

Three *Tricorythodes* (Tree-co-ritk-o-days) nymphs painted by the author. From left, *T. albilineatus*, *T. minutus* and *T. stygiatus*. The illustrations are about ten times the size of the naturals.

*A definitive look at our most important late-season mayfly*

# The Longest Hatch — I

ERNEST SCHWIEBERT

*This is the first of two articles on one of the most significant—and least understood—hatches to occur on most American trout waters during the summer and early fall months. The first portion deals with the identification and life histories of the naturals. In our Late-Season (July) issue, the author will discuss imitations and fishing techniques appropriate to this hatch. Those readers not generally familiar with the basic aspects of angling entomology should first read Carl Richard's introduction to the topic elsewhere in this issue. THE EDITORS.*

ERNEST SCHWIEBERT popularized the field of angling entomology with his classic *Matching the Hatch* in 1955. His second entomological book, *Nymphs*, was published in 1973. Readers who have followed the author's work in these pages will recognize this article as still further evidence of an extraordinary and diverse talent.

**R**ISING IN THE GENTLE MOUNTAINS above Manchester, and gathering strength slowly from its cold spring-heads and tumbling hemlock-thicket tributaries, the Battenkill is born in a Vermont valley of clapboard farmhouses and bright-red barns and outbuildings. The villages are clustered about their greens, with white church spires rising above the trees, and country inns with Grecian pillars and porches.

It winds down its pastoral valley toward Arlington, its seepages cold enough to sustain its wild brook trout, and tumbles west toward the Hudson above Albany. There is a covered bridge on the stretch along which John Atherton lived, and his drawing of the pool there is included in his book *The Fly and The Fish*. Still farther downstream in New York lies the storied Dutchman's Hole, and the swiftly flowing stretch that Lew



Moderate flow and well-oxygenated water are two factors contributing to prime *Tricorythodes* habitat, such as shown here on Vermont's Battenkill. Photo by Craig Woods.

Oatman loved and fished for years. His elegant streamer patterns, such as the Gold and Silver Darters, were among the first conscious imitations of baitfish. Lee Wulff lived on the river for many years, fishing the water between Arlington and the famous covered bridge at Shushan. But the river belongs to the artist who loved it through the last years of his life; the ashes of John Atherton were ultimately scattered into the Battenkill.

It has been twenty-five years since I first fished the river between Manchester and Arlington, and later I explored the big water that lies a few miles downstream in New York. It was there, on an early morning in July, that I discovered a heavy hatch of *Tricorythodes* at the Dutchman's Hole.

THE NIGHT HAD BEEN COOL and still, and I wandered upstream before breakfast to try my luck. The fishing was poor after a week of midday doldrums. The river seemed dead and, although I covered it carefully that morning, I took only a single fifteen-inch brown that boiled out from a deadfall to savage the Shushan Postmaster.

It was bright and still at the Dutchman's Hole, its depths dark and unfathomable under the trusswork bridge. No rises disturbed its smooth currents. Yet the sunlight upstream from the bridge was alive with thousands and thousands of tiny mayflies in a mating swarm that looked like dancing snowflakes. Several were

caught in the spiderwebs on the bridge, and I studied their transparent wings and black bodies with a sense of disbelief.

*Impossible, I thought. They're too tiny!*

The morning light danced on their tiny wings, and the minute spinners rose and fell above the tumbling throat of the pool. Soon their mating flight was finished, and suddenly the still surface of Dutchman's Hole was alive with tiny rises. I could see some of the fish from the bridge, and several looked larger than twelve to sixteen inches, yet their bulging riseforms barely disturbed the eddying currents. It seemed impossible that the fish were rising so eagerly to such tiny spinners, since their wings and bodies measured less than one-eighth of an inch in length, but I studied the tail shallows of the pool and discovered nothing else on the water.

The smallest flies in my box were simply a few turns of badger hackle dressed on size twenty Allcock hooks. The smaller hooks we now use on these minute mayfly patterns were not available then and, lacking a #24 or 26 hook, it was hopeless. My badger-hackle pattern looked like a sailboat among the tiny naturals, and I took a few hatchery fish before the feeding stopped.

