Nothing gets a fly fishers blood pumping faster than a rising trout eating mayflies. Whether it is the gentle sip of a mayfly spinner or the sometimes violent take of the adult mayfly, this is what we live for as fly fishers

So, let's take a look at the mayfly, its behavior, anatomy, and the lifecycle. The more you understand these factors, the more consistent you will be at fooling the wiliest trout!

The mayfly is an aquatic insect belonging to the order Ephemeroptera and consist of over 3,000 species worldwide. Their general appearance is long tails and upright wings that do not fold flat over their bodies like the caddis or stoneflies.

The Hatch

The hatch begins sometime in early spring and will continue into the fall with some species like the Baetis getting smaller in size as the season progresses. The early season hatches are characterized by darker bodies and dark wings and as the season progresses the body and wings become lighter in appearance

The Nymph

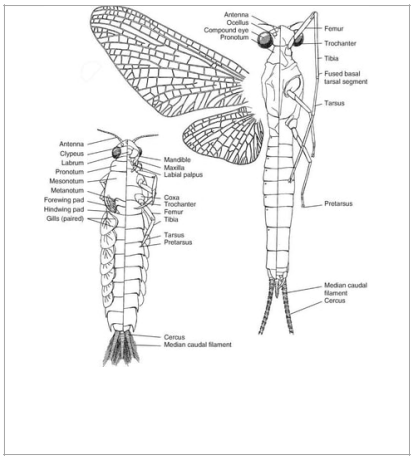
Immature mayflies are aquatic insects and are referred to as nymphs. In contrast to their short lives as adults, they may live for several years in the water. They have elongated, cylindrical or somewhat flattened bodies that passes through a number of installs (stages), molting and increasing in size each time.

When ready to emerge from the water, nymphs vary in length, depending on species, from 3 to 30 mm (0.12 to 1.18 in). The head has a tough outer covering or sclerotin, often with various hard ridges and projection; it points either forwards or downwards, with the mouth at the front. There are two large compound eyes, Three ocelli (simple eyes) and a pair of antennae of variable length, set between or in front of the eyes. The mouthparts are designed for chewing and consist of a flap like labrum, a pair of strong mandibles, a pair of maxillae, a membranous hypopharynx and a labium

The thorax consists of three segments the hindmost two, the mesothorax and the metathorax being fused. Each segment bears a pair of legs, which usually terminate in a single claw. The legs are robust and often covered in bristles, hairs or spines. Wing pads develop in the mesothorax and in some species, hindwing pads develop on the metathorax. The abdomen consists of ten segments, some of which can be obscured by a large pair of operculate gills, a thoracic shield (expanded part of the prothorax) or the developing wing pads In most taxa up to seven pairs of gills arise from the top or sides of the abdomen, but in some species they are under the abdomen and in a very few species are located on the coax of the legs, or the base of the maxillae. The abdomen terminates in a pair of, or three, slender thread like projections

The Subimago

The final molt of the nymph is not the full adult form, but to a winged stage called a sub imago that physically resembles the adult, but which is usually sexually immature and duller in color. The subimago or dun, often has particularly cloudy wings fringed with minute hairs known as microtrichia; its eyes, legs and genitalia are not fully developed. Females of some mayflies do not moult from a subimago stage to an adult stage and are sexually mature while appearing as a subimago with microtrichia on their wings but not on their bodies. Subimagos are generally poor fliers, have shorter appendages, typically lack the color patterns used to attract mates. In males of Ephron leukon, the subimagos have forelegs that are short and compressed, with accordion like folds, and expands to more than double their length after moulting. After a period, usually lasting one to two days but in some species only a few minutes, the subimago moults to the full adult form, making mayflies the only species where a wind form undergoes a further



