Butterfly Basics:

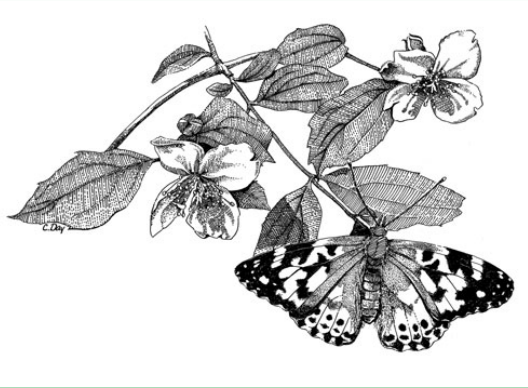
Gardening For Pollinators

From Garden to Campus Workshop Series

Presented by: Anne Madden
Interpretation Coordinator
MUN Botanical Garden

MUN Botanical Garden
Memorial University of Newfoundland

WELCOME



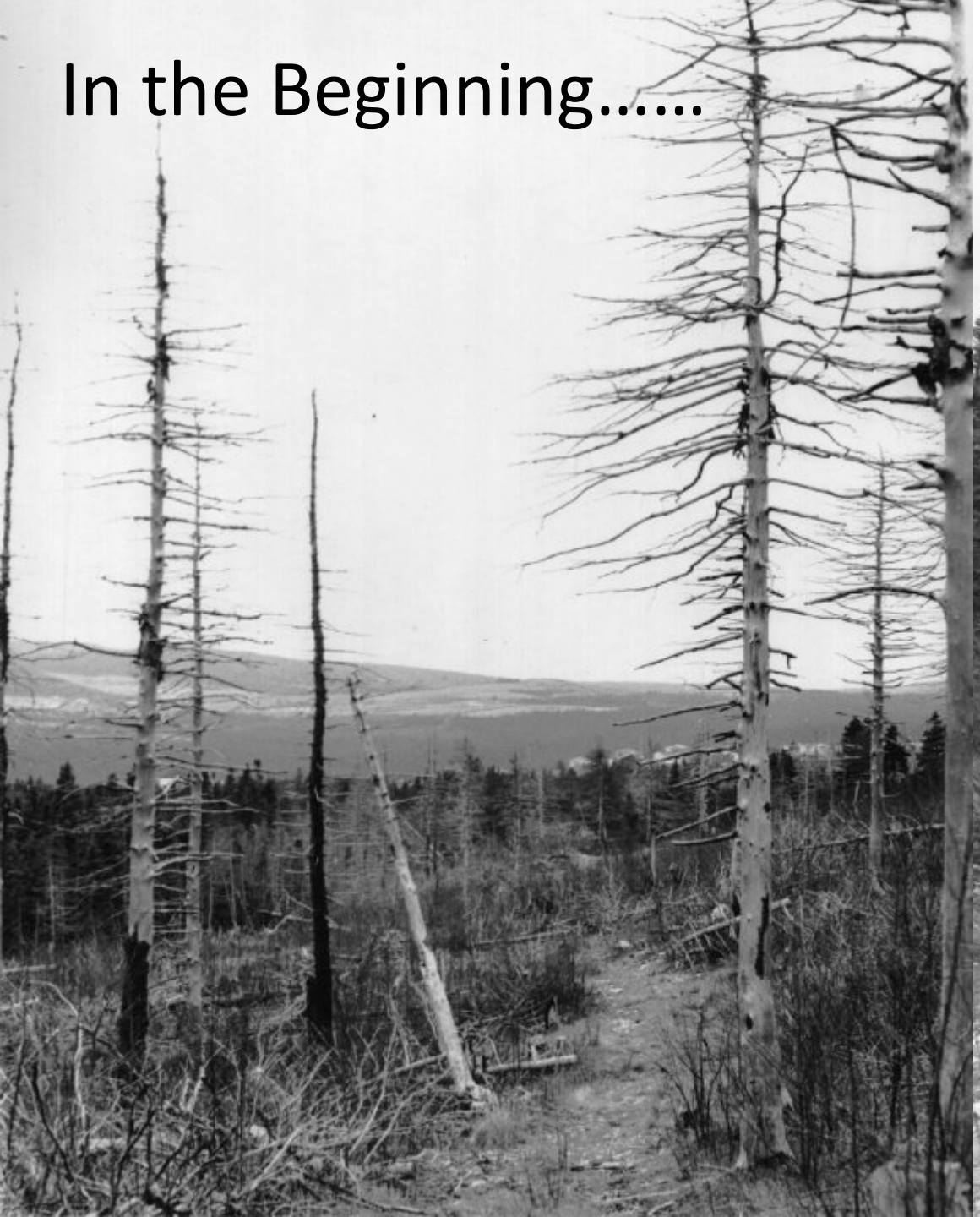
- Safety Moment: In case of an emergency
- Washrooms, Evaluations, Questions
- This PowerPoint will be posted on the MUN Botanical Garden Website: ww.mun.ca/botgarden
- Today's presentation is based on the work of Dr. Bernard S. Jackson, MUNBG's first curator/director
- Photos courtesy of Todd Boland, MUNBG Research Horticulturist

Dr. Bernard S. Jackson

- Butterflies have always been encouraged at MUN Botanical Garden.
- Our first curator Dr. Bernard S. Jackson did extensive research on our native butterflies, including suitable nectar and host plants, management practices, conservation, and species identification.
- The abundance of butterflies residing at the Botanical Garden is proof that these management practices can work in any garden.

Silver-edged Fritillary on Autumn Dandelion

In the Beginning……



Charlie Horse

Butterfly Basics:

Food & Shelter

- Food: Flowers & Foliage
  (Nectar sources & host plants)
- Protection: Sun & Shelter
- Place to raise offspring: Host plants
- Healthy Environment: Pesticide-free?

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Butterfly Life Cycle

In order to understand how to attract butterflies to your garden,

you need to understand their life cycle.

