Integrated approach for Managing pepper weevil, *Anthonomus eugenii* Cano using reduced risk insecticides in combination with sex pheromone

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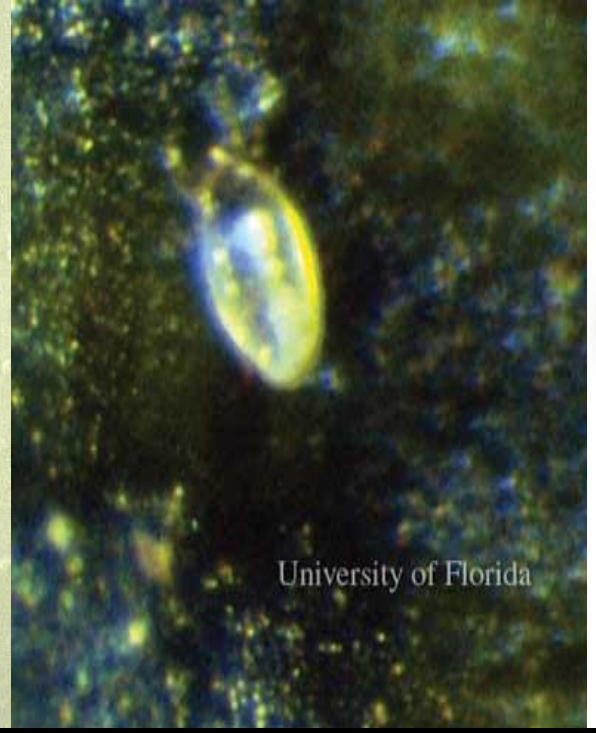
Pepper Production Acreage in the Southern Region

	Sweet pepper	Hot pepper
Florida	19, 554	1,049
Texas	4,919	6,464
N. Carolina	3,943	272
Georgia	3,745	-----
Virginia	1,134	-----
Kentucky	666	
Oklahoma	-	427
Louisiana	-	240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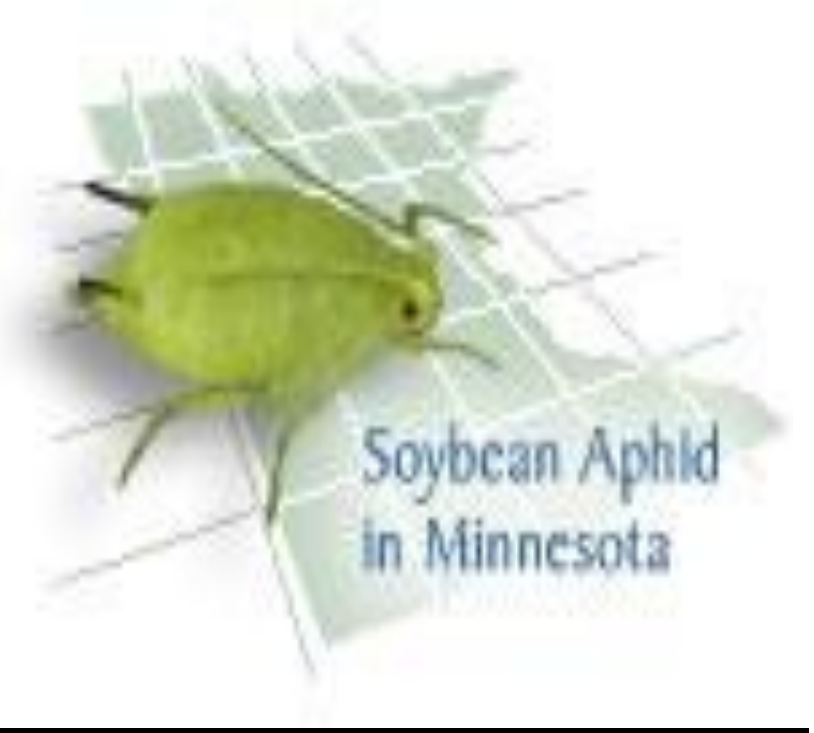

Soybean Aphid
in Minnesota

Origin: Mexico-
Moved through south & Central America.
Spread in Caribbean.

Texas: 1904;
California: 1923;
Florida: 1935;

Hawaii: 1933;

Puerto Rico: 1982.

Hosts:

Petunia, Chrysalis, Lycopersicon
Datura, Nicotiana,
Black nightshade, silverleaf nightshade,
Horsenettle, buffalo bar, Jerusalem cherry

