

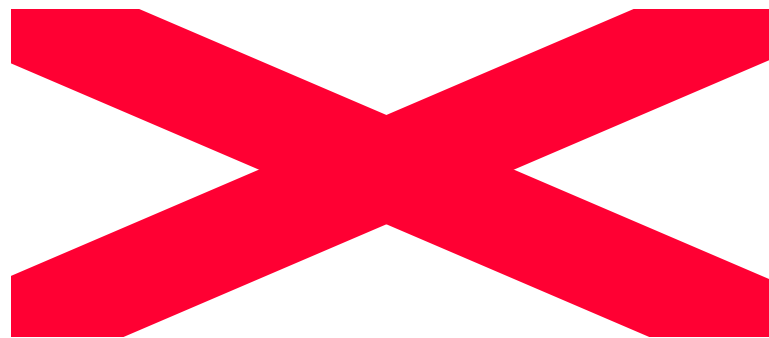
Indoxacarb

Technical Update

Under development by...



DuPont Agricultural Products



*Pending EPA Registration

Indoxacarb

Registration status

- EPA - reduced risk pesticide candidate
- Federal registrations are anticipated to be granted by mid-year 2000
- Product availability is anticipated by the first quarter of 2000

Indoxacarb

Product description

Common name: Indoxacarb

Chemical Class: Oxadiazine

Testing Code: DPX-MP062

Formulation: Avaunt - 30% WDG
Steward - 15% SC (1.25 lb ai/gallon)

Signal word: Caution

Mode of Action: Novel

Indoxacarb

Steward™ *

“Control of *major* worm pests plus **plant bug** while helping you protect beneficials and your cotton crop”



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Indoxacarb Steward™ *

Proposed rates for cotton pests

<i>Cotton insect pests</i>	<i>Rate lb ai/ac</i>	<i>Rate fl oz/ac</i>
Cotton bollworm	0.11	11.3
Tobacco budworm		
Beet armyworm	0.09 - 0.11	9.2 - 11.3
Fall armyworm		
Cabbage looper	0.065 - 0.09	6.6 - 9.2
Soybean looper		
Cotton fleahopper	0.09 - 0.11	9.2 - 11.3
Tarnished plant bug		

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Indoxacarb Steward™ *

REI and PHI intervals

- *Air and ground application*
- *Restricted entry interval: 12 hours*
- *Preharvest interval: 14 days*
- *Application interval: 5 days*

Indoxacarb Steward™ *

Maximum seasonal use amount

Cotton: 4 applications at 11.2 fl.oz.
(44.8 fl.oz. per acre per season)

Indoxacarb

Avaunt™ * Vegetables & Fruit



Residual control of major worm pests to protect your vegetable crop with short re-entry and days to harvest



Broadest spectrum control of the new generation insecticides that helps you protect beneficials and your fruit with a short-reentry interval

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Avaunt™ * Targeted crops

- Lettuce (head and leaf varieties)
- Cabbage
- Broccoli
- Cauliflower
- Tomato
- Pepper (bell and non-bell varieties)
- Sweet Corn (whorl stage application only)
- Apple
- Pear

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Indoxacarb

Avaunt™ *

Vegetable crops: Pests controlled-rate matrix

Crops	Target Pests	Use Rate (oz product/acre)
Broccoli Cabbage Cauliflower	Cabbage looper, diamondback moth, imported cabbageworm	1.3 - 3.5
Lettuce (head and leaf)	Beet armyworm, cabbage looper, corn earworm	1.3 - 3.5
Peppers (bell and non-bell)	Tomato fruitworm, beet armyworm, loopers, southern armyworm, tomato pinworm	1.3 - 3.5
Sweet Corn (whorl application only)	Fall armyworm, European corn borer	1.3 - 3.5
Tomatoes	Tomato fruitworm, beet armyworm, loopers, southern armyworm	1.3 - 3.5

