PROGRESS REPORT

SORGHUM PATHOLOGY

30

REPORT ON
THE RESISTANCE SCREENING WORK
FOR
GRAIN MOLDS, CHARCOAL ROT AND ERGOT
JUNE 1978 - MAY 1979

K.N. RAO, R.J. WILLIAMS, MADHURI MULGUND
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P R E F A C E

This report contains the results of research on sorghum grain molds, charcoal rot and ergot between June 1978-May 1979. During this period major emphasis was laid on identification and utilization of host-plant resistance.

All the three diseases were satisfactorily promoted in the field allowing successful screening. Work load on staff was well distributed because of sequential planting. Material for grain mold screening was planted in June, for ergot in September and for charcoal rot in November. Fairly dry weather prevailed during charcoal rot screening except for two occasional showers in February (5th and 12th), which interfered with moisture stress. However, high levels of disease developed in known high susceptibles.

Field and laboratory screening methods employed for each disease are briefly described in individual sections. Most of the materials included in grain mold and charcoal rot screening are breeding progenies generated by crossing resistant sources on elite backgrounds. Other materials include International sorghum disease nurseries and advanced screening of source material. Progenies from mold resistance breeding program and sorghum germplasm lines were screened for sources of resistance to ergot in the preliminary screening. Results are briefly discussed under various disease sections.

SUMMARY

The major efforts of the Sorghum Pathology team during the period under report were in the area of screening for resistance to grain molds, charcoal rot and ergot.

Consistently less susceptible entries to grain molds in repeated cycles of tests at ICRISAT Center and in multilocational testing are utilized in a collaborative program with sorghum breeders. Elite selections for grain molds and agronomic traits were made from mold resistant x adapted crosses, when large numbers (3010) of breeding progenies were screened under intensive grain mold pressure. Intercrossing of recovered material and further screening for grain molds has enabled us to develop excellent sorghums coupled with mold resistance.

The field screening technique developed in the previous year was used to screen 540 sorghum germplasm lines and 4107 breeding progenies. Entries less susceptible to charcoal rot at ICRISAT Center are exposed to various populations of pathogen in multilocation testing. Identified source material was utilized in a joint program with sorghum breeding staff. Breeding progenies were screened for charcoal rot toothpick inoculations and single plant selections were made for further cycles of testing.

Field screening technique was developed and used to screen 204 germplasm lines and 651 breeding progenies for ergot resistant source material. Eight entries -- IS 3938, IS 6759, IS 7555, IS 7561, IS 7821, IS 7830, IS 7856, IS 7438 -- which were less susceptible to ergot inoculations at ICRISAT Center were also rated as resistant to moderately resistant at Akola in Maharashtra state.

An International Workshop on sorghum diseases was organized at ICRISAT Center, 11-15 December, 1978, jointly by ICRISAT Cereal Pathology Program and Texas A & M University, U.S.A. The objectives of the workshop was to update knowledge on sorghum diseases and to exchange information on sorghum diseases, among the participants. The workshop was attended by 45 participants from 21 countries and 14 participants from ICRISAT Center.

I. GRAIN MOLDS

A. INTRODUCTION

Traditional sorghums are photosensitive, generally long duration and relatively low yielders. Improved genotypes are designed to flower and mature early when soil moisture levels are adequate for good grain filling. When rains persist beyond flowering and maturity, these improved varieties run into the problem of molds developing on the grain, reducing its quality and quantity. The problem of grain molds is widespread and is considered a priority problem in the sorghum improvement program at ICRISAT Center.

Initial symptoms of sorghum grain mold appear as white mycelial growth on rachis, glumes and anthers. The grains become discolored and at physiological maturity pink, black or grey discolorations are observed depending on the organism involved. Severely molded grains are generally lighter than clean grains and disintegrate when pressed between thumb and forefinger. Alternate wetting and drying coupled with infection by mold fungi causes grain deterioration. It is difficult to differentiate physical and physiological grain deterioration from that of fungal deterioration.

Grain molds are a complex problem involving parasitic and saprophytic forms of several organisms. There are limitations of economics

and of residual toxicity for use of fungicides and other chemicals on sorghum grain directly. We cannot advocate the farmers to plant late as an escape mechanism, because when rains fail the grain may poorly develop under moisture stress. Therefore, we feel that host-plant resistance is the only control method for sorghum grain molds that will be viable economically and technically at the peasant farmer level.

B. FIELD SCREENING

Screening for grain mold resistance has been done in various programs utilizing natural mold development, when the materials were exposed to rains during flowering and maturity. There is a possibility that lines selected under such natural screening are not truely resistant lines; they could be escapes. To minimize the escapes there was a need to develop an effective screening method. The method developed at ICRISAT Center for field screening is briefly described here.

a. Screening technique:

1. Inoculum preparation: In 250 ml conical flasks, 50 gms of sorghum grain, preferably white colored, and 50 ml tap water was taken. The flasks were plugged with non-absorbent cotton and autoclaved at 15 lb. pressure for 20 minutes. Three grain mold pathogens i.e. *Fusarium moniliforme*, *F. semitectum* and *Curvularia lunata* were isolated in pure cultures from molded sorghum grain. Conidial and mycelial mixtures

were prepared by adding sterile water into these culture tubes under asceptic conditions. Autoclaved sorghum grain in flasks was inoculated with the conidial-mycelial mixtures from each of the three pathogens separately. These flasks were shaken thoroughly to get the inoculum evenly distributed to all the grains. The flasks were incubated at 25°C for 7 days by which time most of the grains were covered with mold growth. Grains from one flask each of the three organisms were together washed in 5 litres tap water and strained through muslin cloth. The supernatent liquid containing aqueous mycelial - conidial suspensions of mold fungi was used for inoculation.

2. Inoculations: Near uniform ten plants in a 4 m row were covered with brown paper bags at inflorescence emergence from the boot. At about anthesis, or 7 days after bagging, the bags were removed and the heads were sprayed with the inoculum with pneumatic hand sprayers. The bags were replaced immediately after inoculation for another 20 days. Sprinkler irrigation was provided for 20-30 minutes in the evening on every rain free day from flowering to maturity.

3. Evaluation of reactions: Scoring for molds is done 45 days after inoculation on bagged inoculated and on non-inoculated non-bagged panicles for other molds including *Phoma*. The following 1-5 rating scales were used based on the severity of moldy growth and extent of the head covered.

i. Molds other than *Phoma*:

1. No mold
2. Scanty superficial mold growth on rachis branches and glumes and up to 10 percent of grains obviously molded.
3. Considerable mold growth on rachis and glumes and 11-25 percent grains obviously molded.
4. Considerable mold growth on rachis and glumes and 26-50 percent grains obviously molded.
5. Head severely molded with more than 50 percent of grain showing discoloration and mold growth.

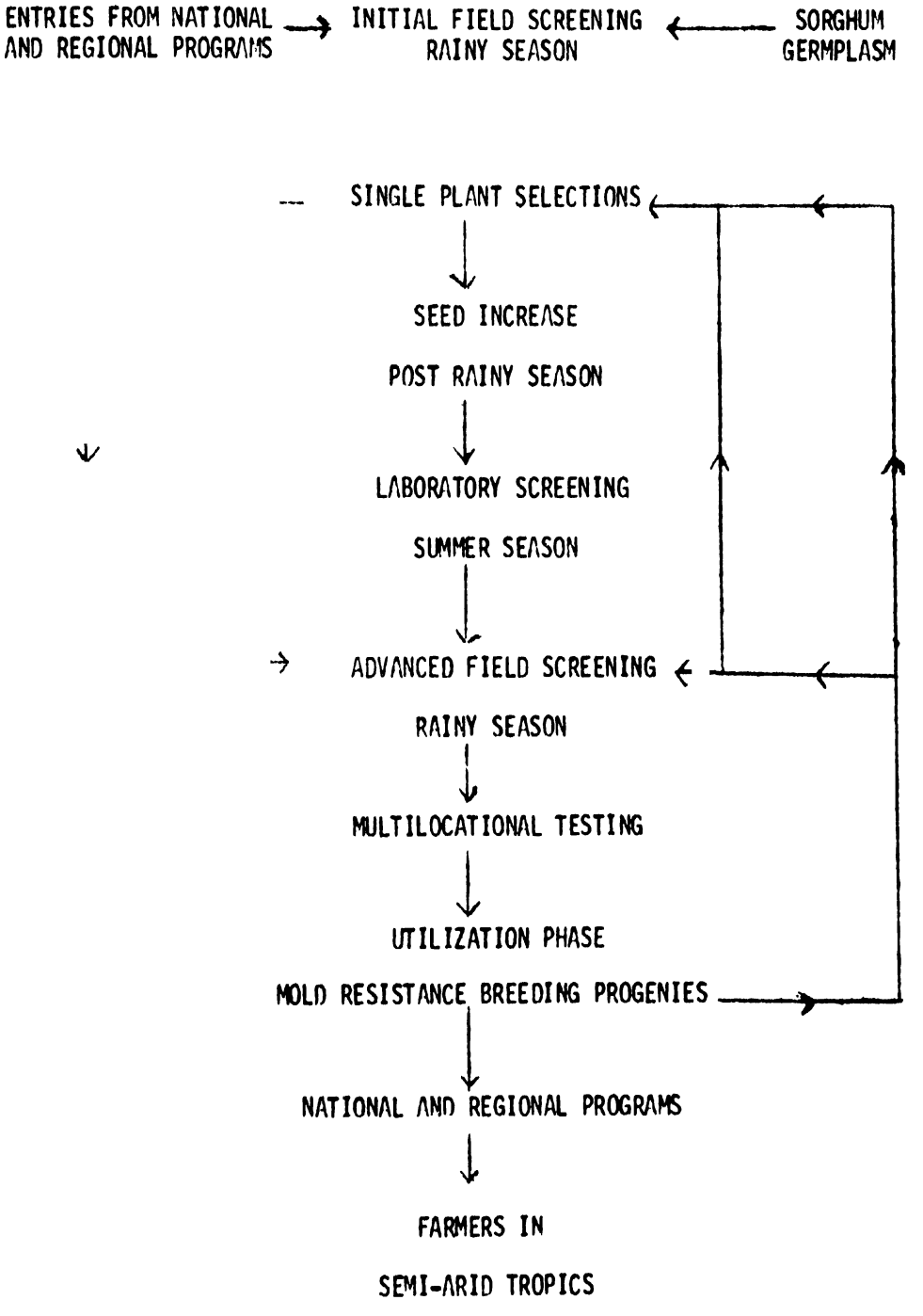
ii. Scoring for *Phoma*:

1. No discoloration on grain
2. Up to 10 percent of the grains obviously *Phoma* infected
3. 11-25 percent grains obviously " "
4. 26-50 percent grains obviously " "
5. More than 50 percent of grains obviously " "

b. Screening activity.

Flow chart of screening activity for sorghum grain mold resistance is presented in Fig. 1. Material planted for initial screening includes germplasm lines and entries reported as sources of resistance to molds in national and regional programs. Individual heads selected

Fig. 1. FLOW CHART OF SORGHUM GRAIN MOLD RESISTANCE SCREENING ACTIVITY AT ICRISAT CENTER.



in the initial screening are planted head to row in post rainy season for seed increase. Laboratory screening is carried out on post rainy season harvested seed. The details of laboratory screening procedures are given separately in the report. Selected entries are planted for advanced screening in the following rainy season. Consistently less susceptible entries in all the three screenings are included in multi-locational testing program, the International Sorghum Grain Mold Nursery (ISGMN). Less susceptible entries across several locations are utilized in a joint program with sorghum breeding staff. Mold resistance breeding progenies developed in the utilization phase are supplied to scientists in national and regional programs who in turn use them in their breeding activities to develop finished products for their regions.

Materials reported as sources of resistance to grain molds in national and regional programs are moved through the initial and/or advanced screening phases at ICRISAT Center. Selected entries from advanced screening are cycled through for repeated tests until consistent low susceptibles are identified.

Summary of the screening activity in 1978 rainy season is presented in Table 1. Maximum entries (40%) were selected as low susceptible in ISGMN program, as the material included in this trial has passed through repeated cycles of selection under intensive screening.

Twenty percent of the entries were selected in the advanced screening of single head progenies and lines from laboratory screening. The 1978 International sorghum disease nurseries other than ISGMN showed high susceptibility to grain molds as they were not developed on a mold resistance background.

Number of entries in different grain mold reactions categories is presented in Table 2. Of the 857 entries screened 157 were rated as low susceptible with a rating of two on a 1-5 scale. About one fifth of the entries from the previous year's selections of mold resistance breeding progenies were reselected in the present screening.

Natural incidence of *Phoma* was considerable during the season and scoring on a 1-5 scale was done for all the entries screened. Number of entries in different *Phoma* reaction categories is presented in Table 3. Of the 833 entries scored for *Phoma* only 17 were rated ≤ 2. The identity of less susceptible entries to *Phoma* are presented in Table 4. It is encouraging to note that seven entries -- IS 14332, IS 2327, E 35-1, IS 9225, IS 2328, IS 2261 and IS 2435 -- are less susceptible to *Fusarium* and *Curvularia* inoculations as well as for *Phoma* under natural infection conditions. The detailed observations in different groups of materials screened are briefly discussed.

1. The 1978 International Sorghum Grain Mold Nursery (ISGMN):

The 30 entry nursery was assembled based on reactions at ICRISAT Center and in national and regional programs. Two known high susceptibles were also included to act as indicators of disease pressure. Out of 28 test entries screened for *Fusarium* and *Curvularia* molds, 12 entries were rated as ≤ 2 and 9 of them are also less susceptible to *Phoma* incidence (Table 5). Entries which had a score of < 2 for molds and *Phoma* are IS 14332, IS 9225, IS 2327, IS 2328, E 35-1, IS 2261, M 36113, IS 2435 and M 36284.

2. The 1978 Sorghum Elite Progeny Observation Nursery (SEPON):

Entries included in this nursery are elite selections from mold resistance breeding project. This nursery is sent out in the multilocation testing program to different locations. Entries with local adaptation and less susceptibility to grain molds are utilized in national and regional programs. Among the 48 entries screened under intensive grain mold pressure at ICRISAT Center, six entries gave a rating of ≤ 2 (Table 6). *Phoma* incidence was less in mold inoculated bagged heads in most of the entries. However, considerable *Phoma* developed on non-inoculated non-bagged heads and no entry had a score of less than 3. Three entries -- M 35586, M 36285, M 35598 -- had mold ratings of < 2 and *Phoma* ratings < 3.

3. The 1978 International Sorghum Downy Mildew Nursery (ISDMN):

In an attempt to find sources of multiple disease resistance in sorghum, International disease resistant nurseries other than ISGMN are also screened for grain molds. Out of 24 entries in the 1978 ISDMN, two entries (E 35-1 and IS 2377) had a rating of ≤ 2 for mold and *Phoma* incidence (Table 7). These two entries are less susceptible to molds because they are selections from the ISGMN program. Severe molds and *Phoma* developed on other entries with maximum scores up to 4.5.

4. The 1978 International Sorghum Charcoal rot nursery (ISCRN):

Of the 28 less susceptible and two known high susceptible entries in the 1978 ISCRN only three entries (IS 1235, (954063 x CS 3541)-30, (954068 x CS 3541)-64) had mold ratings of ≤ 2 and *Phoma* scores of ≤ 3 (Table 8). Twenty entries had a mold ratings of > 3 and 22 entries had *Phoma* scores ≥ 4.

5. The 1978 International Sorghum Leaf Disease Nursery (ISLDN):

Entries with overall less susceptibility to various leaf diseases and known high susceptibles are included in the 1978 ISLDN. Out of 27 entries screened IS 1115 had a mold rating of 2 and another six entries had a rating ≤ 3 (Table 9). No entry had a *Phoma* rating < 3 with most entries rated between 4 and 5. Considerable mold developed on entries (IS 2276, IS 460, IS 2225) which were otherwise good for leaf disease.

6. Entries from laboratory screening:

Mold resistance breeding progenies and source material were screened in the laboratory in summer 1978 (details are given under laboratory screening). Entries with a visual scoring of ≤ 2 were screened in the field under severe grain mold pressure. Of the 82 entries, 17 entries had a mold rating of ≤ 2 and another 37 had a rating of ≤ 3 (Table 10). IS 18385 and IS 18332, two sister lines, and M 36306 had less *Phoma* rating compared with other entries.

7. Advanced screening of single plant selections from the 1977 rainy season:

Single plant selections from the 1977 rainy season screening were increased, and retesting was done under severe grain mold pressure. Out of 517 entries screened, 105 had mold ratings of ≤ 2 and another 255 had ratings of ≤ 3 (Appendix 1). It is encouraging that only 157 entries had high susceptibility to molds. *Phoma* incidence was severe on many entries and only five entries -- M 36308, M 36011, M 35097, M 36321, M 36089 -- had *Phoma* ratings of ≤ 2. The apparent low susceptibility to *Phoma* of these entries needs to be confirmed as they were tested under natural incidence.

8. Mold resistance breeding progenies:

F_3 and F_4 segregating generations of adapted x mold resistant crosses were screened for grain mold reactions and the data is presented

in Table 11. Single head selections were made in this material cooperatively with sorghum breeding staff. Of the 3096 entries 69 panicles were selected with a mold rating of ≤ 2 and another 10 panicles had a rating of ≤ 3. These selections will be further screened to confirm the resistance.

