



TECHNICAL INFORMATION BULLETIN

OVERVIEW

Senstar® Insecticide brings two effective modes of action for long-lasting control of soft-bodied insects, including whiteflies, aphids, psyllids, mealybugs and scales. *Senstar* is a suspo-emulsion (SE) formulation of the active ingredients pyriproxyfen and spirotetramat. With contact, translaminar and systemic activity that affects all life stages of targeted pests for long-lasting control, *Senstar* helps ensure high-quality produce from the start.



SENSTAR TECHNICAL FEATURES

- ▶ Controls target pests at all life stages, including eggs and crawlers
- ▶ Provides dual systemic activity (movement in the xylem and phloem) to control pests moving into new vegetative growth, as well as pests which populate in already developed foliage
- ▶ Delivers translaminar movement within the foliage tissue to reach target pests that feed on the underside of leaves
- ▶ Selectively targets harmful insect pests with minimal impact on beneficial arthropods for excellent fit in Integrated Pest Management (IPM) programs
- ▶ Controls target insects in three primary ways: contact and/or ingestion, suppressing embryogenesis within insect eggs and reduction in the percent of adult female viable eggs
- ▶ Delivers a full rate of spirotetramat and an optimized dose of pyriproxyfen to enhance insect control

MULTIPLE MODES OF ACTION

Senstar delivers both Group 7C and Group 23 insecticides in a single application*. *Senstar* controls insect pests during their whole life cycle. Also, it delivers insecticidal properties via contact and feeding actions to put in place a comprehensive management tool in each application.

- ▶ Pyriproxyfen is a juvenile hormone mimic insecticide (Group 7) that delivers insect growth regulator (IGR) features, which suppress embryogenesis within the insect eggs. In addition, the IGR type of control in *Senstar* provides inhibition of metamorphosis and adult emergence of target insects. Pyriproxyfen has no knockdown activity on adult insects, however hatching of eggs laid by treated adults will be suppressed.
- ▶ Spirotetramat belongs to the Group 23 insecticides. Spirotetramat, when sprayed as a foliar treatment, breaks down into insecticidal compounds that act as inhibitors of the critical process of lipid biosynthesis among insects that feed on the treated plants. Immature insects and female adults are particularly susceptible to this path of insecticidal activity. Spirotetramat negatively disrupts the development and molting processes of insects.

*Insecticide Resistance Action Committee (IRAC) Mode-of-Action Classification

SENSTAR LABELED CROPS

Senstar is labeled to control a diverse spectrum of sucking insects in a comprehensive list of crops.

	Aphids	Whiteflies	Mealybugs	Scales	Thrips	Psyllids	Other	Rate (fl oz/A)
Annual Crops								
Brassica (Cole) Leafy Vegetables	X	X					Diamondback moth*, onion thrips (larvae)*, swede midge	6–10
Carrots (not for use in CA)	X	X						10
Fruiting Vegetables	X	X				X	Leafminers*, Western flower thrips (larvae)*	8–10
Leafy Vegetables (except Brassica Vegetables)	X	X					Diamondback moth*, leafminers*, Western flower thrips (larvae)*	8–10
Legume Vegetables (excluding Soybeans) (not for use in CA)	X	X					Leafminers*, melon thrips (larvae)*, Western flower thrips (larvae)*	8–10
Onion, Bulb / Onion, Green†							Onion thrips (larvae), Western flower thrips*	10
Sugar Beets (not for use in CA)	X	X					Root maggot*	9–18
Tuberous & Corm Vegetables (not for use in CA)	X					X	Western flower thrips (larvae)*	8–10
Watercress (not for use in CA)	X	X					Sharpshooters	8–24
Permanent Crops								
Artichokes (Globe) (not for use in CA)	X	X					Plume moth	10–16
Bananas & Plantains (for use only in FL, HI and Puerto Rico)	X	X						20–32
Bushberries / Low-Growing Berries (not for use in CA)	X			lecanium*	larvae		Blueberry gall midge, blueberry maggot*, cherry fruitworm*, cranberry fruitworm*, cranberry tipworm, leafhoppers*	16–20
Citrus	X	X	X	X ¹	X	X	Black fly, leafminer	16–20
Grapes		X	X	lecanium*			Phylloxera, tumid gallmaker	12–16
Pineapple (not for use in CA and NY)			X	X				20
Pome Fruit	X	X	X	X ²		X	Apple gall midge*, codling moth*, pear leaf midge*, spotted tentiform leafminer*, Western tentiform leafminer*, white apple leafhopper*	12–18
Stone Fruit	X	X	X	X ³			Cherry fruit fly*, oriental fruit moth*, spotted wing drosophila*	12–18
Tree Nuts (including almonds, pistachios, walnuts)	X	X	X	X ⁴			Codling moth*, Phylloxera	12–18
Tropical Fruit (not for use in CA)	X	X	X	X			Avocado thrips	16–20

