Aquatic Entomology:
Plecoptera with special reference to Texas

Order: Plecoptera (stoneflies)
Diagnosing Features, adults:
hind wing usually has large anal lobe
soft-bodied and flattened
wings reticulated and fold flat over abdomen; fore wings elongated and narrow
long antennae.
usually 3-segmented tarsi
chewing mouth parts
Diagnosing Features. nymphs:
flattened, generalized insect
two tarsal claws
two cerci
wing pads usually present, especially in older nymphs
long antennae
Habitat: near streams or rocky lake shores, nymphs are aquatic
Food habits: some detritivores (shredders and more), others predators (but collectors as young)
Metamorphosis: hemimetabolous
Preservation: alcohol, for both nymphs and adults.
Notes: Stoneflies are indicators of the quality of aquatic habitats. The northern hemisphere families are often divided into two "groups": the Euholognatha with glossa and paraglossa of equal length, and the Systellognatha with the paraglossa much larger than the glossa. In this classification care must be taken because the Peltoperlidae and Pteronarcyidae have the paraglossa and glossa of equal length, but are often placed in the Systellognatha for other reasons.
Literature: for Texas, Szczytko, S. W. and K. W. Stewart. 1977. The stoneflies (Plecoptera) of Texas. Trans. Amer. Entomol. Soc. 103: 327-378.

Families

Family: CAPNIIDAE (winter stoneflies).
Morphology, nymphs--small, elongate stoneflies without gills. **Similar** in **appearance to leuctrids but with a pleural fold extending on abdomen from segment 1 to 9.** Glossa and paraglossa of same length and appearance. Young nymphs of capniids and leuctrids are difficult to separate. Capniids are generally in the stream as nymphs earlier in the season than leuctrids and appear only for a few weeks near emergence time.
Ecology, nymphs--hyporheic, only found in the streams and lakes immediately before emergence. Many genera and species are restricted to high, well-oxygenated streams. Detritivores.
Ecology, adults--winter stoneflies. Can emerge on to snow. Often abundant. Many genera in mountainous areas.
Texas genera: all the nymphs look alike, only identifiable to genus when the male genitalia is visible through the nymphal skin.
Allocapnia, Only in northeast Texas.
Mesocapnia, only in the Panhandle. Known from the Prairie Dog Town Fork of the Red River in and around Palo Duro Canyon. Not collected recently, some fear that it has been extirpated.

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Family: CHLOROPERLIDAE.
Morphology, nymphs-- generally small, elongate stoneflies without gills. Glossa much shorter than paraglossa and more pointed. Cerci relatively short and stocky, but still with many articles.
Ecology, nymphs--clean, clear upland streams. Subfamily Paraperlinae is hyporheic and only found in the streams and lakes immediately before emergence. Many genera and species are restricted to high, well-oxygenated streams. Carnivores.
Ecology, adults--summer emerging stoneflies. Most are yellowish with some bright green.
Texas genera: Not found in Texas. Many in mountainous areas.

Family: LEUCTRIDAE.
Morphology, nymphs--small, elongate stoneflies without gills. **Similar in appearance to capniids but without as long** a pleural fold. Glossa and paraglossa of same length and appearance. Difficult to separate from capniids. They are generally present in the stream later than capniids.
Ecology, nymphs--hyporheic, only found in the streams and lakes immediately before emergence. Many genera and species are restricted to high, well-oxygenated streams.
Ecology, adults--late fall,winter stoneflies. They have been taken from intermittent streams. Many genera in mountainous areas.
Texas genera:
Zealeuctra, two species in the Hill Country and another in east Texas.
Leuctra, one species in east Texas.

Family: NEMOURIDAE.
Morphology, nymphs--small, stocky stoneflies some with cervical or submental gills, others without gills. Often hairy and covered with debris. Segment two of tarsus much shorter than either one or three. Wing pads divergent. Glossa and paraglossa of same length and appearance.
Ecology, nymphs--often collected on woody debris. Many genera and species are restricted to high, well-oxygenated streams.
Ecology, adults--generally emerge in spring. Many genera in mountainous areas.
Texas genera:
Amphinemura, east Texas.