It was my baptism in fishing the *Tricorythodes* flies, and I have since fished their early-morning hatches and mating swarms throughout the country. The classic *Biology of Mayflies* by James Needham listed only eight species a half-century ago; current work lists nineteen

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species, although only ten are found on trout water. These species are almost universally morning flies, and their spinner falls occur in such immense concentrations that the trout take them greedily.

#### Classification

THERE IS CONSIDERABLE ARGUMENT among entomologists and anglers about the *Tricorythodes* flies. Some fly-fishing writers have called them the *Caenis* hatch, mistaking them for the *Caenis* flies that British books have long called fisherman's curses. The taxonomy (classification system) found in the pioneering work of James Needham grouped genera like *Tricorythodes* and *Caenis* and *Brachycercus* together in the family *Caenidae*. His system further compounded the mistaken classification in several fishing books, both in Europe and the United States, although his *Biology of Mayflies* (1935) established order in the entomological chaos of our continent.

Such scientific quarrels are puzzling to American anglers, who have matured with the illusion that biology is precise, and that our knowledge of our ecosystem is fully structured and complete. These same quarrels remind me of the time when I participated in a panel discussion with Doug Swisher, and an obviously knowledgeable member of the audience confronted us with a disturbing question about evident differences in our work on some fly-hatches.

When he asked the question, we both laughed. *We've known each other for many years, I responded puckishly, and we refuse to accept any responsibility for quarrels in entomological circles!*

But such scientific differences do exist. James Needham established the taxonomic structure that included *Tricorythodes* in the *Caenidae*, and B. D. Burks accepted that system of classification in his *Mayflies of Illinois* (Univ. of Ill. Natural History Survey, 1953), one of the milestones in American entomology. Six subsequent writers placed *Tricorythodes* in the *Caenidae*. Justin Leonard also grouped them among the *Caenidae* in his *Mayflies of Michigan Trout Streams* (1962). However, George Edmunds and Jay Traver proposed that the genus should be placed in a separate family called the *Tricorythidae*, and have further pressed their case in Edmunds' recent book *The Mayflies of North and Central America* (1976). Perhaps the *Caenidae* classification is obsolete, perhaps not; only time and fresh knowledge can resolve such quarrels.

#### Characteristics of Nymphs

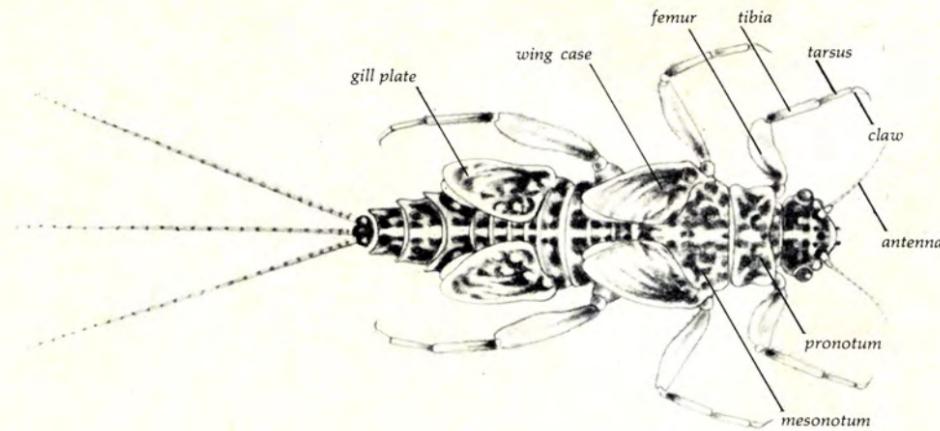
LIKE THE *Caenidae*, the specimens of the *Tricorythidae* are quite small, measuring from about one-eighth to five-sixteenths of an inch in body length. The nymphs

are easily identified by the triangular gill covers attached to the second segment of the abdomen. These gill plates protect the sensitive membranes of the gills themselves, which are rooted between the third and sixth body segments, and their triangular configuration is the origin of the insects' Latin name.

