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Records the seasonal activity and population fluctuation of *Helicoverpa armigera* (Hub.) and *Spodoptera litura* (Fabricius) through light trap catches in Jabalpur region of M.P.

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Abstract

Field experiment was conducted at research farm JNKVV, Jabalpur during 2014 and 2015. Standard design of Jawahar light trap (Model SM-96) was used to collect advantageous information on seasonal activity of two major Noctuid insect pest species viz. Gram pod borer, *Helicoverpa armigera* (Hub.) and Tobacco caterpillar *Spodoptera litura* (Fabricius). Seasonal activity indicated that major activity period of these insect pest was confined between August to April in case of *Helicoverpa armigera*. While major activity period of *Spodoptera litura* was September to December in *kharif*, February in Rabi and March-April in summer. Activities of both the pests were very low during May and June. Three pinnacle point were recorded in trap catch of *Helicoverpa armigera* which indicates completion of 3 generations during cropping period.

Keywords: Light trap, *Helicoverpa armigera* (Hub.), *Spodoptera litura* (Fabricius), seasonal activity

Introduction

Seasonal activity of phototropic insect pest species can be monitored very effectively through light trap catches because of that majority of insect pest are phototaxis in nature. Collections of a light trap provide significant clue to the diversity of insects active at night^[6]. Use of light trap played an important role in entomological research studies all over the world for survey and control of insect pest population in recent years^[3, 1] reported that the seasonal activity of *Spodoptera litura* and *Helicoverpa armigera* through light trap catches. Gram pod borer, *Helicoverpa armigera* (Hub.) and Tobacco caterpillar, *Spodoptera litura* (Fabricius) are major polyphagous pests, they damage a wide range of crops including cereal, pulse, oilseed and horticultural crops and it has a voracious feeder behavior and they are feeding from emergence to before pupation. Both these pest species are phototropic in nature. All though much work has been done on use of light trap against *Spodoptera litura* (Fabricius) and *Helicoverpa armigera* (Hub.) in many regions of India and Madhya Pradesh but very little information is available on these pests in Jabalpur region of M.P Hence an urgent need was felt to study the seasonal abundance and population dynamics of both these important polyphagous pests in Jabalpur region of Madhya Pradesh.

Materials and methods

Research work was conducted at JNKVV research farm Jabalpur, during 2014 and 2015. Standard design of Jawahar light trap (Model SM-96) with 80 watt mercury vapour lamp was operated through out the year from August 2014 to April 2015. Daily records of both the pest population were collected.

Trap catch collected during every night, is an unbiased sample which represents relative activity of night flying insects active in neighborhood of the trap which is as per rough estimate is about 100 m radius around trap. The daily trap catches were converted to weekly totals and mean per day catch per week (weekly means/day) where worked out. Division of weeks were based on calendar days i.e. I week (1st to 7th day), II week (8th to 15th day), III week (16th to 23rd day) and IV week (24th to 30th/31st day)

Results and discussion

Two insect pest species namely Tobacco caterpillar *Spodoptera litura* (Fabricius) and Gram pod borer *Helicoverpa armigera* (Hubner) were identified as most important and polyphagous pests of Jabalpur region because they occurred in significantly high numbers in trap catches as well as in field also in both the season *kharif* and *rabi* respectively. Species wise weekly as well as monthly results of both years are described below:

Tobacco caterpillar- *Spodoptera litura* (Fabricius)
Order-Lepidoptera, Family-Noctuidae

It is a polyphagous pest and the major pest of Soybean, groundnut, cowpeas & moong-urd etc. It is also reported to do

serious damage as foliage feeder in vegetable crops like tomato, cabbage, cauliflower etc. in Jabalpur as well as in other regions.

The activity of this pest was started in trap catch from August (42 moths) (Table 1). With a distinct rise in population in September (113 moths) its activity remained at moderate level during October, November and December (Fig. 1). Activity was declined in January (46 moths). The population then raised again from February (77 moths) and reached to its peak in summer during April (155 moths). Major activity period was September to December in *kharif*, February in *Rabi* and March-April in summer. While [2] reported that the peak activity of *S. litura* during September.

