Envirotalk

GOVERNMENT OF BERMUDA
Ministry of Environment, Planning and Infrastructure Strategy
PROMOTING APPRECIATION, ENHANCEMENT AND CONSERVATION OF BERMUDA'S ENVIRONMENT

SUMMER 2012
VOLUME 80 No. 2

WELCOME

to our summer edition of Envirotalk.

In this issue –

- Department of Conservations' Biodiversity Officer, **Alison Copeland** talks to us about fees and offences regarding the Protected Species.

- In 'Beds, Paths and Beyond…You made your bed now PLANT it!' **Aaron Lutkin**, Department of Environmental Protection, gives important points on planting your square foot garden.

- Are pests invading your citrus trees? **Claire Jessey,** Entomologist and Plant Protection Officer, helps us identify some of the more common citrus pest in this two part article.

- See the planting calendar to get a head start on what to plant this Summer.

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Aaron Lutkin (Tel: 239-2312 or e-mail: ajlutkin@gov.bm) with ideas for future articles.

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PROTECTED SPECIES – FINES AND OFFENCES

The Protected Species Act 2003 was amended in 2011 with changes to the offences and fine structure. Under the amended Act, protected species are graded into one of three levels of protection. The level is assigned after considering the best strategy for recovery of the species, including the level of expertise needed and how desirable community involvement is in the conservation of the species.

Species listed as Level 1 protected species receive the highest degree of protection. These are species, such as the cahow and Bermuda skink, where the involvement of the general public is not seen as a desirable part of their conservation. A high level of expertise is required for their recovery, and this work will be undertaken by licensed researchers and Government officers.

Level 2 protected species receive the second highest degree of protection. These are species where the optimal strategy for population recovery requires a moderate level of expertise and will be carried out by licensed researchers and experienced individuals who have been issued permits. For example the yellowood tree is a level 2 protected species that will be propagated by members of the public who have demonstrated ability in growing trees and who hold a licence from the Department of Conservation Services (DCS).

Level 3 protected species are those where it has been deemed that the most effective way to increase the population of the species is to involve the public. All Level 3 species listed to date are flowering plants. The recovery strategy for Level 3 species involves propagation and planting out by interested members of the public. Research licences will be issued by DCS for research on these plants.

Licences and Permits

Licences and permits will be issued to allow activities to be carried out that would otherwise be prohibited by the Act. Licences, as described in Section 8 of the Act, will be issued to researchers and propagators who have long-term programmes involving protected species, and will be renewable annually. Licences will also be issued to institutions for the public exhibition of protected species, and for aquaculture or horticulture programmes.

Permits, as described in Section 8A of the Act, will be issued for 'one time' activities that would otherwise be prohibited by the Act. Activities for which a permit will be granted include relocation of a species and destruc-

tion that cannot be avoided, for example if the species presents a risk to human health and safety. Permits will be given on a case by case basis as part of the planning process for the installation of utilities, trenching for cables, establishment of moorings and erection of structures. The aim of the permits is not to prevent development, but to ensure that whenever possible protected species and their habitats are impacted as little as possible and maintained on the landscape. This will apply particularly to trees and flowering plants. In cases where it is not possible to avoid impacting a protected plant by development, all reasonable attempts will be made to relocate the specimen either within the property or into a nature reserve. When it is not possible to relocate the plant, the permitting process will alert DCS to the issue so that seed can be collected if possible or genetic material taken. A condition of the permit allowing destruction of a protected plant may be the requirement to replant new specimens after development is finished.

The permit process is not intended to be onerous and will be a part of the existing planning process. Permits are not required for planting or introduction into the environment of a protected species as part of an enhancement programme. Also routine maintenance that does not jeopardise the health of the specimen is allowed. For example branches may be trimmed from a cedar without a permit, so long as it is done in such a way that it does not kill or harm the tree.

