



**FLORIDA FOOD PRODUCTS, INC.**

**INVITE\* EC**

***Fatal Attraction for Corn Rootworms***

(remember the rabbit)

**Distributed by ABM  
Van Wert , Ohio**

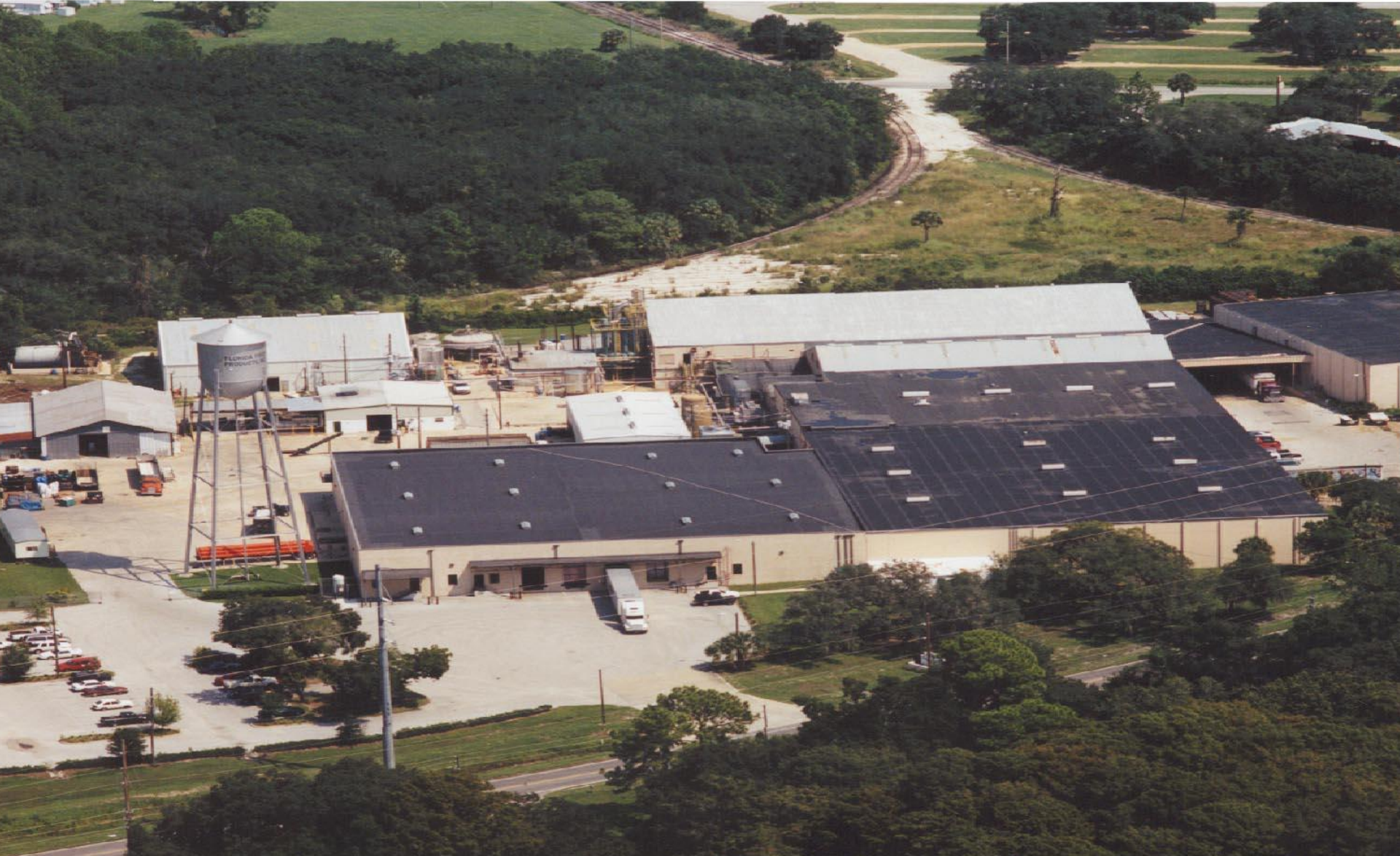
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**Florida Food Products**