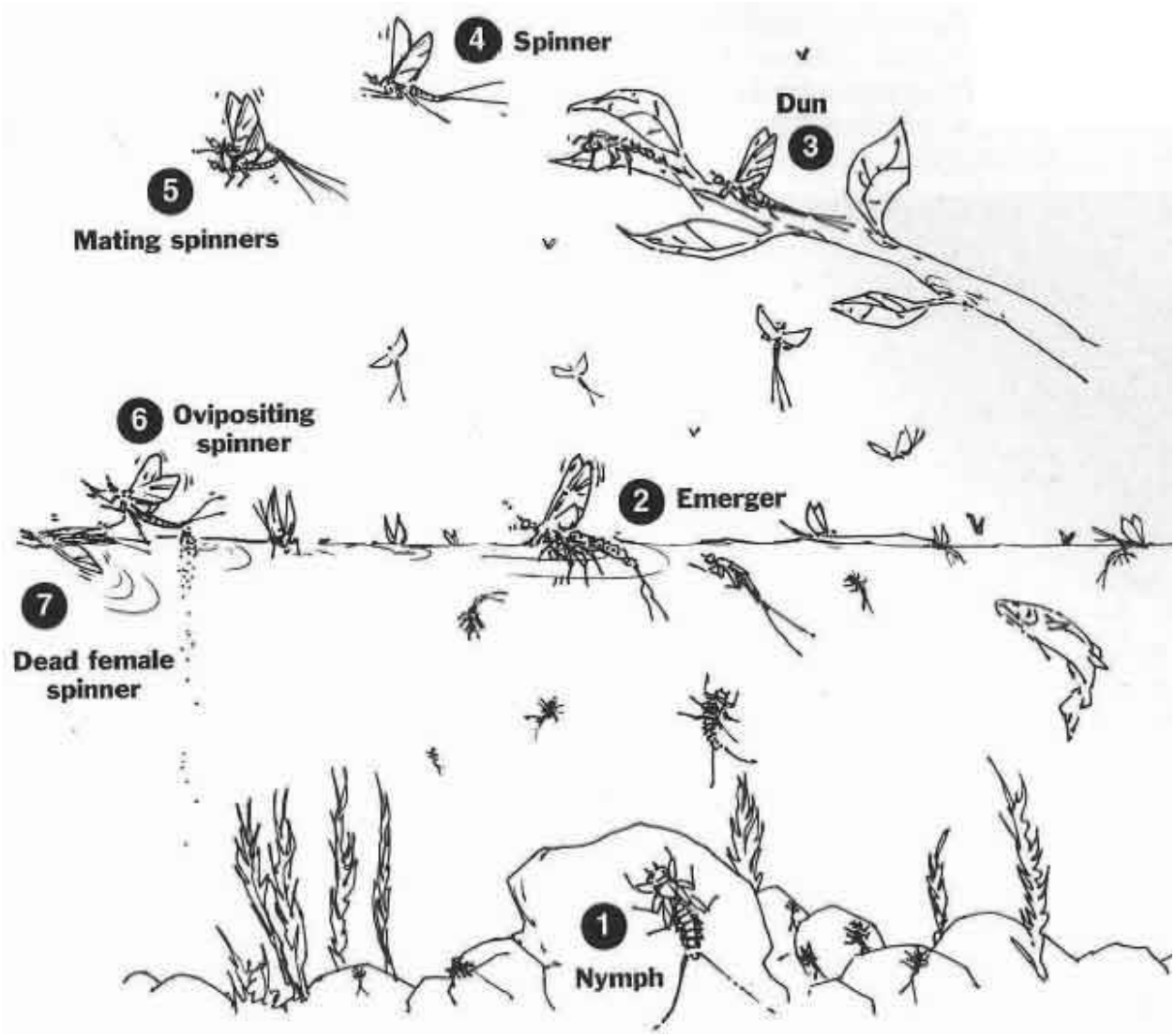
Imago

Adult mayflies, or imagos are relatively primitive in structure, exhibiting traits that were probably present in the first flying insects. These include long tails and wings that do not fold flat over the abdomen. Mayflies are delicate looking insects with one or two pairs of membranous, triangular wings, which are extensively covered with veins. At rest, the wings are held upright like those of a butterfly. The hind wings are much smaller then the forewings and may be vestigial or absent. The second segment of the thorax, which bears the forewings, is enlarged to hold the main flight muscles. Adults have short, flexible antennae, large compound eyes, three ocelli and non functional

