



Presentation Outline

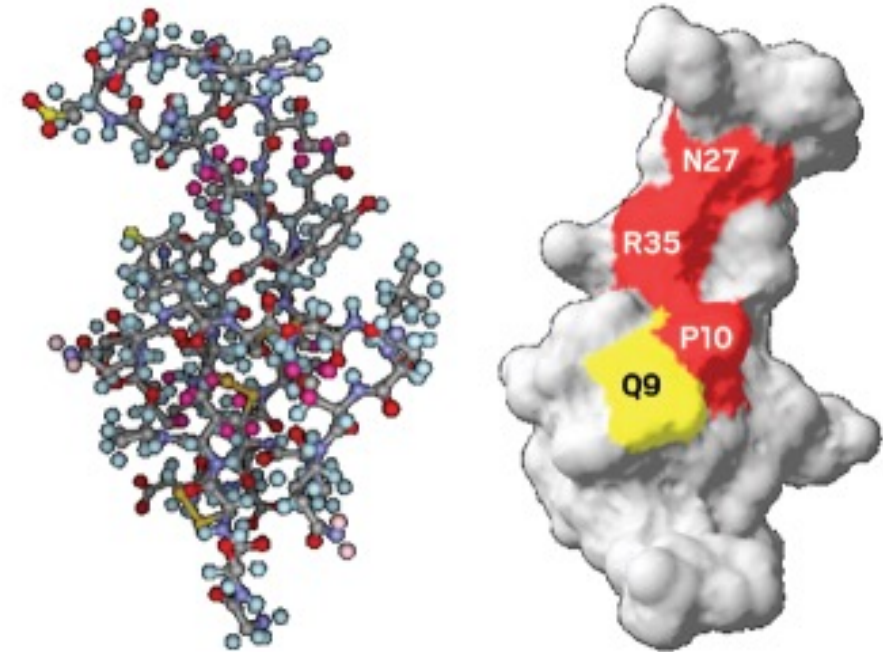
- Introduction to insecticidal peptides
 - Attributes
 - Hurdles to development
 - Two distinct use patterns
- Update on Spear-T & Spear Lep
- Update on VST-7300 (Basin T & Basin-Flex)

Daniel Peck
Director of Field Development



Attributes

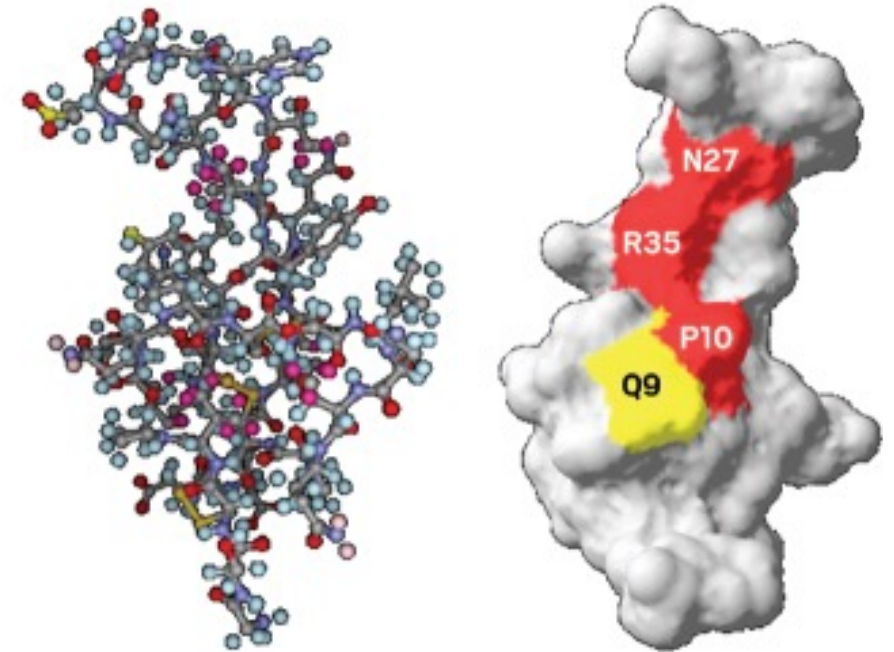
- Derived from naturally occurring peptides
- Classified as bioinsecticides
 - Signal word Caution
 - REI 4 hours, PHI 0 days, MRL exempt
- Demonstrate target site specificity
 - Spear awarded new IRAC Group 32 in Nov 2018
 - Nicotinic Acetylcholine Receptor Allosteric Modulators - Site II



