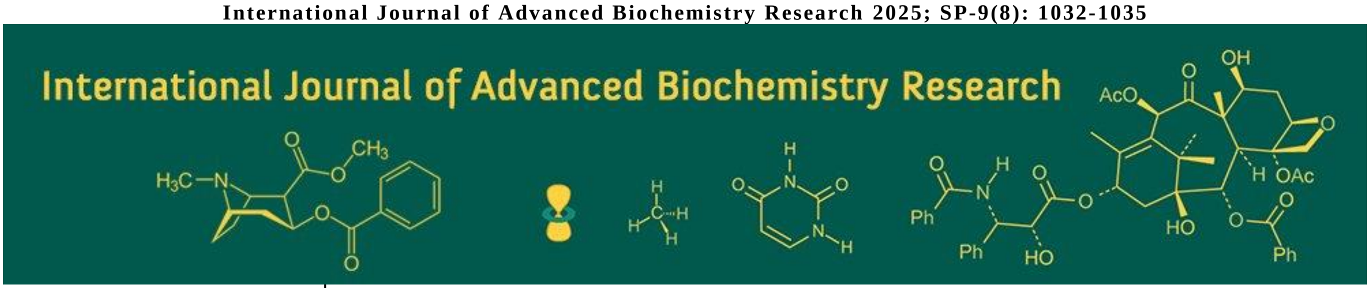
International Journal of Advanced Biochemistry Research 2025; SP-9(8): 1032-1035



ISSN Print: 2617-4693
ISSN Online: 2617-4707
NAAS Rating (2025): 5.29
IJABR 2025; SP-9(8): 1032-1035
www.biochemjournal.com
Received: 24-05-2025
Accepted: 29-06-2025

Satarupa Sarkar
M.Sc Scholar, Post Graduate Institute, Department of Entomology, MPKV, Rahuri, Ahilyanagar, Maharashtra, India

Ashok R Walunj
Professor of Entomology (CAS), Department of Entomology, MPKV, Rahuri, Ahilyanagar, Maharashtra, India

Prakash E More
Scientist-I (Plant Pathology), AICRP, Arid Zone Fruit, Department of Horticulture, MPKV, Rahuri, Maharashtra, India

Uttam K Kadam
Head, Department of Entomology, MPKV, Rahuri, Maharashtra, India

SP Gaikwad
Horticulturist, Department of Horticulture, MPKV, Rahuri, Maharashtra, India

Corresponding Author:
Satarupa Sarkar
M.Sc Scholar, Post Graduate Institute, Department of Entomology, MPKV, Rahuri, Ahilyanagar, Maharashtra, India

Screening of promising ber genotypes against pest complex on ber

Satarupa Sarkar, Ashok R Walunj, Prakash E More, Uttam K Kadam and SP Gaikwad

DOI: https://www.doi.org/10.33545/26174693.2025.v9.i8So.5307

Abstract
A field experiment was conducted during the 2024 season at the Institutional Research orchard, All India Coordinated Research Orchard on Arid Zone Fruits, Mahatma Phule Krishi Vidyapeeth, Rahuri, to evaluate the performance of different ber genotypes against major insect pests and assess the efficacy of various pest management approaches. The study focused on screening promising genotypes of ber against leaf eating caterpillar, leaf webber, fruit borer, and stone weevil. Maximum leaf damage caused by leaf eating caterpillar was recorded during the 23rd to 24th meteorological week, with Apple ber exhibiting the highest damage and Rahuri-1 showing the least. For leaf webber, peak infestation was observed during the twenty-third to twenty-fourth meteorological week, with minimum damage in Rahuri-2. Against fruit borer, Chandegaon was found to be the most tolerant genotype, while Apple ber suffered highest damage. Stone weevil infestation peaked during the 51st to 52nd meteorological week with Apple ber showing maximum damage and Chandegaon the minimum.

Keywords: Ber genotypes, leaf eating caterpillar, leaf webber, stone weevil, fruit borer

