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Host plant resistance in cultivated jute towards hairy caterpillar, *Spilosoma obliqua*

AA Bhosale and UB Hole

Abstract
The experiment laid out in randomized block design with three replications and ten treatments with view of screening of jute cultivars against jute hairy caterpillar. Twenty cultivars were selected and considered as treatments with three replications.
An investigation on varietal screening of jute cultivars against *S. obliqua* were undertaken with a view to find out the source of resistance. The average population of *S. obliqua* was recorded minimum on jute genotype OIN- 94 (0.22 larvae/ mrl) and it was significantly superior to the rest of the genotypes evaluated. However, the genotypes OIN- 97 (1.29 larvae/ mrl) and OIN - 92 (1.96 larvae/ mrl) were the next best ones on the basis of recorded larval population and at par with genotype OIN- 94.The maximum larval population per mrl was recorded on the genotypes OIN- 87 (12.77 larvae/ mrl) and OIN- 104 (11.44 larvae/ mrl) and found to be susceptible to *S. obliqua* infestation.
The results according to plant damage concluded that the genotypes like OIN- 94 (3.33% plant damage; 114.34 cm plant height; 30.33 leaves/ plant) and OIN- 97 (6.67% plant damage; 124.34 cm plant height; 42.82 leaves/plant) were least attacked by *S. obliqua* and hence found promising. Whereas, OIN -87 (36.67% plant damage; 173.34 cm plant height; 72.00 no. of leaves/ plant) and OIN- 100 (30.00% plant damage; 162.17 cm plant height; 45.83 leaves/plant) were highly susceptible to *S. obliqua* incidence.
Also the different plant characteristics *viz*., plant height, leaf area, No. of leaves per plant, basal girth of stem, moisture and chlorophyll content of leaves were recorded at different growth stages *i.e.,* 50, 80 and 110 DAS and correlation studies were made between plant characteristics and larval population of *S. obliqua* as well as per cent plant damage by *S. obliqua.* The results on plant characteristics revealed that, plant height (r = 0.934) and number of leaves (r = 0.844) showed significant influence on incidence of hairy caterpillar); while other plant characters *viz.,* basal girth of stem, leaf area, moisture and total chlorophyll content of leaves showed non- significant correlation with pest incidence. Similar results were obtained when plant characteristics correlated with per cent plant damage by *S. obliqua.*
This correlation concluded that the genotypes with more plant height and No. of leaves/ plant are prone to damage by *S. obliqua,* So on basis of this conclusion the genotypes OIN-94, OIN-92 and OIN- 97 were least attacked by *S. obliqua* and hence found resistant. Whereas, OIN- 87, OIN- 100 and OIN- 104 were highly susceptible to *S. obliqua* incidence.

Keywords: Caterpillar, jute, cultivar, resistance, genotype

Introduction
Jute is an important natural fibre crop in India next to cotton and ranks second only to the cotton in fibre production (Talukder *et al*., 1989) [13]. Jute is known as 'Golden Fibre' due to its golden brown colour and its importance (Anonymous, 2018) [1]. Raw jute plays an important role in the country's economy. Raw jute was originally considered as a source of raw material for packaging industries only, but it has now emerged as a versatile raw material for diverse applications, such as, textile industries, paper industries, building and automotive industries, use as soil saver, use as decorative and furnishing materials etc. Raw jute being biodegradable and annually renewable source, it is considered as an environment friendly crop and it helps in the maintenance of the environment and ecological balance. Jute as a natural fiber has some definite inherent advantages. Its silky luster, high tensile strength, low exhaustibility, considerable heat resistance and long staple length are the qualities that cannot be matched by synthetic fibre.
India ranks first in area coverage and production of jute accounting for 60% of the world's production. The domestic market continues to be the mainstay of industry consuming about 87% of the total production. At the same time, export currently earns about 2095 Crores per annum (Gotyal *et al*., 2015) [5]. Together with Bangladesh, West Bengal contributes 90% of the world jute production. Therefore jute has been regarded as traditional strength of Indian agriculture (Rahman and Khan, 2007) [7], but jute is not a traditional crop of Maharashtra.

However, it produces large quantity of quality seeds through Maharashtra State Seed Corporation and National Seed Corporation.

