Journal of Entomology and Zoology Studies

Available online at www.entomoljournal.com

Journal of Entomology and Zoology Studies

E-ISSN: 2320-7078
P-ISSN: 2349-6800
www.entomoljournal.com
JEZS 2020; 8(4): 356-358

Received: 08-05-2020
Accepted: 12-06-2020

RN Nishad
Department of Entomology, ANDUA&T, Kumarganj, Ayodhya, Uttar Pradesh, India

RB Singh
Department of Entomology, ANDUA&T, Kumarganj, Ayodhya, Uttar Pradesh, India

Suraj Kumar
Department of Entomology, ANDUA&T, Kumarganj, Ayodhya, Uttar Pradesh, India

Pawan Singh
Department of Entomology, ANDUA&T, Kumarganj, Ayodhya, Uttar Pradesh, India

Corresponding Author:
RN Nishad
Department of Entomology, ANDUA&T, Kumarganj, Ayodhya, Uttar Pradesh, India

Study the seed health status of farmers' saved chickpea seed of Eastern Uttar Pradesh in relation to bruchid, *C. chinensis*

RN Nishad, RB Singh, Suraj Kumar and Pawan Singh

Abstract
Chickpea, *Cicer arietinum* (L.) is one of the most important *Rabi* season food legume pulse crop in India. Due to lack of awareness, the farmer's do not distinguish the seed grain and hence the quality of farmers saved seed remains below standard. One hundred eight farmers' saved seed samples were randomly collected from different villages of six districts in Eastern Uttar Pradesh. Ninety one percent chickpea seed samples were infested bruchid, *C. chinensis*. The maximum seed moisture content (11.83%) was recorded in the samples of Bahraich district and minimum seed moisture content (10.86%) in samples of Amethi district. The maximum insect infestation (1.01 %) was recorded in samples of district Bahraich and the minimum (0.78 %) sample was infested in Amethi district. The maximum germination (81.94 %) was noticed in seed sample of Amethi district and the minimum (77.27 %) in sample of Bahraich district. However, the maximum 1423.42 and minimum 1329.9 seed vigour index were observed in Amethi and Basti seed samples of chickpea, respectively. The keeping above in view, overall average performance of seed samples collected different villages of six districts were 11.17 % seed moisture content, 0.88 % seed damaged, 75.06 % seed germination and 1389.6 seed vigour index.

Keywords: Seed, Seed Storage, Moisture, Germination, Seed sample, Chickpea, *C. chinensis*, seed health

Introduction
Pulses, the "wonderful gift of nature" play an important role in Indian economy and are a rich source of supplementary protein of daily diets of vegetarian population. Pulses are the rich source of protein, several amino acids, minerals and certain vitamins, and are available to the poor people at a responsible price. Pulses are also known as "poor man's meat" (Sharma, 1984) [1]. Chickpea, *Cicer arietinum* (L.) is one of the most important *Rabi* season food legume pulse crop in India. It provides high quality of protein and considered to the best food for vegetarian population in India, South Asia, West Asia and Southern European countries. Among pulses, chickpea rank world third pulse crop and fifth in legume. India grow chickpea on about 10.56 Mha with a production of 11.23 M tones and productivity 1063 kg/ha in 2017-18 respectively (Anonymous, 2018-19) [2].

Pulse beetle, *Callosobruchus spp.* attacks grain legumes during both pre and post harvest stages all over the world. In India, 117 species of bruchids belonging to 11 genera have been recorded infesting different pulses (Arora, 1977) [3]. But in India *C. maculatus, C. analis* and *C. chinensis* are the dominate pest species of the genera (Dias, 1986) [4]. Pulse beetle spends its entire immature life (grub) in individual legume seeds, where they cause weight loss, decrease germination potential and diminish the market as well as nutritional value of the commodity. In India Gujar and Yadav (1978) [5] recorded 32.2 to 55.7 percent loss in seed weight and 17.0 to 53.5 percent loss in protein content. In case of severe infestation cent percent damage is caused by this pest (Pruthi and Singh, 1950) [6].

H Material and Methods
Collection of chickpea seed sample: The one hundred eight chickpea seed samples (500 g. seed for each sample) from randomly selected villages of six districts namely; Amethi, Ayodhya, Bahraich, Basti, Gonda and Sultanpur of Eastern Uttar Pradesh during 2018 and 2019. Seed sample were collected from the different village before the showing of crop and investigate the seed health status of farmers' saved seed of chickpea in respect to bruchid insect during storage.

The observation recoded that Insect infestation, Seed moisture content, Seed Germination, Seedling length and Seed vigour index.

Seed moisture percent

Seed moisture content in all sample were recorded with the help of Electronic Moisture-Meter (MT-Pro).