# Who is Florida Food Products and Who are Their People?

- Agribusiness since 1954
- Manufacturer of ingredients for food, cosmetic, pharmaceutical and agriculture industries. All V8 vegetable juice contains their products. FDA approved facility.
- Entered joint development agreement with the USDA to develop a water soluble cucurbitacin bait

# Florida Food Products Processing Facility



# Who is ABM ?

- **Well known producer of inoculants and seed treatments for corn, soybeans, wheat and the vegetable markets.**

**ExCalibre & Excalibre SA** for soybean

**Graph Ex & Graph Ex SA** for soybean

**Sabre Ex** for corn

**Sabre Ex** for wheat

**Natural** for vegetable production

**Producing products that the farmers need and request. Leading researcher for the answers to grow healthier and more productive crops.**

# A Revived Water Soluble Corn Rootworm Bait



USDA\FFP cooperative research effort

# What is Invite ?

1. CRW beetles (squash bugs) are naturally attracted to vines and then corn pollen and silks. This latter feeding damages corn.
2. The natural ancestor of water and musk melons were small, spiny and very bitter.
3. This bitter compound is known as cucurbitacins.
4. USDA scientists at Beltsville MD found a genetic throwback melon that was very bitter. USDA worked with FFP to grow and test this juice.
5. This melon is planted in FL, its juice squeezed and processed in late spring. This concentrated juice becomes Invite.



# How INVITE\* EC Works

- High levels of water soluble cucurbitacin
- Arrestant / Feeding stimulant
- Enhances insecticide performance
- Built in rainfastness / sticker
- Inert (EPA) and not a poison



## Bio-assay to Determine Feeding Stimulant Activity



The beetles are programmed to know they will taste bad to other insects and birds if they eat the bitter tasting compound.

# CRW Biology

- Eggs laid by gravid females in July and August previous year.
- Typical egg hatch begins at 625 GDU but will vary with differences in egg depth and with regional insect populations.
- Dig or use salt water bath/hydrant exam for dark headed larvae.
- Beetle emergence starts near July 4<sup>th</sup>. WCRW then NRW males followed by WRW then NRW females. Watch for silk clipping.
- The females have to feed, drink and mate. Ready to lay eggs about 14 days post-emergence.
- Apply Invite mix when the female beetles have enlarged abdomens and individualized eggs pop out when squeezed.
- Population variance, depth of egg laying, and uneven GDU accumulation can cause longer than normal emergence patterns. Re-scout 10 to 14 days after treatment. Respray if needed.

# Why Use INVITE?

- Compatible with all classes of toxins
- Effective in OP and carbaryl resistant areas
- Beneficials survive
- Dead adult beetles / no eggs
- Very competitive pricing
- Easy and fast to use



## Safe to Store, Simple to Mix and Easy to Apply

### Mixing instructions:

- a) Agitate half full tank of water
- b) INVITE\* EC 12 fl. oz./A
- c) Toxins: Penncap-M  
1.6-3.2 oz. /A  
or Sevin XLR +  
3.2- 4.8 oz./A
- d) Fill with water to 1 GPA

### Aircraft settings:

- \* Rate: 1 GPA
- \* Nozzle: CP .125, .078, D6 SS
- Typical Ag Cat Setting
- \* 11 CP nozzles, .125 setting
- \* Boom pressure: 20-25
- \* Speed: 120-130 mph



### Packaging:

<u>2 x 2.5 gal jugs</u>	<u>Totes</u>
boxed, on pallets	250 gallons
54 A/box	2665 acres

# Adult Corn Rootworm Control Using INVITE\* EC

## CRW Beetle Spray Options

- 1) Remove adult beetles to reduce silk clippings.
- 2) A single application prior to egg laying reduces adult beetle populations for more effective larval control in year #2.
- 3) Eliminate next year's soil insecticides with effective 2 spray adult beetle control or ...
- 4) Give traits or granules/liquids a chance by reducing egg number and larval pressure.



