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Impact of Temperature Metamorphoses in Ranas Curtipes

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Abstract - Amphibians were the first group of vertebrates that were adapted in the course of evolution to both the aquatic and terrestrial way of life. In the evolutionary history of vertebrates, amphibians have a special position for first living on the ground . Among fully aquatic fishes and actual land amniotes, amphibians are intermediate. Amphibian species were perpetuated successfully and their survival had to do with the growth of extremities, lungs, other anatomical modifications and, particularly, the evolution of new reproductive strategies in the new terrestrial world . Since amphibians are poikilothermic and also because most of them rely on water for their reproduction, the constantly changing climatic factors such as air and water greatly affect their reproductive activities. Temperature (Delgado et al., 1992; Sumida et al., 2007). Rainfall, daylength and relative humidity.

Key Word: Morphological, Frogs, Female's Breeder, Temperature, Rana Curtipes Jerdon

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INTRODUCTION

The capacity to create offspring is a fundamental feature of any living species or population (Sarah et al., 2009). In amphibians, the position of potential mates (Wells, 2007), mate stimulation (Wells, 2007, Mellov et al., 2010), and breeding site selection depends on successful reproduction (Kaefer et al., 2007). Reproduction trends for anurans have repeatedly been shown by research in tropical and subtropical regions to closely correlate their reproductive biology with precipitation (Lynch and Wilczynski, 2005). Throughout the year, most tropical and subtropical species can reproduce. Rainfall, however, appears to monitor the timing of reproductive activity as its principal extrinsic factor (Lynch and Wilczynski, 2005). Other ecological factors such as rising temperature, rainfalls (Lynch and Wilczyneski, 2005), photoperiod (Saidapur, 1989), pool drainage (Lind et al., 2008), food availability (Girish and Saidapur, 2000) and pool hydrology have also been accelerated by nature (Ryan and Winne, 2001; Hagman and Shine, 2006). Amphibian breeding activities are also accelerated by other ecological factours. Reproductive behaviour is cyclical in most temperate amphibian organisms and depends on the combination of temperature and precipitation. However, most amphibians are continuously reproductive in tropical areas, where the environmental conditions are constant throughout the year (Balustein et al., 2001).

The temporary patterns of reproduction are classified into two broad categories: extended reproduction and explosive reproduction. Male-male rivalry is characterised by the spatial and temporal distribution of frogs (Ark 1983; Elliott and Kelly 2007). In dense aggregations, males of explosive producers compete in "scramble competitive" with every single person and fail to possess females. Males of protracted breeders often call for female attraction from fixed positions and often maintain a kind of intermale gap (Balustein et al., 2001). Various guidelines for the movement of adult amphibians to the breeding site were proposed (Ishii et al ., 1995). The mates' location can be reached by visual signals (Summers et al., 1999), olfactory signals (Kikuyama, 2005) or hearing signals (Simmons, 2004) or by tactile means (male-female physical contact) or by the combination(Wells, 2007). Some anurans are paired with little to no particular behaviour, whereas other groups, particularly those characterised by complex social interactions, are complemented by a variety of courtships (Mellov et al., 2011). Mates are chosen based on their body size , number of telefone nights per male (Welch et al., 1998; Mitchel, 2001; Wells, 2007; Sarah et al., 2009). The physical features of the breeding grounds, as well as the presence of predators and competitors and community nests, have been recorded in the sites where the eggs are deposited (Magnusson and Hero, 1991). Different studies indicate that women choose egg places on the basis of factors such as water depth, the temperature of the water, pH or lack of predators (Hadded and Prado, 2005). For the arboreal species, the breeding grounds normally lie above the ground and are on the trees. There is also the issue of the desiccation of water, while males more frequently prefer a nest from terrestrial species, defend it from rival males.