Adult: L 2.0-3.5 mm

W 1.5-1.8 mm

Eggs: oval, grayish
L: 0.53 mm
W: 0.39 mm

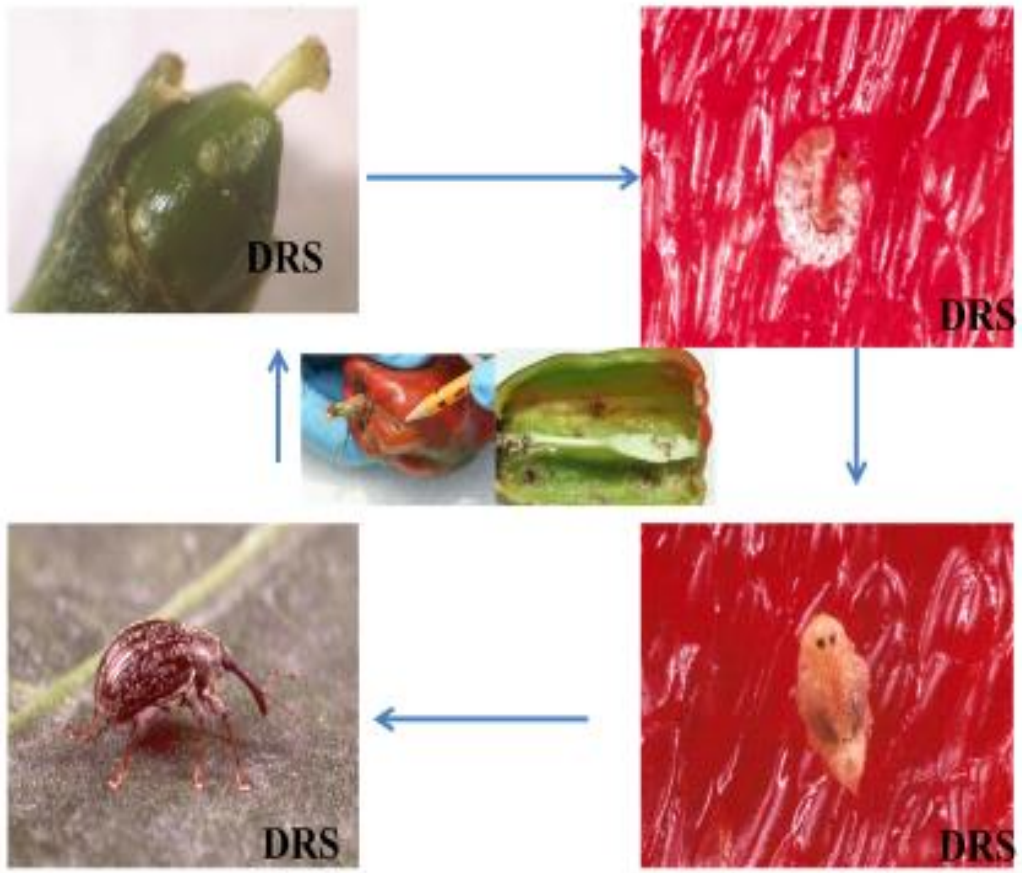
Larva: Elongated, C-shaped

1st instar: 1.0 mm (0.8-1.5) 1.7 d

2nd instar: 1.9 mm (1.3-2.6) 2.2 d

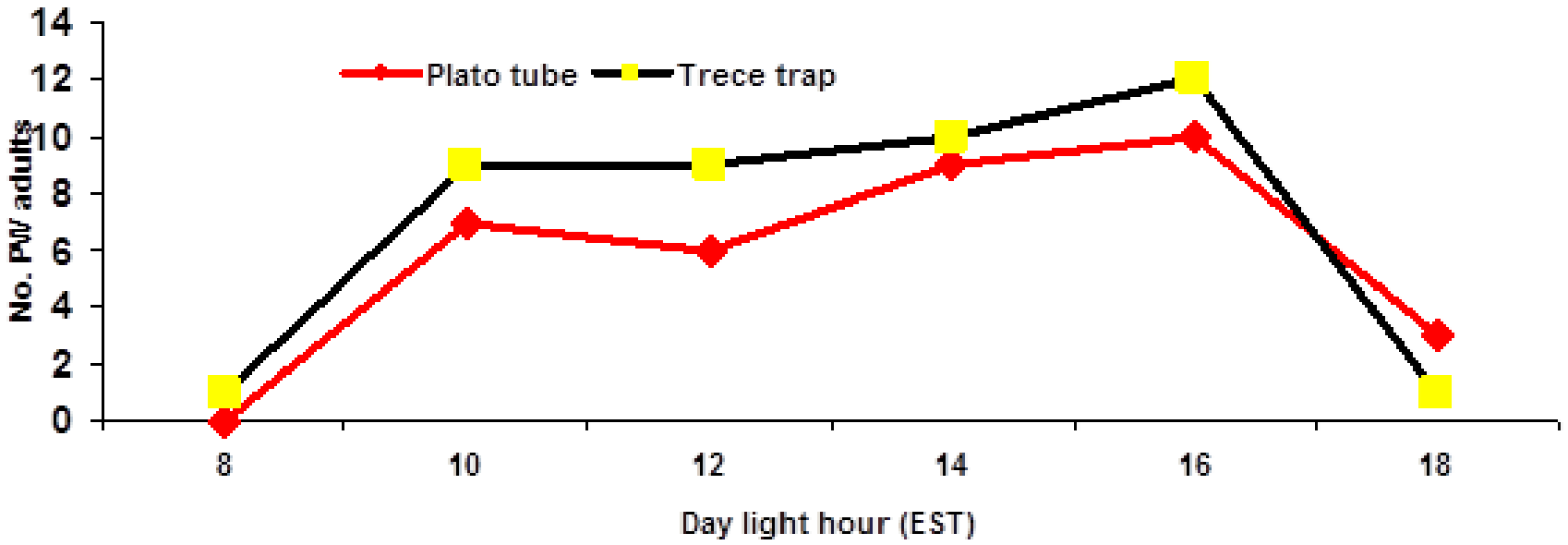
3rd instar: 3.3 mm (2.2-5.0) 8.4 d

Pupa: 2.8 mm 4.7 d



Life cycle biology of PW

Diel activity pattern of pepper weevil



Alternate hosts

Petunia

Nicotiana

Buffalo bar

Chrysalis

Black nightshade

Jerusalem cherry

Lycopersicon

Silver nightshade

Eggplant

Datura

Horse nettle

MANAGEMENT OF PW

- **Pheromone based management program**
- **Reduced risk insecticide**
- **Reflective plastic mulch**

