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Screening of moringa germplasm against leaf caterpillar, *Noorda blitealis* Walker

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Abstract
To study the screening of 140 drumstick germplasm against leaf caterpillar, *Noorda blitealis* Walker at Instructional Research farm, College of Horticulture, Bharregaon Rajnandgaon. Five branches from each plant were selected from all directions i.e. E, W, N, S and central portion of the plants. During entire period of observation leaf caterpillar infestation varied from 0.2 per cent (M- 26) to 87.51 per cent (M-17). Out of one hundred forty genotypes fifty-six genotypes were received less than 10 per cent infestation which grouped under one category (0-10% infestation). However category two with infestation range of 10-20 per cent received twenty seven genotypes. Remaining Eighteen, Seventeen, five, nine, one, four and three genotypes lines were received more than 20 per cent infestation. Out of 56 genotypes lines, six genotypes namely M-26, M-63, M-19, M-46, M-54 and M-66 were most promising lines exhibited less than one per cent infestation. It may be possible due to plant hardness, toughness and bitter in taste in saving attacked from the insects. These lines can be used in breeding programme for development of resistant variety against *N. blitealis*. Apart from these six most promising lines, genotypes M-1 received 2.5 per cent leaf infestation, however, twelve genotypes i.e.M-125, M-86, M-13, M-79, M-93, M-89, M-95, M-39, M-120, M-97, M-98 and M-92 exhibited less than 5 per cent infestation. These thirteen lines are also promising lines which may be used in breeding programme.

Keywords: Screening, moringa germplasm, *Noorda blitealis*

1. Introduction
Drumstick is an important crop, also known as 'Natural Nutrition of Tropics' and is native to India. Drumstick (*Moringa oleifera* Lamk.) is a member of Moringaceae family. In hindi, *Moringa* is called Sahjan or Munaga. In India, *Moringa* is widely used as vegetable crop and grown commercially for pods and leaves.

As a vegetable, the plant possesses various edible parts (leaves, flowers, tender pods and fruits) with high nutritional and medicinal values. They are rich in proteins, minerals (Al, Ca, K, Na) and vitamins (A, B and C) and also the leaves are a rich source of carotene, iron and ascorbic acid (Dahot, 1988). Normal utilization of drumstick can help remake powerless bones, advance weak blood and empower a malnourished mother to nurture appropriately her destitute infant. *Moringa* is mainly grown in India, Africa, Sri Lanka, Mexico, Malaysia and Phillippines. India is a major producer of drumstick with an annual production capacity of 2.2 million tonnes of tender pod from 43,600 hectare area, which is about 51 tonnes per hectare of productivity. Andhra Pradesh is the leading state in area (15,665 hectares). In Chhattisgarh, an area of 2,556 hectare is under the cultivation of drumstick and the production is 19,426 metric tonnes. Chhattisgarh has major *Moringa*producing districts such as Korba, Rajnandgaon, Balauda Bazar, Kabirdham and Kanker (Anonymous, 2017-18) [3]. The leaf eating caterpillar *N. blitealis*is a major pest of *Moringa* leaves. This pest causes 100 per cent defoliation and hence it is a menace for the cultivation of *Moringa* (Kalia and Joshi, 1997 and Munj et. al., 1998) [5]. Anjulo (2009) [2] screened 46 germplasm accession of *M. stenopetala* for resistance to *N. blitealis* in the laboratory and field against *N. blitealis* but no Moringa accession either from *M. stenopetala*, or from *M. oleifera* were found to be resistant in southern rift valley, Ethopia.

2. Materials and Methods

2.2 Experimental details

Already established old drumstick garden of 140 genotypes was selected for the study of screening work against *Noorda blitealis.* Fortnightly observation were recorded on five branches from all directions like E, W, N, S and central portion of the plants and the number of defoliators per branch recorded. Direction was measured with the help of magnetic compass. For visual damage rating, host reaction scale (1, 2, 3, 4, 5, 6, 7, 8, 9 and 10) for rating damage was computed by the infestation range developed by Anjanayamurthy and Reghupathy, 1986, *viz*. 0- 10, 10-20, 20-30, 30-40, 40-50, 50-60, 60-70, 70-80, 80-90 and 90-100. Those genotypes scored more than 10 per cent infestation were categorized in standard 2 (10-20% infestation range). Similarly, genotypes having more than 20 per cent infestation were exhibited in standard 3 (20-30% infestation range). This pattern was followed in entire standards.

Table 1: Category of drumstick germplasm based on leaf caterpillar infestation index.