C. LABORATORY SCREENING

The field screening allows only one screening period in the year and the success depends on the weather during flowering and maturity. Therefore we need to develop alternative screening methods in which we have control over the factors responsible for the promotion of mold development. Screening should be independent of local weather and then made possible all through the year. The laboratory screening technique developed and used at ICRISAT Center to identify sources of resistance to grain molds is described and discussed here. Though, the differentiation between low and high susceptible entries was clear in the laboratory screening, the correlations between field and laboratory screening were not up to the mark. We are still trying to refine our technique further.

a. Screening technique:

Grain of 659 sorghum lines, involving progeny rows of elite x mold resistance crosses and mold less susceptible parents, harvested in 1977-78 postrainy season, were screened. A standard quantity of grain

from each line was washed in tap water and incubated in Petridish moist chambers. Unless otherwise stated incubation was done Percival incubators at 25°C with 12 hrs alternate light and dark regimes. Observations were taken on three infection parameters for each entry viz:

i) Percent grain infected: Simple calculation of percent grain infected were made on 400 randomly selected seeds (100 seeds from each of 4 Petri plates)

ii) Actual severity: Individual grains were rated on 1-5 severity scale where 1 = no mold and 5 = severe mold and the average of 400 grains were calculated.

iii) Visual scoring Taking over all mouldiness of the grain into consideration visual rating on 1-5 scale where 1 = no mold and 5 = severe mold was given for individual entry.

The screening process is divided into two phases with progressively more severe presure on the test materials.

1. Phase I. 40 gm grain per entry was taken from post rainy season harvested (7-10) days after physiological maturity) bulk samples. Grain was soaked for 1 to 3 hr in tap water in 2 litre plastic buckets. Disposable plastic Petri plates (10 cm x 1.5 cm) were used to make moist chambers. The Petri plate moist chambers were prepared by putting 10 ml of 0.2% 2, 4-D solution to soak double layer blotters

over uniform cotton pad (about one mm thick). Blotters were not provided in the lids of the Petri plates. The soaked washed grain was spread over the blotters in a single layer and the Petri plates were incubated as indicated above. Each entry was replicated four times and randomized to minimise position effects within the incubators. Three infection parameters were recorded after four days and the results obtained are presented in Table 12.

All the entries with a rating of 2 or less for visual score were further incubated for three more days and observations were recorded for visual scoring (Table 12). Entries with consistently high performance having a visual score of 2 or less were selected.

2. Phase II. Because of lack of seed only six of 14 entries selected in Phase I were given more the severe test Phase II test by inoculating with mold fungus. Entries were dip inoculated with spore suspension of *Curvularia lunata* (10×10^4 conidia/ml) prepared from freshly grown cultures. For each replication of each entry 10 ml spore suspension was used. Petri plates were incubated for four days and observations were recorded separately for inoculated and non inoculated and the results are presented in Table 13.

b. Screening activity

1. Preliminary and advanced laboratory screening: (Table 11). None of the 659 entries tested were immune to grain mold infection. 77 entries were rated as 2 in visual scoring. Maximum number of lines were in the category of 5 for percent grain infection and average severity whereas for visual scoring maximum lines were scored 4. From table 12 it was clear that even after 7 days of incubation out of 70,14 lines were rated as 2 and 55 lines were rated as 3, whereas one line showed higher infection with a rating of 4.

Inoculation with *Curvularia lunata* has enabled us to differentiate among the entries which were given rating of 2 even after incubation for 7 days (Table 14). Entry 600 and 620 have not developed significant mold infection (2.2 rating) even after inoculations. Our known high susceptibles developed fluffy growth over the grain very severely infecting (5 rating) all the grains.

2. Correlation between three grain mold infection parameters measured in the laboratory: Rank correlations were made between three grain mold infection parameters in the laboratory (Table 15). Maximum correlation was obtained between percent grain infected and average severity. Visual scoring has correlated upto 60 and 70% of average severity and percent grain infected respectively.

3. Correlations between field and laboratory ratings of grain mold incidence: Field ratings from 1977 rainy season of 68 entries for which the laboratory visual ratings were taken were compared. Similarly for 42 entries which were rated as 2 in the field were correlated with laboratory ratings and the data presented in Table 14.

Out of 68 lines, scored as 2 in the laboratory, 96% of lines came from a field rating of 2 or 3. Similarly 42 lines, scored as 2 in the field, 73% of the lines were visual scored as 2 or 3 in the laboratory. Only 4% of the lines which were scored as 4 in the field showed a rating of 2 in the laboratory. Out of the entries with field rating of 2 only 24% and 2% of the lines showed a visual rating of 4 and 5 respectively in the laboratory. Only 20% of the lines from the field rating of two were rated 2 in the laboratory also we need to refine our technique to increase this correlation level.

c. Grain weathering

One of the causes of grain weathering in sorghum is likely the initiation of germination on the heads. Enzymes activated or synthesized in germination initiate hydrolysis of starch in the endosperm causing chalkiness of the grain and loss of test weight. Saprophytic mold fungi growing on this weathered grain may cause further deterioration. Seed dormacy during and after maturation may be useful in reducing

grain deterioration. In a collaborative project between cereal pathology and physiology programs, the seed dormancy aspect of grain deterioration problem has been initiated.

Physiologists have screened large number of germplasm lines for grain dormancy throughout the grain filling period. There were major differences among genotypes; some have initiated germination as early as 15 days after anthesis, while others germinated only 30-35 days after anthesis. Genotypes also differed for percent germination, water uptake and electrical conductivity based on conductivity of grain leachate. Grains at different stages of physiological maturity were incubated in Petri plate moist chambers for four days. Percentage molded grain for each entry and severity of mold incidence on a 1-5 scale were made, where 1 = no mold and 5 = severe mold.

Preliminary investigations carried out so far indicated that there was no relationship between germinability of grain and mold development. However, mold development varied between genotypes when incubated at different growth stages. Entries identified as less susceptible and high susceptible to grain molds in this study are planted in the field for screening under severe grain mold pressure in the 1979 rainy season.

D. MULTILOCATIONAL TESTING

Sources of resistance to sorghum grain molds, identified at ICRISAT Center, are tested in the ISGMN program. The objective of the program is to develop stable grain mold resistance, to distribute source material to interested scientists and to develop a communicating cooperating international network of scientists concerned with grain molds. The list of cooperators and locations from whom the data have been received in the 1978 ISGMN is presented in Table 17. A separate report (SPGM 7901) on the 1978 ISGMN results was prepared and distributed to cooperators and other scientists involved in sorghum improvement.

Although no entry was highly resistant to grain molds at all locations there are a group of eight lines which are consistently better than others at most locations. These entries are IS 14332, IS 9225, E 35-1, IS 2328, IS 2327, JP 2579, M 36284 and M 36285. The two M-lines are derivatives from SC 108-3 and E 35-1. Grain molds are greatly influenced by flowering and humidity during the period from flowering to grain maturity. However, several of these entries performed better than known high susceptible IS 9991 even though they flowered earlier or at about the same time.

E. LOOKING AHEAD

Our future efforts in grain mold studies will involve the following activities.

Table 1. Summary of the grain mold resistance screening activities at the ICRISAT Center during rainy season 1978.

	Material	Entries screened	Entries selected	Percent entries selected*
i.	ISGH 1978	30	12	40
ii.	SEPON 1978	48	6	12.5
iii.	Less susceptible lines from laboratory screening	82	17	20.7
iv.	International nurseries other than ISGH-1978	109	5	4.6
v.	Elite selections from mold resistance breeding project	111	11	9.9
vi.	Single head selections from rainy season 1977	564	112	19.9
vii.	Mold resistance breeding progenies F_2 and F_3	2086	223	10.6
	TOTAL	3030	383	12.6

* Based on field head mold ratings of ≤ 2.

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vii.	Mold resistance breeding progenies F_4 and F_3	2096	223	10.6
	TOTAL	3040	383	12.6

* Based on field head mold ratings of ≤ 2.

Table 2. Number of entries in different reaction categories for grain molds*.

Group of material	Reaction category					Total
	1	2	3	4	5	
ISCRN	0	3	6	9	12	30
ISLDN	0	1	5	13	7	27
SEPON	0	6	27	13	1	47
Lab screening	0	17	51	14	0	82
ISDRN	0	2	11	9	2	24
ISGRN	0	12	13	1	2**	30
Retesting of selected entries	0	105	253	103	54	517
Elite lines	0	11	41	42	6	100
TOTAL	0	157	413	204	84	857

* Fusarium and correlations based on reaction of bagged inoculated heads in the field screening nurseries.

** Known high susceptibles.

Table 3. Number of entries in different reaction categories for *Phoma**.

Group of material	Reaction category					Total
	1	2	3	4	5	
ISCRN	-	-	6	7	17	30
ISLDN	-	1	-	4	22	27
SEPON	-	-	7	28	12	47
Lab screening	-	2	10	45	25	82
ISDRN	-	2	9	7	13	24
ISGRN	-	0	5	12	7	30
Retesting of selected entries	-	5	100	258	130	493
Elite lines	-	1	16	56	23	100
TOTAL	-	17	145	417	254	833

* Rating for *Phoma* incidence was done on a 1-5 scale, where 1 = no *Phoma* and 5 = severe *Phoma* incidence under natural infection conditions.

Table 4. Details of entries less susceptible to *Phoma* incidence under natural infection conditions in different groups of material screened for grain mold resistance.

Group of material	Entries with score of < 2 for *Phoma*
ISCRI	PIL
ISLDI	SC 129-14
SEPOI	PIL
Lab screening	IS 14332
	IS 14334
ISDWI	IS 2327
	E 35-1
ISGMI	IS 2225
	IS 2328
	IS 2261
	IS 14332
	IS 2327
	IS 2435
Retesting of selected entries	IS 36308
	IS 36011
	IS 35007
	IS 36321
	IS 36030
Elite lines	IS 36172

* Panicles not inoculated with mixtures of *Fusarium maniliforme*, *F. semitectum* and *Curvularia lunata* conidia and mycelial bits, and non bagged were scored for *Phoma* incidence on a 1-5 scale, where 1 = no *Phoma* and 5 = severe *Phoma* incidence.

Table 5. Grain mold reactions and days to 50% flowering of 30 entries in the International Sorghum Grain Mold Nursery (ISGMN) 1978.

S.No.	Entry	Days to 50% bloom	Mold inoc.** bagged heads scored for Phoma.	Non-inoc. non bagged heads scored for Phoma.	Mold score in inoculated** bagged heads.	Mold score in non-inoc. non-bagged heads.
1	IS 14332*	80	1.3	1.9	1.3	1
2	IS 9225*	88	1.1	1.5	1.3	1
3	IS 2327*	88.5	1.4	2	1.4	1.1
4	IS 2328*	89	1	1.8	1.4	1
5	E 35-1*	82	1.6	2.4	1.4	1.4
6	IS 2261*	83.5	1.5	1.8	1.4	1.3
7	M 36285	82	2	3.5	1.8	1.5
8	M 36348	78.5	2	3.5	1.9	1.6
9	M 36113*	80	1.9	2.3	1.9	1.3
10	IS 2435*	91	1.3	2	1.9	1.6
11	M 36284*	86	1.6	2.5	1.9	1.6
12	M 36471	83	2.6	3.1	2	2.6
13	M 36109	78.5	2.4	4.8	2.1	2
14	M 36368	82	2.8	4	2.1	2
15	M 35052	78	2	3.5	2.3	1.9
16	M 407-15	78.5	2.3	3.6	2.4	1.8
17	M 36046	79	2.5	4.5	2.4	2
18	JP 26A 2579	72.5	2.5	3.1	2.4	2

S.No.	Entry	Days to 50% bloom	Mold inoc.** bagged heads scored for Phoma.	Non-inoc. non bagged heads scored for Phoma.	Mold score in inoculated** bagged heads.	Mold score in non-inoc. non-bagged heads.
19	IS 472	78	1.8	3	2.6	2.4
20	M 36049	80	2.3	3.8	2.6	2.1
21	M 36619	80	2	4.3	2.6	2
22	M 35175	75.5	2	4	2.8	1.8
23	M 36533	80	2.3	3.5	2.8	2.4
24	CS 3541	82	2	3.6	2.8	2
25	M 36423	85.5	2.5	3	2.9	2
26	M 36333	76	2.6	4.5	2.9	2.5
27	M 4337-2	78.5	2.3	4.8	3	2
28	M 4397-1	76.5	2.8	4.3	3.3	2.4
29	PP2B x IS 11167	67.5	3.1	4.3	5	5
30	IS 9991 x MS 7	80	3	3.5	5	4.5

* Entries less susceptible to *Fusarium*, *Curvularia* molds as well as for *Phoma*.

** Mold inoculum contains equal proportions of *Fusarium moniliforme*, *F. semitectum* and *Curvularia lunata* conidia and mycelial bits, sprayed at anthesis.

Table 6: Grain mold reactions and 50% flowering of 47 entries in the Sorghum Elite Progeny Observation Nursery (SEPON) 1978.

S.No.	Entry	Days to 50% bloom	Mold inoc.* bagged heads scored for Phoma.	Non-inoc., non-bagged heads scored for Phoma.	Mold score in inoculated* bagged heads.	Mold score in non-inoc. non-bagged heads.
1	M 35586	73	2**	3	1.5	1.5
2	M 36109	72	2.5	4.5	2	2
3	M 36285	72	2	3	2	1.5
4	M 36356	71	2.5	3.5	2	2
5	M 35544	72	2	4	2	1.5
6	M 35598	74	2	3	2	1.5
7	M 35610	75	2	3	2.5	2
8	M 36346	70	2	3	2.5	1.5
9	M 36204	75	2	3.5	2.5	2
10	M 36070	77	2	4	2.5	2
11	M 36026	77	3	3.5	2.5	2
12	M 35527	72	2	4.5	2.5	2
13	M 36381	77	2	4.5	2.5	2
14	M 36464	73	2	3.5	2.5	2
15	M 36329	71	2	3.5	2.5	2
16	M 36278	73	2	3.5	2.5	2
17	M 36399	76	3	4	2.5	2
18	M 35616	79	2	3.5	2.5	2

S.No.	Entry	Days to 50% bloom	Mold inoc.* bagged heads scored for Phoma.	Non-inoc. non bagged heads scored for Phoma.	Mold score in inoculated* bagged heads.	Mold score in non-inoc. non-bagged heads
19	M 35082	76	3	4	2.5	1.5
20	M 35534	75	2	3.5	2.5	2
21	M 35628	75	2	4	3	2.5
22	M 35556	75	3.5	4	3	2.5
23	M 35476	79	2	3	3	2.5
24	M 35549	76	2	4	3	2.5
25	M 35629	77	2	4	3	2
26	M 36172	70	2	3.5	3	2
27	M 36176	75	2	4	3	2.5
28	M 36122	76	2	4	3	2
29	M 36203	74	2	3	3	2.5
30	M 36377	75	2	4.5	3	2
31	CSH-6	63	2	5	3	1.5
32	M 35525	71	3	5	3	3
33	M 35486	74	2	4	3	1.5
34	M 36258	73	3	4.5	3.5	2
35	M 35607	78	2	4	3.5	2.5
36	M 36332	76	3	4	3.5	2.5
37	M 36253	73	2	4	3.5	2

S.No.	Entry	Days to 50% bloom	Mold inoc.* bagged heads scored for Phoma.	Non-inoc. non bagged heads scored for Phoma.	Mold score in inoculated* bagged heads.	Mold score in non-inoc. non-bagged heads.
38	M 36509	78	3	4	3.5	3
39	M 35509	76	2	4	3.5	2.5
40	M 35160	76	3	4.5	3.5	3
41	M 36204	74	3	5	3.5	2.5
42	M 36461	74	2	4	3.5	2
43	M 36374	75	2	5	3.5	2
44	M 36545	76	3.5	5	4	3
45	M 35565	73	2	4	4	3.5
46	M 35518	77	3	5	4	4
47	M 35585	77	2	4	5	4

* Mold inoculum contains equal proportions of *Fusarium moniliforme*, *F. semitectum* and *Curvularia lunata* conidia and mycelial bits, sprayed at anthesis.

** Average of two replications.

Table 7: Grain mold reactions and 50% flowering of 24 entries in the International Sorghum Downy Mildew Nursery (ISDMN) 1978.

S.No.	Entry	Days to 50% bloom	Mold inoc.** bagged heads scored for Phoma.	Non inoc. non bagged heads scored for Phoma.	Mold score in inoculated** bagged heads.	Mold score in non-inoc. non-bagged heads.
1.	IS 2327*	88	2	2	1.5	1.5
2	E 35-1*	94	1.5	2	2	1.5
3	CSV-4	80	2	4.5	2.5	2
4	IS 2223	94	3	3.5	2.5	2
5	UCHV-1	80	3	4.5	2.5	2
6	IS 2550	80	3	4.5	2.5	2
7	SPV-35	80	2	3.5	2.5	2
8	2077-B	89	2.5	3.5	3	3
9	CSV-5	95	2.5	4.5	3	2.5
10	UCHV-2	77	2.5	4.5	3	2
11	DMS-652	75	2	3	3	2.5
12	SC 110-14	80	2.5	4	3	2.5
13	IS 2042	80	2	5	3	2.5
14	CK-60 B	80	3	4.5	3.5	3
15	1258 B	75	2	4.5	3.5	2
16	SC 120-14	80	3	4.5	3.5	3
17	IS 5273	80	3	4.5	3.5	2.5
18	CSV-2	80	3	4.5	3.5	3

S.No.	Entry	Days to 50% bloom	Mold inoc.** bagged heads scored for Phoma.	Non inoc. non bagged heads scored for Phoma.	Mold score in inoculated** bagged heads.	Mold score in non-inoc. non-bagged heads.
19	IS 3799	75	3	4	3.5	2.5
20	OL-3	85	3	4	3.5	2.5
21	1202 B	75	3.5	4.5	4	2
22	IS 173	75	2.5	4.5	4	2
23	SC 414-12	80	3	3	4.5	3.5
24	3660 B	80	3	4	4.5	3.5

* Entries less susceptible to *Fusarium* and *Curvularia* molds as well as for *Phoma*.

** Mold inoculum contains equal proportions of *Fusarium moniliforme*, *F. semitectum* and *Curvularia lunata* conidia and mycelial bits sprayed at anthesis.

Table 8: Grain mold reactions and 50% flowering of 30 entries in the International Sorghum Charcoal Rot Nursery (ISCRN) 1978.