Sperm cells mature uniformly during the entire testis in tempered anurans, but sperm cells at different stages of their maturation are present in the tropical species that are uncommon during the year (Brown and Zippel 2007). Morphological changes in Rana ridibunda's testis and thumb pad were prominent during the breeding period (Kaptan and Murathanoglu, 2008). Anuran testis is structurally straightforward and raises sperm size and weight (Kaptan and Murathanoglu 2008). During the reproductive cycle, spermatogenesis and steroidogenesis in amphibians are subject to seasonal variation (Sasso et al . 2004). Test weight in Rana perezi was seasonally unrelated, and no major year-round changes were observed (Delgado et al. 1989; 1992). Histological evidence suggests that the main sperm activity starts in summer, although the cell nests of different types are present any month of the year (Delgado et al . 1989). For Rana dalmatin, there was a highly discontinuous period of spermatogenesis (spermatology, fat-body weight and thumb-pad) (Guarino & Bellini, 1993). In the testis and in fat-body-weight, thumb pad and testosterone, but not plasma-androstenedione, major seasonal variation has been observed in Rana dalmatine (Guarino and Bellini, 1993). Seasonal modifications in polypedate maculatus spermatogenesis and fat bodies (Kannamadi and Jirankali 1992) have also been identified.

This has been shown as a convenient experimental animal in developmental biology by the evolving morphology and physiology in large amphibians. The development is an ongoing process and it is desirable to divide the developmental phase into separate phases or stages in order to allow important distinctions among different species or between individuals of the same species [Dent, 1968]. Successive ontogenic phases tables are very useful in the correct evaluation and evaluation of effects of various development, metamorphosis in particular.

A fairly neat description of several temperate anuran species, including Rana Ovalis [Schernoff, 1907], normal stages of growth. Bufo vulgaris, Bufo valliceps, Bufo valliceps, Hylorina sylvastica, Bufo variegatus, Eupsophus vertebralis, Formas, 1978, 1991. Literia euenemis. Limnodynates Fleetcheri are available [Davies, 1989, 1991, and 1992]. [Shumway, 1937] Hydros [Shumway, 1940, Bufo Vallicempos, Bouffo Vallicepos [Liambaugh and Volpe, 1957].

There are more than 200 amphibian species in the Indian subcontinent and many are used as laboratories. However, the study of developmental biology gained little coverage. Ramaswami And Lakshman (1959) was the first attempt to ontogenically test an Indian anuron species for Rana cyanophlyctis, an Indian skipper. Shumway was introduced and thus only at developmental stages. The remaining part of the experiments were carried out by Mohanty-Hejmadi and Dutta (1979). Subsequely, Rana limnocharis (Roy and Khare 1977; Khare and Roy 1977) Rhacophorus malabaricus (Secar, 1990) was reported as developing stages of tigresses [Bhati, 196 9; Agarwal and Niazi, 1977; Dutta and Mohanty-Hejmadi, 1978]. The developmental phases of Bufo melanostictus and Polypedate maculatus were a big part of Mohanty-Hejmadi and Dutta (1978, 1988).

The above list is far from adequate compared to the number of amphibians in our region. In addition, many of the studies mentioned above are incomplete and many authors disagree about their larval characteristics as they were not raised in standardised conditions. Gesner (1960) made developmental tables simpler and recommended a generalised table covering the whole cycle of growth and transformation based on Tables of Rana pipiens [Shumway, 1940; Taylor and Kollros, 1946] and Bufo valliceps [Liambaugh and Volpes, 1957]. This refers to many anurans in general. However, in Gesner's (1960) opinion, separate development tables for each species are necessary to draw valid conclusions because of differences in the sequence and existence of certain specific characteristics in different species. The available literature on the Rana curtipes tadpole [Rao, 1914; Sekar, 1989] is restricted to general issues on a few-stage feeding, ecology and morphology. In addition, the larvae of Karnataka area collected by Rao (1914) and Sekar (1989) were not recorded in the western Ghats south region, as a result of a literature review.

Thus, this work has been carried out in order to explore the creation of a little known, but highly useful, anuran amphibian, Rana curtipes, because of its availability and large scale.

