Why would an angler want or need to know about the food habits of stoneflies? It probably won't help you catch more trout, but it can give you more insight into what makes a stream tick, and perhaps help explain why some streams have good numbers of insects and others have only a few.

Ever wonder what insects eat? I was looking through some papers on insect behavior a while back and came upon one that perked my interest. It was called “The Food Habits of Stoneflies (Plecoptera) in the Upper Gunnison River, Colorado,” by Randall Fullmer and Kenneth W. Stewart in a journal called Environmental Entomology.

You are probably wondering why an angler would want or need to know about the food habits of stoneflies. After all, most angler's fish for fish not stoneflies. When asked with this question I have to agree it probably won't help you catch more trout, but it can give you more insight into what makes a stream tick, and perhaps help explain why some streams have good numbers of insects and others only a few. Or why some hatches in some streams have declined over the years. The other interesting aspect of a paper like this one is that it doesn't just look at the contents of a few stonefly stomachs. It required collecting stonefly nymphs at different seasons, then comparing their stomach contents with the number and types of other insects and plants in the stream. As a result, a detailed list of the aquatic insects living in the stream throughout the year was developed, and this list can help fly fishers determine which hatches are most important and when.

Let's start with a quick look at the methods used in this study. The study was done on the upper Gunnison River in Colorado. More specifically, samples were collected at the Lost Creek Canyon Resort, approximately two miles south of Almont, Colorado. In this area, the Gunnison is a fast-flowing stream with a large rock-rubble bottom. Stoneflies for stomach analysis were collected with kick nets, seines, and drift nets. The first samples were collected in December. Remaining samples were collected monthly, from May through October, during the following year. Samples were collected twice a day, once at mid-afternoon and once midway between sunset and midnight. Samples of the periphyton (the thin layer of diatoms growing on bottom rocks) and other aquatic insects were also collected at the same time stoneflies were sampled. Periphyton was collected by scraping the surface of the rocks. Insects were collected with kick nets.

The results of the study provide a variety of interesting information about the river and the insects living there. Probably of greatest value is the detailed list of the number of each aquatic insect species present at the study sites from May through October.

A total of 38 different taxon (scientific classifications) was collected during the study. The most abundant taxa and how their abundance changed through the season are summarized in the attached table. There are a couple of things to note about this information. First, the numbers listed are for nymphs only. Adult insects were not collected in this study. You can estimate when emergence of a particular taxon might occur, however, by looking for the month when the “lowest” number of nymphs were collected. The lowest number would indicate emergence because there are very few nymphs left in the stream following emergence. The months with the highest number of nymphs collected indicate that the eggs of that taxon recently hatched.

Second, you can see which taxa were most abundant through the season. Chironomids dominated the fauna...
in each of the six months samples. This points out just how important midges are to fish as a consistent food source, and to fishermen imitating what fish eat. The Baetis mayfly was the second-most-abundant insect in most months samples. This is typical for many Western streams, and points out why Baetis is such an important insect to Western anglers.

Several caddis, while never dominant, were common in most months. The order Trichoptera (caddisflies) also contained a greater number of “common” taxa than the other orders. Such diversity of caddisflies is common in many streams. The large number of oligochaetes (aquatic worms) during the summer is also worth noting. Generally, they are not readily available to fish because they live under bottom debris. However, should a summer rain storm come along and increase flows enough to disturb the bottom substrate, oligochaetes can become a major food for fish. This is well known on streams like the Big Horn and San Juan, where chamois-worm patterns are very successful.

Now that we’ve seen what’s in the Gunnison River, what were the stoneflies eating? A summary of the food habits of the major stonefly species in the Gunnison River is presented below.

Isoperla fulva (Little-yellow Stone)—
The diets of these small stoneflies consisted mostly of chironomid larvae. The importance of chironomids increased as the nymphs grew. Different types of algae were also important in the diet of young nymphs. Mature nymphs were collected in May and June with emergence in July, August, and September.

Caenisia sabulosa—This is a common,
but unusual, Western stonefly closely related to the golden Stone; both belong to the family Perlidae, and are very similar in appearance. A unique characteristic of this species is that most adults lack fully developed wings. Adults emerge in August and September, when they can be seen crawling along the banks unable to fly. Nymphs require two years to mature. During their first year they ate mostly chironomid larvae. During their second year they ate caddis larvae, mayfly nymphs and chironomids.