S.No.	Entry	Days to 50% bloom	Mold inoc.** bagged heads scored for Phoma.	Non inoc. non bagged heads scored for Phoma.	Mold score in inoccu-lated** bag-ged heads.	Mold score in non-inoc. non-bagged heads.
1	IS 1235*	102	2	2.5	1.5	1.5
2	(954063 x CS 3541)-30	94	2	3	1.5	1.5
3	(954068 x CS 3541)-64	85	2.5	3	2	2
4	(954068 x CS 3541)-11	77	2	4.5	2.5	1.5
5	IS 121	69	3	4.5	2.5	1.5
6	9-86	80	3	4.5	2.5	2
7	CSH-6	73	3	4.5	2.5	2
8	CSV-4	78	2	3	2.5	1.5
9	23-94	75	2.5	4.5	3	2
10	5-33	77	3	4.5	3.5	2.5
11	IS 410	75	3	4.5	3.5	3
12	IS 12666C	69	2	4	3.5	2.5
13	SC 120	75	3	4.5	3.5	2.5
14	A 2268	80	3	4.5	3.5	3
15	SC 120-14	80	2	4.5	3.5	3
16	6-39	77	3	4.5	3.5	3

S.No.	Entry	Days to 50% bloom	Mold inoc.** bagged heads scored for Phoma.	Non inoc. non bagged heads scored for Phoma.	Mold score in inoculated** bagged heads.	Mold score in non-inoc. non-bagged heads.
17	1-52	77	3.5	4	4	3.5
18	18-10	80	3.5	4	4	3.5
19	25-98	75	3	4.5	4.5	3
20	4-20	77	3	3.5	4.5	3
21	20-67	80	3	4	4.5	3.5
22	21-82	75	3	5	4.5	2.5
23	8-55	77	2	4.5	4.5	3
24	4-45	77	2	3	5	4.5
25	1-30	80	2	3.5	5	4
26	4-22	80	3	5	5	3.5
27	IS 84	74	3	5	5	3.5
28	15-36	74	3	4	5	3.5
29	21-78	75	3	5	5	4.5
30	20-67	77	3.5	3	5	4.5

* Entries less susceptible to *Fusarium*, *Curvularia* molds as well as for *Phoma* incidence.

** Mold inoculum contains equal proportions of *Fusarium moniliforme*, *F. semitectum* and *Curvularia lunata* conidia and mycelial bits, sprayed at anthesis.

Table 9: Grain mold reactions and 50% flowering of 27 entries in the International Sorghum Leaf Disease Nursery (ISLDN) 1978.

S.No.	Entry	Days to 50% bloom	Mold inoc.* bagged heads scored for Phoma.	Non inoc. non bagged heads scored for Phoma.	Mold score in inoculated* bagged heads.	Mold score in non-inoc. non-bagged heads.
1	IS 115	87	2.5	4.5	2	1.5
2	IS 2419	80	2	4.5	2.5	2
3	CS 3541	88	2	4.5	2.5	2
4	IS 643	71	2	4	2.5	2
5	IS 3390	79	2	4.5	2.5	2
6	TAM 428	80	2	4.5	2.5	2
7	IS 10262	77	2.5	4.5	3	2.5
8	IS 2225	80	3	4.5	3.5	2
9	IS 10240	80	2	4	3.5	3
10	IS 2223	77	2	3.5	3.5	2
11	IS 4150	97	3	4.5	3.5	2
12	IS 517	80	2	4.5	3.5	3
13	BRANDES	88	2	4.5	3.5	3
14	CSV-2	75	3	5	3.5	2.5
15	IS 152	80	2	4.5	3.5	3
16	IS 2232	77	2	4	3.5	2
17	IS 158	80	2	4.5	3.5	2

S.No.	Entry	Days to 50% bloom	Mold inoc.* bagged heads scored for Phoma.	Non inoc. non bagged heads scored for Phoma.	Mold score in inoculated* bagged heads.	Mold score in non-inoc. non-bagged heads.
18	H 112	80	3	4.5	3.5	2
19	IS 3925	88	2.5	4.5	4	2
20	IS 555	96	3.5	4.5	4	2.5
21	SC 326-6	98	2	4.5	4.5	2
22	IS 6838	69	2	5	4.5	3
23	IS 2276	88	2	5	4.5	3
24	IS 856	73	3	4.5	4.5	3
25	IS 73	66	3	5	5	3.5
26	SC 120-14	80	2	2	5	4.5
27	IS 460	80	2	5	5	3

* Mold inoculum contains equal proportions of *Fusarium moniliforme*, *F. semitectum* and *Curvularia lunata* conidia and mycelial bits, sprayed at anthesis.

Table 10: Grain mold reactions and 50% flowering in the retesting of selected entries from laboratory screening.

S.No.	Entry	Days to 50% bloom	Mold inoc.** bagged heads scored for Phoma.	Non inoc. non bagged heads scored for Phoma.	Mold score in inoculated** bagged heads.	Mold score in non inoc. non bagged heads.
1	IS 14333	80	1***	2.4	1.5	1.5
2	IS 14334*	77.5	1	2	1.5	1.5
3	IS 14332*	80	1	1.8	1.5	1.5
4	M 2489	89	2	3.3	1.6	1.5
5	M 36457	80	2	3.3	1.6	1.5
6	M 36630	81	1.9	3.1	1.8	1.6
7	M 36066	80	2	3	1.8	1.6
8	E 35-1	88	1.5	2.4	1.8	1.5
9	M 36008	83.5	2.1	4	1.8	1.5
10	M 36339	80	2	4	1.8	1.6
11	IS 9327	74.5	2	4.3	1.8	1.5
12	M 35026	77.5	2.3	3.3	1.9	1.5
13	M 36088	84.5	2	3.5	1.9	2.1
14	M 2613-1	78	2	3	1.9	1.9
15	M 35052	78.5	2	3.5	2	1.6
16	M 36308*	82.5	2	2.1	2	1.6
17	IS 9221	70.5	2.6	3.8	2	1.5

S.No.	Entry	Days to 50% bloom	Mold inoc.** bagged heads scored for Phoma.	Non inoc. non bagged heads scored for Phoma.	Mold score in inoculated** bagged heads	Mold score in non inoc. non bagged heads.
18	M 36368	84.5	2	3.8	2.1	2
19	M 407-15	75	2.5	3.8	2.1	1.6
20	M 36423	83.5	2.1	4	2.1	2
21	M 2157	78	2.1	2.8	2.3	2.3
22	CSH-6	75.5	2.1	4.3	2.3	1.6
23	M 35115	77	2.1	3.9	2.3	1.8
24	M 36078	78	3.3	4.3	2.3	1.8
25	M 36070	80	2	3.1	2.3	1.8
26	M 36024	88.5	2.4	3.5	2.3	2
27	M 36091	84	2.6	3.9	2.3	2
28	M 36321	80	2.5	3	2.4	1.8
29	M 36102	87	2	3	2.4	1.9
30	IS 472	75	2.4	3.6	2.4	1.6
31	M 36040	80	2	4	2.4	1.9
32	M 36327	84	2.1	4.1	2.4	1.9
33	M 36294	85.5	1.9	3.6	2.4	1.6
34	M 36073	78	2.5	4.5	2.4	2
35	M 35175	80.5	2	4.8	2.4	2.3
36	M 36332	85.5	2	3	2.4	1.8

S.No.	Entry	Days to 50% bloom	Mold inoc.** bagged heads scored for Phoma.	Non inoc. non bagged heads scored for Phoma.	Mold score in inoculated** bagged heads.	Mold score in non-inoc. non-bagged heads.
37	M 36023	80	2.3	3.9	2.4	1.8
38	M 405-17	73	2.4	4.3	2.4	1.9
39	M 36019	86	2	3.1	2.5	1.5
40	M 36096	77.5	2.1	3.3	2.5	2
41	M 36009	80	2.1	3.6	2.5	2
42	M 36086	80.5	2.9	3.8	2.5	2.4
43	IS 473	71.5	2	4	2.5	2
44	M 36380	84	2	3.3	2.5	1.9
45	M 36046	80	2.5	3.8	2.6	2
46	M 36291	86	2	3.9	2.6	2
47	M 36336	80	2.5	3.9	2.6	2
48	M 36619	77.5	2.1	3.9	2.6	2.1
49	M 36636	81.5	2.5	3.9	2.6	2
50	JP 26A-2579	73	2	3.4	2.8	2
51	M 36533	84	2	3.9	2.8	2.3
52	M 36029	88	2.3	3.3	2.8	2.1
53	M 36300	81.5	2	4.3	2.8	2.4
54	M 36065	80	2.3	4.5	2.8	2

S.No.	Entry	Days to 50% bloom	Mold inoc.** bagged heads scored for Phoma.	Non inoc. non bagged heads scored for Phoma.	Mold score in inoculated** bagged heads.	Mold score in non-inoc. non-bagged heads.
55	M 36307	84	2	3.8	2.8	2
56	M 35194	78.5	2.8	4	2.8	2.1
57	M 36049	87.5	2.3	3	2.9	2
58	M 36468	83.5	2	3.9	2.9	2.1
59	M 4337-2	79.5	3.6	4.9	2.9	2.3
60	M 36446	78.5	2.3	4.5	2.9	2.3
61	M 36402	80.5	2.3	4.3	2.9	2.1
62	M 36003	89	2	3.5	2.9	2
63	M 36575	78.5	2.1	4.1	3	2
64	M 36222	82	2.5	4	3	2.3
65	M 36188	76.5	2	4.3	3	2
66	M 36055	87	2.3	3.5	3	2.3
67	M 36471	84.5	2.3	4	3	2.1
68	M 36204	80	2.4	3.8	3	2.6
69	M 36004	82	2	4.4	3.1	2.1
70	M 36338	82.5	2.3	4	3.1	2.4
71	M 36114	78.5	2.5	4.5	3.1	2.4
72	M 36409	78.5	2	4.5	3.1	2.3

S.No.	Entry	Days to 50% bloom	Mold inoc.** bagged heads scored for Phoma.	Non inoc. non bagged heads scored for Phoma.	Mold score in inoculated** bagged heads.	Mold score in non inoc. non bagged heads.
73	M 36126	76.5	2	4.5	3.3	2.4
74	M 35121	74	2.8	4.8	3.3	2.1
75	ERLS x ELTS IB7-2	80	2.3	4	3.3	2
76	M 36137	83	2.5	4	3.3	2
77	M 457-8-1	75.5	3	4.9	3.3	2.1
78	M 36333	80.5	2	4.3	3.5	2.1
79	M 4397-1	76	2.5	4.5	3.5	2.5
80	M 425-19-3	72.5	2	4.8	3.9	2
81	M 4397-3	74	2	4.4	3.9	2.5
82	M 36216	78	2.1	5	4	2.8

* Entries less susceptible to *Fusarium*, *Curvularia* molds as well as for Phoma incidence.

** Mold inoculum contains equal proportions of *Fusarium moniliforme*, *F. semitectum* and *Curvularia lunata* conidia and mycelial bits, sprayed at anthesis.

*** Average of two replications of two row plot each.

Table 11: Number of single head selections made, in different grain mold reaction categories, from breeding progenies of adapted x mold resistant crosses.

Group of Material	Reaction categories*				Total entries screened
	<2	2	<3	3	
Adapted x Mold resistant crosses					
F_4 (early)	13	7	1	-	503
F_3 (early)	5	13	-	2	319
F_4 (Late)	2	5	2	-	946
F_3 (Late)	7	17	4	1	328
Total	27	42	7	3	2096

* Rated on a 1-5 scale, where 1=no mold and 5=severe molds.

Table 12: Number of entries in different reaction categories for three infection parameters.

Grain mold reaction parameters	Reaction categories					Total
	1	2	3	4	5	
Percent grain infected*	0	46	41	172	400	659
Average severity**	0	72	103	224	260	659
Visual scoring**	0	77	172	346	64	659

* Simple percentages were converted to reaction categories as 1=0%, 2=0.1-75%, 3=75.1-85%, 4=85.1-95% and 5=95.1-100%.

** Rated on 1-5 scale where 1=no mold and 5=severe mold..

Table 13: Number of entries in different reaction categories when selected entries were further incubated to 7 days.

No. of days incubated	No. of entries in reaction category					Total
	1	2	3	4	5	
4	0	70	0	0	0	70
7	0	14	55	1	0	70

Table 14: Grain Mold Reaction Parameters of Selected Entries in the Laboratory Screening with and without inoculations.

Entry No.	Row No.	Pedigree	Total lines in each family	WITHOUT INOCULATION			WITH INOCULATION		
				Percent grain infected	Av. severity	Visual scoring	Percent grain infected	Av. severity	Visual scoring
84	M 2613-1	SC 423 x CS 3541	3	78.25	2.12	2.0	-	-	-
443	36066			41.25	1.42	2.0	-	-	-
520	36294			54.0	1.65	1.5	100	2.5	2.2
37	2257	IS 12645 C x CS 3541	2	94.0	2.45	2.0	-	-	-
324	36023			62.0	1.66	2.0	100	2.45	3.0
299	36040	IS 10680 x CS 3541	2	59.0	1.65	2.0	100	2.55	3.0
327	36088			62.0	1.48	1.5	100	2.4	2.5
364	36008	2219 B x CS 3541	2	53.6	1.66	2.0	-	-	-
500	36091			30.0	1.28	1.25	100	2.35	2.2
32	407-15	(IS 2038 x CS 3541)9317	1	93.25	2.05	2.0	-	-	-
96	36049	P-4-8 x CS 3541	1	70.5	1.57	2.0	-	-	-
239	36423	CS 3541 x IS 9327	1	57.0	1.55	2.0	-	-	-
215	36471	(P-3) (IS 3541 x 2219 B)	1	86.0	1.92	2.0	-	-	-
134	36409	(IS 9248 C) (IS 12645 C x CS 3541)	1	62.5	1.55	2.0	99	2.75	3.0
Known high susceptible (CSV-3)*			1	62.5	1.7	2.0	100	4.5	5.0
Known high susceptible (PP_2B)			1	61.0	2.0	2.0	100	4.3	5.0

(-) Entries not included for tests with inoculation because of seed limitations.
* Known high susceptibles were harvested at Physiological maturity.

Table 15: Rank correlations between three grain mould infection parameters in the laboratory.

Percent grain infected	1	
Average severity class	0.72	1
Visual scoring class	0.62	0.67

Table 16: Correlation of grain mold ratings between field and laboratory screening.

	Reaction categories					Total
	1	2	3	4	5	
Laboratory ratings	-	68	-	-	-	68
Field ratings	-	14	51	3	-	68
		(20.6)	(75)	(4.4)		
Field ratings	-	42	-	-	-	42
Laboratory ratings	-	4	27	10	1	42
		(9.5)	(63.3)	(23.8)	(2.3)	

( ) Percent value

Table 17: Cooperators and locations in the 1978 International Sorghum Grain Mold Nursery (ISGMN)a/

Cooperator(s)	Location
J.A. Frowd	Sotuba, Mali
J.A. Frowd	Farakoba, Upper Volta
N.V. Sundaram	Samaru, Nigeria
O. Sidibe	Seha, Tarna, Niger
Brhane Gebrekidan and Yilma Kebede	Arsinegele, Ethiopia
Soontree Patanothai	Khon-Kaen, Tahiland
T.B. Garud	Parbhani, India
K.N. Rao	ICRISAT Center, India
K. Ramaiah, S. Ranga Reddy and V. Muralidhar	Warangal, India
G. Koteswar Rao	Adilabad, India
K.N. Rao and D.S. Murthy	Bhavanisagar, India
Kausalya Gandharan and B. Ramaraj.	Coimbatore, India

a/ From whom data were received by February 15, 1979.

II. CHARCOAL ROT

Charcoal rot caused by *Macrophomina phaseolina* (Tassi) Goid., is a potentially important disease of sorghum in many parts of the world. It is severe on sorghum which is filling grain during hot dry weather, particularly if the crop is subjected to moisture stress. Field symptoms of the disease are not conspicuous until near maturity of the crop. Lodging is usually the first indication of the disease. Lodged plants have poorly filled heads with poor yield of grain, premature ripening of the stalks, and premature discoloration on the outside of the basal stalks. If the stem of a diseased plant is split longitudinally, the pith is found disintegrated and the separated fibro vascular bundles are seen covered with charcoal-colored sclerotial bodies.

The disease has assumed greater proportions in recent years with the introduction of high yielding varieties and hybrids. It has quickly moved to priority position because of widespread occurrence and the high susceptibility of many improved high yielding sorghum cultivars and hybrids. Among various choices for control of charcoal rot, host plant resistance is likely to be the most promising and effective. The first large scale field screening to identify sources of resistance to charcoal rot at ICRISAT was initiated in post-rainy season 1977-78. This is the second year's field screening activity at ICRISAT and the screening technique employed is briefly described.

A. SCREENING TECHNIQUE

a. Inoculum preparation

The medium used for culturing the fungus contains peptone 1 gm, honey 5 ml and distilled water 94.0 ml. Peptone and honey are dissolved in distilled water and sterilized at 15 lb pressure for 20 minutes. Toothpicks (cocktail sticks) are soaked in boiled hot water for 15 minutes, then removed and packed in wide mouthed bottles with a screw cap keeping pointed portion away from the bases of the bottles. The bottles are sterilized at 15 lb pressure for 20 minutes and allowed to cool. Inoculum of *Macrophomina phaseolina* (Tassi) Goid., is drawn from the stock culture and added to the sterilized cooled medium at approximately two loopfulls per 100 ml. The medium is shaken thoroughly to allow even distribution of inoculum and poured aseptically in to the wide mouthed bottles with sterile toothpicks (around 20 ml per bottle which gives about 1.5 cm height). These bottles are incubated at 35°C for seven days at which time the toothpicks, ready for inoculation, are seen covered with mycelia and sclerotia of the fungus.

b. Inoculation

Fungus infested toothpicks are introduced obliquely into the sorghum stalks at about the second internode or about 6" above ground. A pointed iron needle (1-2 mm diameter) with a wooden handle is used to

first make a hole in the stem to facilitate toothpick insertion. Care is taken to make sure the hole does not pierce out through the opposite side of the stem. A single toothpick per stem is enough. Irrigation is stopped at or shortly before the plants reach the boot-leaf stage to induce moisture stress which enhances infection. Inoculations are made around two weeks after 50% flowering. Symptom development of sudden wilting followed by lodging in the inoculated known high susceptible plants is evident in about 7-18 days after inoculation.

c. Evaluation of reactions

Reactions of entries screened are evaluated as percent soft stalk or extent of colonization within inoculated stalk.