The configuration found in the nymphs of *Tricorythodes* is quite similar to the general structure of the *Caenidae*. These subaquatic specimens are easily identified by characteristics other than their operculate (covered) gills. The nymphs typically display an absence of tubercles (small, rounded projections) at the posterior margin of the head. Their bodies and thoracic structures are typically short and stout. The femora are moderate to muscular in their proportions, and delicately fringed with tiny hairs. Each tarsal claw is relatively long and slightly hooked at its end. The apical margin of the labrum is deeply notched. The canines of the mandibles are apically lobed or toothed, and are rather generous in scope. The lacinia are well developed and the maxillae are conical. The pronotum is somewhat longer than is typical of *Caenis*, and the gill covers consist of two fully separate plates, completely lacking the fimbriate (fringed) character of either *Caenis* or *Brachycercus*. Nymphal antennae are approximately twice the length of the pronotum and head together. The legs are somewhat longer than *Caenis*, but considerably shorter than the legs of the genus *Brachycercus*. The tails are relatively long, proportionally stout, and are articulated with fine whorls of hair-like setae. Fine hairs cover both the body and legs, collecting the microscopic silt and detritus in the river until the nymphs acquire the coloring of their parent streams.

THEIR HABITAT CONSISTS of fine sand and aggregates in streams of moderate currents. Extensive populations dwell in such aquatic weeds as coontail, elodea and fountain mosses. Algal growths on bottom stones can shelter many nymphal colonies. Although *Tricorythodes* nymphs seem to require the oxygen saturations associated with perceptible currents, their habitat is typically silty, and their operculate gills are commonly found in species that require such gill-plates to protect their delicate respiratory filaments from abrasive sediments. Although the largest hatches occur on sizable streams providing optimal habitat, significant populations of *Tricorythodes* exist on relatively small tributaries, and in the quiet eddies and backwaters of swift rivers that otherwise lack their typical habitat.

The nymphs are principally herbivorous, and streams offering sufficient algae and aquatic weeds provide the best hatches. Large colonies often exist in the root



structures of aquatic plants, as well as among the exposed underwater roots of terrestrial plants along the stream banks. *Tricorythodes* nymphs are quite clumsy, swimming with awkward undulations of their bodies to emerge, and clambering or crawling as nymphs.

#### Characteristics of Adults

FRESHLY-HATCHED ADULTS can readily be distinguished from *Caenis* and *Brachycercus* by the several cross-veins in the wings of *Tricorythodes*. The wings are also more slender and less ovoid than the wings of the similar genera. The *Tricorythodes* flies have tubercles on the posterior margins of their heads. Males are typically darker than females, as with most mayfly species. The eyes are rather widely separated. The male forelegs are slender and almost as long as the wings, while the other legs are short and less developed. The subimago flies exhibit three tails, those of the males measuring approximately three times the body length. Female caudal filaments (tails) are equal in length to those of the males in several species of *Tricorythodes*. Generally speaking, the freshly-hatched adults have faintly smoky, hyaline (transparent) wings, either black or chocolate bodies, with pale legs and tails.

Although some entomologists disagree, B. D. Burks notes (in his important monograph *The Mayflies of Illinois*) that some species of *Tricorythodes* appear to molt from the dun to the spinner phase in flight. Particular conditions of temperature, precipitation and humidity can play a critical role in the molting time required between hatching and mating. Optimal conditions can result in as little as fifteen minutes between the emergence of the duns and their subsequent gathering as spinners above the point of hatching, although thirty to sixty minutes are more typical. Longer times between the dun and spinner phases are reported by many knowledgeable anglers. Burks based his observations on field research with the species *Tricorythodes atratus*, and I have found similar molting behavior with other species such as *Tricorythodes stygiatus* in Michigan and *Tricorythodes minutus* in Idaho.

Mating adults (spinners) lose the smoky cast often found in the wings of the subimago stage, until their wings are transparent to chalky-white, and most speci-

mens display white wings and dark bodies. Hind wings are completely absent in both duns and spinners. Since the mating swarms offer the largest concentrations of flies for both anglers and trout, the imago stage and its subsequent spinner falls are most familiar to fishermen.

