



## IR-4 Ornamental Horticulture Program Grower & Extension Survey Summary 2015 – US Respondents

<http://ir4.rutgers.edu/Ornamental/ornamentalliterature.cfm>

The intent of the Ornamental Horticulture Survey was to poll growers, landscape care operators, researchers, extension personnel and others affiliated with this industry on needs and issues related to disease, insect, and weed management. The responses from the survey feed directly into how IR-4 allocates its research budget for ornamental horticulture projects.

### Demographics of Survey Participants

The purpose for several questions in this survey was to describe the demographics of participating growers, landscape care personnel and others in the green industry. The survey participants came from across the United States with responses relatively equal among the four geographic regions (Table 1). Fifty-six percent were growers with the next largest segment being lawn care professionals at 16% (Table 2). The operation type most represented was greenhouse followed by nursery container growers (Table 3). Those participants involved in field-grown nursery production or in the landscape represented a significant portion of the operation types. Very few survey participants selected more than one operation type (data not shown).

Relatively equal numbers of respondents identified themselves as using chemical control and/or IPM (Table 4). Twenty percent used biological controls while 11% of survey participants used organic tools. Many participants did not choose a philosophy for when to apply, but those that did make applications when needed rather than based on a calendar.

While respondents grew slightly more perennials than any other crop type, bedding plants, ornamental grasses, shrubs and trees were relatively evenly split among growers (Table 5). Fewer survey respondents grew seasonal potted plants, foliage plants, cut flowers, palms, and Christmas trees.

**Table 1. IR-4 Region for survey participants**

Region	Count	Percent
NorthCentral	46	22%
Northeast	61	30%
Southern	41	20%
Western	58	28%
Total	206	100%

**Table 2. Employment sector for survey participants (single selection option)**

Segment	Count	Percent
Extension	17	8%
Government	6	3%
Grower	116	56%
Industry	16	8%
Interiorscaper	0	0%
LCP	32	16%
Researcher	17	8%
Unspecified	2	1%

**Table 3. Operation types (multiple selections)**

Production Site	Count	Percent
Greenhouse	57	29%
Nursery Container	41	21%
Nursery Field	37	19%
Landscape	36	18%
Interiorscape	9	5%
Christmas Tree Farm	10	5%
Sod Farm	6	3%

**Table 4. Disease, insect and weed management styles (multiple selections)**

Management Styles	Count	Percent
Biological Control	52	20%
Chemical Control	68	26%
IPM	67	25%
Organic	28	11%
Weekly/Monthly Sprays	4	1%
Spray at Thresholds	44	17%

**Table 5. Spectrum of crops grown (multiple selections)**

Crop Type	Count	Percent
Bedding Plants	48	12%
Cut Flowers	19	5%
Christmas Trees	13	3%
Foliage Plants	31	8%
Perennials	60	15%
Ornamental Grasses	48	12%
Palms	13	3%
Seasonal Potted Plants	29	7%
Shrubs	54	14%
Trees	57	14%
Turf	23	6%

**Type of Data Needed**

Two questions solicited information on the general direction of research and the type of data needed in the program. The first question asked whether crop safety data was needed more than efficacy, efficacy more than crop safety, or both equally. The option for needing both crop safety and efficacy equally was highly selected (Figure 1).

**Activities to Protect Beneficial Organisms including Pollinators**

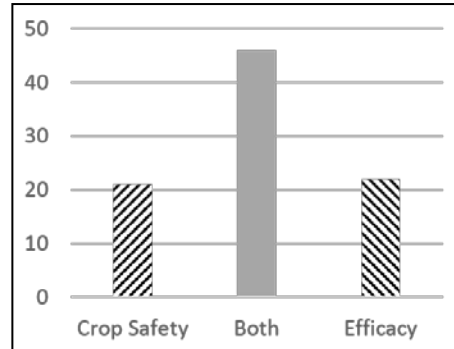
This year a new question was added to the survey to assess current practices used to protect beneficial organisms including pollinators during production and maintenance of plants.

There were 172 respondents to this question, and they were able to select multiple answers. The activity most employed was scouting for pest and disease hot spots and apply crop protection tools to only those areas (Figure 2). The next selection by frequency was applying crop protection tools when no beneficial organisms are present, followed by applying the best tool possible for crop situation knowing that some beneficial organisms may be harmed. The next highest was applying systemic tools when they offer greater safety than foliar tools.