Jute hairy caterpillar (Lepidoptera: Arctiidae) though once was considered as a sporadic pest on jute, but became a major threat to jute plant and gain the status of major pest from last two decades. The cultivation of high yielding – fertilizer responsive cultivars, gradual change in the cropping patterns in the jute growing areas and change in climatic condition *S. obliqua* assumed the major status (Satpathy *et al*., 2014) [3]. *S. obliqua*, is widely distributed in India, China, Bangladesh, Myanmar, Nepal and Pakistan (CPC 2004) [4]. In India, it is a serious pest in West Bengal, Bihar, Madhya Pradesh, Uttar Pradesh, Punjab and Manipur.

Due to its highly polyphagous nature, it attacks variety of fibre crops, pulses, oilseeds, cereals, certain vegetables, mulberry, medicinal, aromatic and other economically important plants and causes severe economic damage (Gupta and Bhattacharya, 2008) [6].The host range of this pest is still increasing (Singh and Sehgal, 1992) [12] It is one of the major pest of fibre crops like jute (*Corchorus spp.*) and mesta (*Hibiscus spp.*). However, jute is a more preferred host than mesta and causes a total foliage loss up to 20-30% in jute plantations in West Bengal and yield loss due to this pest in jute is up to 30% (Bandyopadhya *et al.*, 2014) [3]. Timely management of this pest is very important as delay may lead to complete defoliation of crop.

In recent years, outbreaks of this pest on jute was noticed in 2011. Host plant species that slow or accelerate the development of insect have considerable relevance to development of management methods (Tanga *et al.*, 2013) [14]. In co-evolution, plants and insects have evolved strategies to avoid each other's defense systems. Plants respond to herbivores through various morphological, biochemical and molecular mechanisms to counter or offset the effects of herbivore attack.

The female moth lay eggs in groups on lower surface of leaves and a single female may lay up to 1000 eggs. Upon hatching, the caterpillars feed gregariously on lower surface of leaves. The epidermis of the leaves are gradually eaten up which becomes a peculiar net like membranous structure. The pest is gregarious during the early (first to third instars) larval stages and solitarily in the late (fourth to fifth instars) larval stages (Gupta and Bhattacharya, 2008) [6].

However, the incidence of different pests occurs at different degree on predominantly grown jute varieties, but the effect of plant characteristics of jute varieties on pest incidence are not known yet. Therefore, the present study was undertaken to determine the effect of plant characteristics of popular varieties on pest incidence and the role of weather factors affecting their populations.

Material and Methods

Field experiment on "Host plant resistance in cultivated jute towards hairy caterpillar, *Spilosoma obliqua*" was conducted at the AIN Pon Jute and Allied Fibers, Cotton Improvement Project, MPKV, Rahuri during *kharif* 2019.

Screening of different cultivars of jute against hairy caterpillar

Twenty jute cultivars were screened to find out their resistance towards hairy caterpillar. Seeds of different cultivars as mentioned in Table 3.1 were sown. The manure and fertilizers were applied as per the recommendations. All the cultural operations except plant protection were carried out as and when required.

Table 1: Jute cultivars used for varietal screening

Sr. No.	Name of cultivar	Sr. No.	Name of cultivar
1.	OIN-86	11.	OIN-96
2.	OIN-87	12.	OIN-97
3.	OIN-88	13.	OIN-98
4.	OIN-89	14.	OIN-99
5.	OIN-90	15.	OIN-100
6.	OIN-91	16.	OIN-101
7.	OIN-92	17.	OIN-102
8.	OIN-93	18.	OIN-103
9.	OIN-94	19.	OIN-104
10.	OIN-95	20.	OIN-105

Chemicals and laboratory facilities

Chemicals and laboratory facilities required for the analysis were made available by the Department of Agricultural Entomology and Department of Biochemistry, MPKV, Rahuri.

Other materials

Petri plates, glass wares, plastic container, filter paper, mortar and piston, etc. were obtained from the Department of Agricultural Entomology; while hot air oven, spectrophotometer were used from Department of Biochemistry, MPKV, Rahuri.

Method of recording observations

Characters studied: Morphological characteristics

1. Number of leaves per plant
2. Leaf area
3. Plant height
4. Basal girth of stem

Biochemical characteristics

1. Moisture content.
2. Chlorophyll content

Estimation of pest incidence

Incidence of hairy caterpillar was recorded at weekly interval. Ten randomly selected plants per plot were observed for infestation of *S. obliqua*. Number of plants infested by a hairy caterpillar were counted, among the selected plants and based on the total number of plants per plot, the per cent plant infestation were calculated as per method adopted by Rahman and Khan (2011) [8].

