THE Q BIOTYPE OF *BEMISIA TABACI* IN THE U.S. AND MANAGEMENT SUGGESTIONS

John Sanderson, Dept. of Entomology, Cornell University, Ithaca, NY
Daniel Gilrein, Cornell Cooperative Extension of Suffolk County, LIHREC, Riverhead, NY
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A new whitefly pest has recently become a potential threat to floral and other crops in the U.S. Actually, this isn't a new species but rather a new strain of the familiar silverleaf whitefly. It has been confirmed in poinsettia, gerbera and veronica in at least six states to date (10/05). The following explains the situation and its implications.

First, a bit of whitefly history: the familiar and native greenhouse whitefly, *Trialeurodes vaporariorum*, has been a pest since the early days of U.S. greenhouse production. Around 1987, the sweetpotato whitefly, *Bemisia tabaci*, was found on poinsettias and outdoor crops. Although it has been known in the US for around 100 years, these outbreaks were determined to be from a new biotype (B-biotype) which in 1994 was renamed the "silverleaf whitefly," *B. argentifolii*. In 1995, the registration of imidacloprid insecticides (Marathon, Admire, etc.) enabled growers to control this new strain more easily. Since then several more very effective insecticides have been registered that also control this insect.

At the end of 2004, a strain of the sweetpotato whitefly, called the Q biotype, was found in Arizona on poinsettias purchased at a retail store. Samples of this strain were identified by 3 different labs as the Q biotype, distinct from the common B biotype and thought to originate from a wholesale nursery in California. Fortunately, the Q biotype has not yet been found on outdoor crops in the U.S. It is believed that the Q biotype probably developed in the Mediterranean Basin, where it has become a serious pest.

What is a 'biotype?' In a general sense, biotypes are to insects what varieties and cultivars are to plants. The Q- and B-biotypes can be thought of as genetically distinct strains of *Bemisia tabaci*. Some scientists think the distinctions are sufficient to separate them into unique species (hence B biotype became *B. argentifolii*), but taxonomists do not completely agree on this point. However, there are many similarities between the two strains. Insects of both are visually identical; they can only be distinguished using genetic tests in the lab. They apparently attack the same or similar range of crop plants and can transmit some serious viruses in vegetables. A critical difference is that many Q-biotype populations are generally less susceptible to many insecticides currently used in this country, including pyriproxifen (Distance), buprofezin (Talus, Applaud), imidacloprid (Marathon), thiamethoxam (Flagship), and acetamiprid (Tristar), that have normally performed quite well against B-biotype populations. Different Q-biotype populations seem to vary in susceptibility, so these materials may still provide at least partial control in some cases.

There are no federal or state quarantines currently planned for this insect. Since there is no easy way to distinguish the two biotypes in the field, it would be impractical or impossible to sample every whitefly then await results of lab tests for each shipment of plants in which whiteflies are detected. Growers may suspect the Q biotype is present if the insect appears to be a silverleaf whitefly and certain products are not proving effective. Sometimes poor efficacy results from inadequate coverage, leaching, improper timing or other application issues. Suspect whiteflies (freshly killed, no live material) can be sent to certain labs for testing; contact a regional Extension Specialist for more information.

A "Q-biotypeWhitefly Task Force" of Land-Grant and USDA scientists has been established to work on this new threat. Since European research on their Q biotype may not be directly applicable to our insects, it is important to conduct studies in this country on locally collected whiteflies. U.S. researchers are now screening various insecticides and mixtures against the Q biotype. There are additional plans for research to manage these whiteflies including both short- and long-term projects.

Following are some suggestions to growers on managing whiteflies, particularly the Q-biotype whitefly:

- Carefully check plant shipments for even low levels of whiteflies. Inform propagators of any findings and initiate controls as soon as possible if any are detected.
- Use good non-chemical controls: remove older leaves, keep areas free from weeds, segregate infested from non-infested plants, discard heavily infested material.
- Consider using biological control right from the start. *Eretmocerus eremicus*, a tiny parasitic wasp, has performed well in Massachusetts greenhouses but must be released at the start of the crop for good results. Banker plants may also be useful in some cases. See links below.
- Monitor whitefly population levels as the crop is growing, taking care especially if depending on neonicotinoids (Marathon, Tristar, etc.) or Distance. Scouting weekly is essential to tracking whitefly species, population levels, distribution in the crop and efficacy of controls. Include but don't depend exclusively on yellow sticky cards for detecting whitefly activity. Turn over leaves and look carefully for whitefly nymphs.
- Correctly identify the whitefly species present! It is relatively easy to distinguish silverleaf from greenhouse whitefly; check http://www.greenhouse.cornell.edu/pestsdis/index.html for a fact sheet on whitefly identification and a sampling plan. There have been control problems with the B-biotype (silverleaf) whitefly and with greenhouse whitefly in the past.
- For unusual silverleaf whitefly control problems, submit samples to determine which biotype is present. (*Don't* send samples of greenhouse whitefly!!) Contact a regional Extension specialist for more information on preparing and shipping samples.
- If the usual insecticides are not working, rotate to other products and check carefully for efficacy. Use sentinel plants (not sticky cards) to check for performance: tag infested leaves and/or circle nymphs with a marker, then inspect several days after treatment to see if nymphs have been killed. A hand lens may be needed or leaves can be sent to a diagnostic lab. Insecticides for rotation include Azatin/Ornazin, insecticidal soap, horticultural oil, Sanmite, BotaniGard, Endeavor and tank mixes of Avid + a pyrethroid (Decathlon, Talstar, Tame, Scimitar GC, Mavrik). There have also been good results with applications of Orthene (use low labeled whitefly rate) followed several days later by a pyrethroid. Other options include DuraGuard, Enstar, Pedestal (not for poinsettia), aerosols and smokes, Talus (not on Long Island), Thionex and Aria (for suppression). Efficacy trials now underway should help pinpoint products most effective against Q-biotype whiteflies. Since susceptibility to insecticides may vary, some of them may still provide control or suppresssion. Good coverage of lower leaf surfaces is essential with all of these materials. Judo and Safari are not yet registered in NY but would be good options to try if and when registrations are approved in the state. If there is an ongoing biological control program contact an Extension Specialist for compatible suggestions.

Information, management suggestions and diagnostic laboratories for the Q-biotype whitefly:
http://www.mrec.ifas.ufl.edu/LSO/bemisia/bemisia.htm
http://www.ecke.com/pdf/SilverleafWhitefly.pdf
http://www.anla.org/applications/Documents/Docs/SAF-ANLA_WHITEFLY_FINAL_8_05.pdf
http://ghex.colostate.edu/com_gh/publications/Bemisia_tabaci_Biotype_Q_Pest_Alert.pdf

Using *Eretmocerus* for biological control of whiteflies:
http://www.umass.edu/umext/floriculture/fact_sheets/pest_management/slwf.html
http://www.umass.edu/umext/floriculture/fact_sheets/pest_management/wf_cheap_bio.htm
http://www.fcla.edu/FlaEnt/fe82p570.htm

Using banker plants in biological control
http://www.mrec.ifas.ufl.edu/lso/banker/banker.htm

Sources of biological controls
http://www.umass.edu/umext/floriculture/pest_management/biological_control.html