#### Other Studies in Life History

OTHER ASPECTS OF THE LIFE HISTORY of *Tricorythodes* are also intriguing. George Edmunds observes in his recent *Mayflies of North and Central America* that the nymphal populations of *Tricorythodes minutus* are absent from streams in Utah until relatively late each spring. Several species display multiple broods in a single season. Growth and maturity can occupy as little as fifteen to twenty weeks. Field studies of the species *Tricorythodes atratus* indicate that the nymph grows quite rapidly after hatching from its egg. The largest concentrations of nymphs were observed in late spring and early summer, although a second peak in population occurs again in late summer and early fall. Such waxing and waning in a typical *Tricorythodes* population indicates at least two broods per year. R. J. Hall reports that in Minnesota, populations of *Tricorythodes atratus* winter in their egg stage, and the nymphs require about five weeks after hatching to reach full growth. Hall observed subaquatic emergence during his studies, with the duns reaching a partially winged state before reaching the surface. Males displayed nocturnal hatching behavior that lasted approximately two hours, while the females began emerging at daylight. The adult life-span of the males can reach as much as five to seven hours, while the females expire in two to three. The males of *Tricorythodes atratus* shed their subimaginal skins (molted) between daylight and dawn, and the females followed later, according to Hall's observations.

Some species emerge in the surface film, much like other mayflies, and some larger *Tricorythodes* flies apparently molt in streamside vegetation. There is also conjecture that the males alight to molt, while the females shed their subimaginal skins in flight. Justin Leonard tells us in *Mayflies of Michigan* that reared males of *Tricorythodes stygiatus* have survived as much as forty-eight hours in captivity.

## The Naturals

The following are the author's descriptions of the 10 species of *Tricorythodes* of significance on American trout streams. The lengths cited for the bodies are from the head to the end of the abdomen. Wing lengths refer to the length of one wing. Also given are average emergence times, dates and indications of where the species occur; NE (Northeast), SE (Southeast), SC (South-central), NC (North-central), W (West), SW (Southwest) and NW (Northwest). THE EDITORS.

*Tricorythodes albilineatus*  
4:30 to 9:30 A.M. May 15-July 31 SE  
NYMPH (5.5 mm)

TAILS: Mottled brownish-gray.  
BODY: Darkly ringed with brown, displaying a white dorsal stripe.  
GILLS: Grayish, mottled with dark brown.  
THORAX: Dark-brownish pronotum and mesonotum.  
WING CASES: Brown, mottled darkly toward the dorsal pronotum.  
LEGS: Mottled brownish-gray.  
HEAD: Dark brownish.

DUN (4 mm)

TAILS: Pale brownish-gray.  
BODY: Dark chocolate with pale dorsal stripe.  
THORAX: Dark blackish-chocolate.  
WINGS: 5 mm, hyaline with a faint sooty cast.  
LEGS: Pale brownish-gray.  
HEAD: Dark brownish.

SPINNER (4 mm)

TAILS: Pale grayish.  
BODY: Dark chocolate with a white dorsal stripe.  
THORAX: Dark blackish-chocolate.  
WINGS: 5 mm, hyaline with a chalky cast.  
LEGS: Pale grayish.  
HEAD: Dark brown.

*Tricorythodes allectus*  
8:30 to 12:00 A.M. SE, NE  
July 15-September 15  
NYMPH (5 mm)

TAILS: Mottled brownish-gray.  
BODY: Dark reddish-brown ringed with black.  
GILLS: Grayish, mottled with dark brown.

THORAX: Dark reddish-chocolate.  
WING CASES: Brown, mottled darkly toward the dorsal pronotum.  
LEGS: Mottled brownish-gray.  
HEAD: Dark reddish-brown.

DUN (3.5 mm)

TAILS: Pale brown.  
BODY: Medium brown.  
THORAX: Dark chocolate-brown.  
WINGS: 4.5 mm, hyaline with a faint smoky cast.  
LEGS: Pale smoky brown.  
HEAD: Pale brown.

SPINNER (3.5 mm)

TAILS: Pale brown.  
BODY: Pale yellowish-brown.  
THORAX: Dark reddish-brown.  
WINGS: 4.5 mm, hyaline with a chalky cast.  
LEGS: Pale smoky brown.  
HEAD: Pale brown.