Introduction
Ber (*Ziziphus mauritiana* Lamk.) is a hardy, drought tolerant fruit crop widely cultivated across India, particularly in arid and semi arid regions. Celebrated as the “King of Arid Fruits”, ber holds immense economic and nutritional importance due to its ability to thrive in harsh climates and produce nutritionally rich fruits with high levels of Vitamin C, minerals, and bioactive compounds (Pareek, 1983; Meena *et al.*, 2023) [6, 5]. India ranks second in global ber production with key cultivation zones in Maharashtra, Rajasthan, Gujarat, Uttar pradesh (Stonehouse *et al.*, 2002) [7].
Despite its adaptibility, ber production is often constrained by the attack of multiple insect pests which cause substantial losses in yield and fruit quality. Major pests include the leaf eating caterpillar (*Thiacidas postica*), leaf webber (*Prorosticha zizyphi*), fruit borer (*Meridarchis scyrodes* Meyrick) and stone weevil (*Aubeus himalayanus* Voss), which infest different stages of crop growth and severely affect marketable produce (Lakra & Bhatti, 1985; Haldhar *et al.*, 2016) [4, 2]. To mitigate pest damage and stabilize yields, varietal resistance offers a sustainable and eco-friendly solution. However, variability in pest tolerance among genotypes remains underexplored. Several cultivated genotypes such as Umran, Banarasi kadaka, NB-1, NB-2, RHRG-1, RHRG-2, RHRG-3, Punjab chauhara, Chandegaon, Apple ber-show considerable diversity in morphological traits, yield potential, and pest susceptibility.
Hence, systematic screening of promising ber genotypes under field conditions is critical to identify cultivars that combine superior fruit quality with inherent resistance or tolerance to major pests. This approach not only reduces dependence on chemical control but also supports integrated pest management strategies and long-term crop sustainability.

Materials and Methods
The field experiment was conducted during May 2024 to Januuary 2025 at the Research orchard, AICRP on Arid Zone Fruits, MPKV, Rahuri to screen promising genotypes of ber against major pest complex. The trial was laid out in a Randomized Block Design (RBD) with three replications maintaining 8 m x 8 m spacing.

Each treatment (Genotype) consisted of ten plants. For leaf eating caterpillar and leaf webber pest incidence was recorded at fortnightly intervals. 100 randomly selected leaves per genotype per observation were examined, and the percentage of damaged leaves was calculated using:

$$\text{Percent incidence} = \frac{\text{Number of damage leaves}}{\text{Total number of observed leaves}} \times 100$$

The observations on incidence of fruit borer were recorded on all the ten genotypes by randomly selecting five branches on the tree from top, middle and bottom at fortnightly interval from fruit setting to harvest (45th MW of 2024 to 4th MW of 2025). The percent fruit damage was worked out with counting infested fruits as well as healthy fruits and then cumulative percent fruit damage after harvesting was worked out. Incidence of stone weevil on selected genotypes were recorded through periodical sampling at fortnightly interval to access the serious cause and intensity of stone weevil on immature fruit dropping. The dropped fruits were collected and examined from surrounding the canopy of selected trees at fortnight interval from (40th MW during October 2024 to 2nd MW of 2025). The data on percent infestation of the pests were converted into arcsine transformed values and then subjected to statistical analysis to find out the significant difference in different genotypes. The significance of the genotypes was assessed at 5 percent level (Fisher and Yates, 1963) [1].

Results and Discussion

The results obtained from the present investigation have been presented pest wise:

Leaf eating caterpillar

It is revealed from the table 1 that the pest incidence of leaf eating caterpillar was noticed from 23-24 meteorological weeks which were found in the range of 0-5.963%. The maximum leaf damage (9.38%) was noticed during 29-30 meteorological week. The maximum pest damage was observed in Apple ber (8.02%). Among the ber genotypes Rahuri-1 documented sparse damage of 0.71% due to leaf eating caterpillar during the period of observation and it was found at par with chandegaon and Rahuri-2 with 0.91 and 0.92 percent respectively.

Leaf Webber

It is surfaced from the table 2 that the pest incidence of leaf webber was logged from 23-24 meteorological weeks which were found in the range of 0-2.03%. The maximum leaf damage (3.27%) was noticed during 33-34 meteorological week. The maximum pest damage was witnessed in Apple ber (2.87%). Among the ber genotypes Rahuri-2 was registered least damage of 0.25% due to leaf webber during the period of observation and it was found at par with chandegaon and Rahuri-1 with 0.32% and 0.38% respectively. The genotypes *viz* chauhara, NB-2 and kadaka showed maximum damage to the extent of 1.90 to 2.32 percent due to leaf webber.

Fruit Borer

It is revealed from the data presented in table 3 that the pest incidence of ber fruit borer was noticed from 49-50th meteorological week, which was found across the spectrum of 0-28.4%. Highest fruit damage was recorded during 1st-2nd meteorological week, likely coinciding with the peak maturity. The maximum damage was observed in Apple ber (35.6%) among all the ber genotypes screened.Whereas minimum damage due to fruit borer was noticed in Chandegaon (4.72%). The ber genotype chandegaon was found promising and documented significantly least damage (1.69%) due to fruit borer which was at par with Rahuri-1 (3.8%), Rahuri 2 (3.97%), NB-1 (5.36%), NB-2 (5.47%). The genotype apple ber recorded maximum damage (23.83%) due to fruit borer among all the screened genotypes.