1. Simple evaluation: Evaluation was made based on number of hard and soft stems counted at Physiological maturity. Severity is expressed in terms of percent soft stalk in the row.
2. Stalk colonization: Inoculated stems are split open longitudinally and measurements taken on number of nodes crossed with discoloration of stalk from the point of toothpick inoculation.
3. No node cross reaction was further sub categorised into x, y and z reaction based on length of spread within inoculated internode, where:

X = No spread from point of toothpick inoculation.

Y = Spread on either side of toothpick up to half of inoculated internode.

Z = Spread on either side of toothpick up to total inoculated internode but not crossing over of any node.

B. SCREENING ACTIVITY

Summary of charcoal rot reactions in different groups of materials are presented in Tables 18 and 19. Out of 2041 entries screened there were 1177 lines with no soft stalk and 309 of these had no node-cross in all the inoculated plants. Charcoal rot resistance breeding progenies (F_3) have not contributed when line performance was taken (Table 19). However, we made 951 single head selections of which 649 were from plants with no node-cross (Table 20). Among the single head selections only 26 plants were sub-categorised as 'x' reaction (Table 20) with no spread of inoculum from the point of inoculation. The list of entries that contributed to highly resistant single plant selections to charcoal rot inoculations are presented in Table 21. Individual groups of materials screened are briefly discussed.

a. Initial screening

Entries included are lines from Karper's populations, germplasm lines and drought tolerant material. Of the 540 entries screened, 12

were selected based on no soft stalk and less than 0.1 mean node cross (Table 22 and Appendix II). It is interesting to note that SPV 101, a released variety from All India Coordinated sorghum improvement project (AICSIP) was among the selected entries.

b. Hybrids with mold resistance breeding progenies

Hybrids were developed in sorghum breeding unit utilizing progenies from the mold resistance breeding project as male parents. Most hybrids developed by AICSIP have showed susceptibility to charcoal rot (AICSIP annual workshop, 1979). Therefore, we at ICRISAT are trying to develop hybrids comparable to CSH-6, but they should contain high levels of resistance to charcoal rot. Of the 1019 hybrids screened with toothpick inoculations, 743 of them showed no soft stalk and 378 had no node cross. We need to confirm the less susceptibility of the high number of entries. We experienced some difficulty in obtaining desired levels of moisture stress, as parts of this area was a low land and because of rain there was water logging at anthesis.

c. Charcoal rot resistance breeding progenies

Charcoal rot resistance breeding progenies in F_3 generation were inoculated. Out of 352 entries screened, 18 were selected based on no soft stalk and less than 0.6 mean node cross (Table 23 and Appendix IV). Among the less susceptible breeding progenies IS 3443, CS-3541, 16-9, 20-67 and SC 120-14 were involved as charcoal rot resistance source. Days to 50% flowering in selected entries varied from 62-76.

d. Lines from advanced populations

Out of 130 lines from advanced populations screened, only 10 entries were selected based on no soft stalk and less than 0.1 node cross (Table 24 and Appendix V). The flowering period of selected entries varied from 66-72 days. It is in this material that we need to findout sources of resistance to charcoal rot, as this material contains lines with high yield and high susceptibility to charcoal rot.

C. LINE SOURCE SPRINKLER TECHNIQUE FOR STUDYING SOIL MOISTURE REACTIONS AND CHARCOAL ROT RESISTANCE SCREENING

The "line source sprinkler" consists of a single line of sprinklers down the centre of the plot, with the individual sprinkler heads placed at a spacing of 1/4 to 1/5 the diameter of the wetting pattern of an individual sprinkler. This configuration (ideally) produces a water distribution pattern which is uniform along the direction of the sprinkler line and which varies linearly (or slightly curvalinearly) with perpendicular distance from the line. This continuously variable application is produced in the following way: (1) on the line any individual point is receiving water from 4 to 5 individual sprinklers (2) as the measurement point moves away from the line it approaches the periphery and then passes out of the wetting pattern of the more distant sprinkler heads until (3) at the edge of the area covered by the line

source the measurement point is receiving water only from a single (nearest) sprinkler (Hanks *et al.*, 1976).

The technique has been used for studying direct effects of moisture gradients (such as yield-ET relationships) and for studying interactions of moisture and other variables (such as fertility) by applying the second variable along the length of the irrigation line. It has been used in a joint Cereal Physiology - Cereal Pathology experiment in the 1977-78 post rainy season to study the effects of moisture stress during grain filling on charcoal rot incidence in sorghum. In this experiment we used single known high susceptible CSH-6. During this past season this experiment was repeated using nine sorghum genotypes.

Using the above technique linear gradient of soil moisture stress was established. The grain yield was found to decline linearily with the distance from line source (inverse with stress) whereas reverse was true for charcoal rot incidence. Genotypic differences were clearly seen and a separate report (Rao *et al.*, 1979) is being prepared for distribution.

Limitations inherent in the technique include problems with wind shifts of the water application pattern, no possibility to vary the

Hanks, R.J., J. Keller, V.P. Rasmussen and G.G. Wilson (1976). Line source sprinkler for continuously variable irrigation crop production studies. Soil Sci. Soc. Am. J. 40: 426-429.

frequency of irrigation for different application rates, and statistical problems due to lack of randomization among different water application rates.

D. MULTILOCATION TESTING

The International Sorghum Charcoal Rot Nursery (ISCRN) was initiated in 1978 to identify sources of stable charcoal rot resistance, to obtain information on variability of the charcoal rot pathogen (*M. phaseolina*) and to distribute charcoal rot resistant genotypes to scientists in national and regional programs. The results obtained in this first year of testing are compiled and a separate report is being prepared. List of cooperators and test locations in the 1978 ISCRN from whom results were received by September 1, 1979 are presented in Table 25. Results from the 1978 ISCRN indicated that although no entry was completely free from charcoal rot at all the locations, nine entries had mean node cross of less than one in the mean performance across locations. These were -- (SC 108-4-8 x CS 3541)-64, (SC 108-3 x CS 3541)-30, CS 3541, 20-87, 1-30, (SC 108-4-8 x CS 3541)-11, 8-55, IS 121 and SC 120-14.

E. LOOKING AHEAD

The charcoal rot resistance breeding project at ICRISAT Center has had a good start, but much needs to be done in future. Our future activities in this project will involve the following:

1. To identify consistently charcoal rot less susceptible source material.
2. To utilize source material cooperatively with sorghum breeders and develop elite charcoal rot resistance breeding progenies.
3. To explore the possibilities of developing a laboratory screening technique based on stalk and root colonization of charcoal rot pathogen in seedling stage.
4. To investigate the functions of moisture stress, plant population and fertilizer responses on epidemiology and biology of charcoal rot pathogen.

Table 18. Number of entries in each reaction category for percent soft stalk*.

S.No.	Group of material	REACTION CATEGORIES WITH PERCENT SOFT STALK					Total
		0	≤5	5.1-10	10.1-15	>15	
1.	Initial screening	319	42	52	37	90	540
2.	Hybrids with mold resistant breeding progenies	743	33	70	37	136	1019
3.	Charcoal rot resistance breeding progenies (F_3)	40	43	68	52	149	352
4.	Lines from advanced population	75	20	20	5	10	130
	Total	1177	138	210	131	375	2041

* Based on 30-35 plants in a single row.

Table 19: Number of entries in each reaction category for mean node cross*.

S.No.	Group of material	REACTION CATEGORIES WITH MEAN NODE CROSS					Total
		0	≤0.5	0.51-1	1.01-2	>2	
1.	Initial screening	19	211	167	120	23	540
2.	Hybrids with mold resistant breeding progenies	378	351	127	131	32	1019
3.	Charcoal rot resistance breeding progenies (F_3)	-	32	153	158	9	352
4.	Advanced population breeding material.	2	50	50	26	2	130
	Total	399	644	497	435	66	2041

* Average of 30-35 plants in a single row.

Table 20: Number of single plant selections in each charcoal rot reaction category for no node cross and one node cross in charcoal rot resistance breeding progenies.

S.No.	Group of material	Total entries screened	No. of single plant selections	REACTION CATEGORY NO X	NODE Y	CROSS* Z	One node cross
1.	Rabi sorghum breeding progenies (F_3's)-I	568	133	2	1	89	41
2.	Charcoal rot resistance breeding progenies (F_3's)-I	352	950	5	21	623	301
3.	Rabi sorghum breeding progenies (F_3's)-II	1000	337	9	20	231	77
4.	Charcoal rot resistance breeding progenies (F_3's)-II	998	861	10	59	644	148

* No node cross plants were again sub-divided into three categories X,Y,Z, based on extent of stalk colonization within inoculated node, where X=no spread from inoculation point, Y=about half of internodal area covered and Z=extending upto one internode but crossing any node.

Table 21: Details of 26 entries contributed to highly resistant single plant selections.

S.No.	Entry No.	Pedigree
1	12105	SB-1066 x (CS 3541 x 148)-4-1
2	12202	$UchV_2$ x (10222 x CS 3541)-10-9
3	12214	20/67 x E 35-1-1
4	12295	IS 3443 x 13-35-22
5	12256	E 36-1 x 16/9-1
6	12336	E 12-5 x (964063 x Swarna)-18-7
7	12337	E 12-5 x (964063 x Swarna)-18-8
8	12340	E 12-5 x (964063 x Swarna)-18-11
9	12647	IS 3691 x IS 12666C-2
10	12806	(SC 423 x CS 3541)-47-9
11	13174	13-35 x F 35-1-8
12	13274	IS 6928 x M 10851-18
13	13297	IS 6928 x Early Sol. from WA x P# Bulk 7-3-12
14	13349	IS 6928 x US/R(M)Cosy. 513-1-1-1-1-5
15	13422	E 12-5 x (964063 x Swarna)-18-37
16	13660	IS 3573 x 13-35-6
17	13643	IS 3572 x 18-83-1
18	13810	IS 555 x E 35-1-5

S.No.	Entry No.	Pedigree
19	13813	IS 555 x E 145-1
20	14056	(13-35 x IS 3572)-1
21	14552	TC(M)C1S5-46-356-164-1-4-2 x Q7052-2
22	14893	[16-9 x (SC 423 x CS 3541)-61]-12
23	14921	(20-67 x SB 1067)-3
24	14924-1	[22-22 x (SC 423 x CS 3541)-61]-2
25	14924-2	[22-22 x (SC 423 x CS 3541)-61]-2
26	14929	(22-40 x SPV -105)-2

Table 22: Charcoal rot reactions and days to 50% flowering of 48 less susceptible* entries from initial screening at ICRISAT Center.

S.No.	Entry	Days to 50% flowering	Mean node** cross	Percent** soft stalk
1	3-52	63	0	0
2	3-79	63	0	0
3	2-66	68	0	0
4	IS 9734	67	0	0
5	3-81	68	0	0
6	IS 9736	61	0	0
7	IS 8344	72	0	0
8	3-72	63	0	0
9	IS 703	65	0	0
10	IS 7629	72	0	0
11	IS 7235	59	0	0
12	IS 7465	63	0	0
13	IS 9586	65	0	0
14	R x 49	82	0	0
15	IS 5873	84	0	0
16	IS 7614	81	0	0
17	IS 534	82	0	0
18	IS 9589	61	0	0
19	IS 7502	64	0	0

S.No.	Entry	Days to 50% flowering	Mean node** cross	Percent** soft stalk
20	IS 149	61	0.03	0
21	IS 965	60	0.03	0
22	IS 7197	60	0.03	0
23	IS 8067	60	0.03	0
24	E 36-1	65	0.04	0
25	DURTHU (65)	61	0.04	0
26	3-60	63	0.04	0
27	3-68	62	0.04	0
28	IS 7026	61	0.04	0
29	IS 3980	63	0.05	0
30	IS 5420	72	0.05	0
31	SPV-101	68	0.05	0
32	IS 6995	57	0.05	0
33	IS 3517	60	0.05	0
34	IS 8564	70	0.05	0
35	MUGUTHI	79	0.05	0
36	IS 2195	72	0.06	0
37	1-35	70	0.07	0
38	IS 3076	60	0.07	0

S.No.	Entry	Days to 50% flowering	Mean node** cross	Percent** soft stalk
39	IS 7312	65	0.07	0
40	IS 7263	63	0.07	0
41	IS 7204	60	0.07	0
42	IS 7439	63	0.08	0
43	IS 7332	70	0.08	0
44	IS 3507	60	0.08	0
45	IS 7183	62	0.09	0
46	IS 7818	79	0.09	0
47	15-16	70	0.09	0
48	IS 2914	59	0.09	0

* Entries with mean node cross of <0.1 and no soft stalk.

** Average of 30-35 plants from a single row.

Table 23: Charcoal rot reactions and days to 50% flowering of 18 less susceptible* breeding progenies (F3) at ICRISAT Center.

S.No.	Entry	Days to 50% flowering	Mean node** cross	Percent** soft stalk
1	GC 1137 x IS 4242	64	0.17	0
2	(M 35-1 x M 1031)-6	65	0.21	0
3	[14-40 x (SC 423 x CS 3541)-85]-4	64	0.22	0
4	[20-67 x (10680 x CS 3541)-4]-7	64	0.25	0
5	IS 1331 x IS 3443	63	0.26	0
6	(M 35-1 x M 1031)-7	71	0.28	0
7	CK 60 B x SC 329	67	0.28	0
8	(GC 1137 x E 12-5)-3	63	0.3	0
9	[16-9 x (SC 423 x CS 3541)-61]-10	75	0.31	0
10	[16-9 x (SC 423 x CS 3541)-61]-5	62	0.32	0
11	14-40 x SC 120-4	66	0.36	0
12	16-9 x SPV 35	64	0.37	0
13	(555 x IS 3443)-2	65	0.41	0
14	(E 145 x A 1012)-1	72	0.43	0
15	(FLR-226 x E 36-1)-1	63	0.47	0
16	(13-35 x IS 3443)-2	66	0.48	0
17	(FLR 226 x IS 3443)-2	64	0.49	0
18	[14-40 x (SC 423 x CS 3541)-85]-18	76	0.49	0

* Entries with mean node cross of <0.5 and no soft stalk.

** Mean of 60-70 plants in a two row plot.

Table 24: Charcoal rot reactions and days to 50% flowering of 10 less susceptible entries* from advanced population breeding progenies at ICRISAT Center.

S.No.	Entry	Days to 50% flowering	Mean node** cross	Percent** soft stalk
1	A 9445-3	66	0	0
2	A 9445-1	66	0	0
3	A 9535 Bulk	70	.05	0
4	A 9445-4	66	.05	0
5	A 11650-3	69	.06	0
6	A 11654 Bulk	67	.06	0
7	A 11653 Bulk	67	.06	0
8	A 9445-2	66	.07	0
9	A 11650-4	72	.09	0
10	A 11653-4	68	.09	0

* Entries with <.1 mean node cross and no soft stalk.

** Mean of 30-35 plants in a single row plot.

Table 25: Cooperators and test locations in the 1978 ISCRN from whom results were received by September 1, 1979.

Cooperator	Location
J.A. Frowd	Kamboinse, Upper Volta
O. Sidibe	Tarna, Niger
M.A. Mahamood	Wad Medani, Sudan
G. Koteswar Rao	Nandyal, India
K.H. Anahosur	Dharwar, India
T.B. Garud	Parbhani, India
K.N. Rao	ICRISAT, India
Sam Z. Mukuru	Ilonga, Tanzania

III ERGOT

Ergot, usually known as 'sugary disease' caused by *Sphacelia sorghi* McRae is known to occur in many sorghum growing areas of the semi-arid tropics. This disease is largely a major problem in cool, moist weather, mostly in highland sorghums, and in post-rainy season sorghums of plains. Relatively less priority has been given this disease till now but it is potentially important where male sterile lines are involved. We believe we should evaluate the susceptibility of our material.

Visible symptoms of the disease appear as turbid drops of honey-dew dropping from infected spikelets. Individual spikelets scattered in the ear or in groups are infected. The honey-dew droplets are sweet to taste and attract flies and ants. In the affected spikelets the grains are replaced by soft mass of mycelium. In severe infections considerable yield losses can be recorded. In some regions and some seasons, sclerotia are found in the spikelets. The soil at the base of the affected plants presents sprinkling of white spots, denoting the drops of honey-dew which had fallen on the soil. Often the infected spikelets are overgrown by a hyperparasitic fungus, *Cerebella* sp.

Large scale field screening for ergot resistance at ICRISAT Center was initiated in late in the 1978 rainy season (Sept. planting) and the details of screening technique employed and screening activities are briefly discussed.

A. SCREENING TECHNIQUE

a. Inoculum preparation

Primary inoculum was prepared by washing infected panicles preserved from previous season. Secondary inoculum for regular inoculations was prepared by washing sorghum panicles with honey-dew secretions in tap water. The turbid water was strained through single layer of muslin cloth to remove plant material. The inoculum was diluted by adding some more tap water until the turbidity was turning into clear. Conidial concentration varied between 24 x 10^5 to 32 x 10^5 conidia per one milli litre of water.

b. Inoculations

Inoculum was sprayed onto panicles at protogyny stage (before anthesis) with pneumatic hand sprayers. Inoculated heads were covered with brown paper bags to retain humidity. Sprinkler irrigation was given for half an hour in the evenings to provide additional humidity. Honey-dew secretions from infected spikelets was observed 7 to 10 days after inoculations.

c. Evaluation of reactions

Individual spikelets infected in a panicle were scored for honey-dew secretions and sclerotial formation. Percentage of spikelets infected over total spikelets in 10 inoculated heads were approximately estimated by visual observation.

In the ergot screening material leaf rust caused by *Puccinia purpurea* has appeared in severe proportions. Therefore, scoring for rust infection of top four leaves was given on a 1-5 scale where,

1 = No symptoms.