PEPPER WEEVIL MANAGEMENT BY USING PHEROMONE

Pheromone based pepper weevil management program

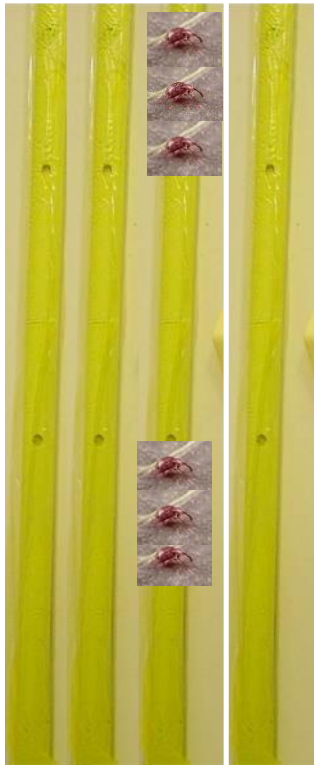
Plato’s PWACT

Trece’s pheromone

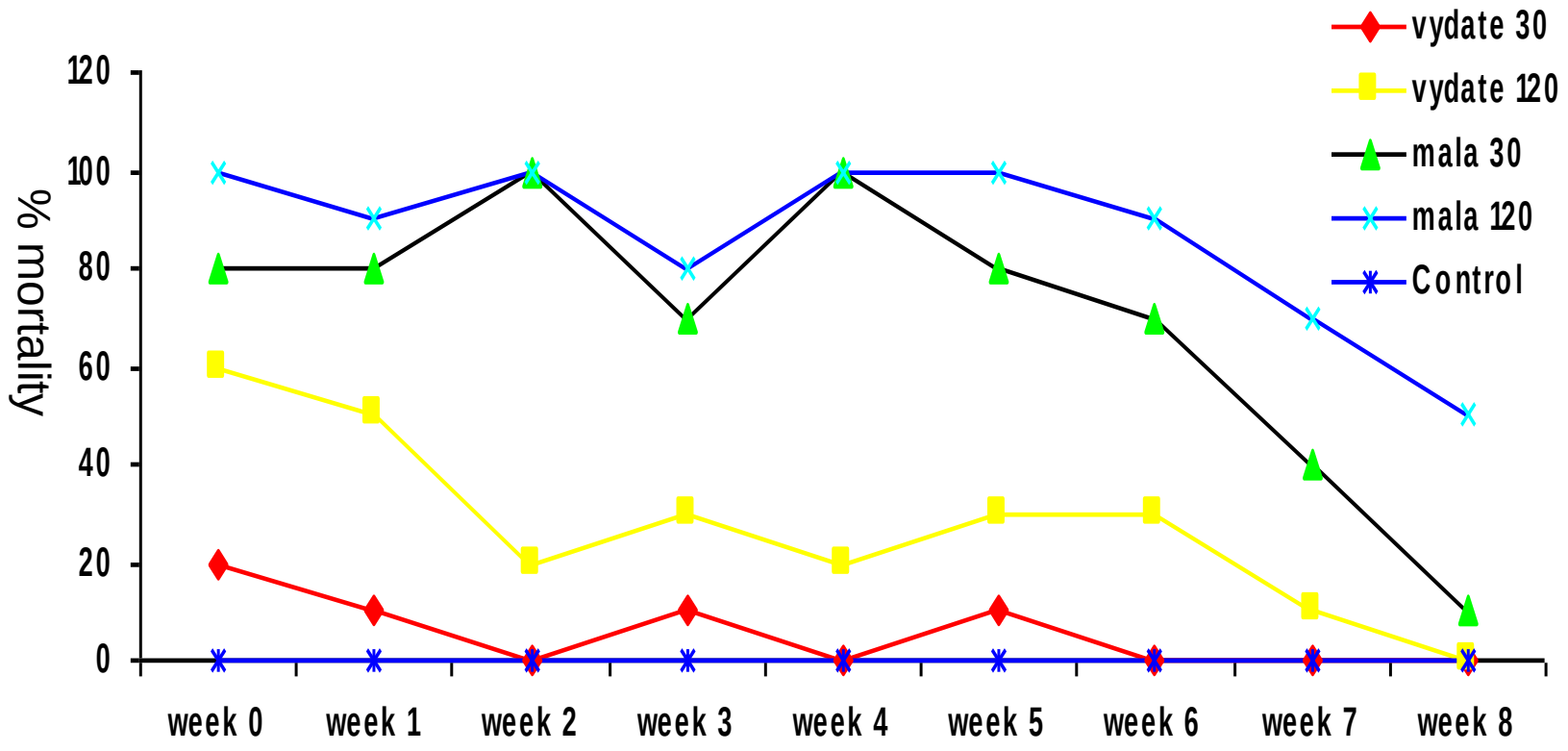
Materials and Methods
Bioassay

- PWACTs were impregnated with Vydate and Malathion
- 8 tubes impregnated with Vydate were placed out side in a normal environmental condition
- Similarly, eight tubes were placed for Malathion and control.
- Each week for eight weeks, one tube for each treatment was brought into the laboratory and exposed to freshly emerged 3 PW adults for 30 secs. in 5 replicates.
- Treated adults were then transferred to a Petri dish and checked every day to record mortality.
- The above study was repeated by exposing PW adults for120 sec.

Treatments	Time of exposure (Sec)	
Vydate	30	120
Malathion	30	120
Control	30	120



Mean percent mortality of PW adults in different treatments



Field Evaluation of PWACT

Treatment	Rate/A
PWACT	8 tubes
Actara	4 oz
Vydate	2 pt
Control	

Plot size: 50 ft long x 4 beds

RCBD

Six applications at weekly intervals

Evaluation was based on mean numbers of infested fruits

Field evaluation of PWACT

Field evaluation
Mean numbers of infested fruits per 20 plants

Mean numbers of infested fruits

Treatment	Rate/A	10 May	17 May	24 May	31 May	8 June	15 June
PWACT	8 tubes	0.25a	0	4.25b	15.25a	56.50a	105.50a
Actara	4 oz	0	0	0.25c	0.25b	0.75b	2.00b
Vydate	2 pt	0	0.25a	1.00c	1.25b	0.75b	2.50b
Control		0.25a	1.50a	10.75a	18.75a	56.00a	129.25a

Means within a column followed by a same letter do not differ significantly (P >0.05; DMRT).