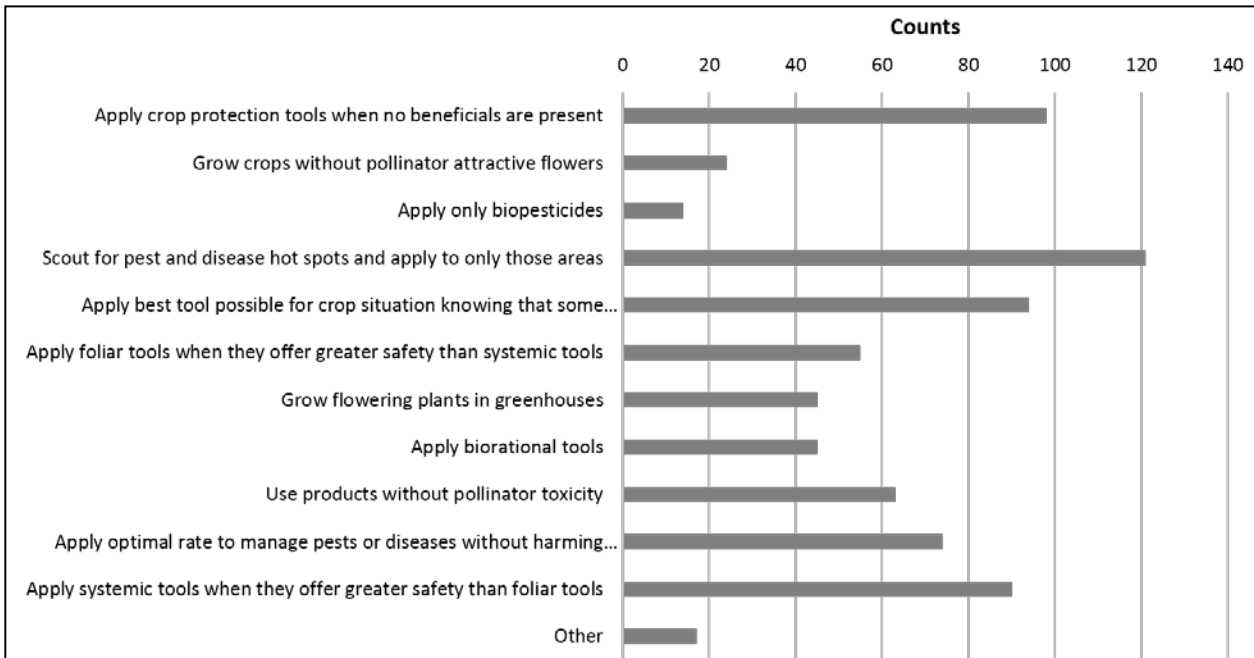
Of note, the option to apply only biopesticides was the least selected followed by growing crops without pollinator attractive flowers.

Among the write-ins (Table 6, p3), several mirror the stated options including ‘always try to spray at dusk’. In two comments, respondents indicated that pesticides are not the primary factor for honey bee decline or reduction of pollinator populations generally.

**Figure 1. Counts for type of data to be generated**



**Figure 2. Activities to protect beneficial organisms including pollinators (multiple selections)**



**Table 6. Comments included related to protecting beneficial organisms including pollinators**

<b>Additional Activities Use to Protect Beneficial Organisms</b>
Using more nursery ground cover mats to reduce/eliminate herbicide use
Keep cover crops between the rows free of flowers (mowing, limit plant choice to grasses)
I apply neonicotinoids AFTER flowering on Rhododendron & Azalea
Crop rotation
Avoiding any applications when pollinators are foraging
Always try to spray at dusk.
Study pesticide toxicology data for good decision making
Use of Biofriendly pesticides with biological control
Tree systemic (injectible) herbicides disperse, into the atmosphere, around those humans present.
Remove host plants for problem bugs and provide plants for beneficial insects
Apply when pollinators aren't present
Don't use pesticide on crops that need pollinators
I do not use pesticides on our field crops as we produce seeds and need Bee pollination.
I don't specifically do pollinator work, but co-workers are starting to research increasing crop plant pollination by having other species of plants in/near fields (berries, tree fruit, seed crops) as well as for areas where noxious weed control is being conducted to give pollinators an alternate source of pollen or nectar when the weed species are removed.
Pesticides have very little to do with the honey bee decline. I am a bee keeper too. Look at the facts not the politics.
Mechanical removal; ie boring insects
Use pesticides when we have issues, but not regularly, sporadic; do not use beneficials regularly but do not consider as we should when we spray.
We are consistently weighing all factors regarding our IPM program and the health of pollinators on a case by case basis. It can be exhausting.
Apply systemics to Rhodies and Azaleas after flowering
Timing of spray during the night
Use of Arborjet trunk injection of emamectin benzoate
Have new pesticide label requirements for bees been added to ornamental product labels and are ornamental producers as keenly focused on bees as food producers?
Sanitation, good housekeeping, crop rotation, house dead time
Grow produce in high tunnels
I believe we need to know what products really affect pollinators and start from there. Many of the problems pollinators have is not pesticide issue as much as other pests.

