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Field carryover of Angoumois grain moth, *S. cerealella* in paddy

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Abstract
The present investigation was conducted to find out the field infestation of *S. cerealella* during the year 2021-2022 and 2022-23. The result showed that during the year 2020-21, fifty-three samples were collected from the field and out of them thirty-three (62.26%) were found infested by the pest. While during 2022-23 Forty-eight sample was collected among them thirty-four sample was infested by pest (70.83%). As a result, the *S. cerealella* infestation began in the field and spread to the godown, where it developed.

Keywords: Rice, store grain pest, Angoumois grain moth, infestation, field carryover

Introduction
Rice (*Oryza sativa*) is the most important cereal food crop of India. It occupies about 23.3 percent of gross cropped area of the country. It plays vital role in the national food grain supply. Rice contributes 43 percent of total food grain production and 46 percent of the total cereal production of the country.

Due to cultivation and introduction of high yielding varieties, modern mechanisation of farming technology and improved irrigation management, the green revolution has not reached the anticipated success. Food grains after harvest are stored for shorter or longer periods in different traditional and primitive storage structures, where colossal losses occur both in terms of quality and quantity. Certain abiotic and biotic factors are responsible for such storage losses. Amongst abiotic factors, temperature, grain moisture and relative humidity are responsible for such losses. Insects, rodents, birds and microorganisms are the biotic factors causing enormous losses in stored foodgrains. Insects, infest the crops and cause damage both in the field and in storage (Usman, 1957) [1]. In India, according to an expert committee 9.33 percent of the total food grains produced are lost during post-harvest operations, of which 1.68 percent is at the threshing yard, 0.15 percent in transport, 0.92 percent in processing and 6.58 percent in storage.

In India, the annual storage losses were estimated as 14 million tonnes of food grains worth $16,000 million every year. Out of this, food grain losses due to insects alone account for a monetary loss of $ 300 million (Mohan and Kavitharaghavan, 2008) [2]. During storage, paddy is highly vulnerable to infestation by a variety of insect pests and diseases. Angoumois grain moth (AGM), *S. cerealella* would certainly rank high among stored grain pest species. The Angoumois grain moth (*S. cerealella*) is a species of the Gelechiidae moth family, commonly referred to as the "rice grain moth".

It is most commonly associated as a pest of field and stored cereal grains as they burrow within the kernel grains of crop plants, rendering them unusable for human consumption. By laying eggs between the grains themselves and hatching at a later time, often during the processing, transportation or storage stages, the moth can be transported to households or countries presently free of Angoumois grain moth infestations. The pest is cosmopolitan in distribution. Fletcher and Ghosh (1919) [3] first reported its occurrence on ripening paddy in the field in India, which was subsequently confirmed by several workers that the grain moth infests the grains in the field itself and later becomes established in storage (Usman, 1957) [1]. It is carried over from field to the stores through the field infested grains. Only larval stage of this pest is destructive. Because of the importance of the Angoumouis grain moth, the present investigation is being conducted to determine the extent of the *S. cerealella* infection in the field. An information on the extent and duration of field infestation of S. cerealella during the milk to maturity phase of grains will be helpful in adopting management strategies to

their carryover to storage.

Materials and Methods

To assess the field infestation of *S. cerealella* in paddy, matured panicles were collected from various paddy fields and threshed separately field wise to prepare 250 gram of grain sample from each field. The samples were filled in polythene bags of the size 20 x 20 cm. The bags were sealed by pins keeping enough space above the grain level in the bags. The bags were kept in laboratory for the emergence of adults from field infestation, if any. The number of moths emerged from each sample was recorded and removed daily from the bags till emergence of the adults stopped. The intensity of infestation was judged on the basis of total number of moths emerged from each sample

Result and Discussion

The field infestation of *S. cerealella* was studied during kharif season of 2021-2022 and 2022-23. The results are presented in Table 1 showed that during the year 2020-21, fifty-three samples were collected from the field and out of them thirty-three (62.26%) were found infested by the pest. The mean number of adults emerged per sample of 250 g grain ranged between 2 (variety Jaya) to 6 (Kolam) while during 2022-23 Forty-eight sample was collected among them thirty-four sample was infested by pest (70.83%). The intensity of moth emergence varied from 2 on Vadakolam to 8 on Mathura.

The pooled data (Table 1) showed that 66.33 percent of the samples were found to be infested in field. The Infestation was recorded in all the ten varieties taken for study. The highest age of samples (75.00 %) was found infected in variety Kolam, while the lowest (44.44 %) infestation was found in IR -28 variety. The number of adults emerged per infested sample was found to be the highest in variety Kolam, Wada, Mathura and Gurjari, (5 adults) and it was lowest in IR 28 (3 adults) among the varieties collected.