Cabbage White Butterflies on *Allium*

Short-tailed Swallowtail

Short-tailed Swallowtail

Short-tailed Swallowtail

Short-tailed Swallowtail

Short-tailed Swallowtail

Short-tailed Swallowtail

Butterfly Life Cycle

- A butterfly undergoes complete metamorphosis.
- Its four stages of development are:
  1. Egg (ova): eggs are usually laid on leaves of certain plants; sometimes they are laid in the soil or at the bottom of a host plant (i.e. wild grasses).
  2. Caterpillar (larvae): when the eggs hatch, the caterpillar often feasts on the leaves of the plant it was born on.
  3. Chrysalis (pupae): at this stage, the pupae should not be disturbed.
  4. Adult butterfly (imago): the adult butterfly will search for food (nectar) and a mate.

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Canadian Tiger Swallowtail

Canadian Tiger Swallowtail

(Papilio canadensis Rothschild & Jordan, 1906)

- On the wing in June & July. One generation/year
- Hibernation takes place as a pupa
- As with the short-tailed swallowtail, the young larvae resemble a birds dropping.
- Host Plants include:
  - *Amelanchier bartramiana* (Wild pear)
  - *Betula* spp. (Birch)
  - *Crataegus* spp. (Hawthorn)
  - *Malus baccatta*. M. “MAKAMIK” (Apple)
  - Populus alba, P. balsamifera (Poplars)
  - *Populus tremuloides* (Trembling Aspen)
  - *Prunus pensylvanica* (Pin Cherry)
  - *Salix* spp. (Willow)
  - *Sorbus americana* (Dogberry or Mountain Ash)

Rhodora is a native nectar source

Canadian Tiger Swallowtail

Nectar Sources

- *Acer spicatum:* Mountain Maple
- *Allium schoenoprasum:* Chives
- *Alyssum saxatile:* Basket-of-Gold
- *Barbarea vulgaris*: Winter cress
- *Campanula carpatica*: Harebell
- *Chamaedaphne calyculata*: Leatherleaf
- *Cheiranthus allionii*: Siberian wallflower
- *Dianthus barbatus* 'Wee Willie': Sweet William
- *Echium vulgare* hybrids: Echium
- *Hemerocallis* sp.: Daylily
- *Hesperis matronalis*: Sweet rocket
- *Heuchera racemose*: Coral Bells (Yellow)
- *Lonicera morrowii*: Bush Honeysuckle
- *Malus* 'Makamik': Crabapple
- *Myotis* sp.: Forget-me-not
- *Philadelphus* sp.: Mock Orange

Swallowtail on *Cremanthodium* (daisy family)

Mourning Cloak (*Nymphalis antiopa* Linnaeus, 1758)

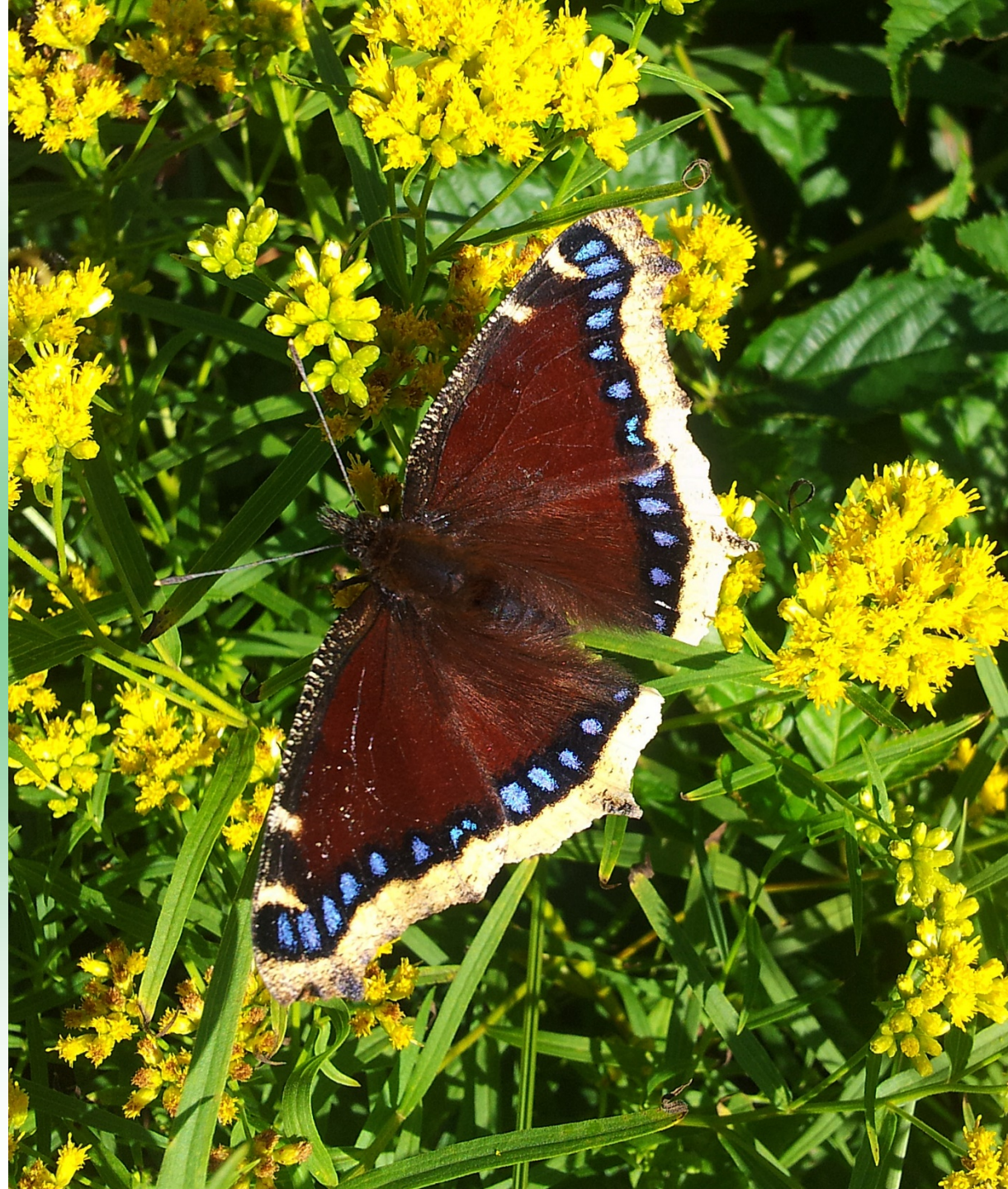
Mourning Cloak adult on *Solidago* (above) & larvae on O*nopordum*, milk thistle (right).