*Tricorythodes atratus*  
4:30 to 10:00 A.M. NC  
July 26-September 15  
NYMPH (5.5 mm)

TAILS: Lemon, mottled with brown.  
BODY: Light olive, ringed with reddish-brown.  
GILLS: Olive, mottled with brown.  
THORAX: Dark olive mixed with brown markings.  
WING CASES: Dark olive.  
LEGS: Lemon, mottled with light brown.  
HEAD: Olive.

DUN (4 mm)

TAILS: Smoky yellowish-cream.  
BODY: Dull yellowish-gray.  
THORAX: Reddish-brown.  
WINGS: 5 mm, hyaline with a faint smoky cast.  
LEGS: Dirty yellowish-gray.  
HEAD: Yellowish-gray.

SPINNER (4 mm)

TAILS: Smoky white.  
BODY: Pale dirty yellowish-gray.  
THORAX: Reddish-brown.  
WINGS: 5 mm, hyaline with a chalky cast.  
LEGS: Dirty yellowish-gray.  
HEAD: Yellowish-gray.

*Tricorythodes explicatus*  
4:30 to 10:00 A.M. SW, SC  
May 15-July 31

NYMPH (7 mm)

TAILS: Dark-mottled brown.  
BODY: Medium-olive, ringed with chocolate.  
GILLS: Olive, mottled with brown.  
THORAX: Dark olive.  
WING CASES: Dark olive-brown.  
LEGS: Dark olive-brown with dark femora.  
HEAD: Dark olive.

DUN (5.5 mm)

TAILS: Brownish gray.  
BODY: Dark reddish-brown.  
THORAX: Chocolate-brown.  
WINGS: 6.5 mm, hyaline with a faint smoky cast.  
LEGS: Medium-brown.  
HEAD: Brown.

SPINNER (5.5 mm)

TAILS: Dirty whitish-gray.  
BODY: Dark chocolate.  
THORAX: Dark chocolate-black.  
WINGS: 6.5 mm, hyaline with a chalky cast.  
LEGS: Dark brown.  
HEAD: Black.

*Tricorythodes fallax*  
8:30 to 12:00 A.M. NC, W, NW  
July 15-September 15

NYMPH (6.5 mm)

TAILS: Brown mottled.  
BODY: Brown, darkly ringed with chocolate.  
GILLS: Brown, mottled with darker markings.  
THORAX: Rich reddish-brown.  
WING CASES: Brown, richly mottled with darker coloring.  
LEGS: Olive, mottled with brown.  
HEAD: Brown.

DUN (5 mm)

TAILS: Smoky gray.  
BODY: Medium reddish-brown.  
THORAX: Dark brown.  
WINGS: 6 mm, hyaline with a smoky cast.

Longest Hatch . . .

LEGS: Medium brown.  
HEAD: Brown.

SPINNER (5 mm)

TAILS: Smoky gray.  
BODY: Dark reddish-brown.  
THORAX: Dark mahogany.  
WINGS: 6 mm, hyaline with a chalky cast.

LEGS: Pale mahogany-brown.  
HEAD: Mahogany.

*Tricorythodes fictus*

4:30 to 10:30 A.M. NC, SC  
May 15-July 31

NYPH (6.5 mm)

TAILS: Brown mottled.  
BODY: Dark reddish-brown, ringed with chocolate.

GILLS: Reddish-brown, darkly mottled.

THORAX: Dark reddish-brown.  
WING CASES: Brown, mottled with dark brown.

LEGS: Brown mottled.  
HEAD: Brown.

DUN (5 mm)

TAILS: Smoky gray.  
BODY: Reddish-brown, ringed with darker brown.

THORAX: Reddish brown.  
WINGS: 6 mm, hyaline with smoky cast.

LEGS: Pale brownish gray.  
HEAD: Medium brown.

SPINNER (5 mm)

TAILS: Smoky gray.  
BODY: Reddish-brown, ringed with chocolate segments.

THORAX: Dark reddish-brown.  
WINGS: 6 mm, hyaline with a chalky cast.

LEGS: Pale brownish-gray.  
HEAD: Medium brown.