Recording plant characteristics

Plant characteristics such as plant height, number of leaves per plant, leaf area, moisture and chlorophyll content of leaves of all varieties were recorded at three different growth stages, i.e. at 50, 80 and 110 DAS.

Plant height was measured by a linear scale from five selected plants of variety. Leaf area was measured following the methodology adopted by Seshardi and Shanmugham (1983) [11]. Basal girth of stem was measured by vernier caliper and number of leaves per plant were also counted.

Biochemical analysis

1. **Estimation of moisture content:** To determine the moisture content of leaves, all the leaves from three randomly selected healthy plants were removed and fresh weight was taken. The leaves were oven-dried at 70ºC at 24 hours and the dry weight of the leaves was taken. The difference of fresh weight and dry weight was expressed in percentage for calculation of moisture content of leaves. Three randomly selected healthy plants from each plot were used for estimation of moisture content from leaves.
2. **Estimation of chlorophyll content in leaf:** The chlorophyll a, chlorophyll b and total chlorophyll content of leaf tissues from each of varieties under study were estimated following the methodology of Arnon (1949) [2] at different growth stages and data obtained will be expressed in mg g^{-1} of fresh weight. For the estimation of leaf chlorophyll, freshly plucked leaves were used avoiding the larger veins. Few discs of 5 mm diameter were punched from the leaves at random to get a weight of 0.2 g. Then the leaf discs were crushed by using 10 ml of 80% acetone and then chlorophyll extracted in acetone was collected in test tubes by filtering the homogenate using Whatman filter paper No. 1., The supernatant was decanted and final volume of filtrate was made up to 25 ml, then absorbency for each sample was recorded at 645 nm for cholorophyll a and at 663 nm for cholorophyll b in a spectrophotometer taking acetone as blank finally total chlorophyll content was calculated by formula given by Arnon (1949) [2].

Statistical analysis

Data obtained on pest incidence and plant characteristics were statistically analyzed using analysis of variance. The pest incidence on different varieties of jute was correlated with various plant characteristics using standard statistical methods.

Results and Discussion

Screening of jute cultivars against hairy caterpillar (*S. obliqua*)

During the course of present investigation, twenty jute cultivars were screened for their reaction to jute hairy caterpillar, *S. obliqua* under field conditions on the basis of per cent plant damage by *S. obliqua* and the population of *S. obliqua* on these genotypes were recorded at 60, 75 and 90 DAS. The different plant characteristics *viz.*, morphological and biochemical characters were recorded during different growth stages such as 50 DAS, 80 DAS and 110 DAS.

Infestation of *S. obliqua*

The observations were recorded on larval population of *S. obliqua* at an interval of 60, 75 and 90 DAS. The results obtained are presented in Table 2

It could be seen from Table 4.3 that the population of *S. obliqua* per mrl at 60 DAS was recorded minimum on genotype OIN- 94 (0.55) which was significantly lower than all the remaining genotypes. However, it is at par with cultivars *viz.,* OIN- 97 (3.11), OIN- 92 (3.89) and OIN- 89 (3.99) in respect of registering *S. obliqua* population. The maximum number of *S. obliqua* per mrl were recorded on genotypes *viz.,* OIN- 87 (14.77), OIN- 100 (14.11), OIN- 104 (13.44) and OIN- 86 (12.66) at 60 DAS.

At 75 DAS, minimum number of *S. obliqua* per mrl were recorded on genotype OIN- 94 (0.11) which was lower than other genotypes. However, it is at par with cultivars *viz.,* OIN- 97 (0.77), OIN- 92 (1.44), OIN- 102 (1.78), OIN- 95 (1.99), OIN- 101 (2.33), OIN- 99 (2.55) and OIN- 89 (3.99). However, maximum *S. obliqua* population was observed on jute varieties OIN- 87 (12.77 larvae/ mrl) followed by OIN- 104 (10.88 larvae/ mrl) and OIN- 100 (10.77 larvae/ mrl).