Stone weevil

It is elucidated from the data presented in table 4 that the pest incidence of ber stone weevil was noticed from 40th-41st meteorological week, which was found within the range of 0-15.7%. The maximum fruit damage was noticed during 51st-52nd meteorological weeks. The maximum damage was observed in Umran (21.0%) among all the ber genotypes screened. Whereas minimum damage due to stone weevil was noticed in Chandegaon (4.1%). The genotype apple ber enumerated maximum damage (19.66%) due to stone weevil among all the screened genotypes

Table 1: Seasonal incidence of leaf eating caterpillar against different genotypes of Ber

Genotypes	Percent leaf damage due to leaf eating caterpillar during metereological weeks								
	23-24 MW	25-26 MW	27-28 MW	29-30 MW	31-32 MW	33-3 4MW	36-37 MW	38-39 MW	Avg Damage%
Umran	5.963	6.32	6.75	6.79	6.85	6.57	5.8	5.37	6.3 (14.54)
Chauhara	5.96	6.28	6.3	6.71	6.04	5.5	5.06	4.37	5.78 (13.91)
Rahuri-1	0.12	0.06	0.32	1.38	0.75	1.16	1.21	0.73	0.71 (4.83)
Rahuri-2	0	0	0.48	2.79	0.95	1.12	1.37	0.73	0.92 (5.5)
NB-1	2.77	2.84	3.85	3.87	3.43	3.16	2.9	2.42	3.15 (10.22)
NB-2	1.2	2.36	2.26	1.96	1.76	1.57	1.24	1.04	1.67 (7.43)
Kashmir Ber	2.43	2.95	3.46	3.92	2.15	1.67	1.48	1.03	2.38 (8.87)
Apple ber	8.66	9.25	9.31	9.38	8.71	3.97	7.83	7.09	8.02 (16.45)
Chandegaon	0.14	0.54	0.65	1.01	1.38	1.34	1.21	0.99	0.91 (5.47)
Kadaka	2.04	2.2	2.65	2.72	2.98	3.03	2.58	1.29	2.44 (8.99)
S.E±									0.32
CD at 5%									1.00

*Figures in parenthesis are arcsine transformation

Table 2: Seasonal incidence of leaf webber as against different genotypes of Ber

Genotypes	Percent leaf damage during metereological weeks								
	23-24 MW	25-26 MW	27-28 MW	29-30 MW	31-32 MW	33-34 MW	36-37 MW	38-39 MW	Avg Damage%
Umran	0	1	1.26	1.79	2.23	1.91	2.02	1.87	1.51 (7.06)
Chauhara	0	1.27	2.20	2.68	3.2	3.3	3.17	2.75	2.32 (8.76)
Rahuri-1	0	0	0	0.46	0.52	0.61	0.70	0.76	0.38 (3.53)
Rahuri-2	0	0	0	0	0	0.61	0.68	0.72	0.25 (2.86)
NB-1	0	0	1.81	2.1	2.6	2.67	2.52	2.44	1.76 (7.62)
NB-2	0	1.7	2.25	2.54	2.31	2.86	2.73	2.46	2.10 (8.33)
Kashmir Ber	0	0	0	0.56	1.27	2.81	1.70	1.04	0.92 (5.50)
Apple ber	2.03	2.52	2.77	2.95	3.24	3.27	3.15	3.06	2.87 (9.75)
Chandegaon	0	0	0	0	0	0.77	0.89	0.96	0.32 (3.24)
Kadaka	0	1.57	1.68	1.94	2.4	2.49	2.57	2.6	1.90 (7.92)
S.E±									0.28
CD at 5%									0.80

*Figures in parenthesis are arcsine transformations.

Table 3: Seasonal incidence of fruit Borer as against Different genotypes of Ber

Genotypes	Percent fruit damaged due to fruit borer during metereological weeks						
	45-46 MW	47-48 MW	49-50 MW	51-52 MW	1-2 MW	3-4 MW	Avg damage%
Chauhara	0	0	11.73	16.2	16.5	18	10.41 (18.82)
Rahuri-1	0	0	0	7.2	7.5	8.10	3.8 (11.24)
Rahuri-2	0	0	0	7.55	8.12	8.2	3.97 (11.49)
NB-1	0	0	0	10.5	10.62	11	5.36 (13.39)
NB-2	0	0	0	10.63	10.9	11.3	5.47 (13.53)
Kashmir ber	0		0	6.29	7.3	8.12	3.61 (10.95)
Apple Ber	0	21.6	28.4	32.2	35.6	25.2	23.83 (29.22)
Chandegaon	0	0	0	0	4.72	5.43	1.69 (7.47)
Kadaka	0	0	9.7	10.45	10.55	10.32	6.83 (15.16)
Umran	0	0	14.89	16.7	17.85	18.3	11.29 (25.33)
S.E±							1.39
CD at 5%							3.86

*Figures in parenthesis are arcsine transformations.

