UNIVERSITY OF FLORIDA EXTENSION
Institute of Food and Agricultural Sciences

Berry/Vegetable Times

May 2003

In this issue

Calendar of Events

May 13 and June 10 – Pesticide Testing 7:30 am at Hillsborough Co. Cooperative Extension Office, Seffner. No pre-registration. Call (813) 744-5519 for details.

June 8 through June 10 – Florida State Horticultural Society Annual Meeting. Orlando, Florida. Visit their website at www.fshs.org for details and registration.

Sting Nematode - The Scourge of Florida Strawberry

J. W. Noling, J. L. Nance, and A. J. Whidden
Edited by A. J. Whidden

The Problem

The sting nematode, *Belonolaimus longicaudatus*, is the most economically important nematode pest of strawberry in Florida. In most years it has only caused sporadic problems but this past season in the Plant City area strawberry fields it caused significant problems for many growers. Yields reduced by the cool winter were further reduced by sting nematode damage. Also problems in the rotation crops following the berries are becoming apparent in the double crops of tomato, green beans, bell pepper, onions, cantaloupe and squash. These crops are displaying severe stunting and decline due to sting nematode parasitism.

Nematode damage in a pepper field.

Symptoms

As with strawberries the infested areas consist of various sized spots but the boundary is fairly well defined between damaged and undamaged plants. The degree of damage expressed depends on the soil population levels. Visible plant top damage

Tomatoes damaged by nematodes.

develops as a result of root damage from nematode feeding. In general, the roots of infected plants are unable to penetrate below the upper 3 to 4 inches of soil. Sting nematode feed externally, particularly on root tips which are killed, resulting in little or no new root growth, plants lacking in fine feeder roots, and the development of short stubby branches formed from the development of new lateral roots. This produces a shallow root system of coarse roots with knobby tips.

Why A Problem This Year?

It is likely sting nematode was a greater problem this year because soil and environmental conditions played a very significant role, as did farmer pest management practices. During August and September of 2002, when fields were being fumigated, air temperatures for these months were on average 5°F higher than the 30 year average for the area and rainfall was only 15 to 25% of the 30 year average for this time of year. Hot and dry conditions favor the rapid escape of soil fumigant gases which likely translated to poorer nematode control. Also the atypically cool winter we had favored root and nematode population growth rather than foliage and fruit production.

In many fields there is the presence of a compacted traffic layer that restricts the diffusion of the fumigant into deeper soil and this likely played a significant role in the loss of fumigation efficacy. Sting nematodes are known to be at soil

(Continued on page 2)

depths below 24 inches so it is necessary to be able to get the fumigant gases deep into the ground. Although the impact of the compaction layer on loss of fumigant efficacy has yet to be field evaluated, destruction of the compacted traffic layer via chisel plow prior to fumigation is highly recommended for sting nematode infested fields this coming season.

How to Resolve the Problem

Nematode management should be viewed as a year-round program requiring consideration of all cultural, chemical and agronomic practices within the areas where strawberry plants will be grown. Since there are currently no post plant remediation measures available, growers must insure the best conditions (particularly soil moisture) for soil fumigation in early fall. After final harvest, all crops should be destroyed as soon as possible to remove nematode food sources; a delay leads to greater nematode populations and greater difficulty in achieving control. Injection of water soluble fumigant compounds through the drip tube has been successfully used to get rid of the crop and reduce the sting population.

Sting nematode seem to be very sensitive to sudden changes in soil conditions such as rapid drying so fallowing even for a short time, especially when coupled with early crop destruction, can give significant and immediate reduction in nematode numbers. To extend the fallow period, it may be necessary to frequently cultivate the field to maintain a clean weed-free condition. Many weeds, such as bermuda and crabgrass as well as other native plants, can support a large increase in sting population so weeds must be managed during the summer to control nematode numbers.

An alternative to summer fallowing is cover cropping with a poor or non-host crop. Cover crop rotations with American jointvetch, hairy indigo, or showy crotalaria have all been shown to reduce sting nematode populations. Hairy indigo (*Indigofera hirsuta*) and velvet bean (*Mucuna deeringiana*), two vigorous growing legumes, have been reported to suppress sting and root-knot nematode populations. Sorghum sudangrass is a poor choice for sting infested fields and iron clay pea has been observed to increase sting populations. To be effective, cover crop stands should be established quickly and kept as free as possible of grasses and other undesirable host weeds.