2 = Few scattered chlorotic lesions, about pinhead size.

3 = Lesions turning tan or red with rust pustules developing and covering up to 25% leaf area.

4 = Rust pustules coalescing into small clusters at several places and covering between 25 and 40% leaf area.

5 = Symptoms covering more than 40% leaf area, with severe premature drying of leaves.

B. SCREENING ACTIVITY

Two groups of materials -- germplasm lines and mold resistance breeding progenies were screened. No entry was immune to ergot. There were 60 entries which had ≤3% of spikelets infected at honey-dew stage (table 26). Additional 466 entries had mean percent honey-dew infection upto 10, whereas M 36212 had 98.5% mean honey-dew infection (Appendix VI). Details of screening in different materials is discussed here.

a. Mold resistance breeding progenies

In an effort to find sources of multiple disease resistance, breeding progenies, developed by crossing mold resistance source on to elite background, were screened for ergot resistance and were also

scored for natural rust infections. Out of 651 progenies screened, 24 entries had mean percent honey-dew and sclerotia up to 3 and rust reactions of ≤2 (Table 27). Ergot reactions and flowering data of these 24 entries is presented in Table 28. In the second reaction class,additional eight entries were selected when rust reactions of ≤3 are considered (Table 27). These are -- M 36111, M 36651, M 35007, M 3603, M 36423, M 36459, M 36283 and M 36044. Four breeding progenies -- M 36543, M 36014, M 36488, M 36016 -- had mean honey-dew and sclerotia of ≤2% and rust reaction up to 2 (Table 28).

b. Germplasm lines

Reported sources of resistance to ergot in the AICSIP program, and tan plant type germplasm lines, were screened as a part of screening of the world sorghum collection for ergot resistance. Of the 204 lines inoculated with ergot inoculum, only eight lines had mean percent honey-dew and sclerotia of ≤3% and rust reaction up to category two (Table 29 and Appendix VII). Additional six lines were selected when rust reactions were considered up to category three. The list of these 14 entries with ergot reactions and flowering data are presented in Table 30. Of the 14 entries IS 3938, IS 6759, IS 7555, IS 7561, IS 7821, IS 7830, IS 7856 and IS 7438 were rated as resistant to moderately resistant in field screenings at Akola (Sangitrao, personal communication).

C. MULTILOCATION TESTING

Entries identified as less susceptible to ergot at ICRISAT Center and candidate entries supplied from national and regional programs are assembled into an International Sorghum Ergot Nursery (ISEN) and will be screened in 1980 growing season. This trial will be sent to cooperators, who have asked for sources of resistance to ergot and locations where the disease is of widespread occurrence. The main objective of this trial is to develop a communicating cooperative network of scientists working on this disease, to identify pathogen variability at different locations and to distribute ergot resistance sources to other scientists.

D. LOOKING AHEAD

We have developed effective screening technique and screened large numbers of germplasm and breeding progenies. This project has been in slow progress because of staff limitations at technical and field assistant level. We will need to identify collaborating scientists in other sub-programs to utilize the available sources of ergot resistance. A brief outline of future activities in sorghum ergot program are:

1. To refine the field screening technique particularly quantification of temperature, humidity, inoculum etc.
2. To screen new germplasm lines and breeding progenies from other programs.
3. To confirm the sources of resistance identified in preliminary screening.
4. To utilize the confirmed resistant sources in a joint program with sorghum breeders.
5. To be able to follow the path of infection of ergot pathogen.
6. To identify potential collateral hosts of the ergot fungus.

Table 26: Number of entries* in different reaction categories to mean percent honey dew rating.

S.No.	Group of material	Mean honey dew reaction categories in percentages					Total
		0	≤3	3.1-10	10.1-15	>15	
1	Mold resistance breeding progenies	0	40	357	158	96	651
2	Germplasm lines	0	20	109	39	36	204

* For each entry mean percent florets infected in 10 ergot inoculated heads is recorded.

Table 27: Number of entries in different reaction classes in the mold resistance breeding progenies screened for ergot resistance.

	Reaction class		No. of entries
I	Mean percent honey-dew*	≤3%	24
	Mean percent sclerotia*	≤3%	
	Rust reactions**	≤2	
II	Mean percent honey-dew	≤3%	32
	Mean percent sclerotia	≤3%	
	Rust reactions	≤3	

* Mean percent florets infected in 10 inoculated heads.

** Rust reactions were scored on a 1-5 scale, where 1=no infection and 5=severe rust infection.

Table 28: Ergot reactions and 50% flowering data of 24 selected* entries in the mold resistance breeding progenies.

S.No.	Entry	Days to 50% flowering	Mean percent** Honey dew	Mean percent** sclerotia	Rust***
1	M 36543	68	1.4	2	1
2	M 36049	67	1.4	3	1.5
3	M 36014	66	1.4	2	1.5
4	M 36538	71	1.5	3	1
5	M 411-3	54	1.5	3	1
6	M 36488	67	1.8	2	2
7	M 36166	66	1.9	3	2
8	M 36101	70	1.9	3	1.5
9	M 36016	68	2	2	2
10	M 36011	69	2	2	1.5
11	M 36367	64	2	3	2
12	M 36284	70	2.1	3	2
13	M 36637	67	2.2	2	1.5
14	M 35052	53	2.3	3	2
15	M 36385	67	2.3	3	2
16	M 35115	59	2.4	3	1.5
17	M 36377	67	2.4	2	1.5
18	M 36282	69	2.4	3	2
19	M 36102	70	2.6	3	2

S.No.	Entry	Days to 50% flowering	Mean percent** honey dew	Mean percent** sclerotia	Rust***
20	M 35160	66	2.7	3	1.5
21	M 36405	62	2.7	3	1.5
22	M 36110	62	2.7	3	2
23	M 36457	60	2.7	3	2
24	M 36358	70	2.8	3	1.5

* Selected based on honey-dew and sclerotial rating $\leq$3% and rust reaction of $\leq$2.

** Mean percent spikelets infected on 10 inoculated panicles.

*** Rust reaction scored on 1-5 scale, where, 1=no infection, 5=severe rust infection.

Table 29: Number of entries in different reaction classes in the sorghum germplasm screening for ergot resistance.

	Reaction class		No. of entries
	Mean percent honey-dew*	≤3%	
I	Mean percent sclerotia*	≤3%	8
	Rust reactions**	≤2	
II	Mean percent honey-dew	≤3%	
II	Mean percent sclerotia	≤3%	14
	Rust reactions	≤3	

* Mean percent florets infected in 10 inoculated heads.

** Rust reactions were scored on a 1-5 scale where 1=no infection, 5=severe rust infection.

Table 30: Ergot reactions and 50% flowering data of 14 selected* entries in the sorghum germplasm lines.

S.No.	Entry	Days to 50% flowering	Mean percent** honey-dew	Mean percent** sclerotia	Rust***
1	IS 6759	66	1	2	2
2	IS 7821	63	2.1	1	1.5
3	IS 9784	54	2.2	2	1.5
4	IS 1107	51	2.2	3	1.5
5	IS 7561	66	2.5	2	1.5
6	IS 7555	68	2.6	3	2
7	IS 7856	75	2.6	3	1.5
8	IS 7830	71	2.8	2	2
9	IS 8980	65	2.4	2	2.5
10	IS 956	53	1	1	2.5
11	IS 9676	55	2.7	5	2.5
12	IS 7438	67	1.5	2	3
13	IS 2782	74	1.8	2	3
14	IS 3938	49	1.8	3	3

* Selected based on mean honey-dew and sclerotia rating $\leq 3\%$ and rust reaction ≤ 3.

** Mean percent spikelets infected in 10 inoculated panicles.

*** Rust reaction was scored on a 1-5 scale, where 1=no infection and 5=severe rust infection.

IV. INTERNATIONAL WORKSHOP ON SORGHUM DISEASES

An International workshop on sorghum diseases was organized at Hyderabad, 11-15 December 1978, jointly by Texas A & M University and ICRISAT Center. Main objectives of the workshop was to update the knowledge on sorghum diseases after 1968, as Dr. S.A.d. Tarr had comprehensively reviewed the information up to 1968 in 'Diseases of sorghum, sudan grass and broom corn' published by Commonwealth Mycological Institute, Kew, Surrey. The workshop has also enabled the sorghum disease researchers to exchange information. Proceedings of the workshop are being prepared separately for distribution to scientists. The recommendations of workshop participants on grain molds, stalk rots and ergot are briefly discussed here.

A. GRAIN MOLDS

1. Identification and incorporation of resistance to grain molds and other causes of grain deterioration are of prime importance to all sorghum-breeding programs and should receive continued attention.

2. In view of the complex nature of grain deterioration, the techniques for resistance screening need further improvement and refinement. We particularly recommend further examination of laboratory screening procedures with the objective of development of a simple set of tests which could be used on large numbers of breeding lines to reduce numbers prior to laboratory and field testing with fungal inoculation.

3. There is a need to further study the importance of the mold-causing fungi at various stages of grain development and maturity. The role of facultative parasites in grain deterioration during the postmaturity stage needs investigation.

4. The effects of interactions of microorganisms on and in sorghum grain are not well understood and need further investigation.

5. There is a need to determine the factors responsible for resistance to grain infection at different stages of development. A greater understanding of such factors could lead to improved screening techniques and a more rapid development of resistance to grain mold and deterioration.

6. While we recognize that several national and international programs have identified sources of resistance to grain mold and grain deterioration, and have successfully used these in breeding programs, we recommend that the search for additional resistance sources be intensified, with particular emphasis in areas where deterioration problems are common.

7. Information on the genetics of grain-mold resistance will be useful in breeding programs and we recommend studies to obtain this information.

8. There are conflicting reports on the occurrence and importance of mycotoxins in moldy sorghum grain. There is a need for further studies to fully determine the mycotoxin potentials of

moldy sorghum and we recommend particularly studies on the interaction of fungal species as a possible factor in the non-production of mycotoxins.

9. The effects of mycologically produced or induced plant growth regulators on Kernel structure and composition and on grain sprouting should be examined.

B. HEAD BLIGHT AND STALK ROTS

1. As sorghum stalk rots are greatly affected by environmental stresses, yield potential, and maturity and since replacement of long-duration lower-yielding sorghum cultivars with shorter-duration higher-yielding cultivars has increased the incidence of stalk rots in several semi-arid tropical countries, we recommend that in the development of improved cultivars and hybrids a critical evaluation be made for stalk rot susceptibility.

2. Breeding for resistance to stalk rots must be closely coordinated with other yield characteristics.

3. The implications of the knowledge on interactions between stalk rot development and postflowering stress, grain-sink size, maturity, etc., should be fully considered in the development of screening techniques and evaluation of varieties for stalk rot susceptibility.

4. In a stalk rot resistance-screening program, as many replications, planting dates, and locations as can be afforded should be used. At any one location we recommend two planting dates with at least two replications per planting date. If only one planting date is possible, a minimum of three replications is recommended.

5. Flowering-date records are important in stalk rot susceptibility evaluations. Comparisons of stalk rot reactions should be made within test materials of similar maturities.

6. As size of the carbohydrates sink is important in the predisposition of plants to stalk rots, the stalk rot susceptibility evaluation records should include visual yield ratings, perhaps on a 1 to 5 scale, to enable the identification of entries which combine high yield with stalk rot resistance.

7. Direct stalk inoculation with *Macrophomina phaseolina* can be useful, but must be done to at least 20 plants in each replication of each test entry. Border rows and end plants in a row should not be used in these inoculations. Length of internal stem discoloration and number of internodes infected are valid criteria for evaluation if considered along with stresses, yields, and maturities.

8. As senescene ratings can be used as indicators of stalk rot susceptibility, and as they take less time than the splitting

of stalks and measuring internal infection, we recommend that senescence ratings be made in all stalk rot-susceptibility evaluations.

9. We recommend expansion of the ICRISAT coordinated multilocational cooperative program for the identification of charcoal rot resistance. The experimental design and evaluation should be consistent with the principles outlined in these recommendations. Planting should be timed so that the postflowering period coincides with stress conditions. Local stress interactions must be considered in reaction evaluation. Universal stalk rot resistance is not expected. Evaluation of adaptability to a location is the strongest value of the international stalk rot resistance-screening program. Such adaptability is most acurately predicted following testing in several environments.

10. Future research on stalk rots should emphasize evaluation of the stresses which predispose plants to infection in each geographical region, and the development of efficient techniques to identify sorghums capable of overcoming those stresses.

11. There is a need for basic research on the interactions among the different organisms involved in stalk rots, particularly *M. phaseolina*, *Fusarium* spp., and *Colletotrichum graminicola*.

C. ERGOT

1. Determination of the factors affecting sclerotial production in ergot infected sorghum inflorescence is needed.

2. Effective resistance screening and screening techniques need to be developed and standardized.

3. Potential hazards of sorghum ergot sclerotia needs investigation.

APPENDIX-1

Grain mold reactions and 50% flowering in the retesting of the selected entries from the rainy season 1978 screening.

S.No.	Entry	Days to 50% bloom	Mold Inoc. bagged heads scored for Phoma.	Non Inoc. non bagged heads scored for Phoma	Mold score in inoculated bagged heads	Mold score in non inoc. non bagged heads
1	M-35060	81	2.5	3.5	1.5	1.5
2	M-35052	76	2.3	4	1.5	1.5
3	M-36044	84	3	4	1.5	2
4	M-35004	78	2	4	1.5	1.5
5	M-35054	81	2	3	1.5	1.5
6	M-36311	83	2	4	1.5	1.8
7	M-35008	81	2	3.5	1.5	1.5
8	M-35025	79	2.3	4.3	1.5	1.5
9	M-35005	77	2	4	1.5	1.5
10	M-35007*	86	2	2	1.5	1.5
11	M-36051	80	2.3	3.8	1.5	1.5
12	M-36046	89	2.5	3.3	1.5	1.8
13	M-36066	77	2	3	1.5	1.5
14	M-35059	80	2	3	1.5	1.5
15	M-35048	80	2.3	3.3	1.5	1.8
16	M-36637	82	2	4	1.5	1.5
17	M-36376	77	2	2.8	1.5	1.5
18	M-35026	80	2	3	1.5	1.5
19	M-35050	79	2	3	1.5	1.5
20	M-35053	74	1.5	2.3	1.5	1.5
21	M-36486	80	1.8	2.3	1.5	1.5
22	M-36102	88	3	3	1.5	1.8
23	M-35013	79	2	4	1.5	1.5
24	M-35057	81	2.3	3.8	1.5	1.5
25	M-36040	78	2	3.5	1.8	1.5

S.No.	Entry	Days to 50% bloom	Mold Inoc. bagged heads scored for Phoma.	Non Inoc. non bagged heads scored for Phoma.	Mold score in inoculated bagged heads	Mold score in non inoc. non bagged heads
26	M-35003	79	2	4.5	1.8	1.5
27	M-36633	82	2	3.8	1.8	1.8
28	M-35075	89	2	3.5	1.8	2
29	M-35021	78	2	4	1.8	1.5
30	M-36105	89	2	4	1.8	1.8
31	M-35077	78	2	4	1.8	1.8
32	M-35066	76	3.3	4	1.8	1.8
33	M-36631	81	2	4	1.8	1.5
34	M-36089*	85	2	2	1.8	1.5
35	M-35027	80	2	3.3	1.8	1.5
36	M-36110	76	2.8	3.5	1.8	1.5
37	M-36075	76	2.3	2.8	1.8	1.5
38	M-35023	81	2.5	3.8	1.8	1.5
39	M-35171	81	2.3	3	1.8	1.8
40	M-35038	75	2	4	1.8	1.5
41	M-35055	80	2	2.8	1.8	2.3
42	M-36112	79	2	3.5	1.8	1.5
43	M-35078	85	2.3	5	1.8	2
44	M-36031	81	2	3.3	2	2
45	M-36274-2	83	3.5	4.5	2	1.8
46	M-35067	81	2.5	3.5	2	1.5
47	M-36382-1	69	2.3	3.3	2	2
48	M-36487	80	3	3.5	2	2
49	M-36630	80	2.3	4.3	2	1.5
50	M-35072	73	2	3.8	2	1.8
51	M-36211	89	2.5	3.3	2	2
52	M-36098	80	2.5	4	2	2
53	M-35159	84	2.5	3.3	2	2
54	M-36284	87	2.3	4	2	1.8
55	M-36559	95	2.3	2.8	2	2

S.No.	Entry	Days to 50% bloom	Mold Inoc. bagged heads scored for Phoma.	Non Inoc. non bagged heads scored for Phoma	Mold score in inoculated bagged heads	Mold score in non inoc. non bagged heads
56	M-36396	84	2.5	3.5	2	2
57	M-36355-2	81	2	3.5	2	2
58	M-36011*	92	2	2	2	1.5
59	M-36348	82	1.8	3	2	2.3
60	M-36015	79	2	3.3	2	2
61	M-36485	81	2.3	3.5	2	2
62	M-36307	93	2.3	3	2	2
63	M-36574	88	2.3	3.5	2	2
64	M-36024	88	3	4	2	2
65	M-36625	85	2.5	4.3	2	2
66	M-36417	85	2.3	2.5	2	2
67	M-36368	88	2	3	2	1.8
68	M-36071	80	2.5	3	2	1.5
69	M-36041	80	2.5	4	2	1.8
70	M-36091	85	2.8	2.5	2	2
71	M-36582	85	2.3	3	2	1.5
72	M-36629	82	2.3	3.5	2	1.5
73	M-36355-3	81	1.8	3	2	2
74	M-36620	80	1.5	3.5	2	2
75	M-35058	75	2.5	4	2	1.5
76	M-35151	81	2.5	3.5	2	2
77	M-36294	80	3	3.8	2	2
78	M-36654	76	2	3.5	2	2.3
79	M-36406	86	2	2.8	2	2
80	M-36456	80	2	3.5	2	1.8
81	M-36624	81	3	4	2	1.8
82	M-36050	87	2.8	3.5	2	1.5
83	M-35134	77	2.3	3.5	2	2
84	M-36100	79	2.5	4	2	1.8
85	M-36101	90	2.5	2.5	2	2

