

## USEFUL COTTON GERMPLASM FIELD TOLERANT TO JASSIDS AND BOLLWORMS

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Jassids and bollworms constitute the most serious insect enemies of cotton affecting yield and quality considerably. The Central Institute for Cotton Research, Nagpur maintains a global collection of cotton genetic resources (Table 1) of which 4268 in *G. hirsutum* and 1680 in *G. arboreum* have earlier been catalogued for major economic characters. So far no systematic effort was made by any one to evaluate a large number of accessions of these two species for the field reaction to jassids and incidence of bollworms including pink (*Pectinophora gossypiella*), spotted (*Earias vittella*) and American bollworm (*Heliothis armigera*) over a continuous period of 3 seasons under field conditions in a systematic manner. In this paper, results of study conducted with 254 accessions of *G. hirsutum* and 201 of *G. arboreum* for screening against jassids and 473 and 201 accessions of *G. hirsutum* and *G. arboreum* respectively for bollworms are discussed.

**Table 1.** Germplasm holdings in cotton Gene Bank, CICR, Nagpur

Species	Number of accessions		
	Upto 1992	1993	Total
<i>G. hirsutum</i>	4268	1438	5706
<i>G. barbadense</i>	298	620	918
<i>G. arboreum</i>	1680	45	1725
<i>G. herbaceum</i>	450	10	460

A total of 254 and 473 germplasm accessions of *G. hirsutum* and 201 accessions of *G. arboreum* involving breeders working collections were evaluated for 3 consecutive seasons during 1989-1992 at CICR, Nagpur under field conditions (rainfed). The above materials were grown in 3 replications of 10 plants each per replication. Standard procedures for screening for jassids and combined incidence of bollworms on boll and locule basis were followed (Bhat and Jayaswal, 1989; Narayanan, 1991 and Singh and Narayanan, 1993). The data were analysed each year and based on the 3 year overall performances, the germplasm were grouped into various resistance grades.

**Table 2. Results of field evaluation for jassid and combined bollworms incidence in elite *G. hirsutum* and *G. arboreum* germplasm.**

Pest	Species	Total number of accs.	Number of accessions			
			HR	MR	MS	HS
Jassids	Hirsutum	254	74	154	22	4
	Arboreum	201	201	-	-	-
			Number of accessions			
			Mean bollworms incidence percent			
Boll worms (Combined incidence)			0-10.0	10.1-20.0	20.1-30.0	30.1 & above
Locule basis						
	Hirsutum	473	144	100	67	162
	Arboreum	201	179	20	2	-
			Mean bollworms incidence percent			
			0-20.0	20.1-40.0	40.1-60.0	60.1 & above
Boll basis						
	Hirsutum	473	111	133	97	132
	Arboreum	201	174	23	4	

HR = Highly resistant; MR = Moderately resistant; MS = Moderately susceptible; HS = Highly susceptible

The results of field evaluation for jassids and combined bollworms incidence are presented in Table 2. Based on the 3 years mean performance,

the germplasm accessions were listed under resistant and susceptible categories (Table 3).

**Table 3. Elite germplasm accessions with field tolerance to jassid and bollworms**

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**Jassids**

*G. hirsutum:*

**Fairly resistant**

Cocker 100 staple, EL 592, DC 534-3, 86-la-1, 561, Blight Master, Hirsutum Tashkent, B 1007, 68-G-6, JK 266, Sobhagya, A 72-62, Acala SJ 5, CB 2472-3, Deviraj.

**Moderately susceptible**

Meade 9030 D, Texas 1050, 9030-8-5, AR 27, PH 36A, DS 61, B 61- 2307, PKV 053, PKV 802, G. Cot. 12, M 4, DHY 286.

*G. arboreum:*

**Highly resistant**

AC 27, 30797, 30805, H 234, H 442, AKH 2, Vira 6, Desi 6, Million Dollar, BDN 6377, Rozi 6, AK 235, Naked Seed, Chinese spotless, Malvensis, AC 3662, G 153, Cocanada 5, B-11, Chandroda, P 642 NLL.

**Bollworms**

*G. hirsutum :*

**Fairly resistant**

Coker 100 Staple, DCI 108, JK 259, 68-G-6, DS 59, JK 297-621, Buri NL, G. Cot. 12, PKV 804, 9030-8-5, Meade 9030 D, Reba B 50, KW 61-276, Lankart 57.

**Moderately susceptible**

Acalaglandless, Acala 69/5, Bikaneri Narma (Frego), M-19 cy, PD 695.

*G. arboreum :*

**Fairly resistant**

AC 27, AC 36, 30811, 30805, AC 28, BJ-6, LD 132, 30820, 30816, B- 15-3-0 MLL, H 446, H 73, LD 135, 7735, JL 10 BLL, 79/BH-53, 30820 NLL, AKH 5, G 27.

**Moderately susceptible**

Lohit, Chinese Spotless, Lohit Red, G 153, B-11, P 562 NLL, Sanguineum BL/RF, AC 3294, Malvensis, Sanguineum G 29, 79/BH 53.

**Jassids**

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It may be seen from the table that out of 254 accessions screened, 74 were highly resistant while 154 recorded moderate resistance grade and 22 were medium susceptible whereas, only 4 accessions exhibited high susceptibility to jassids in the tetraploid species *G. hirsutum*. In the case of 'desi' cotton (*G. arboreum*) all the 201 accessions were found highly resistant against jassids.

### Bollworms

In case of combined bollworms incidence recorded on locule basis in *G. hirsutum*, 144, 100 and 67 accessions fell under 0-10.0, 10.1-20.0 and 20.1-30.0 per cent bollworm incidence categories respectively, while 162 accessions recorded bollworm incidence of 30.1 per cent and above. In case of *G. arboreum*, 179, 20 and 2 accessions were represented in the three categories of 0-10.0, 10.1-20.0 and 20.1-30.0 per cent bollworm incidence, whereas none of the accessions fell in the category of 30.1 per cent and above.

The combined bollworms incidence recorded on boll basis also showed similar trend as in the case of incidence of bollworm on locule basis. It is seen from the table that out of 473 *G. hirsutum* accessions studied, 111 and 133 fell in the categories of 0-20.0 and 20.1-40.0 respectively while 97 and 132 accessions were grouped under 40.1-60.0 and 60.1 per cent and above categories. In case of 201 *G. arboreum* accessions 174 and 23 accessions fell in the first two categories of bollworm incidence whereas only 4 were grouped into third category of 40.1-60.0 per cent while none of the accessions showed higher incidence of bollworms under 60.1 per cent and above category.

From the above, it is evident that there are considerable germplasm lines which are showing field tolerance/resistance towards combined bollworms incidence and jassids in the national gene pool of cotton available at CICR, Nagpur. These accessions can be further screened/tested under artificial cage conditions so as to confirm their reactions against the jassids and bollworms complex and thereby could be utilized in breeding programmes to develop suitable resistant/tolerant cultivars for commercial cultivation.

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