Spear: GS-omega/kappa-Hxtx-Hv1a
MW 4,571
Inhibitory Cystine Knot (ICK) Peptide

Major Hurdles to Development

- Manufacturing
 - Engineering for efficacy, safety, stability
 - Expression in food-grade yeast under liquid fermentation
- EPA regulatory path
 - Not microbial, biochemical or PIP
 - Emerging Technologies branch of the BPPD
- Bioavailability
 - Large molecule almost 20x larger than imidacloprid
 - Applied with a gut disrupting facilitator (Bt) for ingestion activity

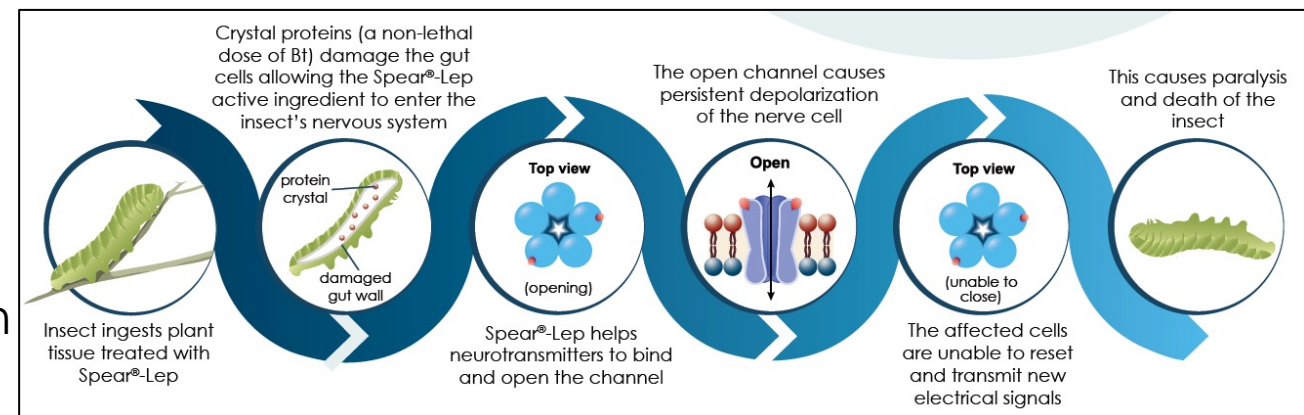
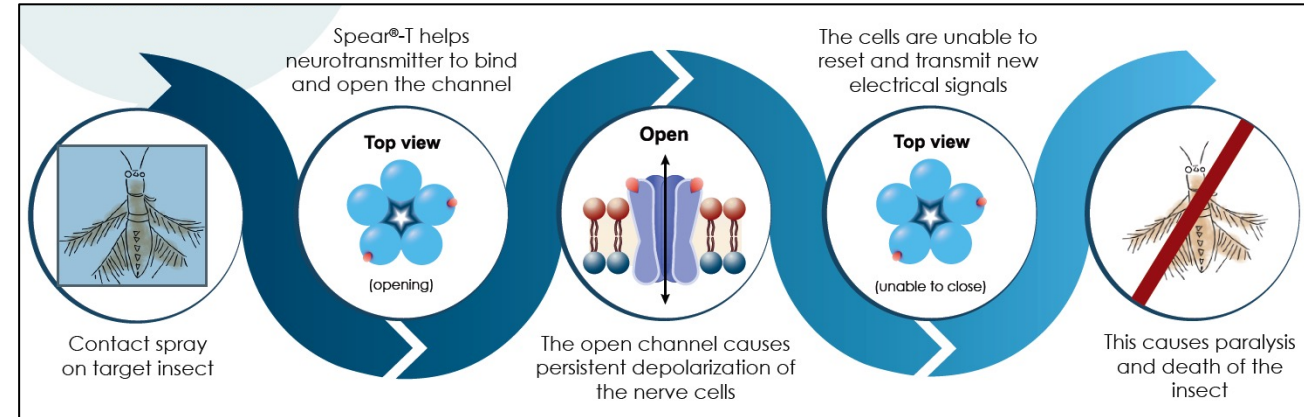


Spear: GS-omega/kappa-Hxtx-Hv1a
MW 4,571
Inhibitory Cystine Knot (ICK) Peptide




Two Distinct Use Patterns


- Contact
 - Diffusion through cuticle (spiracles)
 - Targets smaller soft-bodied pests such as aphids, mites, thrips, whiteflies
 - Higher use rates
- Ingestion
 - Peptide reaches target site via midgut disruption
 - Applied with low label rate of Bt product
 - Broad spectrum activity vs lepidopteran larvae
 - Lower use rates