S.No.	Entry	Days to 50% bloom	Mold Inoc. bagged heads scored for Phoma.	Non Inoc. non bagged heads scored for Phoma	Mold score in inoculated bagged heads	Mold score in non inoc. non bagged heads
86	M-35009	80	3	4.3	2	1.8
87	M-36072	80	2	3	2	1.5
88	M-35028	96	2.5	0	2	0
89	M-36355-1	81	2.3	3	2	2
90	M-35051	78	2.5	3.5	2	1.5
91	M-35088	75	2	3	2	1.8
92	M-36131	77	2.8	4.3	2	1.8
93	M-35099	74	3.8	4.5	2	2
94	M-35170	81	2	2.8	2	1.8
95	M-35062	79	2	3	2	1.8
96	M-36619	81	2.3	3.8	2	2
97	M-36634	88	3	4	2	2.5
98	M-35167	80	2	3	2	2
99	M-36119	75	2.8	4	2	1.8
100	M-36459	76	2	3.3	2	2.5
101	M-36321*	81	2	2	2	1.5
102	M-36632	75	2	3.8	2	1.5
103	M-36350-3	83	1.8	2.8	2	2
104	M-36514	75	2.3	3	2	2
105	M-36483	77	3	3.5	2	2.5
106	M-36308	93	2.3	1.5	2.3	2.5
107	M-35045	79	3	4	2.3	2.3
108	M-36350-2	83	2.5	3.5	2.3	2
109	M-35096	76	2.3	3.5	2.3	1.5
110	M-36222	88	2.5	3	2.3	2
111	M-36640	83	3	4	2.3	2.3
112	M-36421	81	3	4.8	2.3	2.3
113	M-36047	89	2	3.5	2.3	2
114	M-36115	80	2	3.3	2.3	1.8
115	M-36012	89	3	4	2.3	2

S.No.	Entry	Days to 50% bloom	Mold Inoc. bagged heads scored for Phoma.	Non Inoc. non bagged heads scored for Phoma.	Mold score in inoculated bagged heads	Mold score in non inoc. non bagged heads
116	M-35083	73	2	3	2.3	1.8
117	M-36491	84	2.3	3	2.3	2
118	M-36074	80	2.5	4	2.3	1.8
119	M-36099	91	2	3	2.3	2.5
120	M-36045	76	3	3.8	2.3	1.5
121	M-35152	81	2.5	3.3	2.3	2
122	M-36073	81	2.8	3.3	2.3	1.8
123	M-36447	79	2	3	2.3	2
124	M-35086	78	2.5	4.3	2.3	2.3
125	M-36149	77	2.3	3.5	2.3	2
126	M-3602 7	80	2.5	4	2.3	1.5
127	M-36364	89	2.5	3.3	2.3	2
128	M-36395	88	2	0	2.3	0
129	M-36458	84	2	3.8	2.3	2.3
130	M-35002	77	2	4	2.3	2
131	M-35049	80	2.3	3	2.3	1.8
132	M-36273-3	87	1.8	3	2.3	2.5
133	M-36413	84	2.5	3.5	2.3	2.5
134	M-35173	81	4.5	2.5	2.3	2.5
135	M-36094	81	2.3	3.5	2.3	2
136	M-36288	81	2.3	4	2.3	2
137	M-35016	81	3.5	4	2.3	1.8
138	M-35022	81	2	3.5	2.3	2
139	M-36414	83	2.3	3	2.3	2
140	M-36465	81	2.5	3.3	2.3	2
141	M-36290	76	2.5	3.5	2.3	2.3
142	M-35118	80	3.5	4	2.3	1.8
143	M-36025	81	2.5	3.3	2.3	2
144	M-36032	91	2.8	3.3	2.3	1.8
145	M-36009	81	1.8	3	2.3	2

S.No.	Entry	Days to 50% bloom	Mold Inoc. bagged heads scored for Phoma.	Non Inoc. non bagged heads scored for Phoma.	Mold score in inoculated bagged heads	Mold score in non inoc. non bagged heads
146	M-35024	82	1.8	4	2.3	2
147	M-36029	80	2.3	4	2.3	2
148	M-35047	78	3	4	2.3	1.5
149	M-36132	81	2	3	2.3	1.5
150	M-35015	79	2.5	3.5	2.3	1.8
151	M-36383	82	2.5	3	2.3	2
152	M-36340	81	3.5	3.8	2.3	2.3
153	M-36443	79	2.8	4.5	2.3	2
154	M-36384	76	2.3	3	2.3	2
155	M-35162	84	2.3	3	2.3	2
156	M-36279-1	86	3	4	2.3	2.5
157	M-36023	81	2.5	3.5	2.3	1.8
158	M-36078	76	2.8	4	2.3	2
159	M-36652	83	2.3	3.5	2.5	2
160	M-36206	82	2.3	3.5	2.5	2.8
161	M-36159	91	2.5	3.5	2.5	2
162	M-36350-1	81	2.3	3.3	2.5	2.3
163	M-36349	81	2.3	2.8	2.5	2.3
164	M-36561	79	2.5	3.5	2.5	2.3
165	M-36474	81	2.5	3	2.5	2.5
166	M-36088	86	2	3	2.5	2
167	M-36409	86	2.5	3.3	2.5	2
168	M-36037	80	2.3	3	2.5	2
169	M-36042	81	2	4	2.5	2.3
170	M-36533	91	2	3.3	2.5	2
171	M-36636	81	2.8	4	2.5	2
172	M-35211	79	4	4.5	2.5	1.8
173	M-36001	91	2	2.5	2.5	2
174	M-36478	78	2.3	3	2.5	2.8
175	M-36382-2	71	2.5	3.3	2.5	2

S.No.	Entry	Days to 50% bloom	Mold Inoc. bagged heads scored for Phoma.	Non Inoc. non bagged heads scored for Phoma.	Mold score in inoculated bagged heads	Mold score in non inoc. non bagged heads
176	M-36462	75	4.8	4.8	2.5	3.5
177	M-35063	80	3.3	4	2.5	2.5
178	M-35081	76	2.8	4	2.5	1.8
179	M-36053	81	2.5	4.5	2.5	1.5
180	M-36057	95	2.5	2.8	2.5	2.3
181	M-36327	81	4	4.3	2.5	4.5
182	M-36370	80	2.8	3	2.5	2.3
183	M-36043	81	2	4.5	2.5	2
184	M-36567	81	2.5	3.5	2.5	2
185	M-36195	82	2.8	2.5	2.5	2.8
186	M-36415	88	2.5	0	2.5	0
187	M-36471	88	2.5	3	2.5	2
188	M-36570	81	2.5	3	2.5	2.5
189	M-36475-1	94	2.8	0	2.5	0
190	M-36060	83	2.5	3.5	2.5	2
191	M-36214	81	2	3.5	2.5	2
192	M-36210	84	2	3.3	2.5	2
193	M-36316	81	2.8	3.5	2.5	2.3
194	M-36353-2	73	2	2.5	2.5	2
195	M-36193	85	2.3	0	2.5	0
196	M-36354	76	2.3	3	2.5	2
197	M-36657	85	2.5	3.5	2.5	2.5
198	M-36373	82	2.3	3.3	2.5	2.3
199	M-36357	81	2.5	3	2.5	2
200	M-36467	83	2.5	3.3	2.5	2
201	M-36651	82	2.5	3.5	2.5	2
202	M-36644	80	2.5	3.3	2.5	2
203	M-36646	84	2.5	0	2.5	0
204	M-36096	83	2.3	3.8	2.5	2.3
205	M-36366	84	2	3.3	2.5	2

S.No.	Entry	Days to 50% bloom	Mold Inoc. bagged heads scored for Phoma.	Non Inoc. non bagged heads scored for Phoma.	Mold score in inoculated bagged heads	Mold score in non inoc. non bagged heads
206	M-35163	73	2	3.5	2.5	2
207	M-35073	89	3	0	2.5	0
208	M-36543-1	88	2.5	3.3	2.5	2
209	M-36160	91	2.5	3.5	2.5	2.3
210	M-35133	76	2.3	3	2.5	2
211	M-35125	88	2.5	0	2.5	0
212	M-36404	82	2.3	3.5	2.5	2
213	M-36215	81	2	3	2.5	2
214	M-35036	76	3	3.8	2.5	1.5
215	M-36201	95	2.3	3	2.5	2.3
216	M-36108	80	2.3	3.5	2.5	2
217	M-36165	88	2.8	3	2.5	2
218	M-36179	73	2.5	3	2.5	2.5
219	M-35139	77	2.3	3	2.5	2
220	M-36068	81	3	3.3	2.5	2
221	M-35208	71	2.5	4.5	2.5	2
222	M-36493-1	82	2.5	3.5	2.5	2
223	M-35143	73	3	3	2.5	2
224	M-36515	79	2.8	4	2.5	2
225	M-36496	87	2.5	3.5	2.5	2
226	M-36426	89	3	0	2.5	0
227	M-36655	78	2.5	3	2.5	2
228	M-35076	82	2.3	4	2.5	2
229	M-36418	96	2	0	2.5	0
230	M-36170	88	2.3	3	2.5	3
231	M-36363	85	2.5	3.3	2.5	2
232	M-36391	80	2.5	3	2.5	2
233	M-36283	82	2.5	4.3	2.5	2.8
234	M-36273-1	81	1.8	3	2.5	1.5
235	M-36394	81	2.3	3	2.5	2

S.No.	Entry	Days to 50% bloom	Mold Inoc. bagged heads scored for Phoma.	Non Inoc. non bagged heads scored for Phoma.	Mold score in inoculated bagged heads	Mold score in non inoc. non bagged heads
236	M-35161	84	2.5	3	2.5	2
237	M-36016	82	1.8	4.3	2.5	2
238	M-36473	84	2.5	3.3	2.5	2
239	M-36287	76	2.5	4	2.5	2
240	M-36400	88	2.5	0	2.5	0
241	M-36544-1	88	2	3	2.5	2
242	M-35132	76	2.3	2.8	2.5	2
243	M-36468	88	1.8	2.5	2.5	2
244	M-36033	80	2.8	4.3	2.5	1.8
245	M-36177	73	2.5	3.3	2.5	2
246	M-36576	94	2.3	3.5	2.5	2
247	M-36281	80	2.8	4.3	2.5	2.3
248	M-36182	76	2	3.5	2.5	2
249	M-36650	81	2.5	3.5	2.5	2
250	M-35157	90	2.3	3.5	2.5	2
251	M-36405	80	2.3	3.5	2.5	2
252	M-35018	80	2.5	4	2.5	2
253	M-36200	95	2.5	3.5	2.5	2
254	M-35029	76	2	4	2.5	1.8
255	M-36178	69	2.5	3.5	2.5	2
256	M-35144	81	2.3	3.5	2.8	2
257	M-36562	85	2.5	3.5	2.8	2
258	M-36189	84	2	3.5	2.8	2
259	M-36500	89	2.5	0	2.8	0
260	M-35136	74	2.5	3.3	2.8	2.3
261	M-35050	80	3	4.3	2.8	2.5
262	M-36199	89	2.5	3.5	2.8	2.3
263	M-36454	78	2	4.3	2.8	2
264	M-36546	83	2.8	3.3	2.8	3
265	M-35033	82	3	4.5	2.8	2

S.No.	Entry	Days to 50% bloom	Mold Inoc. bagged heads scored for Phoma.	Non Inoc. non bagged heads scored for Phoma.	Mold score in inoculated bagged heads	Mold score in non inoc. non bagged heads
266	M-36219	81	2.3	3	2.8	2.3
267	M-36455	87	3	0	2.8	0
268	M-35039	80	3	3.5	2.8	2
269	M-35124	93	2.5	0	2.8	0
270	M-35122	84	2.5	3.5	2.8	2.5
271	M-35131	79	2.5	3	2.8	2.3
272	M-36479	85	2.3	0	2.8	0
273	M-36185	81	2	3.5	2.8	2.5
274	M-36161-1	95	2.3	3.5	2.8	2.5
275	M-36604	81	2.3	3.3	2.8	2.3
276	M-36209	80	2.3	3.5	2.8	2.3
277	M-36469	81	3	4.8	2.8	2.8
278	M-36432	75	2.5	4.8	2.8	2.5
279	M-36392	76	2.8	3.5	2.8	2
280	M-36125	76	2	3.8	2.8	2
281	M-36653	91	2.5	3.3	2.8	2
282	M-35135	81	2.3	3.3	2.8	2.3
283	M-36590-2	76	2.3	3	2.8	2
284	M-36476-1	91	2.5	4	2.8	2
285	M-36494	81	2.5	3	2.8	2
286	M-36475-2	94	2.5	3.5	2.8	2.5
287	M-36476-2	88	2.5	3	2.8	2
288	M-36282	80	3	3.8	2.8	2.3
289	M-36497	81	2.5	3.5	2.8	2.5
290	M-35020	82	2.8	4	2.8	2.5
291	M-35213	78	3	4.3	2.8	1.5
292	M-35034	75	3.3	4.3	2.8	2
293	M-36535	80	2.5	3.5	2.8	2.3
294	M-36565	88	2.5	0	2.8	0
295	M-36399	79	2.8	3.5	2.8	2.3

S.No.	Entry	Days to 50% bloom	Mold Inoc. bagged heads scored for Phoma.	Non Inoc. non bagged heads scored for Phoma.	Mold score in inoculated bagged heads	Mold score in non inoc. non bagged heads
296	M-36607	81	2.3	3	2.8	2
297	M-35166	78	2.5	3	2.8	2.3
298	M-36648	88	2.5	3.3	2.8	2.3
299	M-36169	88	2.5	3	2.8	2
300	M-36250	82	2.5	3.5	2.8	3
301	M-35041	78	2	4	2.8	2.5
302	M-35006	80	2	3.8	2.8	2.3
303	M-36277-1	79	3.8	4.5	2.8	1.8
304	M-36273-2	82	2.3	3.8	2.8	1.8
305	M-35089	79	2.8	4.5	2.8	2.5
306	M-36407	85	2.5	0	2.8	0
307	M-35141	81	2	3	2.8	2
308	M-36235	73	3.3	4.3	2.8	2.3
309	M-36387	81	2.5	3.5	2.8	2.5
310	M-36540	78	2	3.5	2.8	2
311	M-36359	84	2.3	3	2.8	2.3
312	M-36038	81	2.8	4.5	2.8	2.3
313	M-36272	87	3.5	4	2.8	1.8
314	M-35203	74	2.5	4.5	2.8	1.8
315	M-36405-1	82	2.8	3.5	3	2.5
316	M-36369-1	81	2.5	3.5	3	2.3
317	M-35155	95	2	0	3	0
318	M-35064	88	3	3.5	3	2.5
319	M-36289	80	2.8	4.3	3	1.8
320	M-35019	76	3	4	3	2.5
321	M-36544-2	81	2.5	3.5	3	2.5
322	M-35145	81	2.3	0	3	0
323	M-36365	81	2.3	3.5	3	2.5
324	M-36161-2	76	2.5	3.5	3	2.5
325	M-36554	81	2	3.5	3	2.3

S.No.	Entry	Days to 50% bloom	Mold Inoc. bagged heads scored for Phoma.	Non Inoc. non bagged heads scored for Phoma.	Mold score in inoculated bagged heads	Mold score in non inoc. non bagged heads
326	M-36378-1	81	2.3	3.5	3	2.5
327	M-36265	79	4	5	3	1.5
328	M-35180	81	2.8	3.8	3	2.5
329	M-35035	76	2.8	4.3	3	2.3
330	M-36484	82	3	4	3	2.5
331	M-36019	81	2.3	3.5	3	2.8
332	M-35142	69	2.3	3.5	3	2
333	M-36275	80	2.5	4	3	2
334	M-35040	73	3.3	4.5	3	2.8
335	M-35044	80	3.3	4.5	3	2.8
336	M-36445	81	2.8	4.8	3	2.8
337	M-36499	89	2.3	0	3	0
338	M-36412-2	83	2.3	3.5	3	2.5
339	M-36573	85	2.5	3.5	3	2.5
340	M-36274-3	87	2.3	4.5	3	1.5
341	M-36457	81	2.3	4.5	3	1.8
342	M-36162	82	2.5	3	3	2.3
343	M-36186	74	2.3	3.5	3	2
344	M-36385	81	2.5	3.5	3	2.3
345	M-36247	79	2.3	4.5	3	2
346	M-36493-2	79	2.5	3	3	3
347	M-36590-1	77	2	3.5	3	2.5
348	M-36490	80	2.5	3.8	3	2.3
349	M-36240	78	3.3	4.5	3	2.5
350	M-36154	85	2.5	3.5	3	2.3
351	M-36589	89	2.5	3.3	3	2
352	M-36362	83	2.5	3.8	3	2.5
353	M-36300	80	2.8	4	3	3
354	M-36086	78	2.5	3.5	3	2.3
355	M-36489	76	2	4.5	3	2.5

S.No.	Entry	Days to 50% bloom	Mold Inoc. bagged heads scored for Phoma.	Non Inoc. non bagged heads scored for Phoma.	Mold score in inoculated bagged heads	Mold score in non inoc. non bagged heads
356	M-36452	80	2.3	4	3	1.8
357	M-35138	79	2	3.3	3	2.5
358	M-35201	75	2.8	4.8	3	1.8
359	M-35127	84	2.5	3.3	3	2.5
360	M-36292	91	3	3	3	3
361	M-35046	80	2.8	4	3.3	2.8
362	M-35103	73	2.5	5	3.3	2.8
363	M-36430	82	2.5	4	3.3	2.3
364	M-36593	81	2.5	3.3	3.3	2
365	M-36393	77	3	3.8	3.3	2.5
366	M-36123	74	2.5	4.3	3.3	2.5
367	M-36064	79	2.8	4	3.3	2.5
368	M-36039	83	2.3	3.5	3.3	3
369	M-36141	81	2	4.3	3.3	2
370	M-36264	81	2.3	4.5	3.3	3
371	M-35148	81	2.5	4	3.3	2.5
372	M-35017	80	2.5	4	3.3	2
373	M-35227	75	2.5	3.8	3.3	1.5
374	M-36412-1	84	2.5	3.5	3.3	2.5
375	M-36224	81	4.8	4	3.3	3.5
376	M-35104	76	3	4.8	3.3	2.5
377	M-36548	82	2.3	3	3.3	2.3
378	M-35116	80	2.5	4	3.3	2.5
379	M-36378-2	75	2.5	3.8	3.3	1.5
380	M-36543-2	87	2.5	3.5	3.3	2.3
381	M-36225	80	3.5	4.3	3.3	2.8
382	M-36352	79	3.3	4.5	3.3	1.5
383	M-36312	74	3	3	3.3	2
384	M-36084	81	3.3	3.3	3.3	2.3
385	M-36174	76	2	3.8	3.3	2

