Chase News

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SAF PEST MANAGEMENT CONFERENCE ENTOMOLOGY HIGHLIGHTS

The 26th Annual Society of American Florists Pest Management Conference was held in late February in Orlando, FL. Last month I summarized some of the highlights of the program for plant pathology and this month I will highlight entomology talks.

One of the first talks on insects and mites was given by Dr. Ray Cloyd (Associate Professor and Extension Specialist at Kansas State University.) Ray has been working quite a bit in the past few years on alternative products for insect and mite control including plant derived essential oils.

These oils have been derived from such diverse plants as rosemary, clove, basil, mint, lavender, neem tree, cinnamon, canola, lemon grass, almond and soybean to name but a few. They are deemed safer due to relatively short REI (usually less than 12 hr) since they degrade with temperature and exposure to ultraviolet. This also means they do not have a long residual on the crop.

He mentioned concerns with safety to crops and a literature search showed that they have caused damage to vegetables, herbaceous and foliage ornamentals. The concentration of the product, type of plant and environment all affect safety of these and other products applied to plants.

Ray presented data from a series of trials he performed with more than nine essential oil products. I have tried to summarize some of his results for three pests—two-spotted spider mite, sweet potato white fly and green peach aphid-in the table to the right. You can see that many of the products provided pretty good control of two-spotted spider mites. In contrast, percent kill on sweet potato white fly was poor and did not compare to efficacy achieved with standard insecticides for this pest. Similarly, green peach aphid was not affected much by these essential oils either.

Percent mortality at 21 days after treatment

Product tested	Two-spotted spider mite	Sweet potato white fly	Green peach aphid
Bug Assassin	80	20	8
Bugzyme	95	10	<5
Concern	65	12	<5
GC-Mite	100	38	<5
Neem Oil	85	8	5
Organocide	65	8	7
Pyola	70	25	20
Sharpshooter	70	5	20
SMC	85	10	12
Water	2	10	<5

Dr. Scott Ludwig (Extension Specialist– Texas A & M University) and Dr. Lance Osborne (Professor of Entomology at the University of Florida) presented an update on thrips management. They started with Chilli thrips, *Scirothrips dorsalis*, which was first found on landscape plants in Florida in 2005. They have since been found in production nurseries and greenhouses in Alabama, Florida, Georgia, New York and Texas.

Adults chilli thrips are very small and pale with dark wings. Feeding causes bronzing on leaves, buds and fruit. Severely damaged tissues become brittle and drop. This thrips has a very broad host range and the authors say that all broad-leaved plants should be considered potential hosts.

Lance and Scott suggest the following insecticides for control of chilli thrips in the greenhouse and nursery: Orthene (IRAC MOA class 1B), Tristar (4A), Safari (4A), Marathon (4A), Flagship (4A), Conserve (5), Avid (6), Aria (9c), Pylon (13) and Overture (unknown IRAC MOA). Since Chilli thrips attack developing terminals and buds they recommend treating plants when they are actively growing. They also stress rotating between different IRAC MOA groups to help prevent development of insecticide resistance. Follow the label carefully before using any pesticide. You can contact Dr. Ludwig at:swludwig@tamu.edu (continued on

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WOODY ORNAMENTAL FOCUS—VERTICILLIUM

Verticillium wilt is know to occur on a wide number of woody ornamentals across the US. Both *Verticillium dahlia* and *V. albo-atrum* are soil-borne diseases responsible for yellowing, dieback, scorch and decline. Symptoms can appear severe one year and be mild the next or not even present. Examining infected sap wood can reveal streaking of black or dark brown but it may be absent if the infection is new. Verticillium is a soil-borne fungus that makes resting structures called microsclerotia. Solarization can suppress Verticillium in the soil but is usually insufficient to control subsequent infections in many locations. In some locations where summers are very hot and dry, the infection of above ground twigs and stems can be eliminated due to heat alone but this is something that cannot be relied on for control. The same conditions can actually exacerbate symptoms as the damaged woody fails to translocate enough water to keep leaves and twigs hydrated. Fumigation is not routinely practiced since it requires removal of all living plants from the treated area. It is also important to remember that drenching with fungicides (even systemic products) will not cure plants infected with this pathogen. Management through choice of resistant plants is recommended. There have been many lists prepared for plants susceptible or resistant to Verticillium and indeed some genera have both susceptible and resistant species or cultivars. I have included an abbreviated listing in the tables on this page.

