

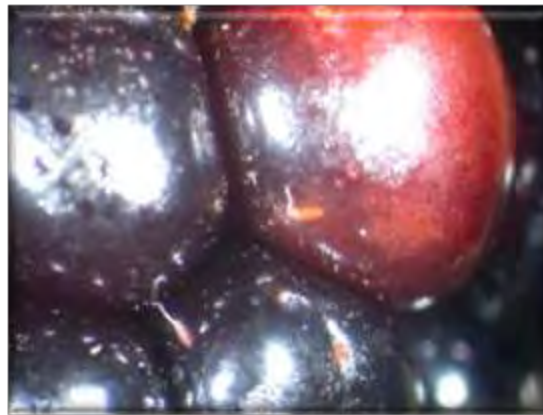
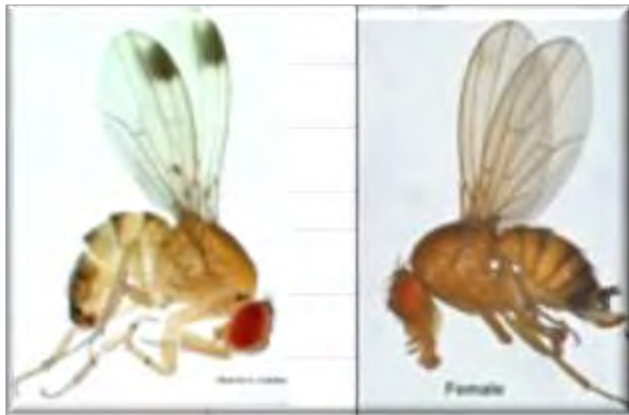
# A Closer Look at Spotted Wing Drosophila

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Department of Entomology

North American Raspberry & Blackberry Conference

26 February 2015 in Fayetteville, AR



# Online Spotted Wing Drosophila Information



<http://swd.ces.ncsu.edu/>



<http://spottedwing.org/>



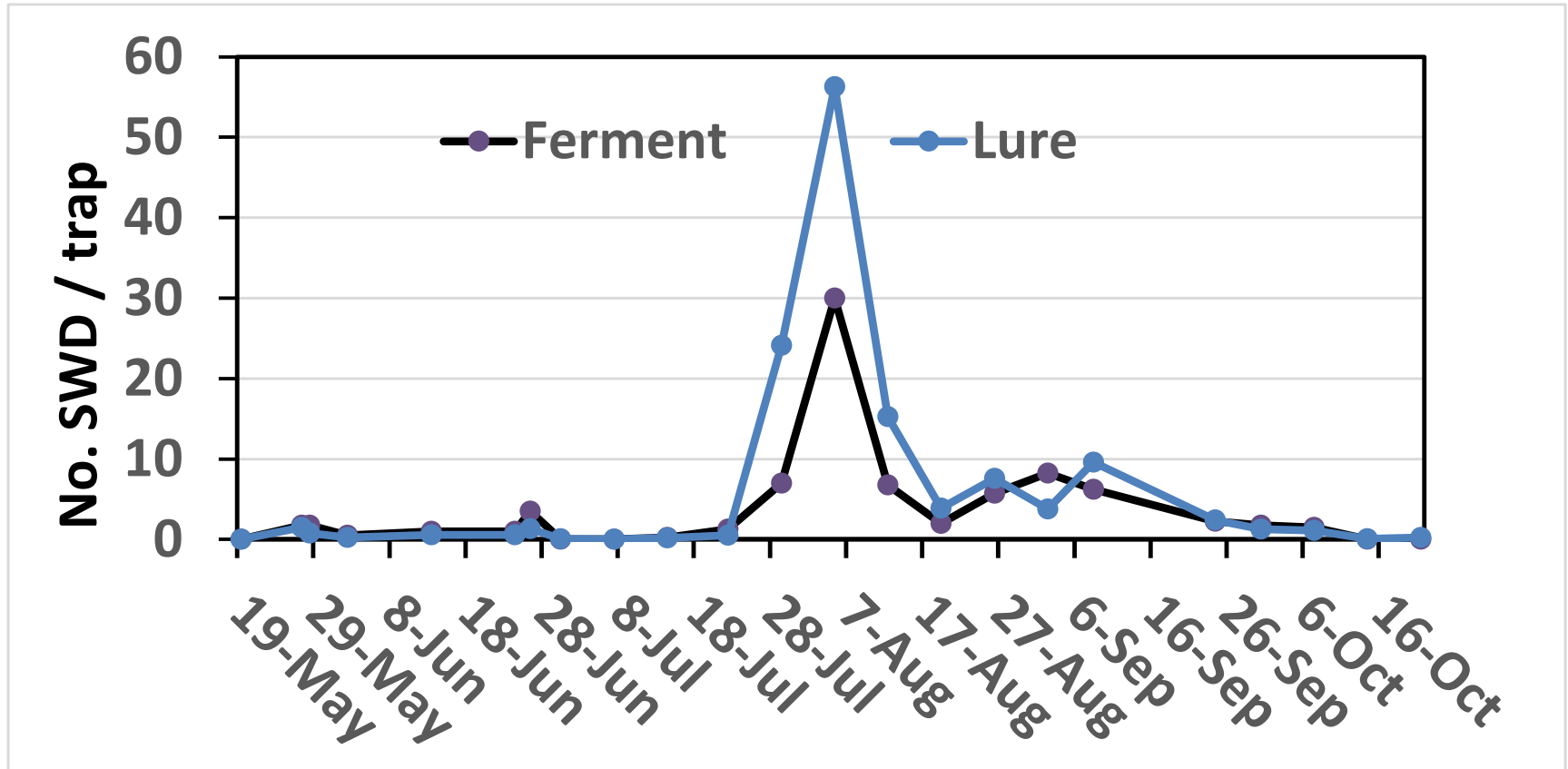
[http://www.ipm.msu.edu/invasive\\_species/spotted\\_wing\\_drosophila](http://www.ipm.msu.edu/invasive_species/spotted_wing_drosophila)



