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Screening of groundnut (*Arachis hypogaea* L.) genotypes against lepidopteran (*Helicoverpa armigera*, *Spodoptera litura*, *Aproaerema modicella*) insect-pests

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Abstract

Screening of groundnut (*Arachis hypogaea* L.) genotypes against *Helicoverpa armigera* H, *Spodoptera litura*, and *Aproaerema modicella* was conducted during Kharif 2019-20 at Oilseed Research Station, Latur. Among 50 germplasm lines screened for *Helicoverpa armigera*, *Spodoptera litura* and *Aproaerema modicella* larvae incidence, one entry was found 'Highly Resistant' against *Helicoverpa armigera* larvae i.e. ISK-I-2019-17 and ten germplasm lines were categorized as 'Resistant' germplasm lines. Sixteen germplasm lines were found as 'Moderately Resistant' and thirteen as 'Susceptible' while ten varieties were found 'Highly susceptible' to *Helicoverpa armigera* larvae. Whereas, Out of 50 germplasm lines none of the entry was found 'Highly Resistant' against *Spodoptera litura* and eleven germplasm lines were categorized as 'Resistant' germplasm lines. Fifteen germplasm lines were found as 'Moderately Resistant' and twelve as 'Susceptible' while twelve germplasm lines were found 'Highly susceptible' to *Spodoptera litura*. Two of the entries were found 'Highly Resistant' against *Aproaerema modicella* larvae and twelve germplasm lines were categorized as 'Resistant' germplasm lines. Fourteen germplasm lines were found as 'Moderately Resistant' and twelve as 'Susceptible' while ten germplasm lines were found 'Highly susceptible' to *Aproaerema modicella* larvae. The check JL-24 was found 'Susceptible' to *Helicoverpa armigera*, *Spodoptera litura* and *Aproaerema modicella* larvae. Among 50 germplasm lines screened for respective lepidopteran pest of groundnut, most of the germplasm lines were found moderately resistant to *Helicoverpa armigera*, *Spodoptera litura* and *Aproaerema modicella* larvae.

Keywords: Screening of lepidopteran insect-pests, *Helicoverpa armigera*, *Spodoptera litura*, *Aproaerema modicella*

Introduction

Groundnut (*Arachis hypogaea* L.), is an important oilseed and ancillary food crop of the world belongs to genus *Arachis* tribe Aechynomenae, family Fabaceae, is a tetra foliate legume crop with yellow sessile flowers and subterranean pods. It is native of South America. It is a valuable cash crop for millions of small scale farmers in the semi-arid tropics and is the principle oilseed crop in India. The groundnut seeds are rich source of edible oil (48 to 50 percent), protein (26 to 28 percent) and also a valuable source of dietary fiber, minerals and vitamins namely B, E and K (Smith, A. F. 2002) [30]. Among the total fatty acid in groundnut oil Oleic acid and linoleic acid accounts for 75 to 80 percent of the total fatty acid in groundnut oil (Mercer *et al.*, 1990) [15]. It is also known as 'Indian Almond' and eaten as roasted or boiled. After the oil extraction groundnut cake is a high protein animal feed and haulm provides quality fodder. A variety of value products like peanut butter, chikki, milk, burfi, bhujia and biscuits are made from groundnut. The groundnut shell used in industries as fuel, filler in fertilizers and in extraction of mustard facilitates better recovery and low energy consumption. World's statistics revealed that India has the largest groundnut growing area in the world and is the second largest producer after china. Gujarat, Andhra Pradesh, Tamil Nadu, Rajasthan, Karnataka and Maharashtra are the major groundnut growing states of India and together account for about 90% of the national area under groundnut. In India, groundnut crop is cultivated in Kharif, Rabi and summer seasons grown in an area of about 5.06 m ha with the production of 8.05 mt and productivity of 1583 kg/ha. In Maharashtra, the area under groundnut cultivation was 1.95 lakh hectare with production of 2.66 lakh metric tons and productivity comprises 883 kg per hectare (Anonymous, 2018) [4].