# Field Trials, Sublette, Kansas July 2000

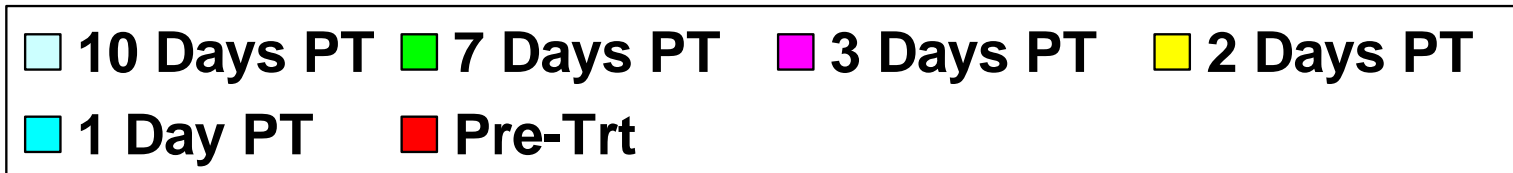
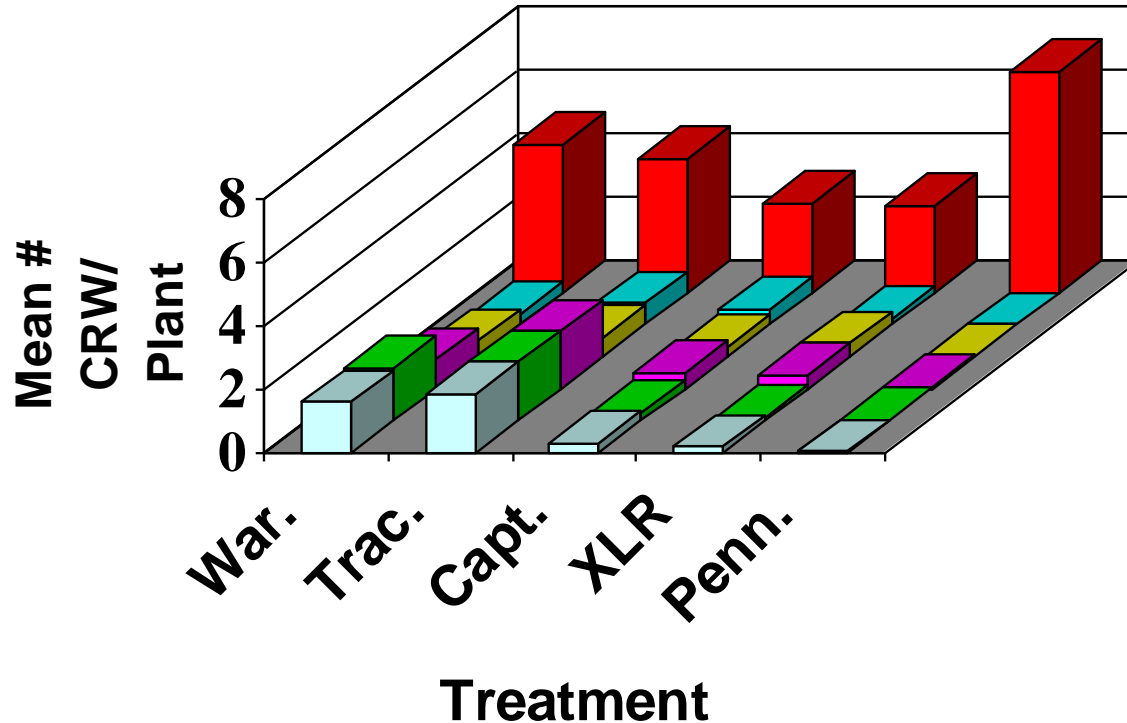
- Evaluate 5 insecticides applied at 10% rate
- Corn under pivot irrigation
- INVITE\* EC @ 12 oz./gal., applied at 1 gal./A. using fixed wing aircraft with CP nozzles.
- 40 acres/ treatment
- Cooperators: Loarn Bucl, Crop Consultant, Sublette, KS