- This butterfly overwinters as an adult and is often the first to be seen in spring.
- On the wing in spring and late summer/fall.
- In Newfoundland, the food of the caterpillar is mainly willow and poplar.

Mourning Cloak

Nectar Sources

- *Anaphalis margaritacea:* Pearly Everlasting
- *Arabis alpina rosea:* Rock cress
- *Buddleia davidii* 'White profusion': Butterfly Bush
- *Calluna vulgaris* 'H.E. Beale': Heather
- *Chionodoxa luciliae:* Glory of the Snow
- *Chrysanthemum maximum*: Shasta daisy (single)
- *Crocus chrysanthus":* Crocus
- *Daphne mezereum:* Spring Daphne
- *Draba azoides:* Draba
- *Erica carnea* 'King George': Spring Heath
- *Helichrysum bracteatum:* Strawflower
- *Linaria repens*: Pale toadflax
- *Lythrum salicaria* 'Morden Gleam': Purple Loosestrife
- *Phlox paniculata:* Fall phlox
- *Phlox subulata:* Creeping phlox
- *Pulsatilla vulgaris:* Pasque Flower
- *Salix* sp.: Pussy willow
- *Saponaria officinalis:* Bouncing Bet
- *Sedum spectabile:* Showy Sedum
- *Solidago graminifolia:* Lance-leaved goldenrod
- *Tagetes patula* 'Naughty Marietta': French marigold
- *Trifolium pretense:* Red clover
- *Viola* sp.:Pansy



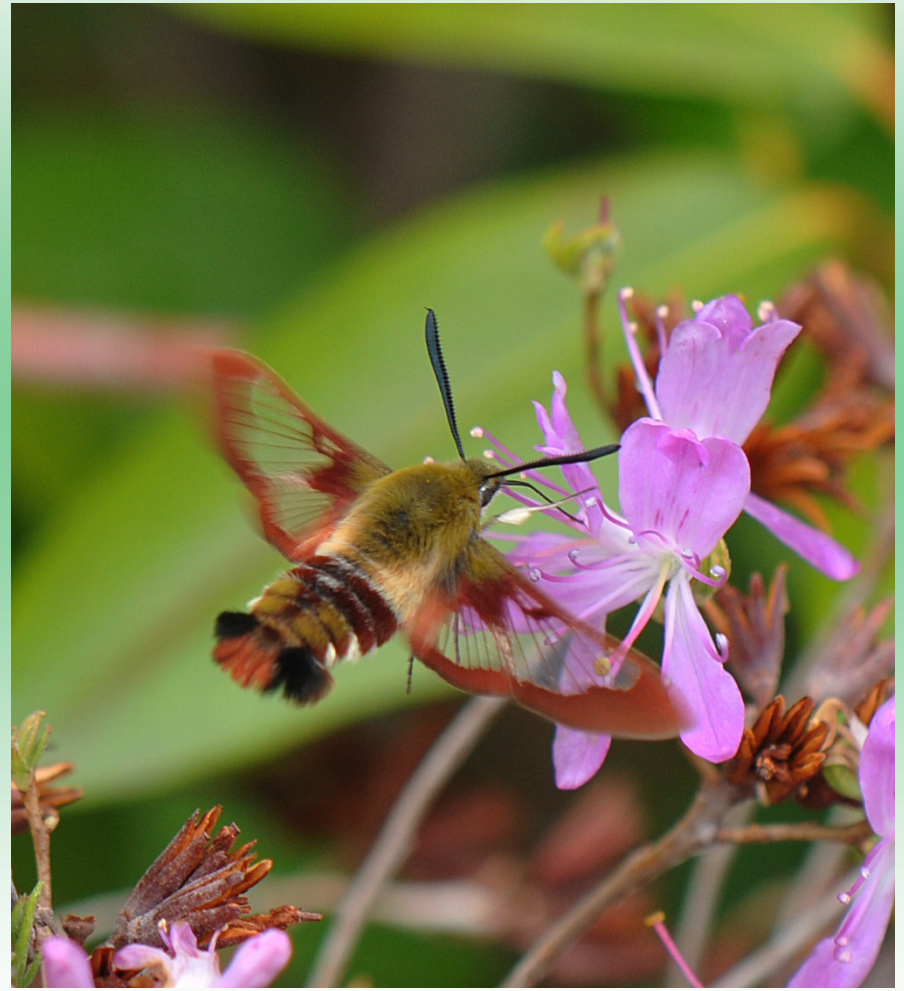
Painted Lady (*Vanessa cardui* Linnaeus, 1758)

Painted lady caterpillar on *Onopordum* (Milk Thistle)

- Its range is from coast to coast in Canada, and on all continents except Antarctica and South America. Possibly the most cosmopolitan of all butterflies.
- This butterfly is a migrant into Newfoundland. Some years we have many, whereas in others there are none.
- Earliest record for the Garden is May 12 and the latest is October 24.
- Recorded nectaring on 50 types of flowers.

Painted Lady on Lance-leaved goldenrod

Hummingbird Hawkmoth



Adult nectaring on *Rhodora* (left) and caterpillar feeding on Chokecherry (right)

Butterfly Garden
Location and Management

- Butterflies are cold-blooded: they are active during warm weather.
- The scales on their wings are easily damaged by rain (and handling by humans), so they avoid wet weather.
- Sunny, warm days are the preferred weather conditions for butterflies.
- In a wildlife friendly garden, provide a location that is sunny and reasonably sheltered.
- Unlike bees, butterflies are not strong fliers.

Host Plants

Short-tailed Swallowtail larvae on Hemlock Parsley

- Butterflies are dependent upon plants throughout their juvenile (caterpillar) stage as well as their adult stage.

