Short Communication

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Evaluation of ber cultivars against bark eating caterpillar (*Indarbela sp.*) under field condition

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Ber (*Zizyphus mauritiana* L.) is an important fruit crop cultivated under arid and semi-arid climatic conditions. The importance of bark eating caterpillar, *Indarbela sp* infesting to this crop has been recognized since many years. It is most devastating pest in ber growing areas. Plants frequently display genetic variation within and between population for traits that influence the preference and non-preference of insects on their hosts that are resistance traits (Johnson and Agrawal, 2005; Haldhar *et al*., 2017; Samadia and Haldhar, 2017; Muthusamy *et al*., 2017). Least susceptible cultivar is an economical and environment-friendly, farmer friendly and do not need much financial investment for insect management. Host plants play an important role in determining insect populations in respect to concentrations and proportions of nutrients, which differ among species (Schoonhoven *et al*., 2005). Direct defenses are mediated by plant characteristics that affect the herbivore's biology such as mechanical protection on the surface of the plants (e.g., hairs, trichomes, thorns, spines, and thicker leaves) that retard the development of herbivores (Hanley *et al*., 2007). *Zizyphus nummularia* provides a nutritious leaf fodder for the animals. The leaves contain 5.56 per cent DCP and 49.7 per cent TDN and are rich in protein and mineral matter. The fruits are believed to purify blood and to help in digestion. The bark is said to be a remedy in diarrhea. The root is used as decoction in fever and as powder applied to ulcer and wounds. The leaves form a plaster in strangury and are used in conjunctivitis. Besides providing the nutritious fruits, various parts of the ber tree are also known to have medicinal value (Bhandari, 1969; Kirtikar and Basu, 1975).

Bark eating caterpillar, *Indarbela sp.* (Metarbelidae-Lepidoptera) is the most destructive and polyphagous pest of fruits in India. Among them Bark eating caterpillar, (*Indarbela tetraonis* Moore) is now-a-days becoming one of the serious production constraint (Dharam, 2012). Besides, pest is also known to infest other crops *viz.,* ber, citrus, jack-fruit, jamun, loquat, pomegranate, mango, aonla, rose, mulberry, phalsa, rambutan and logan (Dharam, 2012). The total duration of the fruit fly life cycle varies with respect to environmental condition. The female of this pest is active from June to August and deposit their egg on branches and stems on which cracks or the junction of branch in 15 to 20 clusters. A females deposit 300 to 400 egg. Caterpillar after hatching enter the junction of branch, making gallaries and start feeding. The egg stage 8-10 days, the larval period 8-10 month, pupal period from May-June about four week and the adult moth emerging from these pupa mate and lay egg again and adult survive 3-4 days. The caterpillar remains concealed in the stem during the day time but eat away the bark in the night. Heavy infestation by this pest retards the growth ultimately affecting the fruit yield adversely. Cultivation of resistant cultivars to bark eating caterpillar is a major component of integrated pest management programmes and therefore this work was taken under field conditions. No holistic information is available regarding varietal screening against bark eating caterpillar. Hence, an investigation was undertaken to generate the data and document results regarding the resistant cultivar to bark eating caterpillar.

A field experiment was conducted in a Randomized Block Design (RBD) with four replication from 2013 to 2020. The eight year data of 12 ber cultivars were screened against bark eating caterpillar is presented in Table-1. Twelve cultivars of ber grown in gene bank trail namely Gola, Umran, Chomu local, Kaithli, Chandi Supari, Ilaichi, Pathani, Ashapuri-II, Saphar Chandni, Lakhani, Chhuara and Pusa Prolific were kept under observations to find out their relative susceptibility to bark eating caterpillar. The cultural practices except recording the bark eating caterpillar infestation were followed as per the crop production guide for horticultural crops. The plant established in 8x8 metre distance and each treatment had four plants (each plant considered as a one replication). The observations recorded at fortnightly intervals starting from August to November month (peak activity of this pest). The presence of frass ribbon on trees with freshly eaten bark was considered as the sign of infestation. In order to determine the resistant ber cultivar, the live hole made by bark eating caterpillar per plant was recorded. The cessations of ribbon elongation were fixed as the criteria for active holes. The established twelve ber cultivar of *Z. mauritiana* at the field gene bank at experimental farm of Asalpur farm, SKN College of Agriculture, Jobner were used for preliminary resistance study (Table 1). Three branches were randomly selected from each plants and average incidence of active holes/ plant was recorded. Twenty ber cultivars were evaluated against bark eating caterpillar in field condition during eight years (2013-14 & 2020-21). The cultivars were categorized on the basis of eight year pooled data on active hole / plant: least susceptible (1.70 to 4.44 active

holes/plant), moderately susceptible (5.53 to 6.67 active holes/plant), highly susceptible (7.10 to 9.27 active holes/plant). Transformations (Values in parenthesis are $\sqrt{X}+0.5$ transformed values) were used to achieve normality in the data before analysis.