†Not all subgroup crops will be labeled in California

*Suppression only

¹Citricola scale suppression only

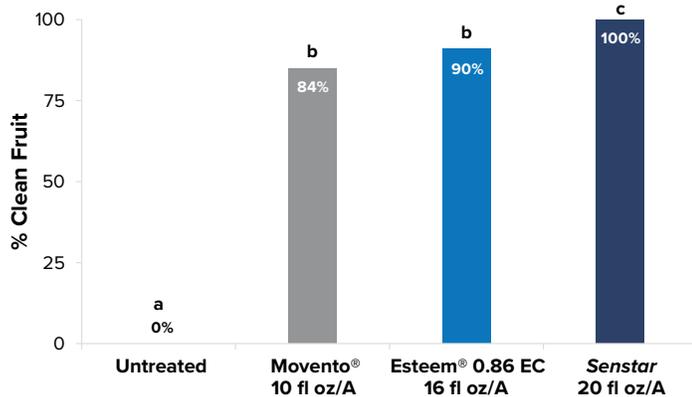
²Lecanium scale and San Jose scale rate is 18 fl oz/A

³Black scale suppression only

⁴Black, brown, Italian, olive and lecanium scale suppression only

SENSTAR EFFICACY

California Red Scale—Citrus (Oranges)

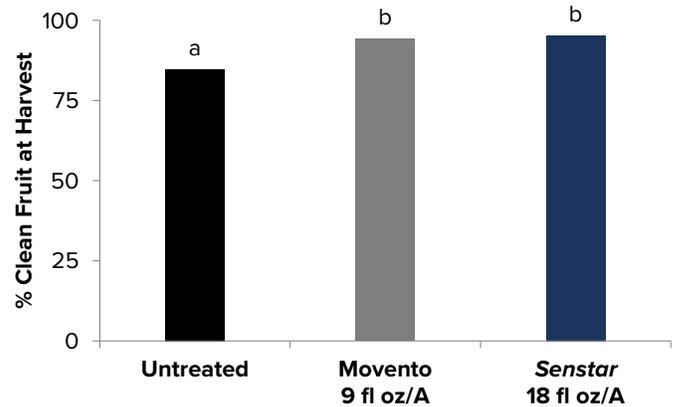


Senstar applied at the first generation red scale crawler stage delivered cleaner fruit compared to *Esteem* 0.86 EC Insect Growth Regulator or *Movento*.

Means followed by the same letters are not significantly different ($P \leq 0.10$).

Source: Sawtooth Ag

San Jose Scale—Pome Fruit

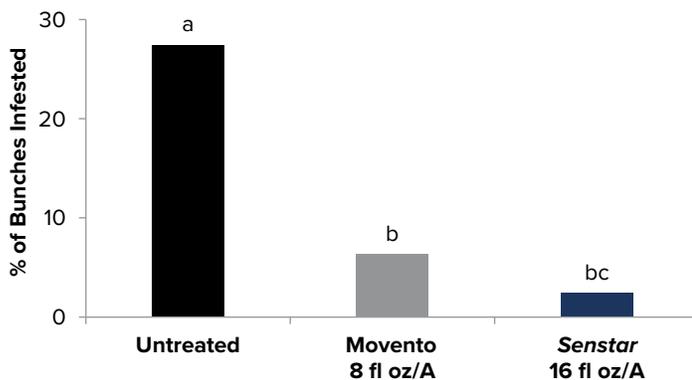


Senstar provided excellent control of San Jose scale at 18 fl oz/A.

