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MONITORING THE MOTH DIVERSITY (*Spodotera litura*) IN AND AROUND AGRO ECOSYSTEM OF LOVELY PROFESSIONAL UNIVERSITY WITH SOME ECOLOGICAL OBSERVATIONS

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ABSTRACT

The objectives of research were to monitor the moth diversity in and around agroecosystem of Lovely Professional University, Punjab. The moths were collected using light traps. The collected specimens were stretched and then identified.Fourteen species of six families viz.,Noctuidae, Arctiidae, Lymantridae,Sphingidae,Notodontidae and Pyralidae were identified. Noctuidae appeared to be the abundant family as seven species of it were identified. *Spodotera litura* Fabricius was registered as most prevalent showing index of dominance 0.30. Statistical analysis was done by calculating coefficient of correlation and coefficient of regression to study the relationship of the moth population with relative minimum temperature and relative minimum humidity.

INTRODUCTION

Biodiversity is defines as the variation of life at all levels of biological organisation or it can be defined as the relative diversity among living organisms present in different ecosystems. India is one of the twelve mega diversity countries in the world. According to a recent documentation there are 1,719,183 species present on this globe, out of which 1,26,656 species have been enlisted from India, so far (MoEF,1998). Estimates of global species diversity have varied from 2 to 100 million species, with a best estimate of somewhere near 10 million (Anonymous, 1992). Insect diversity is very important because it can be used as a food, and also for other ecological services like recycling of nutrients, detoxification of toxic chemicals and pollination. Over thousand species of insects are used as food. They are cosmopolitan. Insects rule the planet earth, by occupying all possible niches, as more than four out of every five animal species are insects (New,1984). Insects represent more than 56% of the total global biodiversity (Groombridge,1992). According to Holloway *et al*(1992), there are about 2,00,000 species of Lepidotera on global basis and out

of these, only 15,000 species belong to the butterflies (Papilionoidia) and the remaining being moths. Agricultural pests causing damage to grains and vegetables mostly belong to family Noctuidae. Hampson (1894) classified family Noctuidae into 9 subfamilies and later on revised this classification in 1902 by suggesting 15 subfamilies. Kitching (1984) suggested 16 subfamilies viz., Rivulinae, Hypenodinae, Catocalinae, Aconitinae, Nolinae, Chleophorinae, Sarrothripinae, Plusiinae, Pantheinae, Acronictinae, Amphipyrinae, Cucullinae, Hadeninae, Noctuinae, Heliothinae and Hypeninae.

From the foregoing, it becomes crystal clear that family i.e., Noctuidae is of great economic importance. The taxonomic studies on *Spodoptera litura* of this family are warrented in order to bring to book its population fluctuations and effects of temperature and humidity in and around LPU(Punjab) . Such taxonomic studies are necessary in different parts of this vast country in order to take up revisionary studies on this species

METHODOLOGY:

LOCATION:

Study area i.e. Lovely Professional University is located near Phagwara. This city is located (31 degree 13'4"N to 75 degree 46'10"E) .The altitude is 234m (767 feet). Phagwara is located on Delhi –Amritsar National highway between two big cities Ludhiana & Jalandhar.

VEGETATION:

Vegetation of the Phagwara includes crops like wheat, rice, maize, barley, bajara and jowar. It also includes number of seasonal flowers which attracts the moths.

COLLECTION OF THE MATERIAL:

The intial and the most important requirement to achieve the objectives of the present research proposal is the procurement of the research material. The collection of the material required for present studies was done with the help of portable light traps. The traps comprise a funnel (diameter top 30cm, bottom 6cm, height 30cm) fitted with baffle plates. The source of light to attract the moths was a 125w mercury vapour lamp, which is fitted in the centre of the funnel, the lower end of which goes into the collecting chamber (30cm×30cm×12cm) of the light trap. In some light traps, the sources of light is the U.V tube. The collecting chamber is fitted with two sliding collection trays (29cm×29cm).These traps were located at four different location in LPU campus.

PINNING, SPREADING AND PRESERVATION OF SPECIMENS

The specimens collected were processed as per methodology discussed by workers such as Amsel (1935), Holland (1937), Lindquist (1956), Hodges (1958), Tagestad (1974), Zimmerman (1978), Nielson (1980), Mikkola (1986) and Landry and Landry (1994).