REDUCED RISK INSECTICIDE IN MANAGING PEPPER WEEVIL

Effectiveness of reduced risk insecticides in combination with Trece's Pheromone traps

Treatments	Rate/acre		Active component	Application intervals
Untreated	--	--	---	
Asana	6 oz			
Xpectro OD	1 qt		Pyrethrin+ *B. bassiana*	Weekly
Spear	4 lbs		Spider venom	Weekly
Venerate XC	3 qts		Heat killied *Burkholderia rinojensis*	weekly

2 One acre field

Five treatments

Four beds each 80 ft long RCBD

Five replications

One pheromone trap/acre

Application: once a week for eight weeks

Evaluation: Collected all PW infested fruits

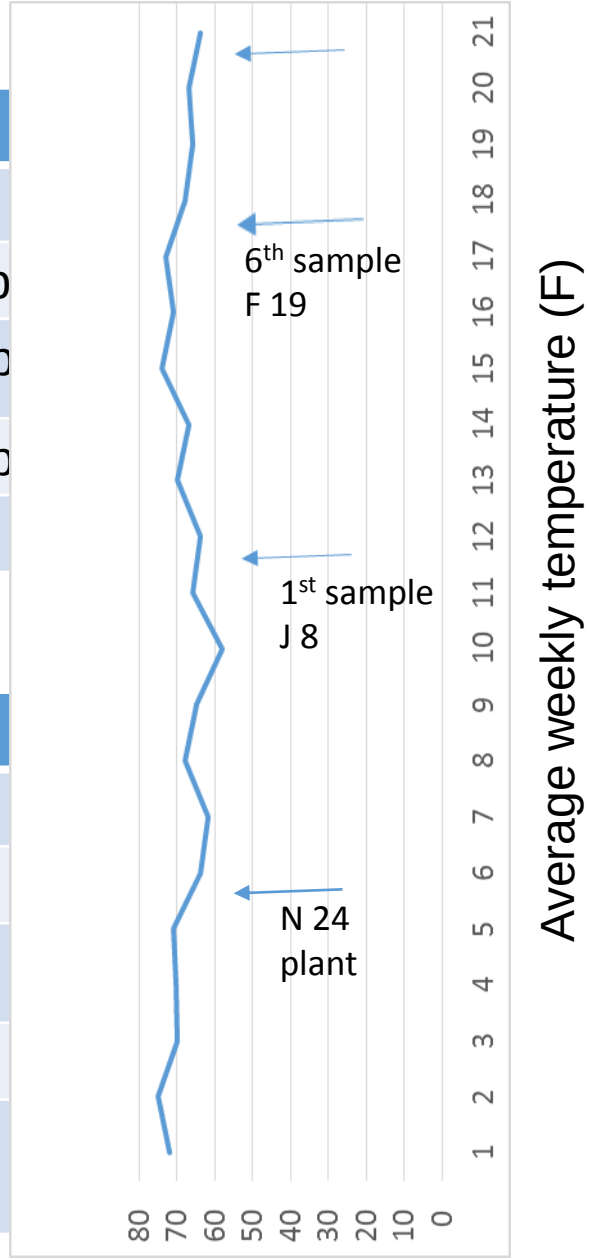
PW infested fruits in different treated plots

In presence of pheromone trap

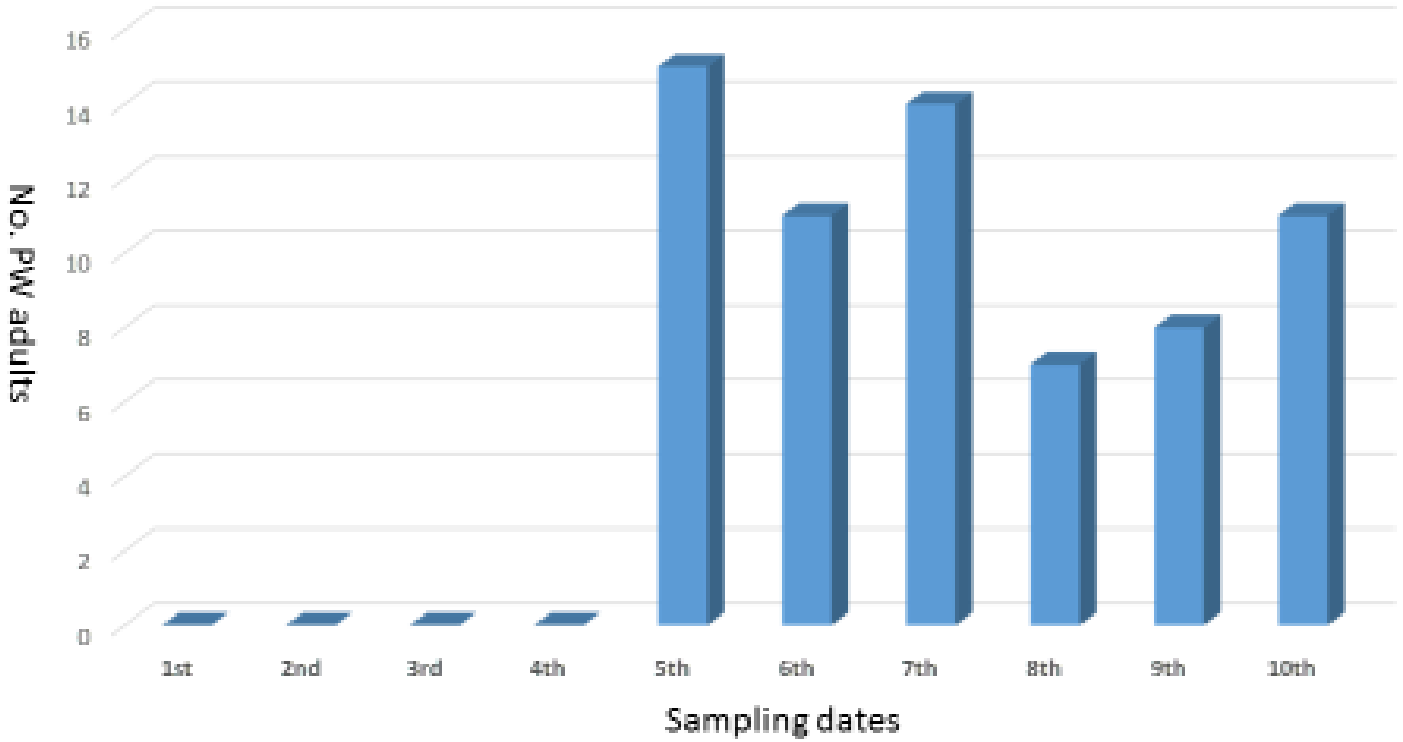
	J 8	J 16	J 22	J 31	F 9	F 19	F 25	M 4	M 14
Asana	0	0	0.60	0.75	2.00a	25.6ab	58.0b	47.4b	68.4b
Xpectro	0	0	0.20	0.50	0.60a	12.8b	33.8c	43.0b	116.6ab
Spear	0	0	0.20	0.82	2.00a	35.2a	108.4a	122.4a	162.4ab
Venerate	0	0	0.20	1.28	1.80a	36.8a	106.6a	119.8a	174.4ab
Control	0	0	0.20	1.30	2.20a	34.0a	105.4a	115.6a	189.4a

