

Efficacy of Flagship 25WP, Safari 20SG, Talus 40SC, and Tristar 20WSP for Managing Scale Insects 04/19/05

Ornamental Protocol Number: 05-002a

Objective: Determine efficacy of Flagship, Safari, Talus and Tristar on scale insects of ornamental plants.

Experimental Design:

Plot Size: Must be adequate to reflect actual use conditions.

Replicates: Minimum of 4 replications

Application Instructions: For foliar applications, make two applications 14 days apart using a volume per acre suitable to provide adequate coverage of plant material. For drench applications of Safari 20SG, follow application guidelines in the table below conducting either 5a and 6a OR 5b and 6b based on whether plant material is in containers or in the ground. Applications should be made using application equipment consistent with conventional commercial equipment. Rates are in formulated product.

Target Species: See attached list of target species.

Plant Hosts: Use a plant host suitable for target scale species, recording species and variety used.

Use Site: May be greenhouse, field container or field in-ground. Please specify in final report.

Evaluations: Record initial insect counts and then 7, 14 (prior to 2nd application), 28 and 42 days after initial application. Record phytotoxicity at each rating date on a scale of 0 to 10 (0 = no phytotoxicity; 10 = complete kill). If phytotoxicity is observed in treated plants, take pictures comparing treated and untreated plant material.

Recordkeeping: Keep detailed records of weather conditions including temperature and precipitation, soil-type or soil-less media, application equipment, application volume per acre, irrigation, liner size, plant height & width, and plant growth stage at application and data collection dates.

Treatments:

#	Product	Rate	Application Instructions
1	Flagship 25WP (thiamethoxam)	2.0 oz/100 gal	Two foliar applications 14 d apart. On hard to wet plants use a wetting agent, do not use surfactants/adjuvants that binds Flagship to the leaf surface.
2	Flagship 25WP (thiamethoxam)	4.0 oz/100 gal	Two foliar applications 14 d apart. On hard to wet plants use a wetting agent, do not use surfactants/adjuvants that binds Flagship to the leaf surface.
3	Safari 20SG (dinotefuran) – Foliar	4.0 oz/100 gal	Two foliar applications 14 d apart with a nonionic surfactant, preferably Capsil.
4	Safari 20SG (dinotefuran) – Foliar	8.0 oz/100 gal	Two foliar applications 14 d apart with a nonionic surfactant, preferably Capsil.
5a	Safari 20SG (dinotefuran) – Container drench	12.0 oz/100 gal	Single drench application using 4 fl oz solution per gallon of container pot volume Do not apply to saturated or dry soil
6a	Safari 20SG (dinotefuran) – Container drench	24.0 oz/100 gal	Do not leach pots for first week after application For transplanted plugs or liners: do not apply until new roots begin forming
5b	Safari 20SG (dinotefuran) – In-ground drench	3 g/ft of shrub or tree height	Single drench application to soil surface, at a volume of 1 qt of drench solution/foot of shrub or tree height. (Ex.: For a 4-ft shrub, dissolve 12 gm or 24 gm of Safari in 4 quarts of water and apply to soil surface.) Do not apply to saturated or dry soil Apply only when plants are actively growing.

6b	Safari 20SG (dinotefuran) – In-ground drench	6 g/ft of shrub or tree height	
7	Talus 40SC (buprofezin)	21.5 fl oz/100 gal	Two foliar applications 14 d apart
8	TriStar 30SG (acetamiprid)	112 g/100 gal	Two foliar applications 14 d apart with a non-ionic wetting agent.
9	TriStar 30SG (acetamiprid)	224 g/100 gal	Two foliar applications 14 d apart with a non-ionic wetting agent
10	Standard Foliar Treatment	Standard Rate	Two foliar applications 14 d apart
11	Untreated	--	--

For labels, materials, and any required adjuvants contact:

Flagship - Syngenta, Dave Ross, 336-632-6411, david.ross@syngenta.com

Safari - Valent, Joe Chamberlin, 770-985-0303, jcham@valent.com

Talus - SePRO, Todd Bunnell, 317-216-5667, toddb@sepro.com

Tristar - Cleary, Rick Fletcher, 732-329-8399, rick.fletcher@clearychemical.com

Reports:

Report must include a brief summary paragraph of results, a summary table with appropriate statistical analyses, a section on experimental design and materials and methods, with raw data and recordkeeping information as listed above included as appendices. If pictures were taken, please include them.

An electronic report is preferred but not required. If the report is provided electronically, the basic report can be sent in MS Word or WordPerfect, the recordkeeping information as pdf or other electronic documents, and the raw data in MS Excel or other suitable program such as ARM.

Please direct questions to: Cristi Palmer, IR-4 HQ, Rutgers University, 681 US Hwy 1 S, North Brunswick, NJ 08902-3390, Phone 732-932-9575 x629, palmer@aesop.rutgers.edu **OR** Ely Vea, 308 Aston Forest Lane, Crownsville, MD 21032, Phone & FAX#: 410-923-488, E-mail: evvea@comcast.net.