Standards	Infestation range (%)
1	0 – 10
2	10 – 20
3	20 – 30
4	30 – 40
5	40– 50
6	50 – 60
7	60 – 70
8	70 – 80
9	80 – 90
10	90– 100

The per cent leaves damage was calculated with the help of the following formula:

$$\text{Percent leave damage} = \frac{\text{Number of damaged leaves}}{\text{Total no of leaves}} \text{ X } 100$$

3. Result and Discussion

One hundred forty moringa germplasm have been screened against leaf caterpillar, *Noorda blitealis* Walker an experiments was conducted at Instructional Research farm, College of Horticulture and Research station, Bharregaon Rajnandgaon. The leaf caterpillar infestation was estimated on established moringa germplasm. Five branches from each plant were selected in all directions i.e. E, W, N, S and central portion of the plants. The level of defoliator infestation was recorded over the crop growth period by recording the extent of damage by defoliator at 15 days interval starting from vegetative stage soon after pruning, vegetative grand growth, flowering, pod initiation and pod maturity stage. The plants morphological attributes were recorded for the entire entries if it is so there the all characters, attributes recorded should be compared.

Based on these observations, per cent damage was worked out by visual observation by comparing with the standards 0-10, 10-20, 20-30, 30-40, 40-50, 50-60, 60-70, 70-80, 80-90 and 90-100 as per the guideline given by Anjaneymurthy and Regupathy (1986) [1]. In the present study, 140 drumstick germplasm were tested against leaf caterpillar infestation under field condition during *kharif-rabi*, 2019-20. During entire period of observation leaf caterpillar infestation varied from 0.2 per cent (M- 26) to 87.51 per cent (M- 17). Out of one hundred forty genotypes fifty-six genotypes namely (M-26, M-63, M-19, M46, M-54, M- 66, M-1, M-125, M-86, M-113, M-79, M-93, M-89, M-95, M-39, M-120, M-97, M-98, M-92, M-24, M70, M42, M74, M94, M104, M133, M56, M84, M99, M44, M118, M90, M109, M100, M124, M80, M103, M139, M10, M36, M111, M16, M- 116, M-108, M-115, M-132, M-11, M-5, M-67, M-119, M-51, M-122, M-69, M- 102, M-6 and M-87) were recorded under one category (0 to 10% infestation range). However, category two with infestation range of 10-20 per cent received twenty seven genotypes *i.e.* M-121, M-81, M-62, M-77, M-13, M- 28, M-72, M-68, M-88, M-112, M-48, M-123, M-135, M-4, M-96, M-9, M-40, M- 140, M-14, M-105, M-110, M-49, M-32, M-52, M-117, M-134 and M-128. Eighteen genotypes shown the third category under the infestation range of 20-30 per cent. Seventeen genotypes lines were exhibited under 30-40 per cent infestation range which show the category fourth, while, five genotypes M-65, M- 58, M-76 and M-25 had show category fifth (40 -50% infestation range). Remaining nine, one, four and three genotypes lines were exhibited under the category of six, seven, eight and nine, respectively. However, none of the genotypes had recorded under tenth category.

Table 2: Categorization of drumstick germplasm based on their mean susceptibility to *N. blitealis*

Category	*N. blitealis* infestation range	Germplasm
1	0-10	M-26, M-63, M-19, M-46, M-54, M-66, M-1, M-125, M-86, M-113, M-79, M-93, M-89, M-95, M-39, M-120, M-97, M-98, M-92, M-24, M-70, M-42, M-74, M-94, M-104, M-133, M-56, M-84, M-99, M-44, M-118, M-90, M-109, M-100, M-124, M-80, M--103, M-139, M-10, M-36, M-111, M-16, M-116, M-108, M-115, M-132, M-11, M-5, M-67, M-119, M-51, M-122, M-69, M-102, M-6, M-87(56 genotypes)
2	10-20	M-121, M-81, M-62, M-77, M-13, M-28, M-72, M-68, M-88, M-112, M-48, M-123, M-135, M-4, M-96, M-9, M-40, M-140, M-14, M-105, M-110, M-49, M-32, M-52, M-117, M-134, M-128(27genotypes)
3	20-30	M-34, M-78, M-114, M-47, M-2, M-53, M-29, M-61, M-126, M-8, M-20, M-83, M-107, M-138, M-7, M-129, M-55, M-21(18 genotypes)
4	30-40	M-18, M-31, M-71, M-91, M-64, M-73, M-137, M-75, M-59, M-127, M-22, M-130, M-101, M-17, M-85, M-82, M-35(17 genotypes)
5	40-50	M-65, M-58, M-76, M-3, M-25(5 genotypes)
6	50-60	M-30, M-60, M-12, M-23, M-131, M43(9 genotypes)
7	60-70	M-41(1 genotype)
8	70-80	M-50, M-136, M-15, M-33(4 genotypes)
9	80-90	M-57, M-106, M-37(3genotypes)
10	90-100	
Total		140

