

FURTHER NOTES ON PATHOLOGIC POPULATIONS OF TIGER SALAMANDERS IN THE WASATCH MOUNTAINS, UTAH

Katherine Worthylake (Department of Biology, Idaho State University, Pocatello, Idaho) and Peter Hovingh (Department of Biochemistry, University of Utah, Salt Lake City, Utah)

The Tiger Salamanders (Ambystoma tigrina) died off in Lake Desolation during the summer of 1983. This is the fourth consecutive year in which this die-off has been monitored. In 1983, the adult males first died, followed by the adult females, and then the young of the year. The peak die-off occurred in September with over 2900 young of the year dying in one week.

Water analysis did not indicate any unusual component. The nitrogen compounds were low with nitrites and nitrates essentially undetectable. Ammonia (as N) varied between 20 ug/l to 400 ug/l but with the pH being 6.8, the ammonia was essentially ammonium and not toxic. Histological analysis by Dr. John Harshbarger indicated some parasitism, but no liver toxicity due to heavy metals or organic compounds.

Bacterial analysis of the dying salamanders revealed a monoculture of Acinetobacter calcoaceticus (formerly Mima) in the skin, gills, and peritoneal cavity. Bacterial analysis of the lake water indicated that Acinetobacter was the major bacteria in the lake with 10,000 MPN per 100 ml at the surface and over 100,000 MPN per 100 ml near the bottom (greater than 20 feet down). The bottom water contained a lesser quantity of coliform bacteria (10,000 MPN per 100 ml). Experiments showed that the Acinetobacter could kill healthy populations of young salamanders.

Two additional lakes (man-made reservoirs) have been observed with pathologic populations of salamanders. All three lakes in the Wasatch Mountains are characterized by the lack of vegetative growth, a draw-down of the water levels, and by drainage of the lake occurring only with seepage through the barrier (moraine or earthen dam). Lake Desolation, for instance draws down over 120 inches as the water leaks through the moraine which forms the lake basin.

At this time one could suggest that the lack of plants in these lakes provide for unlimited bacterial growth. If the bacteria is infectious, the salamanders will die. Conversely, when plants compete for the nutrients with the bacteria, the bacterial growth is limited.