At 90 DAS, no population of *S. obliqua* per mrl were found on genotypes OIN- 94 and OIN- 97 (0.00) and therefore found to be significantly superior in this respect. However, genotypes OIN- 92 (0.55), OIN- 89 (1.44), OIN- 102 (1.66), OIN- 99 (1.77), OIN- 101 (1.78), OIN- 95 (1.99) and OIN- 98 (2.00) are at par with these superior genotypes. The maximum *S. obliqua* population was recorded on OIN- 87 (10.77 larvae/ mrl).

Thus, it seems from the data presented in Table 2 that the average population of *S. obliqua* was recorded minimum on jute genotype OIN- 94 (0.22 larvae/ mrl) which was significantly superior to the rest of the genotypes evaluated. However, the genotypes OIN- 97 (1.29 larvae/ mrl) and OIN - 92 (1.96 larvae/ mrl) were the next best ones on the basis of recorded *S. obliqua* population and at par with genotype OIN- 94.The maximum *S. obliqua* population per mrl was recorded on the genotypes OIN- 87 (12.77) and OIN- 104 (11.44) and found to be the most susceptible to *S. obliqua* infestation.

Plant characteristics of different jute genotypes-

Morphological characters of different jute genotypes *viz.,* plant height, No. of leaves, leaf area, basal girth of stem and biochemical characters *viz.,* moisture content of leaves and total chlorophyll content were recorded at different growth stages i.e., 50 DAS, 80 DAS and 110 DAS, these characteristics are given in Table 3 and Table 4 and while screening of different genotypes of jute against *S. obliqua* at mean of 50 and 80 DAS of plant characteristics was taken and data is presented in Table 5

Table 2: Screening of different genotypes of jute against population of *S. obliqua*

Sr. No.	Variety	Larval population of *S. obliqua* population per plant at			Average
		60 DAS	75 DAS	90 DAS	
1	OIN-86	12.66(3.63)*	9.77(3..21)	8.33(2.97)	10.25(3.28)
2	OIN-87	14.77(3.91)	12.77(3.64)	10.77(3.36)	12.77(3.64)
3	OIN-88	11.66(3.49)	9.10(3.10)	7.33(2.80)	9.36(3.14)
4	OIN-89	3.99(2.12)	2.44(1.71)	1.44(1.39)	2.62(1.77)
5	OIN-90	6.00(2.55)	4.33(2.20)	3.44(1.98)	4.58(2.26)
6	OIN-91	8.22(2.95)	5.88(2.53)	4.55(2.25)	6.21(2.59)
7	OIN-92	3.89(2.09)	1.44(1.39)	0.55(1.03)	1.96(1.57)
8	OIN-93	8.33(2.97)	6.77(2.70)	5.44(2.44)	6.84(2.71)
9	OIN-94	0.55(1.03)	0.11(0.78)	0.00(0.71)	0.22(0.85)
10	OIN-95	4.66(2.27)	1.99(1.58)	0.78(1.13)	2.47(1.73)
11	OIN-96	6.66(2.68)	3.88(2.09)	2.89(1.86)	4.47(2.23)
12	OIN-97	3.11(1.90)	0.77(1.13)	0.00(0.71)	1.29(1.34)

13	OIN-98	5.33(2.41)	3.21(1.93)	2.00(1.58)	3.51(2.00)
14	OIN-99	4.55(2.25)	2.55(1.75)	1.77(1.51)	2.96(1.86)
15	OIN-100	14.11(3.82)	10.77(3.36)	9.22(3.12)	11.36(3.44)
16	OIN-101	4.22(2.17)	2.33(1.68)	1.78(1.51)	2.77(1.81)
17	OIN-102	4.66(2.27)	2.66(1.78)	1.66(1.47)	2.99(1.87)
18	OIN-103	7.66(2.86)	5.44(2.44)	4.44(2.22)	5.84(2.52)
19	OIN-104	13.44(3.73)	10.88(3.37)	10.00(3.24)	11.44(3.46)
20	OIN-105	8.22(2.95)	6.88(2.72)	5.00(2.34)	6.69(2.68)
	SE+	0.35	0.44	0.40	0.28
	CD at 5%	1.20	1.27	1.14	0.81
	CV%	10.21	14.78	17.08	10.88

*Figures in parentheses are $\sqrt{x+0.5}$ transformed values

Table 3: Morphological characteristics of jute genotypes at different growth stages during *Kharif* 2019