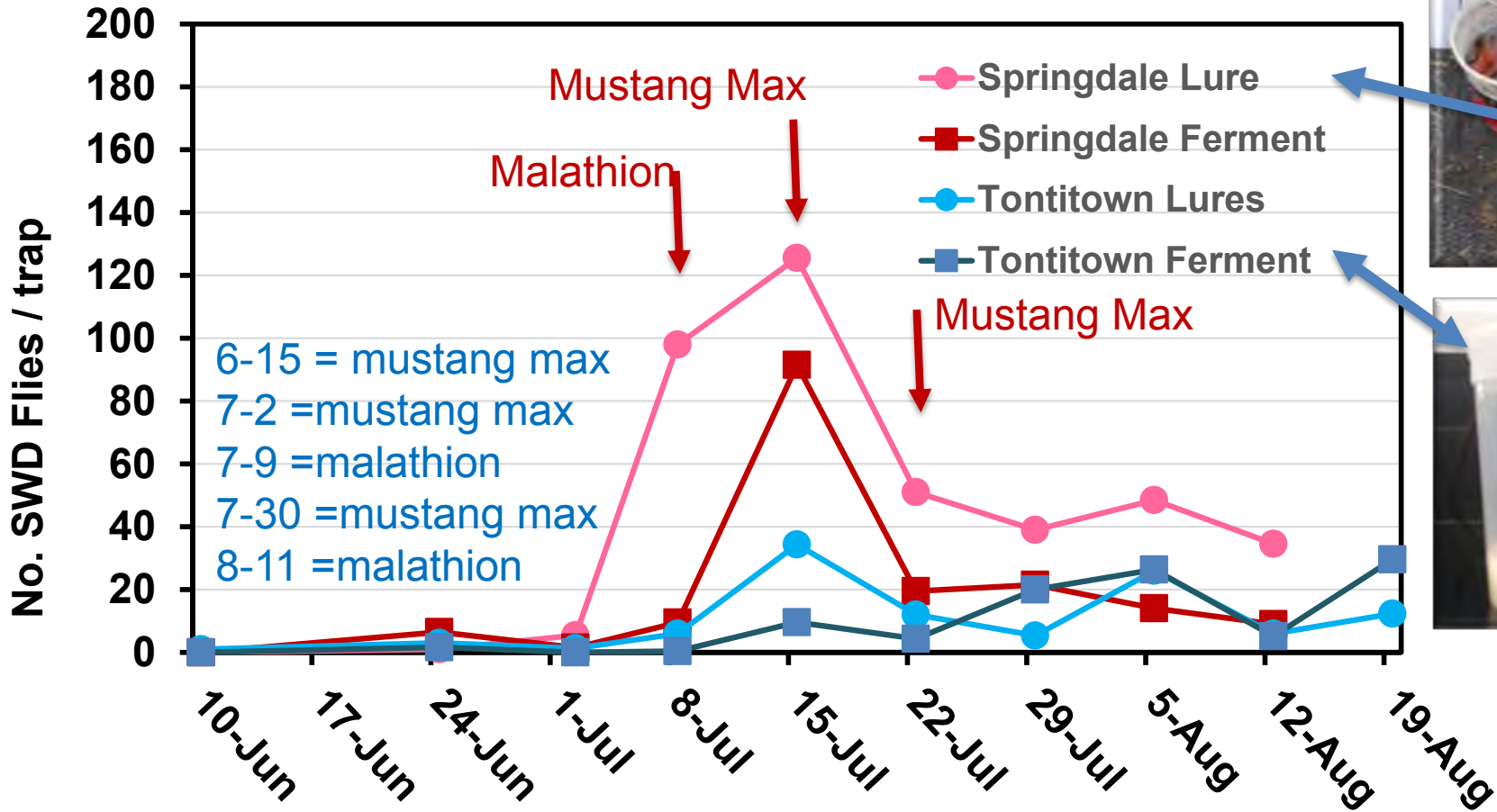
<http://comp.uark.edu/~dtjohnso/>

# Seasonal Flight of SWD in Searcy, AR

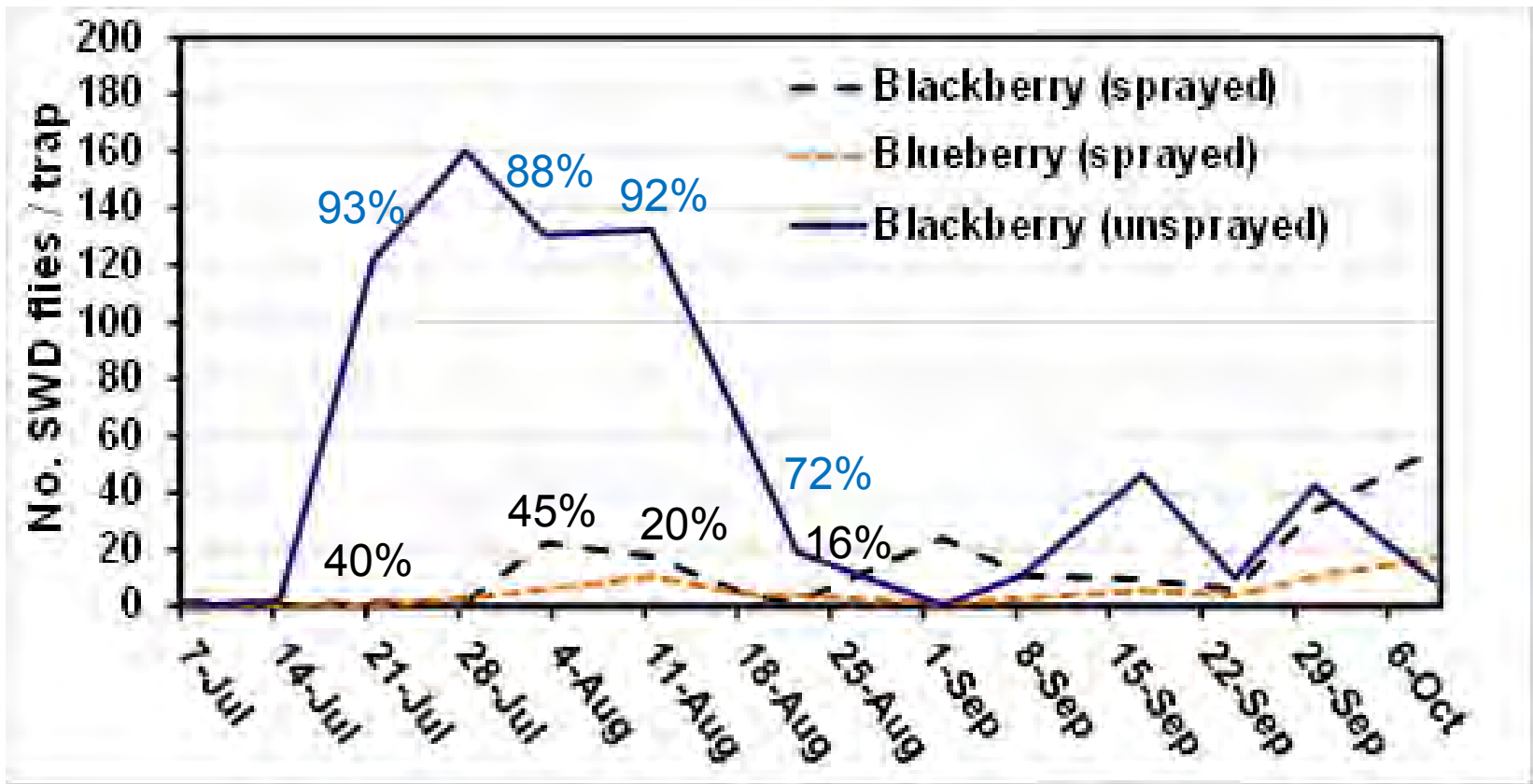
## Commercial Blackberry Field Sprayed Weekly