S.No.	Entry	Days to 50% bloom	Mold Inoc. bagged heads scored for Phoma.	Non Inoc. non bagged heads scored for Phoma.	Mold score in inoculated bagged heads	Mold score in non inoc. non bagged heads
386	M-36498	79	2.5	3.3	3.3	2.8
387	M-36507	79	2.5	3.3	3.3	2.8
388	M-35011	76	3.3	3.8	3.3	2.5
389	M-36656	79	2.3	3.8	3.3	2.3
390	M-36175	76	2.5	3.5	3.3	2.3
391	M-36082	81	3.5	4.3	3.3	3
392	M-36398	81	2.5	4	3.3	2.5
393	M-35105	73	3.5	4.8	3.3	2.3
394	M-36470	85	2.5	2.5	3.3	3.5
395	M-35094	73	3.8	4.5	3.3	1.5
396	M-36477	83	2.5	3	3.3	2.5
397	M-36238	75	3	4.5	3.3	2
398	M-36558	79	2.3	3.5	3.3	2.5
399	M-36429	79	2	4	3.3	3
400	M-36138	74	4.5	5	3.3	2
401	M-36444	82	2.8	4.5	3.3	3.8
402	M-36183	73	2.5	3.5	3.3	2.5
403	M-36402	87	2.5	3	3.3	2.5
404	M-36277-2	81	2.5	4	3.3	1.8
405	M-36405-2	81	2.8	3.5	3.3	2.5
406	M-36614	81	2.5	3	3.5	2.5
407	M-36615	94	2.5	3.5	3.5	2.5
408	M-35110	89	3	5	3.5	4
409	M-35194	81	2.8	4.8	3.5	2.5
410	M-35037	81	2	4	3.5	2
411	M-35032	79	2	4	3.5	2.5
412	M-36320	75	2	4.5	3.5	1.5
413	M-36401	87	2.5	0	3.5	0
414	M-36061	80	2.5	4.5	3.5	3
415	M-35212	75	3	4.5	3.5	1.8

S.No.	Entry	Days to 50% bloom	Mold Inoc. bagged heads scored for Phoma.	Non Inoc. non bagged heads scored for Phoma.	Mold score in inoculated bagged heads	Mold score in non inoc. non bagged heads
416	M-36542	78	2.3	3.5	3.5	2.3
417	M-35217	80	2	4	3.5	2.3
418	M-36136	73	4	5	3.5	3.5
419	M-36244	75	3	4.5	3.5	2.3
420	M-36388	81	2.5	4	3.5	3.5
421	M-36522	81	2.5	3.5	3.5	2.5
422	M-36205	94	2.5	3	3.5	2.8
423	M-36059	75	3	4.3	3.5	3.3
424	M-36433	78	2	4.8	3.5	1.8
425	M-36237	79	2.8	4.3	3.5	2.5
426	M-35214	79	2.8	4.5	3.5	2.3
427	M-35175	81	2.8	5	3.5	2.8
428	M-36262	76	3.8	4.8	3.5	1.5
429	M-35121	76	2.5	3	3.5	2.5
430	M-36155	84	2.5	3.5	3.5	2.5
431	M-36152	76	2.5	3.5	3.5	2.5
432	M-36133	80	2.8	2.8	3.5	2
433	M-35128	88	2.5	0	3.5	0
434	M-36345	88	1.5	4	3.5	3
435	M-36606	80	2.3	3.5	3.5	2.3
436	M-36081	81	2.3	4	3.5	2.5
437	M-36380	75	2	3.8	3.5	1.5
438	M-36083	69	3	4.5	3.5	1.5
439	M-35102	71	3.5	5	3.8	3.5
440	M-36482	73	2.8	3.5	3.8	2.3
441	M-35191	81	3.5	3	3.8	2.5
442	M-36274-1	82	2.3	4.8	3.8	2
443	M-36411	80	2.5	3.8	3.8	2.3
444	M-36267	75	3.8	5	3.8	1.5
445	M-36034	75	4	4.5	3.8	3.3

S.No.	Entry	Days to 50% bloom	Mold Inoc. bagged heads scored for Phoma.	Non Inoc. non bagged heads scored for Phoma.	Mold score in inoculated bagged heads	Mold score in non inoc. non bagged heads
446	M-36353-1	73	3.8	4.5	3.8	2
447	M-36127	75	2	4.3	3.8	1.3
448	M-36369-2	92	2.5	4	3.8	2.5
449	M-36065	80	3.5	4.3	3.8	3
450	M-36334	79	2.5	3.5	3.8	3.5
451	M-36539-1	80	2.3	3.5	3.8	3.5
452	M-36428	83	3.3	4.5	4	3.3
453	M-36069	79	4.3	5	4	3
454	M-35222	80	3.8	4.8	4	3
455	M-36126	75	3	4.5	4	2.3
456	M-36270	88	3.8	0	4	0
457	M-35181	81	2.3	5	4	2.5
458	M-35205	73	2.3	4.8	4	2.3
459	M-35114	80	2	4.3	4	2.3
460	M-36226	75	2.8	4.8	4	3.3
461	M-36135	76	2.8	4.3	4	3.3
462	M-36145	81	3.5	4.5	4	3.5
463	M-35174	80	3.5	4.5	4	3
464	M-36021	81	4.3	4.8	4.3	3.5
465	M-35095	74	2.5	4.8	4.3	2.5
466	M-35186	75	2.3	4.3	4.3	3
467	M-35195	80	2.8	5	4.3	2
468	M-36303	81	4	4.3	4.3	4.5
469	M-36343	84	3	4.8	4.3	3.3
470	M-35093	76	3.5	5	4.3	3.3
471	M-35113	81	3	5	4.3	3.3
472	M-35108	76	2.8	4.5	4.3	2.5
473	M-36248	80	2.5	4.3	4.3	2
474	M-36279-2	81	3.3	4.8	4.3	1.5
475	M-36424-2	90	3	5	4.3	3

S.No.	Entry	Days to 50% bloom	Mold Inoc. bagged heads scored for Phoma.	Non Inoc. non bagged heads scored for Phoma.	Mold score in inoculated bagged heads	Mold score in non inoc. non bagged heads
476	M-36315	83	2.5	3	4.5	3.5
477	M-35228	73	3.5	4.8	4.5	1.5
478	M-36420	81	2.5	5	4.5	3.8
479	M-36251	79	3	3.5	4.5	1.5
480	M-36269	76	3.3	4.8	4.5	2.3
481	M-36427	82	3.3	4	4.5	2.5
482	M-36146	70	3	5	4.5	1.5
483	M-36035	74	2.5	4.3	4.5	1.5
484	M-36333	76	2	3.5	4.5	4.5
485	M-36143	76	3.5	4.5	4.5	3.5
486	M-36335	77	2.8	3	4.5	3.8
487	M-36260	75	3.3	5	4.5	4.5
488	M-35109	80	3.5	4.8	4.5	3
489	M-36114	80	3.3	4.5	4.5	1.8
490	M-36148	71	3.3	4.5	4.5	2.8
491	M-36422	81	3	4.3	4.5	4
492	M-36463-2	76	2.5	4.8	4.5	1.8
493	M-36425	89	4	3.5	4.5	2
494	M-36055	85	4	4.8	4.5	3.5
495	M-36325	81	3.3	4	4.8	4.5
496	M-36054	86	4	4	4.8	2.5
497	M-36129	81	2.3	4.5	4.8	4.5
498	M-35274	73	3	4.5	4.8	2.5
499	M-35091	80	4	4.8	4.8	3
500	M-36259	81	3	0	4.8	0
501	M-36142	73	4	3.8	4.8	3.8
502	M-35106	75	3	5	4.8	2.5
503	M-36424-1	81	2.8	4.8	4.8	2.8
504	M-36337	81	2.5	4.3	4.8	3.3
505	M-36147	73	2	4	4.8	2

S.No.	Entry	Days to 50% bloom	Mold Inoc. bagged heads scored for Phoma.	Non Inoc. non bagged heads scored for Phoma.	Mold score in inoculated bagged heads	Mold score in non inoc. non bagged heads
506	M-36379	75	3	4	4.8	3.3
507	M-36263	71	3.3	5	4.8	3.5
508	M-35184	82	2	4.8	4.8	1.5
509	M-36116	81	1.8	4.8	4.8	3
510	M-36242	71	2.8	5	5	2.5
511	M-36271	84	3.8	5	5	4
512	M-36463-1	76	2	4.3	5	3
513	M-35100	76	3.8	5	5	3.8
514	M-36539-2	76	2	3.8	5	2.5
515	M-35111	80	3.5	4.5	5	4.5
516	M-36342	81	1.8	4	5	3
517	M-36338	82	3	3.3	5	3.5

APPENDIX-II

Charcoal rot reactions and days to 50% flowering of sorghum material in the initial screening during Rabi 1978-79 at ICRISAT Center.

S.No.	Entry	Days to 50% flowering	Mean node cross	Percent soft stalk	Remarks
1	3-52	63	0	0	
2	3-79	63	0	0	
3	2-66	68	0	0	
4	IS 9734	67	0	0	
5	3-81	68	0	0	
6	IS 9736	61	0	0	
7	IS 8344	72	0	0	
8	3-72	63	0	0	
9	IS 703	65	0	0	
10	IS 7629	72	0	0	
11	IS 7235	59	0	0	
12	IS 7465	63	0	0	
13	IS 9586	65	0	0	
14	R x 49	82	0	0	
15	IS 5873	84	0	0	
16	IS 7614	81	0	0	
17	IS 534	82	0	0	
18	IS 9589	61	0	0	
19	IS 7502	64	0	0	
20	IS 149	61	0.03	0	
21	IS 965	60	0.03	0	
22	IS 7197	60	0.03	0	
23	IS 8067	60	0.03	0	
24	E 36-1	65	0.04	0	
25	DURTHU (65)	61	0.04	0	
26	3-60	63	0.04	0	
27	3-68	62	0.04	0	
28	IS 7026	61	0.04	0	
29	IS 3980	63	0.05	0	
30	IS 5420	72	0.05	0	

S.No.	Entry	Days to 50% flowering	Mean node cross	Percent soft stalk	Remarks
31	SPV-101	68	0.05	0	
32	IS 6995	57	0.05	0	
33	IS 3517	60	0.05	0	
34	IS 8564	70	0.05	0	
35	MUGUTHI	79	0.05	0	
36	IS 2195	72	0.06	0	
37	1-35	70	0.07	0	
38	IS 3076	60	0.07	0	
39	IS 7312	65	0.07	0	
40	IS 7263	63	0.07	0	
41	IS 7204	60	0.07	0	
42	IS 7439	63	0.08	0	
43	IS 7332	70	0.08	0	
44	IS 3507	60	0.08	0	
45	IS 7183	62	0.09	0	
46	IS 1118	64	0.09	4.3	
47	IS 7818	79	0.09	0	
48	15-16	70	0.09	0	
49	IS 2914	59	0.09	0	
50	IS 3836	70	0.10	0	
51	AISPURI	74	0.1	0	
52	3-55	63	0.1	15	
53	4-18	67	0.1	0	
54	IS 7229	72	0.11	0	
55	IS 9727	60	0.11	0	
56	IS 7366	70	0.11	0	
57	IS 6056	62	0.11	0	
58	3-70	62	0.11	0	
59	IS 3535	61	0.12	0	
60	IS 3440	62	0.12	4	

S.No.	Entry	Days to 50% flowering	Mean node cross	Percent soft stalk	Remarks
61	3-71	64	0.12	0	
62	IS 3592	72	0.13	0	
63	3-80	68	0.13	0	
64	IS 7262	72	0.13	0	
65	IS 901	60	0.14	0	
66	IS 7305	65	0.14	0	
67	1-96	69	0.14	0	
68	BJ 107-7	79	0.14	0	
69	IS 9665	64	0.14	4.8	
70	IS 4496	72	0.14	0	
71	E 117-1	70	0.14	0	
72	3-62	62	0.15	3.7	
73	IS 3541	60	0.15	3.9	
74	1-37	82	0.15	0	
75	Bulk-Y	66	0.15	0	
76	NP-25	63	0.15	0	
77	IS 1159	73	0.15	0	
78	NP-45	64	0.15	0	
79	IS 3825	72	0.16	0	
80	(954068 x CS 3541)-55	68	0.16	0	
81	N-13	72	0.16	0	
82	IS 11705	80	0.16	0	
83	IS 2377	79	0.16	0	
84	IS 3691	70	0.17	0	
85	IS 3866	70	0.17	0	
86	IS 7320	62	0.17	0	
87	E 35-1	72	0.17	0	
88	IS 3488	61	0.17	0	
89	IS 2095	71	0.18	0	
90	IS 4309	77	0.19	0	

S.No.	Entry	Days to 50% flowering	Mean node cross	Percent soft stalk	Remarks
91	1-62	70	0.19	0	
92	(954068 x CS 3541)-35	70	0.19	0	
93	IS 7301	72	0.19	0	
94	WA x Nigerian Bulk	71	0.19	4.8	
95	4-23	69	0.2	0	
96	IS 639	72	0.2	0	
97	3-40	72	0.2	0	
98	IS 1066	84	0.2	0	
99	DJ 1195	73	0.21	0	
100	IS 3515	63	0.21	0	
101	IS 7198	71	0.21	0	
102	IS 9710	64	0.21	0	
103	IS 3627	66	0.21	0	
104	IS 3447	63	0.22	0	
105	IS 699	71	0.22	0	
106	3-57	63	0.22	11.1	
107	IS 3581	64	0.22	4.4	
108	E 178-5	67	0.22	0	
109	(SB 1066 x CS 3541)-9-2	72	0.22	0	
110	NP x ELITE # B-11-1	69	0.22	0	
111	IS 3835	64	0.22	17.4	
112	IS 7630	60	0.23	0	
113	(2219B x 148)-8	70	0.23	0	
114	IS 6819	72	0.23	0	
115	IS 9761	65	0.24	0	
116	IS 7308	63	0.24	3.5	
117	IS 2293	61	0.24	0	
118	IS 5421	72	0.24	0	
119	IS 1116	64	0.24	19.1	
120	IS 6928	59	0.24	19.1	

S.No.	Entry	Days to 50% flowering	Mean node cross	Percent soft stalk	Remarks
121	IS 7298	70	0.24	0	
122	SPV-66	64	0.24	9.5	
123	1202-B	68	0.24	0	
124	(WAxP#Bulk)-18-1	66	0.24	0	
125	(954063x148)-27	72	0.24	0	
126	(WAxP#Bulk)-19-1	71	0.25	0	
127	IS 1320	69	0.25	3.6	
128	IS 9693	64	0.26	0	
129	E 185-2	67	0.26	5.3	
130	IS 9614	73	0.26	0	
131	IS 7191	64	0.26	3.7	
132	IS 3878	72	0.26	0	
133	IS 4425	64	0.27	3.9	
134	3-63	61	0.27	10	
135	IS 7570	72	0.27	0	
136	3-69	62	0.27	4.6	
137	PJ-IR	72	0.27	0	
138	IS 7514	78	0.27	0	
139	IS 3444	72	0.27	0	
140	5-4-1, Muguthi	72	0.27	0	
141	IS 7539	72	0.28	0	
142	IS 7326	65	0.28	5.6	
143	IS 7463	64	0.29	0	
144	(SB1066xA1)-9-1	72	0.29	0	
145	IS 13	73	0.29	0	
146	DW-20	70	0.29	0	
147	IS 11561	71	0.29	0	
148	IS 3898	70	0.29	0	
149	IS 3541	58	0.29	35.3	
150	1-59	70	0.3	0	

S.No.	Entry	Days to 50% flowering	Mean node cross	Percent soft stalk	Remarks
151	IS 7362	70	0.3	0	
152	(954063 x CS 3541)-57	72	0.3	0	
153	IS 10736	65	0.3	0	
154	IS 6830	66	0.31	0	
155	IS 5603	81	0.31	0	
156	4-15	66	0.31	18.8	
157	E 14-3	72	0.32	0	
158	IS 3856	83	0.32	0	
159	(SC 423 x CS 3541)-47	64	0.32	5.3	
160	E 179-1	69	0.32	0	
161	IS 183	69	0.33	0	
162	IS 7017	71	0.33	0	
163	IS 2140	72	0.33	0	
164	IS 8662	62	0.33	0	
165	(SB1066xA1)-9-2	72	0.33	0	
166	SPV-99	69	0.35	0	
167	IS 10737	70	0.35	10	
168	IS 7052	58	0.35	34.8	
169	(954063 x CS 3541)-30	67	0.35	0	
170	4-14	68	0.35	7.7	
171	E-182	72	0.35	0	
172	E-145	70	0.35	0	
173	(SC 423 x CS 3541)-85	70	0.36	0	
174	Early sel. from Dekalb -15-4	66	0.36	0	
175	IS 5765	69	0.36	4.6	