Resistant Plants

Species	Common Name
Gymnospermae	Gymnosperms- cypress
Gymnospermae	fir, gingko, larch, juniper
Gymnospermae	pine, sequoia, spruce etc.
Monocotyledoneae	Palms, bamboo, banana
Arctostaphylos species	Manzanita
Buxus species	Boxwood
Ceanothus species	Ceanothus
Cistus species	Rockrose
Citrus species	Orange, lemon, grapefruit etc
Eucalyptus species	Eucalyptus
Ficus carica	Fig
Juglans species	Walnut
Liquidamber styraciflua	Liquidamber, sweet gum
Malus sylvestris	Apple
Morus species	Mulberry
Nerium oleander	Oleander
Platanus species	Plane tree
Pyracantha species	Pyracantha, firethorn
Pyrus species	Pear
Quercus species	Oak
Salix species	Willow
Umbellularia californica	California laurel

Susceptible Plants

Species	Common Name
Abutilon species	Abutilon
Acer negundo	Box Elder
Acer Species	Maple
Ailanthus altissima	Tree of heaven
Berberis (Mahonia) species	Barberry
Campsis radicans	Trumpet vine
Carya illinoensis	Pecan
Catalpa species	Catalpa
Ceratonia siliqua	Carob
Cercis canadensis	Redbud
Cinnamomum camphora	Camphor tree
Cistus ladaniferus	Rockrose
Cistus palhinhai	Rockrose
Cistus purpureus	Rockrose
Cladrastis lutea	Yellow wood
Cotinus coggygria	Smoke tree
Cupaniopsis anacardioides	Carrotwood
Diospyros species	Persimmon
Dodonaea viscosa	Hop seed bush
Elaeagnus angustifolia	Oleaster, Russian Olive
Erica species	Heather
Fraxinus species	Ash
Fremontodendron species	Flannel bush
Fuchsia species	Fuchsia
Hebe species	Hebe
Jasminum magnificum	Angel wing jasmine
Jasminum mesnyi	Primrose jasmine
Koelreuteria paniculata	Goldenrain tree
Ligustrum species	Privet
Liriodendron tulipifera	Tulip tree
Magnolia grandiflora	Southern magnolia
Nandina domestica	Sacred bamboo
Olea europaea	Olive
Paeonia species	Peony
Parthenium argentatus	Guayule
Persea americana	Avocado
Pistacia chinensis	Chinese pistache
Pistacia vera	Pistache
Platanus species	Sycamore, plane tree
Prunus species	Almond, apricot, cherry
Prunus species	peach, plum, prune
Raphiolepis species	India hawthorn and others
Rhus integrifolia	Lemonade berry
Rhus species	Sumac
Ribes species	Currant, gooseberry
Robinia pseudoacacia	Black locust
Rosa species	Rose
Rubus species	Blackberry, raspberry
Sambucus species	Elderberry
Schinus terebinthifolius	Brazilian pepper tree
Syringa vulgaris	Lilac
Tilia species	Linden
Ulmus species	Elm
Viburnum species	Viburnum, wayfaring tree

DIAGNOSTICS REPORT

Bacterial leaf spots are on the rise in our diagnostic lab. One example was Pseudomonas leaf spot on Penstemon. Others we have seen are bacterial speck on tomato caused by *Pseudomonas syringae* pv. *tomato* and Pseudomonas blight on Kangaroo Paw fern. We are currently

involved in a Pseudomonas leaf spot trial on Mandevilla for IR-4. Many experimental bactericides are included and results will be interesting. I have reported on the same products in previous trials on Erwinia on orchid and Xanthomonas on geranium. At present, the best products for Pseudomonas and Xanthomonas leaf spots are generally those with copper and the biocontrol agent in Cease, with streptomycin sulfate somewhat more effective on Erwinia diseases.

We saw rust diseases and downy mildews really crop up in the past month. Rust on Silene was a first for me.

Downy mildew on rose has been a big problem during April all over the country. It is attacking many types of roses including Knock Out and Flower Carpet and OSO Easy types sometimes affecting only a few colors. Leaves and stems have both been damaged.