The biggest threat to groundnut cultivation is the vulnerable wide spread attack by more than 115 insects have been reported to occur on groundnut in India and few are quite destructive and reduce the yield considerably. The crop annually incurs losses amounting to Rs. 238 crores due to insect-pests and diseases (Dutta *et al.*, 2020) [7]. Insect pests of groundnut causes damage in both field and storage conditions. Of these, *Spodoptera litura*, *Aproaerema modicella*, white grub, thrips, aphid, jassids, gram caterpillar, red hairy caterpillar and termites are found to be economically important. Possible yield losses due to *Aproaerema modicella* are estimated 49.56 percent, Jassids 40 percent, aphid 16-40 percent, thrips 17-40 percent, red hairy caterpillar 26-75 percent. Tobacco caterpillar, *Spodoptera litura* is one of the important pest which is polyphagous and occur regularly in the field. *Helicoverpa armigera* and *Spodoptera litura* causes about 26 to 100 % yield loss under field conditions. (Dhir *et al.*, 1992) [6]. *Helicoverpa armigera* and *Spodoptera litura* are reported to cause damage on more than 180 crops (Islam *et al.*, 2007) [11]. Hairy caterpillar are widely distributed in Asia and Africa and it is polyphagous insect pest of groundnut, the larvae of hairy caterpillar, feed on groundnut leaves, buds and flowers (Rangarao and Rao, 2013). Amongst which *Aproaerema modicella* Deventer, *Amrasca biguttula biguttula*, *Spodoptera litura* Fabricius, *Helicoverpa armigera* Hubner, *Aphis craccivora* Koch, *Scirtothrips dorsalis* H. are considered as important destructive pests on groundnut (Amin and Mohammad, 1980) [3].

Helicoverpa armigera larvae feed on the foliage, prefers flowers and buds. When tender leaf buds are eaten symmetrical holes or cuttings can be seen upon unfolding of leaflets. *Spodoptera litura* larvae feed gregariously scraping the chlorophyll soon disperse. Later stages feed voraciously on the foliage at night, hiding usually in the soil around the base of the plants during the day. *Aproaerema modicella* larva mines into tender leaflets or it webs together adjacent leaflets and feeds on the tissue. The leaflets get distorted and due to feeding get dried up in course of time. In a very severely infested crop, the whole field presents a burnt up appearance and the small adults could be seen flying in large numbers when one walks through the crop. The loss in yield of pods is also considerable (APEDA) [3].

Materials and Methods

“Screening of Groundnut (*Arachis hypogaea* L.) Genotypes Against Lepidopteran (*Helicoverpa armigera*, *Spodoptera litura*, *Aproaerema modicella*) insect-pests” were conducted during Kharif season 2019 at Oilseed Research Station, Latur, Maharashtra, India. The experiment was conducted in a randomized block design (RBD) with two replications. Groundnut crop was sown on 31 July 2019 in a gross plot of 4.2 m x 5 m maintaining net plot of 3.6 m x 4.8 m. The row to row distance of 30 cm and plant to plant distance of 10 cm was maintained. The 50 genotypes were screened in the field under natural lepidopteran pest infestation to find out the resistance/tolerance. The standard susceptible check was JL-24. The 50 entries were grown with susceptible check after every 10th entry in 4.2 m row length with spacing of 30 × 10 cm in two replications. The groundnut crop was raised as per the recommended package of practices except plant protection measures for insect-pests.

Observations: Observations on *Aproaerema modicella* population, percent leaflets damaged and number of larvae of

Helicoverpa armigera, *Spodoptera litura* and were recorded from three (top, middle and bottom) leaves of 5 randomly selected plants.

Analysis: Using the recorded data, the mean population per five plant, % leaflets damaged was put forth for further analysis and categorization of genotypes were *Aproaerema modicella* made.

2 *Helicoverpa armigera* and *Spodoptera litura*: Among total number of leaves damaged leaves with percent defoliation of *Helicoverpa armigera* and *Spodoptera litura* was recorded.

Table 1: Rating Scale for *Helicoverpa armigera* and *Spodoptera litura* damage in groundnut

Injury rating	Defoliation (%)	Resistant reaction
1	0	Highly Resistant
2	1-5	Resistant
3	6-10	Moderately resistant
4	11-20	Susceptible
5	21-30	Highly Susceptible
6	31-40	Highly Susceptible
7	41-50	Highly Susceptible
8	51-75	Highly Susceptible
9	76-100	Highly Susceptible

1 *Aproaerema modicella* -The procedure for evaluating the resistance/tolerance against *Aproaerema modicella* was done on the basis of per cent leaflets damaged from 5 plant from each groundnut genotypes and mean scale index obtained and grades I, II, III, IV and V were as shown in table.