# Seasonal Flight of SWD in NW AR



**Numbers of SWD flies trapped in berry plots  
either sprayed ( - - - ) or unsprayed ( — )  
and % SWD-infested berries  
(Fruit Station in Clarksville, AR 2014)**



# Residual efficacy of pesticides on SWD

IRAC #  
1B

5

1A

4A

3

**Table 2.** Efficacy of pesticides tested on cherry against *D. suzukii*.

Insecticide	Rate form./acre	Rating*		
		Days after treatment		
		1	7	14-15
Diazinon 50WP	2-4 lb	E	F-G	F
Dimethoate 4E	2.75 pt	E	E	G
Malathion 57%	45 oz	G	P	P
Malathion 57%	90 oz	E	P	P
Malathion 8 Aquamul	5 pt	E	P	P
Malathion ULV	1 pt	G	P	P
Success 2SC	8 oz	E	F	P
Entrust 80WP	2.5 oz	E	F-G	P
Delegate 25WG	7 oz	E	G	F
Delegate 25WG	4.5 oz	E	F	P
Sevin XLR	4 qt	F-G	F	P-F
Sevin XLR	2 qt	F	F	P
Provado 1.6F	4 oz	P-F	P	P
Provado 1.6F	8 oz	F	P	P
Danitol 2.4 EC	10.7 oz	G	F	G
Danitol 2.4 EC	16 oz	E	G	G
Danitol 2.4 EC	21.3 oz	E	G	G
Warrior II	1.28 oz	F-G	F	F
Warrior II	2.56 oz	G	G	F
Mustang 1.5EC	4.3 oz	E	G	G
Baythroid XL	2.8 oz	E	G	G
Perm-Up 3.2EC	8 oz	F	F	P

\*E = excellent, G = good, F = fair, and P = poor control.

Based on field-lab assays: VanSteenwyk, UCB; Shearer, OSU.