Seed infestation

To calculate the insect infestations by, 100 hundred seed from each sample were carefully examined by observing damaged seed by the bruchid pests with the help of magnifying lens (10X). The obtained data were computed to work out percent damaged seed by *C. chinensis* from following formula (Kumar, 2008) [7].

$$\text{Per cent damage (bored grain)} = \frac{\text{Number of bored grains}}{\text{Total number of grains}} \text{x100}$$

Seed germination and vigour index

The germination of chickpea seed sample was observed by using the towel paper (Germination paper) as per ISTA (1976) [8] method. One hundred randomly selected seed from each sample were taken and placed on water soaked towel paper and which was rolled after covering them by another water soaked towel paper. The rolled towel papers was covered with butter paper and thereafter, kept in seed germinator at 28±2° C and 75±5 percent RH for seven days. The germination percent was work out by counting the number of germinated seed. Seedling vigour index was computed by adopting the following formula as suggested by Abudul-Baki and Anderson (1973) [9] and was expressed in whole:

Vigour Index= Germination (%) X Seedling length (cm)

Results and Discussion

Out of one hundred eight farmers' saved chickpea seed samples were collected from different village of six districts in Eastern Uttar Pradesh. Among them ninety eight percent sample were found infested pulse beetle, *C. chinensis*.

In Ayodhya district, all nineteen farmers' saved chickpea seed samples were collected from four villages. The average seed damage was 0.86% and about 90.19 % samples were infested by *C. chinensis* and about 30.82 % samples were having damage beyond permissible limit (>1.0). The average moisture content was recorded 11.16%. About 84.67% of the samples recorded average seed germination and 63.33% samples having seed germination above IMSCS. The average seed vigoure indexes (1526.6) of samples were recorded.

In Baharich district, all sixteen farmers' saved chickpea seed samples were collected from four villages. The average seed damage was 1.12% and about 93.75 % samples were infested by *C. chinensis* and about 42.08 % samples were having damage beyond permissible limit (>1.0). The average moisture content was recorded 11.81%. About 81.07% of the samples recorded average seed germination and 56.24% samples having seed germination above IMSCS. The average seed vigoure indexes (1412.1) of samples were recorded.

In Basti district, all seventeen farmers' saved chickpea seed samples were collected from four villages. The average seed damage was 0.96% and about 91.87% samples were infested by *C. chinensis* and about 31.25 % samples were having damage beyond permissible limit (>1.0). The average moisture content was recorded 11.36%. About 83.41% of the samples recorded average seed germination and 55.33% samples having seed germination above IMSCS. The average seed vigoure indexes (1455) of samples were recorded.

In Gonda district, all nineteen farmers' saved chickpea seed samples were collected from four villages. The average seed damage was 0.96% and about 92.91% samples were infested by *C. chinensis* and about 36.66% samples were having damage beyond permissible limit (>1.0). The average moisture content was recorded 11.29%. About 83.97% of the samples recorded average seed germination and 55.20% samples having seed germination above IMSCS. The average seed vigoure indexes (1429.5) of samples were recorded.

In Sultanpur district, all eighteen farmers' saved chickpea seed samples were collected from four villages. The average seed damage was 0.92% and about 91.25% samples were infested by *C. chinensis* and about 28.12 % samples were having damage beyond permissible limit (>1.0). The average moisture content was recorded 10.99%. About 83.91% of the samples recorded average seed germination and 56.25% samples having seed germination above IMSCS. The average seed vigoure indexes (1424.15) of samples were recorded.

These results were also similar to Anonymous 2018 [10]; Sharma *et al*. 2017 [11]; Kumar *et al*., 2015 [12]; Karthikeyen *et al*., 2009 [13] and Hossain *et al*., 2013[14].

Table 1: Mean percent infestation, seed moisture content, germination and vigour index of farmers' saved chickpea seed of Eastern Uttar Pradesh during- 2018 and 2019