Table 2: Categorization of germplasm against *Aproaerema modicella*

Sr. No.	Leaflets damaged (%)	Injury rating	Resistance reaction
1	0	1	Highly resistant
2	1-25	3	Resistant
3	26-50	5	Moderately resistant
4	51-75	7	Susceptible
5	76-100 or death of plant	9	Highly Susceptible

Results and Discussion

Screening of groundnut germplasm lines for resistance/tolerance to *Helicoverpa armigera* larvae

The results in respect of screening of groundnut germplasm lines for resistance to *Helicoverpa armigera* larvae are presented in Table 3 and Fig.1 Data presented in the table revealed that the *Helicoverpa armigera* larvae incidence was observed. Lowest *Helicoverpa armigera* larvae damage range in between 0 to 30 percent. Lowest *Helicoverpa armigera* larvae was recorded on germplasm ISK-I-2019-17 i.e. 0.2 larvae per five plant which is highly resistant germplasm followed by ISK-I-2019-25 (2 larvae per five plant), IES-I-2019-3 (2 larvae per five plant), IES-I-2019-12 (2 larvae per five plants). Highest number of *Helicoverpa armigera* larvae were reported on G-2-52 i.e. 20 larvae per five plant followed by LGN-1 (17.3 larvae per five plants).

The percent defoliation ranged in between 0.66 to 29 percent while the damage grade lies 1 to 5. The G-2-52 recorded highest germplasm line recorded highest 28.50 percent defoliation followed by LGN-1 (26.99 percent defoliation) and damage grade 5. The susceptible check was JL-24 (16.20 defoliation percentage) which damage grade was 4.

Further the germplasm lines were categorized into five different categories based on damage grades. Out of 50 germplasm screened for *Helicoverpa armigera* larvae incidence one entry was found 'Highly Resistant' against *Helicoverpa armigera* larvae and ten germplasm lines were

categorized as 'Resistant' germplasms. Sixteen germplasm lines were found as 'Moderately Resistant' and thirteen as 'Susceptible' while ten varieties was found 'Highly susceptible' to *Helicoverpa armigera* larvae.

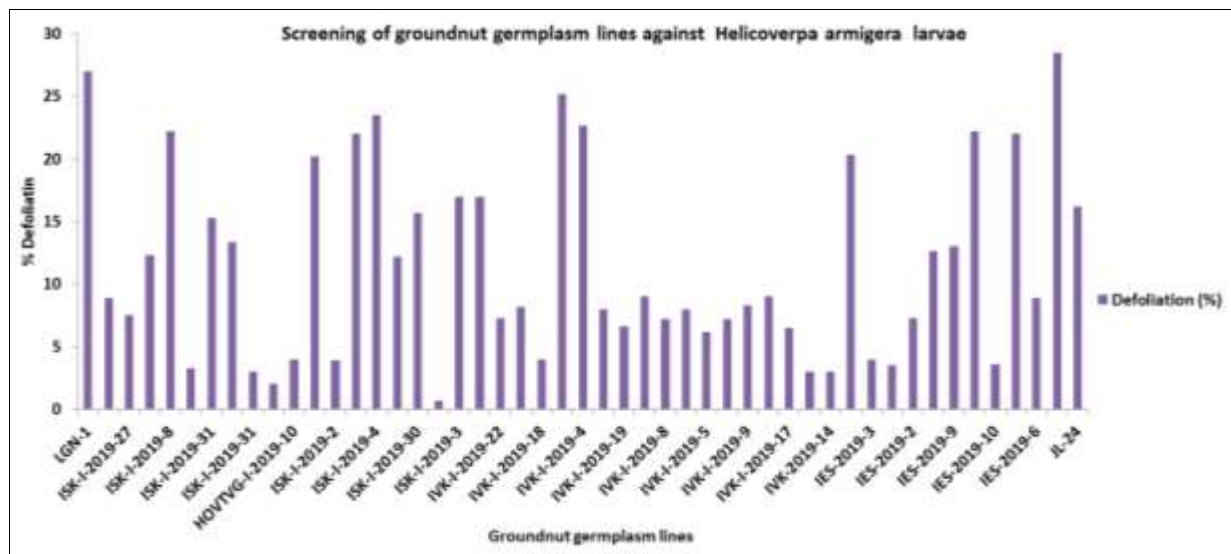


Fig 1: Screening of groundnut germplasm lines against *Helicoverpa armigera* larvae

Table 3: Percent defoliation, mean number of larvae per five plants and damage grade of *Helicoverpa armigera* infesting groundnut

