

Gram Pod borer (*Helicoverpa armigera*) a very destructive insect pest in Chickpea: a focus on its management by intercropping and monitoring through Pheromone traps under temperate conditions

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Abstract: Field experiments were laid down to study the impact of intercropping on Gram Pod borer(*Helicoverpa armigera*) and to monitor population of adults via pheromone traps. Grain yield of Chick pea was recorded highest in Chick pea plus Garlic(6:2) in both the seasons followed by Chickpea plus mustard (4:3) during rabi 2017-18 and Chick pea plus Linseed/Chickpea plus Coriander(4:3) during 2018-2019. Pod damage by *H.armigera* was highest in Chickpea sole crop. *Helicoverpa armigera* catches in pheromone traps was peak during 14-15th standard week.

Key words: *Helicoverpa armigera*, Chickpea, intercropping, Pheromone traps.

Introduction

Chickpea is a very important crop of India which contributes 67 % of the global production and 37% to the national pulse production (Ali and Kumar, 2003). Chickpea is highly proteinaceous food. On an average, chickpea contains protein (12.4 to 31.5 %), Carbohydrate (48.2 to 67.6 %) and fat 6% (Anwar F et al, 2009). Among the insect pests *Helicoverpa armigera* is the most destructive pest that affects both the pods and the leaves thereby reducing the crop yield appreciably. High application of pesticides not only leaves toxic residues in the food chain but also causes ill effects on the non-target organisms, development of pest resistance, pest resurgence. In this connection experiments were conducted to study or assess the influence of intercropping on the Pod borer and to monitor the adult male *Helicoverpa armigera* population through Pheromone traps.

Materials and Methods

Chickpea cultivar Shalimar Chickpea 1 of released variety by SKUAS Kashmir was intercropped with Kashmiri Garlic(6:2), Mustard Shalimar sarson-3 (4:3), linseed Shalimar masoor-3(4:3) and local coriander during Rabi 2017. Sole crop of Chickpea was also grown. Observations were recorded on number of larvae per meter row length Pod damage and grain yield. Two best intercrops (Chickpea plus Garlic and Chickpea plus mustard) based on decreased Pod damage resulting in increased grain yield were further studied during Rabi 2018-2019 along with two more combinations, Chickpea plus linseed(4:3), Chickpea plus Coriander(4:3) and sole crop. The experiments were laid out in a randomized block design in a plot size of 3x12 m at spacing of 35 cm at pulse field block of DARS, Rangrath, SKUAST Kashmir in four replications. Five pheromone traps were installed in Chickpea fields to monitor the *Helicoverpa armigera* adult male population throughout the Chickpea cropping season during Rabi 2017-2018 and Rabi 2018-2019. *Helicoverpa armigera* was also recorded weekly.

Results and discussion

The data presented in of Table 1 indicates that Chickpea+Kashmiri Garlic (6:2) intercropping recorded the lowest larval population and Pod damage (33.0 larvae/mrl:44.0% pod damage) followed by Chickpea+Mustard(4:3)(33.0 larvae /mrl: 46% Pod damage) during rabi 2017-2018.The Chickpea grain yield was also highest in Chickpea +Kashmiri garlic(735 kg/ha followed by Chickpea+Mustard (702 Kg/ha). Sole Chickpea crop recorded lowest grain yield (574 kg/ha) owing to maximum Pod damage (68 %).

Similarly (Table 2) ,during Rabi 2018-2019 number of larvae /mrl and Pod damage were lowest in Chickpea +Kashmiri Garlic (7 larvae/mrl:27% Pod damage) and highest in Chickpea sole crop (12 larvae/mrl:44.00% Pod damage).Likewise,the percent .Grain yield was also recorded highest in Chickpea+Kashmiri Garlic 857 Kg/ha followed by Chickpea+mustard.Intercropping ofChickpea with Linseed ,wheat and Mustard a swell as other non hosts crops has been reported to cause significantly lower pod damage than Chickpea sole crop(Ahmad,2003).

Table 1.Influence of Intercropping on gram pod borer damage and Chickpea grain yield during 2017-2018

Treatments	Number of larvae/mrl	Per cent Pod damage	Grain yield (kg/ha)
1.Chickpea+Garlic	33.00	44.00	735.00
2. Chickpea+Mustard	37.00	59.00	670.00
3. Chickpea+lentil	36.00	52.00	647.00
4.Chickpea+Coriander	33.00	46.00	700.00
5. Chickpea sole	39.00	68.00	574.00
C D at 5%	0.51	2.2	30.00

Table 2.Inflence of intercropping on Gram pod borer and grain yield of Chickpea during 2018-2019.

Treatments	Number of Larvae /mrl	Per cent pod damage	Grain yield (Kg/ha)
1.Chickpea +Garlic	6.98	27.00	856.00
2. Chickpea+Mustard	8.00	30.00	796.00
3.Chickpea+linseed	9.99	39.00	719.00
4. Chickpe +Coriander	7.50	33.00	796.00
C D at 5%	0.39	1.5	20.7

Table 3.Monitoring of Helicoverpa armigera population through Pheromone Traps

Month/Year	Std week	Pheromone trap catches		No of H.armigera Larvae/mrl	
		2017	2018	2017	2018
October	40	0.00	0.00	0.00	0.00
	41	0.00	0.00	0.00	0.00
	42	0.00	0.00	0.00	0.00
November	43	0.00	0.00	0.00	0.00
	44	0.00	0.00	0.20	0.00
	45	0.00	0.13	0.27	0.45
	46	0.00	0.28	0.44	0.00
December	47	0.13	0.57	1.12	2.81
	48	0.27	0.71	2.09	3.42
	49	0.00	0.41	2.40	1.08
	50	0.00	0.14	1.59	0.00
	51	0.00	0.00	1.21	0.00
January	52	0.00	0.00	0.80	0.00
	1	0.00	0.00	0.00	0.20
	2	0.00	0.00	0.00	0.00
	3	0.00	0.00	0.00	0.00
February	4	0.00	0.00	0.00	0.00
	5	0.00	0.00	0.00	0.00
	6	0.00	0.00	0.00	0.00
	7	0.00	0.00	0.00	0.00

	8	0.00	0.00	0.00	0.00
March	9	0.00	0.00	0.00	0.00
	10	0.00	0.00	0.00	0.00
	11	0.00	0.64	0.00	0.00
	12	0.14	0.75	0.20	0.40
April	13	1.99	3.13	2.21	0.80
	14	3.15	9.50	3.60	4.60
	15	6.56	11.86	8.51	7.29
	16	3.30	8.51	5.81	10.40
May	17	2.30	5.67	4.21	6.79
	18	2.15	4.12	3.90	4.52
	19	0.87	2.27	2.40	1.71
	20	0.58	0.57	1.11	1.18

The data presented in Table 3 indicated that the Pheromone trap catches were negligible from 45th to 50th week and again from 1 to 10th standard week of March 2017,2018, trap catches were nill.From the 11th standard week,moth catches /trap started increasing and it reached to peak in 15th-16th standard week of April(6.56,11.86 moths/trap during rabi 2017 AND 2018 respectively).It further decreased till 19th-20th standard week of May when the crop was harvested.An increased in pest population during post winter months between 9th and 15th standard week has been reported to be a regular trend in north india(Ahmad,2003).Yadava et al.1991 observed *H.armigera* larvae to occur at all growth stages of the crop ,being less than 0.81 larvae per m2 at the foliage stage and more than 19.02 larvae /m2 at the Poding stage.

H.armigera population can therefore be effectively managed by intercropping with Garlic and mustard /coriander or linseed.

Referances

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