

## SECTION I: DISEASES

### INTRODUCTION

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Axolotls can be raised successfully in simple artificial environments by persons who have little or no prior experience with amphibia. At times, however, animals in even the most stable, long-established colonies are affected by illnesses which have obscure causes and unknown cures. Epidemics may decimate a laboratory in a few weeks, or changes in water chemistry may wipe out an entire group of experimental animals in hours.

This issue of the Axolotl Newsletter has been assembled with a modest goal: to provide a clearinghouse for information about diseases of axolotls. We have included the experiences of all who wished to contribute - and further contributions are welcome for future editions - on the assumption that in our present state of knowledge a fragmentary observation which stimulates thought and experiment may be as valuable as a definitive account of symptoms, diagnosis and treatment. Clearly, we are at an early stage in our understanding of axolotl diseases.

### PREVIOUS LITERATURE

The most complete single case history of an axolotl disease is the description of an Aeromonas hydrophila epidemic published some nine years ago by Boyer, Blackler and DeLanney (1). They summarized their experience as follows:

A spontaneous outbreak of an Aeromonas hydrophila infection occurred in a colony of over 3,000 Mexican axolotls. It was first seen in an imported axolotl. Clinical signs were sluggishness, anorexia, edema, and reddening of subcutaneous tissues. Within several weeks over 150 animals died. Postmortem examinations revealed subcutaneous hemorrhages, ascites, and pale livers with surface petechiae. A. hydrophila was isolated from various tissues and organs in pure culture. Massive drug treatment was not attempted. Effective control was accomplished by improved husbandry, refrigeration of some animals, and temporary suspension of surgical procedures. When surgical procedures were resumed, a furazolidone spray

of the surgical incisions was found helpful. The disease was reproduced experimentally in axolotls by subcutaneous and intradermal inoculations of pure cultures of the organism. Attempts to reproduce the disease via the feed or water failed.

The bacterium was isolated from skin lesions, internal organs, and blood, cultured and identified. It was sensitive in vitro to tetracycline, oxytetracycline, dihydrostreptomycin, chlor-tetracycline, chloromycetin and neomycin; it responded to the administration of tetracycline hydrochloride as in cases of "red leg" in Rana pipiens (2).

This "one bacterium, one disease" paradigm is often applicable to outbreaks of disease, as is shown by many of the notes in this issue. At other times, a wider view may be appropriate, such as that put forward by Amborski and Amborski in "Pathogens and Diseases of Aquatic Animals" (3). They point out that 28 genera of bacteria are known disease-causing agents in ectothermic animals, including species of Aeromonas, Proteus, Pseudomonas and Vibrio. Moreover, environmental and nutritional factors need to be considered since they "could have major effects on either the production or activity of toxins produced by opportunistic pathogens." They recommend the formation of multi-disciplinary teams of biological scientists in devising definitive controls for opportunistic pathogens.

A further discussion of pathogens and disease states in amphibia - but with little specific attention to axolotls - is found in Elkan (4) and Elkan and Reichenbach-Klinke and Elkan (5).

#### REFERENCES

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2. Gibbs, E. L. An effective treatment for red leg disease in Rana pipiens. Lab. Anim. Care 13: 781-783, 1963.
- \*3. Amborski, R. L. and G. F. Amborski, Pathogens and diseases of aquatic animals. Lab Animal, Nov.-Dec. 1978, 14-26, 1978.

4. Elkan, E. Pathology in the amphibia, pp. 273 - 312 in Brian Lofts, ed., Physiology of the Amphibia, III (Academic Press, N.Y., 1976).
  5. Reichenbach-Klinke, H. and E. Elkan, The Principal Diseases of Lower Vertebrates. Book II, Diseases of Amphibians. (Distributed by T. F. H. Publications, Inc., Neptune City, N.J. and Crown Publishers, Inc. N.Y., N.Y., 1965)
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