Sr. No.	Germplasm	% defoliation	Mean number of Larvae / five plant	Damage grade	Resistant reaction
1	LGN-1	26.99	17.3	5	Highly susceptible
2	ISK-I-2019-32	8.9	6.5	3	Moderately Resistant
3	ISK-I-2019-27	7.5	4.9	3	Moderately Resistant
4	ISK-I-2019-29	12.32	12.4	4	Susceptible
5	ISK-I-2019-8	22.20	11.2	5	Highly Susceptible
6	ISK-I-2019-5	3.24	2	2	Resistant
7	ISK-I-2019-31	15.3	15	4	Susceptible
8	ISK-I-2019-1	13.32	15.5	4	Susceptible
9	ISK-I-2019-25	3	2.4	2	Resistant
10	HOVTSB-I-2019-7	2.0	3.5	2	Resistant
11	HOVTVG-I-2019-10	3.96	3.0	2	Resistant
12	ISK-I-2019-20	20.2	12	4	Susceptible
13	ISK-I-2019-2	3.92	2.5	2	Resistant
14	ISK-I-2019-7	22	16.20	5	Highly Susceptible
15	ISK-I-2019-4	23.5	15.0	5	Highly Susceptible
16	ISK-I-2019-28	12.16	11.20	4	Susceptible
17	ISK-I-2019-30	15.66	12	4	Susceptible
18	ISK-I-2019-17	0.66	0.2	1	Highly resistant
19	ISK-I-2019-3	16.99	15.20	5	Highly Susceptible
20	IVK-I-2019-23	16.99	12.50	4	Susceptible
21	IVK-I-2019-22	7.3	5.0	3	Moderately resistant
22	IVK-I-2019-7	8.20	6.0	3	Moderately resistant
23	IVK-I-2019-18	4.0	3.0	2	Resistant
24	IVK-I-2019-2	25.20	16	4	Susceptible
25	IVK-I-2019-21	18	12	4	Susceptible
26	IVK-I-2019-4	22.65	12.50	5	Highly susceptible
27	IVK-I-2019-6	8.0	6.0	3	Moderately resistant
28	IVK-I-2019-19	6.60	5.50	3	Moderately resistant
29	IVK-I-2019-10	9.0	8.20	3	Moderately resistant
30	IVK-I-2019-8	7.20	7.0	3	Moderately resistant
31	IVK-I-2019-24	8.0	7.80	3	Moderately resistant
32	IVK-I-2019-5	6.20	5.0	3	Moderately resistant
33	IVK-I-2019-3	7.20	6.20	3	Moderately resistant
34	IVK-I-2019-9	8.32	5.20	3	Moderately resistant
35	IVK-I-2019-1	9.0	7.20	3	Moderately resistant
36	IVK-I-2019-17	6.50	5.20	3	Moderately resistant
37	IVK-2019-20	3	3.0	2	Resistant
38	IVK-2019-14	3	6	3	Moderately resistant

39	IES-2019-1	20.33	12	4	Susceptible
40	IES-2019-3	4	2.00	2	Resistant
41	IES-2019-12	3.5	2.0	2	Resistant
42	IES-2019-2	7.3	6.00	3	Moderately resistant
43	IES-2019-7	12.65	12.00	4	Susceptible
44	IES-2019-9	13.00	12.20	5	Highly susceptible
45	IES-2019-4	22.20	16	5	Highly susceptible
46	IES-2019-10	3.60	3	2	Resistant
47	IES-2019-5	22	10.0	5	Highly susceptible
48	IES-2019-6	8.9	14	4	Susceptible
49	G-2-52	28.50	20	5	Highly susceptible
50	JL-24	16.20	8.0	4	Susceptible

Screening of groundnut germplasm lines for resistance/tolerance to *Spodopteralitura* larvae

The results in respect of screening of groundnut germplasm lines for resistance/tolerance to *Spodoptera litura* larvae are presented in Table 4 and Fig.2 Data presented in the table revealed that the *Spodoptera litura* incidence was observed. Lowest *Spodoptera litura* larvae was recorded on germplasm IES-I-2019-3 i.e. 1.05 larvae per five plant which is resistant germplasm followed by IVK-I-2019-22 (2 larvae per five plant). Highest number of *Spodoptera litura* larvae were reported on IES-I-2019-4 i.e. 28.02 larvae per five plant followed by IVK-I-2019-2 (28 larvae per five plants). The percent defoliation ranged in between 2 to 31 percent while the damage grade lies 1 to 5. The LGN-1 recorded

highest germplasm line recorded highest 30.30 percent defoliation followed by G-2-52 30 percent defoliation and damage grade 5. The susceptible check was JL-24 (24.0 defoliation percentage) which damage grade was 4.

Further the germplasm lines were categorized into five different categories based on damage grades. Out of 50 germplasm screened for *Spodoptera litura* incidence, none of the entry was found 'Highly Resistant' against *Spodoptera litura* and eleven germplasm lines were categorized as 'Resistant' germplasms. Fifteen germplasm lines were found as 'Moderately Resistant' and twelve as 'Susceptible' while twelve varieties was found 'Highly susceptible' to *Spodoptera litura* larvae.