## Ranking of Issues by Discipline

Each of the issues within the disciplines listed by participants was given a weighted ranking based on the order written. Each was also assigned to a group based on similar diseases, pests, or weeds. This section also examines the survey responses grouped by production site.

### Entomology

When all responses were grouped together the top five pests of concern were thrips, borers & beetles, mites & spider mites, scale & mealybugs, and white grubs & root weevils (Table 7, p4). Note that the calculation for weighted ranking here removes any duplication for crop or production site.

When weighted rankings were calculated for categories of crops, the top 5 pests changed for each crop type (Table 9, p5). One pest group was present in all five crop types: mites & spider mites. There was little consistency among the rest of the top five pests. Thrips appeared in all groups but Ornamental Grasses, and white grubs & root weevils appeared in all but Cut Flowers.

When the weighted rankings were calculated based on the production sites, there were some differences among the order, but 4 of the top 5 were similar (Table 10, p5). Four pest types were in the top five for each primary production site: thrips, mites & spider mites, white grubs & root weevils, and scale & mealybugs. For greenhouse, whiteflies was the fifth pest group while for outdoor use sites borers & beetles was the remaining group.

### Plant Pathology

When all responses were grouped together, the top five diseases included bacterial diseases, crown & root rots, leaf spots & anthracnose, downy mildew, and *Phytophthora* & *Pythium* (Table 8, p4). The crown & root rot group contains diseases affecting roots, crowns, and lower trunks that are clearly not caused by *Pythium* or *Phytophthora*. Note that the calculation for weighted ranking here removes any duplication for crop or production site.

When the rankings were calculated based on the crop types there were some differences among the groups (Table 11, p5). Crown & root rots, bacterial diseases and *Phytophthora* & *Pythium* appeared in 4 of the crop types. Of interest, but not shown, is that the six ranked group for bedding plants was the category of vegetable diseases.

For the rankings grouped by production site, bacterial diseases, crown & root rot, *Phytophthora* & *Pythium* and downy mildew appeared in all four production sites. (Table 12, p5). For greenhouse, *Botrytis* was the fifth pathogen group while for outdoor use sites leaf spots & anthracnose was the remaining group.

**Table 7. Ranking of pests with limited management choices.**

Pest Group	Weighted Ranking
Thrips	114
Borers & Beetles	75
Mites & Spider Mites	71
Scale & Mealybugs	50
White Grubs & Root Weevils	43
Flies, Sawflies & Fungus Gnats	23
Aphids	22
Lygus	22
Whiteflies	22
Leafminers	16
Lace Bugs	14
Lepidopterans	9
Snails & Slugs	8
Adelgids	6
Midges	6
Turf Pests	6
Leaf Hoppers	6
Vegetable Pests	6
Nematodes	5
Stinkbugs	5
Other	3
Comment	3
Psyllids	3
Fruit & Nut Pests	2
Ants	2
True Bugs	1

**Table 8. Ranking of diseases with limited management choices.**

Disease Group	Weighted Ranking
Bacterial Diseases	92
Crown & Root Rot	70
Leaf Spots & Anthracnose	52
Downy Mildew	52
<i>Phytophthora</i> & <i>Pythium</i>	46
Powdery Mildew	26
<i>Botrytis</i>	25
Foliar Blights	25
Canker	18
Other	18
Nematodes	17
Rusts	16
Virus	15
Turf Diseases	12
Vegetable Diseases	12
Abiotic	5
Fruit & Nut Diseases	3
Vascular Wilts	3

**Table 9. Top 5 issues by crop for Entomology.**

	<b>Bedding Plants &amp; Seasonal Potted Plants</b>	<b>Cut Flowers</b>	<b>Ornamental Grasses</b>	<b>Foliage &amp; Perennial Plants</b>	<b>Shrubs, Trees, Palms &amp; Christmas Trees</b>
1	Thrips (83)	Thrips (25)	White Grubs & Root Weevils (16)	Thrips (49)	Borers & Beetles (65)
2	Mites & Spider Mites (28)	Mites & Spider Mites (9)	Aphids (7)	Mites & Spider Mites (21)	Mites & Spider Mites (43)
3	Whiteflies (19)	Whiteflies (6)	Mites & Spider Mites (5)	White Grubs & Root Weevils (19)	Scale & Mealybugs (38)
4	White Grubs & Root Weevils (16)	Lygus (6)	Flies, Sawflies & Fungus Gnats (5)	Scale & Mealybugs (17)	Thrips (36)
5	Aphids (12)	Scale & Mealybugs (5)	Borers & Beetles (3)	Whiteflies (14)	White Grubs & Root Weevils (35)

