Influence of intercropping on the incidence of gram pod borer *H. armigera* (Hub.) and its natural enemies in chickpea (*Cicer arientinum* L.)

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**Abstract**

A field experiment on influence of intercropping on the incidence of gram pod borer *H. armigera* (Hub.) and its natural enemies in chickpea (*Cicer arientinum* L.) was conducted at Entomology Research Farm, PGI, MPKV, Rahuri during Rabi 2019-20. Eight treatments intercrop with gram *Cicer arietinum* (L.) and its natural enemies in chickpea (*Cicer arientinum* L.) with mustard, coriander, linseed, oat, lentil, pea, wheat, sorghum and one sole crop of gram were evaluated. The result revealed that the treatment T1 (Chickpea+ Coriander) had the lowest (2.38 larvae/mrl) population. The maximum population (6.43 larvae/mrl) was observed in treatment T1 Chickpea sole crop. The mean percent parasitization of *C. chlorideae* was best influenced by intercrops. The treatment T3 (Chickpea+ Coriander) had highest (26.7%) parasitization by *C. chlorideae*. Significant lowest pod damage (15.50%) was recorded in the treatment T2 (Chickpea + Mustard). Regarding the economics of the intercropping system, the treatment T3 (Chickpea + Coriander) was found superior. It recorded the highest net return of Rs.68344/hectare.

**Keywords:** Chickpea, intercropping, gram pod borer, *Helicoverpa armigera*, sole crop

**Introduction**

Pulses are the important group which occupies a unique position among the food crops in the world of agriculture by virtue of their high protein content. Gram (*Cicer arietinum* Linnaeus) commonly called as ‘Chickpea’ or ‘Bengal gram’ is the most important pulse crop of India grown in *Rabi* season. It is a self-pollinated crop and belongs to the sub family Papilionaceae of the family Leguminaceae (Benthem and Hooker, 1970) with its probable origin in South West Asia i.e.in countries like Afghanistan and Persia. Pulses beside rich source of proteins, also enriched the soil by symbiotic nitrogen fixation. Due to their protein richness, pulses are the integral part of daily diet of the Indian people. In nutritional point of view, chickpea seeds contain protein (17.7%), lysine (0.49%) and methionine (0.11%) (Katiyar, 1982). In addition to this, it also carries 56.6% carbohydrates, ash, calcium, phosphorus, iron and vitamin B in considerable amount (Thakur, 1980). India is the largest producer of chickpea (*Cicer arietinum*) with 67 per cent of the global production and occupies nearly 31 percent of area in the country contributing over 37 per cent to the national pulse production (Reena et al., 2009). In 2017-18, chickpea was cultivated in about 106 lakh ha area in India. The country harvested a record production of > 111 lakh ton at the ever highest productivity level of 1056 kg/ha. As usual, Madhya Pradesh has contributed a significant 34% of the total gram area and 41% of total gram production in the country, thereby ranking first both in area and production. Maharashtra (18%) and Rajasthan (13%) were the next in terms of area. (Anonymous, 2018). Chickpea crop suffers a lot due to the attack of number of insect-pests. Among these Gram pod borer, *Helicoverpa armigera* (Hubner) (Lepidoptera: Noctuidae) is the most important pest of chick pea. *Helicoverpa armigera* (Hubner) causes up to 75 percent reduction in yield (Begum et al., 1992). On average about 30 to 40% pods are found to be damaged by the pod borer resulting in the yield loss of 400 kg/ha (Rahman, 1990). It is a polyphagous insect also known as American bollworm has become a pest of national importance in India, causing economic losses to several crops like chickpea, pigeon pea, cotton, tomatoes etc. (Sachan 1994).
The intercropping is economical method of pest management and has become popular, particularly among the small and marginal farmers. Intercrops in the study were chosen on the basis of their wide cultivation among small-holder farmers in the region. The possible success of these crops in ensuring profit and reducing damage by the pests of chickpea. The application of chemical insecticides and biological insecticide is the common method of controlling this pest on chickpea. *Helicoverpa armigera* develops resistance to almost all the insecticides used for its control.