Table 4: Percent defoliation, mean number of larvae per five plants and damage grade of *Spodoptera litura* infesting groundnut.

Sr. No.	Germplasm	% defoliation	Mean number of Larvae / five plant	Damage grade	Resistant reaction
1	LGN-1	30.30	25.50	5	Highly susceptible
2	ISK-I-2019-32	8.9	10.0	3	Moderately Resistant
3	ISK-I-2019-27	7.5	11.20	3	Moderately Resistant
4	ISK-I-2019-29	12.32	15.50	4	Susceptible
5	ISK-I-2019-8	22.20	22.0	6	Highly Susceptible
6	ISK-I-2019-5	12.0	14.0	4	Susceptible
7	ISK-I-2019-31	15.3	15	4	Susceptible
8	ISK-I-2019-1	13.32	15.5	4	Susceptible
9	ISK-I-2019-25	3	4	2	Resistant
10	HOVTSB-I-2019-7	2.0	3.5	2	Resistant
11	HOVTVG-I-2019-10	3.96	5	2	Resistant
12	ISK-I-2019-20	20.2	16	4	Susceptible
13	ISK-I-2019-2	3.92	4	2	Resistant
14	ISK-I-2019-7	22	20.0	5	Highly Susceptible
15	ISK-I-2019-4	23.5	20.20	5	Highly Susceptible
16	ISK-I-2019-28	12.16	13.20	4	Susceptible
17	ISK-I-2019-30	26.80	21.50	5	Highly Susceptible
18	ISK-I-2019-17	3.20	1.2	2	Resistant
19	ISK-I-2019-3	14	18	4	Susceptible
20	IVK-I-2019-23	16.99	20.0	4	Susceptible
21	IVK-I-2019-22	4	2.0	2	Resistant
22	IVK-I-2019-7	8.20	11.60	3	Moderately resistant
23	IVK-I-2019-18	4.0	4	2	Resistant
24	IVK-I-2019-2	25.20	28.0	4	Highly Susceptible
25	IVK-I-2019-21	20	16	3	Susceptible
26	IVK-I-2019-4	22.65	22.02	5	Highly susceptible
27	IVK-I-2019-6	8.0	12	3	Moderately resistant
28	IVK-I-2019-19	6.60	10	3	Moderately resistant
29	IVK-I-2019-10	9.0	9	3	Moderately resistant
30	IVK-I-2019-8	7.20	11	3	Moderately resistant
31	IVK-I-2019-24	8.0	9.80	3	Moderately resistant
32	IVK-I-2019-5	6.20	10.0	3	Moderately resistant
33	IVK-I-2019-3	7.20	13.0	3	Moderately resistant
34	IVK-I-2019-9	8.32	14.20	3	Moderately resistant
35	IVK-I-2019-1	9.20	16.20	3	Moderately resistant
36	IVK-I-2019-17	6.50	8.9	3	Moderately resistant
37	IVK-I-2019-20	3	5.0	2	Resistant

38	IVK-2019-14	3	12.20	3	Moderately resistant
39	IES-2019-1	20.33	26.50	4	Susceptible
40	IES-2019-3	4	1.05	2	Resistant
41	IES-2019-12	4.50	2.20	2	Resistant
42	IES-2019-2	9.80	10	3	Moderately resistant
43	IES-2019-7	12.65	20	4	Susceptible
44	IES-2019-9	13.00	20.24	5	Highly susceptible
45	IES-2019-4	22.20	28.02	5	Highly susceptible
46	IES-2019-10	3.60	5	2	Resistant
47	IES-2019-5	24	18.0	5	Highly susceptible
48	IES-2019-6	16	18	4	Susceptible
49	G-2-52	30	24	5	Highly susceptible
50	JL-24	24.0	11.0	4	Susceptible