Table 4: Seasonal incidence of stone weevil against diffferent genotypes of ber

Genotypes	Percent fruit damage due to stone weevil during metereological weeks							
	40-41 MW	42-43 MW	45-46 MW	47-48 MW	49-50 MW	51-52 MW	1-2 MW	Avg damage %
Umran	0	0	11.5	12.5	14.2	21.0	13	10.31 (18.73)
Chauhara	0	0	10.2	11.7	19.9	15.4	13.6	10.12 (18.54)
Rahuri-1	0	0	5.70	8.65	11.6	5.2	4.5	5.09 (13.04)
Rahuri-2	0	0	7.6	8.96	15.2	8.7	3.8	6.32 (14.56)
NB-1	0	0	5.89	8.15	13.5	11.2	10.62	7.05 (15.39)
NB-2	0	3.7	4.5	8.7	12.25	14.7	10.1	7.7 (16.11)
Kashmir Ber	2.99	4.2	6.6	12.0	14.3	7.6	2.9	7.2 (15.56)
Apple ber	15.7	19.02	21.4	22.7	20	19.1	18.3	19.66 (26.32)
Chandegaon	0	3.40	4.6	5.7	6.3	4.1	2.5	3.80 (11.24)
Kadaka	3.7	4.5	4.55	5.6	6.1	4.9	4.3	4.80 (12.65)
S.E ±								0.69
CD at 5%								2.08

*Figures in parenthesis are arcsine transformations

The current findings are consistent with research by Karuppaiah (2015) [3] who tested seven different cultivars of ber for fruit weevil infestation including Umran, Seb, Gola, Mundia, Gomakirti, Banarasi Kadaka, Thar sevika, Thar Bhuvraj in which the maximum infestation was recorded in Umran (38.9%).

Conclusion

The screening of ten ber genotypes under field conditions revealed significant variability in pest resistance. Among the screened genotypes against pest complex it was indicated Rahuri-1, Rahuri-2 and Chandegaon consistently showed low percent damage including leaf eating caterpillar, leaf webber, fruit borer and stone weevil making them promising sources of pest resistance for integrated pest management and future breeding programs. In contrast Apple Ber showed cumulative pest damage especially from fruit borer and stone weevil. These findings underscore the importance of genotype selection in minimizing pest related losses and improving sustainable ber cultivation

References

1. Fisher RA, Yates F. Statistical tables for biological, agricultural and medical research. Edinburgh: Oliver and Boyd; 1963. p. 146.
2. Haldhar SM, Deshwal HL, Jat GC, Berwal MK, Singh D. Pest scenario of ber (*Ziziphus mauritiana* Lam.) in arid regions of Rajasthan: a review. Journal of Agriculture and Ecology. 2016 Jun 20;1:10-21.
3. Karuppaiah V. Seasonality and management of stone weevil, *Aubeus himalayanus* Voss (Curculionidae: Coleoptera): an emerging pest in Indian jujube (*Ziziphus mauritiana* L.). African Journal of Agricultural Research. 2015 Apr 1;10(8):871-876.
4. Lakra RK, Bhatti DS. Insect pests of ber with special reference to fruit fly, *Carpomyia vesuvania* Costa. In: Third National Workshop on Arid Zone Fruit Research; 1985; Rahuri, India. p. 216-220.
5. Meena VS, Singh K, Shekhawat N, Bhardwaj R, Lal H, Rani K, et al. Assessment of genetic variability for fruit nutritional composition in the ex-situ collection of jujube (*Ziziphus* spp.) genotypes of arid regions of India. Horticulturae. 2023 Feb 5;9(2):210.
6. Pareek OP, Vashishtha BB. Delicious ber varieties of Rajasthan. Indian Horticulture. 1982;27(1):13-15.
7. Stonehouse J, Mahmood R, Poswal A, Mumford J, Baloch KN, Chaudhary ZM, *et al*. Farm field assessments of fruit flies (Diptera: Tephritidae) in Pakistan: distribution, damage and control. Crop Protection. 2002 Sep;21(8):661-669.