Materials and method
The present experiment on “Influence of intercropping on the incidence of gram pod borer *H. armigera* (Hub.) and its natural enemies in chickpea (Cicer arietinum L.),” was conducted at Entomology Research Farm, Post Graduate Institute, Mahatma Phule Krishi Vidyapeeth, Rahuri during Rabi 2019-20. Field trial was laid out in randomized block design (RBD) with 4 replication and 9 treatments including chickpea sole crop to evaluate the efficacy of 8 intercrop i.e., mustard, coriander, linseed, oat, lentil, pea, wheat, sorghum against pod borer in chickpea they are intercrop with chickpea ‘Digvijay’ variety. Crop was raised in plot measuring 3.6 x 4m with spacing of 30 x 10 cm between rows and plant, respectively. Crop was raised according to all agronomic package of practices under irrigated condition except the plant protection measures. Pod borer infestation per plant was recorded at weekly intervals from the randomly tagged 5 places per metre row length starting from flowering to pod maturity from three replications. All the pods were counted from each plot and examined. The data on damaged (bored), healthy and total pods was recorded from each plot on number basis by examining the pods for *H. armigera* infestation. The percent pod damage was calculated using the following formula:

\[
\text{% Pod damage} = \frac{\text{Damaged pod}}{\text{Total pod}} \times 100
\]

Twenty larvae of third instar were collected at 10 days interval from 4th replication and bring to laboratory for examine the associated parasitoid with larvae of *H. armigera* (Hub.). The larvae were supplied with fresh green gram leaves every alternate day and were observed daily in the forenoon for any change/cocoon/pupal formation etc.

Result and Discussion
Influence of intercropping on the incidence *H. armigera* larval population
The effect of intercropping on the incidence of *H. armigera* in various weeks were recorded. The various intercrops were mustard, coriander, linseed, oat, pea, wheat and sorghum. Significant effect was found on the *H. armigera* larval population at the various days after sowing. The effect of inter cropping on the incidence of *H. armigera* (Hub.) in chickpea at the various day after sowing is presented in Table 1

35 Days after Sowing (DAS)
The minimum population of *H. armigera* (0.73 larvae/mrl) was found in the treatment T8 (Chickpea + Mustard) followed by treatment T1 (Chickpea + Coriander, 0.84 larvae/mrl). The treatment T1 (Chickpea sole crop) and T6 (Chickpea + Sorghum) was next better treatment (1.42 larvae/mrl and 1.45 larvae/mrl) respectively. The highest population of *H. armigera* (2.42 larvae/mrl) was found in the treatment T6 (Chickpea + wheat).

42 DAS
The minimum population of *H. armigera* (2.06 larvae/mrl) found in the treatments T2 (Chickpea + Mustard) and T3 (Chickpea + Coriander) and T6 (Chickpea + Lentil) which were at par with each other, followed by treatments T1 (Chickpea + Linseed, 2.78 larvae/mrl) and T9 (Chickpea + Sorghum, 3.27 larvae/mrl) respectively. The maximum population (4.03 larvae/mrl) was observed in treatment T1 (Sole Chickpea crop).

49 DAS
The minimum pest population (2.04 larvae/mrl) was found in the treatment T2 (Chickpea + Mustard) followed by the treatments T3 (Chickpea + Coriander, 2.09 larvae/mrl) and T9 (Chickpea + Linseed, 2.38 larvae/mrl) which were at par with each other. The maximum population was found (4.53 larvae/mrl) in the treatment T1 (Sole Chickpea crop), followed by the treatments T3 (Chickpea + Wheat, 4.31 larvae/mrl) and T5 (Chickpea + Oat, 4.01 larvae/mrl) respectively.

56 DAS
The minimum population of *H. armigera* (1.96 larvae/mrl) was found in the treatment T1 (Chickpea + Coriander), followed by the treatments T2 (Chickpea + Mustard, 2.05 larvae/mrl) and T5 (Chickpea + Sorghum, 3.35 larvae/mrl) respectively. The maximum population (5.52 larvae/mrl) was found in the treatment T1 (Sole Chickpea crop).

63 DAS
The minimum pest population (2.28 larvae/mrl) was found in the treatment T3 (Chickpea + Coriander), followed by the treatment T2 (Chickpea + Mustard, 2.48 larvae/mrl) respectively, which were at par with each other. The maximum population (5.42 larvae/mrl) was found in the treatment T1 (Sole Chickpea crop).

