

**STUDIES ON SYSTEMATICS AND ECOLOGY
OF CERTAIN ANURAN TADPOLES
OF NORTH-EASTERN INDIA**

ABSTRACT

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ABSTRACT

This thesis embodies an investigation on systematics and ecology of certain anuran larvae of North-Eastern India, with a normal table of one species, presented in 5 chapters.

CHAPTER 1 - STUDY SITES.

This chapter deals with brief descriptions of the sites surveyed for the collection of anuran larvae and adults in the course of the present investigation. Survey work was carried out at the Khasi, Jaintia and Garo Hills Districts of Meghalaya. Few surveys were also conducted in Assam, Nagaland and Mizoram.

CHAPTER 2 - SYSTEMATIC STUDY OF TADPOLES.

This chapter deals with the breeding periods, larval descriptions and systematic key of tadpoles of 14 species. It was found that most of the species breed during increasing atmospheric temperature and rainfall from March to September. The tadpoles of the species investigated can be identified by characters given below :-

(I) The tadpoles of Leptobrachium hasselti Tschudi are stout and have non-emarginate oral disc, with a rostral but without a mental gap, kidney shaped nostrils, marginal keratodonts and keratodont formula : $1:5+5/5+5:1$.

(II) The tadpoles of Leptobrachium nigrops Berry and Hendrickson, are stout and have non-emarginate oral disc without any rostral or mental gap, nostril openings with papillae and keratodont formula : $1:4+4/2+2:1$.

(III) The tadpoles of Bufo melanostictus Schneider are stout and have emarginate oral disc with broad rostral and mental

gaps and laterally confined oral papillae, median vent, round nostrils and keratodont formula : 1:1+1/3.

(IV) The tadpoles of Bufo sp. have stout built, emarginate oral disc with broad rostral and mental gaps, nasal flaps and keratodont formula : 1:1+1/3.

(V) The tadpoles of Microhyla ornata (Dum and Bibr) have weak built, median vent and spiracle. Oral disc is without rostradonts and keratodonts.

(VI) The tadpoles of Rana alticola Boulenger are stout and are characterized by large size, presence of ocelli in the tail, parotid glands on the body and tail fins, marginal teeth in the oral disc with a rostral gap and keratodont formula : 2:5+5/1+1:6.

(VII) The tadpoles of Amolops afghanus (Gunther) have ventral sucker, dorsoventrally compressed body, convex dorsal and flattened ventral surface, reduced vascular tail fins, parotid glands, medially divided suprarostradonts, laterally confined oral papillae and keratodont formula : 3:5+5/1+1:2.

(VIII) The tadpoles of Rana danigali Pillai and Chanda are characterized by the presence of poison glands on the ventral abdominal lining, oral disc with both rostral and mental gaps and keratodont formula : 1:1+1/1+1:2.

(IX) The tadpoles of Rana limocharia Wiegmann are characterized by yellowish lateral line curving upward somewhat behind the middle of the tail, oral disc with rostral as well as mental gaps and keratodont formula : 1:1+1/3.

(X) The tadpoles of Rana cyanophlyctis Schneider have stout built, pointed snout, blackish lateral line organ in the tail regions, oral disc with both rostral and mental gaps, heavily built rostradonts and keratodont formula : 1/2.

(XI) The tadpoles of Philautus cherrapunjee Roonwal and Kripalani are characterized by kidney shaped nostrils, oral disc with rostral and mental gaps and keratodont formula : 1:4+4/1+1:2.

(XII) The tadpoles of Philautus sp. are characterized by spotted tail, oral disc with rostral but without a mental gap and keratodont formula : 2:4+4/3 or 2:4+4/1+1:2.

(XIII) The tadpoles of Rhacophorus leuconyctax (Kuhl) are characterized by filamentous tail tip, well developed neuromast organs, 3 faint subdivisions of pigmentation on the tail, oral disc with rostral and mental gaps and keratodont formula: 1:4+4/3.

XIV) The tadpoles of Rhacophorus nigropalmatus Boulenger are characterized by the presence of 2 white spots in front of the snout, oral disc with both rostral and mental gaps and keratodont formula : 2:4+4/1+1:2.

Based on the above descriptions, a dichotomous key has been provided for these 14 tadpoles and a diagrammatic field key has also been given.

CHAPTER 3 - FOOD AND FEEDING HABITS OF TADPOLES.

This chapter deals with an investigation on the food and feeding habits of tadpoles of 11 species. It includes- gut content and periphyton analysis, percentage composition, change in the food habits during metamorphosis, gut length index and digestibility.

The gut contents of all the tadpoles consisted of algal forms comprising Chlorophyceae, Bacillariophyceae, Cyanophyceae and Euglenophyceae and also detritus, vascular plant parts and mud. Percentage composition studies suggests that the tadpoles of H. ornata preferred Euglenoids, L. hasselti Bacillariophyceae, B. melanostictus at stages 27, 28, 34 and 35 Bacillariophyceae, R. limnographia Chlorophyceae, R. cyanophlyctis and R. danielei Bacillariophyceae. The tadpoles of R. alticola collected from lotic water systems showed preference for Bacillariophyceae and those from lentic water systems Cyanophyceae. P. charraniana and R. leucovatax preferred Chlorophyceae and P. sp. at stages 21, 25 and 37 preferred Cyanophyceae. All tadpoles were found to be mainly bottom feeders except those of H. ornata which were found to be surface and mid-water feeders. The presence of bacteria in the gut of the tadpoles of H. ornata, L. hasselti and R. limnographia suggests them to be microphagous. The analysis at developmental stages showed a considerable reduction in the feeding activity towards the climax of metamorphosis and a shift from herbivory to carnivory was pronounced at Stage 45 in the case of R. alticola. The gut length index increased up to about stage 38 and showed a diminishing trend after this period in the tadpoles of R. alticola, B. melanostictus and P. sp. In the hind gut most of the food contents were observed to be without their cell contents suggesting that digestion occurred in these tadpoles chemically rather than by mechanical process.

CHAPTER 4 - TADPOLES POPULATIONS AND PHYSICO-CHEMICAL FACTORS.

This chapter deals with population structure and metamorphosis of anuran larvae belonging to 3 species viz. (1) B. melanostictus

(2) R. limncharia and (3) R. leucomyctax investigated in relation to physico-chemical factors such as temperature, pH, electrical conductivity, free carbondioxide, total alkalinity, dissolved oxygen and phosphate, nitrate and silicate contents of their habitats. The findings do not show any direct correlation between these physico-chemical factors and the larval populations. It has been suggested that these factors effect the tadpole population indirectly through the primary producers.

CHAPTER 5 - NORMAL TABLE OF DEVELOPMENT OF RHACOPHORUS NIGROPALMATUS BOULENGER.

This chapter deals with a normal table of development of R. nigropalmatus from gastrula to the formation of spiracle. The development from gastrula to the formation of spiracle took place in 262.0 hours at water temperature of 19.0° - 22.0°C. It has been divided into 19 stages each based on a significant morpho-genetic change. The variation in the development of certain structures such as gills, opening of mouth and development of tail fins of this high altitude species have been discussed.