Table 1: Field infestation of *S. cerealella in* Paddy

		2021-2022			2022-2023			Pooled				
Sr. No	**Variety**	**No. of sample collected**	**No. of infested sample**	**Av.no of adult emerged**	**No. of sample collected**	**No. of infested sample**	**Av.no of adult emerged**	**No. of sample collected**	**No. of infested sample**	**age of infested sample**	**No. of adult emerged**	**Average**
1	Jaya	3	2	2	3	2	6	6	4	66.66	3-8	4
2	Gurjari	5	4	3	4	3	6	9	7	77.78	2-10	5
3	Wada	10	6	4	5	4	5	15	10	66.67	1-8	5
4	Daptri	4	2	3	6	4	5	10	6	60.00	2-8	5
5	Ratna	6	5	4	5	3	5	11	8	72.72	3-8	4
6	Vadakolam	4	2	3	4	2	2	8	4	50.00	1-8	4
7	Mathura	6	4	5	5	4	8	11	8	72.72	3-12	5
8	Kolam	6	4	6	6	5	7	12	9	75.00	2-9	5
9	Masuri	3	2	4	7	5	7	10	7	70.00	4-12	4
10	IR-28	6	2	5	3	2	7	9	4	44.44	7-12	3
	Total	53	33 (62.26 %)	39	48	34 (70.83%)	58	101	67 (66.33 %)	65.59	1-12	88

Discussion

S. cerealella field incidence in paddy fields has already been documented by many scientists. A field infestation of 0.26 percent at harvest could lead to a total loss in storage (Simmons and Ellington, 1927) [4]. Cotton (1956) [5] reported that initial infestation of maize in the field involves only a small age of grain by *S. cerealella*. Small amount of infestation in the field, which carried to storage, causes severe damage and loss in the store. The infestation of the pest in paddy field was also reported in Madhya Pradesh by Kittur and Patel (1972) [6], in Punjab by Singh *et al*. (1978) [7], in Karnataka by Sundararaj and Sundararajan (1990) [11] and in Tamil Nadu by Dakshinamurthy and Ragupathy (1988) [8]. Nageswaran (1993) [9] investigated the field incidence of *S. cerealella* on different paddy varieties in Thanjavur district, Tamil Nadu.

Sangeetha *et al*. (2013) [10] observed the field incidence of *S. cerealella* on different grain varieties of paddy, thus more or less in accordance with the present findings where the infestation of *S. cerealella* starts from the field and moved to the godown.

Conclusion

Thus, it can be concluded that the infestation of *S. cerealella* was started from the field level. Higher the level of field incidence, greater will be the storage loss. So, knowledge about that field incidence of *S. cerealella* will be useful in taking up proper prophylactic measures to reduce the loss in storage. Before the rice crop is harvested, infestation of the Angoumois grain moth begins in the field.

References

1. Usman S. Stored insect pests come from field, Mysore. Agric. J. 1957;15:6-10.
2. Mohan S, Kavitharaghavan Z. Studies on the popularization of TNAU stored product insect management kit technology. Green Farming. 2008;46:53.
3. Fletcher TB, Ghosh CC. Annotated list of Indian crop pests, Proc. Entomol. Meet. Pusa. 1919;2:720.
4. Simmons P, Ellington GW. Dispersion of Angoumois grain moth to wheat fields. J Agric. Res. 1927;34(5):459-467.
5. Cotton RT. Pests of Stored Products. Burgess, U. S. A. 1956, 306 pp.
6. Kittur SU, Patel RK. Preference of *Sitotroga cerealella* (Oliv.) to rice varieties during storage. Ind J agric. Sci. 1972;42(7):621-622.
7. Singh KN, Agrawal RK, Srivastava PK. Infestation of grain moth, *S. cerealella* (Oliv.) and maize weevil, *S. zeamais* Mots on standing crops in the field. Bull. Grain Technol. 1978;16(2):125-127.
8. Dakshinamurthy A, Ragupathy A. Alternate rice field hosts of the Angoumois grain moth. Int. Rice Res. News. 1988;13(3):42-43.

9. Nageswaran R. Studies on the Angoumois grain moth *Sitotroga cerealella* (Oliver) (Gelechiidae: Lepidoptera) with special reference to its biology, the nature and extent of damage caused on the popular paddy varieties of Thanjavur town, Ph.D. Thesis (unpublished), Bharathidasan University, Tiruchirapalli, Tamil Nadu, India. 1993, p 99.
10. Sangeetha S, Kavitha P, Rajendran K. Relative susceptibility of paddy varieties to *Sitotroga cerealella* (Oliv.) (Lepidoptera: gelichiidae). I. J Res. Photochem. & Pharmacol. 2013;3(3):128-131.
11. Sundararaj R, Sundararajan R. Susceptibility of rice (*Oryza sativa*) to angoumois grain moth *(Sitotroga cerealella*) and its field incidence in Tamil Nadu. Indian Journal of Agricultural Sciences. 1990;60(10):703-704.