70 DAS
The maximum population of *H. armigera* (10.83 larvae/mrl) was recorded in the treatment T1 (sole chickpea crop). The treatments T7 (Chickpea + Pea, 7.06 larvae/mrl) and T9 (Chickpea + Wheat, 7.06 larvae/mrl) having maximum population of pest after T1 (Sole Chickpea crop) which were at par with each other. The minimum population (3.27 larvae/mrl) of *H. armigera* was observed in the treatment T3 (Chickpea + Coriander) followed by the treatment T2 (Chickpea + Mustard, 3.39 larvae/mrl).

77 DAS
The maximum population of *H. armigera* (12.50 larvae/mrl) was recorded in the treatment T1 (Sole chickpea crop) followed by the treatments T2 (Chickpea + Sorghum, 8.47 larvae/mrl) and T8 (Chickpea + Wheat, 8.44 larvae/mrl) which were at par with each other. The minimum population (3.88 larvae/mrl) of *H. armigera* was observed in the treatment T2 (Chickpea + Mustard) followed by the treatment T3 (Chickpea + Coriander, 4.00 larvae/mrl) which were at par which each other.

84 DAS
There is decline trend were recorded in the population of *H. armigera*. The minimum population (2.47 larvae/mrl) was
recorded in the treatment T2 (Chickpea + Mustard) followed by
the treatment T1 (Chickpea + Coriander, 2.69 larvae/mrl)
which were at par with each other. The maximum pest
population (7.78 larvae/mrl) were recorded in treatment T1
(Sole Chickpea crop).

91 DAS
The minimum pest population (2.26 larvae/mrl) was recorded
in the treatment T3 (Chickpea + Coriander) followed by
the treatment T2 (Chickpea + Mustard, 2.49 larvae/mrl) which
were at par with each other. The maximum population of H.
armigera (5.83 larvae/mrl) were recorded in the treatment T1
(Sole Chickpea crop).

It was concluded from the Table.1 that the intercropping of
chickpea with various other Rabi crops had significant effect
on the population of H. armigera. The statistical analysis of
the data showed that the overall mean minimum population
(2.38 larvae/mrl) was observed in the treatment T3 (Chickpea
+ Coriander), followed by T2 (Chickpea + Mustard, 2.40
larvae/mrl) which were at par with each other. The treatments
T4 (Chickpea + Linseed, 4.10 larvae/mrl), T5 (Chickpea + oat,
4.64 larvae/mrl) and T6 (Chickpea + Lentil, 4.02 larvae/mrl)
also were at par with each other. The treatments T7 (Chickpea
+ Pea, 4.60 larvae/mrl) and T9 (Chickpea + Sorghum, 4.55
larvae/mrl) were also at par with each other. The maximum
population (6.43 larvae/mrl) was observed in T1 (Sole
Chickpea crop) followed by T8 (Chickpea + Wheat) with
population 4.1 larvae/mrl.

Singh and Singh (1978) [12] found that, the intercropping
may affect the microclimate of the agro-ecosystem, which
ultimately produces an unfavorable environment for pest.
Saha et al., (2000) [11] found a general downward trend in
infestation level of different pest in intercrop combination
compared to their number in sole crop of preferred host. The
intercrops were found to be more suitable for natural
suppression of the pest population.

In the present investigation the minimum population of H.
armigera (2.38 larvae/mrl) was observed in the Treatment T3
(Chickpea + Coriander) followed by the Treatment T2
(Chickpea + Mustard). The maximum population (6.43
larvae/mrl) was observed in T1 (sole chickpea crop). These
results are coincide with those of Paras and Chakravorty
(2005) [7] who reported that, the chickpea intercropped with
coriander harboured the minimum population, and the damage
inflicted by the larvae as recorded in the same intercrop was
also the minimum among the various intercrops. Highest seed
yield was obtained in the chickpea intercropped with
coriander. Ghugal et al., (2013) [5] reported that, the
intercropping combinations i.e. chickpea + marigold (0.97
larvae/mrl), chickpea + mustard (1.08 larvae/mrl) and
chickpea + coriander (1.47 larvae/mrl) were the most
effective in suppressing larval population of H. armigera as
compared to sole chickpea which supports our findings.

Influence of intercropping on the incidence Campoletis
chloridea population
The effects of various intercrops on the parasitization of H.
armigera by C. chloridea were recorded and it is presented in
Table 2. It is revealed that the overall mean per cent
parasitization by C. chloridea on H. armigera which were
found to be the best affected by the intercropping of chickpea
with various other Rabi crops.