**Table 10. Top 5 issues by production site for Entomology.**

	<b>Greenhouse</b>	<b>Nursery Container</b>	<b>Nursery Field</b>	<b>Landscape</b>
1	Thrips (169)	Thrips (102)	White Grubs & Root Weevils (81)	Thrips (52)
2	Mites & Spider Mites (81)	White Grubs & Root Weevils (74)	Thrips (73)	White Grubs & Root Weevils (48)
3	White Grubs & Root Weevils (62)	Mites & Spider Mites (66)	Borers & Beetles (40)	Scale & Mealybugs (45)
4	Scale & Mealybugs (48)	Borers & Beetles (47)	Mites & Spider Mites (38)	Borers & Beetles (44)
5	Whiteflies (39)	Scale & Mealybugs (34)	Scale & Mealybugs (21)	Mites & Spider Mites (29)

**Table 11. Top 5 issues by crop for Plant Pathology.**

	<b>Bedding Plants &amp; Seasonal Potted Plants</b>	<b>Cut Flowers</b>	<b>Ornamental Grasses</b>	<b>Foliage &amp; Perennial Plants</b>	<b>Shrubs, Trees, Palms &amp; Christmas Trees</b>
1	Downy Mildew (45)	Botrytis (11)	Rusts (6)	Bacterial Diseases (38)	Bacterial Diseases (53)
2	Bacterial Diseases (43)	Crown & Root Rot (11)	Abiotic (3)	Phytophthora & Pythium (18)	Leaf Spots & Anthracnose (42)
3	Crown & Root Rot (29)	Bacterial Diseases (8)	Powdery Mildew (3)	Crown & Root Rot (17)	Phytophthora & Pythium (29)
4	Powdery Mildew (18)	Downy Mildew (5)		Nematodes (11)	Crown & Root Rot (24)
5	Phytophthora & Pythium (13)	Phytophthora & Pythium (5)		Downy Mildew (10)	Foliar Blights (21)

**Table 12. Top 5 issues by production site for Plant Pathology.**

	<b>Greenhouse</b>	<b>Nursery Container</b>	<b>Nursery Field</b>	<b>Landscape</b>
1	Bacterial Diseases (112)	Bacterial Diseases (101)	Bacterial Diseases (70)	Bacterial Diseases (63)
2	Crown & Root Rot (72)	Crown & Root Rot (50)	Crown & Root Rot (33)	Leaf Spots & Anthracnose (29)
3	Downy Mildew (56)	Downy Mildew (36)	Phytophthora & Pythium (32)	Crown & Root Rot (25)
4	Phytophthora & Pythium (52)	Phytophthora & Pythium (35)	Downy Mildew (28)	Downy Mildew (22)
5	Botrytis (25)	Leaf Spots & Anthracnose (27)	Leaf Spots & Anthracnose (21)	Phytophthora & Pythium (21)

## Weed Science

When all responses were grouped together, the top five weeds included Broadleaf Perennial, Grass, Broadleaf Summer Annual, Sedge & Nutsedge, and Horsetail & Similar Weeds (Table 13, p6). Note that the calculation for weighted ranking here removes any duplication for crop or production site.

Although there were some variations between rankings whether the responses are grouped together or separated by crop or production site, there was a general trend with broadleaf perennials and broadleaf summer or winter annuals in the top five weed types across crops and production sites (Table 14, p6, Table 15 – p7). Within Ornamental Grasses, however, the top issues were Sedge & Nutsedge and Liverworts & Moss and Algae.

In several weed groups, there were no individual weeds mentioned more than others (Table 18, p13). However for several weed groups, there were certain weeds viewed as more problematic. In their respective weed groups, spurge, conyza, bittercress, liverwort and nutsedge (unspecific) ranked highest.

