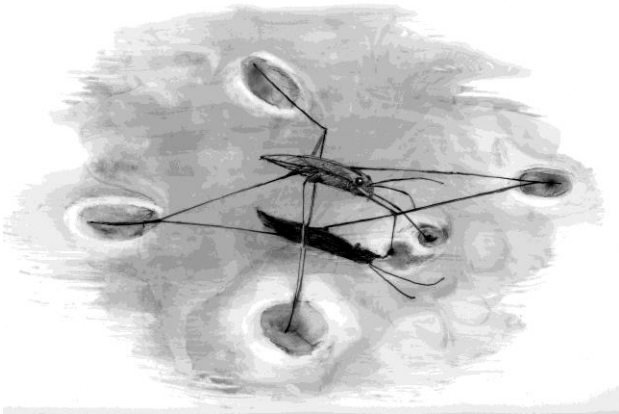


The Outside Story



Summer Skaters

By: Declan McCabe

Scanning a sunlit pond floor for crayfish, I was distracted by seven dark spots gliding in a tight formation. Six crisp oval shadows surrounded a faint, less distinct silhouette. The shapes slid slowly and then, with a rapid motion, accelerated before slowing to another glide. I can remember seeing this pattern as a child, in my first explorations of pond life.

Water strider shadows are far larger than the insects casting them. To visualize the surprising proportion of legs to body, it may help to think in human scale. For mathematical simplicity, picture a six-foot-tall man lying flat on the water surface. Imagine that attached near his hips he has a pair of seven-foot-long, stick-skinny legs pointing back at a 45 degree angle. Just forward of these spindles he has another pair pointing forward at a 45 degree angle; these are nine feet long. A pair of three-foot-long arms point forward and each has a single claw protruding from the palm.

The legs are long for good reason; they distribute body weight over a wide area, and aided by water repellent hairs, allow the insect to coast across the water's surface tension. The minute leg hairs are densely packed and each has many air-trapping surface grooves. According to the Chinese scientists who discovered the grooves, water striders displace enough water to float up to fifteen times their own body weight. This extreme buoyancy is enough to keep the water strider's body high and dry above the water, even during rainfall and choppy conditions.

Because the insects literally walk on water, some call them "Jesus bugs." When fish or backswimmers approach, the water striders are well positioned to make an aerial getaway. Their super buoyancy means that they can use their long legs to jump straight up from the water surface, and once airborne, they can spread their wings (yes, they have wings) and fly to safer haunts.

Slow motion video reveals how water striders move. The longer middle legs sweep back rapidly like oars, pushing against the surface tension to drive the insect forward. Human rowers lift their oars out of the water on the recovery stroke to reduce drag, and rapidly moving water striders do the same thing. However, when moving more slowly, they drag their middle legs forward along the water surface. The rear legs trail and change angles like twin rudders steering the insect towards food, or mates, or away from hazards.

All the while, the front legs rest on the water surface just forward of the insect's head. Theirs is a murderous function, allowing the water strider to find and seize its next meal. Subtle ripples made by surfacing aquatic insects

including mosquito larvae, or struggling terrestrial insects on the water surface function like tugs on a spider web, leading the water strider to its prey. The single-clawed forelegs grapple the prey while the insect's piercing mouthparts stab through the cuticle, consuming bodily fluids as if through a drinking straw.

To see this first hand, my Saint Michael's College students and I dropped a few large carpenter ants onto the water surface of some ponds in Winooski. It took only seconds for a water strider to grab the first ant. Others were rapidly scooped up and carried off. A braver student dunked a yellow jacket, trapping her in the surface tension. The water striders investigated but took a pass on that risky meal. The yellow jacket climbed out on some vegetation a little the worse for wear.

My students and I were also curious to see if the insects were faithful to particular pools or if they moved around. We used paper correction fluid ("Wite-Out") to mark a dozen water striders and released them where we caught them. The following day, we found marked water striders in their home pool, but also in pools upstream and downstream. We frequently observed water striders fighting each other. Perhaps territoriality and competition drives them to seek other living space?

As summer arrives, I have noticed that the water striders are back in force from their winter hideouts among the pond-side leaf litter. I'd welcome a little sun any day now so that their spectacular shadows may also return.

Declan McCabe teaches biology at Saint Michael's College. His work with student researchers on insect communities in the Champlain Basin is funded by Vermont EPSCoR's Grant NSF EPS Award #1556770 from the National Science Foundation. The illustration for this column was drawn by Adelaide Tyrol. The Outside Story is assigned and edited by Northern Woodlands magazine, www.northernwoodlands.org, and sponsored by the Wellborn Ecology Fund of New Hampshire Charitable Foundation: wellborn@nhcf.org.

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