The overall mean maximum parasitization (26.7 %) was
observed in the treatment T3 (Chickpea + Coriander). The treatment T2 (Chickpea + Mustard) was second best treatment
(24.40 % parasitization) followed by the treatment T6
(Chickpea + Lentil, 21.65 %). The treatment T1 (Sole
Chickpea crop), T5 (Chickpea+ Linseed), T3 (Chickpea+
Oat), T8 (Chickpea + Wheat) and T6 (Chickpea + Sorgum)
was found 16.45%, 16.30 %, 14.00%, 14.9% and 16.7%
parasitization, respectively. The maximum parasitization
(12.15%) was observed in the treatment T7 (Chickpea + Pea).

The present investigations found that, the overall mean
maximum parasitization (26.7 %) was observed in the
Treatment T3 (Chickpea + Coriander), Turkar et al., (2000) [15]
studied the effect of intercropping of coriander with chickpea
on the activity of C. chloridea and recorded significantly
higher parasite activity as compared to sole chickpea, when
the coriander was sown within the rows of chickpea which
coincide with our results. Chandrashekhara et al., (2014) [4]
revealed that, the chickpea intercropped with coriander (4:2)
recorded significantly highest total of 24.44 and 8.89 per cent
parasitization by C. chloridea and tachnid fly respectively
from the H. armigera larvae which support our findings.

Effect on pod damage and grain yield
Intercropping of various other Rabi crops with chickpea also
affect the larval population of H. armigera which affect
the pod damage and yield which is presented in the Table 3. It
showed the effect of intercropping on the per cent pod
damage and the grain yield of chickpea under various
treatments. Significant effect was found in different
treatments.

The minimum pod damage (15.50 %) was observed in the
Treatment T2 (Chickpea + Mustard) with 23.13 q/ha chickpea
and 5.54 q/ha mustard yield. The treatment T1 (Chickpea +
Coriander) gave 16.63 % pod damage with 22.38 q/ha chickpea
and 5.62 coriander yield. In treatment T2 (Chickpea +
Linseed) there was 18.56 % pod damage and 19 q/ha chickpea
and 6.51 q/ha Linseed yield, which were at par with each
other. In treatment T3 (Chickpea + oat) had 25.64 % pod
damage with 18.50 q/ha chickpea and 1.38 q/ha Oat yield. T7
(Chickpea + Lentil) had 19.92 % pod damage with 19.5 q/ha
chickpea and 5.54 q/ha Lentil yield. In treatment T7
(Chickpea + Pea) had 19.63 % pod damage with 19.75 q/ha
chickpea and 7.1 q/ha Pea yield. In treatment T7 (Chickpea +
Wheat) had 24.69 % pod damage with 18.5 q/ha chickpea and
3.55 q/ha wheat yield. In treatment T9 (Chickpea + Sorgum)
had 19.19 % pod damage with 21 q/ha chickpea and 5.54 q/ha
Sorgum yield. The maximum pod damage 29.25% was
observed in the sole chickpea crop giving 16.13 q/ha yield.

The present investigations found that, the minimum pod
damage (15.50 %) was observed in the treatment T2
(Chickpea + Mustard) with 23.13 q/ha chickpea and 5.54 q/ha
mustard yield, followed by the treatment T3 (Chickpea +
Coriander) gave 16.63 % pod damage with 22.38 q/ha chickpea
and 5.62 coriander yield. Tripathi and Sharma (2008) [14]
found highest yield increase in chickpea + mustard
followed by chickpea + barley and chickpea + wheat which
support our findings. Reena et al., (2009) [9] reported that,
the highest chickpea equivalent grain yield was recorded in
chickpea + mustard (6:2) during both the seasons followed
by chickpea + barley (4:2) during Rabi 2004-05 and chickpea +
linseed / chickpea + coriander (4:2) during 2006-07. Pod
damage by H. armigera was highest in chickpea sole crop
which coincide with our results.