**Table 13. Ranking of weeds with limited management choices.**

Weed Group	Weighted Ranking
Broadleaf - Perennial	44
Grass	41
Broadleaf - Summer Annual	38
Sedge & Nutsedge	30
Horsetail & Similar Weeds	26
Broadleaf - Annual/Perennial	20
Broadleaf - Winter Annual/Biennial	20
Broadleaf - Winter Annual	17
Liverworts & Moss & Algae	15
Broadleaf - Annual	15
Other	12
Comment	12
Turf weeds	9
Vine - Perennial	6
Aquatic Weed	3
Sedge	3
Broadleaf	2

**Table 14. Top 5 issues by crop for Weed Science.**

	Bedding Plants & Seasonal Potted Plants	Cut Flowers	Ornamental Grasses	Foliage & Perennial Plants	Shrubs, Trees, Palms & Christmas Trees
1	Broadleaf - Summer Annual (17)	Broadleaf - Perennial (8)	Sedge & Nutsedge (10)	Broadleaf - Summer Annual (17)	Broadleaf - Summer Annual (35)
2	Broadleaf - Perennial (12)	Broadleaf - Summer Annual (7)	Liverworts & Moss & Algae (10)	Broadleaf - Perennial (13)	Broadleaf - Perennial (31)
3	Broadleaf - Winter Annual/Biennial (10)	Broadleaf - Annual/Perennial (7)	Broadleaf - Winter Annual/Biennial (10)	Broadleaf - Annual (11)	Horsetail & Similar Weeds (20)
4	Grass (7)	Broadleaf - Winter Annual (5)	Broadleaf - Summer Annual (9)	Broadleaf - Winter Annual/Biennial (11)	Sedge & Nutsedge (20)
5	Broadleaf - Winter Annual (6)	Broadleaf - Winter Annual/Biennial (3)	Broadleaf - Perennial (7)	Grass (10) Liverworts & Moss & Algae (10)	Broadleaf - Annual (15)

**Table 15. Top 5 issues by production site for Weed Science**

	Greenhouse	Nursery Container	Nursery Field	Landscape
1	Broadleaf – Summer Annual (77)	Broadleaf - Summer Annual (78)	Broadleaf – Summer Annual (65)	Broadleaf – Summer Annual (41)
2	Broadleaf - Winter Annual/Biennial (46)	Broadleaf - Perennial (51)	Broadleaf - Perennial (51)	Broadleaf - Annual (33)
3	Broadleaf – Perennial (43)	Sedge & Nutsedge (37)	Broadleaf - Annual (33)	Broadleaf - Perennial (30)
4	Broadleaf - Winter Annual (36)	Broadleaf - Winter Annual/Biennial (36)	Horsetails & Similar Weeds (31)	Grass (21)
5	Liverworts & Moss & Algae (34)	Liverworts & Moss & Algae (34) Broadleaf – Annual (34)	Liverworts & Moss & Algae (25)	Broadleaf – Winter Annual (19)

**Table 16. Specific issues for each pest group.**

Pest Group	Pest	Weighted Ranking
Adelgids	Balsam Woolly Adelgid	3
	Cooley adelgid on Douglas Fir	3
Ants	Ant nests in plant material. If we use too much pesticide, this ruins their roots	2
Aphids	Aphids	8
	Aphids on calibrachoa	3
	Foxglove aphid	3
	Potato and Green Peach Aphids on Calibrachoa	2
	Root Aphids	3
	Root Aphids on True Fir	1
	Root Aphids on various crops	1
	Woolly apple aphid on Malus roots (galls visible at harvest)	1
Borers & Beetles	Acacia beetle hatches on seeds wide host range	3
	Ambrosia beetle	12
	Ambrosia beetles on ornamental trees	3
	Asian Longhorned Beetle	2
	Beetle on hardy water lilies with fish in pond	1
	Borers	3
	Bronze Birch Borer	4
	Cucumber beetle on dahlias	1
	Dutch Elm Disease	2
	Emerald Ash Borer	12
	Emerald Ash Borer on Ash	3
	Flea beetle	3
	Flea Beetle On Gaura	2
	Flea beetle on Itea	2
	Flea Beetle on paniculata Hyd.	2
	Fuller rose beetle	1
	Japanese beetle on Linden <i>Tilia spp.</i>	2
	Japanese Beetle on numerous crops	3
	Peachtree borer	1
	Pine Shoot Beetle	3
	Polyphogus boarer	1
	Potato beetle	2
	Red lily leaf beetle	3
	Shot hole borer hackberry, koelretueria, zelkova	3
	White pine weevil	1
	Comment	Systemic miticides needed, especailly on red maples