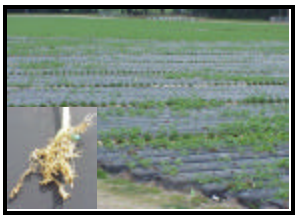
Sting Nematode Management Suggestions

- Avoid methyl bromide formulations with high levels of chloropicrin since the pic has only limited nematicidal activity. Do not compromise maximum application rate per acre in sting infested field areas.
- Implement year-round weed management practices which minimize weed densities.
- Ensure chemical and/or physical destruction of all crop roots as early as possible after final harvest to minimize further increase of nematode population.
- Consider a summer weed free, clean fallow.
- Consider broadcast application of Telone II, C-17, or C-35, using deep injection and effective soil sealing systems (i.e. Yetter, roller, surface water seal). Do not rotovate or disturb soil after fumigation, other than to roll or surface water seal.
- Consider chisel plowing of field to destroy compacted traffic layer prior to soil fumigation.

Green bean damage.

Obvious damage to onions.

Field of squash damage by nematodes.



Cantaloupe field damage.

Spring Blueberry Growing Tips

Alicia Whidden

Blueberries require acid soils (pH 3.5-5.5) to grow well in Florida. They are susceptible to iron deficiency and iron is more available at a lower pH. If iron deficiency symptoms are seen, this could be a sign that the soil pH is too high for blueberries so check the soil pH to see if it is in the proper range for good growth. Foliar applications of iron chelates can be sprayed until the pH problem can be corrected.

Blueberry roots do not have root hairs, therefore, they have a small surface area to absorb nutrients and are not very efficient. The roots are very sensitive to waterlogged or dry conditions. If mycorrhizae, which are naturally occurring specialized fungi associated with roots, are present the nutrient uptake is improved. Roots are sensitive to nitrate fertilizers and chlorides. An ammonium source of fertilizer should be used, such as ammonium sulfate or urea; also do not use muriate of potash (KCl) because of the chloride content.

Blueberry plants have little lateral translocation in the plant of water and nutrients so the entire root zone should be reached by the irrigation system and fertilizer should be evenly distributed over the entire root zone. In Florida it is necessary to fertilize more often than in other states due to our long growing season, heavy summer rains and the low fertilizer-holding capacity of the soils and bark used to grow blueberries. Dr. Paul Lyrene recommends fertilizing lightly 8 times per year- approximately the first of each month from February to September. Use a NPK fertilizer plus magnesium and the total amount of nitrogen applied per acre for the year should not be less than 100lb/acre/year; put out a fairly equal amount of nitrogen in each application.

Southern highbush blueberry plants are pruned to stimulate vegetative growth for the next crop and to adjust fruit load. You can prune to adjust the fruit load in late winter and through petal drop. Pruning done as soon as the fruit harvest is finished is to stimulate a vegetative growth flush. This pruning will produce the new growth that forms flower buds for next year's crop of fruit. It is important to have as many leaves as possible and to keep them on the bush through the fall to produce a large amount of bloom for next year. To retain the leaves on the bush it is necessary to protect them from fungal diseases and this will require several fungicide applications throughout the growing season.

Thanks to Dr. Paul Lyrene for the fertilizer information and reviewing the article.

Cold Wintery Conditions may have Impacted Thrips Abundance in Florida Blueberries during 2003

Dr. Oscar Liburd, Entomology and Nematology, Gainesville, Florida. E. mail oeliburd@mail.ifas.ufl.edu

Little is known about flower thrips management with regards to blueberry production in the southeastern United States. In a recent survey conducted by the University of Florida Fruit and Vegetable IPM Laboratory in Gainesville, in cooperation with several county extension agents, Florida blueberry growers cited flower thrips as their most important insect pest that warrants management. In general, flower thrips species have a very short life cycle, approximately 18-22 days under ideal conditions, and will complete multiple generations per year. In Florida, the Florida flower thrips, *Frankliniella bispinosa* (Morgan), eastern flower thrips, *F. tritici* (Fitch), and western flower thrips *F. occidentalis* (Pergrande) have been identified as pests of both southern highbush and rabbiteye blueberries. These three species of flower thrips are known to have a wide host range and cause extensive damage on many different crop plants. In north-central Florida, the Florida Flower thrips appear to be the dominant species in blueberries, occurring in about 95% of our samples. Thrips feed on ovary, style, filaments and anthers, as well as developing berries, which can ultimately affect yield. During 2003, growers in north central Florida experienced fewer problems from thrips damage compared with 2002. We believe the primary reason for this may be that the cold December and January freeze resulted in a quick bloom and delayed the emergence and movement of thrips into commercial blueberry fields. In Gainesville, by the time thrips population was high enough to cause economic damage the bloom period was over. A similar less dramatic situation occurred south-central Florida. Populations of thrips became high during mid bloom in Haines City, subsequently posing less threat to blueberry yields. Growers in those areas who were using insecticide tactics for managing thrips apparently used less insecticide sprays. In our spring insecticide screening trials for thrips, the only compound that performed well in suppressing thrips population was Surround™ (kaolin clay). Surround™ is produced by Engelhard Corporation in Iselin, New Jersey and is available at selected agricultural retail stores. Surround™ is a white powdery compound, which does not kill the insect but apparently prevent the insect from feeding on floral organs. Surround™ has been reported to be compatible with most sprayers. The mechanism in which Surround™ control thrips has not been fully understood and needs further research. However, it is important to note that similar findings have been reported for Surround™ with respect to thrips in other fruit crops. A more detailed account of our thrips insecticide work will be reported in the next issue of the newsletter.

