr	14 d	*25.6 fl oz (0.2 lb)	5 total, 4 post bloom	> 5 d	Good to Excellent
*Mustang Maxx Insecticide	zeta-cypermethrin	3A	279-3426	4 fl oz	12 hr	3 d	24 fl oz (0.15 lb)	6	> 7 d	Excellent
^Grandevo	<i>Chromobacterium subtsugae</i> strain PRAA4-1 and spent fermentation media	UN	84059-27	2-3 lb	4 hr	0 d	-	-	≤ 7 d	Moderate to Good [#]
Tart Cherry Only										
*Imidan 70W	phosmet	1B	10163-169	2.13 lb (0.75 lb/100 gal water)	72 hr	7 d	7.5 lb (5.25 lb)	3	-	Excellent

SWD insecticide quick guide

plum
curculio

Baythroid XL 2(ee) for SWD, 264-840, 7 day PHI.

SWEET & TART CHERRY

PRODUCT	AI ¹	IRAC group ²	EPA#	RATE/A	REI ³	DTH ⁴	Max Prod/A/yr (ai)	Total applic's	Spray Interval	Probable efficacy
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SWD insecticide quick guide

Rhagoletis

Baythroid XL 2(ee) for SWD, 264-840, 7 day PHI.

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SWD management strategy

- Plan insecticide use so you have materials with lower PHI for use close to harvest.
- Rotate active ingredients (IRAC groups) through to harvest for resistance management.
- Choose PC and CFF/BCFF/ECFF insecticides that have activity against SWD.
- Don't stretch spray intervals, 7 day interval max.
- Achieve thorough coverage.
- If it rains, reapply (according to label).
- Read and follow label recommendations.
- Mow the row middles.
- Prune to open the canopy.
-

SWD Resources

- Cornell Fruit Resources SWD pages
 - fruit.cornell.edu/spottedwing
 - Management info
 - Insecticide quick guides
 - SWD hosts
 - SWD biology
- SWD Blog, blogs.cornell.edu/swd1

Provides SWD trap catch information from the NYS network.
- Cornell Cooperative Extension personnel
 - nysipm.cornell.edu/agriculture/fruits/cce-programs/

Welcome to “summer insect management in cherry”, Organized by LOF and NYS IPM

You can ask questions at any time during the presentation in the Q+A window. We will address all your questions at the end of the presentation.



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585-447-7305

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Spotted wing drosophila intro

Spotted wing drosophila intro



Spotted wing drosophila intro



	12-Jun	19-Jun	26-Jun	3-Jul	10-Jul	17-Jul	24-Jul	31-Jul	7-Aug	14-Aug	21-Aug	28-Aug
2013 Males	0.00	0.00	0.00	0.00	0.00	0.00	0.22	1.15	0.90	2.04	2.80	0.43
Females	0.00	0.00	0.00	0.00	0.00	0.00	0.09	0.76	0.79	1.28	1.85	1.14
2014 Males	0.00	0.00	0.00	0.00	0.00	0.00	0.22	0.00	1.64	1.75	2.13	0.67
Females	0.00	0.00	0.00	0.00	0.00	0.14	0.44	0.13	1.64	2.00	1.25	2.17
2015 Males	0.00	0.00	0.00	0.56	0.29	1.14	1.60	4.40	1.25	1.50	4.50	
Females	0.00	0.11	0.13	0.00	0.86	0.86	3.60	9.00	2.25	6.50	29.00	
2016 Males	0.00	0.00	0.17	0.17	0.00	2.75	0.50	2.50				
Females	0.00	0.33	0.67	1.33	0.00	3.00	5.50	13.00				
2017 Males	0.00	0.25	0.60	0.60	0.00	0.00						
Females	0.00	1.50	0.40	4.40	0.50	5.00						
2018 Males	0.00	0.00	0.00	0.00	0.00	0.67	0.25	0.00	5.00		54.00	
Females	0.00	0.00	0.00	0.00	0.67	1.67	0.25	1.00	10.00		41.50	
2019 Males	0.00	0.00	0.00	0.13	0.25	0.50	3.00	0.75	2.75			
Females	0.00	0.00	0.13	0.13	0.13	0.67	5.83	4.25	7.75			
	12-Jun	19-Jun	26-Jun	3-Jul	10-Jul	17-Jul	24-Jul	31-Jul	7-Aug	14-Aug	21-Aug	28-Aug