In absence of pheromone trap

	J 8	J 16	J 22	J 31	F 9	F 19	F 25	M 4	M 14
Asana	0	0	0	0.3	0	1.75a	10.5b	18.5b	66.25b
Xpectro	0	0	0	0.3	0	2.50a	33.0a	50.0a	147.0a
Spear	0	0	0	0.3	0	1.75a	24.8ab	17.0b	110.7a
Venerate	0	0	0	0.0	0	2.50a	20.3ab	40.8a	100.5a
Control	0	0	0	0.3	0.3	1.75a	18.3ab	33.3a	98.25ab



PW adults recorded on the Trece Pherocon PEW trap on various sampling dates during the study



Mean weight (lb) of marketable yield /acre

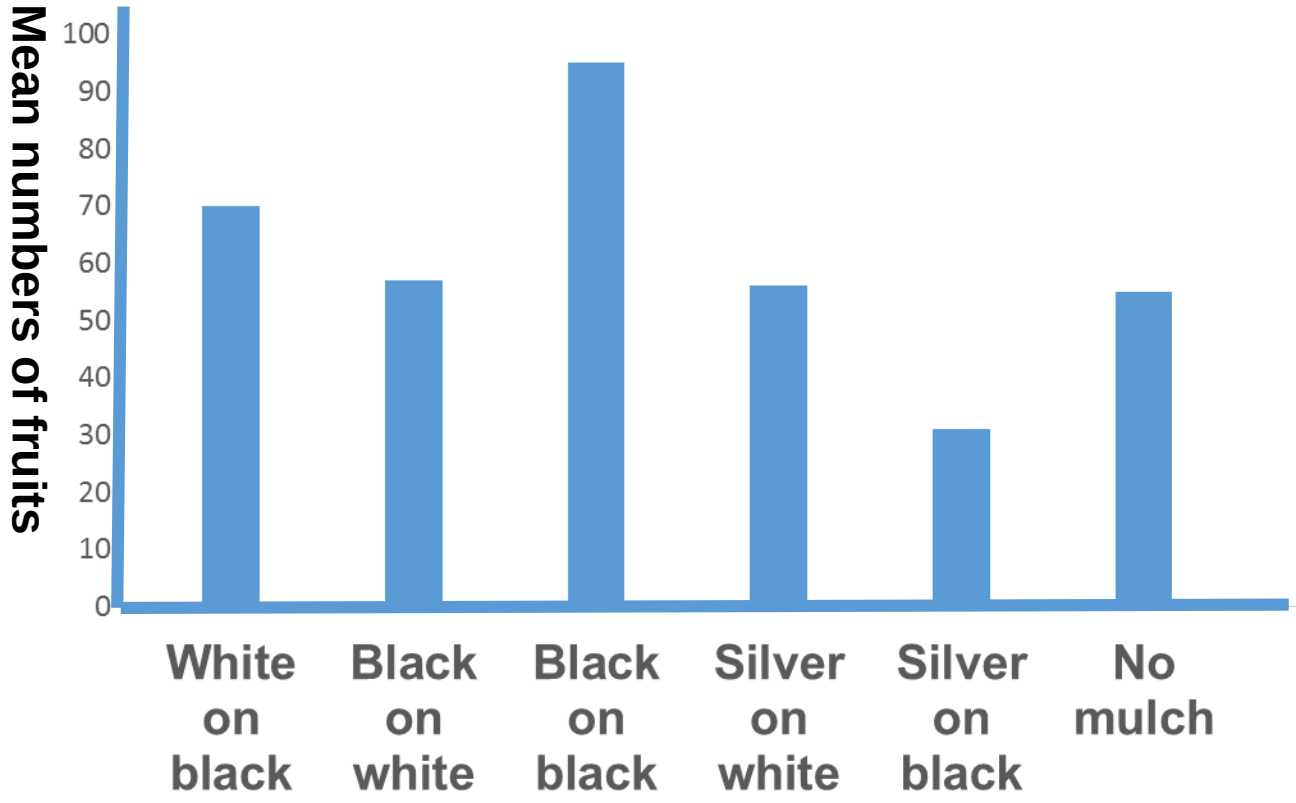
Marketable Yield (lb)

Treatments	Rate/acre	With Pheromone	Without pheromone
Asana	6 oz	2,904a	7,783ab
Xpectro	1 qt	1,888a	9,453ab
Spear	4 lbs	3,485a	9,707ab
Venerate	3 qts	2,701a	11,522a
Control	-	3,136a	5,699b

Means within a column followed by a same letter do not differ significantly (P < 0.05; DMRT).