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OBSERVATIONS:

Genus *Spodoptera* Guenee

Guenee, 1852, Noctua, **1**: 153.

Type species: *Spodoptera maurita*, Boisdwal.

Old distribution: West Indies, North & South America, Africa, North China and throughout Oriental Australian region.

***Spodoptera litura* (Fabricus)**

Fabricius, 1775, Noctua, **1775** : 601.

Diagnosis : Dark grey with a rusty tinge; abdomen fuscus. Forewing with subbasal, antemedial and postmedial double waved lines indistinct; the orbicular small and ochreous; the reniform blackish spot; the submarginal line whitish and irregularly waved; a whitish patch is often present between the orbicular and reniform and a dark patch on central marginal area. Hind wing opalescent and semihyaline white with a dark marginal line.

Old distribution : India, Himachal Pradesh

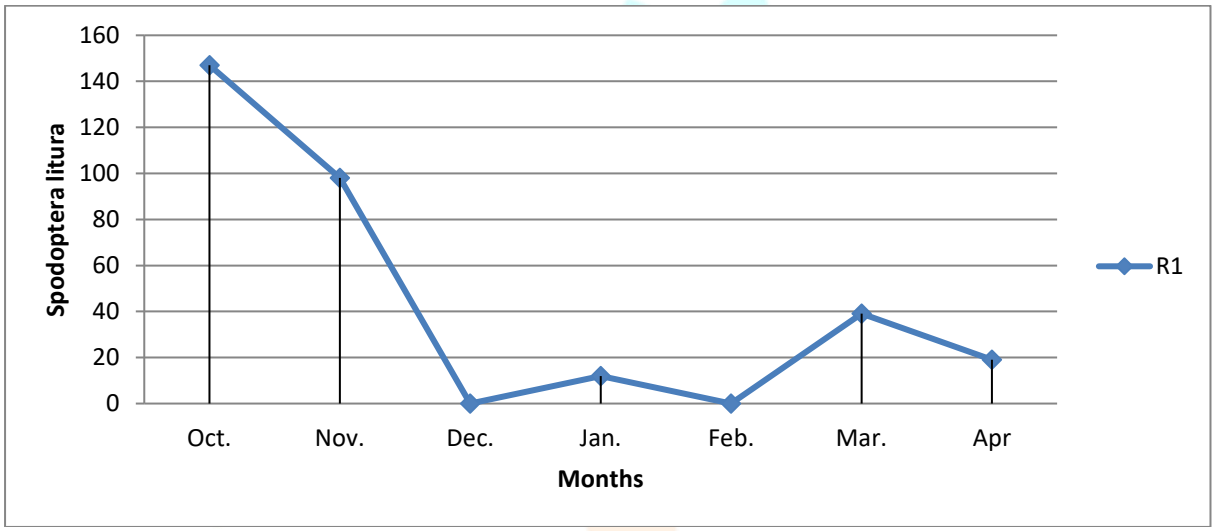

Fig.1 Showing monthly catches

Table1 Showing weekly catches of *Spodoptera litura* Fabricius, mean log per month and index of dominance.

Month	First Week	Second Week	Third Week	Fourth Week	Total (N_{max})	Mean log (n) per month	Total no.of moths (N_T)	Index of dominance $d = N_{max}/N_T$
Oct.	53	27	36	31	147	1.5508	472	0.31
Nov.	13	20	26	39	98	1.3553	208	0.47
Dec.	-	-	-	-	-	-	39	-
Jan.	3	5	1	3	12	0.4133	35	0.34
Feb.	-	-	-	-	-	-	35	-
Mar.	15	9	8	7	39	0.9696	108	0.36
Apr.	9	2	3	5	19	0.6078	136	0.14

Coefficient of correlation (r) = $$\frac{N\sum dxdy - \sum dxdy}{\sqrt{N\sum dx^2 - (\sum dx)^2}\ \sqrt{N\sum dy^2 - (\sum dy)^2}}$$

Coefficient of regression (b_{xy}) = $$\frac{N\sum dxdy - \sum dx \times \sum dy}{N\sum dy^2 - (\sum dy)^2}$$

Table- $3T_1$ Showing Coefficient of Correlation (r) and Coefficient of regression (b) of *Spodoptera litura* Fabricius with temperature.