The rate of growth and metamorphosis of anuran larvae in temples [Moore, 1939; Herried and Kinny, 1967; Howard 1978; Townsend and Stewart, 1986] is affected greatly by temperature. Moore (1939) stated that an increase of 0,8 degrees c in some American Rana species can shorten the early part of the embryo period by 10-15%.

Etkin (1964) proposed that the rise in temperature accelerates metamorphosis. In Rana temporaria and Rana Dalmatina, Riis (1991) reported a logarithmic relationship between temperature and time of embryo evolution. The larval size and length differ by species due to alien (environmental) and intrinsic (genetic) factors. Extra influences have a profound impact on growth of amphibians since they are poikilothermic.

In order to confirm this, we based our analysis also on the impact of temperature on the production and transformation of a tropical anuran — Rana curtipes, which is a major extrinsic factor.

METHOD AND MATERIALS

There were two different sets of experiments. The first collection (the following group is known as group A) showed tadpole size and development period at laboratory temperature (29 + 2 ° c).

Egg masses have been collected from natural environments in order to study the growth, or obtained by retaining the amplectant pair in froggers. When the eggs were laid and fertilised, they were divided into groups of 50 and moved into a huge, over 10 litre plastic basin of freshly drawn water. At room temperature of 27 ° C to 31 ° c and a photo-duration of 12L:12D, the plastic tubs were maintained. When the tadpole was spread into groups of 7, it was then broken up in plastic boxes to prevent over-population, before the forebear came into being. As the anterior steps emerged, they were moved in the froggery into an amphibious state. The water was modified every 2 days, with boiled spinach leaves being fed to tadpole ad libitum. In wide stock tanks, tadpoles were also raised.

Parallel experiments (Group B) were also performed at the collection site in order to research the effect of temperature on growth. The daily ra nges water temperature, also during summer time, in this field from 17 to 21 0C. So tadpoles were held at 19 + 2 ° C without much pressure. To prevent a crowding effect, the sarne size of plastic basins with the same number of basses has been reared. Groups A and B have also been used to prevent the intrinsic variance of the sibling tadpole. In the river itself, plastic basins were held at a natural habitat temperature of about 19 + 2 oC with special attention. All other conditions were similar to those of tadpoles reared in the laboratory (Group A).

In the case of morphological changes in short periods, eggs and embryos were grown under a binomial microscope. By counting the hatched larvae and the remaining eggs or embryos of each basin, the percentage of slump per embryo was determined. Normal observations and the use of Shumway {1940] and Taylor and Kollros (T-K) method (1945) for Rana pipiens was performed at regular intervals and embryos and larvae, respectively. For all tadpolis in one category, the period between consecutive stages was reported from egg deposition to froglet.

Formaldehyde and morphometric variables of 5 to 10% were preserved in the tadpoles of each point. Measurements using the eyepiece micrometre were performed in earlier stages. The student's 't' test to evaluate comparing temperatures to age and length statistics was conducted.

OUTCOME

Rane curtipes tadpoles taken at 29±2 (Gruppe A) and (Gruppe B) , respectively, 130.21±4.06 and 19±2±159.47±4.84days. Similarly, tadpoles were reached during their growth in maximum sizes of 75.52 ± 2.9 and 96.9 ± 2.04 mm. These show that rana curtips tadpoles need an unusual longer development time and are unusually large compared to other related tropical species. These findings show moreover that Rana tapered pole size and development rate are significantly affected by temperature.

Every critical stage of development from egg to forglets was investigated under both natural and working conditions.

EGGS

The eggs were newly spawned with a spherical diameter of 1,4 + 0,16 averages. The light-creamed vegital pole and the white-colored animal poles were observed. In vegital hemisphere, there was a relatively high volume of yolk compared to egg sizes. Capsules were closely attached to each other in jelly of individual eggs.

