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CORRELATION BETWEEN TESTOSTERONE, BODY WEIGHT AND LIPID RESPONSE IN PHOTOSENSITIVE, PHOTOSTIMULATED AND PHOTOREFRACTORY MALE EMBERIZA BRUNICEPS UNDER LONG PHOTOPERIOD.

DR. UMESH GAUR

PRINCIPAL, M K PONDA COLLEGE OF BUSINESS AND MANAGEMENT,
BHOPAL-462038, MP, INDIA

Abstract: The observation was carried out using male hormone, Testosterone, commercially available as Aquaviron. The hormone treatment is given in different doses as describe earlier using photosensitive, photostimulated and photorefractory male *Emberiza bruniceps* birds. This study has been carried out **P**hotoperiodic **R**esponse **S**ystem [PRS] of Emberiza bruniceps, to validate the climatic factors under the influence of testosterone treatment.

Key Words: Testosterone, Body weight, Lipid, PRS, *Emberiza bruniceps*.

INTRODUCTION: A response to light, the phoptoperiodic response, is result of the interpretation of light input by the neuro-endocrine machinery , collectively called the **P**hotoperiodic **R**esponse **S**ystem [PRS]. Captive bird show periodic cycles in food intake, body fattening and gain in body mass, gonadal growth and development under natural daylength (Jain and Kumar 1995, Gaur *et al* 2013).

Under artificial day length , a long photoperiod (>11.5/Day) stimulates body fattening , gonadal growth and increasement in plasma level of LH, testosterone and thyroxine (Thapliyal *et al* 1991, Gaur and Singh 2018).

MATERIALS AND METHOD: The *Emberiza bruniceps* bird is a seasonally breeding , long distant palaearctic Indian migratory small passerine finch (Family: Emberizadae, Order: Passeriformes), male bird is beautiful with golden brown head (above) and under part yellow.

Birds were maintained under natural day length (NDL), fed with paddy grains, *Oryza sativa* ; Kakoon, *Setaria italic*a and water *at libitum*.

In long photoperiod experiments, male birds were exposed to artificial photoperiodic treatments in light proof wooden boxes. These boxes were fitted with the fluorescent rods of 20 watt , the light intensity of 400-500 *lux*, from perch to floor.

Birds were given hormonal treatment of testosterone in different doses of 50 µg, 100 µg and 200 µg , given by injecting the doses of hormones in 0.1 ml. vehicle. Injections were made in the chest and thigh muscles of the birds alternatively ,the control birds were injected by vehicle alone.

Assessment of parameters: Birds were weighed on single pan mechanical balance, in all experiments initial and final body weights were recorded.
The data is presented as mean and standard error (mean ± S.E.). Mean body weight was compared with their own initials and within the group by student's t-test (Fisher 1963).

EXPERIMENT AND RESULT: In study of **photosensitive birds** which have already given four weeks of 8L:16D treatment , were used injections of 200 µg,100 µg,50 µg was given in 0.1 ml vehicle. Vehicle injected group served as control ten alternative injection of each dose were given. From day one of the injection ,birds were maintained under 16L:8D till 21st day ,the termination of experiments.

The body weight response of photosensitive male birds under different hormonal treatment indicated an increase in weight and it was found comparable to the control birds. The increase in body weight was maximum under 100 µg hormone treatment. The lipid response indicated increase in all birds both treated and control (Table no.01).

The **Photostimulated male buntings** exhibited differential response to the different doses of testosterone. In case of photostimulated birds, the body weight remain unaltered under all hormonal treatments and it is comparable to control birds(Table no.02).

TABLE NO. 01: [Photosensitive]

Doses of Testosterone (µg)	Initial Body Weight(gm) [MEAN ± S.E.]	Initial Body Weight(gm) [MEAN ± S.E.]	Lipid(gm) [MEAN ± S.E.]
200	22.68 ± 0.26	25.26 ± 0.18*	3.20 ± 0.10**
100	23.10 ± 0.42	28.78 ± 0.24	5.28 ± 0.42
50	23.22 ± 0.18	26.12 ± 0.26	3.92 ± 0.86
Control	22.88 ± 0.34	26.76 ± 0.36	4.68 ± 0.56
Initial Control			1.42 ± 0.28

* P Value <0.01
** P Value <0.001

The **Photostimulated male buntings** exhibited differential response to the different doses of testosterone. In case of photostimulated birds, the body weight remain unaltered under all hormonal treatments and it is comparable to control birds. The lipid response of photostimulated birds also exhibited similar pattern and remained at the level of initial control (Table no.02).

TABLE NO. 02: [Photostimulated]

Doses of Testosterone (µg)	Initial Body Weight(gm) [MEAN ± S.E.]	Initial Body Weight(gm) [MEAN ± S.E.]	Lipid(gm) [MEAN ± S.E.]
200	27.25 ± 0.16	26.54 ± 0.22*	5.48 ± 0.66**
100	26.92 ± 0.21	26.12 ± 0.24	6.18 ± 0.92
50	26.86 ± 0.34	25.74 ± 0.32	5.06 ± 0.88
Control	28.20 ± 0.40	27.46 ± 0.46	5.20 ± 0.62
Initial Control			5.84 ± 0.86

* P Value <0.01
** P Value <0.001

In the **photorefractory birds** ,before the experiment ,birds were exposed to 16L:8D for four months, given hormonal treatment of 200 µg,100 µg & 50 µg testosterone. The experiment to continued for 21 days with alternative 10 injection of the hormone.
The body weight in photorefractory male redheaded , no significant change was observed as compared to their own initials and with control birds. The value of lipid in all hormone treated bird , didn't change and it remain close to value of initial control (Table no.03).

TABLE NO. 03: [Photorefractory]

Doses of Testosterone (µg)	Initial Body Weight(gm) [MEAN ± S.E.]	Initial Body Weight(gm) [MEAN ± S.E.]	Lipid(gm) [MEAN ± S.E.]
200	20.84 ± 0.22	19.68 ± 0.12*	1.32 ± 0.37
100	21.12 ± 0.18	20.46 ± 0.47	1.08 ± 0.14
50	21.68 ± 0.17	20.22 ± 0.31	1.03 ± 0.17**
Control	21.42 ± 0.28	21.36 ± 0.18	1.06 ± 0.12
Initial Control			1.14 ± 0.21

* P Value <0.01
** P Value <0.001

DISCUSSION: The observation found in table no. 01-03 indicates the gonadal steroid some however interrupted with photoperiodic metabolic functions in the redheaded bunting. This study support the photoperiodic threshold has been described by several workers (Tewary and Tripathi 1983, Hamner 1964, Gaur *et al* 2013).

The coincidence of the external photoperiod with the endogenous photosensitivity of rhythm is dependent upon the availability of light during specific phase. The coincidence of the external photoperiod with the endogenous photosensitivity of rhythm is originally demonstrative in the house finch (Hamner 1964). The present investigation are in the agreement with the external coincidence, number of reports on other birds including house finch are available for review and analysis (Thapliyal and Singh 1995, Gaur *et al* 2013,Gaur 2021).

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