Downy mildew on Buddleia cuttings in propagation was also a problem but it disappeared with treatment and as the cuttings rooted out and were removed from misting. By the way, these cuttings showed absolutely no signs of infection when originally received.

We have also seen quite a few leaf spots including Colletotrichum and Heterosporium leaf spots on Dianthus, Alternaria leaf spot on columbine and Colletotrichum on Cordyline/Dracaena. It is

critical that you do not jump to conclusions on diagnosing leaf spots. The spots on the Dianthus were both thought to be *Heterosporium* which is indeed very common. However, the first sample was anthracnose caused by Colletotrichum and ideal fungicides for one are not the same as ideal fungicides for the other.

Don't forget viruses. We did see INSV on Penstemon and TMV on Echinacea. We test plants for INSV, TSWV, TMV and CMV using Agdia test strips. For other viruses contact Agdia directly.

RESEARCH REVIEW-PYTHIUM AND PHYTOPHTHORA

USING PLANTS AS PHYSICAL BARRIERS AGAINST SPREAD OF RAMORUM BLIGHT —Shishkoff tested ten ornamentals for possible use as physical barriers in camellia production. A summary is shown in the table to the right. Only one of the plants tested was immune to *Phytophthora ramorum* in this trial (*Buxus*). This plant developed no symptoms and was not infected. Other plants had few symptomatic leaves but were heavily infected including *Berberis*, *Ilex verticillata*, *Nandina* and even *Rhododendron* which is a known host of this disease. Using plants as barriers for this Phytophthora disease may not be practical in most cases due to its very wide host range. For a complete report see: Plant Dis. Management Rept. 3:OT029.

Plant Response to Ramorum Blight

Plant	Percent infected with Ramorum blight	Percent symptomatic leaves
Aronia	92	30
Berberis	100	21
Buxus	0	0
Clethra	55	7
Diervilla	100	81
Ilex x meserveae	100	41
Ilex verticillata	63	7
Ilex irginica	17	1
Mahonia	100	43
Nandina	100	13
Rhododendron	100	15

PHYTOPHTHORA BLIGHT ON VINCA—Steddom and Kimberley (Texas AgriLife Extension Service) reported on a 2009 trial with a new formulation of Stature. Three rates each of Stature DM (3.2, 6.4 and 12.8 oz/100 gal) and Stature SC (3.1, 6.2 and 12.3 fl oz/100 gal) were applied three times on a 14 day interval. Results showed that all rates provided a very high level of control with the exception of the 3.1 oz rate of Stature SC. The trial also showed very effective control with Fenstop (14 oz/100 gal) and Subdue MAXX (1 oz/100 gal). For a complete report see: Plant Dis. Management Rept. 3:OT030.

PYTHIUM AND PHYTOPHTHORA SPECIES REPORT—Margery Daughtrey is Senior Extension Specialist at the Long Island Horticultural Research & Education Center for Cornell University. The center publishes and annual report and the table below summarizes results from Marge's diagnostic lab on *Pythium* and *Phytophthora* for Long Island greenhouses in 2009. The isolates were identified using both morphology and DNA analysis in some cases. *Pythium* was far more common than *Phytophthora* and *Pythium irregulare* was most common with a huge host range.

Much of the basis for making fungicide recommendations is dependent on the belief that all species of a pathogen will respond to a fungicide similarly. IR-4 testing on *Phytophthora* species has shown that sometimes different species did not react to the fungicides the same way. We have started some of this type of work—see next page–and will continue.

Pythium and Phytophthora species from Long Island greenhouses

Species	Hosts
Pythium irregulare	Agastache, blueberry, calibrachoa, chrysanthemum, coleus, Cuban oregano, dahlia, geranium, lantana, lobelia, marigold, mountain laurel, New Guinea impatiens, Osteospermum, poinsettia, primrose, rubeckia, sedum and snapdragon
Pythium cryptoirregulare	Coreopsis, fuchsia, geranium, New Guinea impatiens and oyster plant
Pythium aphanidermatum	Chrysanthemum
Pythium graminicola	Hackonechloa
Pythium splendens	Lantana
Pythium intermedium	Lily
Phytophthora nicotianae	Gardenia, Perovskia, pieris and poinsettia
Phytophthora cactorum	Hellebore and peony
Phytophthora citricola	Boxwood and rhododendron
Phytophthora palmivora	ivy
Phytophthora cryptogea	begonia
Phytophthora drechsleri	Poinsettia

RESEARCH REVIEW—PYTHIUM

There have been a number of new fungicides for downy mildew, Phytophthora and Pythium. They have each been very good to excellent for both downy mildew and Phytophthora diseases in our trials and those reported by other researchers. In contrast, we have had mixed results in our trials with many of these products when evaluating them for control of Pythium root rot. We decided to evaluate some of these products in a trial on Pythium damping-off on Celosia.