Offences

A person who carries out the following actions is considered to be committing an offence unless authorized by a licence or permit:

Offence	Level 1	Level 2	Level 3	All Species
Willfully damages; destroys, removes or obstructs the habitat or nest of any protected species	fine of $25,000 or 2 years in prison			
Willfully damages, destroys, injures, disturbs, uproots, fells or kills a protected species	fine of $25,000 or 2 years in prison	fine of $15,000 or 1 year in prison	fine of $5,000 or 6 months in prison	
Takes, imports, exports, sells, purchases, transports or has in this possession a protected species or any part of a protected species	fine of $25,000 or 2 years in prison	fine of $15,000 or 1 year in prison		

Contravenes any regulations or does any act in contravention of an order or any prohibitions or restrictions imposed by an order under this Act				fine of $5,000 or 6 months imprisonment
Fails to comply with the terms and conditions of a licence under section 8 or a permit under section 8A				fine of $5,000 or 6 months imprisonment
Makes a false statement to an authorized officer or for the purpose of obtaining a licence or permit;				fine of $5,000 or 6 months imprisonment
Obstructs an authorized officer in the execution of his functions under this Act				fine of $5,000 or 6 months imprisonment

A new Protected Species Order was written under the amended Act in January 2012, with an additional 33 species added to the 49 species already protected by the Act. The key additions were habitat building species like mangroves and seagrasses, and endangered flowering plants. A list of species can be found at http://www.conservation.bm/protected-species/.

Alison Copeland
Biodiversity Officer
Department of Conservation Services

BEDS, PATHS AND BEYOND...YOU MADE YOUR BED NOW 'PLANT IT!'

How many of our square foot gardens lay empty, filled with soil and weeds, or end up being the litter box for the neighbour's cat? Given Bermuda's sub-tropical climate, we can grow flowers, herbs and vegetables most of the year round; it just takes a little planning and succession planting.

With urbanization and condo living increasing on the island, there is less arable land available for Bermudian home owners to grow plants and as such, many people are resorting to container or raised square foot gardening in order to satisfy their growing needs (Square foot gardening is a way to grow vegetables & flowers in raised containers, making efficient use of small garden spaces). There have been many articles written on how to prepare and build square foot gardens, allowing gardeners the flexibility

to easily construct adapted and apply them to individual needs and circumstances.

How should I make my bed?
Before planting, gardeners should ensure that they have provided their seeds with a good substrate in which to grow, that is, the best growing media, soil, or compost mix, suitable for germinating seeds or transplant seedlings. Leached, dry and unfertile top soil will not give your plants a good start and probably won't provide them with the nutrients needed to grow viable abundant vegetable crops.

When planting your seeds, you may want to cover the area with a plastic bottle or something similar, to provide a consistent warm and moist environment to germinate. This is also good protection against birds that may eat your seeds.

In addition, you may want to initially consider securing some fine netting over the top of the frame, stopping our resident toads from burrowing and digging up your seeds, when they are trying to find somewhere cool to hide during the day.

Once your seeds have started germinating, it is important to remember to water them particularly during the summer, as these raised gardens tend to dry out quickly, depending on where they are located, and if you have used wood framing, as it is possible that the wood may absorb some of the moisture if not sealed.

What shall I plant?
The type of flowers, herbs or vegetables you may want to plant relies entirely on an individual or family's specific needs, and what you use the most. There are a variety of things that can be planted during the year to cater to a variety of personal preferences.**Check out the last page of this Envirotalk bulletin for ideas of what to plant at this time of the year.**

Companion planting versus pesticide spray?
As an alternative to spraying pesticides on your vegetable plants to control insects; consider companion planting. By growing other herbs and certain flowering plants amongst your vegetables, you will help to repel insects that negatively affect your crops, naturally! Flowering plants including marigolds, geraniums and nasturtium as well as rosemary, dill and borage are all excellent companion plants that help to deter or repel insects through natural substances in their roots, leaves and flowers (Contact your

local plant nursery for advice on other non-toxic insect controls).

How do I do succession planting?
Succession planting ensures a constant supply of vegetables by extending the harvesting season through staggering planting times, or replanting a different crop after harvesting another.

By using some of the recommended vegetable seeds and applicable planting times, you can start choosing which vegetables that you want to grow. Once you have decided, plant your first set of seeds, within a designated area of your square foot garden. Then 2-3 weeks later, plant the same seeds next to the first lot that have started germinating. Repeat this process as many times as you feel necessary if this is the vegetable that you would like to continue harvesting on a more regular basis.

In addition, when the first set of seeds have produced their crop, harvest them, remove the plants, top up the growing media, and then plant another lot of vegetables in the free space and start the whole process again.

Do I need to fertilize the plants?
Yes, of course! We need food to maintain our life, and so do plants. There are three basic nutrients that plants need in order to grow well; N (Nitrogen), P (Phosphorus) and K (Potassium). Nitrogen helps with vegetative or leaf growth; Phosphorus with flowering and fruiting, and Potassium with healthy root growth. Usually an all purpose or "complete fertilizer" will include all of these nutrients and will be sufficient to supply your vegetables with the necessary food to grow abundant fruit and vegetables. These fertilizers can be applied in either a water soluble or granular application. Remember to read product labels to ensure proper application rates and the best products for your individual needs.

