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Effect of Different Doses of Estradiol on Body Weight Response of Photostimulated, Photosensitive and Photorefractory Female Redheaded Bunting under Long Photoperiod

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Abstract: ***In view of the changed observed in photoperiodic response system (PRS) of the birds it is aimed in the present investigation, to validate the effect of climatic factors under the influence of hormonal treatment. The investigation was carried out using female hormone (Estradiol Benzoate commercial available as estradiol).The hormone treatment is given in different doses as describe earlier using photosensitive, photostimulated and photo refractory birds. Birds were weighed on single pan mechanical balance, in all experiments initial and final body weights were recorded.***

Keywords: Estradiol,Body weight, photostimulated, photosensitive, photorefractory, redheaded bunting, Long photoperiod.

1. Introduction

In several species of birds ,in both the sexes, various aspects of photoperiodic control of reproductive cycle such as photoperiodic threshold for induction of gonadal activities ,nature and extent of gonadal photostimulation ,phenomenon of photo-refractoriness and co-ordinations between the photoperiod and other environmental stimulus have widely investigated [Bains *et al* 1999, Chandola and Chakravorthy 1984, Chu 1940, Foster1998, Gaur *et al* 2014, Tewary and Tripathi 1983, Thapliyal 1978, Thapliyal 1981].

2. Materials and Method

The Redheaded bunting, *Emberiza bruniceps* is along distant palaearctic Indian migratory small passerine finch (Family Emberizidae, Order Passeriformes) that breeds in West Asia and East Europe and overwinters in India [Ali 1996]. Female redheaded bunting is dull looking ashy brown head (above), buffish washed with yellow (below) and under tail-coverts yellow.

Adults birds were captured from the field and maintained under Natural Day Lengths (NDL) in captivity, fed with paddy grains, *Oryza sativa*, sometimes Kakoon, *Setria italica* .Food and water were changed daily and available at all the times in the cups attached with wire net cages. Photopriodic treatments given in the course of experiment are different in the duration of light and dark periods.

Birds were given hormonal treatment of Estradiol in different doses. Estradiol was injected in doses of 50µg, 100 µg and 200 µg. The hormone was dissolved in suitable solvent. The stock solution thus prepared was used for to prepare different concentrations .Hormonal treatment was 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. 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.) for all quantitative values. Mean body weight was compared with their own initials and within the group by student's *t-test* [Fischer1963].

3. Experiments and Result

Photopriodic treatments given in the course of experiment are different in the duration of light and dark periods,16 hours light and 8 hours dark(16L:8D) is called long photoperiod.

The hormone treatment is given in different doses as describe earlier using photosensitive, photo stimulated and photo refractory birds. Ten (10) alternative injection were made and the experiments were terminated on 21st day, at least 05 birds (n=5) were maintained in during experiment. Three experiments were performed in this study.

Experiment No. 01

In this study the photosensitive birds which have already given four weeks of 8L: 16D (08 Hours of light and 16 Hours of dark) treatment, were used. Injection of 200,100 and 50 microgram (µg) was given in 0.1 ml vehicle (Olive Oil), vehicle injected group served as control 10 alternative injection of each doses were given (Estradiol).

The body weight in females photosensitive birds was affected by the estradiol.The body weight was significantly greater ($P<0.01$)in control birds than hormone treated groups(**Table No.01)**.The lipid response was significantly different than the body weight. The value of lipid remained higher in all birds than initial control.

Table 1: Phtosensitive

Estradiol Treatment (µg)	Initial Body Weight (gm) [MEAN ± SE]	Final Body Weight(gm) [MEAN ± SE]	Lipid Weight(gm) [MEAN ± SE]
200	21.42±0.44	24.20± 0.72	3.82 ±0.48
100	20.86 ±0.28	24.08 ± 0.68*	3.56 ±0.52
50	22.10 ± 0.26	26.12 ± 0.44	2.06 ± 0.98**
Control	21.26 ± 0.18	28.24 ± 0.18	6.18 ± 1.22
Initial Control			1.72 ±0.36

*P value< 0.01
**P value< 0.001

Experiment No.02
In this study photo stimulated birds were used .Before the commencement of experiment female birds were exposed for three weeks under 16L:08D photoperiods, to bring about photostimulation, continued for 21 days.

The body weight of photostimulated females declined under the hormone treatment. The value of the body weight in all hormone treated birds remained lower than the control birds **(Table No.02)**.The lipid profile in all hormone treated birds was decreased .The value of lipid in initial control birds and vehicle treated birds was found at the same level but it was higher than the hormone treated birds.

Table 2: Photostimulated

Estradiol Treatment (µg)	Initial Body Weight (gm) [MEAN ± SE]	Final Body Weight(gm) [MEAN ± SE]	Lipid Weight(gm) [MEAN ± SE]
200	26.12±0.88	22.64 ±1.20	2.06 ±0.86**
100	26.28 ±0.74	23.28 ± 0.98	3.10 ±1.24
50	25.36 ± 0.66	23.74 ± 0.36*	3.46 ±1.24
Control	21.26 ± 0.56	25.92 ± 0.28	5.12 ± 1.10
Initial Control			5.86 ±0.86

*P value< 0.01
**P value< 0.001

Experiment No.03:
Before the experiment, birds were exposed to 16L: 08D for four months .The body weight in photorefractory female redheaded bunting was remained unaltered under the hormonal treatment. No significant changed in body weight was observed as compared to their own initials and with control birds **(Table no.03)**.The value of lipid in all hormone treated bird did not change and it remain close to value of initial.

Table 3: Photorefractory

Estradiol Treatment (µg)	Initial Body Weight (gm) [MEAN ± SE]	Final Body Weight(gm) [MEAN ± SE]	Lipid Weight(gm) [MEAN ± SE]
200	22.28±0.34	21.20 ±0.20	1.02 ±0.12**
100	22.32 ±0.44	20.36 ± 0.12*	1.12 ±0.22
50	21.74 ± 0.20	20.64 ± 0.18	1.05 ±0.18
Control	21.16 ± 0.46	20.44 ± 0.22	1.25 ± 0.16
Initial Control			1.20 ±0.24

*P value< 0.01
**P value< 0.001

4. Discussion

The observation presented in table no. 01, 02 and 03 indicated that the metabolic (body weight and lipid) response in female red headed bunting ,found in agreement with previous reports (Lal and Thapliyal 1985, Singh and Thapliyal 1988, Thapliyal and Singh1995).The significant changes which has been observed in present study reveals a delayed regression patterns compared to the previous work (Thapliyal and Singh 1995,Tripathi 1987,1989).

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