	12-Jun	19-Jun	26-Jun	3-Jul	10-Jul	17-Jul	24-Jul	31-Jul	7-Aug	14-Aug	21-Aug	28-Aug
2013 Males	0.00	0.00	0.00	0.00	0.00	0.00	0.22	1.15	0.90	2.04	2.80	0.43
Females	0.00	0.00	0.00	0.00	0.00	0.00	0.09	0.76	0.79	1.28	1.85	1.14
2014 Males	0.00	0.00	0.00	0.00	0.00	0.00	0.22	0.00	1.64	1.75	2.13	0.67
Females	0.00	0.00	0.00	0.00	0.00	0.14	0.44	0.13	1.64	2.00	1.25	2.17
2015 Males	0.00	0.00	0.00	0.56	0.29	1.14	1.60	4.40	1.25	1.50	4.50	
Females	0.00	0.11	0.13	0.00	0.86	0.86	3.60	9.00	2.25	6.50	29.00	
2016 Males	0.00	0.00	0.17	0.17	0.00	2.75	0.50	2.50				
Females	0.00	0.33	0.67	1.33	0.00	3.00	5.50	13.00				
2017 Males	0.00	0.25	0.60	0.60	0.00	0.00						
Females	0.00	1.50	0.40	4.40	0.50	5.00						
2018 Males	0.00	0.00	0.00	0.00	0.00	0.67	0.25	0.00	5.00		54.00	
Females	0.00	0.00	0.00	0.00	0.67	1.67	0.25	1.00	10.00		41.50	
2019 Males		0.00	0.00	0.13	0.25	0.50	3.00	0.75	2.75			
Females			0.13	0.13	0.13	0.67	5.83	4.25	7.75			
			26-Jun	3-Jul	10-Jul	17-Jul	24-Jul	31-Jul	7-Aug	14-Aug	21-Aug	28-Aug

2020 First trap
~June 12

Spotted wing drosophila intro

More Info:

<http://fruit.cornell.edu/spottedwing/>

<http://blogs.cornell.edu/swd1/>

Cherry Fruit Fly Management Update

Art Agnello, Cornell AgriTech, Geneva

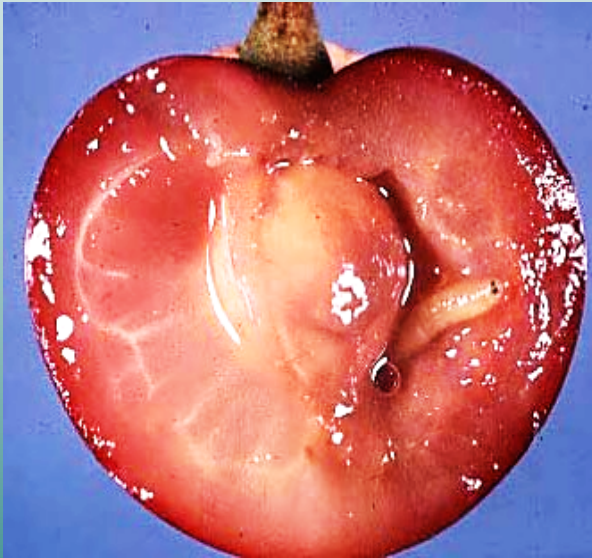


Photo: R. Coutin/Office Pour les
Insectes et leur Environnement (OPIE)

Cherry Fruit Flies

- Principal NY Species

Cherry fruit fly (*Rhagoletis cingulata*): main species

Black cherry fruit fly (*Rhagoletis fausta*): secondary in importance, mostly infests 'bird cherries'; wing pattern has a "doughnut hole"

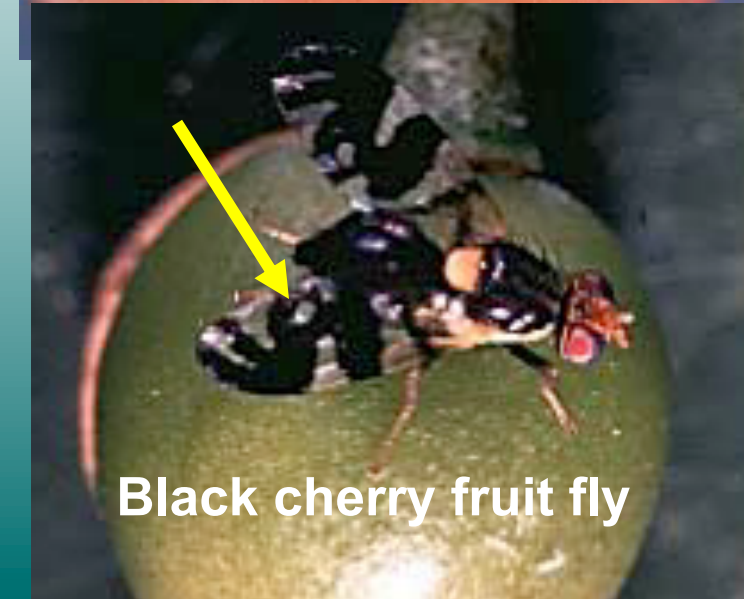
- Biology

Both species univoltine (1 generation per year); emergence as adults in late May-early June when early tart cherries first start to color

