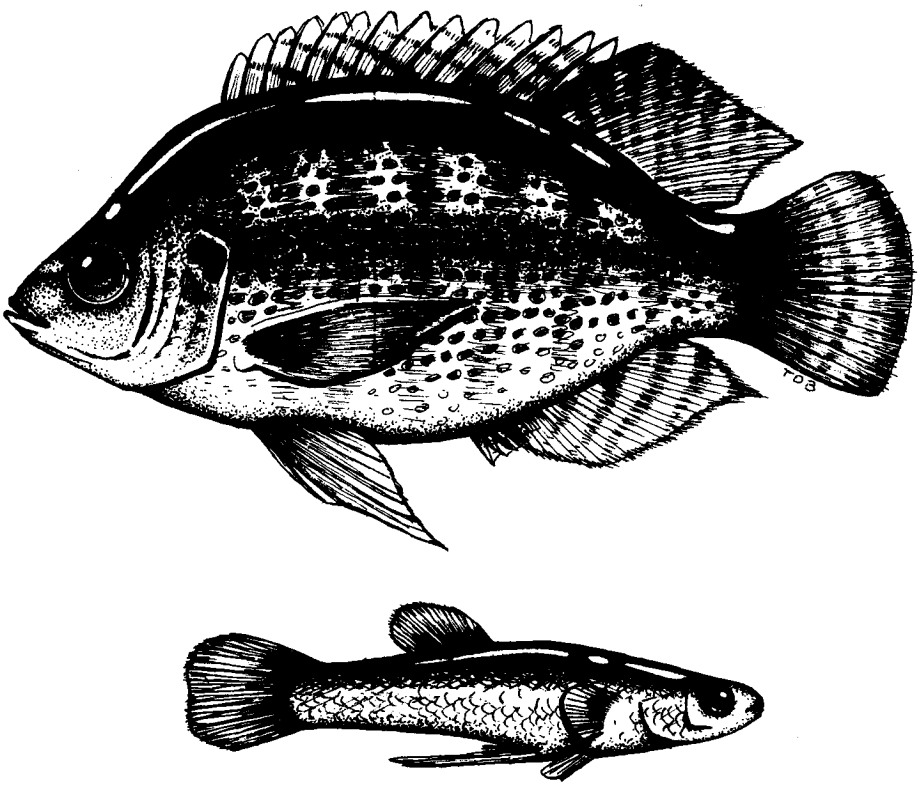
GUT CONTENT ANALYSIS

OF WILD *GAMBUSIA* AND *TILAPIA* IN HOT CREEK, BRUNEAU, IDAHO



by

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Protecting Sheet

Gut Content Analysis of Wild *Gambusia* and *Tilapia* in Hot Creek, Bruneau, Idaho.

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SUMMARY

The springsnail, *Pyrgulopsis bruneauensis*, once inhabited Hot Creek, a tributary to the Bruneau River. After a major runoff event in July 1992, researchers failed to observe springsnails in the creek. The feeding activities of local fish populations (*Gambusia* and *Tilapia*) were examined as a possible reason for the lack of recovery of the springsnail population. Gut analyses of the two fish populations indicated that their diets consisted of organic matter, vegetative matter, and a small number of insect parts. *Pyrgulopsis* bruneauensis were not found to be a component of the fish diets.

INTRODUCTION

The springsnail, *Pyrgulopsis bruneauensis*, is an endemic hydrobiid inhabiting a complex of related hot springs near the Bruneau River, south of Bruneau, Idaho. Mladenka (1992) studied the ecological life history of the snail. Since then, the snail and its habitat have been monitored on an approximately month-by-month basis (Robinson et al. 1992, Royer and Minshall 1993, Varricchione and Minshall 1994).

Monitoring locations designated as Site 2 and Site 3 are hot springs found to have viable snail populations. During the monitoring period, Site 1 (Hot Creek) experienced a major runoff event (July 1992), which is believed to have locally extirpated the snail. *Gambusia* and *Tilapia* are known to inhabit Hot Creek and may potentially prey upon the snail. If any refugia do exist for the snails in Hot Creek, the fish may prey upon the remaining snails and reduce any chance for populations to re-establish. The objective of this study was to examine the stomach contents of Hot Creek *Gambusia* and *Tilapia* to determine if snails were being consumed as a part of these fishes' diets.