- The plants (referred to as ‘host’ plants) fed upon as larvae may be completely different from the plant species the butterfly nectars upon as adults.

Host Plants

- Most butterfly gardening resources provide nectar sources for the adult, but omit host plants for their caterpillars. You can’t have one without the other.
- Did you know adult butterflies can identify plants? They have to know which plants are suitable host plants to lay their eggs.

Canadian Tiger Swallowtail larvae on Birch Leaf

Nectar Sources

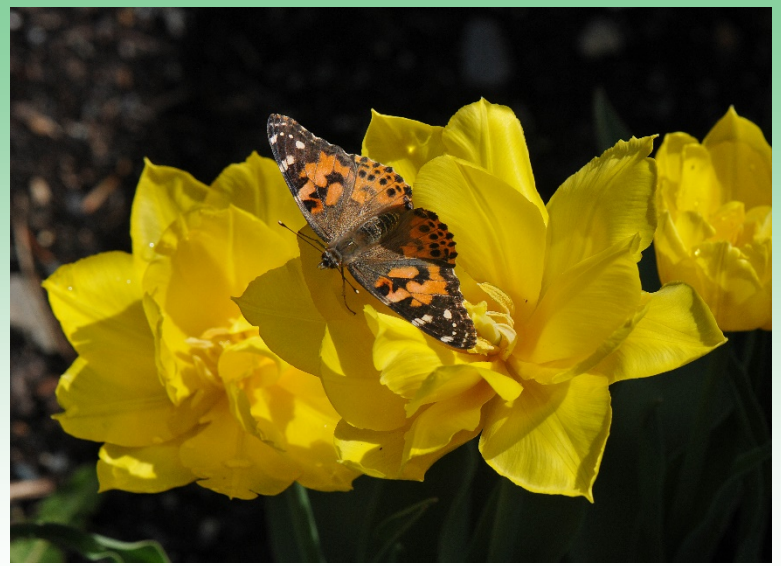
For a nectar source to be of any use, the flower has to be blooming and producing nectar when the butterfly species is on the wing.

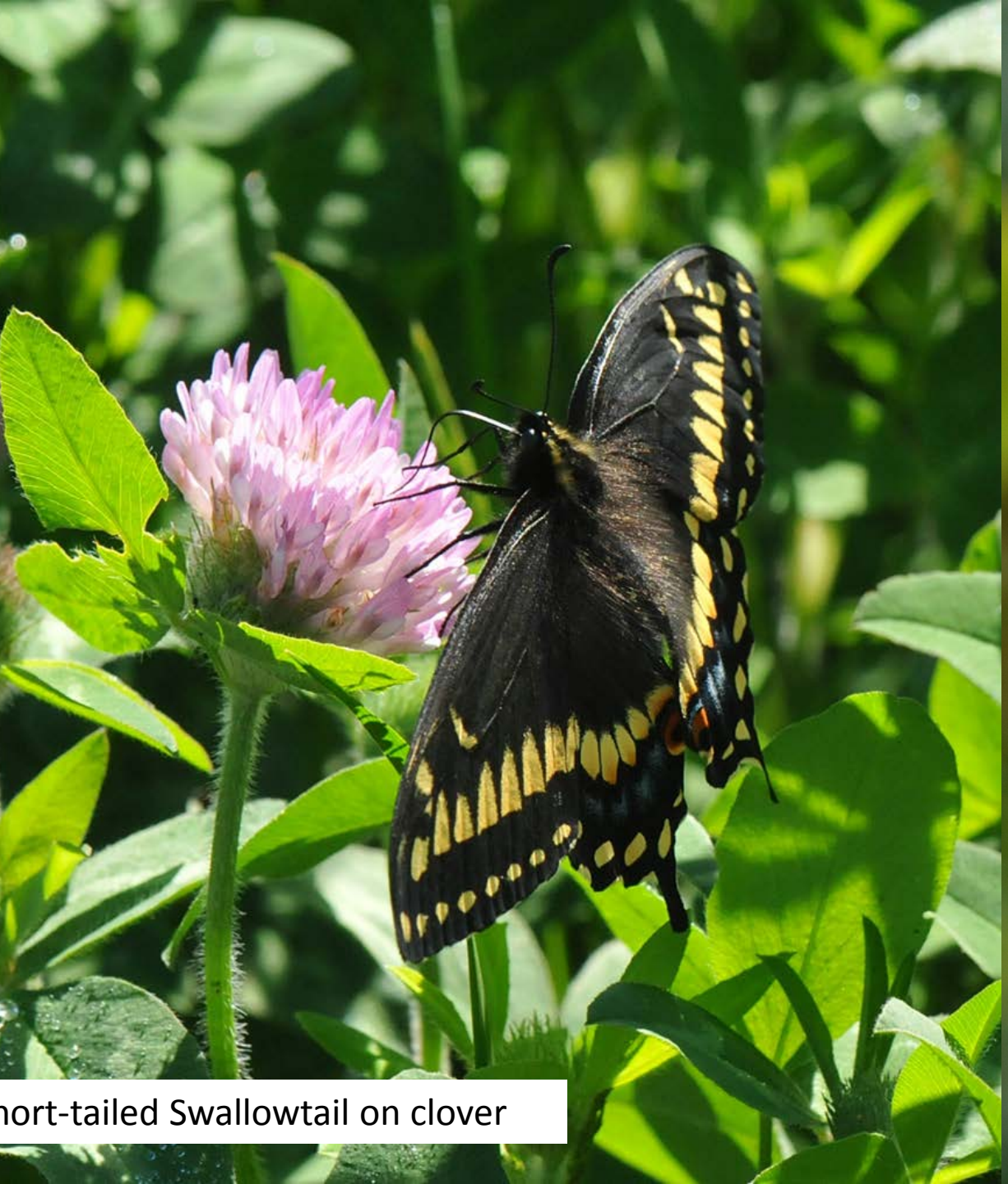
- Adult butterflies are easier to accommodate than their larvae.
- Adult butterflies are attracted to a wide variety of plants.
- Main criteria: flowers head needs to be relatively flat (i.e. a landing pad of sorts!)
- Bees often approach a flower from the side and they will crawl into tubular flowers.
- Butterflies approach flowers from above and generally land as they feed.