Sr. No.	Varieties	Plant height (cm)			Number of leaves / plant			Leaf Area (cm^2)			Basal girth (cm)		
		50 DAS	80 DAS	110 DAS	50 DAS	80 DAS	110 DAS	50 DAS	80 DAS	110 DAS	50 DAS	80 DAS	110 DAS
1.	OIN-86	118.67	214.67	269.34	54.33	70.67	73.33	34.33	42.03	53.66	0.98	1.56	1.63
2.	OIN-87	123.34	223.34	268.34	65.33	80.67	83.33	37.66	48.63	60.86	0.58	1.11	1.61
3.	OIN-88	109.67	206.67	249.67	45.66	58.33	63.33	32.33	43.86	55.78	0.67	1.23	1.44
4.	OIN-89	94.67	159.34	200.34	31.66	43.33	47.00	31.83	45.36	58.66	1.63	1.09	1.21
5.	OIN-90	116.34	196.34	243.22	43.66	56.67	61.66	29.63	38.08	50.66	0.68	1.28	1.36
6.	OIN-91	104.00	193.34	234.67	36.33	53.67	58.33	36.03	45.63	56.33	0.59	1.13	1.28
7.	OIN-92	98.34	147.67	190.67	29.66	41.00	46.33	39.63	51.08	62.08	0.57	1.10	1.17
8.	OIN-93	116.00	176.34	226.34	46.00	57.00	62.33	41.08	53.66	64.66	0.69	1.17	1.24
9.	OIN-94	89.34	139.34	194.34	24.00	36.66	38.33	31.33	42.30	53.78	0.57	1.10	1.21
10.	OIN-95	100.67	158.34	203.34	31.00	41.66	44.33	34.63	41.66	52.33	0.60	1.04	1.15
11.	OIN-96	98.34	172.34	200.34	36.66	50.33	55.00	38.03	50.03	61.66	0.51	0.98	1.17
12.	OIN-97	102.00	146.67	210.67	36.33	49.33	69.50	31.33	43.46	54.06	0.53	0.87	1.18
13.	OIN-98	99.34	174.34	210.67	34.33	51.33	49.66	38.63	46.78	58.63	0.87	1.15	1.22
14.	OIN-99	94.34	153.67	209.34	25.33	67.36	54.00	38.46	49.63	61.33	0.74	1.14	1.18
15.	OIN-100	124.67	199.67	252.34	42.00	49.67	39.33	42.56	50.23	62.66	0.85	1.23	1.56
16.	OIN-101	109.34	143.34	218.34	32.66	43.67	53.33	40.03	49.66	60.30	0.89	1.18	1.27
17.	OIN-102	84.34	156.67	196.34	30.33	41.67	50.00	33.08	42.08	53.00	0.67	1.13	1.22
18.	OIN-103	103.67	171.34	209.34	31.33	43.34	48.33	37.63	49.66	62.08	0.82	1.19	1.30
19.	OIN-104	136.67	207.34	266.67	61.66	74.66	77.00	30.03	42.03	53.23	0.87	1.26	1.55
20.	OIN-105	108.00	159.34	218.67	31.66	48.00	51.33	30.33	41.08	52.03	0.71	1.00	1.24

Table 4: Biochemical characteristics of jute genotypes at different growth stages *Kharif* 2018

Sr. No.	Variety	Moisture content (%)			Total Chlorophyll content (mg/g)		
		50 DAS	80 DAS	110 DAS	50 DAS	80 DAS	110DAS
1.	OIN-86	73.61	75.74	78.72	4.369	4.924	5.178
2.	OIN-87	71.85	73.55	76.42	5.163	5.466	5.628
3.	OIN-88	76.23	74.22	78.82	11.878	12.155	12.366
4.	OIN-89	78.23	71.86	72.21	7.136	7.563	7.778
5.	OIN-90	80.84	76.63	74.56	6.689	6.817	6.911
6.	OIN-91	77.68	75.31	81.78	6.981	7.261	7.356
7.	OIN-92	81.53	74.74	78.82	6.336	6.778	6.852
8.	OIN-93	78.61	72.21	71.75	7.458	7.712	7.972
9.	OIN-94	73.34	74.22	77.88	8.656	8.982	9.102
10.	OIN-95	84.36	74.96	77.45	1.816	2.164	2.366
11.	OIN-96	75.76	73.23	72.26	8.421	8.681	8.786
12.	OIN-97	77.89	74.65	78.59	1.418	1.814	1.860
13.	OIN-98	80.23	73.98	74.85	8.114	8.498	8.541
14.	OIN-99	76.34	78.04	84.23	7.678	7.907	7.989
15.	OIN-100	78.33	77.43	76.23	2.996	3.292	3.336
16.	OIN-101	83.34	74.80	72.80	9.120	9.463	9.562
17.	OIN-102	78.79	76.27	82.71	7.851	8.352	8.410
18.	OIN-103	78.12	77.90	78.59	10.470	10.728	10.860
19.	OIN-104	84.26	77.22	77.50	11.115	11.651	11.710
20.	OIN-105	86.22	74.73	72.23	10.756	11.151	11.300

