

Envirotalk



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PROMOTING APPRECIATION, ENHANCEMENT AND CONSERVATION OF BERMUDA'S ENVIRONMENT

WELCOME

to our winter edition of Envirotalk.

In this issue –

- Entomologist, **Claire Jessey**, discusses Widow Spider identification for Bermuda residents.
- **Claire Jessey**, Plant Protection Officer, updates us on the status of the Citrus Leaf Miner and the exciting bio-control for this pest.
- **Claire Jessey**, Entomologist, informs us on The Mimic Butterfly a rare but exciting visitor to Bermuda.
- See the planting calendar on what to plant this Winter.

Please contact:

Envirotalk mailing list: envirotalk@gov.bm to be placed on the mailing list or for suggestions for future articles.

Editors note

While December marks the years end January 2014 will prove to be a bright and new beginning to the UN's International Year of Family Farming (<http://www.fao.org/family-farming-2014/en/>). By raising the profile of small holder and family farming the UN seeks to focus the world to look at ways to end world 'hunger and poverty, provide food security and nutrition, improving livelihoods, managing natural resources, protecting the environment, and achieving sustainable development'.

Kimberly Burch – Editor

IDENTIFYING WIDOW SPIDERS

Over the last several years, members of the public have been presenting specimens of the brown widow spider (*Latrodectus geometricus*) for identification with the concern that they are black widow spiders (*Latrodectus mactans*). And although we have had a few incidents of black widow spiders on imported grapes and bananas in the past, it is an unusual occurrence and the spiders in those situations were captured and destroyed. Similarly, an inspection of a housing estate in Southampton in 2009 revealed spiders that appeared to be black widows, however they were ultimately identified by a University of Florida spider expert as exceptionally dark brown widows.

Black widow spiders are not known to be established on the island, however their cousins the brown widows are present in every parish. The brown widow spider is not considered to be a 'dangerous' spider in spite of its toxic venom, as they are extremely reluctant to bite so their presence should not itself be cause for alarm.

As there has been some interest in the media recently regarding spiders, including black widows, being intercepted in fresh produce, and given the high vigilance of the public to spiders in general, it is worth knowing the difference between our local brown widow population and the black widows.

The following characteristics of the two spiders can help with general recognition; however a positive identification by the entomologist at the Department of Environmental Protection can be made by emailing an image to: **cjessey@gov.bm** or by presenting a live or dead specimen. Live suspect black widow specimens should be collected and handled with extreme caution. A household insecticide can be used to kill the spider prior to collection if necessary. As the egg sac has very distinctive features, wherever possible it should be collected or photographed as well.



Identification:

Female black widow spiders are 1½ inches long (when legs are extended) shiny black in colour with a large spherical abdomen. There is a distinctive orange-red or red hourglass shaped marking on the underside of their abdomen. Males are much smaller and lack these characteristic markings.

Identification:

Female brown widow spiders are highly variable in colour from beige to dark brown-almost black with a yellowy-orange to orangey red hourglass shape on the underside of their large spherical abdomen. They are a similar size to the black widow but slightly smaller. The sides of the abdomen may have a few white stripes and markings on each side. Their legs often have visible darker bands around the joints of the legs. Males are much smaller and lack these characteristic markings.

Eggsac:

The eggsac is the best identification feature. The black widow eggsac is round to pear shaped, white or cream coloured, with a smooth surface.

Eggsac:

The brown widow egg sac is off-white to tan, round with many tufts of silk sticking out, giving it a spiky appearance. The eggsacs of both types of widow are found in the centre of the web near the spider.

Habitat:

This spider is generally not found inside the house, but often takes up residence in dry, dark sheltered structures such as a garage, outbuilding or shed. The strong, sticky webs can also be made outside in low shrubs.

Habitat:

This spider can be common outside buildings wherever there is space to build a web, such as under balustrades, fences, window sills, in door hinges or under plant pots. It prefers dry, sheltered, quiet areas such as Bermuda stone walls.

Medical Importance:

Caution: black widow spiders are venomous and victims can have a moderate to severe reaction to the neurotoxic poison depending on the amount of toxin injected, the age and health of the victim and the part of the body bitten. Bites are rarely fatal, however, medical attention should be obtained for these bites.