EFFECT OF REFLECTIVE PLASTIC MULCH IN MANAGING PEPPER WEEVIL

Mean numbers of pepper weevil infested fruits on different plastic mulches




No mulch


White-Black

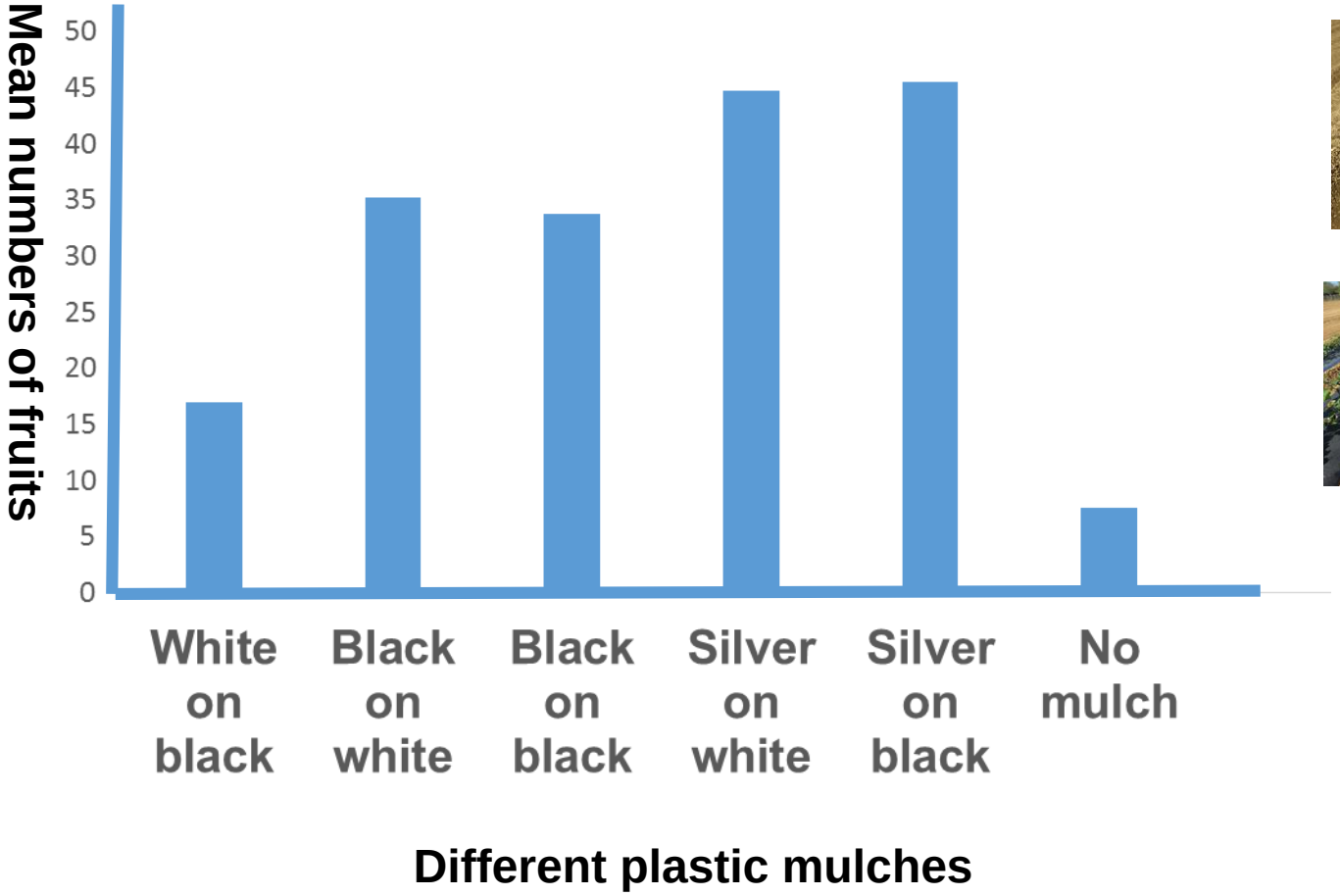

Black-White


Black-Black


Silver-White


Silver-Black

Mean numbers of marketable fruits on different plastic mulches




