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Effect of Pest Incidence Before timely sowing and timely sowing on Chickpea (*Cicer arietinum* L.)

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Abstract

Chickpea (*Cicer arietinum* L.), also known as Bengal grams or grams, is the second most important legume in Asia, North Africa, and Mexico. More recently, it has also become an important legume crop in the northern United States, Canada, and Australia. It is grown on an average of 13,544,400 hectares worldwide. 8.8 million tons produced. India is the largest producer of chickpeas in the world with a share of at 71.0 and 67.2% of the total area (9th place) 6 million hectares) and production (8.8 million hectares) and (FAOSTAT, 2013) [5]. Several biotic and abiotic constraints limit chickpea production and productivity, and pests are a major constraint for increasing chickpea production and productivity (Sharma 2005 and Yadav *et al.*, 2006. Sharma *et al.*, 2011) [13-14, 19]. Five chickpea genotypes resistant – RVSSG – 63, RVSSG 8102, Pusa Chickpea Manav, CG Lochan Chana, H 12-55 commercial cultivars were sown across four planting dates between October - January at monthly intervals during 2022 - 23 post rainy seasons under field conditions. The experiment was laid out in randomized block design (RBD) with three replications for each genotype, in a plot of six rows 3 m long (with a spacing of 60 cm between the rows and 10 cm between plants with in a row). Data were recorded one meter row length. At Seven days intervals in each planting. The incidence of *Helicoverpa armigera* (Hubner) larvae was highest in the crop sown in October (52.47 larvae per meter row length) in RVSSG 8102. Lowest in the December sown crop (14.46 larvae per meter row length) in RVSSG 63. In the 2022 – 23 cropping season. The interaction effects were significant. Second Highest number of *Helicoverpa armigera* (Hubner) larvae were recorded on CG Lochan chana (44.13 larvae per meter row length), followed by H12-55 (14.52 larvae per meter row length) and RVSSG 63 (8.60 larvae per meter row length). The lowest incidence of *Helicoverpa armigera* (Hubner) larvae was recorded in H12-55 (5.52 larvae per meter row length).

Keywords: Chickpea, Bengal grams, *Cicer arietinum* L

Introduction

Chickpea (*Cicer arietinum* L.), also known as Bengal grams or grams, is the second most important legume in Asia, North Africa, and Mexico. More recently, it has also become an important legume crop in the northern United States, Canada, and Australia. It is grown on an average of 13,544,400 hectares worldwide. 8.8 million tons produced. India is the largest producer of chickpeas in the world with a share of at 71.0 and 67.2% of the total area (9th place) 6 million hectares) and production (8.8 million hectares) and (FAOSTAT, 2013) [5]. Several biotic and abiotic constraints limit chickpea production and productivity, and pests are a major constraint for increasing chickpea production and productivity (Sharma 2005 and Yadav *et al.*, 2006. Sharma *et al.*, 2011) [13-14, 19]. Losses from pest damage are likely to increase as a result of changing cropping patterns and global warming. One of the main constraining factors in chickpea production is his *Helicoverpa armigera* (Hubner), a pod borer (Sharma, 2005) [13-14]. Its population peak generally corresponds to the full bloom and pod formation stage of the post-rainy season harvest. Temperature, relative humidity (Yadava and Lal 1988, Yadava *et al.*, 1991) [20, 21], precipitation (Tripathi and Sharma 1985) [18], predators (Thakur *et al.*, 1995, Gunathilagaraj 1996) [17, 6], and parasites (Bhatnagar 1980, Srinivas *et al.* Jayaraj 1989, Thakur *et al.*, 1995) [4, 16,], Chickpea *Helicoverpa armigera* (Hubner). Information on the occurrence of pests under field conditions over sowing days can be used to assess the impact of pest occurrences on grain yield. Therefore, we examined the effects of climatic factors on pest incidence and grain yield for his five genotypes of chickpea.

Materials and Method

Five chickpea genotypes resistant – RVSSG – 63, RVSSG 8102, Pusa Chickpea Manav, CG Lochan Chana, H 12-55 commercial cultivars were sown across four planting dates between October - January at monthly intervals during 2022 - 23 post rainy seasons under field conditions. The experiment was laid out in randomized block design (RBD) with three replications for each genotype, in a plot of six rows 3 m long (with a spacing of 60 cm between the rows and 10 cm between plants with in a row). Data were recorded one meter row length. At Seven days intervals in each planting.