Prior

- Original label
 - Approved August 2017
 - Greenhouse use only
 - Aphids, Mites, Thrips, Whiteflies
 - Spotted-wing drosophila
- Revised label
 - Approved April 2020
 - Broader range of GH targets
 - New GH application instructions
 - Open field uses added
 - Hemp and Tobacco added





GROUP 32 INSECTICIDE

Biological Insecticide/Miticide

Active Ingredient:
GS-omega/kappa-Hctx-Hv1a 2.0%

Other Ingredients: 98.0%

Total: 100.0%

Contains 0.17 lb active ingredient per gallon.

KEEP OUT OF REACH OF CHILDREN

CAUTION/PRECAUCION

Si usted no entiende la etiqueta, busque a alguien para que se la explique a usted en detalle.
(If you do not understand the label, find someone to explain it to you in detail.)

See inside booklet for additional Precautionary Statements and Directions for Use.

FIRST AID	
If in eyes	• Hold eye open and rinse slowly and gently with water for 15 – 20 minutes. • Remove contact lenses, if present, after the first 5 minutes, then continue rinsing eye. • Call a poison control center or doctor for treatment advice.
If on skin or clothing	• Take off contaminated clothing. • Rinse skin immediately with plenty of water for 15 – 20 minutes. • Call a poison control center or doctor for treatment advice.

HOTLINE NUMBER

Have the product container or label with you when calling a poison control center or doctor, or going for treatment. You may also contact 1-800-535-5053 (and +1-352-323-3500 for International) for emergency medical treatment information and chemical emergency assistance.

Produced for:
 Vestaron Corporation
 600 Park Offices Drive, Suite 117
 Research Triangle Park, NC 27709

EPA Reg. No.: 88847-6
EPA Est. No.: Printed on Container
 Made in USA

NET CONTENTS: 1 GALLON (3.78 L)

SAL030421 REV031121v1.0



Prior


- Original label
 - Approved August 2017
 - Greenhouse use only
 - Aphids, Mites, Thrips, Whiteflies
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 - Broader range of GH targets
 - New GH application instructions
 - Open field uses added
 - Hemp and Tobacco added

Update

- Application rates
 - GH high volume sprayers widened to 1-3 gal/100 gal (vs 2-3 gal/100)
 - GH for immersion/dipping treatment dropped to 5-10% product solution (vs 10-25%)
 - NIS use recommendation defined as 0.125% v/v (vs no definition)
 - Aerial application added
- Crops and pests
 - Whiteflies added for Field Vegetables
 - Thrips added for Field Fruit
 - Tree Nuts (group 14-12) added with plant-feeding mites

Prior

- Original label
 - Approved September 2018
 - Commercially available January 2019
 - Open field uses
 - Broad range of lep targets
 - Co-applied with a lep-active Bt product
 - Identical formulation to Spear-T
- Revised label
 - Approved April 2020
 - Revised and simplified target species
 - Added Colorado potato beetle in combination with beetle-active Bt
 - Hemp and Tobacco added



SPEAR® LEP

For Control of Lepidopterans

OPEN

GROUP 32 INSECTICIDE

Biological Insecticide

Active Ingredient:
GS-omega/kappa-Htx-Hv1a 2.0%

Other Ingredients: 98.0%

Total: 100.0%

Contains 0.17 lb of active ingredient per gallon.

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Update

- Use restrictions
 - Chemigation allowable for cranberry
 - Maximum of 5 applications per season or crop cycle (vs 10 gallons per year)
- Application volume
 - Added in definition for mature orchard crops (minimum of 50 gal/A for ground and 10 gal/A acre for aerial)
- Crops and pests
 - Pecan nut case bearer added



Prior

- Introduced to IR-4 as VST-7300 in 2020
- Like Spear
 - Bioinsecticide with peptide active ingredient
 - Contact efficacy against smaller, soft-bodied insects/mites
 - Ingestion efficacy against lepidopteran larvae when combined with Bt facilitator
- Unlike Spear
 - Active ingredient U1-AGTX-Ta1b-QA
 - Targets the insect nervous system at distinct site and likely a new IRAC group
 - Dry flowable formulation