Nectar Sources

Pulsatilla vulgaris (Pasque Flower) is a nectar source for Milbert's Tortoiseshell, Mounring Cloak and Painted Lady butterflies.

Below: American Painted Lady on *Tulipa.*





hort-tailed Swallowtail on clover

Red Admiral on *Allium* sp

Green Comma butterfly on Spring Heath

Newfoundland Nectar Sources

Early spring is a challenging time of year in Newfoundland for nectar sources.

Dandelions and Spring Heath (*Erica carnea*) are excellent spring nectar plants for pollinators.

Garden Nectar Sources

- Butterflies are most attracted to yellow, orange and red flowers.
- Many herbs (marjoram, oregano, thyme, lavender) are ideal.
- Annuals, perennials, trees, shrubs and grasses can be used to attract butterflies.
- Fragrant flowers are highly attractive.
- Many new plant hybrids are sterile and useless for pollinators.

Garden Nectar Sources

- Daisies, which belong to the plant family Asteraceae, provide the perfect landing pad for butterflies.
- Members of this family include daisies, sunflowers, asters, chrysanthemums, dandelions, goldenrod, coneflowers, thistles, marigolds, chamomile, and more.
- Did you know that butterflies taste with their feet?

Milbert’s Tortoiseshell on Michelmas Daisy

Garden Nectar Sources

Garden phlox (*Phlox* spp), & Butterfly Bush (*Buddleia*) are excellent nectar sources.
Spring Azure on Creeping Phlox (left)
Painted Lady on *Buddleia* (below)

Garden Nectar Sources

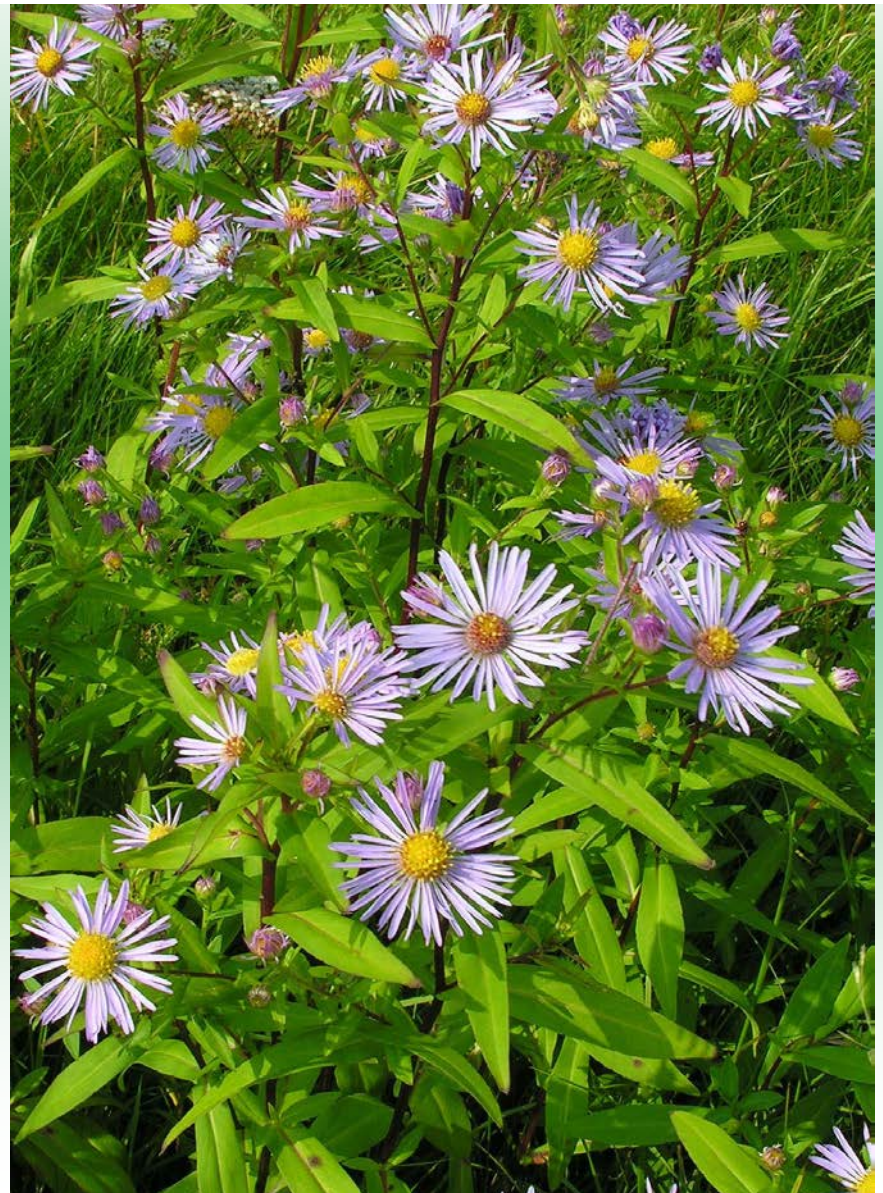
Pinks (*Dianthus* spp) are excellent butterfly flowers.

Spring Azure on *Dianthus* sp. (right)

Garden Nectar Sources

- Autumn Joy Sedum (*Sedum spectabile*) is a tried-and-true perennial for Newfoundland gardens and a fabulous flower for local bees and butterflies including:
- Green Comma
- Milbert's Tortoiseshell
- Mourning Cloak
- Red Admiral
- Painted Lady *(Pictured with native half-black bumblebee*)

Rough Meadows and Other Butterfly Habitats



- In addition to flower beds, rough meadows provide excellent habitat for a variety of nectaring insects, including butterflies.
- Rough meadows along roadsides, abandoned railways, and other ‘waste areas’, are often home to the greatest diversity of butterflies.
- Such areas are often populated by plants associated with sunny sites of mixed vegetation, including grass which has not been mowed.
- Adults feed from the blossoms and may lay eggs on any suitable host plants found in these areas.