# Treatments, Sublette, Kansas, July 2000

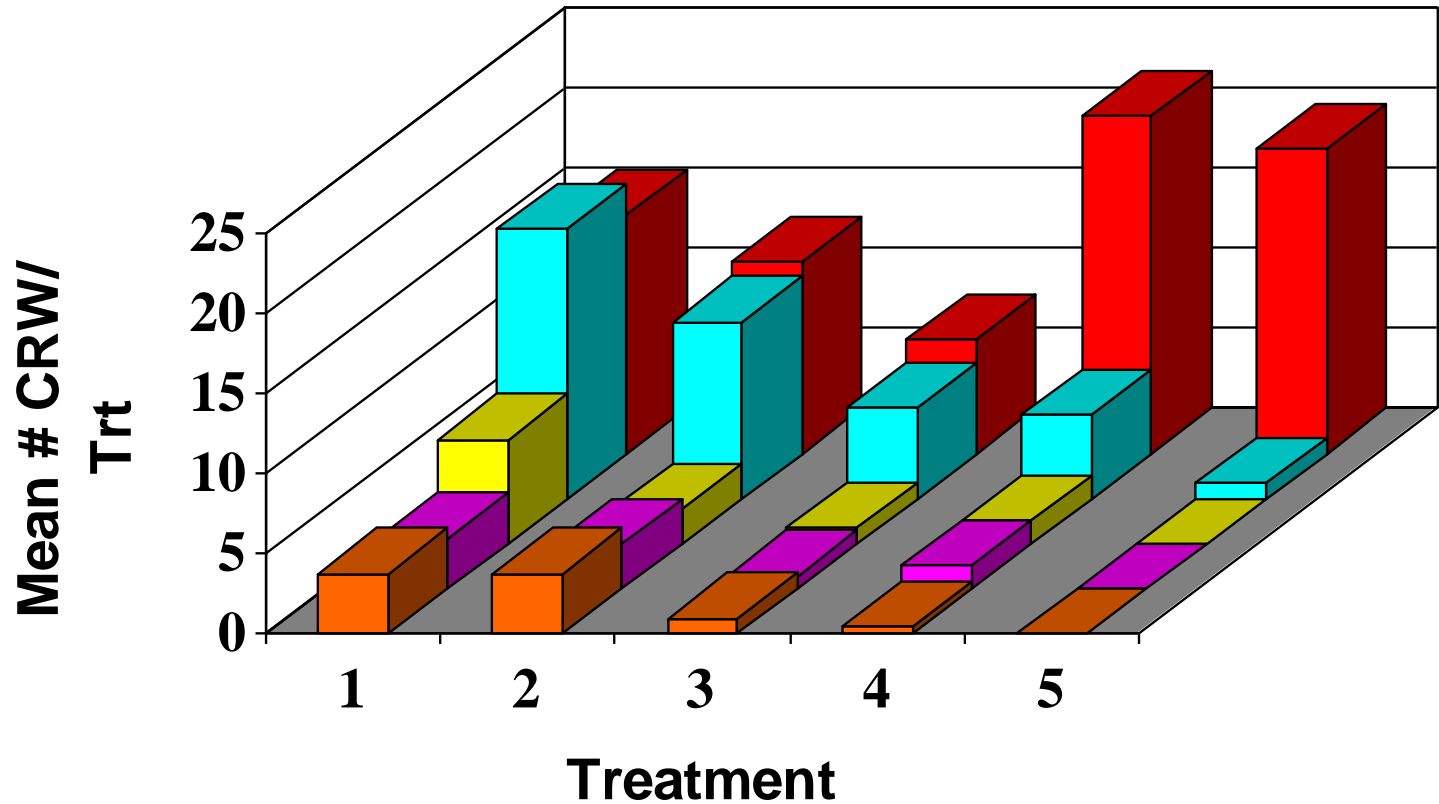
- Applied aerially at 1 gal./ acre.
- 1. Warrior T, @ rate 0.4 fl. oz.
- 2. Tracer (Spinosad), @ rate 0.5 fl. oz.
- 3. Capture 2EC, @ rate 0.6 fl. oz.
- 4. Sevin XLR Plus, @ rate 4.8 fl. oz.
- 5. Pennncap - M, 2 rate 2.4 fl. oz.