Table 2 revealed that fifty-six genotypes were expressed less than 10 per cent infestation of *N. blitealis* which is mentioned by category one. These are the pomissing lines expressed minimum infestation range. Out of these 56 genotpes lines i.e. M-26, M-63, M-19, M-46, M-54 and M-66 were most promising lines exhibited less than 1 per cent infestation as shown in Table 3 It may be possible due to plant hardness, toughness and bitter in taste are the attributes which might have protected / detected the insect from attack. These lines can be used in breeding programme for development of resistant variety against *N. blitealis*. Apart from these six most promising lines, genotype M-1 received 2.5 per cent leaf infestation, however, twelve genotypes i.e. M-125, M-86, M-13, M-79, M-93, M- 89, M-95, M-39, M-120, M-97, M-98 and M-92 exhibited less than 5 percent infestation. These thirteen lines are also promising lines which may be used in breeding programme. However, category two received more than 10 per cent infestation because of light green leaves, pod, dwarf and dense characteristics of the plant. Germplasm with more branch characteristic received more than 30 per cent infestation. Germplasm of category four having soft leves, pod and stem characters exhibited more than 40 per cent damage. Germplasm of remaining categories five, six, seven, eight and nine received more than 50 per cent infestation it may be possible because of their late maturity characteristics. These finding is in accordance with the finding of painter (1954) [6] who reported thickness of plant part was an important component when insect plant interaction factor for plant resistance were considered. Slansky (1982) [7] reported that increased nitrogen, water and sugar content of the host plant might have significantly influenced the survival, fecundity and efficacy of food utilization by pests, these findings may be supported to present one where fifty-six genotypes were recorded as promising lines may be due to above characters as reported by earlier workers.

Anjulo (2009) [2] screened moringa accessions from different localities for resistance to the defoliator *N. blitealis*. Forty-six moringa accessions were tested against *N. blitalis* under field condition by visual damage rating scale of 0 to 4. Similarly in the present investigation per cent damage was recorded by visual observation by comparing with the categories 1, 2, 3, 4, 5, 6, 7, 8, 9 and 10 accordingly, germplasm were grouped into different above categories.

Table 3: Most promising lines of drumstick germplasm against leaf caterpillar, *N. blitealis* Walker

Standard	Name of Germplasm	Leaf damage (%)	Total no. of germplasm
0-1	M-26	0.2	6
	M-63	0.38	
	M-19	0.45	
	M-46	0.51	
	M-54	0.62	
	M-66	0.65	
1-3	M-1	2.50	1
3-5	M-125	3.24	12
	M-86	3.56	
	M-113	3.63	
	M-79	3.74	
	M-93	3.79	
	M-89	4.24	
	M-95	4.41	
	M-39	4.42	
	M-120	4.52	
	M-97	4.74	
	M-98	4.84	
	M-92	4.92	

4. Conclusion

140 genotypes of moringa were screened against leaf eating Caterpillar *N. blitealis* Walker at field condition. Out of this, 56 genotypes were grouped under ten percent infestation range and rest of the genotypes exhibit at more than ten percent infestation range. Looking to the most promising entries of moringa germaplasma, 6 genotypes namely M-26, M-63, M-19, M-46, M-54 and M-66 were found most promising lines exhibited less than 1% infestation which may be used in breeding program.

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6. References

1. Anjaneyamurthy JN, Regupathy A. Insecticidal control of fruit fly 1986.
2. Anjulo A. Screening accessions for resistance to *Moringa* moth, *Noorda blitealis* Walker (Crambidae: Noordinae). Indian Journal of Forestry 2009;32(2):243- 250.
3. Anonymous. *Status Report*, Department of Horticulture, Chhattisgarh Government 2017-18
4. Dahot R. "Vitamin contents of flowers and seeds of *Moringa Oleifera*" Pakistan Journal of. Biochemistry, 1988;21:1-24.
5. Kalia S, Joshi KC. Efficacy of foliar spraying of three varietal strains of Bacillus thuringiensis against the *Moringa* defoliator *Noorda blitealis* Tams. (Lepidoptera: Pyralidae). Indian J. Plant Prot 1997;25(1):65-66.
6. Painter RH. Some ecological aspects of the resistance of crop plants to insects. Journal of Economic Entomology 1954;47(6):1036-1040.
7. Slansky F. Insect nutrition an adoptionists prespective, Florida Entomologist 1982;65:45-71.