Medical Importance:

The bite of the brown widow is not considered to be medically significant and the spider is extremely reluctant to bite and it does not inject much venom. However, due to the possibility of an unpleasant reaction, these spiders should not be handled.

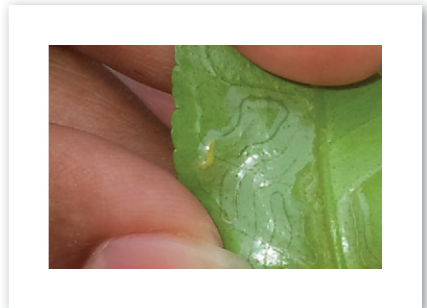
Claire Jessey
 Entomologist/Plant Protection Officer
 Department of Environmental Protection

CITRUS LEAFMINER (PHYLLOCNISTIS CETRELLA) UPDATE

The citrus leafminer, a serious pest of oranges, lemons, grapefruit, tangerines, limes etc., was first identified in Bermuda in 1998. A survey carried out at that time determined that the pest was established in orchards in every parish examined. Importation of citrus planting material is strictly regulated, so this pest may have made its way to the island via smuggled citrus plants or plant parts. The citrus leafminer is an established pest in all citrus producing areas of the world. Bermuda is now unfortunately on that country list too.

The adult stage of this pest is a very small white-grey moth only about 2mm long (4mm wingspread). The female moth lays an egg on the very new, soft citrus leaves. The egg hatches and the tiny, legless larva burrows into the leaf. The larva begins to feed inside the leaf and leaves behind distinctive silvery, serpentine trails on the ventral side of the leaf. After about a week the larva mines to the edge of the leaf, stops feeding and begins the process to turn into the adult moth stage. The adult moth emerges, flies away to mate, and the cycle begins again. The adults are small, unnoticeable and are mostly active at night.

Although this pest is considered to be a serious pest of citrus, it causes only aesthetic damage to established trees as a result of larva burrowing into the leaf and occasionally the rind of the fruit. It does not ever damage the fruit and at no time is the fruit unsafe or unpleasant to eat. Young or newly planted trees are more at risk as feeding by the leafminer larval stage can rupture the epidermis of the leaves leading to increased water loss, which in drought periods can lead to the death of the tree if extra water is not supplemented.



Damage caused by Citrus Leafminer

In 2000, the Department of (then) Agriculture and Fisheries, now Environmental Protection, collaborated with a leading researcher in this field, Dr. Marjorie Hoy, from the University of Florida to import an encyrtid endo-parasitic wasp (non-stinging), *Ageniaspis citricola*, that was known to be extremely effective in controlling the citrus leafminer.

This parasitoid wasp established easily in Bermuda and did indeed prove itself to be an effective control for this citrus pest. Very few reports were received of citrus leafminer being considered a notable pest from 2001 onwards. Occasionally a lag in the wasp population would allow a few leaves to be damaged by the citrus leafminer, but the situation was usually rectified quickly as the parasitoid populations increased.

However for unknown reasons, possibly including dry seasons and hurricanes causing severe defoliation, in conjunction with our small island area and limited numbers of citrus trees, the citrus leafminer population increased dramatically in 2010 and 2011 and damage levels are similar to when the pest was first introduced to the island was not under control. Samples of infested leaves examined consistently indicated the absence of the biological control wasp for the first time since its introduction.

There are no other reported circumstances where *Ageniaspis* has 'died out' which makes Bermuda's situation unique. Unfortunately biocontrol of citrus leafminer using *Ageniaspis* has been extremely successful and effective in all countries that have introduced it and therefore no further research is being carried out on this parasitoid and the supply colonies have been replaced with biological controls for other new and emerging insect pests. As a result, when we contacted the University of Florida and all other institutions that had been rearing the parasitoid, there were no more *Ageniaspis* available.

A contact at the Department of Plant Industry in Florida, kindly shipped another citrus leafminer parasitoid, *Citrostichus phyllocnistoides*, in June of 2012 which had been used successfully in Spain. Two shipments of these parasitoids were released in two orchards. A survey carried out six months later did not indicate that this parasitoid had established on the island.