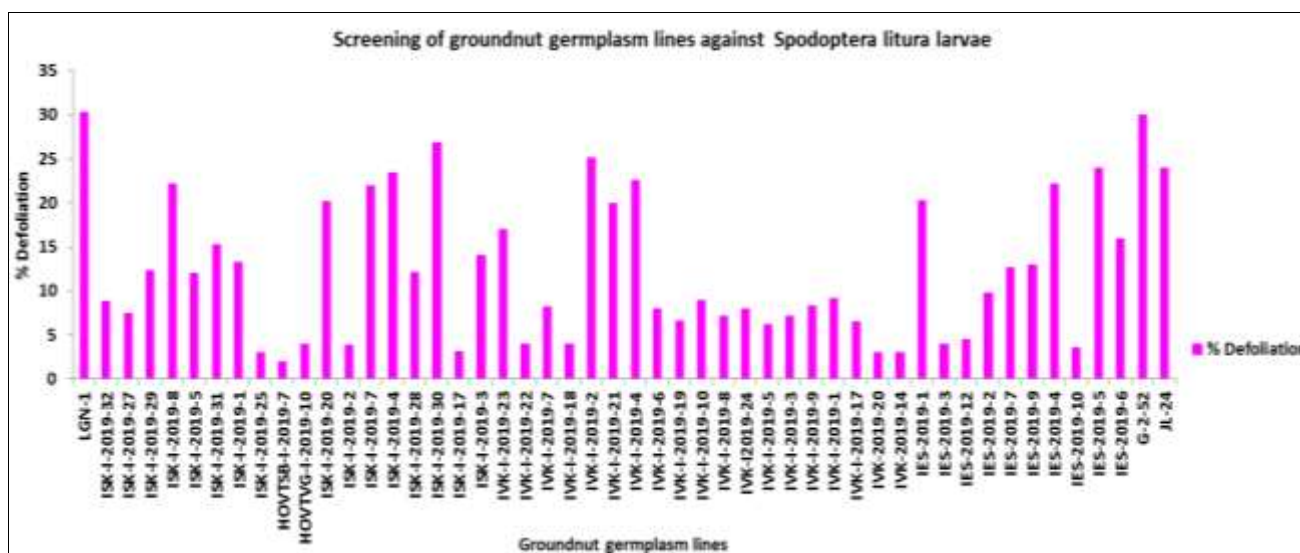


Fig 2: Screening of groundnut germplasm lines against *Spodoptera litura* larvae

Screening of groundnut genotype lines for resistance/tolerance to *Aproaerema modicella* larvae

The results in respect of screening of groundnut genotype lines for resistance/tolerance to *Aproaerema modicella* larvae are presented in Table 5 and Fig. 3. Data presented in the table revealed that the lowest *Aproaerema modicella* larvae was recorded on genotype HOVTSB-I-2019-7 i.e. 3 larvae per five plant which is highly resistant genotype followed by ISK-2019-25 (4.05 larvae per five plant). Highest number of *Aproaerema modicella* larvae were reported on IVK-I-2019-4 i.e. 24.10 larvae per five plant followed by ISK-I-2019-17 (21.50 larvae per five plants).

The percent leaflets damaged ranged in between 3.06 to 86.30 percent while the damage grade lies 1 to 9. The IVK-I-2019-4 recorded highest genotype line recorded highest 86.30 percent defoliation followed by ISK-I-2019-17 (85.0 percent defoliation) and damage grade 9. The susceptible check was JL-24 (72.50 defoliation percentage) which damage grade was 7. Further the genotype lines were categorized into five different categories based on damage grades. Out of 50 genotype screened for *Aproaerema modicella* larvae incidence, two of the entry was found 'Highly Resistant' against *Aproaerema modicella* larvae and twelve genotype lines were categorized as 'Resistant' genotypes. Fourteen genotype lines were found as 'Moderately Resistant' and twelve as 'Susceptible' while ten genotype were found 'Highly susceptible' to *Aproaerema modicella* larvae.

To find out the resistant/tolerant resources against major lepidopteran insect-pests as the resistance in crop plants is an important component Mahadevan *et al.*, (1988) [14] reported

ICGS 50 had resistance against *Aproaerema modicella*, *Spodoptera litura*, *Helicoverpa armigera* ICGV 87264, ICGV 86350 and ICGV 86276 these lines recorded less leaf damage (17.5%) as well as well higher pod yield over JL-24 Singh *et al.*, (1993) [29] also showed BG-2 and a Virginia bunch variety showed resistance to *Spodoptera litura* and *Helicoverpa armigera* Ratnoo *et al.*, (1995) [24] studied six varieties and concluded that JL-24 and CG-2 were least susceptible to all pests, but ICGS-44 was highly susceptible Nadaf *et al.*, (1995) [17] reported the superiority of resistant genotypes ICGV-86350, ICGV-87264, ICGV-87165, GBFDS-273 over national check JL-24 against groundnut defoliators. Groundnut cultivars viz, Dh-53, Dh-56, Dh-57 and Dh-74 consistently recorded low damage by the defoliators and performed better with respect to pod yield when compared to JL-24 (Susceptible check) and moderately resistant variety, ICGV-86590 Amin (1985) [2] studied sucking and lepidopteran pest on groundnut Motka *et al.*, (1985) [16] reported JL-24 was mostly susceptible to groundnut *Aproaerema modicella* Ghule *et al.*, (1988) [9] evaluated 193 groundnut testes for resistance to the gelechiids (*Aproaerema modicella*) and showed none was resistance 18 showed moderate resistance ICG 7758 and ICG 8322 with 20.5 and 21.53 percent infestation respectively. Kalaimani (1989) [12] screened eighteen derivatives of a groundnut and recorded VG 101 entry lowest incidence of damage i.e. 4 percent Patil *et al.*, (1991) [19] studied twenty seven initial and fifteen advanced groundnut genotype trials at Dharwad during 1989 and ICGV 87264, ICGV 86598 (advanced), ICGV 86350 and ICGV 86276 (initial) showed minimum damage of leaf by