mouthparts. In most cases, the males eyes are large and the front legs unusually long, for use in locating and grasping females during the mid-air mating. In the males of some families, there are two large cylindrical “turban” eyes that face upwards in addition to the lateral eyes. They are capable of detecting ultraviolet light and are thought to be used during courtship to detect females flying above them. The abdomen is longhand roughly cylindrical, with ten segments and two or three long cerci (tail-like appendages) at the tip. Uniquely among insects, mayflies possess paired genatalia, with the male having two adage (penis-like organs) and the female two genopores (sexual openings)

Mayflies are hemimetabolous (Incomplete metamorphosis). They are unique among insect in that they moult one more time after acquiring functional wings, this last but one winged instar usually lives a very short time and is known as a subimago, or to the fly fisherman as a dun. Mayflies at the subimago stage are a favorite food of many fish, and many fishing flies are modeled to resemble them. The subimago stage does not survive for long, rarely more than 24 hours.

Often, all the mayflies in a population mature at once (hatch), and for a day or two in the spring or autumn, mayflies are everywhere, dancing around each other in large groups, or resting on every available surface. In many species the emergence is synchronized with dawn or dusk, and light intensity seems to be an important cue to emergence, but other factors may also be involved. The soft bodied subimagos are very attractive to predators, Synchronous emergence is probably an adaptive strategy that reduces the individuals risk of being eaten. The lifespan of an adult mayfly is very short, varying with species. The primary function of the adult is reproduction; adults do not feed and have only vestigial (unusable) mouthparts, while their digestive systems are filled with air.



Male adults may patrol individually, but most congregate in swarms a few feet above the water with clear open sky above, and perform a nuptial (courtship) dance. Each insect has a characteristic up-and-down pattern of movement; strong wingbeats propel it upwards and forwards with the tail sloping down; when it stops moving its wings, it falls passively with the abdomen tilted upwards. Females fly into these swarms, and mating takes place in the air. A rising male clasps the thorax of a female from below using his front legs bent upwards, and inseminates her. Copulation may last just a few seconds, but occasionally a pair remains in tandem and flutters to the ground. Males may spend the night in vegetation and return to the nuptial dance the following day. Although they do not feed, some briefly touch the surface to drink a little water before flying off

Females typically lay between four hundred and three thousand eggs. The eggs are often dropped onto the surface of the water; sometimes the female deposits them by dipping the tip of her abdomen into the water during flight, releasing a small batch of

eggs each time, or deposits them in bulk while standing next to the water. In a few species, the female submerges and places the eggs among plants or in crevices underwater, but in general, they sink to the bottom. The incubation time is variable, depending at least in part on temperature, and may be anything from a few days to nearly a year. Eggs can go into a quiet dormant phase or diapause.] The larval growth rate is also temperature-dependent, as is the number of mounts At anywhere between ten and fifty, these post-embryonic moults are more numerous in mayflies than in most other insect orders. The nymphal stage of mayflies may last from several months to several years, depending on species and environmental conditions.

Many species breed in moving water, where there is a tendency for the eggs and nymphs to get washed downstream. To counteract this, females may fly upriver before depositing their eggs. For example, the female. Tisza mayfly, the largest European species with a length of 10 cm (4 in), flies up to 3 kilometres (2 mi) upstream before depositing eggs on the water surface. These sink to the bottom and hatch after 45 days, the nymphs burrowing their way into the sediment where they spend two or three years before hatching into subimagos.

When ready to emerge, several different strategies are used. In some species, the transformation of the nymph occurs underwater and the subimago swims to the surface and launches itself into the air. In other species, the nymph rises to the surface, bursts out of its skin, remains quiescent for a minute or two resting on the exuviae (cast skin) and then flies upwards, and in some, the nymph climbs out of the water before transforming.

Check back next issue as we discuss how to fish the various stages of the mayfly lifecycle!
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