## Insecticides for control of SWD in Michigan caneberries, their properties and restrictions

Trade name	Active ingredient	Rate	Class*	PHI days	REI hours	Minimum days btn. sprays	Annual limit	Days of activity**	Rain-fast?***	SWD activity	Natural enemy effects****
Malathion 8F	malathion	2 pint	Organophos.	1	12	7	8 pints	5-7	+	E	M
Mustang 0.8EC	zeta-cypermethrin	4 oz	Pyrethroid	1	12	7	24 oz	7	++	E	T
Danitol 2.4EC	fenpropathrin	16 oz	Pyrethroid	3	24	14	32 oz	7	?	E	T
Asana XL*	esfenvalerate	4.8-9.6 oz	Pyrethroid	7	12	0	28.8 oz	7	?	E	T
Brigade 2EC	bifenthrin	3.2-6.4 oz	Pyrethroid	3	12	7	12.8 oz	7	?	E	T
Hero 2.13SC <sup>#</sup>	bifenthrin+zeta cyp.	4-10.3 oz	Pyrethroid	3	12	7	27.4 oz	7	?	E	T
Assail 30SG	acetamiprid	5.3 oz	Neonicotinoid	1	12	7	5 apps.	7	+	G	M
Delegate WG <sup>##</sup>	spinetoram	6 oz	Spinosyn	1	4	4	19.5 oz	7	+	E	M
Entrust 80WP <sup>##</sup>	spinosad	2 oz	Spinosyn	3	4	6	9 oz	3-5	?	G	M
Entrust SC <sup>##</sup>	spinosad	4-6 oz	Spinosyn	3	4	5	29 oz	3-5	?	G	M
Pyganic 1.4EC	pyrethrum	64 oz	Pyrethrin	0.5	12	0	-	1-2	?	F	M