<b>Pest Group</b>	<b>Pest</b>	<b>Weighted Ranking</b>
Flies, Sawflies & Fungus Gnats	Fungus Gnats	11
	Rose slug	6
	Shore Fly	3
	Spotted Wing Drosophila Fruit Fly	3
Fruit & Nut Pests	Apple Borer	2
Lace Bugs	Azalea Lace Bug	2
	Azalea Lace bug on Rhododendron	3
	Azalea Lace Bugs (rhodies/azaleas, demonstration gardens, residential)	3
	Azalea/Rhody Lacebug	3
	Lace Bug, both Rhododendron & Azalea	3
Leaf Hoppers	Leafhoppers	6
Leafminers	Boxwood leafminer	8
	Leaf Miners on citrus	2
	Leafminer	3
	Leafminer on rhododendron	3
Lepidopterans	Coddling moth	2
	Cut worm on cabbage	3
	Noctua pronuba catapilars	1
	Opogona in Dra massangeana and Yucca Canes	3
Lygus	Lygus	6
	Lygus bug control on seedlings with longer residual vs. spraying every 10-14 days	3
	Lygus bugs on dahlias and zinnias	3
	Lygus bugs on doug fir seedlings	3
	Lygus control on red maples	2
	Lygus on Douglas Fir container trays	3
	Tarnished plant bugs and related species on pine seedlings	2
Midges	Midge on Douglas Fir	3
	Tip midge on junipers	3
Mites & Spider Mites	Broad mite	7
	Broad Mite/Maranta Mite	2
	Broad mites on New Guinea Impatiens	3
	Broad Mites;(Didn't have the correct miticide on hand when b. mites first showed up.	2
	Broadmite/cyclamen mite	2
	Bulb Mite on Tulip Bulbs	3
	Cyclamen Mites	2
	Eriophyid mite	5
	Maple mite	2
	Mites	6
	Mites - rose rosette disease	3
	Mites in general a larger threat than in past	2
	Mites on palms and roses	1
	Mites on spruce	3
	Mites on verbena	2
	Pear blister mite	1
	Red Spider mites	3
	Spider Mites	6
	Spider mites on buddleia	1
	Spider Mites On Dianthus	1
Spider mites on hydrangea	2	



Pest Group	Pest	Weighted Ranking
	Spider mites on Italian Cypress	3
	Spider Mites on Noble Fir	2
	Spider mites on roses	2
	Two Spotted Mites	2
	Two spotted mites in Croton, Palms, Hibiscus, etc	1
	Two spotted spider mites on english ivy	1
	Two Spotted Spider mites on hydrangea	1
Nematodes	Foliar nematodes	3
	Pine Shoot Nematodes	2
Other	Grasshoppers	3
Psyllids	Psyllids (any and all)	3
Scale & Mealybugs	Armored scales on many hosts (euonymus scale, white prunicola scale, etc.)	3
	Citrus mealy bug.	1
	Crapemyrtle bark scale (Eriococcus lagerstroemia)	3
	Euonymus Scale	2
	Florida scale	3
	Japanese maple scale	3
	Magnolia Scale	2
	Mealybugs	8
	Mealybugs in public conservatory	3
	Scale	7
	Scale in cymbidium plant material difficult to control	3
	Scale on holly, bay laurel	1
	Scales in public conservatory	2
	Scales on holly, camellia, and maple	3
	Tea scale	4
	Tulip Tree scale	2
Snails & Slugs	Slugs / amber snails	3
	Snails	3
	Snails & Slugs	2
Stinkbugs	Brown marmorated stinkbug	3
	Marmorated Stink bugs	2
Thrips	Chili Thrips	6
	Chili thrips (control limited to neonics)	3
	<i>Echinothrips americanus</i>	2
	Greenhouse thrips - <i>Heliothrips haemorrhoidalis</i>	3
	Resistant Western Flower Thrips	3
	Thrips	54
	Thrips (especially with Tospoviruses)	3
	Thrips and fungus gnats on gerberas	2
	Thrips in Gerbera	3
	Thrips in Greenhouse	3
	Thrips on cut flowers	3
	Thrips on dahlias	2
	Thrips on mums, melapodium	3
	Thrips on mums, verbena, Callie's	3
	Thrips on petunia, verbena and tomato	3
	<i>Thrips palmi</i>	2
	Thrips problem on asstd plants	3
	Western Flower Thrips	9
	Western Flower thrips outdoor flowering crops	2