Economics of intercropping in chickpea
Intercropping gives extra yield from different intercrops than
sole chickpea crop which gives increased production over sole
crop presented in Table 4. It showed that, the chickpea yield influenced by the intercropping effectively. Due to combination of various intercrops i.e. mustard, coriander, linseed, oat, lentil, pea, wheat and sorghum there being much variation in the net return per hectare. The net returns ranged from Rs 15041/ha to Rs 68344/ha. The lowest net return i.e. Rs 15041/ha was recorded in the treatment T3 (Chickpea + Oat) and the highest net return was Rs. 68344/ha in the treatment T3 (Chickpea + Coriander), followed by treatment T2 (Chickpea + Mustard), T7 (Chickpea + Pea) and T4 (Chickpea + Linseed) with 52347, 41440 and 36461 Rs/ha, respectively. Waseem et al., (2017) [16] reported that among the all treatment highest cost benefit ratio was recorded in Chickpea + Coriander (1:2.93) which coincide with our results.

Table 1: Effect of intercropping on the incidence of H. armigera (Hub.) in chickpea

| Treatments                  | Number of Larvae/Meter row length (Days after sowing) |
|-----------------------------|------------------------------------------------------|
|                             | 35   | 42   | 49   | 56   | 63   | 70   | 77   | 84   | 91   | Mean |
| T1 (Sole Chickpea Crop)     | 1.42 | 1.56 | 1.42 | 1.47 | 1.52 | 1.52 | 1.52 | 1.52 | 1.52 | 1.52 |
| T2 (Chickpea + Mustard)     | 2.06 | 1.75 | 2.06 | 1.75 | 2.05 | 1.75 | 2.05 | 1.75 | 2.05 | 1.75 |
| T3 (Chickpea + Coriander)   | 2.05 | 1.75 | 2.05 | 1.75 | 2.05 | 1.75 | 2.05 | 1.75 | 2.05 | 1.75 |
| T4 (Chickpea + Linseed)     | 2.28 | 2.12 | 2.28 | 2.12 | 2.28 | 2.12 | 2.28 | 2.12 | 2.28 | 2.12 |
| T5 (Chickpea + Oat)         | 2.62 | 2.18 | 2.62 | 2.18 | 2.62 | 2.18 | 2.62 | 2.18 | 2.62 | 2.18 |
| T6 (Chickpea + Lentil)      | 1.75 | 1.66 | 1.75 | 1.66 | 1.75 | 1.66 | 1.75 | 1.66 | 1.75 | 1.66 |
| T7 (Chickpea + Pea)         | 1.61 | 1.61 | 1.61 | 1.61 | 1.61 | 1.61 | 1.61 | 1.61 | 1.61 | 1.61 |
| T8 (Chickpea + Wheat)       | 2.42 | 2.30 | 2.42 | 2.30 | 2.42 | 2.30 | 2.42 | 2.30 | 2.42 | 2.30 |
| T9 (Chickpea + Sorghum)     | 1.45 | 1.57 | 1.45 | 1.57 | 1.45 | 1.57 | 1.45 | 1.57 | 1.45 | 1.57 |
| Sem                         | 0.07 | 0.07 | 0.07 | 0.07 | 0.07 | 0.07 | 0.07 | 0.07 | 0.07 | 0.07 |
| C.D. at 5%                  | 0.20 | 0.24 | 0.24 | 0.24 | 0.24 | 0.24 | 0.24 | 0.24 | 0.24 | 0.24 |

Parenthesis are transformed values based on √ x + 1

Table 2: Per cent parasitization by C. chloridea in different intercrops

| Treatments                  | Number of C. chloridea/20 larvae |
|-----------------------------|----------------------------------|
|                             | 4th | 5th | 6th | 7th | 8th | Mean |
| T1 (Sole Chickpea crop)     | 21.50 (27.62) | 10.50 (18.43) | 30.50 (33.52) | 0.00 (0.00) | 20.25 (26.74) | 16.45 (23.93) |
| T2 (Chickpea + Mustard)     | 25.30 (30.33) | 14.00 (21.97) | 20.50 (26.92) | 30.50 (33.52) | 31.5 (34.14) | 24.40 (29.60) |
| T3 (Chickpea + Coriander)   | 30.75 (33.68) | 20.50 (26.92) | 21.50 (27.62) | 39.75 (39.09) | 21.00 (27.27) | 26.70 (31.11) |
| T4 (Chickpea + Linseed)     | 10.50 (18.91) | 19.75 (26.39) | 9.75 (18.19) | 21.00 (27.27) | 20.50 (26.92) | 16.30 (23.81) |
| T5 (Chickpea + Oat)         | 0.00 (0.00) | 19.00 (25.84) | 19.75 (26.39) | 10.50 (18.91) | 20.75 (27.10) | 14.00 (21.97) |
| T6 (Chickpea + Lentil)      | 20.00 (26.57) | 10.75 (19.14) | 21.5 (27.62) | 30.50 (33.52) | 25.30 (30.33) | 21.65 (27.73) |
| T7 (Chickpea + Pea)         | 10.00 (18.43) | 10.75 (19.14) | 9.75 (18.19) | 30.25 (33.37) | 0.00 (0.00) | 12.15 (20.40) |
| T8 (Chickpea + Wheat)       | 21.50 (27.62) | 21.50 (27.62) | 10.75 (19.14) | 0.00 (0.00) | 20.75 (27.10) | 14.9 (22.71) |
| T9 (Chickpea + Sorghum)     | 20.50 (26.92) | 10.50 (18.91) | 11.00 (19.37) | 20.75 (27.10) | 20.75 (27.10) | 16.70 (24.12) |