BCFF starts ~PF of Macs, CFF about 1 week later; both emerge into early July

- Monitoring

Hang fluorescent yellow sticky boards baited with ammonium acetate near abandoned blocks to time adult emergence; adults feed for ~1 week until mature enough to lay eggs



Cherry Fruit Flies

- **Damage**

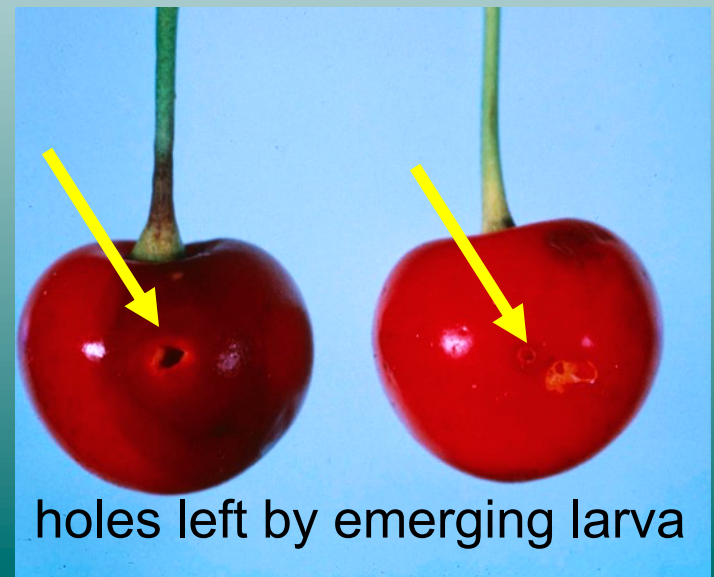
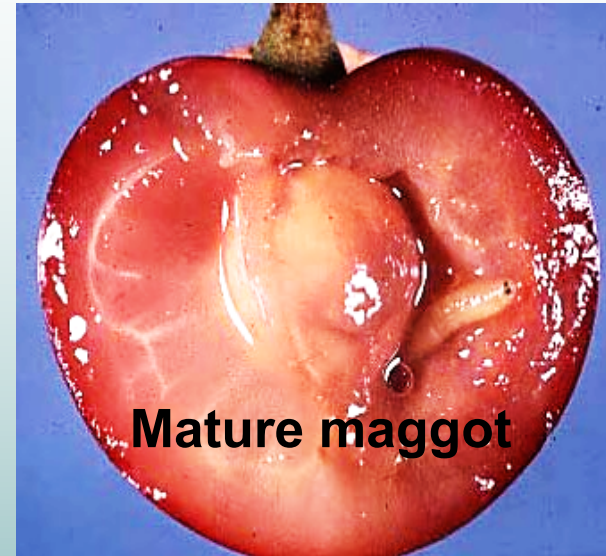
Ovipositor used to deposit eggs singly under skin. Larvae feeding in fruit separate the pulp from the pit, cause browning of pulp.

After feeding 2-3 weeks, full-grown larva bores through the skin and drops to ground to pupate.

- **Management**

Apply 2-3 preventive insecticide sprays, starting ~7 days after 1st emergence in abandoned site.

Options: Imidan (tart cherries only), Lorsban, pyrethroids (Asana/Warrior/Baythroid), Assail, Sevin, Delegate, Exirel; Entrust an option in organic orchards (somewhat less effective)



Cherry Fruit Flies

European Cherry Fruit Fly (*Rhagoletis cerasi*)

- invasive
- native to mainland Europe, Middle East
- found in Canada (2015), WNY (2017)

Hosts:

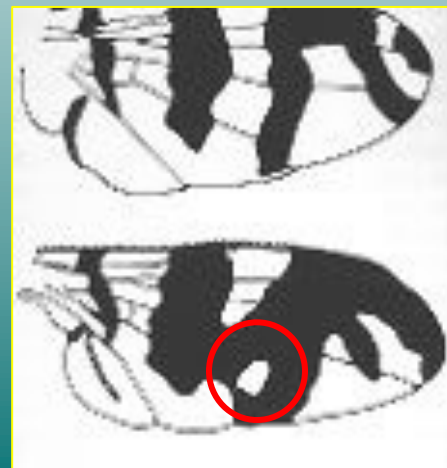
- Species of *Prunus* (cherry) & *Lonicera* (honeysuckle)
- *Prunus avium* (sweet cherry) (Preferred – low acidity)
- *Prunus cerasus* (tart cherry) (Alternate)
- *Prunus serotina* (wild black cherry)
- *Prunus mahaleb* (mahaleb or perfumed cherry)
 - Introduced: present in parts of Lake Ontario region