# Pre and Post Treatment CRW Live Adult Counts, Invite Trials, Sublette, Kansas, July, 2000.



# Pre and Post Treatment CRW Sticky Board Counts, Invite Trials, Sublette, Kansas, July, 2000.



# INVITE™ PENNCAP RESEARCH 2000

Consultant: Neb-Kan Consultant Service, Inc., Superior, NE  
 Aerial Applicator: Butler Air Service, Superior, NE  
 Farm: Flying B Farms, Superior, NE

## Date Treatments-- Counts Beetles/Plants

### Pre-spray

17-Jul	#1	#2		#1	#2	
	4/2	3/2	Count 7-24	0-2	0-2	
	6/3	7/3		1-3*	0-3	*Male
	3/2	6/2		0-2	0-2	
	<u>6/3</u>	<u>6/3</u>		<u>0-3</u>	<u>0-3</u>	
Total	19/10	22/10	Total	1-10	0-10	

### Sprayed 7-18

Count 7-20	0-2	0-2	Count 7-26	1-2*	0-2	*Male
	0-3	0-3		0-3	0-3	
	0-2	0-2		0-2	1-2**	**Female
	<u>0-3</u>	<u>0-3</u>		<u>0-3</u>	<u>0-3</u>	
Total	0-10	0-10	Total	1-10	1-10	

Whole Plant Counts of Adult CRW Before and After Invite™ Application  
10//10/2000

Robert Bowling, Sarah Harbert, Robert Harris, David Moore, and Jim Elzner  
Texas A&M Ag Ext Service  
Not for Publication

Plant location	Number of Beetles /Plant ( Whole Plant Counts)			
	July 10	July 17	July 24	July 31
West	4, 14, 9, 6, 40 (avg.= 14.6)	0, 0, 0, 0, 0 (avg.=0)	0, 0, 0, 0, 0 (avg.=0)	0, 0, 0, 0, 0 (avg.=0)
North	9, 3, 16, 16, 13 (avg.=11.4)	0, 0, 0, 0, 0 (avg.=0)	0, 0, 0, 0, 0 (avg.=0)	1, 0, 2, 0, 0 (avg.=0.6)
East	2, 2, 1, 0, 1 (avg.=1.2)	0, 1, 0, 0, 1 (avg.=0.4)	0, 0, 0, 0, 0 (avg.=0)	0, 0, 0, 0, 0 (avg.=0)
South	1, 0, 0, 0, 0 (avg.=0.2)	0, 0, 1, 0, 0 (avg.=0.2)	0, 1, 0, 0, 0 (avg.=0.2)	0, 0, 0, 0, 0 (avg.=0)

Invite™ +3.2 oz/acre PennCap-M was applied on July 14, 2000.

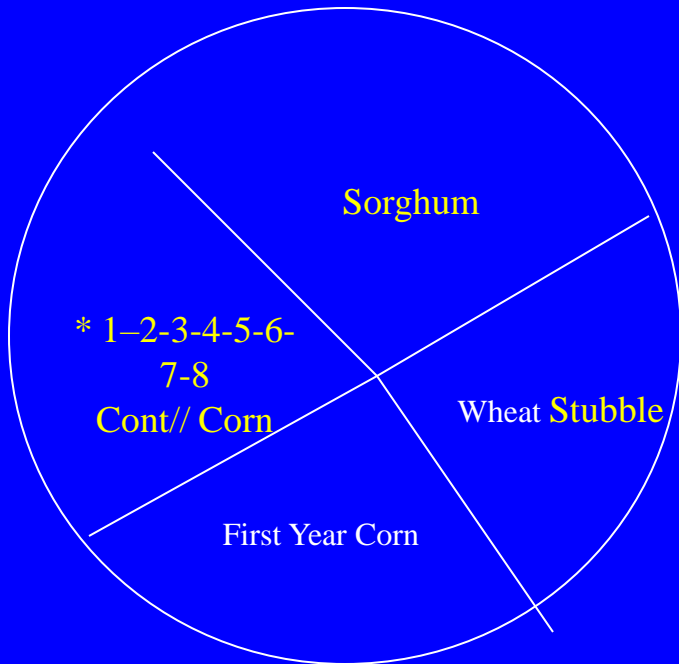
Invite™ was applied on continuous corn, first year corn was not treated.