Finished product
At this year's 74th annual Agriculture Exhibition at the Botanical Gardens, 20 schools entered box square foot gardens, displaying a variety of vegetables, herbs and flowers. The schools entered in each of preschool, primary and middle school levels, to compete for the overall 'Best In Class' award, and the Hon. Gerald Simons trophy which, this year, was won by Dellwood Middle School. Their garden was 2 feet by 2 feet and was planted with romaine, iceberg, and red leaf lettuce, bell peppers, cherry tomatoes, parsley, broccoli and cauliflower.

The amount of entries increased significantly from previous years, showing how popular and valuable square foot gardening is becoming on the

Island. Not only does this provide food which we can enjoy, but it is also an excellent educational tool for students learning basic agricultural skills on how to germinate, grow and care for plants, how to plan a planting season, and teaches students teamwork.

So remember, you made your bed, now plant it! There is no need for you to have an empty square foot garden.

Aaron Lutkin
Department of Environmental Protection

IDENTIFYING CITRUS PESTS – PART ONE

Producing a good crop of citrus fruit can be frustrating and not as easy as anticipated. However, with care and persistence, a good fruit crop can be expected. Learning to identify and control the insect and related pests is one of the first steps to your healthy citrus crop!

Aphids
Aphids are small, oval to round shaped, soft bodied insects (1.5 to 2mm long). They vary in colour and can be orange, yellow or brown.

Aphids feed on the tender, new growth of plants. They are usually found in crowded colonies on the stems or underside of new leaves (older, hardened leaves are not attacked). Aphids (scale insects and mealybug) produce a sticky, sugary liquid called 'honeydew' upon which ants feed. A black fungus, which looks like soot and is referred to as 'sooty mould', also grows on this liquid. This fungus does not directly damage the tree and may be washed off with a stream of water.

Aphids suck the plant sap from new young leaves causing them to become permanently distorted and curled as the leaves mature. Heavy aphid feed-

ing can slow the growth of young trees and may also spread citrus viruses.

In the spring, new growth with heavy aphid infestations can be pruned out and burned. Aphids can also be blasted off with a strong stream of water. Environmentally safe products such as a horticultural oil or soap spray can be used to control aphids. Contact insecticides can also be used but are not as safe.

Aphids are often parasitized by naturally occurring biological controls, such as tiny wasps. Parasitized aphids are often a bronze colour, round and firm and do not move (because they are dead and what is left is a mummified body).

Interesting Fact: *Aphids, also known as "plant lice" or "greenfly", can produce offspring without mating (parthogenetic reproduction) i.e. they do not require the male species!! They also have the ability to produce either eggs or live young, depending on the availability of food and the season.*

Citrus Leafminer
Adults are tiny, silvery moths, rarely seen. The immature stage is a small (3mm) legless translucent yellow-green coloured maggot (larvae).

Larvae tunnel between the leaf surfaces, feeding on the leaf tissue and leaving silvery, winding mines. Look for mines starting on the upper or lower surfaces of new, tender leaves. Older, hardened leaves may have mines, but the larvae have probably already turned into adults and flown away. Heavy infestations of citrus leafminer can result in leaf drop. Young plants (under two years) are most at risk from this pest. Ensure that the plant has enough water to compensate for the water being lost from the damaged leaves. Older trees do not usually require treatment, although they will still be damaged by the pest.

Few chemicals control this pest. Products containing natural insecticides such as azadirachtin (neem) or spinosad offer some control over the larvae in the leaves and are safe for natural enemies. Routine sprays with neem

oil or horticultural oil on the newest flush of leaves are reported to deter egg-laying by the adult moth. The treatment must be re-applied every seven to 14 days during the new growth period.

Interesting Fact: *The citrus leafminer was a new pest to Bermuda in 2001 and was successfully controlled by the introduction of a very specific biological control insect for the last 10 years. However, in the last year, this biological control has inexplicably disappeared. Research is underway into establishing a new biocontrol for this pest.*

Scale Insects

Adult female scale are wingless and often legless and do not move. They look like soft or hard bumps on stems. Some are oval and flattened and very difficult to notice. Other scales project out from the plant as a very obvious round bump. Males are very small and have wings, similar to gnats. The immature stages look very much like the adult female, but smaller. Colour varies depending on the species. They can be white (citrus snow scale), brown (soft brown scale) or green (green scale).