Pest Group	Pest	Weighted Ranking
True Bugs	Bragada Bug on Brassicas	1
Turf Pests	Billbug	3
	Pearl scale in turf	3
Vegetable Pests	Aphids on tomatoes	1
	Aphids on vegetables	2
	Root aphids on lettuce	1
	Thrips on edible plants - peppers highest populations	2
White Grubs & Root Weevils	Agave weevil	2
	Black vine weevil grubs in container plants	3
	Black vine weevil	7
	Diaprepes in ground tree production	3
	Grubs	4
	Japanese beetle	9
	Root Weevil	6
	Scarab grubs	2
	Sri Lanka weevil	2
	White grubs (any and all)	2
	White grubs on pine seedling roots	3
Whiteflies	Q biotype whiteflies poinsettias	3
	Q Type White Fly in Hibiscus	2
	Q whitefly	2
	Whiteflies on poinsettias, others	3
	Whitefly	9
	Whitefly on Chrysanthemum	3

**Table 17. Specific issues for each disease group**

Disease Group	Disease/Pathogen *	Weighted Ranking
Abiotic	Drought induced disease	3
	Sunscald, fir	2
Bacterial Diseases	Bacteria	13
	Bacterial leaf spot	4
	Crown gall	6
	Erwinia	8
	Erwinia, aquilegia, bedding plants	2
	Erwinia, poinsettia, philodendron	3
	Fire blight	18
	Pseudomonas	10
	Pseudomonas, english laurel	3
	Pseudomonas, lilac	6
	Ralstonia	3
	Xanthomonas	11
Xanthomonas, begonia	3	
Bacterial Diseases	Xanthomonas, hibiscus	2
Botrytis	Botrytis	25
Canker	Canker	4
	Canker ( <i>Grovesiella sp</i> )	3
	Canker fungi	2
	Canker, holly	3
	Dieback	3
	Phoma, douglas fir	3
Crown & Root Rot	Cotton root rot ( <i>Phymatotrichum omnivorum</i> )	3
	Crown rot, sedum	3

Disease Group	Disease/Pathogen *	Weighted Ranking
	Damping off	3
	Fusarium	5
	Fusarium, bulb	3
	Fusarium, daffodil	3
	Fusarium, douglas fir	4
	Fusarium, Gleditsia	2
	Fusarium, palm	2
	Fusarium, tulip	2
	Phoma/Phomopsis, vinca	3
	Rhizoctonia	10
	Rhizoctonia, boston fern	1
	Rhizoctonia, New Guinea impatiens	3
	Rhizoctonia, vinca	3
	Root rot	3
	Root rot, dahlia	2
	Thielaviopsis, calibrachoa	3
	Thielaviopsis, calibrachoa, vina	3
	Thielaviopsis, phlox, vinca	3
	Thielaviopsis, prunus	3
	Wilt, fir seedlings	3
Downy Mildew	Downy mildew	23
	Downy mildew, basil	11
	Downy mildew, impatiens	14
	Downy mildew, rose	3
	Downy mildew, viburnum	1
Foliar Blights	Boxwood blight	7
	Diplodia	3
	Interior Needle Blight	4
	Needle necrosis	2
	Southern blight ( <i>Sclerorium rolfsii</i> )	4
	Tip Blight	3
	Tip Blight ( <i>Delphinella balsameae</i> )	2
Fruit & Nut Diseases	Canker ( <i>Cytospora sp</i> )	1
	Rust, blueberry	2
Leaf Spots & Anthracnose	Alternaria	3
	Anthracnose	2
	Anthracnose ( <i>Phormium</i> )	2
	Anthracnose, dogwood	3
	Apple scab	5
	Black spot	5
	Brown spot	2
	Colletotrichum	1
	Cylindrocarpon	3
	Cylindrocladium	3
	Leaf blister, maple ( <i>Taphrina carveri</i> )	3
	Leaf Spot	1
	Leaf spot, aspen	3
	Leaf Spot, peony	1
	Needle cast	3
	Needle cast, douglas fir	3
	Needle cast, swiss	1
Needle cast, swiss, douglas fir	3	