Potential Weed Host for Tomato Spotted Wilt Virus in Florida

Scott Adkins, Larry T. Markle & Erin Rosskopf- USDA-ARS-USHRL, Fort Pierce & Carly Baker, FDACS-DPI, Gainesville
Edited by Alicia Whidden

As reported in a UF Pest Alert, American black nightshade (*Solanum americanum*) found in a vegetable field in southeast Florida was confirmed as having tomato spotted wilt virus (TSWV). Symptoms were most noticeable on new growth. American black nightshade is a common weed in fields and could possibly serve as a source of TSWV for infection of the crop. TSWV infects tomatoes, peppers and a wide range of other vegetables and ornamental crops. The Solanaceae and Compositae families have the largest number of susceptible plant species. The virus is transmitted by several species of thrips, including the western flower (*Frankliniella occidentalis*) and tobacco thrips (*F. fusca*). Only larval thrips can acquire TSWV, but both larval and adult thrips can transmit the virus in a persistent, though often sporadic fashion. TSWV replicates in the thrips vector and the plant hosts. The virus and vector are frequently spread through transport of ornamentals and vegetable transplants.

The extremely wide and overlapping host range of the virus and its thrips vector makes control difficult. There are very few host plant resistance genes and a large number of weed and ornamental hosts providing between crop virus reservoirs which make the situation more difficult. The use of virus-free transplants is a necessity.

Effect of Interplanting Secondary Crops on Strawberry Yield

John Duval, GCREC-Dover

To increase the utility of land preparation, existing plastic mulch, and micro-irrigation, secondary crops are planted in beds with winter annual strawberries. This practice allows for earlier harvesting of the secondary crop. The effect of these secondary crops on marketable yield of strawberry has not been thoroughly investigated. Planting takes place up to 5-6 weeks before the end of the strawberry production season dependent on strawberry variety. Common secondary crops are squash, cantaloupe, pickles, and peppers.

A study was instituted that examined the effect of interplanting squash, cantaloupe, and pickles from seed, and cantaloupe and pepper from transplants, on yield of strawberry. Plantings of secondary crops occurred on 28 Feb., 7 Mar., 14 Mar., and 21 Mar., 2003 into a stand of 'Strawberry Festival' strawberries spaced 15 inches apart in row and 12 inches between rows. Treatments were replicated 3 times. Fertilization was increased from 0.75 lbs N/acre/day (IFAS recommendation) to 0.83 lbs/N/acre/day, a 10% increase to compensate for additional plants in the field. Data was collected from the time of planting the second crop into the plots until the end of the harvest period. Data was collected for marketable yield, number of marketable berries, and cull fruit until 31 Mar. 2003. Data was subjected to ANOVA procedures using SAS statistical software. No significant differences were detected among treatments ($p<0.05$) for yield (Fig. 1), number of berries (Fig. 2) or number of cull fruit (data not presented).

This data suggests that there is no detriment to strawberry fruit from the interplanting of strawberries with squash, pickles, cantaloupes, or pepper planted up to 31 days before the end of fruit harvest. This is true when the strawberry population of the field has been maintained and no plants removed for the planting of the second crop.

Figure 1. Effect of interplanting on marketable yield of strawberry

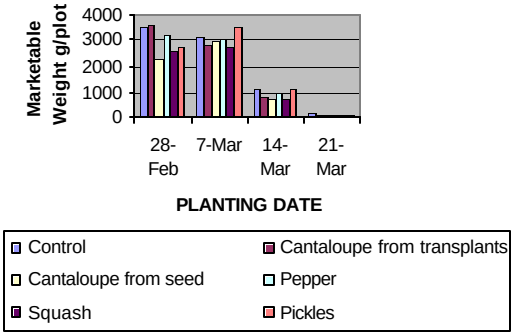
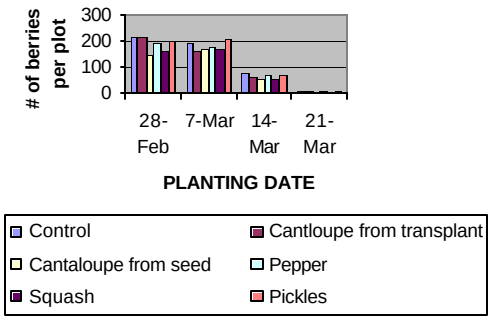


Figure 2: Effect of interplanting four second crops on number of marketable berries.