MASTER LABEL - containing:	
Sublabel A, Basin®-T: Greenhouse and Field Use	
Sublabel B, Basin® Flex: Greenhouse and Field Use in Tank Mixes with Bt	

Basin®

In Water Soluble Packets
Biological Insecticide/Miticide

Active Ingredient:	
U1-AGTX-Ta1b-QA	8.5%
Other Ingredients:	91.5%
Total:	100.0%

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See Inside Booklet for Additional Precautionary Statements and Directions for Use

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EPA Reg. No.: 88847-XXXX	EPA Est. No.: XXXXX-XX-XXX
Net Contents: _____ [Gal] [lbs]	Lot No.: XXXX
Made in USA	

Manufactured for:
Vestaron Corporation
800 Park Offices Drive, Suite 117
PO Box 13137
Research Triangle Park, NC 27709



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Update

- EPA submission March 2021
 - Decision expected October 2022
- Two products
 - Basin-T vs smaller-soft-bodied insects/mites
 - Basin Flex vs lepidopteran larvae
- Label highlights
 - Water soluble 4-oz packets
 - 8.5% active ingredient



Sublabel A:
Greenhouse and Field Use

Basin®-T
In Water Soluble Packets
Biological Insecticide/Miticide

Active Ingredient:
U1-AGTX-Ta1b-QA 8.5%
Other Ingredients: 91.5%
Total: 100.0%

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EPA Reg. No.: 88847-XXXX
EPA Est. No.: Printed on Container
Made in USA

NET CONTENTS:
40 x 4 oz. packets (10 lbs.)
SALXXXX REV031221v1.4

FIELD USES

Crop	Insect/Mite Pest
Field Vegetables: Vegetables, Root and Tuber (Group 1), such as: Beet, Carrot, Potato, Radish, Sugarbeet Vegetable, Bulb (Group 3), such as: Garlic, Leek, Onion (Green and Bulb) Vegetable, Leafy Except Brassica (Group 4), such as: Celery, Endive, Lettuce, Parsley, Spinach Vegetable, Brassica Leafy (Group 5), such as: Broccoli, Brussels Sprouts, Cabbage, Cauliflower, Chinese Cabbage, Collards, Kale, Kohlrabi, Mustard Greens Vegetable, Legume (Group 6), such as: Bean, Lentil, Pea, Soybean Vegetable, Fruiting (Group 8), such as: Eggplant, Pepper, Tomato Vegetable, Cucurbit (Group 9), such as: Cucumber, Melon, Squash, Watermelon	Plant-feeding Mites, such as: Broad Mite Lewis Mite Twospotted Spider Mite Psyllids, such as: Potato Psyllid Thrips, such as: Onion Thrips Tobacco Thrips Western Flower Thrips Whiteflies, such as: Sweetpotato Whitefly
Field Fruit and Berries: Fruit, Citrus (Group 10), such as: Grapefruit, Lemon, Lime, Orange Fruit, Pome (Group 11), such as: Apple, Pear Fruit, Stone (Group 12), such as: Cherry, Nectarine, Peach, Plum, Prune Berry (Group 13), such as: Blackberry, Blueberry, Grape, Raspberry, Strawberry	Plant-feeding Mites, such as: Broad Mite Citrus Rust Mite Twospotted Spider Mite Psyllids, such as: Asian Citrus Psyllid Pear Psylla Spotted-wing Drosophila, Thrips, such as: Western Flower Thrips
Tree Nuts (Group 14-12)	Plant-feeding Mites, such as: Broad Mite Pacific Spider Mite Twospotted Spider Mite
Hemp	Aphids, such as: Cotton/Melon Aphids Green Peach Aphid Plant-feeding Mites, such as: Broad Mite Twospotted Spider Mite Thrips, such as: Onion Thrips Tobacco Thrips Western Flower Thrips
Hops	Plant-feeding Mites, such as: Broad Mite Lewis Mite Twospotted Spider Mite
Tobacco	Aphids, such as: Green Peach Aphid Thrips, such as: Tobacco Thrips