CONCLUSION

The morphometric analysis is one of the important reasons for a biological-description solution. With regard to Indian anuran, it is evident from the literature review that little attention has been paid to life storey, breeding behaviour, and endokrinological influences on the production and metamorphosis of Rana curtipes. There is only a few systematic descriptions (Boulenger, 1882a, 1890, 1920; Guenther, 1875). There are 142 morphometric informations. Thus, this study seeks to introduce this little known tropical species to the scientific world and to determine the effect on the production and metamorphosis of temperatures and hormones. this study show that Rana curtips are normally nocturnal, slow in movement and uncomfortable in sea. Only during the breeding season do they approach water.

REFERENCES

[1]. Abdulali, H. S. and A. G. Sekar (1988). On a small collection of amphibians from Goa. J. Bombay Nat. Hist. Soc. 85: 202-205.

[2]. Acharya, s. R. K., T. N. Kumar, c. Vamsadhara, S. Venketaraman, T. R. Ramanujam and V. s. Venetasubbu (1982). Effect of L-thyroxine sodium on skeletal muscle of frog. Indian J. Exp. Biol. 20(2): 187-188.

[3]. Bradford, D. F. (1984). Temperature modulation in a high elevation amphibian, Rana muscosa Copeia 1984, 966-976.

[4]. Chopra, R. N. and K. Kumar (1977). Extension of range of the frog Rana crassa, Jerdon, to Western Himalayas, U. P., J. Bombay, Nat. Hist., Vol. 74, No. 1: 180182.

[5]. Derby, A. and W. Etkin (1968). Thyroxine induced tail resorption in vitro as affected by anterior pituitary hormones. J. Exp. Zool. 169: 1-8.

[6]. Dent, J. N. (1985). Interaction between prolactin and thyroidal hormones in amphibian systems. In B. Lofts and w. N. Holmes (eds), Current trends in comparative endocrinology, pp. 541-544.

[7]. Etkin, w. and R. Lehrer (1960). Excess growth in tadpoles after transplantation of the adenohypophysis. Endocrinology. 67: 457-466.

[8]. Formas, J. R. (1978). Tadpoles of Eupsophus roseus and Bufo variegatus (Amphibia: Anura) in Southern Chile. J. Herpetol. 12: 243-246.

[9]. Gudernatsch, tadpoles. J. F. (1914). Feeding experiments II. A further contribution knowledge of organs of internal secretion. Anat., 15: 431-482.

[10]. Hanaoka, y., K. s. Miyashita, Y. Kondo, Y. Kobayashi, and K. Yamamoto (1973). Morphological and functional maturation of thyroid during early development of anuran larvae. Gen. Comp. Endocrinol., 21: 410-423.

[11]. Krug, E. c., K. v. Honn, J. Battista, and c. s. Nicoll (1983). Corticosteroids in serum of Rana catesbeiana during development and metamorphosis. Gen. Comp.Endocrinol., 52: 232-241.

[12]. Larras-Regard, E. (1985). Hormonal determination of neoteny in facultative neoteinic urodeles. In "Metamorphosis." M. Balls and M. Bowes, eds. PP•294-312.

[13]. Roy, D. and Khare, M. K. (1977). Studies on the life history of Rana limnocharis (Weigmann). Second All India Syrop. on Dev. Biol. Univ. of Poona, No. 52: 42 (Abstract).

[14]. Saidapur, s. K. and v. A. Kupwade (1993). Effect of thyroxine, prolactin and adrenalin on the gravid ovaries of the frog Rana cyanophlyctis. Indian J.Exptl. Biol. 31(5): 40-45.

[15]. Tata, J. R. (1968). Early metamorphic competence of Xenopus larvae. Develop. Biol. 18: 415-441.

[16]. Volpe, E. P. ands. M. Harvey (1958). Hybridization and larval development in Rana palmipes Spix. Copeia, 1958: 197-207.

[17]. Wahlberg, A., c. Bright, and E. Frieden (1964). Activity of some new triiodothyronine analogs in the tadpole. Endocrinology, 75: 561-564.

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