No mulch


White-Black


Black-White

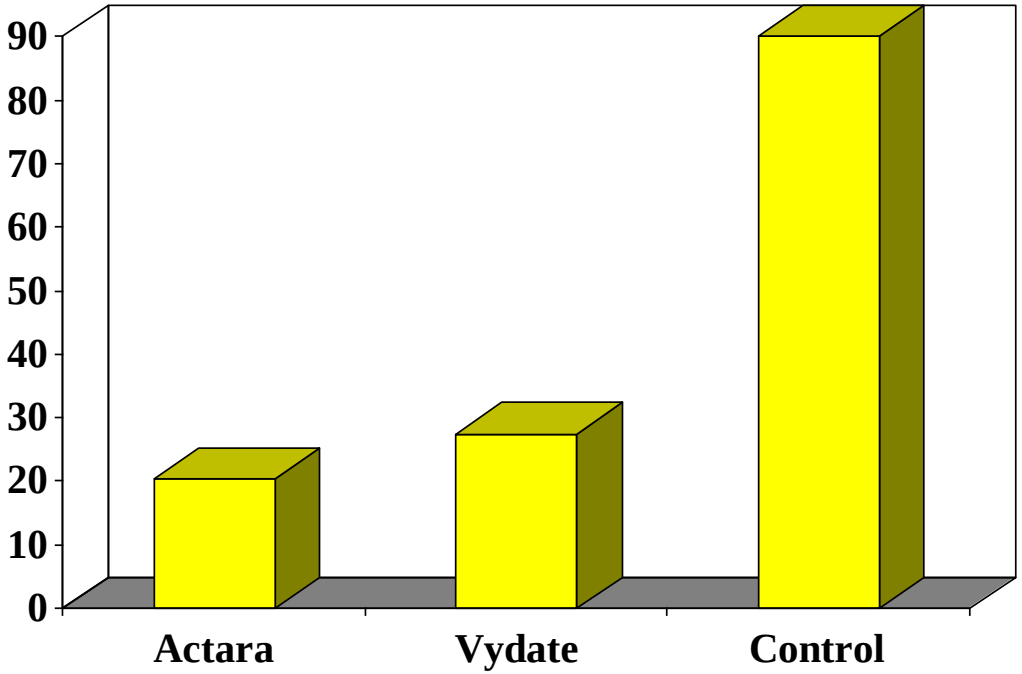

Black-Black


Silver-White

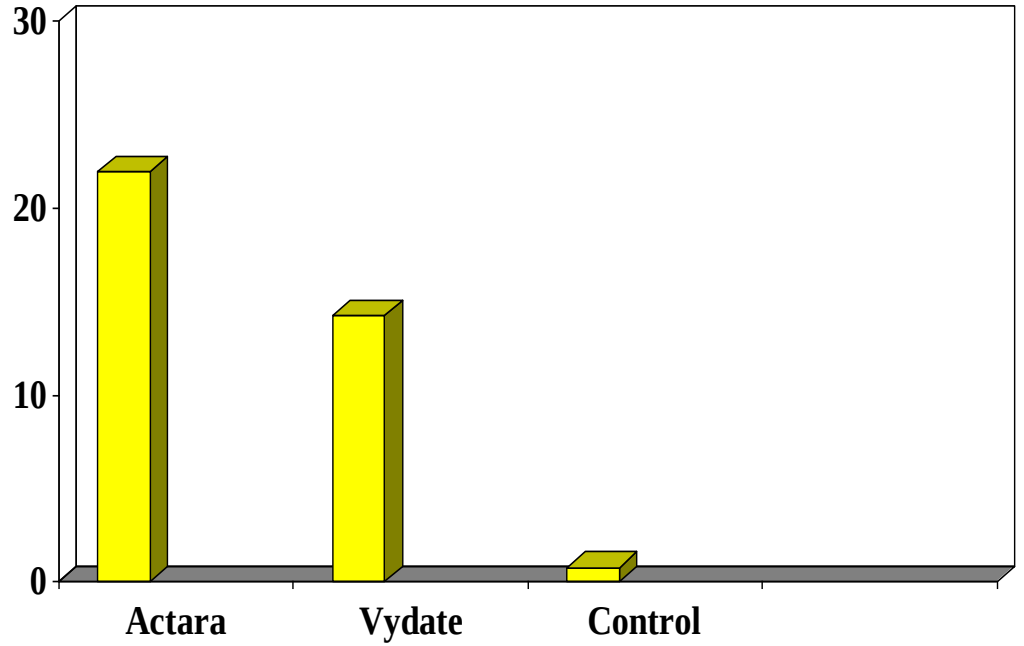

Silver-Black

Chemical control

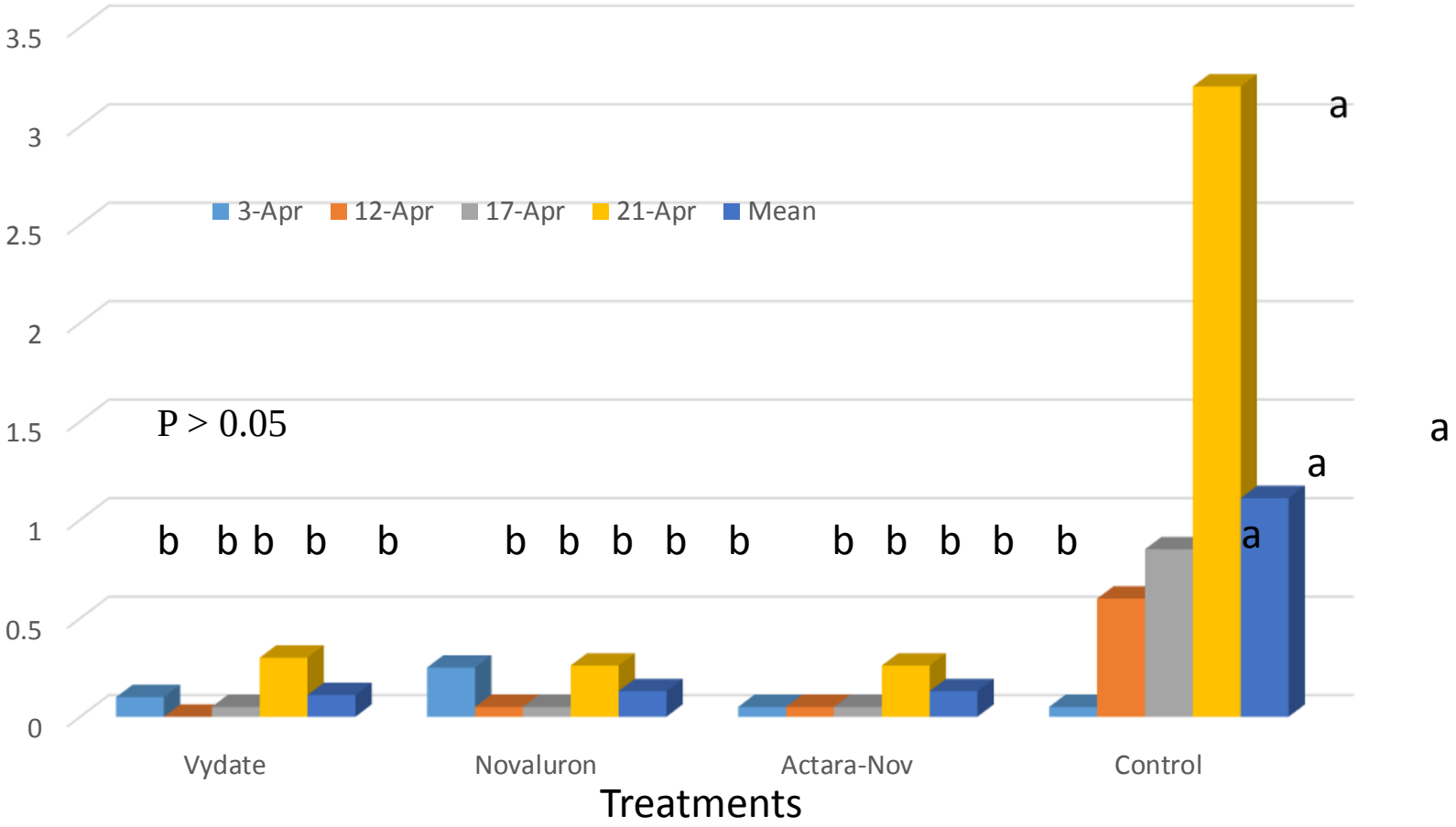
Mean number of infested fruits/plot treated with Actara and Vydate