The North and West locations were continuous corn.

The East and South locations were first year corn.

Western CRW Adults Monitored with Trece Lure Traps  
10/10/ 2000

Robert Bowling, Sarah Harbert Robert Harris, David Moore, and Jim Elzner  
Texas A&M Ag Exten Service  
Not For Publication



live beetles were  
observed on plants

\*Trece Lure Trap Locations

Number of Beetle Per Trap

Trap Number	Number of Beetle Per Trap			
	July 10	July 17*	July 24	July 31
1	270	30	0	0
2	303	25	0	0
3	381	68	0	0
4	488	ND	4	0
5	498	165	0	0
6	696	160	0	0
7	655	229	0	0
8	618	120	0	0

Invite™ +3.2 oz/acre PennCap M was applied on July 14, 2000.

\* Beetles in traps were likely collected between July 10 and July 14 (prior to Invite™ application). Field margins were inspected 2 hours post application and no beetles were observed. A number of dead beetles were observed on the ground,

**Central States Agronomics, Inc.**  
**P.O. Box 314 \* Kearney, NE 68848 \* (308) 234-5622**

***Invite Contract Research***

Grower: T. Rowe, Inc.  
Location: Elwood, NE  
Application Date: 7/15/00  
Applicator: Johnson Lake Flying Service  
Working Speed: 115 MPH  
Temperature: 79 F

Aircraft: Ag Cat  
Nozzles: CP with 30 degree break  
Orifice Size:  
Spray Volume: 1 GPA  
Boom Pressure: 30  
Wind Speed: 2 MPH from SE

***Live Rootworm Beetle Per Plant***

Product Rate Per Acre	Pre Treatment 7/12/00	Post Treatment 7/16/00	Post Treatment 7/20/00
12 oz. Invite & 3.2 oz. PennCap M	3.5	.07	.19

\*Three reps - 30 plants examined / rep on 7/16 & 20 plants / rep on 7/20

***Average Number of Dead Beetle Per Tray***

Product & Rate Per Acre	7/16/00	7/20/00
12 oz. Invite & 3.2 oz. PennCap M	32	1.8

\*A total of six dead beetle trays were placed in the field.

Trial was conducted in an area where rootworm beetle have been difficult to control with PennCap M.