METHODS

Specimens of *Gambusia* and *Tilapia* were obtained by electrofishing and hand-netting along Hot Creek on 14 February 1995. Specimens were placed on ice and later frozen in the laboratory until processed. During processing, the stomachs of 66 *Gambusia* and 34 *Tilapia* were removed by dissection. The stomach contents were examined for the presence of *Pyrgulopsis bruneauensis* and other food types using a dissecting microscope. Stomach contents and lengths of fish were recorded. Also noted was the presence of larval guppies and eggs.

RESULTS

Gambusia

The *Gambusia* population size distribution was approximately normal in shape (Fig. 1a) having a mean length of 3.18 cm (± 0.14 cm). Larval guppies were found in 10.6% of the specimens. Organic matter was found in 100% of the *Gambusia* stomachs (Fig. 1b). Vegetative matter was found in 24.2% of the guts. Only 1.5% of the *Gambusia* stomachs examined contained insect parts (Fig. 1b). *Gambusia* stomachs were not found to contain intact or fragmented *Pyrgulopsis* parts.

Tilapia

The *Tilapia* population size distribution was fairly even across all size classes except the 5.6-6.0 cm size class (Fig. 2a). Mean length of the fish was 6.82 cm (± 0.619 cm). Eggs were found in 14.7% of the specimens. Organic matter was found in 100% of the *Tilapia* stomachs (Fig. 2b). *Tilapia* stomachs had more organic matter (41% of guts examined) and insect parts (2.9% of guts examined) than *Gambusia* stomachs (Fig. 2b), but this variation might be explained by the smaller *Tilapia* sample size. *Pyrgulopsis* snail parts were not found in *Tilapia* gut contents.

ACKNOWLEDGEMENTS

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LITERATURE CITED

Mladenka, G.C. 1992. The ecological life history of the Bruneau hot spring springsnail (*Pyrgulopsis bruneauensis*). Unpublished M.Sc. Thesis, Idaho State University, Pocatello, Idaho.

Robinson, C.T., G.W. Minshall, and K. Sant. 1992. Annual monitoring report: Bruneau hot spring springsnail (*Pyrgulopsis bruneauensis*). Prepared for the U.S. Bureau of Land Management, Boise, ID.

Royer, T.V. and G.W. Minshall. 1993. Annual monitoring report: Bruneau hot spring springsnail (*Pyrgulopsis bruneauensis*). Prepared for the U.S. Bureau of Land Management, Boise, ID.

Varricchione, J. T. and G.W. Minshall. 1994. Annual monitoring report: Bruneau hot-spring springsnail (*Pyrgulopsis bruneauensis*). Prepared for the U.S. Bureau of Land Management, Boise, ID.

