ROLE OF ADRENAL GLAND IN THE GONADOSOMATIC INDEX OF MALE *CALOTESVERSICOLOR* (BOULENGER)

A.M.Avinashe

Department of Zoology
S.S.S.K.R.InnaniMahavidyalaya, Karanja(Lad) M.S. India
ajayavinashe@gmail.com

ABSTRACT

In reptiles the cyclic changes in the gonadal activities are influenced by endocrine gland and environmental factors. Endocrine glands are pouring their secretions directly into the blood. Endocrine glands secreted hormones plays an vital role in the reproduction and other physiological activities. Male Calotesversicolor during nonbreeding season increases the weight of testis and diameter of testis. In present study male Calotesversicolor was selected for investigating role of adrenal in reproduction. In the research work, Gonadosomatic index and Adrenosomatic index were recorded.

Key Words: Calotesversicolor, adrenal gland testis.

Introduction

Endocrine glands are the ductless glands which pour their secretions directly the blood. These glands are richly supplied with blood and their secretions are named as hormones or endocrine hormones. This secreted hormone plays a vital role in the reproduction and other physiological activities. Hormones are the chemical messengers and secreted in small amount by the endocrine glands which travel all over the body via blood to effect different organs.

Endocrine system is composed of many ductless glands situated at specific region in the body. A gland may in the form of specialized somatic tissue or modified neurons, one thing is common, it synthesized certain hormones which on appropriate stimulation are released directly in the circulation and are carried to different sites responsive them. Hormones are produced new action but modify the physiological function of the body. In other words, they have a regulatory role on the physiological functions. Hormones usually produce their effect at the target organs in the body situated for away from the gland. Adrenal gland were first described in man by Eustachius in 1563,other anatomists, identified these organs along the anterior borders of the kidneys and were impressed by the fact that they were generally filled with fluid. According to Cuvier 1805, recognized that gland consists of an outer and outer regions referred as the medulla and cortex respectively. The adrenal gland of reptiles is more compact than in lower forms. The adrenals of turtle are discrete bodies located on the anterior ventral surface of kidneys. In snake, the chromoffincells aggregate to form a distinct band of tissue at the periphery of the organ, partly surrounding the central mass of steroidogenic tissue. In present study, the male Calotesversicolor was selected

Materials and Methods

The animals selected for the present study is common garden lizard, Calotesversicolor (Boulenger). The male Calotesversicolar (snout- vent length (SVL) > 8.5 cm) were collected from areas surrounding Amravati city (Lat. 20°56' North and Long. 77°45' East),

Maharashtra state. They were maintained under identical conditions.

Gonadosomatic index (GSI)

The earliest part of the experiment is some as that of the other experiments that is maintenance, acclimatization and the doses etc. Four groups of 40 male calotesversicolor (Boulenger) were kept in separate cages for different groups of experiments.

Simultaneously a control was also maintained. They were fed with grasshoppers, cockroaches and other insects caught in swapping of insect nets every day during experiment tenure. The weight of Calotesversicolor was recorded before and after the experiment. Testes of 10 calotes from each experimental set were dissected out after 24, 48, 72 and 96 hours of the time interval. Tissue were weighed gonad and weighed of total animal was taken and GSI was calculated by the following formula.

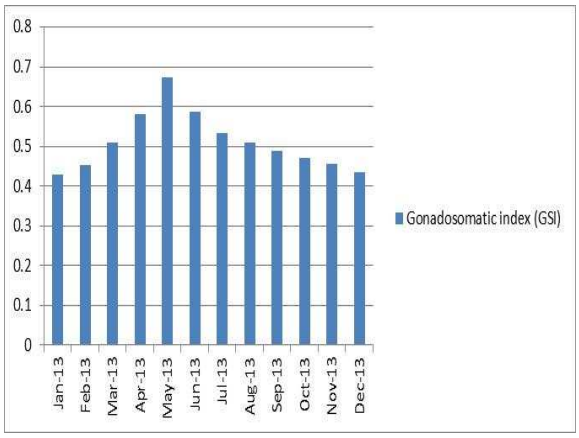
Gonadosomatic Index (GSI)

$$= \frac{weight\ of\ the\ gonad}{weight\ of\ the\ calotes}\ x\ 100$$

Table: 1

Months	Gonadosomatic index (GSI)
January 2013	0.430
February 2013	0.453
March 2013	0.510
April 2013	0.582
May 2013	0.672
June 2013	0.588
July 2013	0.532
August 2013	0.510
September 2013	0.488
October 2013	0.472
November 2013	0.455
December 2013	0.436