*Tricorythodes minutus*

9:30 to 12:00 A.M. W, NW  
July 15-October 15

NYPH (4.5 mm)

TAILS: Dark-mottled brown.  
BODY: Chocolate, ringed with black.

GILLS: Brown, mottled with chocolate markings.

THORAX: Chocolate brown.  
WING CASES: Brown, mottled with chocolate.

LEGS: Dark-mottled brown.  
HEAD: Brown.

DUN (3 mm)

TAILS: Pale brownish-gray.  
BODY: Dark brown.  
THORAX: Dark chocolate-brown.  
WINGS: 4 mm, hyaline with smoky cast.

LEGS: Pale brownish-gray.  
HEAD: Brown.

SPINNER (3 mm)

TAILS: Pale brownish-gray.  
BODY: Blackish-brown.  
THORAX: Deep reddish-brown.  
WINGS: 4 mm, hyaline with a chalky cast.

LEGS: Pale brownish-gray.  
HEAD: Reddish-brown.

*Tricorythodes peridius*

4:30 to 10:00 A.M. NC, W  
July 8-August 31

NYPH (5 mm)

TAILS: Lemon-mottled.  
BODY: Pale yellowish-brown, ringed with brown.

GILLS: Pale brown, darkly mottled.

THORAX: Pale yellowish-brown.  
WING CASES: Pale brown, mottled with darker brown.

LEGS: Lemon, mottled with brown.  
HEAD: Pale yellowish-brown.

DUN (3.5 mm)

TAILS: Dirty yellowish.  
BODY: Medium yellowish-brown, ringed with brown.

THORAX: Medium yellowish-brown.  
WINGS: 4.5 mm, hyaline with a smoky cast.

LEGS: Pale yellowish with brown mottlings.  
HEAD: Dirty yellowish-tan.

SPINNER (3.5 mm)

TAILS: Dirty yellowish.  
BODY: Dirty yellowish-amber.  
THORAX: Brownish-gray.

WINGS: 4.5 mm, hyaline with a chalky cast.  
LEGS: Dirty grayish-yellow with brown mottlings.

HEAD: Dirty yellowish-tan.

*Tricorythodes stygiatus*

4:30 to 10:00 A.M. SE, NC, NE  
July 15-October 15

NYPH (5.5 mm)

TAILS: Dark mottled brown.  
BODY: Medium-brown, darkly ringed with black.

GILLS: Brown, darkly mottled with chocolate.

THORAX: Dark chocolate-brown.  
WING CASES: Dark brown, mottled with chocolate.

LEGS: Dark-mottled brown.  
HEAD: Dark brown.

DUN (4 mm)

TAILS: Grayish-white.  
BODY: Black with a brownish cast.  
THORAX: Dark shiny black.

WINGS: 5 mm, hyaline with a smoky cast.

LEGS: Pale reddish-brown.  
HEAD: Black.

SPINNER (4 mm)

TAILS: White.  
BODY: Black with a faint brownish cast.

THORAX: Dark shiny black.  
WINGS: 5 mm, hyaline with a chalky cast.

LEGS: Pale reddish-brown.  
HEAD: Black.

*Tricorythodes texanus*

4:30 to 10:00 A.M. SW, SC  
July 1-October 15

NYPH (4.5 mm)

TAILS: Lemon-mottled.  
BODY: Pale yellowish, ringed with dark olive.

GILLS: Pale yellowish, ringed with olive.

THORAX: Medium olive-brown.  
WING CASES: Medium olive, mottled with brown.

LEGS: Lemon mottled.  
HEAD: Pale amber.

DUN (3 mm)

TAILS: Pale silvery gray.  
BODY: Dirty olive with dark chocolate ringing.

THORAX: Dirty olive-brown.  
WINGS: 4 mm, hyaline with a smoky cast.

LEGS: Smoky-yellowish with silvery-gray tarsi.  
HEAD: Dirty yellowish-gray.

SPINNER (3 mm)

TAILS: Pale silvery gray.  
BODY: Dirty yellowish-gray with darker dorsal markings.

THORAX: Dirty grayish-olive.  
WINGS: 4 mm, hyaline with a chalky cast.

LEGS: Smoky yellowish with silvery tarsi.  
HEAD: Dirty yellowish-gray.

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