Spodoptera litura (less than 17.5 %) and also maximum yield pods also Tiwari *et al.*,(1991) [33] reported C-501 peanut variety less suitable for *Spodoptera litura*, it means it is resistant to *Spodoptera litura* larvae. Dwivedi [8] also reported Spanish type groundnut variety F-334, A-B 14 and NCAC 22 type genotype resistant to thrips, jassids, *Spodoptera litura*, *Aproaerema modicella* and bud necrosis virus while ICGV 86031 was resistant to *Spodoptera litura*. Singh *et al.*,(1993) [29] screened fifteen genotypes and showed Virginia bunch variety BG-2 was found resistant to both *Helicoverpa armigera* and *Spodoptera litura* Singh *et al.*,(1993) [29] identified ICGV 87264, ICGV 86350 and ICGV86276 resistant to *Spodoptera litura* and *Helicoverpa armigera* these lines not only recorded less leaf damage (17.5 %) but also higher pod yield over JL-24 under highest pod load. Stevenson 1993 [31] studied wild species of *Arachis* to show resistance against *Spodoptera litura*. He observed groundnut cultivar ICGS 11 was highly susceptible while the hybrid *A.chacocense* × *A. hypogea* ICGS 11, *A.chacocense* and *A.paraguariensis* highly susceptible. Rao *et al.*,(1998) [23]

studied ICG 5040, ICGS 2741, ICG 10, NCAC 17090 and GBPRS 312 susceptible while ICG 221, ICGS 44 and Raut 33-1 cultivar resistant to *Aproaerema modicella*. Satynarayana Rao (2000) [27] reported NCAC 2575 was found resistant to GLM (*Aproaerema modicella*) Sharma *et al.*, (2002) [28] proved ICGV 86031, GP-NC 343 and TMV 2 less damage as compared to JL-24 which is susceptible to *Spodoptera litura* Prasad and Gowda (2006) [21] showed mechanism of resistance to tobacco cutworm on groundnut and reported that Mutant (28-2), NCAC 343, ICED 86031, R 9227 and TAG 24 lowest leaf damage. Yambhatnal *et al.*, (2011) [35] evaluated 6 peanut entries for resistance against *Spodoptera litura* with susceptible check JL-24 at Dharwad and showed Mutant III and ICGV-86699 susceptible. Arunachalam and Zadda (2012) [5] studied response of groundnut genotypes to *Aproaerema modicella* twenty five genotypes field screened and recorded ICGV 06424, ICGV07220, ICGV 07222, ICGV 07240, ICGV 07245, ICGV 07247, ICGV 07268, ICGV 11 and VRI 6 less *Aproaerema modicella* incidence was recorded.

Table 5: Percent defoliation, mean number of larvae per five plants and damage grade of groundnut of *Aproaerema modicella*