Mean weight (Lb.) of marketable yield/plot

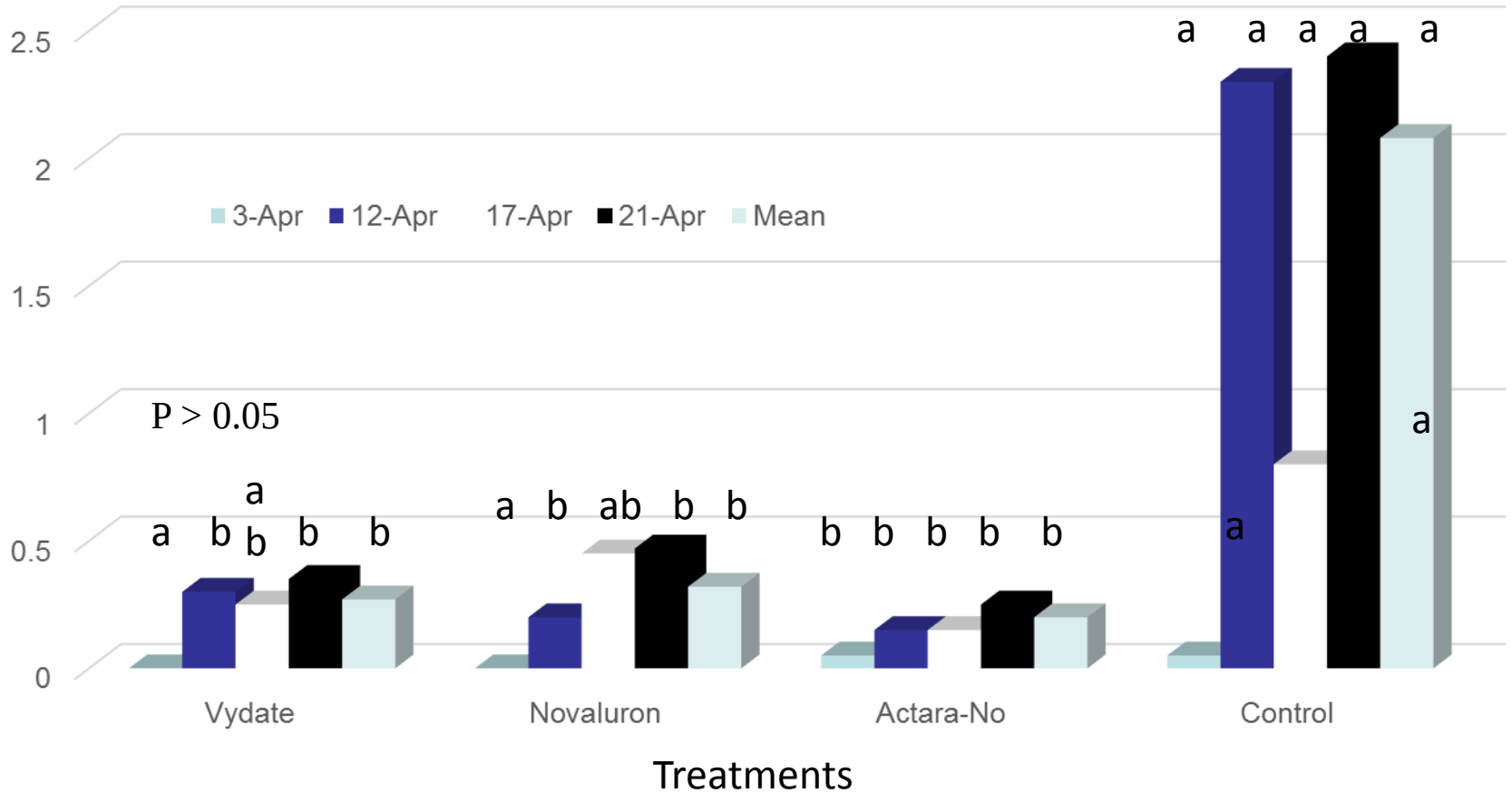


Effect of Novaluron in controlling PW adults



Treatment	Rate [oz]/acre
Vydate	32.0
Novaluron	12.0
Actara-Novaluron	4.0-12.0
Control	--

Effect of Novaluron on PW infested fruits/plant



Treatment	Rate [oz]/acre
Vydate	32.0
Novaluron	12.0
Actara-Novaluron	4.0-12.0
Control	--

Conclusion

PWACT provided suppression of PW up to four weeks

PW infestation was high in the pheromone treated field

Venerate increased total marketable yield

Both Actara and Vydate significantly reduced PW infested buds, flowers and fruits. However, effectiveness of Actara was better than Vydate.

Actara in rotation with Novaluron provides significant reduction of PW and PW infested fruits.

Disclaimer

- **The above information on the efficacy of insecticides in controlling thrips were generated based on our various research studies. This information should not be used as a recommendation by the University of Florida for controlling any specific pest. Use of an insecticide must be based on the label of that insecticide.**

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Thanks!

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