Figure 1



Adrenosomatic Index (ASI)

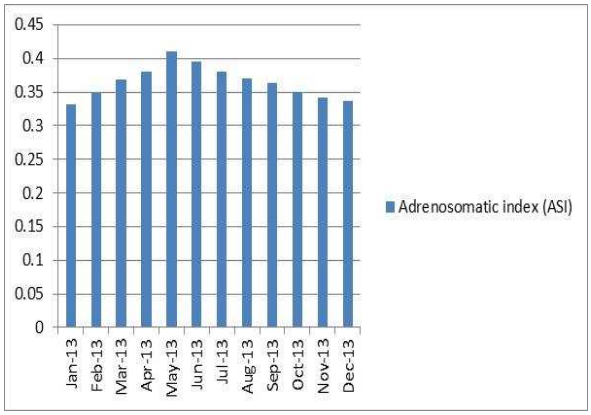
The adrenal gland of the 10 male Calotesversicolor (Boulenger) from each experimental set were dissect out after the time interval like 24, 48, 72 and 96 hrs. Weight the adrenal tissue and total body weight of the animals. The adrenosomatic index were calculated on wet weight basis was used for calculating index by following formula.

$$\text{Adrenosomatic Index} = \frac{weight\ of\ the\ adrenal}{weight\ of\ the\ calotes} \text{X } 100$$

Table 2

Months	Adrenosomatic index (ASI)
January 2013	0.331
February 2013	0.348
March 2013	0.368
April 2013	0.380
May 2013	0.410
June 2013	0.396
July 2013	0.381
August 2013	0.371
Septembers 2013	0.364
October 2013	0.350
November 2013	0.341
December 2013	0.337

Fig. 2



Experimental Design

For each experimental set of 10 male calotesversicolor were used and were subdivided into 4 groups of each experimental period.

Group I: Control - Calotesversicolor males without injection or adrenal ablation.

Group II: Experiment 1.

Unilateral adrenalectomy after 24, 48, 72 and 96 hrs.of the period. Testes of calotes were fixed.

Group III: Experiment 2.

Bilateral adrenalectomy after 24, 48, 72 and 96 hrs.of the period. Testes of the calotes were removed.

Group IV: Experiment 3.

Injection of adrenaline 0.2 ml/body weight) to the unilateral adrenalectomizedcalotes after 24, 48, 72 and 96 hrs.of period. At this respective period the testis were fixed.

Group V: Experiment 4.

Injection of adrenaline (0.2 ml/ body weight) to unilateral adrenalectomizedcalotes after 24, 48, 72 and 96 hrs. At respective treatment period testes were fixed for studies.

With all the above experiments male calotesversicolor were used. After experimentation, water content of gonad, testes was studies at different hours. Behavioural pattern was observed.

Histological studies of gonad-Testes and Adrenal of different injected and adrenal ablated tissues:

Expt. No.1: Unilateral adrenalectomy –For this unilateral adrenalectomy experiment the 4 groups were made like as 24, 48, 72 and 96 hrs. of period. To remove the adrenal gland on one side, weight and fix it for histological studies. Immediately after the removal of above adrenal gland. To inject the 0.2 ml/body weight of adrenalene to the calotes for the experiment of the bilateral adrenalectomy.

Expt. No.2: Bilateral adrenalectomy - After unilateral adrenalectomy experiments the calotes of 4 groups like 24, 48, 72 and 96 hrs. of period, to inject 0.2 ml./body weight of the adrenalene in the body of calotes. In the first group of 24 hrs.,single dose of adrenalene is sufficient, but in the groups 48, 72 and 96 hrs.period, such group of calatesversicolor required 2 , 3, and 4 doses of (0.2ml /body weight of adrenalene of each) injection after 24 hours.After the particular interval of time hours to dissect out adrenal gland on other side weight and fix it for histological studies.

Expt. No. 3: Unilateral gonadoectomy – For this unilateral gonadoectomy 4 groups fixing either gonad or adrenal at different experimental periods. Fixed tissue was further processed up to the block preparation, then section cutting and slide preparations. Slides were observed under the microscope. Histological correction was made between adrenal and gonad, testes.