Table 5: Screening of different genotypes of jute against jute hairy caterpillar, *S. obliqua*

	Variety	Incidence of pest (% infestation)	Average population of *S. obliqua*	Morphological characteristics				Biochemical characteristics	
				Plant height (cm)	Basal girth (cm)	No. of leaves/plant	Leaf area (cm^2)	Moisture content (%)	Total chlorophyll content (mg/g)
1.	OIN-86	26.67	10.25(3.28)*	166.67	1.27	62.50	38.18	74.67	4.646
2.	OIN-87	36.67	12.77(3.64)	173.34	0.84	72.00	43.14	72.45	5.314
3.	OIN-88	23.33	9.36(3.14)	158.17	0.95	51.99	38.09	75.22	12.016
4.	OIN-89	10.00	2.62(1.77)	127.00	1.36	37.49	38.59	75.04	7.374
5.	OIN-90	16.67	4.58(2.26)	156.34	0.98	50.16	33.85	78.73	6.753
6.	OIN-91	20.00	6.21(2.59)	148.67	0.86	44.49	40.83	76.49	7.121
7.	OIN-92	10.00	1.96(1.57)	123.00	0.83	35.33	45.35	78.13	6.582
8.	OIN-93	20.00	6.84(2.71)	146.17	0.93	51.50	47.37	75.4	7.585
9.	OIN-94	3.33	0.22(0.85)	114.34	0.83	30.33	36.81	73.78	8.551
10.	OIN-95	13.33	2.47(1.73)	129.50	0.82	36.33	38.14	79.66	1.990
11.	OIN-96	13.33	4.47(2.23)	135.34	0.74	43.33	44.03	74.49	8.551
12.	OIN-97	6.67	1.29(1.34)	124.33	0.70	42.82	37.39	71.66	1.616
13.	OIN-98	10.00	3.51(2.00)	136.89	1.01	42.83	42.70	77.1	8.306
14.	OIN-99	10.00	2.96(1.86)	124.00	0.94	30.66	44.03	77.19	7.792
15.	OIN-100	30.00	11.36(3.44)	162.17	1.04	45.83	46.39	77.88	3.144
16.	OIN-101	10.00	2.77(1.81)	126.34	1.03	38.16	44.84	79.07	9.291
17.	OIN-102	10.00	2.99(1.87)	120.50	0.90	36.83	37.58	77.53	8.101
18.	OIN-103	16.67	5.84(2.52)	137.50	1.00	37.33	43.64	78.01	10.599
19.	OIN-104	33.33	11.44(3.46)	172.00	1.07	68.16	36.03	80.74	11.383
20.	OIN-105	16.67	6.69(2.68)	133.78	0.85	39.83	35.70	80.47	10.953

*Figures in parentheses are $\sqrt{x+0.5}$ transformed values

Correlation of *S. obliqua* incidence with different plant characteristics of jute

Correlation studies between population of *S. obliqua* per mrlwas made with morphological and biochemical characteristics of genotypes tested for pest resistance. Table 6 shows the correlation of plant damage and plant characteristics of twenty different cultivars grown during *kharif*2019. The result revealed that among various plant characteristics, plant height showed significant influence on incidence of jute hairy caterpillar (r = 0.934) and No. of leaves per plant also showed highly significant correlation with pest incidence (r = 0.844) while other plant characters *viz*., basal girth of stem, leaf area, moisture and total chlorophyll content of leaves showed non- significant correlation with pest incidence.

