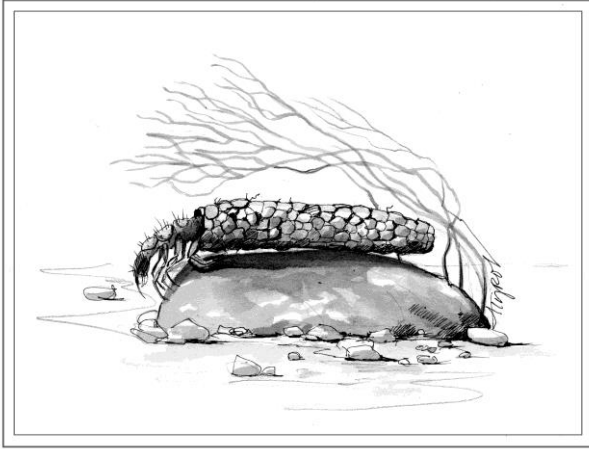


The Outside Story



Caddisflies: Submerged Silk Spinners

By: Declan McCabe

A small boy asked “what’s your favorite insect?” I answered without hesitation: caddisflies. Not the short-lived adults, which while charming in their own hairy moth-like way, do not capture my attention. My caddisfly predilection is reserved for the larval stages that last for most of the insect’s one or, less often, two or three year life span. These larvae, like their caterpillar cousins, make and use silk in ways that fascinate me. Silk permits their use of a wide variety of freshwater habitats and food sources.

Consider the caddisflies of the family Rhyacophilidae. Their name translates to “rock loving,” and this preference serves them well in fast-flowing streams. They spin silk ropes

that anchor firmly to rocky surfaces, helping them to defy the pull of currents, and stay off some trout’s dinner menu. Like ice climbers using crampons, they also have impressive claws that grow right out of their rear ends. Their anal claws and silk lines keep their bulging, segmented, Michelin-Man bodies secured while they scramble about, eating insects including other caddisflies.

A more patient hunting approach is used by caddisflies in the genus *Nyctiophylax*. They find shallow grooves in a stream rocks, and roof them over with stretched silk. There they wait, as a hunter might in a deer stand, until some insect takes its fatal step onto their gossamer tent. I can’t tell if this is a more or less effective tactic than the search and destroy approach of their rock loving cousins; *Nyctiophylax* larvae are certainly slimmer. But both groups are successful predators.

Two caddisfly families are distinguished by their complicated silk nets. Philoptamids sieve food particles from water using loose, finger-shaped nets under river bed stones. Hydropsychid caddisflies stand their ridged-framed nets right up in the water flow to maximize their catch. I can often find their nets by searching sunlit river beds for shadows on otherwise smooth rocks. Because these nets filter particles from the water column, in sufficient abundance they can improve water quality. My Saint Michael's College student researchers and I find that hydropsychids are particularly common in streams receiving particles eroded from urban and agricultural landscapes. The particles are an abundant source of digestible food, and can support large populations of these resilient insects.

Case-building caddisflies are more commonly found in cleaner streams. These species may have been the inspiration for the “caddisfly” name. In Elizabethan England, traveling salesmen – “cadice men” – attached their wares to their clothing. Similarly, case-building larvae construct silk-lined, sleeping-bag shaped body coverings, and ornament these with materials found in their habitat. Often, materials selected are specific to the type of caddisfly. Some use sand grains; others larger pebbles; still others use sticks and leaves. There are even caddisflies that cover themselves in growing liverwort leaves, and one species that uses snail shells.

All caddisflies use materials gathered in their immediate environments, and some species are less choosy than others. I have seen *Neophylax* cases made primarily from tiny pieces of broken brick eroded from a construction site. More than one intrepid artist has provided the insects with semiprecious stones, and sold their bedazzled cases as jewelry. I once kept some case-building caddisflies in an aquarium for a few months. I dropped in some wooden match sticks, along with natural aquatic vegetation. They incorporated the matches into log-cabin style cases.

All of this silk production – for tethering and camouflage – is costly to the insects. By some estimates, caddisflies invest more than ten percent of their resources in silk. This is a significant expenditure, and some caddisflies recycle silk by eating it.

Speaking of consumption, I’m reminded of Aldo Leopold’s comment that one should seek

to cultivate a “refined taste in natural objects.” For whatever reason, my “refined taste” as an entomologist has developed as a preference for a silk-spinning, case-building aquatic insect. Of all the insects on the planet, why caddisflies? Why not? I hope no one asks me to choose a favorite caddisfly!

Thank you Nathan Buckley for your wonderful question. 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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