Testes and adrenal glands which are dissect out in case of normal and experimental animals are fixed in Bouins fixative. The testis was wash in running water, for about 5 to 8 hrs. It is then

transferred at 70% alcohol, dehydrated in graded series of alcohol, cleaned in xylol and finally embedded in 58 ° to 60 °C, paraffin wax, according to the standard histological procedures. The section of the adrenal and gonad were cut at 5 to 7µ and mounted serially using Mayer's albumen. The section was stained with Enrich's haematoxylin and counter stain with eosin.

Result and Discussion

Gonadosomatic index was found highest during May (0.672) and lowest in January (0.430). The gonadosomatic index during prebreeding season range from January (0.430) to May (0.672). During breeding season June (0.588) to August (0.510) and value for post breeding range from September (0.488) to December (0.436)(Table 1 and Fig.1).Illustrated the adrenosomatic values are depicted. Adrenosomatic index (ASI) followed similar trained as that of Gonadosomatic index (GSI).

Unilateral adrenoectomised test animal testes showed partial spermatogenetic stages. Similarly unilateral adrenoectomised animal receiving 1 dose of adrenal extract showed little recovery.

The effect of unilateral adrenoectomised animal at 48, 72, and 96 hrs.effects are shown in experiments. The effects were found to be very prominent at 72 and 96 hrs. Unilateral adrenoectomised animals receiving 1,2,3and 4 doses at 24, 48,72 and 96 hrs. Showed recovery changes of which recovery at 72 and 96 hrs.was very much similar to that of normal testes. Different stages of spermatogenesis were clearly visible.

Effect of bilateral adrenoectomised animals at 24, 48, 72 and 96 hrs.receiving 1, 2, 3 and 4 doses showed major recovery in spermatogenesis and weight of the gonad. The related changes of extra adrenal extract received adrenal showed proliferation and retarding growth with higher doses in the experiment.

Gonadosomatic index increased towards breeding period (May –Sept.) and decreased was observed during postbreeding period (Sept.–Jan.). Adrenosomatic index also followed similar pattern that is index increases from prebreeding period to breeding and their after decreased in index was observed. During prebreeding and breeding period the appearance of adrenal was very prominent and lustery. Similar observations were made in different animals belonging to birds and mammals.

Some seasonal variations in the spermatogenic cycle of *B. Taitanus* are suggested by the significant changes in the volume of testes together with changes in the level of active spermatogenesis (Wake, 1995 and Smita*et al.*2006).

The administration of GnRH during nonbreeding season increased the weight of testes in *C.versicolor* indicating GnRH stimulation of gonadotrophin released during nonbreeding season (Bhaktaraj, B.2000).

Testicular degeneration in adrenoectomised adult rats indicated the role of adrenal gland in the process of spermatogenesis (Freed, S.C. *et al.*(1931), Friedman, S.M. *et al.(* 1950), Harris, M.E. and Androaj,B. (1974).

Reference

Bhaktaraj, B., S. Patil and S.B. Patil (2000): GnRH and /or testosterone induced changes in reproductive activities during nonbreeding season in *Calatesversicolor* (Daud).Ind. J. Exp. Biol. Vol.38, 873-876.

Freed, S.C., B. Brownfield, and H.M.Evans,(1931): Effect of adrenoectomy on the testicular cells of immature Rat. Proc. Soc. Exp. Bio., NY. 29:31.

Freedman, S. M., C.L.Friedman and Nakashima, M. (1950): Effect of adrenoectomy on the testicular cells of immature rat. Am. J. Physiol.163-179.

Harris, M.E. and B. Androaj (1974): Effect of adrenoectomy on testicular cells of immature rat. Endocrinol. 95- 701.

Smita, M., R.S. Beyo, M.G. Jancy, M.A. Akbarsha, O.V. Oommen& J.M. Exbrayat (2006): Caecilian spermatogenesis, pp.231-246 In. J. Exbrayat J.M., Edit.Reproductive biology and phylogeny of Gymnophiona. Enfield, NH: Science Publishers, Inc, 395 pp.

Wake, M. H.(1995): The spermatogenic cycle of *Dermophismexicanus* (Amphibia: Gyamnophiona). Journal of Herpetology 29: 119-122.