USE Basin®-T ON THE FOLLOWING CROPS: GREENHOUSE AND NURSERY USES

Crop	Insect/Mite Pest
Greenhouse Vegetables: Vegetable, Root and Tuber (Group 1), such as: Beet, Carrot, Potato, Radish, Sugarbeet Vegetable, Bulb (Group 3), such as: Garlic, Leek, Onion (Green and Bulb) Vegetable, Leafy Except Brassica (Group 4), such as: Celery, Endive, Lettuce, Parsley, Spinach Vegetable, Brassica Leafy (Group 5), such as: Broccoli, Brussels Sprouts, Cabbage, Cauliflower, Chinese Cabbage, Collards, Kale, Kohlrabi, Mustard Greens Vegetable, Legume (Group 6), such as: Bean, Lentil, Pea, Soybean Vegetable, Fruiting (Group 8), such as: Eggplant, Pepper, Tomato Vegetable, Cucurbit (Group 9), such as: Cucumber, Melon, Squash, Watermelon	Aphids, such as: Green Peach Aphid Plant-feeding Mites, such as: Broad Mite Lewis Mite Twospotted Spider Mite Spotted-wing Drosophila Thrips, such as: Onion Thrips Tobacco Thrips Western Flower Thrips Whiteflies, such as: Greenhouse Whitefly Sweetpotato Whitefly
Greenhouse/Nursery Flowers and Ornamental Plants, such as: Bedding Plants, Container Stock, Cut Flowers, Ornamental Flowers, Ornamental Plants	
Greenhouse Herbs and Mint, such as: Basil, Chive, Cilantro, Dill, Mint, Parsley, Rosemary, Sage, Thyme	
Greenhouse Fruit Fruit, Citrus (Group 10), such as: Grapefruit, Lemon, Lime, Orange Fruit, Stone (Group 12), such as: Cherry, Nectarine, Peach, Plum, Prune Berry (Group 13), such as: Blackberry, Blueberry, Grape, Raspberry, Strawberry	
Hemp and Tobacco	

USE DIRECTIONS FOR FIELD AND ORCHARD CROPS

Use high pressure for application of the spray solution. Apply 1-6 lb. of Basin per acre. Better coverage and penetration of crop canopy is usually achieved when smaller spray droplets are applied. Use very fine nozzles to create a fine spray mist. Use of a non-ionic or blended organosilicone surfactant at 0.125% (v/v) to improve coverage may increase performance. Repeat applications at 3-10-day intervals depending upon plant growth rate, pest activity and other factors.

Sublabel B:
Greenhouse and Field Use
in Tank Mixes with Bt

Basin® Flex
In Water Soluble Packets
Biological Insecticide

Active Ingredient: U1-AGTX-Ta1b-QA 8.5%
Other Ingredients: 91.5%
Total: 100.0%

KEEP OUT OF REACH OF CHILDREN
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NET CONTENTS
40 x 4 oz. packets (10 lbs.)
SALXXXX REV031221v1.4

USE Basin® Flex IN A TANK MIX WITH Bt ON THE FOLLOWING CROPS

Vegetable and Cole Crops:

Vegetable, Root and Tuber (Group 1), such as:

Beet, Carrot, Horseradish, Potato, Radish, Sugar Beet, Sweet Potato, Turnip, Turnip Greens

Vegetable, Bulb (Group 3), such as:

Garlic, Leek, Onion, Shallot

Vegetable, Leafy Except Brassica (Group 4), such as:

Celery, Endive, Lettuce, Parsley, Spinach

Vegetable, Brassica Leafy (Group 5), such as:

Broccoli, Brussels Sprouts, Cabbage, Cauliflower, Collard, Kohlrabi

Vegetable, Legume (Group 6), such as:

Bean, Lentil, Pea, Soybean

Vegetable, Fruiting (Group 8), such as:

Eggplant, Pepper, Tomato

Vegetable, Cucurbit (Group 9), such as:

Cucumber, Melon, Pumpkin, Squash, Watermelon

Other Vegetables

Artichoke, Asparagus, Malagna, Watercress

Field Crops, such as:

Alfalfa (Hay Seed), Canola, Corn (Field, Sweet, Popcorn), Cotton, Forage Crop, Jojoba, Peanut, Rapeseed, Rice, Safflower, Small Grains, Sorghum, Sunflower

Herbs, Mints (Group 25) such as:

Basil, Oregano, Peppermint, Thyme

Fruits, Nuts

Small Fruits and Berries (Group 10), such as:

Blackberry, Blueberry, Cranberry, Currant, Grape, Raspberry, Strawberry

Pome Fruits (Group 11), such as:

Apple, Pear, Quince

Stone Fruits (Group 12), such as:

Apricot, Cherry, Nectarine, Peach, Plum

Tree Nuts (Group 14-12), such as:

Almond, Chestnut, Hazelnut/Filbert, Pecan, Pistachio, Walnut

Avocado, Banana, Citrus, Kiwi, Persimmon, Pineapple, Pomegranate, Tropical Fruits