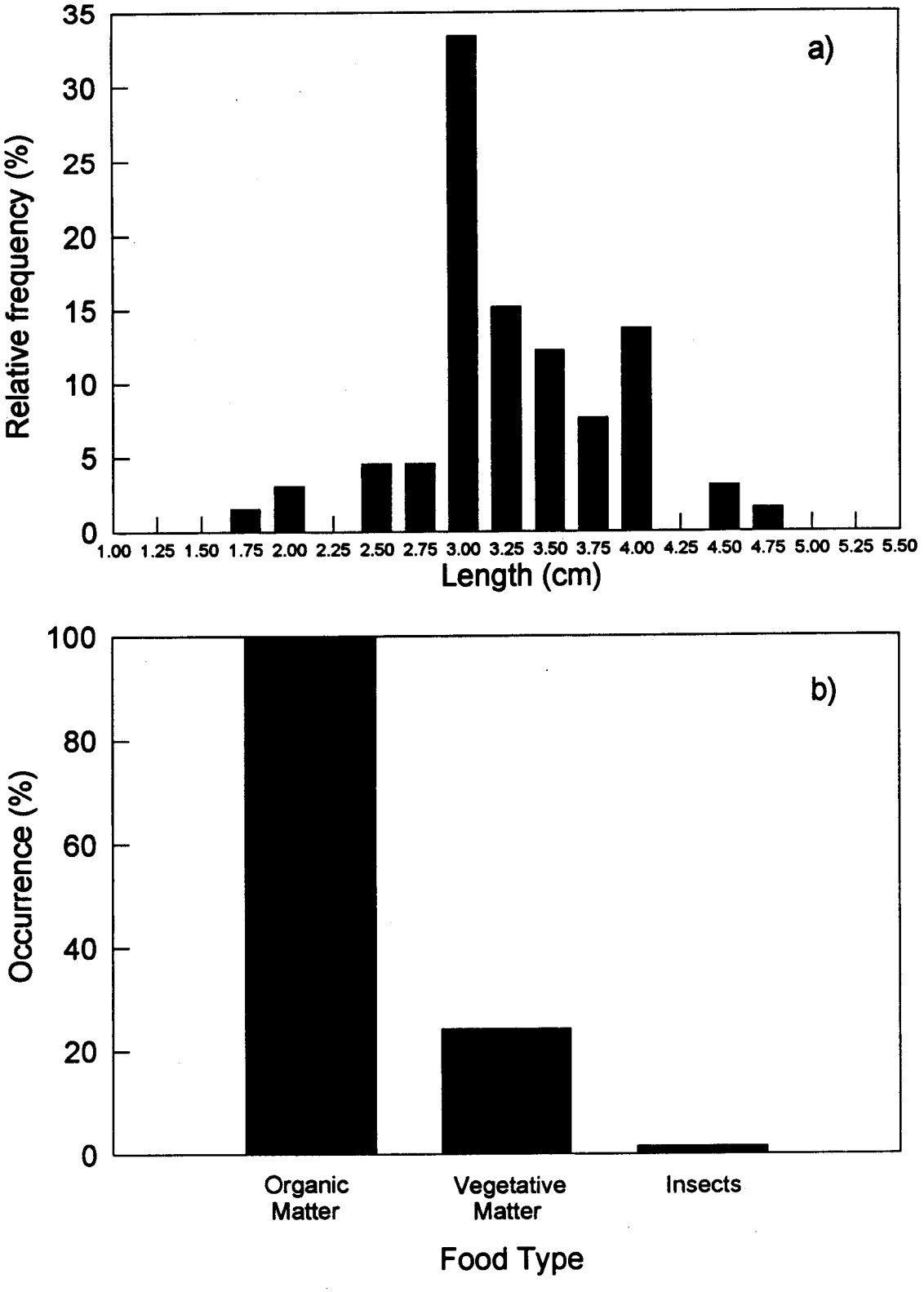
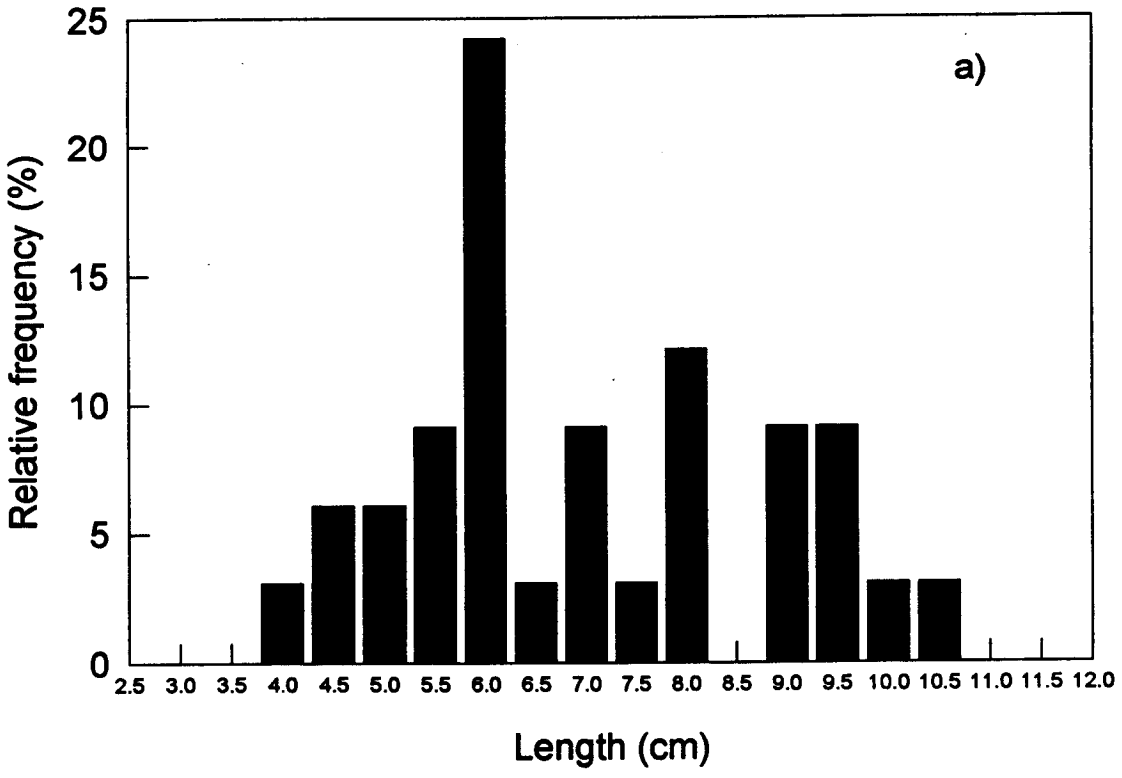


