



Glossosoma cases on rock. Putah Creek Fishing Access No. 5. Photo taken 10/27/08.



Glossosoma cases on rock. Photo taken 10/27/08.



Glossosoma larva grazing on algae.



Glossosoma pupae (ventral view)

December 1, 2008

To: Chris Lee
Solano county Water Agency

Subject: Impact of Dewatering in the Interdam Reach on *Glossosoma*, a Common Caddisfly.

Executive Summary:

Numerous anglers have expressed concern about invertebrates (*Glossosoma*) that appeared to be “stranded” by lower water levels in the Interdam Reach (IDR) of Putah Creek. Due to a significant switch in invertebrate communities and domination by New Zealand mudsnails, I decided to investigate the reported strandings. At no cost to SCWA, I collected 163 *Glossosoma* pupal cases at Fishing Access Number 5 and examined them for mortality. Eighty-three (83) percent of the pupal cases showed exit holes used by the adult caddis to escape while the cases were still submerged. Seventeen (17) percent contained mummified pupae that succumbed, possibly due the lowered water levels. The early-instar (next year’s population) *Glossosoma* larvae at Fishing Access No. 5 averaged 1500 larvae per sq. meter. The New Zealand mudsnail density at the same site was 280,555 snails per sq. meter.

Background:

For several years, numerous anglers have commented to me that when water levels are lowered in the Interdam Reach that the invertebrate population is severely impacted (stranded) by the lower water levels. They were quick to point out the numerous caddis cases (*Glossosoma*) isolated above water level. I decided to document the impact of lowered water levels on *Glossosoma* caddisflies because recent mudsnail surveys in the IDR have shown a significant switch in caddisfly populations.

Glossosoma Life Cycle: *Glossosoma* is the genus of a caddisfly commonly found throughout California. The genus is rated as requiring non-polluted, well oxygenated, and cool water. As larvae, *Glossosoma* move protected in a rock case, while scraping algae off the surface of submerged rocks. When they reach maturity, they form pupae inside a rock case and cement the case typically to a cobble substrate. After 21-30 days the maturing adult chews it’s way out of the case and swims to the water surface and flies away. The “hatching” process in *Glossosoma* is typically sporadic and takes place from April to the middle of September. In Putah Creek, I have documented that a very small percentage of *Glossosoma* emerge into November.

Study Protocol:

I collected large rocks (Image No. 1) with significant caddis cases from Fishing Access No 5 on 10/17/08 and 10/27/08. The specimens were transported to my laboratory where they were photographed and examined. Each case was carefully excised from the rocks and examined for the presence of an “exit hole” (image on left) which would document that the pupae matured and emerged as an adult prior to the water level being lowered.



Glossosoma cases showing exit holes made by emerging adult *Glossosoma*. 10/27/08



Glossosoma (Ventral view). Shows “mummified” pupae.



Glossosoma adult hatched in laboratory.

If no exit hole was noted, the *Glossosoma* pupa was surgically removed from the case and examined each under a stereo microscope to determine its condition. Mummified pupae were easily identified (see photo on left). A process of carefully opening the pupal sheath would generally reveal desiccated wings and other body parts. Those specimens were considered stranded by the lowering water levels although there could be other reasons including natural mortality.

Results:

Eighty-three percent of the pupal cases examined showed exit holes from the rock cases and empty pupal sheaths which documents that the adult *Glossosoma* chewed their way out of the pupal cases and emerged while the cases were submerged. Seventeen percent of the cases showed “mummified” pupal remains that had developed wings and other body parts. The cause of mortality remains unknown, but certainly could be amplified by lower water levels. I do not know the natural mortality rate for *Glossosoma* pupae.

Some *Glossosoma* broods overlap, which is the case in Putah Creek. The early-instar *Glossosoma* population in the Interdam Reach averaged 1500 individuals per square meter. At the same site, the New Zealand mudsnail density on November 11, 2008 was 280,555 individuals per square meter.

Discussion:

The concern about the stranded *Glossosoma* cases is probably amplified because the cases (83% empty) are obvious to anglers fishing in the Interdam Reach. In addition, the invertebrate community in the Interdam Reach has decreased significantly in species richness and total density. Significant invertebrate “hatches” noted even a few years ago, have essentially disappeared. The situation could be caused by the New Zealand Mudsnail population, the lack of flood scouring from Glory Hole breaches, or other factors.

The *Glossosoma* population appears to be very healthy in spite of the visual appearance of the cases exposed by low water levels in the Interdam Reach of Putah Creek. The vast majority (83%) of adults emerged prior to the low water condition. The early instar population (next year’s crop) is healthy at 1500 individuals per square meter.

Submitted via e-mail December 1, 2008:

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