Figures in parentheses are angular transformed values

Table 3: Damaged pods (%) by H. armigera and grain yield (q/ha) of chickpea

| Treatment                  | Pod Damage (%) | Grain yield (q/ha) |
|---------------------------|----------------|-------------------|
| Chickpea                  | Intercrop      | Chickpea          |
| T1 (Sole chickpea crop)   | 29.25 (32.74)  | 16.31             |
| T2 (Chickpea + Mustard)   | 15.50 (23.18)  | 23.13             |
| T3 (Chickpea + Coriander) | 16.63 (24.06)  | 22.38             |
| T4 (Chickpea + Linseed)   | 18.56 (25.52)  | 6.51              |
| T5 (Chickpea + Oat)       | 25.64 (30.42)  | 18.50             |
| T6 (Chickpea + Lentil)    | 19.92 (26.51)  | 19.50             |
| T7 (Chickpea + Pea)       | 19.63 (26.30)  | 7.1               |
| T8 (Chickpea + Wheat)     | 24.69 (29.79)  | 18.50             |
| T9 (Chickpea + Sorghum)   | 19.19 (25.98)  | 21                |
| SEm                       | 0.80           | 0.65              |
| C.D. at 5%                | 2.34           | 1.90              |

Figures in parentheses are angular transformed values

Table 4: Economics of different intercropping systems

| Treatments                  | Yield q/ha | Chickpea | Intercropping |
|-----------------------------|------------|----------|---------------|
| T1 (Sole chickpea crop)     | 16.13      | 7969     |
| T2 (Chickpea + Mustard)     | 23.13      | 5.44     |
| T3 (Chickpea + Coriander)   | 22.38      | 131956   |
| T4 (Chickpea + Linseed)     | 19.00      | 5.21     |
| T5 (Chickpea + Oat)         | 18.50      | 4.16     |
| T6 (Chickpea + Lentil)      | 19.50      | 4.81     |
| T7 (Chickpea + Pea)         | 19.75      | 5.16     |

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Table 1: Net return (Rs/q) of intercrop, sale price (MSP) and its percentage to the sole crop

| Inter作物 | Net return (Rs/q) | Sale price (MSP) | Percentage to sole crop |
|-----------|------------------|-----------------|------------------------|
| Chickpea + Wheat | 23.13 | 2025 | 655 |
| Chickpea + Sorghum | 18.50 | 1925 | 4800 |

Sale price (Linseed –4500 Rs/q, Coriander –7500 Rs/q, Lentil – 4800 Rs/q, Pea – 4800 Rs/q, Chickpea – 4875 R/q, Wheat – 1925 Rs/q, Mustard – 4425 Rs/q, Oat –3000 Rs/q, Sorghum – 2550 Rs/q). (Sale price (Chickpea, mustard, lentil, wheat and jowar) as per MSP of 2019-20.)

Fig 1: Damaged pods (%) by *H. armigera* and grain yield (q/ha) of chickpea in intercropping

**Conclusion**

In parasitization of *H. armigera* by *C. chlorideae*, all the intercrops were superior to the sole chickpea crop. Coriander was effective intercrop in encouraging the activity of *C. chlorideae*, followed by mustard and lentil. In Intercropping maximum yield (23.13 q/ha) of chickpea was obtained from Chickpea + Mustard. The average pod damage recorded ranged between 15.50 to 29.25 %. The maximum net return was obtained from Chickpea + Coriander.

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