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EFFECT OF INTERCROPPING ON THE INCIDENCE OF *HELICOVERPA ARMIGEREA* (HUBNER) IN CHICKPEA

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ABSTRACT

A field experiment on effect of intercropping on the incidence of gram pod borer, *Helicoverpa armigera* (Hubner) in chickpea was carried out during rabi season at experimental farm, Rajasthan College of Agriculture, Udaipur (Rajasthan). The four treatments of intercrop with gram *viz*. barley, wheat, mustard and linseed and one sole crop of gram were evaluated. The results revealed that overall mean per cent pod damage (17.99%) in gram sole crop was significantly higher than all intercropping system. The mean population of the pest in gram intercropped with linseed (4.43) and mustard (4.64) were at par and both these intercropping system carried significantly lower mean pest population when compared with gram sole crop (5.25) and gram + wheat (5.20) and gram + barley (5.23) intercropping system.

Key words: Chickpea, Gram pod borer, *Helicoverpa armigera*, Intercropping, Sole crop

INTRODUCTION

Role of pulses in India Agriculture need hardly any emphasis. Pulses play an important role in fulfilling the quantitative and qualitative protein requirement of large parts of humanity. Gram (*Cicer arietinum* L.) ranks world's third pulse crop and fifth food legumes. India is the leading gram producing country. Many insect pest attack chickpea crop, among them gram pod beror, *Helicoverpa armigera* (Hubner) is one of the major insect pests of gram. This pest is active throughout the year. The pest causes damage to gram from November to March. The damage is caused by the larvae which feed on the leaves and destroy the seedlings in the early stages. At the time of pod formation it feeds on the developing grain after cutting a hole in the pod and thrusting its heads therein. It has been estimated that a single caterpillar may destroys 30–40 pods of gram in its life time. In severe infestation the pest causes 20–25 per cent damage. Many formulations of synthetic insecticides are available in the market for the management of this pest but they have several problems like residual effects, pest resistance, environmental pollution, health hazards etc. Therefore, in the present investigation management of *H. armigera* was worked out through intercropping.

MATERIALS AND METHODS

A field experiment on effect of intercropping on the incidence of gram pod borer, *Helicoverpa armigera* (Hubner) in chickpea was conducted out during rabi season at experimental farm, Rajasthan College of Agriculture, Udaipur (Rajasthan). The experiment was laid out in a randomized block design with five treatments *i.e.* four treatments of intercrop with gram *viz.,* barley, wheat, mustard and linseed and one sole crop of gram. The gram variety Dahod yellow was sown in plot each measuring 5.0 × 1.5 m at 30 cm row to row and 10 cm plant to plant spacings by adopting recommended agronomic practices and each treatment was replicated five times. The observation on incidence of *H. armigera* was recorded on five randomly tagged plants of gram by counting the damaged and healthy pods along with larval population.

RESULTS AND DISCUSSION

Effect of intercropping on larval population: Weekly observations on population of gram pod borer, *Helicoverpa armigera* (Hubner) in different intercrops have been presented in Table 1 which showed that the pest was present in all intercrop combinations of gram throughout the growing season. Gram crop when intercropped with linseed and mustard, carried significantly low population of gram pod borer when compared with gram sole crop and gram + wheat and gram + linseed and gram + mustard intercropping system was however, same as observed in gram intercropped with wheat and barley and gram sole crop. At 50 meteorological weeks the pest appeared with initial population of 2.2 and 2.6 / five plants on gram, when intercropped with linseed and mustard, respectively and started increasing continuously. The population of gram pod borer touched its peaks in 07 meteorological weeks (17 week after sowing) with an average population of 7.0 and 7.4 / five plants when gram

Table 1. Effect of intercropping on the incidence of *H. armigera* in chickpea during Rabi season

Standard week	Mean larval population / five plant															
	50	51	52	1	2	3	4	5	6	7	8	9	10	11	12	Mean
Week after sowing	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	–
Treatment																
Gram (sole crop)	3.4	3.6	4.6	5.0	5.4	5.8	6.4	6.8	4.6	8.0	7.2	5.8	4.0	3.2	2.0	5.25
Gram + Wheat	3.2	3.8	4.4	4.8	5.2	6.0	6.4	6.6	7.4	7.8	7.4	6.0	3.8	3.0	2.2	5.20
Gram + Barley	3.2	3.6	4.2	4.6	5.2	6.2	6.4	6.8	7.4	7.8	7.4	6.2	4.0	3.0	2.4	5.23
Gram + Linseed	2.2	2.6	3.6	4.0	4.8	5.4	5.8	6.2	6.8	7.0	6.6	5.0	3.2	2.0	1.2	4.43
Gram + Mustard	2.6	3.2	3.8	4.6	5.0	5.4	6.0	6.4	6.8	7.4	6.4	5.2	3.2	2.4	1.2	4.64

CD at 5%	Intercropping	:	0.23
	Meteorological week	:	0.39
	Interaction	:	0.89

Table 2. Effect of intercropping on the per cent pod damage of *H. armigera* in chickpea during Rabi season

Standard week	Per cent pod damage										
	3	4	5	6	7	8	9	10	11	12	Mean
Week after sowing	13	14	15	16	17	18	19	20	21	22	–
Treatment											
Gram (sole crop)	18.20	18.84	19.65	19.70	20.58	18.53	17.36	16.67	15.72	14.63	17.99
Gram + Wheat	16.83	18.21	18.94	18.99	19.57	17.74	16.45	16.29	15.63	14.33	17.30
Gram + Barley	16.79	16.90	17.82	18.41	18.50	16.54	16.17	16.16	15.40	14.26	16.70
Gram + Linseed	14.93	15.22	16.37	16.69	18.28	16.98	16.08	15.90	15.98	14.27	15.97
Gram + Mustard	16.30	16.59	17.35	18.43	19.15	17.37	15.87	15.45	14.82	14.12	16.55

CD at 5%	Intercropping	:	0.48
	Meteorological week	:	0.68
	Interaction	:	1.52

intercropped with linseed and mustard, respectively as against 8.0 / five plants on gram grown sole crop. However, there was no significant difference in overall mean population of the pest between gram intercropped with linseed (4.43) and mustard (4.64) but both these intercropping system carried significantly lower mean pest population when compared with gram sole crop (5.25) and gram + wheat and gram + barley intercropping system.

Effect of intercropping on pod damage: Observation on the pod borer damage on gram sole crop and on gram intercropped with, wheat, barley, linseed and mustard during Rabi season have been presented in Table 2. The observation revealed that pod damage in gram sole crop started at 03 meteorological week, with initial pod damage of 18.19 per cent and then increased continuously. Pod damage was highest at 07 meteorological week with an average damage of 20.58 per cent. Incidence of *H. armigera* on gram crop when intercropped with wheat and barley commenced at 03 meteorological weeks with initial pod damage of 16.82 and 16.78 per cent respectively. The borer damage was highest at 07 meteorological week with average pod damage of 19.56 and 18.49 per cent on gram intercropped with wheat and barley, respectively. However, significant difference in mean pod damage among gram sole crop and gram intercropped with wheat and barley was recorded. There was significant difference in mean damage between gram intercropped with wheat and barley and gram intercropped with linseed. Mustard and barley intercropping were also at par, however, overall mean pod damage in gram sole crop was significantly higher than all intercropping system. Present results are corroborate with the findings of Mehta *et al.*, 1988 and Ameta *et al.*, 1995 who reported that intercropping has caused considerable impact on the succession and incidence of insect pest of chickpea.

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