All the screened ber cultivars were prone to the attack by *Indarbela sp.* Among 12 cultivar of ber tested, none of them was immune to bark eating caterpillar (Table 1).Twelve cultivars of ber grown in gene bank trail namely Gola, Umran, Chomu local, Kaithali, Chandi Supari, Ilaichi, Pathani, Ashapuri-II, Saphar Chandni, Lakhani, Chhuara and Pusa Prolific were kept under observations to find out their relative susceptibility to bark eating caterpillar. On the basis of eight year pooled data given in Table -1 revealed that the maximum infestation of bark eating caterpillar was observed in cultivar Gola (9.27 active hole/plant), Kaithli (7.91 active hole/plant), Umran (7.10 active hole/plant) and Ilaichi (7.08 active hole/plant) whereas, it was minimum in Pusa Prolific (1.70 active hole/plant), Ashapuri-II (1.89 active hole/plant) and Chandni Supari (2.52 active hole/plant). The cultivar Pusa Prolific, Ashapuri-II, and Chandni Supari, were statistically at par in their susceptibility to bark eating caterpillar. The cultivar Chomu Local (6.67 active hole/plant), Lakhani (6.04 active hole/plant), Chhuara (5.56 active hole/plant), Saphar Chandni (5.53 active hole/plant), and Pathani (4.44 active hole/plant), were moderately susceptible to bark eating caterpillar. The results of the present investigation show the overall effect of ber resistance traits against the bark eating caterpillar, *Indarbela sp*. While bark eating caterpillar, *Indarbela sp* infestation in different cultivars of ber showed significant differences. The present finding were also in favour of Verma and Singh (1974) observed that Ilaichi, Dandan, Gola and Kaithli were susceptible the bark eating caterpillar.

Table 1. Incidence of bark eating caterpillar, *Inderbella sp.* on different ber cultivars

Sr. No.	Varieties	Average active hole per plant								
		2013	2014	2015	2016	2017	2018	2019	2020	Pooled
1	Gola	4.70 (2.28)	7.50 (2.87)	13.75 (3.67)	15.71 (3.92)	9.00 (3.07)	8.25 (2.83)	7.75 (2.86)	7.50 (2.82)	9.27 (3.04)
2	Umran	1.50 (1.41)	2.75 (1.79)	8.75 (3.01)	14.08 3.52)	8.25 (2.96)	7.25 (2.67)	7.25 (2.76)	7.00 (2.74)	7.10 (2.61)
3	Chomu Local	2.50 (1.73)	4.50 (2.19)	5.50 (2.40)	12.37 (3.09)	8.00 (2.91)	7.50 (2.82)	6.75 (2.68)	6.25 (2.58)	6.67 (2.55)
4	Kaithli	4.50 (2.24)	7.25 (2.78)	9.75 (3.19)	14.53 (3.63)	7.75 (2.87)	6.75 (2.52)	6.75 (2.68)	6.00 (2.53)	7.91 (2.81)
5	Chandni Supari	0.00 (0.71)	0.00 (0.70)	1.0 (1.19)	5.89 (1.47)	3.00 (1.86)	3.50 (1.85)	3.25 (1.93)	3.50 (1.98)	2.52 (1.46)
6	Ilaichi	4.00 (2.12)	6.75 (2.68)	6.75 (2.68)	12.64 (3.16)	7.75 (2.87)	6.50 (2.50)	6.5 (2.62)	5.75 (2.49)	7.08 (2.64)
7	Pathani	1.70 (1.35)	3.25 (1.67)	3.75 (2.09)	9.07 (2.26)	4.75 (2.28)	4.25 (2.06)	4.5 (2.23)	4.25 (2.17)	4.44 (2.01)
8	Ashapuri-II	0.00 (0.71)	0.00 (0.70)	0.50 (0.97)	4.36 (1.09)	2.50 (1.63)	2.75 (1.61)	2.75 (1.80)	2.25 (1.61)	1.89 (1.27)
9	Saphar Chandni	3.00 (1.63)	4.50 (1.89)	5.25 (2.39)	11.27 (2.81)	5.50 (2.42)	5.00 (2.33)	5.25 (2.37)	4.50 (2.20)	5.53 (2.26)
10	Lakhani	3.75 (1.93)	6.00 (2.36)	5.75 (2.49)	11.57 (2.89)	5.75 (2.49)	5.25 (2.22)	5.5 (2.41)	4.75 (2.28)	6.04 (2.38)
11	Chhuara	2.25 (1.47)	3.75 (1.93)	4.25 (2.16)	11.98 (2.99)	5.50 (2.40)	5.50 (2.25)	6 (2.54)	5.25 (2.39)	5.56 (2.27)
12	Pusa Prolific	0.00 (0.71)	0.00 (0.70)	0.25 (0.83)	3.84 (0.96)	2.25 (1.57)	2.75 (1.35)	2.5 (1.73)	2.00 (1.48)	1.70 (1.17)
S.E.M. ±		0.25	0.33	0.15	0.14	0.20	0.41	0.14	0.14	0.44
C.D. at 5%		0.76	1.00	0.46	0.43	0.59	1.24	0.43	0.41	1.22

Values in parenthesis are $\sqrt{X}+0.5$ transformed values.

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