_Hesperoperla pacifica_ (Golden Stone)—This stonefly ranks with the salmonfly in importance on Western rivers. Emergence typically occurs in June or July. Nymphs require two to three years to mature. Like _C. sabulosa_, the nymphs are predators. During the first year nymphs fed mostly on chironomid larvae. In the second year they shifted to large caddisfly larvae, but chironomid larvae were still important, particularly prior to emergence.

_Chloroperlidae_ (Little-green Stone)—This family contains a number of genera difficult to identify as nymphs, so they were not separated for this study. Most of the species emerged in late June through July and August. Only a single year is required for the nymphs to mature. Young nymphs fed mostly on algae and detritus. During the last two or three months of development, however, chironomid larvae became their dominant food.

One thing this study clearly points out, is the importance of chironomids as food, not only for fish but also for stonefly nymphs. It is easy to understand the important relationship between fish and insects, but the importance of one insect to another, however, is not obvious until a careful study is performed.

Think about the importance of midges the next time you're on a stream frustrated by a midge hatch. Without midges, fishing might be less frustrating, but it would also be less exciting because there would be few stonefly hatches without the midges. One can't exist without the other.

_(See data table on next page)_
### Number of Insects Collected by Month on the Upper Gunnison River

<table>
<thead>
<tr>
<th>Taxa</th>
<th>May</th>
<th>June</th>
<th>July</th>
<th>Aug</th>
<th>Sept</th>
<th>Oct</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chinonomidae</td>
<td>776</td>
<td>919</td>
<td>873</td>
<td>2535</td>
<td>1233</td>
<td>2194</td>
</tr>
<tr>
<td>Baetis sp.</td>
<td>176</td>
<td>277</td>
<td>249</td>
<td>470</td>
<td>187</td>
<td>88</td>
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<tr>
<td>Rhithrogena sp.</td>
<td>22</td>
<td>15</td>
<td>0</td>
<td>55</td>
<td>16</td>
<td>0</td>
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<tr>
<td>Ephemerella inermis</td>
<td>20</td>
<td>21</td>
<td>3</td>
<td>3</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>Hexoperla pacifica</td>
<td>15</td>
<td>22</td>
<td>19</td>
<td>43</td>
<td>6</td>
<td>1</td>
</tr>
<tr>
<td>Chloroperlidae</td>
<td>29</td>
<td>43</td>
<td>16</td>
<td>39</td>
<td>7</td>
<td>68</td>
</tr>
<tr>
<td>Arctopsyche sp.</td>
<td>21</td>
<td>17</td>
<td>4</td>
<td>133</td>
<td>67</td>
<td>41</td>
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<tr>
<td>Glossosoma sp.</td>
<td>20</td>
<td>5</td>
<td>2</td>
<td>70</td>
<td>89</td>
<td>97</td>
</tr>
<tr>
<td>Leptostoma sp.</td>
<td>46</td>
<td>89</td>
<td>63</td>
<td>63</td>
<td>49</td>
<td>99</td>
</tr>
<tr>
<td>Oligophlebiodes sp.</td>
<td>33</td>
<td>0</td>
<td>0</td>
<td>23</td>
<td>74</td>
<td>182</td>
</tr>
<tr>
<td>Brachycentrus sp.</td>
<td>8</td>
<td>13</td>
<td>6</td>
<td>87</td>
<td>66</td>
<td>33</td>
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<tr>
<td>Simuliidae</td>
<td>35</td>
<td>45</td>
<td>1</td>
<td>147</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Oligochaeta</td>
<td>46</td>
<td>30</td>
<td>141</td>
<td>96</td>
<td>220</td>
<td>141</td>
</tr>
<tr>
<td>TOTAL No.</td>
<td>1352</td>
<td>1617</td>
<td>1631</td>
<td>5346</td>
<td>2407</td>
<td>3220</td>
</tr>
</tbody>
</table>

Common Names of Taxa Listed:
- **Chironomidae** - midge
- **Simuliidae** - Black fly
- **Ephemeroptera**
  - **Baetis** - Blue-wing Olive
  - **Rhithrogena** - Western March Brown
  - **Ephemerella inermis** - Pale Morning
- **Dun**
- **Trichoptera**
  - **Lepidostoma** - Plain Brown Sedge
- **Aptophysycce** - Great Grey Sedge
- **Glossosoma** - Little Tan Short-Horned Sedge
- **Brachycentrus** - American Grannom
- **Oligophlebiodes** - Little Western Dark Sedge
- **Oligochaeta** - Aquatic worms

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