Males are hardly ever seen. Scales are usually located along the main veins of the leaves and along the stems of branches, usually near new to medium-old growth. Snow scale is often found dramatically infesting the trunk of the tree.

Scales feed on plant juices, which it sucks through its mouthparts. When a scale infestation is severe it may drastically affect plant vigor and may even kill a young plant. Typical symptoms of infestation are moderate to severe defoliation and fruit drop.

Badly infested branches can be pruned out and destroyed. Oils and soap sprays can provide control however they must be applied several times. Chemical controls labeled for citrus can be used. Good coverage of any spray is essential to get any control of this pest.

Interesting Fact: *Ants are usually found visiting scale (and also aphids, mealybug or whitefly) infested plants to collect the 'honeydew' produced. Eliminating the scale or other sucking pest will resolve the ant problem.*

Citrus Rust Mite

The adult rust mite is extremely small 1/200 of an inch (0.15mm) and cone shaped. These mites are a light yellow colour and are barely visible by eye.

In the spring, mites migrate to the spring flush, where they feed on the

underside of the leaves. It is very difficult to see these mites unaided, so it is more suitable to learn to identify the damage caused by these mites, and use preventative sprays (or you can just live with imperfect looking fruit).

Citrus rust mites have piercing-sucking mouthparts and feed by penetrating the plant cells. Injury on the upper leaf surface results in small brown spots referred to as russeting. The greatest damage occurs when feeding occurs on the lower leaf surface. Damage to critical cells on the leaf underside can lead to leaves losing water and leaf drop. Injury during early fruit growth causes a "silvering" of the peel which may lead to a condition called "shark-skin" where the peel has a rough texture to it. Injury to older fruit results in a "bronzed" or brown sheen to the peel. Citrus rust mite does not like full shade and moves toward light, but avoids direct sunlight. This avoidance of solar exposure results in non-injured fruit areas commonly called "sun spots".

If you have had rust mites last year (if your fruit is not squeaky clean, chances are you have had them) you are likely to have another problem this year. Spray with horticultural oils in the early spring and again in the early summer. More sprays will be needed if populations are high. Mite infestations normally peak in the hot dry weather of the summer months.

Interesting Fact: *Mites have eight legs as they are more closely related to spiders than insects. However the rust mites are in a group that only has four legs. The other four have been significantly reduced as the body has adapted into the unusual cone shape.*

Important To Note – Use Pesticides Sparingly and Safely

Many non-toxic or less-toxic products are available for citrus pest control including horticultural oils, neem and soap products. We suggest you use toxic chemicals as a last resort to control pests. Ensure that you are using

the right product to control the right pest and that the product is labeled for use on citrus. Many products are NOT. Use the product according the label instructions and follow all safety equipment requirements. Take into consideration that chemical pesticides will also kill any natural enemies that are trying to help control your pest problem. Also ensure your trees have adequate water before applying pesticides. Drought stressed trees are more likely to have a negative reaction to a treatment.

Claire Jessey
Plant Protection Officer (Entomologist)
Department of Environmental Protection

PLANTING CALENDAR – WHAT TO PLANT IN THE SUMMER...

Vegetables:
June
Beans, Cucumber, Squash, Tomato

July
Beans, Carrots, Tomato

August
Beans, Broccoli, Brussel sprouts, Cabbage, Carrots, Kale, Leeks, Mustard Greens, Pepper, Radish, Rutabaga, Tomato

Flowers:
June
Amaranthus, balsam, calendula, celosia, coreopsis, cosmos, gaillardia, gazania, globe amaranth, hollyhock, marigold, portulaca, rudbeckia, vinca and zinnia

July
Celosia, cosmos, gazania, globe amaranth, impatiens, marigold, salvia, snow-on-the-mountain, vinca and zinnia

August
Celosia, cosmos, gazania, globe amaranth, impatiens, marigold, salvia, snow-on-the-mountain, vinca and zinnia

ON HER MAJESTY'S SERVICE

GOVERNMENT OF BERMUDA

Ministry of Environment, Planning and Infrastructure Strategy

PUBLISHED BY: GOVERNMENT OF BERMUDA • MINISTRY OF THE ENVIRONMENT, PLANNING AND INFRASTRUCTURE STRATEGY• DAME LOIS BROWNE EVANS BUILDING • 58 COURT STREET • HAMILTON HM 12 • BERMUDA • DESIGN: DEPARTMENT OF COMMUNICATION AND INFORMATION