Additional contacts were made which eventually led to a contact at the Department of Agriculture in Hawaii confirming that although he did not have any *Ageniaspis* from a reared colony to send us, he would be happy to hand collect some from citrus orchards. In July of 2013 about 30 pupa arrived via courier. These pupa are very sensitive to desiccation and unfortunately, despite all precautions, only sixteen adult *Ageniaspis* emerged. The sixteen adults were successfully released at a Devonshire orchard. A survey of several locations carried out in December of this year revealed that *Ageniaspis* has now established on the island again in the initial orchard and in several other orchards in the adjacent parishes, which indicates that it is spreading rapidly. A survey is underway to determine how far the *Ageniaspis* has spread. It is expected to reach both ends of the island within the next few months without needing specific introductions to eastern and western orchards.

Interestingly, a sample of some unusual looking leafminer mines in citrus leaves collected during this survey revealed that the parasitoid released in 2012, the *Citrostichus*, has also managed to establish and is present in the orchard in which it was released 18 months later! This is quite unexpected and a pleasant surprise as we had had no indication that it had survived. This 'doubling-up' of parasitoids is good insurance for citrus in Bermuda, just in case another environmental 'event' causes one of the parasitoids to die out, we'll have another that hopefully will survive that event and continue controlling the leafminer.



It is hoped that citrus tree owners should start to see some improvement in new leaves by late spring, certainly by the fall flush as the parasitoids work to bring the pest under control. To ensure the continued success of these parasitoids, it would be very helpful if tree owners could cease treating their citrus with any systemic pesticides that may have been recommended for leafminer control as the pesticides may also have a negative effect on the parasitoid.

Claire Jessey
Entomologist/Plant Protection Officer
Department of Environmental Protection

THE MIMIC BUTTERFLY IN BERMUDA

In October of this year Bermuda was treated to an unexpected visit by a group of butterflies, *Hypolimnas missipus*. This butterfly known in different areas by many common names including the mimic, the diadem, the tropical blue moon butterfly, the egg fly, the tropic queen and the danaid butterfly. The 'blue moon' name is a reference to the blue halo on the wings of the male. The 'egg' name is a reference to the resemblance to a closely related Asian species (*H. antilope*) whose female sits over her batch of eggs until they hatch. This behavior may be protecting the eggs from parasitoid wasps that can attack the eggs.



Female butterfly – The Nature Library: Butterfly Pictures by W. J. Holland, © 1904

The first recorded sighting of this butterfly in Bermuda was in 1991 when Andrew Dobson photographed two male mimic butterflies at Astwood Park. There had been no other reports until earlier this year in October 2013, when observant farmer Frank Machado noticed an unusual butterfly resting on the steps of his house. He collected it and brought it to the Department of Environmental Protection for identification. The next day, Lisa Greene from the Bermuda Aquarium, Museum and Zoo reported that she and a colleague, Camilla Stringer saw and photographed another male at Spittal Pond. Ms. Stringer kindly shared this image with the Bermuda Audubon Society and the Royal Gazette so it could be used alongside a request for additional sightings to be reported. This generated a number of reports from many areas of the island from Fort Scaur in Sandys to Clearwater Park in St. Davids. To date, a total of 13 individual reports of these butterflies were received.

The mimic butterfly exhibits strong sexual dimorphism. This means that the adult males and females look strikingly different with different colouration and patterns on the wings. The female itself can have slightly differing forms, but it essentially mimics the toxic African butterfly, *Danaus chrysippus* with orange wings with black borders and a variable number of white spots in the black tips of the forewings. Their wingspan can be as wide as 7 or 8 cms (slightly smaller than that of a monarch butterfly-which it also loosely resembles). The mimicry of the females affords them protection from predators who have already learned that butterflies with these colours and approximate wing patterns can be toxic. The mimic itself is not toxic. The males of this butterfly are black with large white patches on their wings surrounded by an iridescent blue-purple halo – hence the name blue moon butterfly.



Male butterfly

This butterfly is common in the tropics and subtropics of Asia and Africa, Australia and is reported as an occasional visitor to Mississippi, Florida and North Carolina. It is a resident of several Caribbean islands, where it is presumed to have been accidentally introduced via slave ships travelling from Africa. This assumption is interesting in itself, as adult butterflies feed on nectar only. Therefore adult butterflies would need flowering plants to be present and accessible on the entire journey from Africa and keeping butterflies alive in any non-natural environment can be challenging.

