Acrobats of the Air

New York's Damselflies Dragonflies

BY COLE GILBERT AND FRANCES FAWCETT

To many, the sight of dragonflies and damselflies represents peaceful days of summer, but these fierce, territorial predators are anything but peaceful. Dragonflies and damselflies have voracious appetites and are efficient hunters, no matter their stage of life.

New York is home to approximately 200 species of odonates—dragonflies and damselflies. Damselflies are smaller and delicate, with well-separated eyes. They rest their similarly shaped fore and hind wings over their abdomen, or slightly spread. Dragonflies are larger and robust, with large eyes typically meeting on top of the head. At rest, they hold their differently shaped fore and hind wings out to the side.

Life Stages and Feeding

Most damselflies and dragonflies overwinter as eggs. Female damselflies and some dragonflies, such as darners, insert eggs into plants emerging from or under the water. The majority of other dragonflies lack egg-laying tubes and simply drop eggs into water or stick them onto nearby dry surfaces. When spring rains come, a tiny non-feeding prolarva will jump out into the water. It may exist for only a few minutes before molting into a nymph that, depending on its species and amount of summer warmth, will be a submarine killer for several months to years.

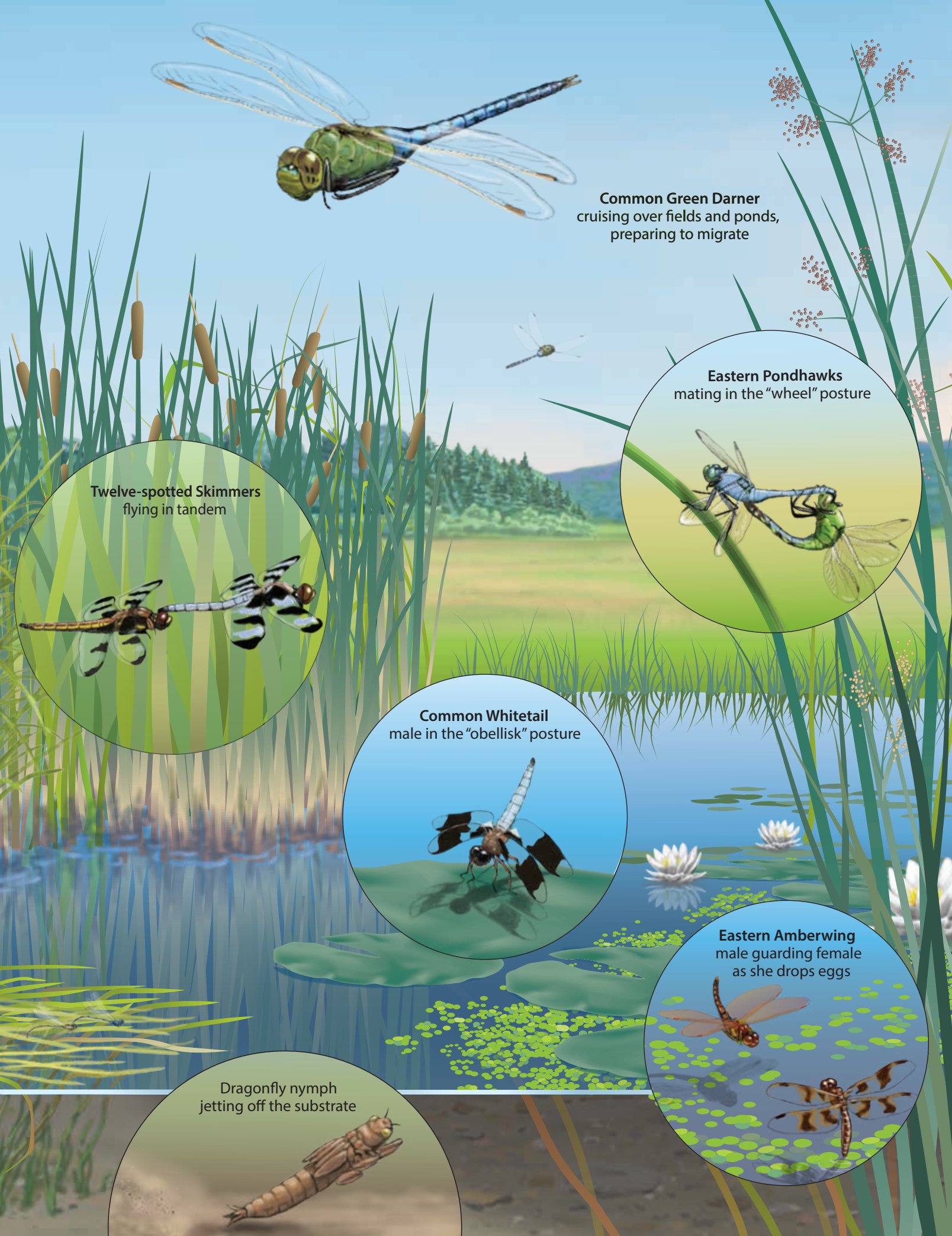
Nymphs breathe through abdominal gills. Damselfly nymphs have three plate-like gills extending from their abdomen, which they wag to increase flow over the gills and to propel themselves through the water. In contrast, dragonfly nymphs have gills protected inside a chamber at the tip of their abdomen. They breathe by drawing oxygenated water in and out. When frightened, they expel jets of water and zoom away.