The products tested were Subdue MAXX (0.5 oz/100 gal from Syngenta Professional products), FenStop (7 oz/100 gal from OHP), Adorn (1 oz/100 gal from Valent USA.) and Segway (1 oz/100 gal from FMC Corporation). Plants were drenched at the rate of about 1 oz/3.5 inch pot. Table 1 (below) shows some of the characteristics of the newer fungicides. One further note is that Adorn MUST be tank-mixed with another product for Pythium and cannot be used more than twice per crop.

Seeds were planted in Fafard Mix 2B in 3.5 inch pots and top-dressed with Osmocote Plus 15-9-12 on 30 March. They were treated right after emergence started on 6 April. Then the next day they were inoculated with either *Pythium ultimum* (blue/purple bar graph) or an unidentified isolate of Pythium (green bar graph) we recently collected from *Hypoestes* (pink polka dot plant) with damping-off. The number of healthy seedlings per pot was counted after 1 and 2 weeks.

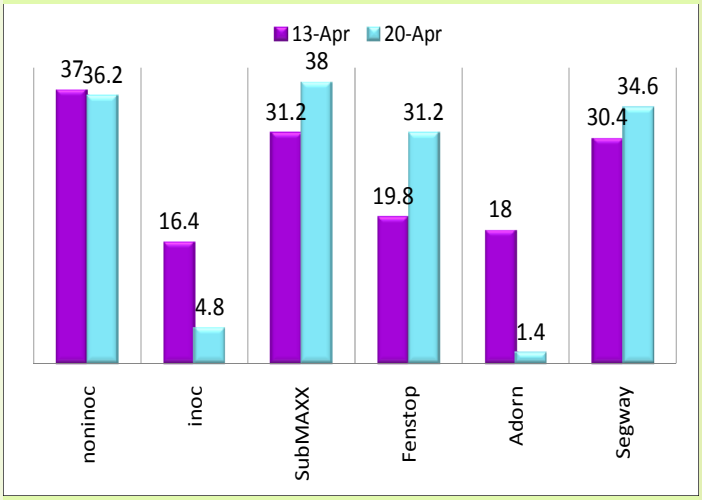
Using New Pythium fungicides

Fungicide	Mode of action group	REI	Rate per 100 gal	Treatment interval
Adorn	43	12 hr	1-4 oz	14-28 days
Fenstop	11	12 hr	7-14 oz	28 days
Segway	21	12 hr	1.5-3 oz	14-28 days

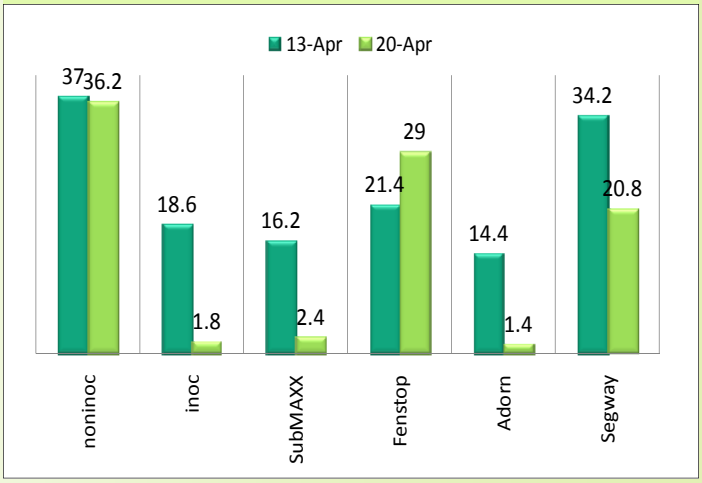
The results of this trial were consistent with our results for the past 10 years or so with the same products for Pythium on larger plants. We did not see any control with Adorn on plants infected with either Pythium isolate. In contrast, we saw pretty good results with FenStop and very good results with Segway. The rate of Segway chosen was too low (below the label) and started to fail at the end of the trial on the *Pythium* sp. but held up well on *P. ultimum*. I was interested to see very good results with Subdue MAXX on *Pythium ultimum* but no control on the new *Pythium* sp. As a result of this test, we checked this isolate for Subdue MAXX resistance and found it was clearly resistant.

