2014 Year of the LEPIDOPTERA

Pre-requisitie Test Presentation
By Brian Bockhahn
Why didn’t the butterfly go to the dance?

Because it was a moth ball!
Just what are they???

Animal Kingdom
Arthropod Phylum
Insect Class
**Lepidoptera** Order
Butterflies and Moths

Lepido: Scale
ptera: wing
How many are there in NC?

There are 17 times as many moths as there are butterflies!

3,011+ moth species! 176 butterfly species!
Why are leps important???

- Pollinate flowers
- Indicator species
- Enjoyable to watch
- Link in food chain
- Challenging to identify different species
- Diverse!

For the Love of Butterflies
Some differences between butterflies and moths...
Butterflies vs. Moths

Diurnal
heat from sun

Nocturnal
Gain heat from flight

There are just a few day active moths, but no night active butterflies.
Butterflies vs. Moths

- Clubbed Antenna
- Straight or feathered
Butterflies vs. Moths

Wing position while **perched** or **resting**, when basking butterflies will hold their wings flat.
Butterflies vs. Moths

No wing hooks Frenaculum

This makes moths really bad fliers, no wonder they fly into porch lights!
Butterflies vs. Moths

Body with few hairs

Hairy body
Butterflies vs. Moths

Most feed only as larva

Feed with proboscis
Butterflies vs. Moths

Chrysalis

Cocoon
Lepidoptera anatomy

- **Head** with eyes, antenna and proboscis
- **Thorax** with three pairs of legs and two pairs of wings
- **Abdomen** with reproductive organs
- **Taste buds** on feet
Lepidoptera life cycle

COMPLETE METAMORPHOSIS
Egg laying

- Mated female lays eggs on specific caterpillar foodplants
- Some lay one egg per plant or egg masses
- Eggs vary by family
- Butterflies lay from a few dozen to a few thousand eggs (average = 100)
Larval stage - Caterpillar

- **Eggs hatch** in less than one week
- In 2-3 weeks the feeding caterpillar sheds skin 3-4 times
- Most do not survive
- Identification difficult
- EAT, EAT and avoid being eaten
Pupal stage
chrysalis or cocoon

• After reaching full size caterpillar attaches and forms a chrysalis
• Moths will spin a silken cocoon around their bodies
• Tissues and structures break down and are replaced with adult structure (imaginal cells)
• Hatch in one to two weeks, a few months and sometimes over winter.
Adult Emergence

- When adult is fully formed the chrysalis splits open
- Adult pumps fluid through its wings to extend and set them
- Once it emerges it will grow no larger
- Males emerge earlier
Courtship

- Males patrol or perch in territories
- Some fly to female to **mate** if receptive
- Some fan wings to dispense pheromones
- Some engage in upward spiraling mating **flights**
- Spermatophore is transferred from male to female
Life spans

- Most adults live for one to two weeks
- Some as short as a week
- Migratory species up to eight months
- Many are taken by predators
- Butterflies usually live longer than moths
Broods

- Lepidoptera complete 1-5 life cycles, or broods each year
- Some are in spring or fall only
- Many broods overlap so you can see fresh and worn individuals
- Last broods eggs overwinter

Flight chart from Butterflies of North Carolina website
Colors and patterns

- Wings are covered by pigmented scales
- Most are sexually dimorphic, males inseparable from females
- Multiple brooded species vary seasonally in color or pattern
- Coloration helps attract mates, scare predators or act as camouflage.
Size

• Females tend to be larger than males
• Spring and fall broods sometimes smaller in size than summer broods
• Sizes range from ½ inch to 5 inches
• Size is determined by caterpillar growth, so foodplants are important!
Distribution

- Temperature extremes
- Caterpillar food plant
- And/or adult nectar sources
- Can change over time
- Many endemic species
- Venus fly trap moth found nowhere else in the world!

Range Map from Butterflies of North Carolina website
Behavior - feeding

- Adult butterflies feed with a proboscis
- Used as a straw to drink nectar
- Some have different length proboscis
- Certain flowers attract more species
Behavior - Basking

- Gain heat from sun
- Cold blooded
- Dorsal basking on flat surfaces
- Lateral basking on leaves or other perches
Behavior - Hilltopping

- Butterfly singles bar
- Males perch and wait or patrol for females
- Unmated females visit the area
- Open hill tops with steep sides are best
Behavior – puddling, etc

- Butterflies congregate at mud puddles to imbibe salts
- They can also imbibe sweat from humans
- Scat and roadkill provide some nutrients
- Emperors & Snouts
Moth behavior - lights

