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**STUDIES ON CERTAIN ASPECTS OF ECOLOGY,
DEVELOPMENT AND EXPERIMENTAL BREEDING
OF *Rana cyanophlyctis* SCHNEIDER**

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**ABSTRACT
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ABSTRACT

The thesis embodies an investigation on certain aspects of ecology, development and experimental breeding of Rana cyanophlyctis Schneider, a common aquatic frog species available at plains and hills of North Eastern India, arranged in six chapters.

Chapter 1 :

Chapter 1 deals with a description of the study sites: (1) Government Fish Farm, Ulubari, Gauhati, Assam (49.4 m a.s.l., 25.05°N and 91.45°E) and (2) Pologround adjoining Umkrah river, Shillong, Meghalaya (1428 m a.s.l. 25.34°N and 91.56°E). The two sites were selected to find out, whether the frog species under investigation shows any intraspecific or ecological variations or not. The Gauhati site is a properly managed fish farm by the State Government of Assam and represents typical ecological conditions of plains. The Umkrah river site at Shillong is a natural site surrounded by hills and coniferous trees. The major difference is that the Gauhati site has lotic

water system with alkaline pH and Shillong site has lentic water system with acidic pH. Gauhati has tropical climate and Shillong sub-tropical.

Chapter 2 :

Chapter 2 deals with an analysis of morphological characters, morphometric measurements, length-weight relationship and annual breeding cycle of Rana cyanophlyctis at the two sites. This species is identified by a depressed head, somewhat broader than long, equal size 1st and 2nd fingers, slightly dilated and completely webbed toes and warty skin with pores and tubercles. Males are smaller and lighter (SVL 4.0 - 5.30 cm) and body weight 7.0 - 19.0 gm) and females are larger and heavier (SVL 5.10 - 7.20 cm and body weight 22.0 - 38.5 gm). There was no significant variation in their morphology or morphometry. Linear relationship was obtained between their length and weight. Relative conditions of the frog did not show much variations in different months. The annual breeding cycle is divisible into 3 phases (i) Pre breeding (February to April) (ii) Breeding (May to September (iii) Post breeding (October to January). In winter, they do not hibernate, presumably because of aquatic adaptation, and are often seen basking in morning hours at the edges of water bodies. ^{Statistical} analysis does not show any racial difference between two populations.

Chapter 3 :

Chapter 3 deals with relative abundance and home range movements of Rana cyanophlyctis and relationship of these with environmental conditions at both sites. The investigations were made with the help of two techniques, 1) Number catch per unit time and 2) Capture, marked, release and recapture technique. The second technique was attempted at Gauhati only. During winter months (November-February) they remain restricted to the middle core of water bodies except juveniles which are seen on embankments also. With the increase in temperature from March onwards they became more active and their relative abundance on land increases. They maintain a 'home range' which is largest during summer months.

Chapter 4:

Chapter 4 deals with food and feeding habits of Rana cyanophlyctis. The percentage composition analysis reveals that insects formed a very large bulk of the food items of this species at both sites. Homoterans formed highest percentage in Gauhati frogs and Insect larvae and Dipterans formed highest percentage in Shillong frogs. The amount of food intake did not vary much during different phases of annual breeding cycle. The food types reflected food abundance in the ecosystem and their availability in

relation to changing environmental conditions. The relationship between length and weight of the alimentary canal and gastro somatic index did not show much variation. Gastro somatic index did not show any significant correlation ($P < 0.05$) with length and weight of the frog also.

Chapter 5 :

Chapter 5 deals with a normal table of development of Rana cyanophlyctis investigated after induced breeding, at room temperature $17^{\circ}\text{C} - 21^{\circ}\text{C}$ in the months of June, July and August. Hatching occurs on 4th/5th day and metamorphosis is completed on 68th day. Entire development has been divided into 40 stages. Fertilization: stages 1 - 2, cleavage: stages 3 - 9, gastrulation: stages 10 - 12, neurulation: stages 12 - 18, organogenetic stages 18 - 24, and metamorphic: stages 24 - 40.

Chapter 6 :

Chapter 6 deals with induced breeding and gonadosomatic index. Homoplastic pituitaries preserved in absolute ethyl alcohol were used for induced breeding. The pituitaries were as effective even 3 years after their fixation as when they were freshly preserved. The

induced breeding was possible for 3 months from March to October. Pituitary dosage 0.03 mg/gm weight of the female induced successful ovulation in females having SVL 5.3 cm and above and weight 25.0 gm and above during breeding period. During pre and post breeding periods larger dosage (0.15 - 0.2 mg/gm weight of female) were required. A linear regression was obtained between SVL and number of ova, present in ovary; SVL and weight of ova; body weight and size of ova; gonadosomatic index and body weight, gonadosomatic index and SVL and gonadosomatic index and weight of ovaries.