Rough Meadows and Other Butterfly Habitats

- Collect the required plants or seeds to introduce, roughly disturb the surface in your chosen site and then plant.
- The best times to plant the ‘wild’ meadow is early spring, before the plants have put on much growth, or later in the fall when they start to yellow.
- No need to fertilize or lime the meadows as our native or naturalized wildflowers are adapted to poor soils.
- Tall grass, which has not been mowed, is an excellent host plant for our little skipper butterflies and the seeds provide food for native birds.

European Skipper

Native Plants

- It is wise to stick to native plants if at all possible because native butterflies are adapted to such plants.
- Also, the intentional encouragement of alien species could cause problems for nearby farmers and may, in some instances, be illegal.

Salix (willow) is both a host and nectar source for Mourning Cloak and Green Comma (right)

Solidago graminifolia (Lance-leaved goldenrod)

- American Lady
- Clouded Sulphur
- Compton Tortoiseshell
- European Skipper
- Green Comma
- Milbert's Tortoiseshell
- Monarch
- Mourning Cloak
- Painted Lady
- Red Admiral
- White Admiral

Anaphalis margaritacea (Pearly everlasting)

- Atlantis Fritillary
- Bog Copper
- Cabbage White
- Dorcas Copper
- European Skipper
- Milbert's Tortoiseshell
- Mourning Cloak
- Northern Blue
- Pink-edged Sulphur
- Red Admiral
- Silver Bordered Fritillary
- White Admiral

Native Shrubs

- A few native shrubs could be encouraged in certain patches of the meadows but take care not to create too much shade.
- Dry Locations: Northern Wild Raisin (*Viburnum cassinoides*), Blueberry (*Vaccinium angustifolium*) and Shrubby Cinquefoil (*Potentilla fruiticosa*)
- Moist locations: Willows (Salix spp.), Mountain alder (*Alnus viridis ssp.crispa*).
- These shrubs are known host plants for the Spring Azure, Tiger Swallowtail, Mourning Cloak, Green Comma and the Hummingbird Hawkmoth.

Ledum groenlandicum (Labrador Tea)

Nectar Source for:

- Arctic Blue
- Common Ringlet
- Jutta Arctic
- Painted Lady
- Short-tailed Swallowtail

Chamaedaphne calyculata (Leatherleaf)

Nectar Source for:

- Brown Elfin
- Canadian Tiger Swallowtail
- Eastern Comma
- Green Comma
- Spring Azure

Vaccinium angustifolium (Blueberry)

Nectar Source for:

- Arctic Skipper
- Brown Elfin
- Painted Lady
- Spring Azure
- Short-tailed Swallowtail

Damp Areas

- Damp areas are useful in butterfly management for they provide a suitable habitat for some useful butterfly vegetation.
- Caterpillar host plants such as willows (for mourning cloaks), alders (for green commas), violets (for fritillaries) and cranberry (for bog coppers), grow well in a moist environment.
- Some useful nectar sources, particularly the late summer flowering Joe-pye-weed (*Eupatorium maculatum*) grow well in a moist soil.

Eupatorium maculatum (Spotted Joe-Pye weed)

Nectar Source for:

- Atlantis Fritillary
- Bog Copper
- Cabbage White
- Green Comma
- Milbert's Tortoiseshell
- Northern Blue
- Painted Lady
- Red Admiral
- Silver Bordered Fritillary

Trees

- The natural edges of a deciduous and/or coniferous forest not only provide habitat for some butterfly species, but the trees can act as a wind-break for your garden.
- Mourning Cloaks, Red Admirals and Milbert's Tortoiseshells have been observed feeding on Birch or Willow sap in the Botanical Garden. Mourning Cloaks have also been seen feeding on the juice of dogberries (*Sorbus* sp).

Rocks, Compost

- We have seen butterflies emerging from old stone walls and rock piles. This is why we left rock piles along the edge of some of the trails here in the Botanical Garden.
- Red Admirals have been attracted to bruised apples put out for them here at the Garden and a compost pile, located in a sunny, sheltered location, could indeed attract butterflies searching for food.

Weed or Wildflower?

- In many areas of Canada, and certainly here in Newfoundland, there are a number of alien ‘weeds’ that have been here so long and are so well established that it is difficult to think of them as anything other than native.
- The Common Dandelion and Black Knapweed are examples.

Centaurea nigra (Black Knapweed)

- American Lady
- Atlantis Fritillary
- European Skipper
- Green Comma
- Milbert's Tortoiseshell
- Monarch
- Painted Lady
- Red Admiral
- Short-tailed Swallowtail
- White Admiral

Red admiral (left) & Short-tailed Swallowtail (right) on black knapweed.

Taraxacum officinale (Dandelion)

- Cabbage White
- Canadian Tiger Swallowtail
- Eastern Comma
- Green Comma
- Painted Lady
- Red Admiral
- Short-tailed Swallowtail
- Spring Azure

Trifolium pratense (Red clover)

- American Lady
- Arctic Skipper
- Atlantis Fritillary
- Canadian Tiger Swallowtail
- Common Ringlet
- European Skipper
- Monarch
- Mourning Cloak
- Painted Lady
- Pink-edged Sulphur
- White Admiral