Month	Number of Weeks (N)	$\sum dx$	$\sum dx^2$	$\sum dy$	$\sum dy^2$	$\sum dxdy$	Coefficient of Correlation (r)	Coefficient of regression (b)
Oct.	4	2	6	13	69	12	0.47	0.52
Nov.	4	4	24	13	411	-74	0.71	-0.17
Dec.	4	-	-	-	-	-	-	-
Jan.	4	2	6	51	3693	-42	-0.55	-0.02
Feb.	4	-	-	-	-	-	-	-
Mar.	4	2	6	7	657	-47	-0.89	-0.08
Apr.	4	4	24	9	293	-36	-0.61	-0.17

Table- 4H_1 Showing Coefficient of Correlation (r) and Coefficient of regression (b) of *Spodoptera litura* Fabricius with humidity.

Month	Number of Weeks (N)	∑dx	∑dx^2	∑dy	∑dy^2	∑dxdy	Coefficient of Correlation (r)	Coefficient of regression (b)
Oct.	4	6	54	13	69	36	0.48	0.62
Nov.	4	2	6	-13	411	-37	-0.71	-0.08
Dec.	4	-	-	-	-	-	-	-
Jan.	4	2	6	51	3693	-42	-0.55	-0.02
Feb.	4	-	-	-	-	-	-	-
Mar.	4	8	96	7	657	-4	-0.08	-0.03
Apr.	4	6	54	9	293	-54	-0.61	-0.05

In a nutshell,it appears that the influence of these climatic factors changes seasonally and annually. The effect of abiotic factors is complex phenomenon, not easily comprehensible as other biotic factors are also involved.

BIBLIOGRAPHY

Amsel, H.G. (1935). Neue Palastinensische Lepidopteran. *Mitt. Zool. Mus. Berlin.*, 20 : 271- 319.

Anonymous (1992). Global Biodiversity Strategy, WRI, IUCN, UNEP : 1-244.

Groombridge, B. (1992). *Global Biodiversity, World conservation monitoring centre,* chapmann and Hall, London.

Hampson, G.F. (1892). *Fauna of British India including Ceylon and Burma, Moths.* Vol.I. Taylor and Francis, London, xii + 527pp.

Hampson, G.F. (1892). *Fauna of British India,* (Moths). Vol. I. Taylor and Francis, London : xii + 527 pp.

Hampson, G.F. (1894). *Fauna of British India including Ceylon and Burma, Moths.* Vol.II. Taylor and Francis, London, xii +546pp.

Hampson, G.F. (1894). *Ibid. Vol. II. Ibid.,* 1-xxviii + 1-546

Holloway, J.D., Bradley, J.D. and Castor, D.J.(1992). *The Guide to Insects of importance to man* (Lepidoptera). 1-21.

Hubner (1816). *Vertz. Bekannter Schmett.,* 407.

Linnaeus, C. (1758). *Sys. Nat.* (Edn. 10) : 824 Holmiae.

Linnaeus, C. (1758). Systema Naturae per regna tria naturae, secundum classes, ordines, genera, species cum chacteribus, differentiis, synonymis, locis. 10th ed. Tom. I. Laurentii Salvii, Holmiae., 824.

Mikkola, K. (1980). Two new noctuid species from Northern-Europe : *Polia sabmeana,* new species and *Xylomina strix,* new species. (Lepidoptera- Noctuidae : Hadeninae and Amphipyrinae). *Not. Entomol.,* 60(4) : 217- 222.

MoEF, (1998). Implementation of Article 6 of the Convention on Biological Diversity in India (National Report) : 1-59.

New , T.R. (1984). *Insect Conservation – as Australian Perspective.* Dr. W. Junk Publishers, Dordrecht/Boston/Lancastor, pp. 184.

Nielsen, E.S. (1985). The monotrysian heteroneuranphylogeny puzzle : a possible solution. *Proc. Cong. Eur. Lep.*, 138-143.