Insects and Their Ways (Why Study Entomology?)

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WHY Would YOU Want to Study Insects and Their Relatives?

• Consider the following…
Insects---the dominant animals on earth today...

--- number of insect species far outnumber all other terrestrial animals (80% of spp. are insects!)

---They occur practically everywhere---except the Oceans!
Insects as Beneficial Creatures…

Pollinators

--it’s not just about honey bees any more…
Insects as Beneficial Creatures...

- Products---honey, beeswax, silk, lacquer
Insects as Beneficial Creatures…

• Control other insects---predators, parasitoids
Insects as Beneficial Creatures...

- Control noxious weeds
Insects as Beneficial Creatures…

• Cleaning up refuse, recycling nutrients
Insects as Beneficial Creatures…

• Forensic entomology---solving crime
Insects as Beneficial Creatures...

Treatment of certain medical conditions

Maggot Debridement Therapy (MDT) is the medical use of live maggots (fly larvae) for cleaning non-healing wounds, stimulating healing.
Insects as Beneficial Creatures…

• Education, demonstration, models, scientific deduction (heredity, gene activity, cell division, evolution, sociology, behavior, resistance pathways, physiology, etc.)
Insects as Beneficial Creatures…

• Aesthetic values---in nature, landscapes, photography, jewelry, decoration, art
Insects as Beneficial Creatures…

• Avocation, needed course(s) in your field and Vocation (purpose of this presentation ; )
Insects as Beneficial Creatures

Serve as food for humans in ancient times and even today........
Insects as Beneficial Creatures

• Insects as food for many animals…
Insects as Beneficial Creatures - Fame & Fortune!

4H & FFA projects, competitions
Some Insects are Pests...

Damage/contaminate crops
Some Insects are Pests...

Attack man’s clothes, food, possessions
Some Insects are Pests...

Some can put you on TV.....(watch Verminators on Discovery Channel?)
Some Insects are Pests...

Bite, sting, transmit disease
Just a Few Diseases Transmitted by Mosquitoes

- Malaria
- Typhus
- Yellow Fever
- Dengue Fever
- West Nile Virus
- Heartworm (dogs, cats)
- Western Equine Encephalitis
- St. Louis Encephalitis
- Eastern Equine Encephalitis

All of the above affect animals, including man---some have changed history.
Plant diseases transmitted by other insects (thrips, aphids, leafhoppers)

- Curlytop of chile, tomatoes, et al.
- Tomato spotted wilt virus
- Alfalfa mosaic
- Pierce’s disease of grape
- Oleander leaf scorch
- Pecan leaf scorch

These pathogens affect plants
Some Insects are Pests...

Some damage or destroy our landscapes.....

Western flower thrips
Aphids (Hemiptera, Aphididae)

Numerous species; plant hosts vary from few to many by spp.; alternate hosts for some spp.

Piercing-sucking mouthparts (some are virus vectors)

Females ONLY in season

Parthenogenesis; prolific!!

Simple metamorphosis; winged adults if crowded (dispersal)

Damage: sap loss, wilting, chlorosis, necrosis, leaf loss, HONEYDEW, disease, death; appearance

Insect parasitoids attack

Aphid “mummy.”
So much for the good and the bad associated with insects....

Let’s look at some of the WOW features of insects....
Longevity---Insects have lived on Earth for over 350 million years---even before dinosaurs appeared---WOW!
The largest flying insect that ever occurred was a dragonfly living in prehistoric times -WOW!

It’s wingspan was nearly 3 feet!
But wait! There’s MORE!

In ancient times
A lot of things were
Much BIGGER -WOW!

*Jaekelopterus rhenaniae*, a “sea scorpion”, 360 million Years old---a giant predator
In ancient lakes & oceans
Insects are like us…and not

Insect skeletons are on the OUTSIDE of the body

Growth requires molting, but this ends at adulthood -WOW!
Insects are like us…and not

Insects have BRAINS!---most behaviors are inherited---some
Can learn (limited); a few (very few) can REASON

Insects have SPIT!---liquify food, pre-digestion, can cause
Allergic reactions in animals/people; discolor/kill plant tissues

(30)
Insects are like us...and not

Look Ma! No Lungs!!!

Instead air enters a series of small holes in the body wall behind the head---and is piped directly to tissues using it through branched airways
Insects are like us…and not

The insect heart and blood are NOT IMPORTANT in transporting oxygen to the tissues---or in removing carbon dioxide from the tissues.

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Heart

Insect blood
Bathes all organs---
Distributes food,
Removes some wastes

Spiracle, entrance
To respiratory system
Insects are like us...and not

Insects SMELL with their antennae

All the better to SMELL you, My Dear!
Insects are like us...and not

Some insects TASTE with their FEET

“Mmmmm..”
Insects are like us…and not

Some insects HEAR with special organs in the abdomen

Front legs….

Or antennae…
Insects are the only winged invertebrates...

Adult insects of many species can have BOTH wings and legs....
This can be a good thing…

(very bad idea…)
Reproductive powers of some insects would challenge the best mathematicians….Try this…

(What we know…)

- *Drosophila* sp., fruit fly
- 100 eggs/female
- Half females, half males
- 25 generations/year
Reproductive powers of some insects would challenge the best mathematicians….

- 1\textsuperscript{st} gen. = 2 flies
- 2\textsuperscript{nd} gen. = 100 flies
- 3\textsuperscript{rd} gen. = 5000 flies
- 4\textsuperscript{th} gen. = 250,000 flies
- Etc.
- Etc.
- 25\textsuperscript{th} gen. = 1.192 \times 10^{41}
Reproductive powers of some insects would challenge the best mathematicians.…

- *If this many flies were packed into a ball…*
- 1000/cubic inch

- Form a fly ball over 96 million miles in diameter
- (distance from Earth to the Sun)
So insects and their relatives could affect me as a....

- Farmer, gardener (crop pests, disease transmission, beneficials)
- Rancher, pets (nuisance pests, animal parasites, disease transmission)
- Logger, timber resource manager, forester
- Utility worker, tree trimmer
- Wood working---wood quality, availability
- Construction---termites, carpenter ants
So insects and their relatives could affect me as a….

- Camper, outdoorsman---annoying, stinging, biting, disease transmission
- Pest control---household, landscape, disease management
- Homeowner/renter---annoying, biting-stinging, in possessions, eating the house
- Parent
- And on…and on…
So Why Study Insects?

• Why not? They’re all around us…all the time
So Why Study Insects?

• Watchable wildlife!!! Wherever you are, they are...require little specialized equipment...”cheap safari!”
So Why Study Insects?

It’s a WISE idea!
The END!!!

Thank you very much!