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## Investigation on egg hatching percent of fall armyworm in different genotypes of maize crop

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### Abstract

This study aimed to evaluate the egg hatching percent of fall armyworm, *Spodoptera frugiperda* (Lepidoptera: Noctuidae) in different genotypes of maize crop, which was conducted under controlled conditions ( $25 \pm 1$  °C and 70% RH) at College of Agriculture, IGKV, Raipur (C.G.). The experiment was evaluated by maintaining the nuclear culture of *Spodoptera frugiperda* in three different genotypes viz. hybrid corn (PRO-4212), fodder maize (African tall) and sweet corn (Sugar-75) of maize crop and the egg masses were collected from each treatment separately. Among three genotypes of maize crop the maximum of egg hatching percentage was noted in hybrid corn i.e. 91.12 to 96.46 percent with an average of  $94.08 \pm 1.10$  percent followed by Sweet corn i.e. 87.60 to 95.42 with an average of  $93.16 \pm 1.43$  percent.

**Keywords:** Bio-control, hatching percent, nucleus culture, *Spodoptera frugiperda*

### Introduction

Maize, *Zea mays* L. is a member of the family Poaceae. Maize which is also known as corn is one of the most flexible growing crop with better adaptability to various agro-climatic conditions. Because of superior genetic yield potential among the cereals, this crop is globally admired as the “Queen of cereals” [6]. Maize contains approximately 72 percent of starch, 10 percent of protein, and 4 percent of fat [4]. The United States produces about 40 percent of the world's total harvest of maize; while other top producing countries comprises China, Brazil, Mexico, Indonesia, India, France and Argentina etc. In past few years a novel pest, fall armyworm became a persistent challenge across the world in production of maize. However, the relatively high injury by fall armyworm is sporadically reported [9].

Fall armyworm, *Spodoptera frugiperda* (J. E. Smith) (Lepidoptera: Noctuidae) is native to tropical and subtropical regions of the Americas and was first time reported from the African continent, in Nigeria, Sao Tomé, Benin and Togo region [5]. In India, it was first of all reported in the research fields of maize at the University of Agricultural and Horticultural Sciences, Shivamogga, Karnataka [7]. In Chhattisgarh *Spodoptera frugiperda* was first reported at maize farm of IGKV, Raipur [3].

In maize, fall armyworm attacks in every stages of the late planted maize crop along with causing defoliation, resulting grain injury and later reduces quantity and quality of yield [8]. The current studies conducted by Center for Agriculture and Bioscience International (CABI), was completed in 12 maize-producing African countries resulted that with no appropriate management, FAW can cause maize yield losses ranging from 8 to 21 million tonnes. For the successful management of the pest, there is a need to know about the biology of each stages (viz. Egg, Larva, Pupa and Adult) of the pest [2]. The more we know about the pest, more likely we will able to control them efficiently. So, keeping all these in view, a study is being proposed with the objective of investigation on egg hatching percent of fall armyworm in different genotypes of maize crop.

### Materials and methods

Under this objective the larvae of fall armyworm, *S. frugiperda* were collected from the various fields of maize crop of IGKV, Raipur and the nucleus culture was maintained at Bio-control laboratory, Department of Entomology, IGKV, Raipur (Chhattisgarh). For the maintenance of nuclear culture, leaves of three different genotypes of maize crop i.e. hybrid maize (PRO-4212), fodder maize (African tall) and sweet corn (Sugar-75) were used and the egg masses were collected from each treatment separately.

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Hatching percent of fall armyworm, *S. frugiperda* on various genotypes of maize crop were carried out in completely randomized block design replicated five times under laboratory controlled conditions at an average temperature of  $25 \pm 1^\circ\text{C}$ .

For investigation of hatching percent of *S. frugiperda* on different genotypes of maize crop, fresh leaves of fodder corn (African tall), sweet corn (Sugar 75) and hybrid corn (PRO-4212) were collected from the fields and brought into the Bio-control laboratory of Department of Entomology, IGKV, Raipur (C.G.). The experiment was conducted by using petri dishes. Each replication was performed by using a bunch of ten eggs. Data were carefully observed for hatching percent of egg of *S. frugiperda*.