Table 1: Seasonal activity of *Spodoptera litura* (Fabricius) and *Helicoverpa armigera* (Hub.) collected in light trap during the year 2014-2015.

Months	Total trap catch/month (30 days collection)	
	<i>Spodoptera litura</i>	<i>Helicoverpa armigera</i>
August-2014	42	7
September-2014	113	21
October-2014	101	36
November-2014	85	20
December-2014	111	50
January-2015	46	36
February-2015	77	103
March-2015	117	547
April-2015	155	1711
Total catch of the year 2014-2015	847	2,531

Gram Pod borer- *Helicoverpa armigera* (Hubner)
Order-Lepidoptera, Family-Noctuidae

This is a well known polyphagous pest. It is a key pest of chick pea as well as major pest of maize, tomato, chili and pigeon pea etc. at Jabalpur regions. It is a principle pest of cotton as bollworm in all the cotton growing areas of Indian Union.

The activity of this pest was started right from the month of August (7 moths) remaining at low level during the period

September to November (Table 1). The population started rising from February (103 moths) to March (547 moths) and reached to its peak in April with distinctly higher population of 1711 moths. The major activity period was September to April. [1] reported that the major activity period during February– March while [4] reported that the abundance of *H. armigera* in April and May. Three distinct peaks in population curve (Fig-2) suggest completion of 3 generations the period

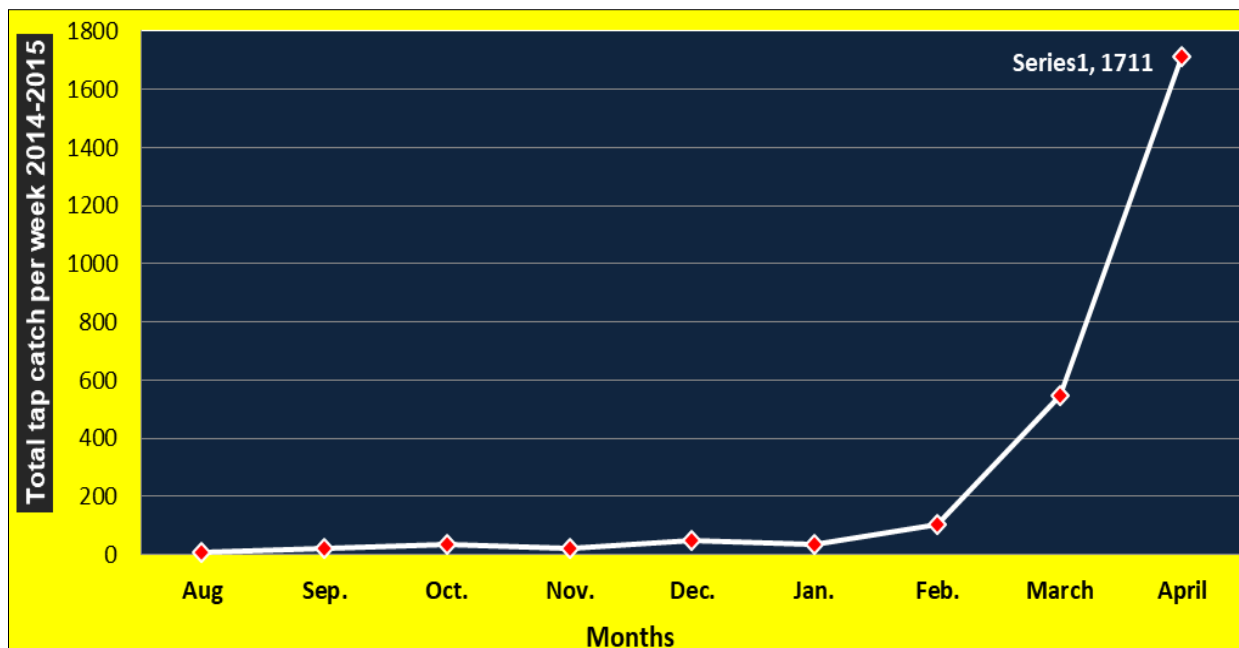


Fig 1: Weekly distribution of light trap catches of *Spodoptera litura* during 2014 and 2015 at Jabalpur