Figure 1. *Gambusia* population and gut content data for Hot Creek, Idaho. (a) Population size distribution. (b) Occurrence of food types in the guts of *Gambusia* specimens.



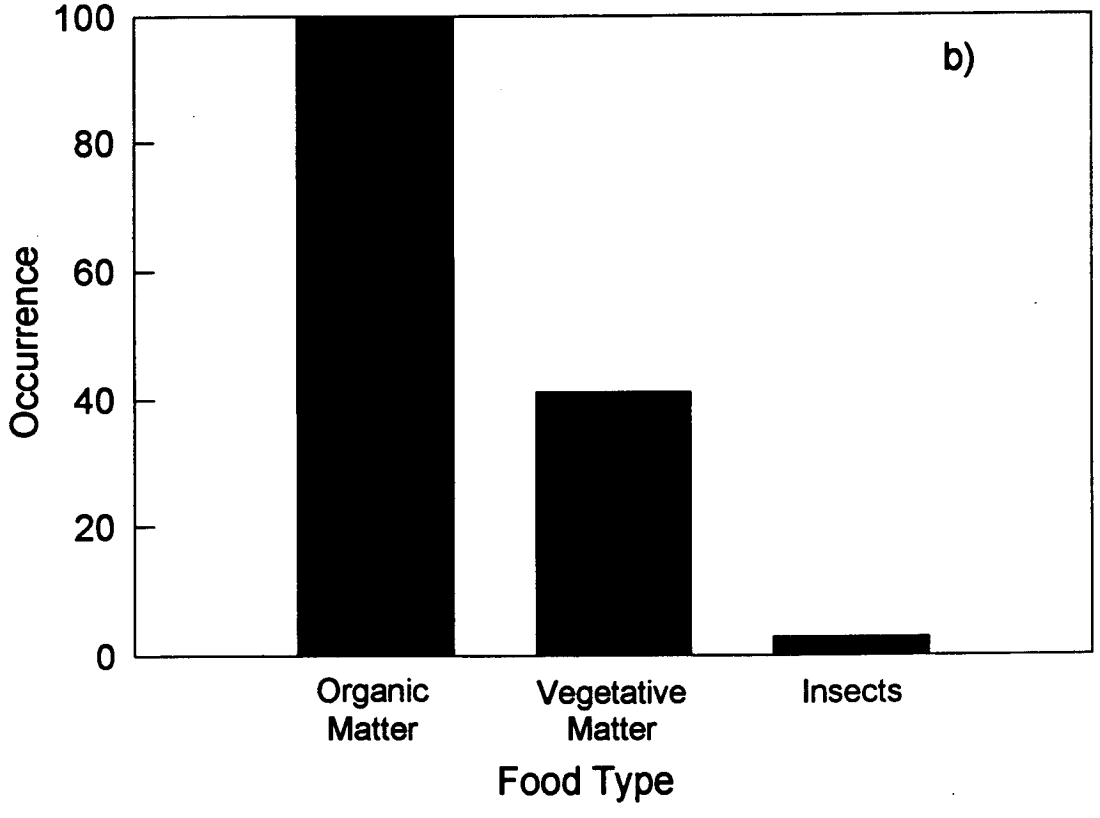


Figure 2. *Talapia* population and gut content data for Hot Creek, Idaho. (a) Population size distribution. (b) Occurrence of food types in the guts of *Tilapia* specimens.

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