Int.J.Curr.Microbiol.App.Sci (2016) *5*(1): 393-395

International Journal of Current Microbiology and Applied Sciences
ISSN: 2319-7706 **Volume 5 Number 1(2016) pp. 393-395**
Journal homepage: http://www.ijcmas.com

Original Research Article http://dx.doi.org/10.20546/ijcmas.2016.501.037

Studies on photoperiod induced biochemical changes in ovotesticular cholesterol in slug *Semperula maculata*

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Keywords

Cholesterol, Ovotestis, Photoperiod, *S.maculata.*

Article Info

Accepted:
22 December 2015
Available Online:
10 January 2016

A B S T R A C T

The present investigation was aimed to observe the biochemical changes, caused by short day (8L. 16D) and long day (16L. 8D) photoperiods in ovotestis of a terrestrial stylommatophoran slug, Semperula maculate. The results showed a significant increase in cholesterol contents after exposure to short day photoperiods when active gametogenesis took place. On the other hand the concentration of cholesterol was lowered after the exposure of slugs to long day photoperiods when the cessation of gametogenesis occurred. The observations indicated some relationship of photoperiods with the gametogenesis in this slug which have been elaborately discussed.

Introduction

Light influences the activity of terrestrial gastropods, except after rain, they remain in their hides during the day and only after dusk do they emerge to go in search of food (Newell,1966).A decrease in light intensity, together with a fall in temperature, and a rise in humidity dew fall at dusk, result in the animals moving onto vegetation. According to Lewis (1969),the influence of daylight on gastropod mobility is greater than the effect of temperature changes. The photoperiodic response on the reproduction of some invertebrate and vertebrate animals has been well established. But such studies on the molluscan animals has been well established.

Also such studies on the molluscan species are scanty. So also, the most of the earlier studies have recorded the changes in the total carbohydrates, proteins and lipids in the gonads of the animals in relation to the photoperiods. But the important lipid component, cholesterol which is expected to affect during the reproductive activities has been paid much attention. Therefore, the present communication reports the cholesterol changes in the ovotestis of a terrestrial stylommtophoran slug, *S.maculata* under the influence of short day and long day photoperiods.

Materials and Methods

Live slugs *S. maculata* were collected from the local agricultural fields and acclimated in the laboratory conditions for a minimum period of one week before experimentation. Visibly healthy slugs were choosen and they were divided into three batches having ten to twelve slugs in each batch. Two batches were exposed to two different photoperiods i.e.Short day (8L:16D) and Long day (16L:8D) photoperiods for five weeks. The slugs of third batch (Control group) were exposed to (12L:12D). The slugs of three batches were sacrificed after every week and their ovotestis were removed and analysed for their vholesterol contents as per the technique described by Zovoisky (1968).

Results and Discussion

The results are shown in Table 1 following the weekly data of cholesterol contents in the ovoestis after exposure of slugs to short day and long day photoperiods. The increase continued throughout the experimental period upto the five weeks. But the exposure to the long day photoperiods showed marked decrease throughout the experimental period for five weeks except a slight rise after the first week.

Simultaneously made histological preparations of the ovotestis showed active gametogenesis during the exposure to short day photoperiods. But there was cessation of gametogenesis after the exposure to the long day photoperiods.

Joosse and veld (1972), Nayar (1977) and Joosse (1984) reported that the reproduction of different animals including invertebrates occurred at the end of short day photoperiods. Some others have noticed increase in the gonadal activities after decreasing the photoperiods in fall-breeding fish (Giese, 1969), in deer and sheep (Turner, 1976) and in M.arvalis (Lecyk, 1963).

It is interesting to note that high lipid level was recorded in the gravid gonads in *Katherina tunicata* and *Mopalia hindsii* (Giese and George, 1962;Tucker, 1962), in vitelogenesis and at maturity(Taylor and Anderson, 1969) and during egg formation period in *Tresus capex* (Reid, 1969) and in *S.maculata* (Nanaware, 1975). During increased lipid level increase in the cholesterol concentration is also expected during the active gametogenesis. Because during this period, the cholesterol is utilized for the synthesis of steroidal hormones whose role is expected at the time of active reproduction of the slugs. Therefore, increased gametogenesis took place during the short day photoperiods, when cholesterol concentration was high.

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How to cite this article:

Bharamal, D.L., 2016. Studies on photoperiod induced biochemical changes in ovotesticular cholesterol in slug *Semperula maculate*. *Int.J.Curr.Microbiol.App.Sci.* 5(1): 393-395
http://dx.doi.org/10.20546/ijcmas.2016.501.037