• Moths are attracted to a wide variety of lights
• They use the moon to navigate and are confused by man made light sources
• Ultraviolet or UV light will bring in many species
• “like a moth to a flame”
How to identify Lepidoptera

- ID to family level
- Consider time of year
- Consider habitat type
- Consider what plants they are associating with
- Familiarize yourself with photos
- Remember appearances change and variation occurs
- If questionable about ID use more than one field mark
How to find Lepidoptera

• Location!
• Open areas with natural vegetation
• Search power lines, fields, roads, etc
• Timing is important
• Bring a friend
Concentrators

- Flowers (gardens)
- Hilltops
- Mud puddles
- Trails and dirt roads that are open and sunny
- Caterpillar food plants
- Regular light sources
Lepidoptera migration

- Most species disperse
- A lot of species migrate
- Northern breeders often fly south for winter
- Spring & fall migrations viewable
Conservation of Butterflies

Butterfly Conservation

Saving butterflies, moths and their habitats
Conservation: habitat destruction

- Most common cause of decline
- Wetlands drained, woodlots cut and fields are developed
- Open areas are reverting into woods
- Fire is needed, streams and natural habitats must be kept natural!
Conservation: spraying pesticides

- Spraying for Gypsy moths and mosquitoes result in HUGE lepidoptera die offs
- Spraying also increases cancer in humans
- Natural and less toxic controls do exist
Conservation: global warming

- Global warming has caused some butterflies to shift ranges to cooler climates
- Edith’s Checkerspot
- First direct biological consequence
Conservation: landowner use

- Military maneuvers on known butterfly colonies have been detrimental
- Forest Service also needs to be made aware of colonies of rare butterflies
Conservation: other factors

• Over collecting
• Pollution
• Urban Sprawl (habitat destruction)
• Butterfly releases – there’s no need, they’re already free!
What can we do?

• Help with NABA butterfly counts
• Monarch Programs
• Join local butterfly clubs to learn more
• Plant a native butterfly garden
• Spread the word!
NABA Butterfly Counts

- Performed in 15 mile diameter count circles
- All day census of butterflies
- Held during warmest months of year
- Some include Dragonflies
Monarch Programs

Monarch Butterfly

- Migrate up to 3,000 miles to warmer weather in the winter
- Their bright coloring & patterning warns predators that they are not good tasting & are poisonous.
• North American Study
• Determine Monarch Density in Milkweed patches
• Optional parasitism study
• MLMP.ORG
Monarch Watch

- **Tag monarchs** in fall as they are migrating to Mexico
- 1,728 miles!
- Monarchwatch.org
- Tags recovered during winter and spring
- Low cost
- Great for volunteers
- [Monarchwatch.org](http://Monarchwatch.org)
Oe parasite: *Ophryocystis elektroschirrha*

A co-evolved parasite that is transferred like an STD. [Monarchparasites.org](http://Monarchparasites.org)
MONARCH WAYSTATIONS
CREATE, CONSERVE, & PROTECT MONARCH HABITATS

www.MonarchWatch.org

MONARCH WAYSTATION

This site provides milkweeds, nectar sources, and shelter needed to sustain monarch butterflies as they migrate through North America. Certified and registered by Monarch Watch as an official Monarch Waystation.

CREATE, CONSERVE, & PROTECT MONARCH HABITATS

www.MonarchWatch.org
Lepidoptera Gardening

• Plant NATIVE species of nectar sources only
• Proximity to natural habitats
• Plant caterpillar food plants and expect them to get eaten!!!
• Diversify!
• Butterflies in your Backyard PDF
Lepidoptera Gardening

- Basking stones
- Damp areas or wet sandy spots
- Artificial nectar
- Butterfly boxes – DO NOT WORK
- Let it grow, WEEDS are beneficial to butterflies and other wildlife
The State Butterfly of NC

- Seen in every county in NC
- Large and recognizable with black and yellow “tiger” stripes
- Puddles regularly
- Host plant is Tulip Poplar!
Lepidoptera Resources

Caterpillars of Eastern North America
David L. Wagner

Peterson Field Guide to Moths of Northeastern North America
David Beadle & Seabrooke Leckie

Kaufman Field Guide to Butterflies of North America
Jim P. Brock & Kenny Kaufman
Lepidoptera Resources

- How Are Butterflies Like Chickens?
  Written by Betty Ann Kinsmen
  Illustrated by Deb Lanier

- The Very Hungry Caterpillar
  by Eric Carle

- The Monarch Butterfly:
  Unitig a Continent
What does a caterpillar do on New Years Day?

It turns over a new leaf!