R. Isaacs, et al. 2013. SWD management



# Can screens exclude and reduce fruit infestation by SWD?

## Proteknet 80g exclusion netting reduce SWD, birds, mammals and hail damage

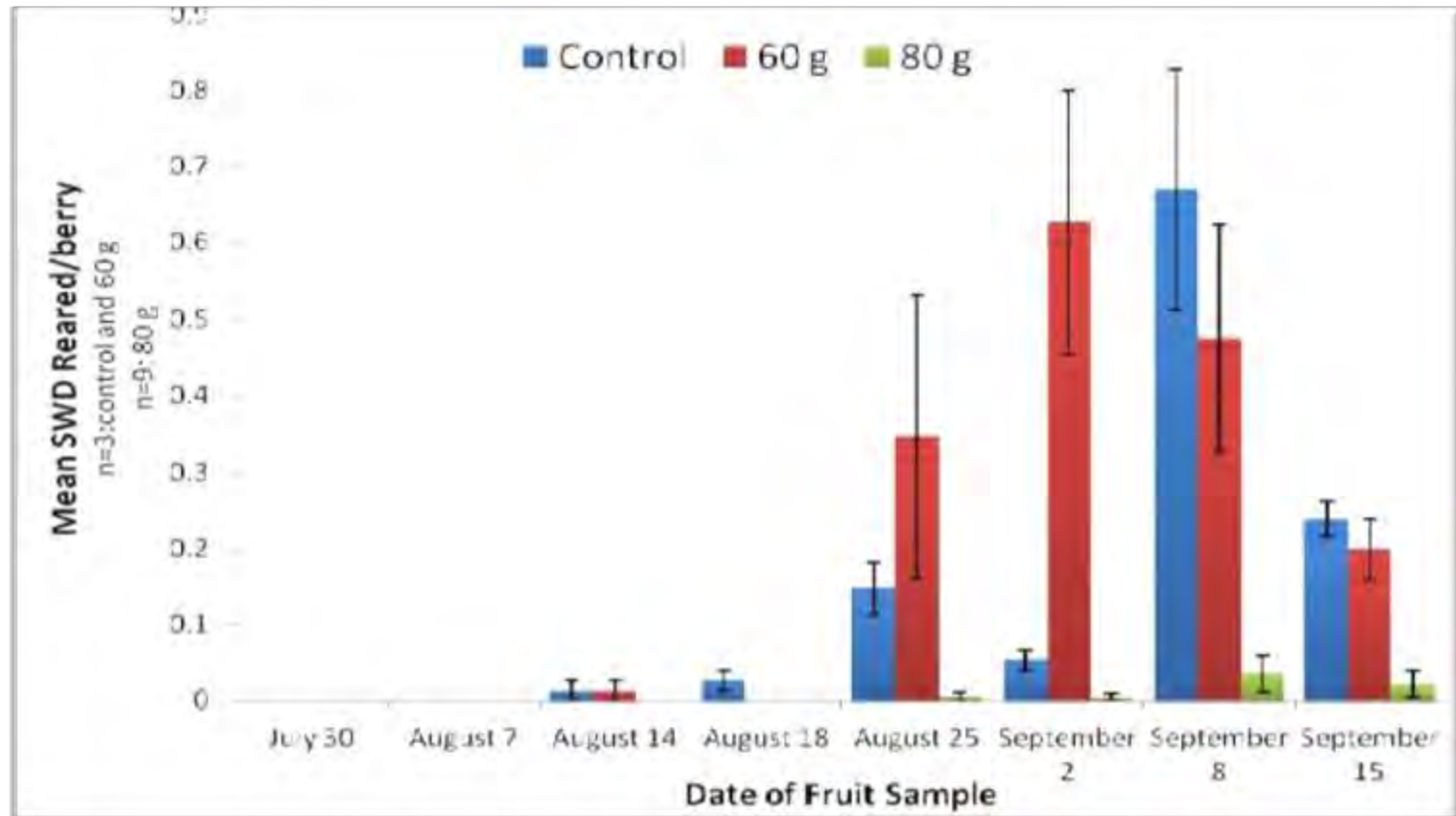


Dale Ila M. Riggs, The Berry Patch of Stone Wall Hill Farm, LLC in Stephentown, NY



New Liskeard, Ontario blueberries