Disease Group	Disease/Pathogen *	Weighted Ranking
	Septoria, rudbeckia	2
	Shot hole (bacterial, fungal, abiotic), prunus	2
	Tar spot	1
Nematodes	Foliar nematode	6
	Foliar nematode, ginger	2
	Nematode	9
Other	Algae	1
	Disease	4
	Fungal disease	3
	Needle shedding	2
	Seed pathogens	3
	Unknown disease	3
	Unknown disease in buds	2
Phytophthora & Pythium	Phytophthora	18
	Phytophthora cinnamomi	3
	Phytophthora foliar blight	2
	Phytophthora ramorum	3
	Phytophthora, maple	2
	Phytophthora, petunia	3
	Phytophthora, rhododendron	3
	Phytophthora, rosemary	3
	Pythium	8
	Pythium, poinsettia	1
Powdery Mildew	Powdery Mildew	13
	Powdery Mildew, hydrangea	3
	Powdery Mildew, physocarpus	2
	Powdery Mildew, rose	3
	Powdery Mildew, salvia	2
	Powdery Mildew, zinnia	3
Rusts	Rust	6
	Rust, cedar-apple ( <i>Gymnosporangium juniperivirginianae</i> )	4
	Rust, cedar-hawthorne ( <i>Gymnosporangium globosum</i> )	2
	Rust, ornamental grass	3
	Rust, snapdragon	1
Turf Diseases	Brown patch	6
	Snow mold	3
	Yellow tuft	3
Vascular Wilts	Verticillium	3
Vegetable Diseases	Powdery Mildew, basil	2
	Powdery Mildew, herbs	3
	Powdery Mildew, lettuce	4
	Powdery Mildew, squash	3
Virus	Rose Rosette Virus	15

\*The authors standardized the format for presenting diseases and pathogens. In parentheses are Latin names, where either mentioned by survey participants or when specific diseases were mentioned to foster clarity (ie rusts). Where crops were mentioned, the disease or pathogen is listed first followed by a comma and one or more crops.

**Table 18. Specific issues for each weed group.**

Weed Group	Weed	Weighted Ranking
Aquatic Weed	Hydrilla	3
Broadleaf	Bindweed	2
Broadleaf - Annual	Parthenium	4
	Beggarticks	3
	Buttonweed	3
	Palmer Amaranth	3
	Phyllanthus, longstalked	2
Broadleaf - Annual/Perennial	Oxalis	8
	Fumaria	3
	Malva	3
	Artillary Fern	3
	Milkthistle	3
Broadleaf - Perennial	Mugwort	6
	Canada Thistle	6
	Northern Willowherb	3
	White clover	3
	Rorippa sylvestris	3
	Perennials	3
	British Yellowhead	3
	Dandelion	3
	Clover	3
	Geum urbanum	3
	Thistle	2
	Virginia Buttonweed	2
	Oriental Bittersweet	2
	Bur clover	1
	Willow	1
Broadleaf - Summer Annual	Spurge	13
	Eclipta	5
	Purslane	3
	Prostrate Spotted Spurge	3
	<i>Polygonum pensylvanicum</i>	3
	Mile-a-minute	3
	Portulaca	2
	Prostrate Knotweed	2
	Bed Straw	2
	Prostrate Spurge	1
	Carpetweed	1
	Broadleaf - Winter Annual	Conyza
Groundsel		5
Cudweed		1
Broadleaf - Winter Annual/Biennial	Bittercress	18
	Northern Marsh Yellowcress	2
Comment	Preemergence weeds in perennials and potted plants	5
	Weeds within forest regeneration seedling trays	3
	Glyphosate resistant weeds	2
	Weeds in Frasier fir when cannot use Oxyfluorfen	2
Grass	Quackgrass	9
	Dallisgrass	6
	Annual Bluegrass	4

Weed Group	Weed	Weighted Ranking
Grass <i>continued</i>	Torpedograss	3
	Japanese Stiltgrass	3
	Witch grass ( <i>Panicum capillare</i> )	2
	Medusahead	2
	Johnsongrass	2
	Field Paspalum	2
	Bentgrass	2
	Grass	2
	Poa annua	1
	Crabgrass	1
	Rough Bluegrass	1
	Bermudagrass	1
	Horsetail & Similar Weeds	Equisetum
Horsetail		3
Liverworts & Moss & Algae	Liverwort	10
	Nostoc Algae	3
	Swallowwort	2
Other	Annual weeds (all species)	4
	Under greenhouse benches	3
	All	3
	Biennial Weeds	2
Sedge & Nutsedge	Nutsedge	14
	Yellow Nutsedge	9
	Sedge	3
	Broom sedge	3
	Nutgrass	2
	Sedge & Nutsedge	2
Turf weeds	Crabgrass	3
	Oxalis	3
	Weed control on St Augustine	3
Vine - Perennial	Wild grape vine	3
	Cats claw	3

**Additional Comments embedded into some of the weed issues:**

Hydrilla in water pools with lilies and fish

Post emergence oxalis

Bittercress in cymbidium orchid plants difficult to control. Material we can use was not affordable

Parthenium in property maintenance applications

Annual bluegrass on sports fields\*\*\* TURF priorities should be separated from ornamentals

Oxalis in Zoysia, st. augustine in transitional period