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Short communication

Effect of soil temperature on adult population of *Helicoverpa armigera* Hubner

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A major biotic constraint to the productivity of chickpea (*Cicer arietinum* L.) is damage to the crop by insect pests, diseases and parasitic weeds. The full grown *H.armigera* larvae leaves the plant, sometimes by dropping to the ground and burrows into the soil to a depth of 2.5 to 17.5cm, where it pupates. The pupal period for *H.armigera* was recorded as 5 to 8 days in India; the moth normally remain inactive in the plant during the day ; most activity is usually between dusk to dawn (Jayaraj ,1990). Thus soil temperature plays an important role in the duration of pupal stage and ultimately on emergence of the moth from the pupae and adult population. Hence, the present study was restricted only to the adult stage of the pest.

Chickpea was sown during *rabi* season of 1997 - 98 at 3 different sowing dates i.e. (December 12, 20 and 28) with two spacing of 30 x 10 cm and 45 x 10 cm in the Agriculture College Farm, Pune. Soil thermometers were installed at 5 and 15cm depths. In each of the main treatments one set of thermometers were installed. Observations were recorded daily at 0730 h and 1430 h. Sleeve type of pheromone traps manufactured by M/s pest control of India were used for trapping the adult males and trap counts were made daily.

Table 1 : Correlation coefficient between soil temperature and adult catches

Average	Sowing date					
	12 December		20 December		28 December	
	5cm	15cm	5cm	15cm	5cm	15cm
1D	0.20*	0.089	-0.10	-0.10	0.14	0.16
5D	0.30	0.068	-0.32	-0.28	0.54**	0.53**
10D	0.47	0.180	-0.44	-0.43	0.62*	0.68**

* Significant at 5 %

** Significant at 1 %

Table 2 : Weekly adult catches and soil temperature at 5cm and 15cm depth (Pooled data)

Week No.	Soil temperature (°C)		Moth
	5cm	15cm	
1	19.5	21.5	0
2	21.8	23.7	3
3	21.0	27.7	1
4	21.4	22.0	2
5	21.2	22.2	1
6	20.0	20.4	2
7	19.3	19.7	1
8	20.1	19.9	0
9	19.4	19.7	1
10	17.3	18.4	1
11	19.1	20.1	1
12	20.1	21.1	2
13	22.5	21.7	1
14	26.7	25.8	0
15	30.4	29.2	0

Daily average soil temperature of 5 cm and 15 cm depth were converted into 1,3,5,7,10 and 15 days means and then were correlated with average daily, 3d,5d,7d,10d and 15d incidence of adult population (Table 1). Highest correlations were found in average daily (1d), 5d and 10d soil temperature at 5 and 15 cm depths. Correlation was positively significant with average daily soil temperature for both the depths at 5 and 10 days for the late sown (28 December) crop. However, soil temperature at both the depths for the crop sown on 12th and 20th December did not show any effect on adult catches (Table1). Sinha and Jain (1992) showed positive and significant effect of soil temperature on adult catches.

To get the critical values of soil temperature for peak adult catches, the weekly data of 15 weeks for three sowing dates and two spacing i.e. 6 treatments were pooled and analysed (Table 2). Highest population corresponded to soil temperature of 21.8 °C at 5cm and 23.7 °C at 15cm depth respectively.

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