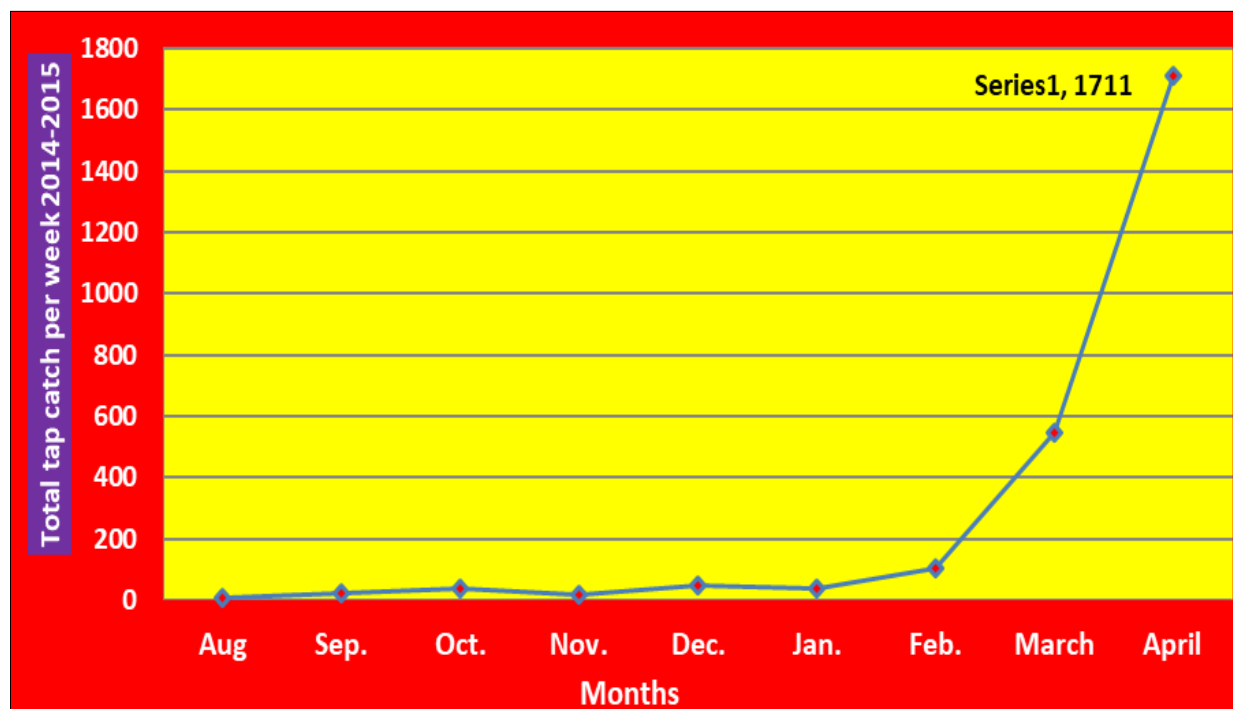


Fig 2: Weekly distribution of light trap catches of *Helicoverpa armigera* during 2014 and 2015 at Jabalpur

Conclusion

Results on seasonal activity indicated that major activity period was confined between September to April in case of *Helicoverpa armigera* with peak activity in March and April. Three peaks were observed during this period which indicates completion of 3 generations during main cropping season while highest weekly peaks were observed during first and fourth week of April. *Spodoptera litura* is active during September to December in *kharif* and March-April in summer.

Present research work provides the fruitful information on activity periods of both the major polyphagous, which is very useful for the preparation of bio intensive integrated pest management strategy against these pests. It also strengthened the importance of light trap in monitoring the pest activity and its scope as IPM tool in the management of major pest species Jabalpur region of central India.

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