Table 6: Correlation of pest's incidence with different plant characteristics of jute

Sr. No.	Plant characteristics	Correlation coefficient (r)
1.	Plant height (cm)	0.934**
2.	Basal girth (cm)	0.270
3.	No. of leaves/ plant	0.844**
4.	Leaf area (cm^2)	0.084
5.	Moisture content (%)	0.027
6.	Total chlorophyll content (mg/g)	0.101

**Significant at 1% level (0.600)

Correlation of plant damage by *S. obliqua* with different plant characteristics of jute genotypes

Correlation studies of per cent plant damage by *S. obliqua* was made with morphological and biochemical characteristics of genotypes tested for pest resistance. Table 7 shows the correlation of plant damage and plant characteristics of twenty different cultivars grown during *kharif* 2019. The results revealed that among various plant characteristics, plant height showed significant influence on incidence of jute hairy caterpillar (r = 0.918) and No. of leaves per plant also showed highly significant correlation with pest incidence (r = 0.872); while other plant characters *viz.*, basal girth of stem, leaf area, moisture and total chlorophyll content of leaves showed non-significant correlation with pest incidence.

Table 7: Correlation of plant damage by *S. obliqua* with different plant characteristics of jute

Sr. No.	Plant characteristics	Correlation coefficient (r)
1.	Plant height (cm)	0.918**
2.	Basal girth (cm)	0.236
3.	No. of leaves/ plant	0.872**
4.	Leaf area (cm^2)	0.071
5.	Moisture content (%)	0.054
6.	Total chlorophyll content (mg/g)	0.014

**Significant at 1% level (0.600)

Rahman and Khan (2011) [8] reported that the plant height and No. of leaves are positively and significantly correlated with incidence of *S. obliqua* and leaf area, basal girth of stem, moisture content of leaves and total chlorophyll content of leaves showed non- significant relationship with incidence of *S. obliqua.*

The results concluded that the genotypes *viz*., OIN- 94 (3.33% plant damage; 114.34 cm plant height; 30.33 leaves/ plant) and OIN- 97 (6.67% plant damage; 124.34 cm plant height; 42.82 leaves/plant) were least attacked by *S. obliqua* and hence found promising. Whereas, OIN -87 (36.67% plant damage; 173.34 cm plant height; 72.00 leaves/ plant) and OIN- 100 (30.00% plant damage; 162.17 cm plant height; 45.83 leaves/plant) were highly susceptible to *S. obliqua* incidence.

Conclusion

With reference to above results, it could be concluded that

- The average larval population of *S. obliqua* was recorded minimum on genotype OIN- 94 (0.22 larvae/ mrl) which was signifiacntly superior to the rest of the genotypes evaluated. However, the genotypes OIN- 97 (1.29 larvae/ mrl) and OIN - 92 (1.96 larvae/mrl) were the next best ones on the basis of recorded *S. obliqua* population and at par with genotype OIN- 94.The maximum *S. obliqua*

population per mrl was recorded on the genotypes OIN-87 (12.77 larvae/ mrl) and OIN- 104 (11.44 larvae/ mrl) and found to be the most susceptible to *S. obliqua* infestation.

- The results according to plant damage concluded that the genotypes like OIN- 94 (3.33% plant damage; 114.34 cm plant height; 30.33 leaves/ plant) and OIN- 97 (6.67% plant damage; 124.34cm plant height; 42.82 leaves/plant) were least attacked by *S. obliqua* and hence found promising. Whereas, OIN -87 (36.67% plant damage; 173.34 cm plant height; 72.00 no. of leaves/ plant) and OIN- 100 (30.00% plant damage; 162.17 cm plant height; 45.83 leaves/ plant) were highly susceptible to *S. obliqua* incidence.
- Plant height (0.934) and No. of leaves /plant (0.844) showed highly significant correlation with *S. obliqua* incidence; while leaf area (0.084), basal girth of stem (0.270), moisture (0.027) and total chlorophyll content of leaves (0.101) showed non- significant correlation.
- Plant height (0.918) and No. of leaves /plant (0.872) showed highly significant correlation with per cent plant damage by *S. obliqua*; while leaf area (0.071), basal girth of stem (0.236), moisture (0.054) and total chlorophyll content of leaves (0.014) showed non- significant correlation.
- The genotypes of jute *viz.*, OIN- 94, OIN- 92 and OIN – 97 were least attacked by *S. obliqua* and hence found resistant.
- The genotypes *viz.*, OIN- 87, OIN- 100 and OIN- 104 were highly susceptible to *S. obliqua*.

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