Sr. No.	Germplasm	% leaflets damaged	Mean number of Larvae / five plant	Damage grade	Resistant reaction
1	LGN-1	80	24.50	9	Highly susceptible
2	ISK-I-2019-32	30.20	10.0	5	Moderately Resistant
3	ISK-I-2019-27	20	8	3	Resistant
4	ISK-I-2019-29	60	16.20	7	Susceptible
5	ISK-I-2019-8	56.50	20	7	Susceptible
6	ISK-I-2019-5	27.20	10.60	5	Moderately resistant
7	ISK-I-2019-31	70	18	7	Susceptible
8	ISK-I-2019-1	78	18.20	9	Highly Susceptible
9	ISK-I-2019-25	10.0	4.15	1	Highly resistant
10	HOVTSB-I-2019-7	10.22	3	1	Highly resistant
11	HOVTVG-I-2019-10	15	7.40	3	Resistant
12	ISK-I-2019-20	60.30	16.40	7	Susceptible
13	ISK-I-2019-2	35	11.05	5	Moderately resistant
14	ISK-I-2019-7	80.5	20.0	9	Highly Susceptible
15	ISK-I-2019-4	78.60	20.20	9	Highly Susceptible
16	ISK-I-2019-28	60.40	13.20	7	Susceptible
17	ISK-I-2019-30	85.0	21.50	9	Highly Susceptible
18	ISK-I-2019-17	30.35	10.05	5	Moderately resistant
19	ISK-I-2019-3	78.20	18.72	7	Susceptible
20	IVK-I-2019-23	66.0	16.0	7	Susceptible
21	IVK-I-2019-22	28.15	11.20	5	Moderately resistant
22	IVK-I-2019-7	20	7.50	3	Resistant
23	IVK-I-2019-18	16.0	5.20	5	Moderately resistant
24	IVK-I-2019-2	81.0	15.20	9	Highly Susceptible
25	IVK-I-2019-21	62.30	16	7	Susceptible
26	IVK-I-2019-4	86.30	24.10	9	Highly susceptible
27	IVK-I-2019-6	36.40	16.20	5	Moderately resistant
28	IVK-I-2019-19	41.0	10.60	5	Moderately resistant
29	IVK-I-2019-10	12.40	6.0	3	Resistant
30	IVK-I-2019-8	8.50	5.90	3	Resistant
31	IVK-I-2019-24	3.06	4.80	3	Resistant
32	IVK-I-2019-5	6.20	7.20	3	Resistant
33	IVK-I-2019-3	16.33	8.55	3	Resistant
34	IVK-I-2019-9	33.30	10.60	5	Moderately resistant
35	IVK-I-2019-1	32.0	13.20	5	Moderately resistant
36	IVK-I-2019-17	46.20	14.80	5	Moderately resistant
37	IVK-2019-20	26.33	9.80	5	Moderately resistant
38	IVK-2019-14	28.05	12.00	5	Moderately resistant
39	IES-2019-1	68.70	20.50	7	Susceptible
40	IES-2019-3	14.20	7.0	3	Resistant
41	IES-2019-12	10	3.20	3	Resistant
42	IES-2019-2	44.10	10.20	5	Moderately resistant
43	IES-2019-7	61.0	16.06	7	Susceptible

44	IES-2019-9	80.20	20.24	9	Highly susceptible
45	IES-2019-4	22.20	8.10	3	Resistant
46	IES-2019-10	6.33	2	3	Resistant
47	IES-2019-5	62	18.0	7	Susceptible
48	IES-2019-6	77	18	9	Highly susceptible
49	G-2-52	60.20	18.18	9	Highly susceptible
50	JL-24	72.50	16.05	7	Susceptible

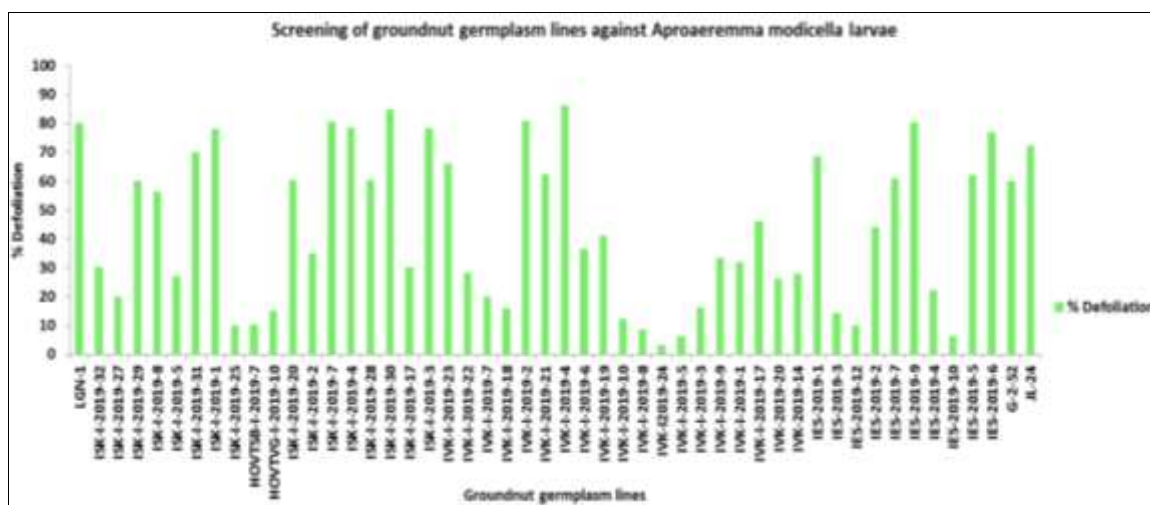


Fig 3: Screening of groundnut germplasm lines against *Aproaerema modicella* larvae

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