# Insect Control Flexibility

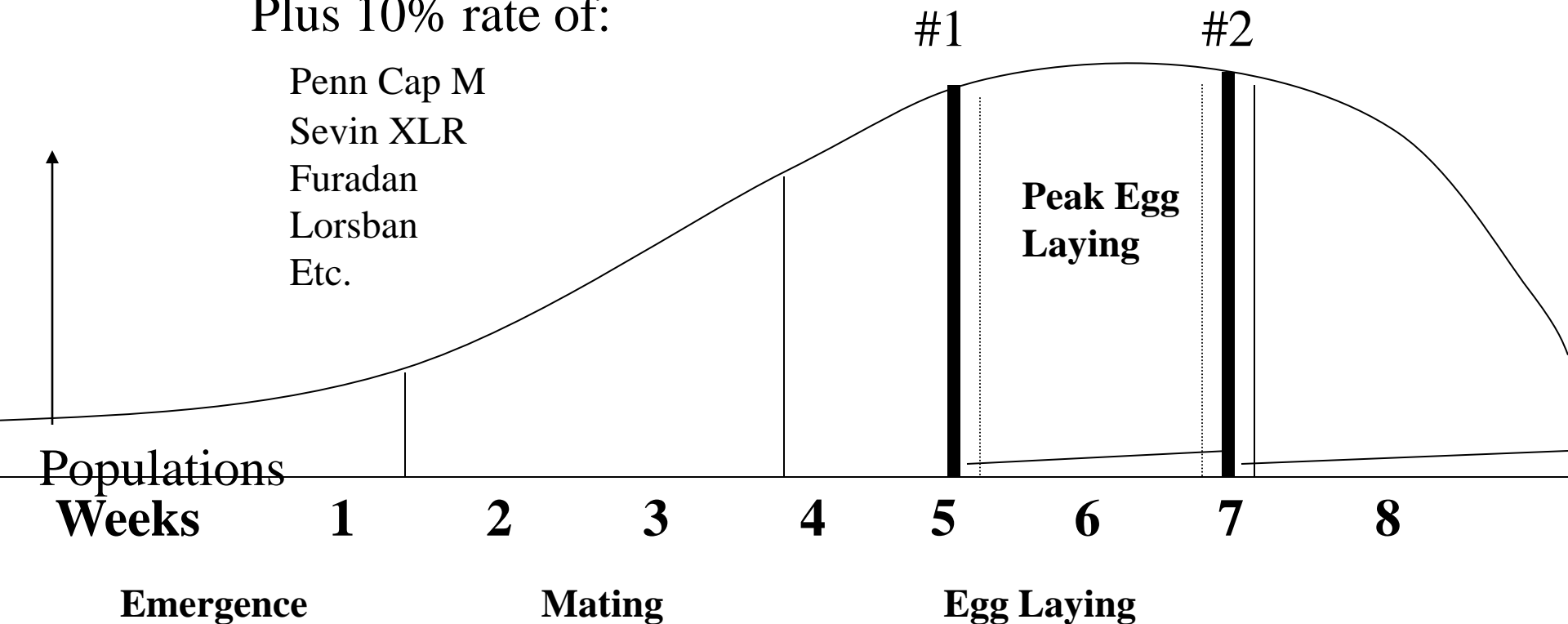
## Spray Options (first or second)

a) **INVITE\* EC**                      b) Traditional blanket applications

Plus 10% rate of:

Plus 10% rate of:

Penn Cap M  
Sevin XLR  
Furadan  
Lorsban  
Etc.





**Larger droplets spit onto the leaf surface are preferred.**





**The beetles are attracted to and will consume the small spray droplets, which should last for 14 days. Scout 7 to 14 days later. If beetle emergence continues longer than the normal 5 to 7 days, respray when swollen females appear again, normally 14 days later.**

**With GPS equipped airplanes 55 ft swaths work well. This speeds work and minimizes cost. This program worked very well in late 1990s to early 2000s.**

# Using Invite in a Systems Approach

- The traits or liquids & granules get overwhelmed via large egg and larval populations. Eliminate the egg layers. There will be one year you will have to use both control methods.
    - 1. Apply granules/liquid insecticides or plant traited hybrids.
    - 2. Scout for the emerging beetles early to mid July. Look for the enlarged females 14-17 days after emergence. This will be approx 7/15-20 in IA.
    - 3. Spray 12 oz/A Invite with 10% rate of labeled insecticide in alternate strips. Penncap worked very well. Now use Steward, a new MOA with greater non-target safety package and longer residual, systemic Dupont product. Mix in Argosyat .25% by vol. Spray a larger droplets at 3 - 5 gpa. Spraying alternate 60 to 90 ft swaths works and can save time, machinery, \$.
    - 4. Scout for beetles again in 10 to 14 days. If there has been an extended emergence respray the alt strips again using the same rates and products.
- Advantages: It works. Low cost. Fits both air or ground rigs. Low gallonage, coverage not an issue. Safe to beneficials. Stops the huge populations peaks. Complements and helps traits or soil applied programs.

# Satisfied Iowa Corn Growers 2000s



Story County



Hamilton County



Hamilton County



Webster County



Amama Farms



Marshall County

# Distribution - INVITE\* EC



- INVITE is inert and non-poisonous.
- 250 gallon = 2665 Acres
- 2 x 2.5 gallon = 54 Acres
- Freezing is a great way to store it.
- Available at select retailers & aerial applicators.

# Promotion

- This program was resurrected due to grower and agronomist requests.
- Organize grower meetings
- ABM will supply promotional information for distribution to growers
- Support by newspaper articles and press.
- [www.greenbook.net](http://www.greenbook.net) for label updates