# Blueberries had much less SWD emerge from fruit under screen 80g than in 60g or Control



# Screened Sides of High Tunnel



Spotted wing drosophila trap



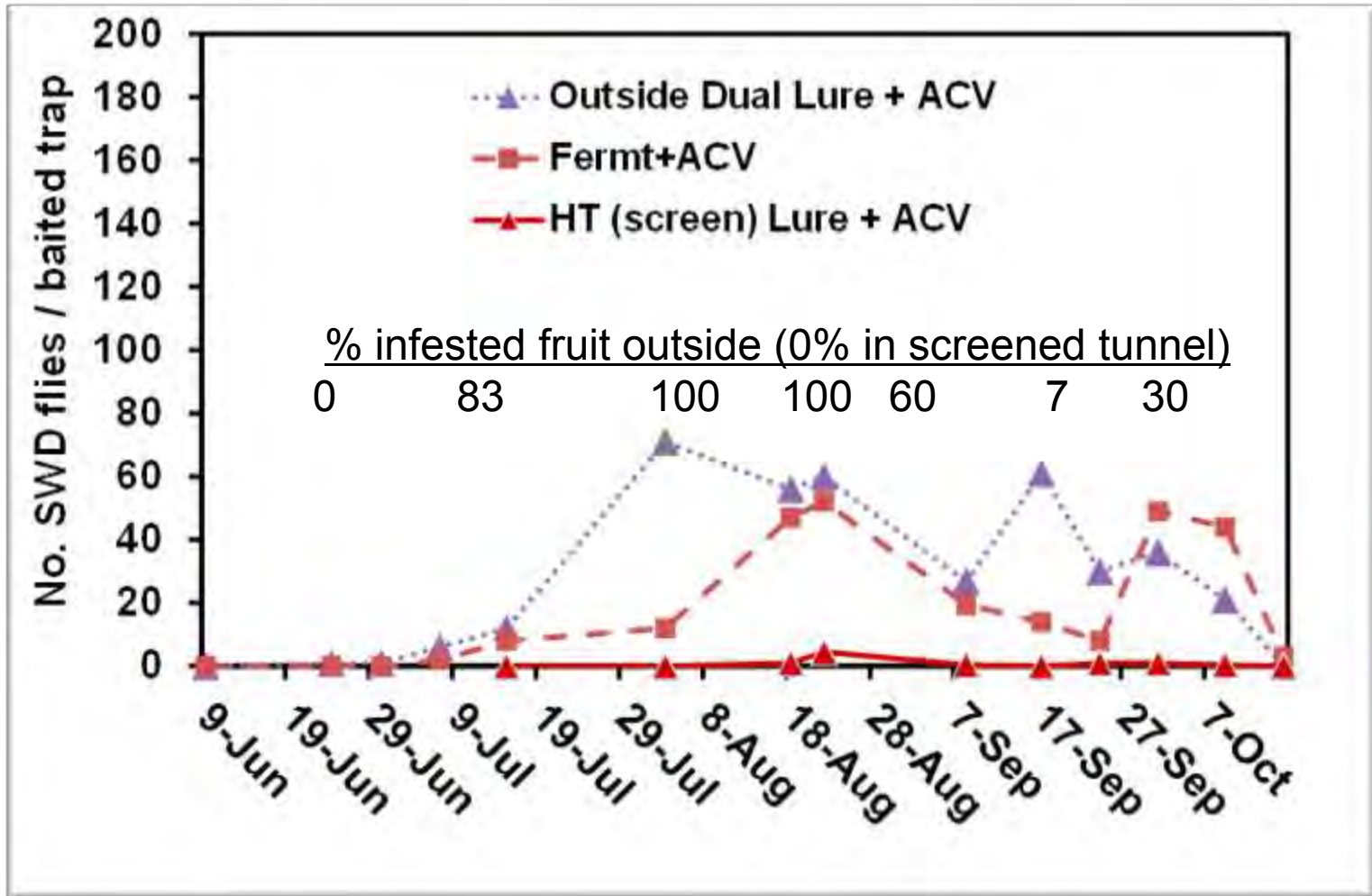
**Recommend ProtekNet**  
screen mesh 80 g/m<sup>2</sup>  
(80% porosity) for better  
air flow than 25 g/m<sup>2</sup>  
screen (62% porosity)