Result and Discussion

Number of larvae/meter row length on different genotypes of chickpea

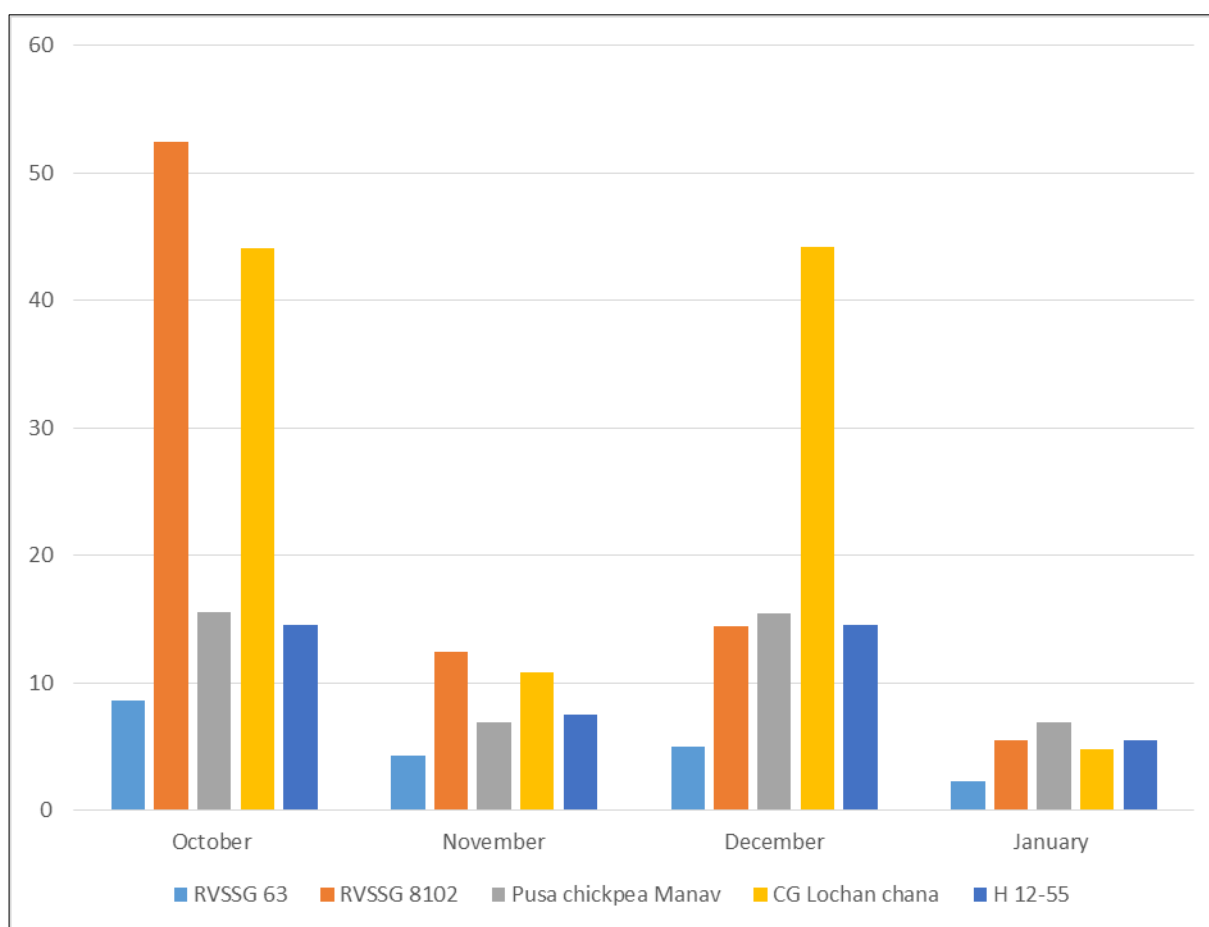
The incidence of *Helicoverpa armigera* (Hubner) larvae was highest in the crop sown in October (52.47 larvae per meter row length) in RVSSG 8102, and lowest in the December sown crop (14.46 larvae per meter row length) in RVSSG 63. In the 2022 – 23 cropping season, the incidence of *Helicoverpa armigera* (Hubner) was quite high in the crop

sown in November (12.47 larvae per meter row length) in RVSSG 8102, January (6.85 larvae per meter row length), and lowest (2.27 larvae per meter row length). Across seasons, the incidence of *Helicoverpa armigera* (Hubner) declined as the sowing date was advanced from October (44.13 larvae per meter row length) in CG Lochan chana to December (15.49 larvae per meter row length) Pusa Chickpea Manav, but decreased in the January sown crop (4.80 larvae per meter row length) in CG Lochan chana. Presented in Table 01 & Graph 01.

There were significant differences in numbers of *Helicoverpa armigera* (Hubner) larvae across genotypes in both the seasons, but the interaction effects were significant. Second Highest number of *Helicoverpa armigera* (Hubner) larvae were recorded on CG Lochan chana (44.13 larvae per meter row length), followed by H12-55 (14.52 larvae per meter row length) and RVSSG 63 (8.60 larvae per meter row length). The lowest incidence of *Helicoverpa armigera* (Hubner) larvae was recorded in H12-55 (5.52 larvae per meter row length), followed by RVSSG 8102 (5.47 larvae per meter row length). Presented in table 01 & Graph 01.