What is probably more likely is that the caterpillar of this butterfly was present on plant material gathered for the journey, either as potential new crops or as food for slaves or for animals on board. The caterpillar is known to feed on a number of host plants including *Portulaca* (purslane), *Talinum*, *Ruellia*, *Asystasia*, *Blepharis*, *Justicia*, *Pseuderanthemum*, *Amaranthus*, *Ipomea* (sweet potato and morning glory), *Abutilon* and *Hibiscus*. It would be interesting to investigate this further to determine exactly which plants were onboard for another purpose that brought this interesting butterfly species with it.

The visiting mimic butterflies found in Bermuda probably arrived in a slightly more ordinary fashion. Although the mimic is not in itself notable for being a migratory butterfly, many of its close relatives are. It does however seem to be ready to 'disperse' and wander at certain times of the year, October to December being one of them. It may be that strong, warm prevailing winds from the Caribbean area corresponded with a flight period and these butterflies made their way here in a small group. It is interesting that the initial report in 1991 was also recorded in October which may lend credence to this theory.

This butterfly is not considered to be an environmental or agricultural threat and although there are host plants here, it may not take up residence. Time will tell. However, if anyone does spot this butterfly, male or female, they are encouraged to report it to Claire Jessey (**cjessey@gov.bm**) at the Department of Environmental Protection or Lisa Greene at the Department of Conservation Services (**lgreene@gov.bm**) so that a record can be made.

Claire Jessey
Entomologist/Plant Protection Officer
Department of Environmental Protection

PLANTING CALENDAR

WHAT TO PLANT IN THE WINTER



VEGETABLES

December

Beans, Beets, Broccoli, Brussels Sprouts, Cabbage, Carrots, Cauliflower, Celery, Chard, Chives, Kale, Leeks, Lettuce, Mustard Greens, Onions, Potatoes, Radish, Rutabaga, Spinach, Squash, Strawberry, Tomato, Turnip.

January

Beans, Beets, Broccoli, Brussels Sprouts, Cabbage, Carrots, Cassava, Cauliflower, Celery, Chard, Christophine, Kale, Leeks, Lettuce, Mustard Greens, Potatoes, Radish, Rutabaga, Spinach, Squash, Tomato, Turnip.

February

Beans, Beets, Broccoli, Cabbage, Carrots, Cassava, Cauliflower, Celery, Chard, Christophine, Corn, Cucumber, Kale, Leeks, Lettuce, Mustard Greens, Potatoes, Pumpkin, Radish, Rutabaga, Spinach, Squash, Sweet Potato, Tomato, Turnip.



A few vegetables you can plant this winter

FLOWERS

December

Ageratum, antirrhinum (snapdragon), aster, aubrieta, begonia, bells of ireland, candytuft, carnation, centaurea, chrysanthemum, cineraria, dahlia, dianthus, geranium, gerbera, gypsophila, impatiens, larkspur, lathyrus, nasturtium, nicotiana, pansy, petunia, phlox, rudbeckia, salpiglossis, salvia, statice, snow-on-the-mountain, spider flower/cleome, star-of-the-veldt, stock, sweet william, verbena and viola.

January

Agratum, antirrhinum, aster, aubrieta, begonia, bells of ireland, candytuft, carnation, centaurea, chrysanthemum, cinerariam, dahlia, dianthus, geranium, gerbera, gypsophila, impatiens, larkspur, lathyrus, nasturtium, nicotiana, pansy, petunia, phlox, rudbeckia, salpiglossis, salvia, statice, snow-on-the-mountain, spider flower/cleome, star-of-the-veldt, stock, sweet william, verbena and viola.

February

Acrolinium, ageratum, alyssum, antirrhinum, aster, aubrieta, baby blue eyes, bachelor's buttons, bird's eyes, blanket flower, begonia, bells of ireland, calendula, candytuft, carnation, centaurea, chrysanthemum, cineraria, coreopsis, dahlia, Africa daisy, dianthus, forget-me-not, geranium, gerbera, globe amaranth, globe gilia, godetia, gypsophila, hollyhock, impatiens, larkspur, lathyrus, marigold (African), marigold (French), nasturatum, nicotiana, pansy, petunia, phlox, phlox (annual), red tassel flower, rose everlasting, rudbeckia, salpiglossis, salvia, scabiosa, statice, snow-on-the-mountain, spider flower (cleome), star-of-the-veldt, stock, sweet pea, sweet william, verbena and viola.