Photo: Univ. of Connecticut

Lonicera

- *Lonicera tatarica* (Tatarian honeysuckle)(Siberia)
- *Lonicera xylosteum* (European dwarf honeysuckle)
(Present in Genesee, Ontario & Onondaga counties)
- Lake Ontario: *L. tatarica*, *L. morrowii* (East Asia) & *L. x bella* (hybrid) (all present in parts of the NY Lake Ontario region)

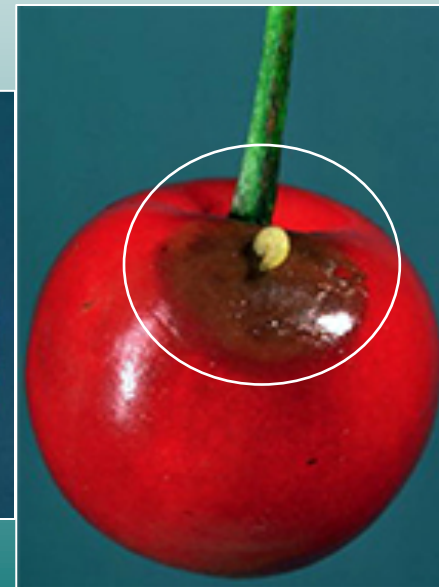


Natives
CFF

BCFF

European Cherry Fruit Fly (*Rhagoletis cerasi*)

- Adults live approx. 4–7 weeks (variable)
- Pre-oviposition period of 6–13 days (temperature-dependent)
- Prefer cherries that are:
 - in full sun (southern / southeastern exposure)
 - changing from green to yellow
 - with a hardened pit and at least 0.2" pulp
- 1 egg per fruit; 30–200 eggs per female (usually 50–80)
- Limited adult dispersal
 - Most less than 100 yds
 - Rarely more than 4/10 mile
 - Except when hosts are scarce
- May emerge approx. 1-2 weeks earlier than native cherry fruit flies



Photos: R. Coutin/Office Pour les
Insectes et leur Environnement (OPIE)

European Cherry Fruit Fly Quarantine and Management

- Quarantine area (NYSDAM / APHIS PPQ): Niagara, Orleans, and Erie Counties
- Fresh cherries may be sold outside the Quarantine Area if the Systems Approach is followed:
 - certified sprays of approved pesticides
 - applied starting 30 days before harvest, every 6-10 days until PHI
- At least 1 ECFF trap required in each cherry orchard block; min. 2 traps in blocks 5A or more in size (to be set, collected, and maintained weekly by NYSDAM)
 - fruit may be sold from the block provided no more than 1 ECFF adult is captured on a trap in the block
- Certified spray program not required if cherries sold to an approved processing facility, but signed compliance agreement (NYSDAM) and permit needed
- No movement of cherries into restricted areas: NY: Chautauqua, Columbia, Schuyler, Ulster and Wayne Counties / States: CA, ID, MI, MT, OR, UT, WA
- Contact: Margaret Kelly, NYSDAM, 518-457-5985; Margaret.Kelly@agriculture.ny.gov
- **ECFF flight has begun and has been caught in the quarantine area**
- **Refer to Quick Guide of NY ECFF Systems Approach Insecticides for New York Cherries (van Zoeren, Agnello, Carroll)**
 - **Cross-references all the *Rhagoletis* insecticides with the SWD products (LOF website)**

February 2020 – Effective NY ECFF Systems Approach Insecticides for New York Cherries – Quick Guide

Compiled by Janet van Zoeren, Art Agnello & Juliet Carroll. Updated regularly.