### Observation and Analysis

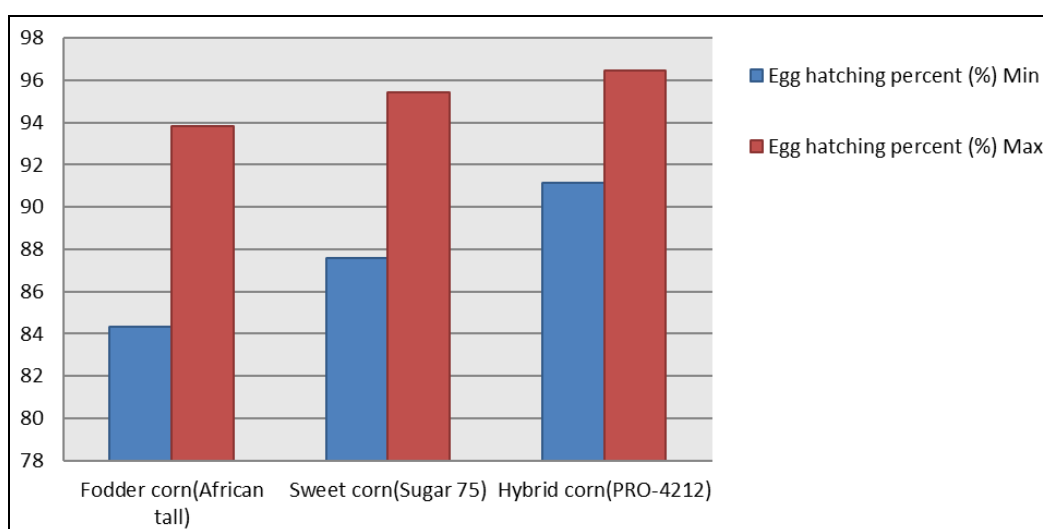
The observations were taken by counting the number of larvae, hatched out from the eggs at proper interval. The data

were subjected without transformation and statistically analysed with CRD using OPSTAT.

$$\text{Egg hatching percent (\%)} = \frac{\text{No. of larvae emerged from hatched eggs}}{\text{Total number of eggs}} \times 100$$

### Results and Discussion

The egg hatching percentage in *S. frugiperda* five sets of ten eggs for each genotype of maize *viz.* fodder corn, sweet corn and hybrid corn were observed. In fodder corn minimum and maximum hatching percentage was 84.34 and 93.85 percent, respectively with an average of  $87.89 \pm 1.74$  percent. In sweet corn the minimum and maximum hatching percentage was 87.60 and 95.42 percent, respectively with an average of  $93.16 \pm 1.43$  percent. In hybrid corn the minimum and maximum hatching percentage was 91.12 and 96.46 percent, respectively with an average of  $94.08 \pm 1.10$  percent. (Table 1).



**Fig 1:** Egg hatching percentage of *S. frugiperda* on different genotypes of maize crop

**Table 1:** Egg hatching percentage of *S. frugiperda* on specific genotypes of maize crop

S.N.	Genotypes	Egg hatching percent (%)		
		Min	Max	Mean $\pm$ SE
1	Fodder corn(African tall)	84.34	93.85	$87.89 \pm 1.74$
2	Sweet corn(Sugar 75)	87.6	95.42	$93.16 \pm 1.43$
3	Hybrid corn(PRO-4212)	91.12	96.46	$94.08 \pm 1.10$
	SE (m) $\pm$			1.451
	CD (5%)			4.52

The present findings confirm that the maximum egg hatching percent of fall armyworm, *S. frugiperda* was reported in hybrid corn (Fig.1). However, average egg hatching percent of *S. frugiperda* was reported  $76.81 \pm 1.13$  percent on corn crop [1]. Other works related to egg hatching percent of *S. frugiperda* are not yet done.

### Conclusion

The present findings confirm that the maximum egg hatching percent of fall armyworm, *S. frugiperda* was reported in hybrid corn (Fig.1). However, average egg hatching percent of *S. frugiperda* was reported  $76.81 \pm 1.13$  percent on corn crop [1]. These results are in agreement where egg hatching was about 96 per cent when fall armyworm larvae reared on CP 818 maize hybrid [10].

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