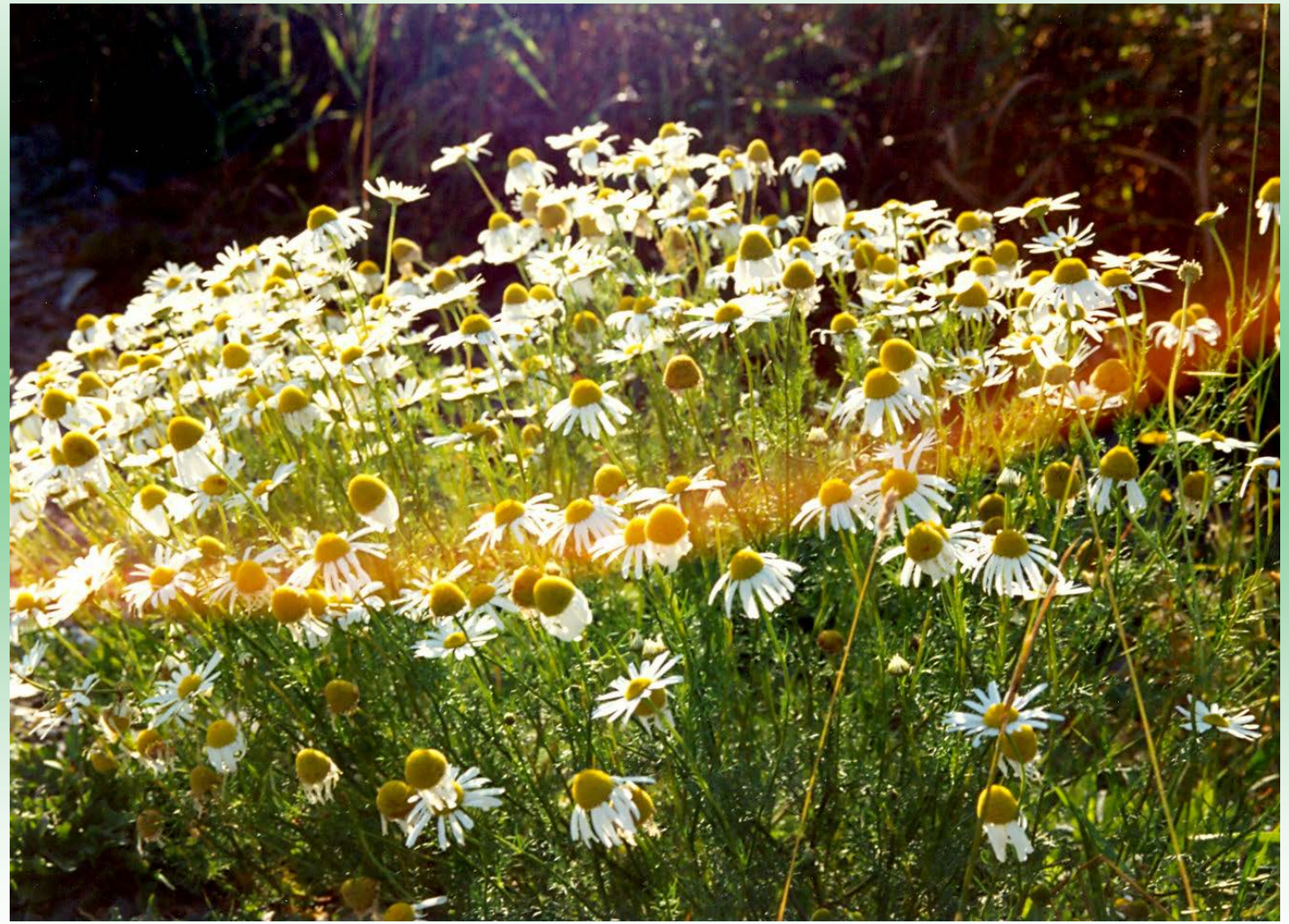
Northern Blue on red clover (right).

Achillea millefolium (Yarrow)

- American Lady
- Atlantis Fritillary
- Clouded Sulphur
- Compton Tortoiseshell
- Milbert’s Tortoiseshell
- Painted Lady
- Red Admiral

Chrysanthemum leucanthemum (Ox-eye daisy)

- Arctic Skipper
- Atlantis Fritillary
- Clouded Sulphur
- Common Ringlet
- Dorcas Copper
- European Skipper
- Milbert’s Tortoiseshell
- Northern Blue
- Northern Crescent



Cirsium arvense (Canada Thistle)

- Atlantis Fritillary
- Cabbage White
- European Skipper
- Green Comma
- Milbert’s Tortoiseshell
- Painted Lady
- Red Admiral
- White Admiral

Monarchs

- Not native to Newfoundland.
- Caterpillars feed exclusively on milkweed (*Asclepias* spp.), also not native to the province.
- Monarchs migrate in the fall to an overwintering site in Mexico.
- Newfoundland has never part of their innate migration route nor are these butterflies used to crossing large bodies of water.

Cabbage: Non-native Nuisance

- Caterpillars of cabbage white butterfly can do serious damage to crops such as cabbage, turnip and broccoli.
- European skipper caterpillars can damage hay crops.
- Both are native to Europe
- None of our native butterflies cause serious damage to commercial crops and most do not feed upon on garden ornamentals, preferring instead, native or naturalized wildflowers. As adult, they will nectar upon wildflowers but will also partake our garden ornamentals.

Wintering Sites

- Butterflies that overwinter in the adult stage must do so in a place that offers protection from the inclement weather and from overwintering predators such as shrews, jays, etc.
- Examples include Red Admiral, Green Comma, Milbert's Tortoiseshell and Mourning Cloak.
- Such butterflies usually spend the winter behind a piece of loose bark, inside a hollow tree and other natural recesses.

The Butterfly Shelter

Log piles have been used to provide wildlife habitat for years.
Could we enhance it for butterflies?

Log Pile Construction

- Make the bottom layer as level as possible, with all pieces of wood running the same way and three to twelve inches apart.
- Position the second row on top of the first, running in the opposite direction. Looking down on it will give the impression of a series of squares.
- The third row should follow the direction of the first, the fourth the direction of the second and so on, until the stack is the height you want. (Continued)

Log Pile Construction (Continued):

- Before putting the last layer in place, cover the top of the pile with a layer of overlapping strips of roofing felt pinned down with large-headed roofing nails. This protects the cavities from rain and snow, yet allows good air circulation from the sides.
- Lay the final layer of logs in position to stabilize the felt and offer some measure of camouflage.
- Note: In the early days, plastic was used instead of the roofing felt, but it would become brittle and disintegrate after a few years.

Log Pile Construction (Continued):

- At MUN Botanical Garden, our butterfly shelters are approximately five feet high. Home gardeners may find a smaller size more appropriate.
- The greater the diameter of the logs, the fewer the number of layers used, and therefore, the fewer the number of cavities created. (So our little Newfoundland trees are a perfect size).