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Indoxacarb Avaunt™ *

Pome Fruit: Pests controlled-rate matrix

Crop	Target Pests	Use Rate (oz product/acre)
Apples & Pears	Codling moth, oriental fruit moth, lesser appleworm, redbanded leafroller, tufted apple bud moth, plum curculio, white apple leafhopper, potato leafhopper	3.5 - 5.8

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Avaunt™ *

Maximum seasonal use amount

- Apple & Pear: *4 applications at 5.8 oz
(23.2 oz per acre per crop)*
- Vegetables: *4 applications at 3.5 oz (14
oz per acre per crop)*

Indoxacarb

Avaunt™ *

Recrop Intervals

- Labeled crops may be planted immediately following harvest.
- Root crops or leafy vegetables which are not labeled may be planted 30 days after last use.
- Do not plant any other crop for 120 days after last use.

Indoxacarb

Avaunt™ *

Application Parameters

- *Air and ground application*
- *Restricted-entry interval: 12 hours*
- *Preharvest interval: 3 days (vegetable crops)
28 days (apples/pears)*
- *Application interval: 3 days (most vegetable crops)
5 days for tomato*

Indoxacarb

Mode of action

- Unique mode of action
- *Sodium channel blocker*: interferes with a group of ion channels by inhibiting the flow of sodium into nerve cells causing paralysis and death of pests
- No evidence of cross resistance to current products

Indoxacarb

Activity on pests

- *Primary activity*: ingestion of treated foliage, also absorbed through the insect cuticle
- *Feeding inhibition*: 0-4 hours - stops feeding quickly, providing excellent crop protection
- *Paralysis and death*: 4-48 hours

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Beneficial predator & parasite impact

- Great safety for predators/ parasites and non-target beneficials
- Honey bees and bumble bees - Under field conditions, Avaunt poses no significant risk to honey bees and bumble bees foraging after sprays have dried

Indoxacarb

Beneficial predator impact

Species	Use Rate (oz. product/acre)	Impact
<i>Geocoris spp.</i> Big eyed bugs	2.4 - 5.8	○
<i>Orius spp.</i> Minute pirate bugs	2.4 - 5.8	○
<i>Coccinella spp.</i> Lady bird beetle	2.4 - 5.8	◐
<i>Nabis spp.</i> Damsel bugs	2.4 - 5.8	○
Predacious diptera	1.6 - 4.6	○
Predacious mites	2.4 - 3.5	○
Spiders	1.6 - 3.5	○

Impact

Slight ○

Moderate ◐

High ●

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Impact on parasites

Species	Use Rate (oz product/acre)	Impact
<i>Apanteles congestus</i>	3.5 - 5.8	○
<i>Cotesia marginiventris</i>	3.5 - 5.8	○
<i>Bracon mellitor</i>	3.5 - 5.8	○
<i>Cardiochiles nigreiceps</i>	1.6 - 3.5 5.8	○ ▨
<i>Microplitis croceipes</i>	1.6 - 3.5	○
<i>Aphidius colemani</i>	1.6 - 4.6	▨
<i>Aphidius rhapalosiphi</i>	3.5	○
<i>Diaeretiella rapae</i>	1.6	▨
<i>Aphelinus mali</i>	1.6 - 4.6	○

Impact	
Slight	○
Moderate	▨
High	●

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Indoxacarb

Favorable attributes

- New chemistry, unique mode of action
- Active at low use rates
- Broad-spectrum insecticide
- Quick crop protection through feeding cessation
- Excellent crop safety on all targeted crops

Indoxacarb

Favorable attributes (cont.)

- Minimal impact on most beneficial insects and non-target organisms
- Low mammalian toxicity
- Favorable environmental/ecological profile
- Excellent rainfastness
- Excellent photo (UV) stability
- Effective at high temperatures
- Resistance management tool; Good fit in IPM programs
- Effective against resistant pests.