Revision Date: 1/05

Revised By: CLP

2005 Target Scale List

Pest Latin Name	Pest Common Name	Flagship	Safari	Talus	Tristar
<i>Aonidiella aurantii</i>	California Red Scale	Y	Y	N	Y
<i>Aspidiotus destructor</i>	Coconut Scale	Y	Y	Y	Y
<i>Aulacaspis yasumatsui</i>	Asian Cycad Scale	Y	N	Y	Y
<i>Ceroplastes ceriferus</i>	Indian Wax Scale	N	Y	N	Y
<i>Ceroplastes cirripediformis</i>	Barnacle Scale	N	Y	N	Y
<i>Ceroplastes floridensis</i>	Florida Wax Scale	Y	N	Y	Y
<i>Chionaspis pinifoliae</i>	Pine Needle Scale	Y	Y	Y	Y
<i>Chrysomphalus aonidium</i>	Florida Red Scale	Y	Y	N	Y
<i>Coccus hesperidum</i>	Brown Soft Scale	N	Y	N	Y
<i>Coccus pseudomagnoliarum</i>	Citricola Scale	N	Y	N	Y
<i>Diaspis boisduvali</i>	Boisduval Scale	Y	Y	N	Y
<i>Diaspis echinocacti</i>	Cactus Scale	Y	Y	N	Y
<i>Eucalymnatus tessellates</i>	Tessalated Scale	N	Y	N	Y
<i>Icerya purchasi</i>	Cottony Cushion Scale	N	Y	N	Y
<i>Lecanium fletcheri</i>	Fletcher Scale *	N	Y	Y	Y
<i>Lepidosaphes ulmi</i>	Oystershell Scale	Y	Y	N	Y
<i>Paratachardina lobata</i>	Lobate Lac Scale	Y	Y	Y	Y
<i>Pinnaaspis aspidistrae</i>	Fern Scale	Y	Y	N	Y
<i>Pseudaulacaspis cockerelli</i>	False Oleander Scale	N	Y	N	Y
<i>Pseudaulacaspis pentagona</i>	White Peach Scale	N	Y	N	Y
<i>Quadraspidotus perniciosus</i>	San Jose Scale	Y	Y	N	Y
<i>Saissetia coffeae</i>	Hemispherical Scale	N	Y	N	Y
<i>Saissetia oleae</i>	Black Scale	N	Y	N	Y
<i>Unaspis euonymi</i>	Euonymus Scale *	Y	Y	Y	Y
Scale insects not listed above		Y	Y	Y	Y

* Single trial conducted in 2004

Y = Researchable

N = No more data needed, but include as an additional standard in the trial

Blank = Unknown

Possible Protocols

(If you need help in setting up your protocol)

Mealybugs. Mealybugs are probably the easiest of this group on which to conduct efficacy trials. Methods may vary by host. The following protocol can be used for foliar attacking mealybugs:

Plants can be infested by placing a set number of mealybugs on each plant. Allow the insects to establish for at least two weeks prior to treatment. Weekly observations can be made by counting a set number of leaves each week or marking the terminals with a permanent marker and counting from the mark up to the tip of the terminal.

It is important to remember that you can have dead females under ovisac. Do not assume that a sac = live female. Crawlers will emerge from the ovisacs for a few weeks after the female has died. Don't be surprised to see crawlers emerging on a plant that you thought was clean.

- Casey, M. 2002. Control of mealybugs on coleus. <http://www.entsoc.org/Protected/AMT/AMT27/Text/G32.asp>
- Cloyd, R. 2003. Foliar applications and potting soil drenches of insecticides for control of citrus mealybug. www.entsoc.org/Protected/AMT/AMT28/Text/G22.asp
- Jacobsen, C. M. 2003. Control of coconut mealybug infesting fishtail palms with acetamiprid, chlorpyrifos, and thiamethoxam. www.entsoc.org/Protected/AMT/AMT28/Text/G29.asp

Soft Scales: Unlike mealybugs, soft scales can not be easily manipulated on the plant. It is best to find plant material already infested for the trials. The following protocol can be used for foliar or stem attacking soft scale:

It is best to wait until the majority of scales are late first or early second instars. To monitor the scale population, a set number of leaves or branches should be marked and the population followed over time. If the scale are all at the same stage at the start of the experiment it is easy to tell if the scale have died. Either they fall off the plant or they stop growing. It is usually easy to see the size difference between dead and growing scale. At the end of the experiment the branches or leaves can be removed from the plant and examined under a microscope or hand lens to confirm mortality.

- Hesselein, C.P. 1997. Control of Florida Was Scale on Dwarf Burford Holly. Proceedings of the SNA Research Conference. 42: 191-192.
- Hesselein, C.P. 2001. Evaluation of several insecticides for control of Florida Wax Scale. Proceedings of the SNA Research Conference. 46: 203-207.

Armored Scale: These are the most difficult group on which to conduct efficacy trials. These insects can not be easily manipulated on the plant and mortality is difficult to determine without the aid of a microscope. The following protocol can be used to determine armored scale mortality:

Remove a set number of leaves or stems and count the number of live and dead crawlers, nymphs, and adults with the aid of a dissecting microscope. Scale mortality can be determined by poking the scales with a dissecting pin and looking for bodily fluid or flipping the scale over and watching for leg and stylet movement (if present). It is common to observe the same number of scale from each plant and present the results as a percent mortality (use arcsine square root transformation to analyze the results).

- Jacobsen, C. 1999. Efficacy of Imidacloprid formulations against the green scale. Arthropod Management Tests. 24: 374-375.
- Smitley, D. 2002. Fletcher scale on Taxus. www.entsoc.org/Protected/AMT/AMT27/Text/G65.asp