Nymphs feed ravenously on aquatic worms and arthropods. Large dragonfly nymphs even catch tadpoles and minnows. All nymphs catch prey with an extendable lower lip that is normally cocked, forming a toothy mask. Using visual depth perception to determine when prey is in range, the lip shoots out, grasps the prey, and pulls it back to waiting jaws.

Nymphs make good "pets" in an aerated aquarium. If fed well, they will molt about a dozen times, with their external wing pads getting larger each time, until they eventually become adults. Mature nymphs climb emergent plant stems or stones, split their cuticles down the back, and the adults crawl out. The adults hang for a while, expanding their wings with blood, like butterflies do.

If you spot any shed skins around a pond, look closely for thin white threads arising from the split. These are remnants of tubes that moved air from gills throughout the body.

New York's Damselflies and Dragonflies


Common Green Darner
cruising over fields and ponds, preparing to migrate
Eastern Pondhawks
mating in the "wheel" posture
Twelve-spotted Skimmers
flying in tandem
Common Whitetail
male in the "obellisk" posture
Eastern Amberwing
male guarding female as she drops eggs
Dragonfly nymph
jetting off the substrate


Elaine Taft

Bluet damselflies ovipositing in tandem.

Newly emerged adults take a few days to harden. Some spend several weeks maturing, flying in fields far from water. One of our largest dragonflies, the common green darner, migrates; arriving from the southern U.S. or Mexico, in late April or early May, ready to mate. The next generation of adults, from eggs laid the previous year, emerge in mid-summer and migrate south in September, often in swarms of 100s.

Reproduction

Damselfly and dragonfly reproduction is unusual. Before males go "courting," they transfer sperm from testes at the tip of their abdomen to a secondary organ seen as a bump under the second abdominal segment. Males of some species, typically damselflies, perform aerial displays in front of females. If she likes his display, she lets him clasp her behind her head. Males of many other species, especially dragonflies, do not court, but simply clasp females that enter their territory. Clasping results in tandem flight with males leading, which presents a problem of transferring sperm to the female. That's why the male loads his secondary organ before "courting," but the tandem-flying female must bend her abdomen up to her male's in order to transfer sperm, a behavior called the "wheel posture."


James Craft

Female black saddlebags skimmer *(Tramea lacerta)* resting.

Before the male transfers sperm, tiny spines in his secondary organ rake out any sperm that the female may have stored from previous matings. The male has vigorously defended his stream or pondside neighborhood, and he does not want his efforts to result in females laying eggs here that were sired by another male. In his zeal to ensure paternity, the male damselfly typically remains clasped to a female while she inserts fertilized eggs into vegetation. He may even go underwater with her. A dragonfly male may remain clasped as the female drops eggs in the water or glues them onto surfaces, or he may let go and hover near her, lest another male swoop in and clasp her.

Behavior

Male dragonflies of different families defend their territories in different ways. Darners and emeralds tend to cruise continuously up and down their territory. You can almost set your watch by a male's regular rounds. On his sojourn, he may catch small flying insects with his six spiny legs, but he continuously exerts energy patrolling his neighborhood. Conversely, male skimmers perch patiently on rocks or tall vegetation, keeping a keen eye (or 30,000 eyes) out for prey or intruders. If spotted, the skimmer sallies out like a guided missile to repel intruders or catch prey that it eats after returning. Female skimmers do this too, and some species, aptly named pondhawks, even capture other dragonflies.

Perching in the hot afternoon sun, looking for prey or intruders is stressful, but a skimmer doesn't want to seek shade and abandon hard-fought-for perches. It adopts a resting posture called the "obelisk posture," doing a headstand pointing its abdomen directly at the sun to minimize its exposure. In the morning after a cool night, skimmers bask with their bodies perpendicular to the sun's rays to absorb as much solar heat as possible, but it is a very different story on a sultry, peaceful afternoon.

There is much to observe and learn about the amazing behavior of these consummate predators. So grab a lawn chair, a cold beverage, and some sunscreen, and enjoy a front row seat at one of nature's great summer dramas, put on by damselflies and dragonflies.

Cole Gilbert is a professor in Cornell University's Department of Entomology. **Frances Fawcett** is a professional artist and scientific illustrator (francesfawcett.com)

Note: Check out DEC's website at **www.dec.ny.gov/animals/31061.html** for information on New York State's Dragonfly and Damselfly Survey.