Pesticide Registrations and Actions - Chemically Speaking April 2003

On March 18, the Florida Department of Agriculture and Consumer Services (FDACS) sent a letter to Syngenta Crop Protection to inform them that the Department had accepted the Section 24(c) application for the use of Fulfill® (pymetrozine) insecticide (EPA Reg. # 100-912) for control of green peach aphid and potato aphid, and suppression of whitefly in tomato grown for transplant. The Special Local Needs (SLN) number is FL-030004. (FDACS letter of 3/18/03).

Based on work by IR-4, tolerances have been obtained for the use of herbicide Dual Magnum ® (S-metolachlor) in or on grass forage (10 ppm), grass hay (0.2 ppm), spinach (0.5) ppm), and tomato (0.1 ppm). (Federal Register, 4/2/03).

Miticide Trial Results

Jim Price, GCREC-Bradenton

Curtis Nagle, John Hogue and Jim Price experimented with several miticides in the UF GCREC Dover fields this season, and the data are in and statistical work has been performed. The results of these experiments will be shared among sponsoring businesses, EPA, and the agricultural industry in general. In then end, there should be additional miticides and better patterns of use available to the strawberry industry that will result in improved mite management and profitability.

The most important points at this time are that we have had very good results from some experimental miticides that are in the more advanced stages of development including:

1. Valent's ovicidal Zeal® (etoxazole) whether alone or in combination with Danitol®
2. Gowan's Mesa® (milbemectin) alone and in combination with Savey®
3. Nichino America's Fujimite® (fenpyroximate) alone
4. Arvesta's TM-41301 (acequinocyl) alone

Each of these has been under testing at GCREC Dover for two to several years and it is very likely that Zeal® and Mesa® will be available for growers this next season under those names. Fujimite® and TM-41301 will not be available until later; they likely will be given other names.

The Strawberry A Book for Growers, Others—Norman Childers, Ph.D., Editor

Dr. Norman Childer's newest book is now available to the public. This is a complete and concise book on strawberry production, modern plasticulture with annual cultivars, matted row with perennial cultivars, protected culture, marketing, foreign production, diseases, and more. Color photography enhances each chapter and contributions from GCREC-Dover faculty are included. To order your copy, send check or money order for $29 plus $6 postage and handling to:

Dr. Norman F. Childers Publications, 3906 NW 31st Place, Gainesville, FL 32606
email: Norm1029@aol.com
Phone: 888-501-8822

Florida State Horticultural Society— CEU Day

IPM strategies for controlling pests with a wide host range and pesticide safety, laws, and regulations

Jonathan H. Crane, Pres.,

As part of the 116th Annual Meeting of the Florida State Horticultural Society, Dr. Steve Sargent, Florida State Horticultural Society Program Chairman, is pleased to announce a CEU program aimed at anyone interested in controlling pests on fruits, vegetables, ornamentals, and landscapes and being updated on the latest in pesticide safety, laws, and regulations. Richard Tyson, Seminole County Vegetable and Turf Extension Agent put the program together. Featured speakers include Entomologist Lance Osborne, who will address the audience on "Integrated pest management strategies for controlling pests with wide plant host ranges" and Thomas Dean, Asst. Extension Scientist, who will instruct the audience on "General standards/core – safety, laws, and regulations". This IPM/Core workshop will be held on Monday, June 9th beginning at 8:00 AM and ending at 12:00 noon at the Sheraton World Resort (10100 International Drive, Orlando). CEUs will be offered for holders of pesticide licenses, Certified Crop Advisors, and FNGA Certified Industry Professionals. This CEU Day is part of the FSHS annual meeting, which will be held from 8 to 10 June. Early registration (before 8 June) is $50 per person and includes a one-day (Monday, June 9) pass to attend the CEU Day, the concurrent Master Gardener Training Workshop, all FSHS presentations, and the Industry Reception that evening. Room rates at the Sheraton are very reasonable at $89/night (call 1-800-327-0363 for reservations, mention FSHS). To learn more about FSHS and this year's Annual Meeting, visit our web site (http://www.fshs.org/) or better yet come to our meeting! (c:/fshs/promotion/press release 4.doc)

Balm Update

Craig Chandler, GCREC-Dover

An architectural firm from Gainesville, Ponikvar & Associates, is currently finalizing plans for roads, parking areas, sidewalks, and out-buildings at the research center site in Balm. These buildings will include housing for the farm manager, graduate students, and visiting scientists; offices for the farm manager and maintenance supervisor; restrooms and a break area for field staff; a garage for vehicle and tractor maintenance; space for pesticide storage and handling, growth chambers, and rearing rooms; and pole barns for the storage of tractors, sprayers, and field implements. Ponikvar is also working with a civil engineering firm that is obtaining water permits and designing irrigation and drainage systems for the new site. The bidding process will begin soon, and construction should start sometime this summer.

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