Bedding Plants, Container Plants, Flowers, Ornamentals

Greenhouse Crops and Outdoor Nursery Crops, such as:

Brassicas, Flowers, Fruiting groups, Herbs and Spices, Leafy Vegetables, Ornamentals, Vegetable Groups

Forest, Ornamentals, Ornamental Fruit, Shade Trees, Shrubs, Sugar Maple Trees,

PESTS CONTROLLED BY Basin® Flex IN A TANK MIX WITH Bt

Colorado Potato Beetle*

*Apply in a tank mix with the low labeled rate of a beetle active Bt, such as Bt ssp. *tenebrionis*

Lepidopteran Larvae (caterpillars, loopers, "worms"), such as:

*Apply in a tank mix with the low labeled rate of a lepidopteran active Bt, such as Bt ssp. *kurstaki*, or Bt ssp. *aizawai*

Alfalfa Caterpillar	Diamondback Moth	Orangedog
Amorbia spp.	Eastern Grapevine Moth	Orangestriped Oakworm
Armyworms	Eastern Tent Caterpillar	Orange Tortex
Artichoke Plume Moth	European Pepper Moth	Oriental Fruit Moth
Azalea Caterpillar	Filbertworm	Peach Twig Borer
Bagworms	Fruitworms, such as	Pickleworm
Banana Moth	Cherry, Cranberry, Green, Tomato	Pineapple feeding Caterpillars,
Bollworms	Grape Berry Moth	such as <i>Thecla basilides</i>
Browntail Moth	Grape Leafroller	Rindworms
Buck Moth	Grapeleaf Skeletonizer	Saddleback Caterpillar
Budworms, such as	Green Cloverworm	Saddled Prominent
Blackheaded, Jack Pine,	Greenstriped Mapleworm	Saltmarsh Caterpillar
Spruce, Tobacco	Gypsy Moth	Satin Moth
California Oakworm	Headworms	Skippers, such as
Cane Bearers, such as	<i>Helicoverpa</i> spp.	Banana, Essex, European
Pecan Nut	<i>Heliothis</i> spp.	Soybean Podworm
Cankerworms	Hickory Shuckworm	Spanworms, such as
Chainspotted Geometer	Hornworms	Bruce, Cranberry, Currant, Elm
Codling Moth	Imported Cabbageworm	Sunflower Moth
Coneworms	Io Moth	Tomato Pinworm
Comborers, such as	Leafrollers, such as	Tufted Apple Bud Moth
European, Southwestern	Filbert, Fruittree, Obliquebanded,	Tussock Moths, such as
Corn Earworm	Omnivorous, Redbanded	Douglas-fir, Hickory, Western
Cotton Bollworm	Leaf-tier	Pine, Whitemarked
Cotton Leafperforator	Leek Moth	Velvetbean Caterpillar
Cotton Leafworm	Loopers, such as	Walnut Caterpillar
Cutworms, such as	Alfalfa, Cabbage, Hemlock,	Webworms, such as
Citrus,	Omnivorous, Soybean	Cabbage, Fall, Filbert,
Cranberry,	Melonworm	Mimosa
Roughskinned,	Navel Orangeworm	Winter Moth
Spotted,	Oleander Caterpillar	
Varigated		

Basin T Targets in 2020

- Green peach aphid
 - Greenhouse Cucumber
 - Greenhouse Coleus
- Spotted-wing drosophila
 - Blackberry

Basin-Flex Targets in 2020

- | | |
|----------------------------|-------------------------------|
| • Beet armyworm | – Broccoli, Cabbage, Lettuce |
| • Cabbage looper | – Cabbage |
| • Codling moth | – Apple |
| • Diamondback moth | – Broccoli, Cabbage, Collards |
| • Fall armyworm | – Sweet corn |
| • Imported cabbageworm | – Cabbage |
| • Lesser appleworm | – Apple |
| • Melonworm/Pickworm | – Cucumber |
| • Navel orangeworm | – Almond, Pistachio |
| • Obliquebanded leafroller | – Apple |
| • Oriental fruit moth | – Apple |
| • Tomato fruitworm | – Tomato |
| • Tufted apple budmoth | – Apple |





Presentation Outline

- Introduction to insecticidal peptides
 - Attributes
 - Hurdles to development
 - Two distinct use patterns
- Update on Spear-T & Spear Lep
- Update on VST-7300 (Basin T & Basin-Flex)

Daniel Peck
Director of Field Development