We will be doing another trial with these fungicides as well as one with strobilurins for Pythium damping-off on Celosia. Look for an update in ***Chase News*** May issue.

Control of Pythium damping-off on Celosia caused by *Pythium ultimum* (number seedlings/pot).



Control of Pythium damping-off on Celosia caused by *Pythium* sp. (number seedlings/pot)



The picture below shows the response for Celosia seedlings starting at bottom left—Noninoculated control (A), Inoculated with *P. ultimum* (B), Subdue MAXX (E), FenStop (H), Adorn (K) and Segway (N).

SAF PEST MANAGEMENT CONFERENCE NON-PATHOGENIC PLANT DISORDERS

Dr. Kimberly Williams (Professor of Floriculture at Kansas State University) presented a talk on the causes and cures of non-pathogenic disorders. These problems are sometimes called abiotic (not caused by something biological like an insect or fungus). She presented a list of the types of symptoms that can develop including chlorosis (yellowing), distortion, necrosis (browning) and bud abortion. These symptoms can be the result of diseases, insect or mites pests and physiological disorders.

Edema on zonal geranium

EDEMA—One of the most common physiological disorders is edema (photo above). While is has been believed that this occurs when roots absorb more water than the plant can use research on ivy geranium, which is especially susceptible to edema, does not support the theory. The edema forms when epidermal cells are stretched over areas where solutes have built up (like a blister). These cells actually collapse. Allowing severe dry down between irrigations appears to make this condition worse as opposed to over-watering. Ivy geraniums are more likely to develop edema than zonal geraniums with some cultivars more sensitive than others.

HEAT DISTORTION can occur on some plants when high daytime and/or nighttime temperatures occur. On hydrangea leaves may become thickened, puckered and leathery. These symptoms are sometimes confused with viral infections.

PHYSIOLOGICAL WILT—The temperature of the potting medium is more important in affecting the ability of the plant to absorb water than air temperature. Wilting in the presence of abundant water can occur when the potting medium is cool (such as 50F) and the air temperature is warmer (such as 70F) and the light level is high. In this case, the leaves lose more water than the roots can absorb and they wilt. This condition is often interpreted as Pythium root rot and results in unwarranted fungicide applications. The plants usually recover as the potting medium warms up later in the day.

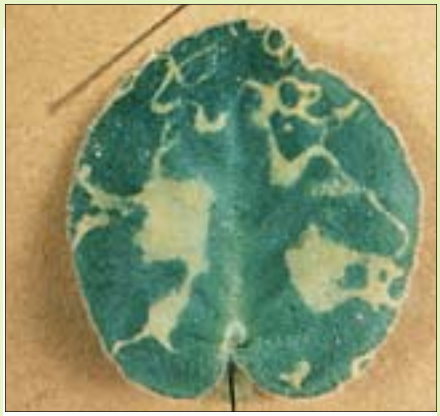
BLEACHING can occur when some plants like ivy geranium experience chlorophyll breakdown due to high temperatures. Research has shown that applications of micronutrients do not affect this disorder and only choosing resistant cultivars or managing temperatures can alleviate the problem.

INTUMESCENCES are the result of a small group of cells swelling and bursting (photo below). They are mainly found on solanaceous crops but have been found on *Cuphea, Eucalyptus, Hibiscus* and *Ipomoea*. Over the years, I have seen this on both *Cuphea* and sweet potato vine. This problem is often confused with phytotoxicity and does occur more on some cultivars than others.

Intumescences on cuphea

Contact Us:
www.chasehorticulturalresearch.com or archase@chaseresearch.net.

OTHER PHYSIOLOGICAL DISORDERS



COLD WATER DAMAGE—The white spotting on the African violet above is caused when warm leaves are watered with cold water. The actual temperature of the irrigation water is not as critical as the difference between the leaf temperature and water temperature. We saw a similar reaction in holiday cactus (image below).

Cold damage during shipping has been common in the past month (photo below is basil).