Family: PELTOPERLIDAE.
Morphology, nymphs-- Medium sized. Glossa somewhat shorter than paraglossa and more pointed, but not quite the same as in leuctrids, capniids, and nemourids. Tapering gills present above legs on at least some segments of the thorax. With overlapping thoracic plates. Resemble roaches. Tear drop shaped.
Ecology, nymphs--some in clean streams and rivers; more in seeps. Herbivores, shredders of leaves.
Ecology, adults--summer emerging stoneflies. Brown or dull yellow.
Texas genera:
Not found in Texas.

Family: PERLIDAE.
Morphology, nymphs-- Can be very large. Glossa much shorter than paraglossa and more pointed. The paraglossae can be bulbous. Filamentous, branched gills on thorax, sometimes between cerci as well, but not on first segments of abdomen.
Ecology, nymphs--generally clean streams and rivers. This family is much more tolerant of poor water quality than other stoneflies. Many genera and species are restricted to high, well-oxygenated streams and a few lakes. Carnivores.

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Ecology, adults--summer emerging stoneflies. Most are brown with some yellow markings. Local species, and many other species from eastern North America come to lights. Western species don't come to lights!
Texas genera:
Acroneuria, East Texas, probably in northeast Texas as well. Try Sandy Creek in Jasper Co.
Anacroneuria, a neotropical genus. One very rare species in the Guadalupe River above Canyon Lake. Bonus if you can find it! Don't get shot!
Neoperla, two ocelli. Not in Austin, but nearby on three sides.
Paragnetina, East Texas, try Sandy Creek in Jasper Co.
Perlesta, common around Austin and in parts east. Similar in size and appearance to *Neoperla* but with three ocelli.
Perlinella, north and east Texas. Closest spot where it is relatively common is the Middle Bosque River in McClennan Co.

Family: PERLODIDAE.
Morphology, nymphs-- Can be very large. Glossa much shorter than paraglossa and more pointed. Gills usually absent, but sometimes finger-like on thorax and/or near mentum. Often with striking light and dark color patterns. Similar in general appearance to perlids, but no gills.
Ecology, nymphs--generally clean streams and rivers. Many genera and species are restricted to high, well-oxygenated streams and a few lakes. Carnivores.
Ecology, adults--spring and summer emerging stoneflies. Most brown with yellow markings.
Texas genera:
Hydroperla, Hill Country and northeastward. One rare species named from Austin. It has never been recollected in Texas since. Probably extirpated with the construction of the Highland Lakes, including Town Lake.
Isoperla, several species in east Texas and extreme west Texas. One species thought to be extinct.

Family: PTERONARCYIDAE.
Morphology, nymphs-- Can be very large. Glossa somewhat shorter than paraglossa and more pointed, but not as different from each other as in the Perlidae. Gills present ventrally on thorax and one the first few segments of the abdomen. Often with extensions on the prothorax and/or abdomen.
Ecology, nymphs--generally clean streams and rivers. Many genera and species are restricted to high, well-oxygenated rivers and streams. Herbivores, shredders of leaves.
Ecology, adults--summer emerging stoneflies. Brown, with intersegmental membranes often bright orange.
Texas genera:
Not found in Texas. Common in Colorado and elsewhere.

Family: TAENIOPTERYGIDAE.
Morphology, nymphs--small, stocky stoneflies without gills (except coxal gills in *Taeniopteryx),* generally larger than the similar nemourids. All tarsal segments of approximately equal length. Wing pads divergent. Glossa and paraglossa of same length and appearance.
Ecology, nymphs--often collected on woody debris. Many genera and species are restricted to high, well-oxygenated streams.
Ecology, adults--generally emerge in spring.
Texas genera:
Taeniopteryx, east Texas.

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