Dragonflies & Damselflies

of the Pinelands

By Jennifer Bulava

Dragonflies and Damselfies

- Kingdom: Animals
  - Phylum: Invertebrates
    - Class: Insects
      - Order: Odonata
- Odonata derived from the Greek *"odonto-"*, meaning tooth, referring to the strong teeth found on the mandibles of most adults
- Dragonflies and Damselflies known collectively as ***odonates***
- 4 wings move independently of one another
- Found in warm months, normally close to water with nearby vegetation

(5,900 species world-wide)

Ancient Insects

- Fast fact: Giant dragonflies from the Paleozoic Era (over 300 million years ago) were the largest insects of all time!
- 28 inch wingspan
- 17 inch body length
- Found in North America

Dragonflies

- Wings held flat out to the side at rest
- Generally larger, more powerful fliers
- Hindwing broader at the base than forewing
- Eyes large, close together

Damselflies

- Wings folded together above body at rest *
- Generally smaller (under 2 inches)
- Wings of similar size and shape
- Eyes smaller and normally separated

* Spreadwings hold their wings above their bodies but spread apart

Dragonflies

- Highly admired by Japanese for 1,000's of years, heavily used in poetry. Entire museums and sanctuaries for dragonflies in Japan!
- In North America and Britain, sometimes mistakenly called "devil's darning needles" and "horsestingers"
- NJ :3rd smallest state by area but ranks 4th for longest list of dragonfly & damselfly species of any state, behind Texas, Virginia, and New York.

Odonates as Beneficial Predators

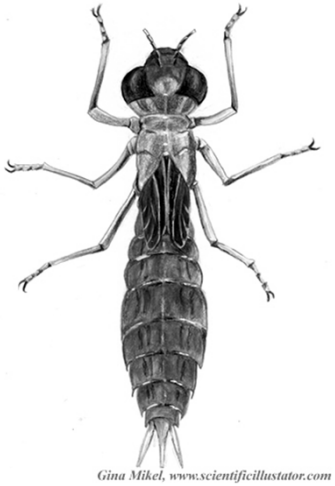
- Adults eat flying insects
- Nymphs eat aquatic prey (anything smaller than them)
- Adults & nymphs consume large quantities of insect pests, especially flies & mosquitoes!

Odonate Life Cycle

- All lay their eggs in or near the water.
  - Some lay eggs directly on the water (emeralds, skimmers, spiketails)
  - Some slice open vegetation and insert eggs inside (darners, spreadwings)
  - Some attach eggs to the outside of plants
  - Some species hatch within 5-10 days (especially those in temporary pools) while others can take several months.

Odonate Life Cycle

- Nymph Stage: Aquatic
  - Modified lower lip with two spiny barbs at the end for capturing prey
  - Top invertebrate aquatic predators in most water bodies and consume huge amounts of mosquito larvae



Odonate Life Cycle

- Metamorphosis to Adult
  - End of nymph stage, climbs out of water and attaches tightly to vegetation
  - Swallows air which causes the shell to swell and eventually split open along the top of the thorax
  - Slowly emerges from its “shell,” during this process the insect is helpless
  - The legs harden and the abdomen inflates and explants to its full length. The wings are pumped full of blood and eventually stretch and harden

Odonate Life Cycle

- Newly emerged adults are called teneral
  - Generally pale and unmarked
  - Body and wing markings take 1-2 days to fully develop.
  - At this point they can forage but cannot mate

Odonate Behavior

- Some dragonflies perch: (clubtails, whitetail, pondhawk, corporals, white face, meadowhawks, skimmers, pennants)
  - Obelisk posture: a handstand-like position that some odonates assume to prevent overheating on sunny days
  - The abdomen is raised until its tip points at the sun, minimizing the surface area exposed to sun
  - When sun is low in the sky, can raise/lower abdomen perpendicular to the sun's rays, maximizing the area exposed to sun

Odonate Behavior

- Some patrol: spiketails, river cruisers, dragonhunter, darners, emeralds, baskettails, gliders
  - While flying, some Saddlebags Gliders lower their abdomens into the shade provided by dark patches at the bases of their hindwings

Odonate Behavior

- Territorial defenses
  - Territorial species develop more rapidly and produce larger adults than other non-territorial species
  - Many adult male dragonflies establish and defend territories along the perimeter of a lake or stream. Females will mate only with males that hold a territory

Odonate Behavior

Mating

- Wheel position: unique among insects
- Odonates of the same species have interlocking structures on the male claspers and female head that enables the wheel to be formed and made secure.
- Flying in tandem, even while ovipositing, to prevent other males from mating with female

Migration

- Migratory Dragonflies
  - 14 species known in the Northeast (ex: Green darner, swamp darner, 12-spotted skimmer
  - Flights late July - early October, the peak in Sept., following major geographic features
  - Mass swarms follow cold fronts
  - Likely requires multiple generations to reach their northern breeding grounds.

Conservation

Threats to Odonates – water quality degradation

- Development & removal of surrounding habitat
  - Soil erosion, silt loading, water temp and dissolved oxygen
  - Areas for feeding, mating, and shelter disappear ↑
- Alteration of natural stream flow
  - Dams, channelization
- Removal of aquatic vegetation
- Pesticides, runoff & other toxins
- Excess groundwater removal

Conservation

- Threatened, Endangered, & Special Concern
  - Over 30 spp in NJ, ___ in Pinelands
- Report rare sightings on the DEP's Endangered and Non-game species website:
- Rare Wildlife Sighting Report Form
  - http://www.state.nj.us/dep/fgw/ensp/rprtform.htm
- www.njodes.com
  - http://www.njodes.com/njos/rare_bug_form.htm

Conclusion

- **Dragonflies & Damselflies = Odonata**
- Adults & nymphs are beneficial predators of pests
- Incomplete metamorphosis
  - Egg, nymph, adult
- Can reposition themselves to regulate heat
- Territorial Defenses (Males patrolling)
- Migratory status:

14 species, mostly darners and saddlebags