Table 1: Insect activity on different month on different genotypes/ Cultivars.

S. No.	Genotype/ Cultivars	October	November	December	January
1	RVSSG 63	8.60	4.27	4.95	2.27
2	RVSSG 8102	52.47	12.47	14.46	5.47
3	Pusa chickpea Manav	15.52	6.85	15.49	6.85
4	CG Lochan chana	44.13	10.80	44.21	4.80
5	H 12-55	14.52	7.52	14.55	5.52
	CD	6.00	3.40	5.70	1.80
	SEm	1.84	1.04	1.75	0.55



Graph 1: Insect activity on different month on different genotypes/ Cultivars.

Discussion

The incidence of *Helicoverpa armigera* (Hubner) larvae was highest in the crop sown in October (52.47 larvae per meter row length) in RVSSG 8102, and lowest in the December sown crop (14.46 larvae per meter row length) in RVSSG 63. In the 2022 – 23 cropping season, the incidence of *Helicoverpa armigera* (Hubner) was quite high in the crop sown in November (12.47 larvae per meter row length) in RVSSG 8102, January (6.85 larvae per meter row length), and lowest (2.27 larvae per meter row length). Across seasons, the incidence of *Helicoverpa armigera* (Hubner) declined as the sowing date was advanced from October (44.13 larvae per meter row length) in CG Lochan chana to December (15.49 larvae per meter row length) Pusa Chickpea Manav, but decreased in the January sown crop (4.80 larvae per meter row length) in CG Lochan chana. Similar finding Shankar *et al.*, (2014) [12] reported that numbers of *Helicoverpa armigera* (Hubner) larvae were maximum on ICC 3137 at the vegetative, flowering and podding stages in both the seasons, while ICCL 86111 harboured the lowest numbers of *Helicoverpa armigera* (Hubner) larvae. More *Helicoverpa armigera* (Hubner) moths were trapped during March to April (Mahapatra *et al.*, 2007) [7], and November sown crops suffered less pod damage than that sown in December (Prasad *et al.*, (1989; Begum *et al.*, 1992) [10, 3]. Delayed sowing of chickpea is risky under rainfed conditions due to inadequate stored soil moisture, and increased risk of damage by *Helicoverpa armigera* (Hubner). (Prasad and Singh 1997) [9]. Oviposition by *Helicoverpa armigera* (Hubner) was low in the crop sown between December to Mid-February due to cold conditions in Pakistan (Shah and Shahzad, 2005) [11], whereas Ali *et al.*, (2009) [1] observed that the numbers of eggs laid.

There were significant differences in numbers of *Helicoverpa armigera* (Hubner) larvae across genotypes in both the seasons, but the interaction effects were significant. Second Highest number of *Helicoverpa armigera* (Hubner) larvae were recorded on CG Lochan chana (44.13 larvae per meter row length), followed by H12-55 (14.52 larvae per meter row length) and RVSSG 63 (8.60 larvae per meter row length). The lowest incidence of *Helicoverpa armigera* (Hubner) larvae was recorded in H12-55 (5.52 larvae per meter row length), followed by RVSSG 8102 (5.47 larvae per meter row length). Similar finding the *Helicoverpa armigera* (Hubner) larval population was high in early sown crops (October 15th to November 1st) than in and delayed sowings (November 1st to 30th) (Anwar *et al.*, 1994) [2]. The genotypic response to damage by *Helicoverpa armigera* (Hubner) varies across seasons and locations (Sharma *et al.*, 2003). The genotypes (ICC 506EB, ICC 12476, ICC 12477, ICC 12478 and ICC 12479) that are not preferred for oviposition also suffer low leaf damage by *Helicoverpa armigera* (Hubner) (Narayanamma *et al.*, 2007) [8].

Conclusion

1. The incidence of *Helicoverpa armigera* (Hubner) larvae was highest in the crop sown in October (52.47 larvae per meter row length) in RVSSG 8102.
2. Lowest in the December sown crop (14.46 larvae per meter row length) in RVSSG 63. In the 2022 – 23 cropping season.
3. The interaction effects were significant. Second Highest number of *Helicoverpa armigera* (Hubner) larvae were recorded on CG Lochan chana (44.13 larvae per meter row length), followed by H12-55 (14.52 larvae per meter

row length) and RVSSG 63 (8.60 larvae per meter row length).

4. The lowest incidence of *Helicoverpa armigera* (Hubner) larvae was recorded in H12-55 (5.52 larvae per meter row length).

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