Means followed by the same letters are not significantly different ($P < 0.10$).

Source: D. Biddinger, Pennsylvania State University; Biglerville, PA

Vine Mealybugs—Table Grapes

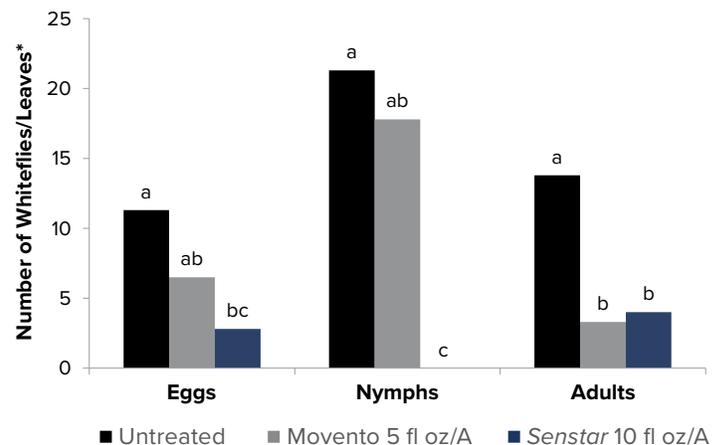


Senstar delivered better protection on grape bunches due to its two modes of action targeting all life stages of the pest.

Means followed by the same letters are not significantly different ($P < 0.10$).

Source: Summary of four trials conducted in California by multiple research scientists and outfits

Whiteflies—Tomatoes



Senstar delivered faster control of eggs and nymphs of whiteflies seven days after initiating the insecticidal program to control whiteflies.

* Eggs and nymphs (5 leaves/plant); adult (10 leaves/plant evaluated).

Means followed by the same letters are not significantly different ($P < 0.10$).

Source: St. Lucie County, FL; Better Crops, LLC

RESISTANCE MANAGEMENT GUIDELINES

Senstar contains both Group 7C/pyriproxyfen and Group 23/spirotriamet insecticides. Any insect population may contain individuals naturally resistant to *Senstar* and other Group 7C or Group 23 or insecticides. Resistant individuals may dominate the insect population if these insecticides are used repeatedly in the same fields without following IPM guidelines including rotating other classes of chemistry. Appropriate resistance management strategies should be followed.

To delay insecticide resistance, take the following steps:

- ▶ Rotate the use of *Senstar* and/or other Group 7C and Group 23 insecticides within a growing season with different groups of classes of chemistries to minimize the risk of onset of resistance.
- ▶ Use tank mixtures with insecticides from a different group that are equally effective on the target pest when such use is permitted. Do not rely on the same mixture repeatedly for the same pest population. Consider any known cross-resistance issue (for the targeted pests) between the individual components of the mixture.
- ▶ Adopt an IPM program for insecticide use that includes scouting, uses historical information related to pesticide use, crop rotation, record keeping, and which considers cultural, biological and other chemical control practices.
- ▶ Monitor after application for unexpected target pest survival. If the level of survival suggests the presence of resistance, consult with your local extension specialist or certified crop advisor.
- ▶ Contact your local extension specialist or certified crop advisors for any additional pesticide resistance management and/or IPM recommendations for the specific site and pest problems in your area.

INTEGRATED PEST MANAGEMENT

IPM is an approach that combines various tools and methods including chemical and biological products, natural pest enemies and cultural methods such as sanitation, crop rotation and resistant crop varieties to manage pests at an economically acceptable level. *Senstar* is highly suited for use in IPM programs because it shows high selectivity to harmful insect species with no hazardous effects on many beneficial insects. Insect predators or parasites which are unaffected by *Senstar* include: *Orius sauteri* (thrips predator), *Anthocoris melanocerus* (pear psylla predator), *Aphytis holoxanthus* (California red scale parasite), *Encarsia pergandiella* (whitefly parasite) and *Chrysopa carnea* (green lacewing, a general predator). In addition, *Senstar* has shown minimal impact to pollinators.