**\*25 g screen makes**  
**tunnel too hot – needs**  
**venting**

# SWD Organic Sprays to Field Brambles

- 7/15 **Entrust** WP (0.3 g/gal) raspberries
- 7/23 **Pyganic** EC 1.4 (1 oz/gal) raspberries
- 7/31 **Entrust** raspberries
- 8/6 **Pyganic** blackberries and raspberries
- 8/13 **Entrust** blackberries and raspberries
- 8/20 **Pyganic** blackberries and raspberries
- 8/26 **Entrust** blackberries and raspberries
- 9/4 **Pyganic** blackberries and raspberries
- 9/9 **Entrust** blackberries and raspberries
- 9/18 **Pyganic** blackberries and raspberries
- 9/24 **Entrust** blackberries and raspberries
- 10/4 **Pyganic** blackberries and raspberries

**Screened (25g) high tunnel = 18 SWD flies, 0% infested blackberries**  
**Outside = 924 SWD flies, > 60% infested blackberries**  
**(Early-July to late-August in Fayetteville, AR 2014)**



# 2015 Proposal:

## Developing and implementing organic management of SWD

1. Develop strategies to manipulate biology and behavior:
  - Seasonality, movement, baits, attract & kill, mass trap
2. Incorporate cultural and non-traditional practices
  - Alter crop canopy, floor and/or use screen exclusion
3. Optimize biological and chemical control strategies
  - Survey for biological control agents
  - Evaluate new insecticides
4. Implement and evaluate management programs
  - Cost/benefit analysis, factsheets, demonstrations, field days, webinars

### Organic Agriculture Research and Extension Initiative (OREI)



# Summarize New Facts on SWD Management

- SWD infest mostly ripened blackberries > 11 °Brix (Johnson)
- Pick ripe fruit daily and refrigerate immediately
- Residual activity of insecticides (Hamby et al. 2013):
  - Malathion and Pyganic killed 100% and 80% SWD, and kept sweep net counts of SWD low for 10 days and 1 day, respectively
- Organic program:
  - Screen (1 mm mesh) does exclude SWD
  - Vacuuming, mass bait and kill trapping, and microbial control as potential control tactics (Pers. Comm., Mark Bolda)



# Acknowledgements



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- Southern Region Small Fruit Consortium
- USDA/SARE - Extending the market season with high tunnel technology for organic fruit production
- Arkansas Agriculture Department and Extension IPM-SCBGP:
  - ✓ Spotted wing drosophila



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