SWEET & TART CHERRY											spotted wing drosophila
PRODUCT	AI ¹	IRAC group ²	EPA#	RATE/A	REI ³	PHI ⁴	Max product / acre / yr	Max applic's per year	<i>Rhagoletis</i> spp. on label ⁵	Probable efficacy (ECFF)	Probable efficacy (SWD)
Sevin 4F	carbaryl	1A	61842-38	2-3 qt	12 hr	3 d	14 qt	3 per crop	CFF, WCFF	Excellent	Not labeled
Sevin XLR Plus	carbaryl	1A	61842-37	2-3 qt	12 hr	3 d	14 qt	3 per crop	CFF, WCFF	Excellent	Not labeled
*Asana XL	esfenvalerate	3	59639-209	4.8-14.5 fl oz	12 hr	14 d	refer to label	refer to label	CFF, WCFF	Excellent	2(ee) Good to Excellent
*Warrior II	lambda-cyhalothrin	3	100-1295	1.28-2.56 fl oz	24 hr	14 d	10.24 fl oz post bloom	no maximum	CFF, BCFF, WCFF	Excellent	Not labeled
*Lamcap II	lambda-cyhalothrin	3	100-1295	1.28-2.56 fl oz	24 hr	14 d	10.24 fl oz post bloom	no maximum	CFF, BCFF, WCFF	Excellent	Not labeled
*Lambda T-2	lambda-cyhalothrin	3	100-1295-5905	1.28-2.56 fl oz	24 hr	14 d	10.24 fl oz post bloom	no maximum	CFF, BCFF, WCFF	Excellent	Not labeled
*Ravage	lambda-cyhalothrin	3	89168-16-89391	2.56-5.12 fl oz	24 hr	14 d	1.28 pts post bloom	no maximum	CFF, BCFF, WCFF	Excellent	Not labeled
*Baythroid XL	beta-cyfluthrin	3	264-840	2.4-2.8 fl oz	12 hr	7 d	5.6 fl oz	no maximum	CFF, WCFF	Excellent	2(ee) Excellent
Assail 30SG	acetamiprid	4A	8033-36-70506	5.3-8 oz	12 hr	7 d	32 oz	4	CFF, BCFF, WCFF	Excellent	Not labeled
Assail 70WP	acetamiprid	4A	8033-23-70506	2.3-3.4 oz	12 hr	7 d	13.6 oz	4	CFF, BCFF, WCFF	Excellent	Not labeled
#^@@ Entrust Naturalyte	spinosad	5	62719-282	1.25-2.5 oz	4 hr	7 d	9 oz	--	CFF, WCFF	Good	2(ee) Good
#^@@ Entrust SC	spinosad	5	62719-621	4-8 fl oz	4 hr	7 d	29 fl oz	--	CFF, WCFF	Good	2(ee) Good
#@@ Delegate WG	spinetoram	5	62719-541	6-7 oz	4 hr	7 d	28 oz	--	CFF	Excellent	Good
#^ GF-120 NF Naturalyte Fruit Fly Bait	bait with spinosad	5	62719-498	10-20 fl oz	4 hr	none	--	--	CFF, BCFF, WCFF (24(c) ECFF)	Good	Not labeled
#*Exirel	cyazypyr	28	352-859	10-17 fl oz	12 hr	3 d	--	3	CFF	Good to Excellent	Excellent
<i>Tart Cherry Only</i>											
*Imidan 70W	phosmet	1B	10163-169	2.125 lb	72 hr (14 days for U-pick)	7 d	7.5 lb	3	CFF	Excellent	Excellent

*Refer to the label for details and additional restrictions.

^ Approved for organic use in NY.

@@ After 3 consecutive applications, rotate to different IRAC.

May cause foliar or fruit injury on cherry (read label).

¹ Active Ingredient.

² Mode of Action, IRAC group code.

³ Re-entry Interval (hr = hours).

⁴ Pre Harvest Interval (d = days).

⁵ CFF, cherry fruit fly, *R. cingulata*

BCFF, black cherry fruit fly, *R. fausta*

WCFF, western cherry fruit fly, *R. indifferens*

ECFF, European cherry fruit fly, *R. cerasi*

RECENT REGISTRATION ACTIVITY

Mustang Maxx insecticide (zeta-cypermethrin; FMC, EPA Reg. No. 279-3426) :

- Has been granted a FIFRA 24(c) Special Local Need label with the decreased **Pre-harvest Interval of 3 days** (down from 14 days) for control of spotted wing drosophila and European cherry fruit fly in NY cherries.
- The label, which can be found on the DEC Pesticide Portal website, must be in possession of the user at the time of pesticide application.

Stone Fruit IPM for Beginners



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A series of how-to-fact sheets for new stone fruit growers and scouts to protect stone fruit orchards from pests

Developed by the Great Lakes Fruit Workers, a work group of the North Central Integrated Pest Management Center

Developed by the
Great Lakes Fruit Workers

A series of how-to fact sheets for
new stone fruit growers and scouts
to protect fruit orchards from pests

Editors/Authors:
Julianna Wilson, MSU
Juliet Carroll, Cornell
Emily Pochubay, MSU
Arthur Agnello, Cornell
William Shane, MSU

<https://www.canr.msu.edu/ipm/agriculture/fruit/stone-fruit-ipm-for-beginners>