Milbert’s Tortoiseshell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Green Comma

Mourning Cloak


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Red Admiral

Log Pile Location

Knowledge of local butterfly activity is important when considering a site for placement; in other words, the butterflies must be able to find it.

Ideal locations include:

- Edge zones of forests
- Rough ground grown up to grasses and forbs
- Sunny clearings among the deciduous scrub regenerating from a burned-out forest
- Near your flower or vegetable beds

Log Pile Site Enhancement

Host Plants & Nectar Sources

- Plant appropriate host plants against the log pile so final instar caterpillars will enter the cavities to pupate.
- Not only will roosting or overwintering adults benefit from a log pile, their chrysalids and those of the short-tailed swallowtail (*Papilio brevicauda*) and possibly tiger swallowtail (*P. glaucus canadensis*) will benefit as well.
- Mourning Cloak, Milbert's Tortoiseshell, Green Comma and Red Admiral butterflies are all species which can benefit from a log pile butterfly shelter.

Host Plants & Nectar Sources

- Tucking such plants against the log pile creates a more natural, less obvious effect.
- Nectar sources nearby will provide food for newly emerging adults.

Red Admiral on *Urtica dioica*, Stinging Nettle host plant

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Host Plants & Nectar Sources

Excellent host plants include:

- Stinging Nettle (*Urtica dioica*)
  Hops (*Humulus lupulus*)
  Garden lovage (*Levisticum officinale).*

Red Admiral chrysalid on *Urtica dioica (*Stinging Nettle).

Other Wildlife:

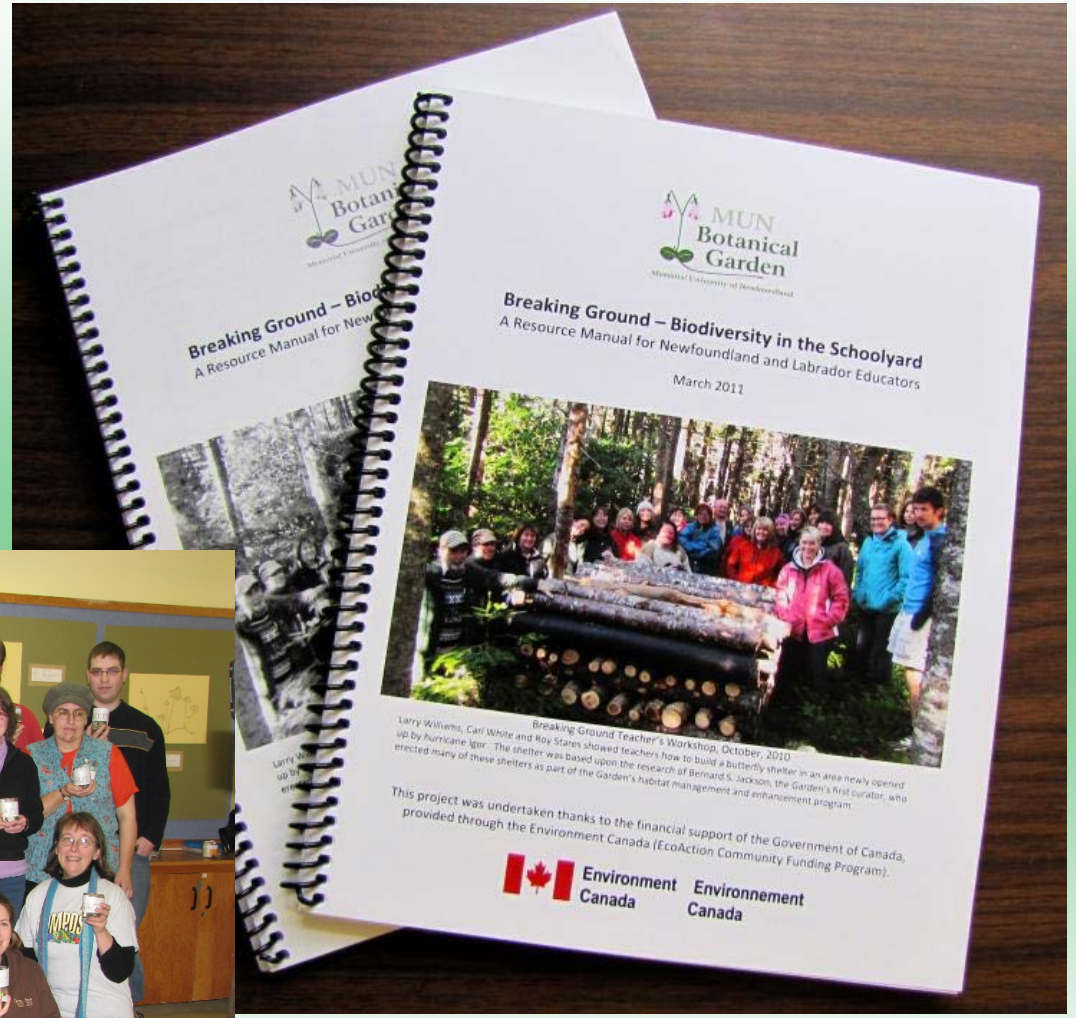
Shelters are also a potential benefit to certain forms of wildlife other than butterflies.

- Many other insects find a home there.
- Small mammals such as the meadow vole, snowshoe hare, and red squirrel may utilize them as retreat cover.
- Insectivorous birds may use them as foraging sites.
- Bats could also use them.
- Having witnessed Milbert's Tortoise shells emerging from dry stone walls, we have also built rock piles for the butterflies in our Botanical Garden. But that is another story…….

Breaking Ground

Biodiversity in the Schoolyard
A Resource Manuel for Newfoundland and Labrador Educators

Financial support provided by Environment Canada (EcoAction Community Funding Program).



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To get in touch:

Anne Madden
Education Coordinator
MUN Botanical Garden
(306 Mount Scio Road)
Memorial University of Newfoundland
St. John’s, NL A1C 5S7

Website: www.mun.ca/botgarden
Telephone: 709-864-8590
E-mail: amadden@mun.ca