S.N.	Name of District	Mean Percent																		Vigour index		
		Percent infested sample			Seed moisture content (%)			Seed infestation (%)			Percent seed sample with seed damage beyond permissible level			Seed Germination (%)			Percent seed sample with seed germination above IMSCS					
		2018	2019	P.M.	2018	2019	P.M.	2018	2019	P.M.	2018	2019	P.M.	2018	2019	P.M.	2018	2019	P.M.	2018	2019	P.M.
1	Amethi	87.5	95.00	91.25	10.84	10.86	10.85	0.77	0.80	0.78	26.66	34.16	30.41	84.37	85.73	85.05	74.16	74.16	74.16	1486.7	1513.9	1500.3
2	Ayodhya	89.57	90.82	90.19	10.82	11.5	11.16	0.86	0.87	0.86	31.66	29.99	30.82	84.57	84.78	84.67	58.75	67.91	63.33	1500.9	1552.3	1526.6
3	Baharich	93.75	93.75	93.75	11.97	11.66	11.81	1.19	1.06	1.12	45.41	42.08	42.24	80.00	82.15	81.07	55.83	56.66	56.24	1412.8	1413	1412.9
4	Basti	88.75	95.00	91.87	11.18	11.55	11.36	0.90	0.96	0.96	40.83	21.25	31.04	83.35	83.47	83.41	50.83	55.83	53.33	1496.7	1413.35	1455.0
5	Gonda	95.00	90.83	92.91	11.16	11.42	11.29	0.94	0.96	0.97	32.08	41.25	36.66	83.42	84.52	83.97	51.66	58.75	55.20	1439	1420	1429.5
6	Sultanpur	87.5	95.00	91.25	10.83	11.16	10.99	0.83	0.92	0.87	28.75	27.5	28.12	83.05	84.78	83.91	55.00	57.5	56.25	1426.22	1422.9	1424.5

*P.M. = Pooled Mean

Conclusion

One hundred and eight chickpea seed sample were collected from six district of Eastern Utter Pradesh *viz*. Amethi, Ayodhya, Sultanpur, Bahraich, Basti and Gonda. In Amethi district. Ninety one percent chickpea seed samples were infested bruchid, *C. chinensis*. In a country like India having large acreage under cultivation, the public and private seed sectors both cannot fulfill the requirement of seed to raise

major crops. Therefore, the use of farmers saved seed in major crops is to be continued. Training of farmers regarding production and post-production activities for healthy, disease free quality seed is very crucial for high productivity but the quality of farmers' saved seed is below standards, hence it is essential to create awareness among farmers regarding frequent replacement of their seed with quality seed to increase SRR for quality production.

Acknowledgement
Authors are thankful to Head, Department of Entomology and Dr. R. B. Singh for providing necessary facilities and permission to conduct the study during my PhD programme.

Reference

1. Sharma SS. Review of literatures of the losses caused by *Callosobruchus* species (Bruchidae: Coleoptera) during storage of pulses. Bulletin of Grain Technology. 1984; 22(1):62-68.
2. Anonymous. Pulse revolution from food to nutritional security. Min. of Agri. & FW (DAC&FW), GOI. 2018; 19(9):14.
3. Arora GL. Bruchidae of North-West India. Oriental Insects Supplement. The association for the study of Oriental Insects, New Delhi. 1977; 7:132.
4. Dias CAR. Ecological studies on Callosobruchus maculates Fab. Callosobruchus chinensis and Callosobruchus analis K. infesting legumes in India. Ph.D. thesis, P.G. school, I.A.R.I., New Delhi, 1986.
5. Gujar GT, Yadav TD. Feeding of Callosobruchus maculatus (Fab.) and Callosobruchus chinensis (Linn.) in green gram. Ind. J of Ent. 1978; 40:108-112.
6. Pruthi HS, Singh M. Pests of stored grain and their control. Manager of publications, Delhi, 1950, 68.
7. Kumar R. Determination of storability index genotype against *Rhizopertha domenica* Fab. and its management under laboratory condition. M. Sc. (Ag.) thesis submitted to NDUAT, Kumarganj, Faizabad India, 2008.
8. Abdul-Baki AA, Anderson JD. Vigor determination in soybean seed by multiple criteria. Crop Sci. 1973; 13:630-633.
9. Anonymous. Annual report Glimpses. AI0CRP- National Seed Project (Crops), ICAR- IISS, Kushmaur, Mau, 2018, 42-43.
10. Sharma M, Agrawal VK, Chaudhary S, Chaudhary MD. Survey of the infestation level of pulse beetle, *Callosobruchus chinennsis* (Linn.) in stored grains of cowpea in Jaipur district. International Journals of Developmental Research. 2017; 7(7):14088-14089.
11. Kumar M, Panwar GC, Kushwaha SR, Dwivedi VK. Field survey on evaluation of seed quality traits and storage methods used in the legume crops by the house hold farmers in Jhansi district of Uttar Pradesh, India. Legume Research. 2015; 38(2):194-201.
12. Karthikeyen C, Veeraragavathatham D, Ayisha Firdouse S. Indigenous storage structures. Ind. J Traditional Knowledge. 2009; 8(2):225-229.
13. Hossain MM, Rahman MM, Howlader MM, Khatum MR. Effect of farmers' storing progress on seed quality germination category and rate of germination index of rice. Eco- friendly Agril. J. 2013; 6(2):17-20.