S.No.	Entry	Days to 50% flowering	Mean node cross	Percent soft stalk	Remarks
176	VZM 2-8	72	0.37	0	
177	IS 7320	78	0.37	0	
178	IS 3491	64	0.38	0	
179	IS 954063	71	0.38	0	
180	E 1267	71	0.38	0	
181	(954063 x SWARNA)-18	66	0.39	0	
182	TSS 7-5	82	0.39	4.4	
183	2-18	65	0.39	16.7	
184	IS 10786	72	0.39	0	
185	(SB 1066 x R 24)-6-2	70	0.39	0	
186	IS 2311	73	0.39	0	
187	2-50	69	0.4	0	
188	NP x F43 x N. WHITE 6-1-1	70	0.4	0	
189	IS 10774	72	0.4	0	
190	IS 3572	66	0.4	4	
191	IS 3877	60	0.41	5.9	
192	3-20	65	0.41	4.6	
193	IS 6747	68	0.41	0	
194	DW-21	70	0.41	0	
195	IS 7999	60	0.41	4.6	
196	IS 7322	72	0.41	11.8	
197	E 496-3	70	0.41	0	
198	BAIDA	64	0.41	0	
199	IS 7324	55	0.42	0	
200	IS 3790	70	0.42	0	
201	4-13	70	0.42	0	
202	DW-5	68	0.42	0	
203	M 35-1	74	0.43	0	
204	IS 7913	64	0.43	14.3	
205	1-66	70	0.43	0	

S.No.	Entry	Days to 50% flowering	Mean node cross	Percent soft stalk	Remarks
206	(AJ-18-1 x SB 1066)-4-1	70	0.43	0	
207	NP-38	68	0.44	0	
208	3-7	65	0.44	11.1	
209	(NP x EC. 65352-1)2-1-1	70	0.44	0	
210	(M 35-1 x 148) CR 35 BRE-2-12	72	0.45	0	
211	1-89	69	0.45	0	
212	(954068 x CS 3541)-43	70	0.45	0	
213	IS 3513	68	0.45	0	
214	(SB.1066 x A)-17-1-2	69	0.45	5	
215	(FR.493 x CS 3541)-3-2	71	0.45	0	
216	IS 3550	64	0.46	0	
217	US/R(M)C1S4-642-1-1-1	67	0.46	0	
218	IS 2321	72	0.47	0	
219	IS 7582	72	0.47	0	
220	V 45-1-1-a	70	0.48	0	
221	IS 8174	62	0.48	12	
222	AAMAINA	60	0.48	14.8	
223	(10680xCS3541)-6	72	0.48	0	
224	IS 7184	70	0.48	0	
225	IS 1044	63	0.48	8.7	
226	VZM 2-B	72	0.5	6.3	
227	IS 7637	71	0.5	0	
228	R-16	78	0.5	0	
229	6-97	70	0.5	0	
230	M 35-1(IS 1054)	72	0.5	0	

S.No.	Entry	Days to 50% flowering	Mean node cross	Percent soft stalk	Remarks
231	IS 2623	70	0.52	0	
232	IS 9178	70	0.52	0	
233	3-M (BJP)	72	0.52	0	
234	IS 6995	64	0.52	0	
235	(CS3541x148)-5	70	0.52	0	
236	RS-5Dx	70	0.52	0	
237	(CS3541x148)-18	68	0.52	4.4	
238	(SC423xCS3541)-52	69	0.52	0	
239	(SB1066xA1)5-14	72	0.53	6.7	
240	HIGH ALTITUDE	71	0.53	6.7	
241	SPV-104	66	0.53	0	
242	IS 3499	64	0.54	0	
243	8-27	72	0.54	0	
244	1-80	68	0.54	3.9	
245	3-67	62	0.54	11.5	
246	(AJ-18-1xSB1066) x M35-1 x CS 3541)194-1	69	0.55	0	
247	2-9	72	0.55	0	
248	IS 7393	66	0.55	13.6	
249	IS 3472	71	0.55	0	
250	IS 1082	78	0.55	0	
251	(SB 1066 x A1) 7-9-DRC-7-9	71	0.55	0	
252	IS 474	64	0.55	10	
253	M 35-1	81	0.56	0	
254	DJ 106	72	0.56	0	
255	(WA. x P # Bulk) 10-2	77	0.56	0	
256	SB-1066	68	0.57	4.4	
257	B.Y(M)C_3S_4-55-2-3-1	70	0.57	0	
258	IS 10755	64	0.57	0	
259	IS 7264	66	0.57	4.8	
260	3-70	68	0.58	0	

S.No.	Entry	Days to 50% flowering	Mean node cross	Percent soft stalk	Remarks
261	3-8	64	0.59	9.1	
262	1-56	70	0.59	0	
263	IS 6248	63	0.59	27.3	
264	(SB 1066 x BJ 111)-25-1	73	0.59	0	
265	(SB 1066 x R-24)-36-1	69	0.59	0	
266	(954063 x CS 3541)-39	72	0.59	0	
267	IS 9708	62	0.6	20	
268	NP 3-31	68	0.6	0	
269	SPV 35	71	0.6	10	
270	DURTHU (63)	60	0.6	8	
271	IS 7474	65	0.6	8	
272	IS 6920	70	0.61	0	
273	(10262 x CS 3541)-13	72	0.61	0	
274	IS 11085	82	0.63	0	
275	(SB 1066 x CS 3541)-9-2	65	0.63	6.3	
276	1-85	68	0.63	10.5	
277	IS 2265	73	0.64	0	
278	IS 3962	73	0.64	0	
279	IS 693	73	0.64	0	
280	IS 7565	72	0.64	9.1	
281	1-67	69	0.65	10	
282	IS 6790	72	0.67	0	
283	(954068 x CS 3541)-81	71	0.67	0	
284	IS 3443	69	0.67	0	
285	IS 3868	82	0.67	0	

S.No.	Entry	Days to 50% flowering	Mean node cross	Percent soft stalk	Remarks
286	IS 7035	70	0.67	4.8	
287	9-54	69	0.67	0	
288	IS 3479	81	0.67	11.1	
289	IS 452	64	0.68	9.1	
290	IS 7223	72	0.69	0	
291	NP x ELITE # B 14-2	69	0.69	0	
292	IS 822	58	0.69	34.6	
293	IS 10745	73	0.69	0	
294	IS 5604	71	0.69	8.7	
295	IS 11758	81	0.69	0	
296	2-19	65	0.7	10	
297	IS 1151	65	0.7	20	
298	IS 2394	81	0.71	14.3	
299	IS 9776	60	0.72	0	
300	IS 3459	77	0.73	9.1	
301	IS 9718	68	0.73	6.7	
302	2-60	69	0.73	9.1	
303	23-53	74	0.73	4.6	
304	(954063 x SWARNA)-12	71	0.74	0	
305	2-13	70	0.75	0	
306	1-61	73	0.75	0	
307	IS 3922	72	0.75	0	
308	2-49	68	0.75	0	
309	IS 6746	72	0.76	9.5	
310	(SC 423 x CS 3541)-16	64	0.76	20	
311	CSV-3	71	0.76	0	
312	SPV-105	70	0.76	0	
313	(SB1066 x A_1) DRC 7-2-1	71	0.76	5.9	
314	(954063 x CS 3541)-1	77	0.77	0	
315	DJ 6514	78	0.77	13.6	

S.No.	Entry	Days to 50% flowering	Mean node cross	Percent soft stalk	Remarks
316	IS 10776	71	0.78	0	
317	3-66	62	0.78	30.1	
318	2-65	72	0.78	0	
319	E 185-2	71	0.79	3.6	
320	(SB 1066 x A_1)-63-2	71	0.79	7.1	
321	NP x ELITE # B-7-1	70	0.79	0	
322	2-20	70	0.8	0	
323	E 454	72	0.8	0	
324	(IS 1082 x WABC-3101)	73	0.81	0	
325	IS 4587	77	0.82	11.8	
326	4-17	64	0.82	9.1	
327	IS 26	81	0.82	0	
328	(WABCxP-4-8)	72	0.82	0	
329	IS 601	71	0.83	0	
330	BP 53	74	0.83	16.7	
331	(954068 x CS 3541)-11	70	0.83	4.4	
332	1-92	69	0.83	0	
333	IS 2122	72	0.83	4.2	
334	(WA x P # Bulk)-1-2	69	0.83	16.7	
335	(2219B x CS 3541)-12	70	0.84	0	
336	NP-8	69	0.84	0	
337	(SB 1066 x IS 84)-73-1	63	0.84	15.8	
338	3-12	70	0.84	0	
339	(954063 x CS 3541)-7	70	0.84	16	
340	IS 5818	63	0.85	29.6	

S.No.	Entry	Days to 50% flowering	Mean node cross	Percent soft stalk	Remarks
341	SPV 105	69	0.85	15	
342	IS 7257	64	0.86	45.5	
343	3-41	64	0.86	7.1	
344	3-33	65	0.86	9.1	
345	2-58	76	0.86	7.1	
346	(WAx P # Bulk)-35-2	71	0.86	4.8	
347	DJ 1195	72	0.87	20	
348	IS 602	61	0.87	39.1	
349	IS 12571	72	0.87	0	
350	2-22	66	0.88	0	
351	IS 6928	64	0.88	55.9	
352	IS 8595	66	0.88	11.5	
353	(M 35-1 x 040) 119 BRE-10-5	70	0.88	0	
354	IS 10748	64	0.88	55.6	
355	IS 301	59	0.88	11.5	
356	(SB 1066 x BJ 111)	71	0.88	28	
357	2-21	69	0.88	37.5	
358	13-88	70	0.88	0	
359	IS 2312	78	0.89	0	
360	IS 3570	64	0.89	16.7	
361	(SB 1066 x R 24)-39-1	71	0.89	0	
362	IS 7505	71	0.9	0	
363	(CS 3541 x R24) x (BJ 111 x 5-4-1-9)-350-1	72	0.9	0	
364	(WA x P # Bulk)-6-1	71	0.9	4.8	
365	IS 3818	65	0.9	9.5	

S.No.	Entry	Days to 50% flowering	Mean node cross	Percent soft stalk	Remarks
366	1-88	68	0.91	21.7	
367	(954068 x CS 3541)-92	69	0.91	0	
368	(954063 x CS 3541)-53	72	0.91	0	
369	IS 11848	79	0.93	13.3	
370	2-43	65	0.95	21.1	
371	(10280 x CS 3541)-2	70	0.95	0	
372	DRC 5-28(SB 1066xBJ 111) 28-BF_4	65	0.95	52.6	
373	WA x P.Bulk 40-2	72	0.95	0	
374	(B.Y x GPR 165)-4-3	70	0.95	0	
375	10-93	70	0.95	0	
376	(SB 1066 x IS 84)-19-1	64	0.96	4	
377	1-55	70	0.96	0	
378	IS 5664	72	1	0	
379	UCHV-2	69	1	0	
380	1-34	77	1	0	
381	1-47	72	1	0	
382	RS_1 x VGc	78	1	0	
383	Indian Diallel Bulk 7-2-1	72	1	4.6	
384	(954063x148)-6	74	1	8	
385	IS 127	59	1	17.7	
386	SPV 329	79	1	22.2	
387	WABC x Entomology 10-1	69	1	11.8	
388	IS 11758	79	1	18.2	
389	(NP x IS 10478-1)-1-3	68	1	5.9	
390	1-98	70	1	0	

S.No.	Entry	Days to 50% flowering	Mean node cross	Percent soft stalk	Remarks
391	IS 2312	73	1	0	
392	(SB 1066 x BJ 111)-32-1	72	1	0	
393	(148xBJ 111) 4-9 x Maldandi x IS 84)	68	1	0	
394	IS 7525	71	1	0	
395	SPV 104	83	1	33.3	
396	1-91	69	1	5.3	
397	IS 1054	74	1	17.7	
398	(AJ-18-1 x SB 1066)39-1	70	1.04	0	
399	(954068 x CS 3541)-92	71	1.04	0	
400	IS 8728	69	1.04	3.9	
401	IS 2176	72	1.04	0	
402	(954068 x CS 3541)-60	68	1.04	26.1	
403	(10680 x CS 3541)-4	72	1.04	0	
404	IS 685	65	1.04	47.9	
405	IS 14286	69	1.05	9.1	
406	WABC x P-4-8	70	1.05	0	
407	1-33	70	1.05	10.5	
408	IS 452	64	1.05	13.6	
409	(954068 x CS 3541)-38	72	1.06	0	
410	(954068 x CS 3541)-46	69	1.06	16.7	
411	(954068 x CS 3541)-77	71	1.07	0	
412	PP_1S_6	71	1.07	0.	
413	IS 12211	64	1.08	12.5	
414	1-73	69	1.08	0	
415	IS 3511	62	1.09	23.8	

S.No.	Entry	Days to 50% flowering	Mean node cross	Percent soft stalk	Remarks
416	1-63	71	1.09	8.7	
417	(NP x IS 104791)3-11	71	1.09	8.7	
418	E 178-3	72	1.09	0	
419	US/R(M)CoS4 408-1-1-5-1	73	1.1	0	
420	DOWNES Bulk	71	1.1	10	
421	IS 1258 B	69	1.11	21.1	
422	(12645 x CS 3541)-40	72	1.12	0	
423	E 303	65	1.12	19.2	
424	9-59	78	1.13	0	
425	2-33	70	1.13	0	
426	2-38	68	1.14	4.6	
427	IS 156	65	1.14	0	
428	3-32	65	1.14	18.2	
429	Early Sel. from Dekalb 10-1	69	1.15	0	
430	IS 633	81	1.15	0	
431	1-76	77	1.16	21.1	
432	1-69	70	1.18	0	
433	(10262 x CS 3541)-21	72	1.18	3.6	
434	(954068 x CS 3541)-14	73	1.19	7.7	
435	IS 9698	60	1.19	33.3	
436	BULK-Y28-71-2	71	1.19	0	
437	2-11	72	1.19	3.7	
438	(954063 x CS 3541)-14	71	1.19	4.8	
439	AJ 2501-1	80	1.2	13.3	
440	(WA x P # Bulk)-7-3	70	1.2	4	

S.No.	Entry	Days to 50% flowering	Mean node cross	Percent soft stalk	Remarks
441	2-83	69	1.2	0	
442	2-42	66	1.21	15.8	
443	Early Sel from Dekalb 4-2	71	1.22	11.1	
444	1-58	70	1.22	0	
445	3-19	78	1.23	30.8	
446	IS 6427	82	1.23	0	
447	18-84	69	1.23	4.6	
448	3-35	69	1.23	9.1	
449	NP x E(65352-1) 2-1-1	82	1.24	17.7	
450	(SB 1066 x R 24)-2-1	64	1.25	8.3	
451	2-98	69	1.25	0	
452	SPV 9	64	1.26	47.9	
453	(SB 1066 x R 24)-11-2	72	1.29	0	
454	IS 637	64	1.29	0	
455	(B.Y x GPR 165)-4-2	69	1.3	12.1	
456	2-14	72	1.32	0	
457	(SB 1066 x CS 3541)-5-1	68	1.32	31.6	
458	IS 7076	64	1.33	58.3	
459	2-34	68	1.33	12.5	
460	2-68	69	1.33	26.7	
461	EC 64734	73	1.35	5.9	
462	US/R (M)C_1S_4 27-1-1-8	72	1.35	21.8	
463	(FR 493 x CS 3541)-25-1	69	1.36	4.6	
464	3-58	68	1.36	21.4	
465	IS 9656	64	1.36	22.8	

S.No.	Entry	Days to 50% flowering	Mean node cross	Percent soft stalk	Remarks
466	(10222 x CS 3541)-10	69	1.36	9.1	
467	3-6	69	1.37	15.8	
468	3-39	70	1.37	0	
469	(SB 1066 x R 24)-11-4	69	1.39	22.2	
470	PJ 18k	80	1.4	20	
471	1-54	71	1.41	5.9	
472	6-98	70	1.41	4.6	
473	(SB 1066 x A_1)-30-1	70	1.42	9.5	
474	Diallel 848-1-2	69	1.43	4.8	
475	(FR 493 x CS 3541)-1-1	72	1.43	17.4	
476	(SB 1066 x A_1) DRC 7-31	69	1.44	0	
477	SPV 55	71	1.44	0	
478	E 12-5	74	1.45	10	
479	1-68	71	1.46	0	
480	10-9	79	1.5	31.3	
481	2-31	77	1.5	27.3	
482	(10222 x CS 3541)-13	68	1.5	12.5	
483	BJ 111	81	1.53	21.1	
484	3-38	71	1.53	10.5	
485	E 1734	71	1.55	0	
486	(NP x IS 10592-2) 3-1-1	69	1.56	18.8	
487	SPV 104-9	71	1.56	60	
488	Diallel 9105-1-1-4	68	1.58	42	
489	2-35	68	1.58	10.5	
490	IS 2312	73	1.58	15.4	

S.No.	Entry	Days to 50% flowering	Mean node cross	Percent soft stalk	Remarks
491	E 178	71	1.59	0	
492	2-36	70	1.62	0	
493	(148 x R24)-22	77	1.63	43.8	
494	2-29	71	1.63	0	
495	1-57	71	1.64	14.3	
496	US/R (M) CoS_4 408-1-1-1-1	69	1.65	20	
497	(10262 x CS 3541)-20	73	1.67	0	
498	SPV 86	78	1.67	26.7	
499	6-95	68	1.68	13.6	
500	2-69	68	1.71	0	
501	1-36	83	1.73	9.1	
502	(SB 1066 x R 24)-5-1	73	1.74	10.5	
503	IS 9702	83	1.75	0	
504	(M35-1 x IS 3691) 115 BRE 14-16	71	1.75	5	
505	(M35-1 x IS 3691) 115-BRE 14-16	73	1.76	57.1	
506	(12622xCS3541)-1	72	1.76	9.5	
507	(SB.1066 x A) 17-1-1	71	1.77	7.7	
508	(SB 1066 x A_1)	72	1.81	27	
509	(954063 x CS 3541)-3	71	1.85	20	
510	11-28	71	1.87	13	
511	SPV 77	62	1.89	50	
512	IS 10513	60	1.9	0	
513	(M 35-1 x 148) CRF 329-BRE-2-6	74	1.91	13.6	
514	Good grain Pop. Bulk	71	1.95	10.5	
515	11-19	76	2	0	

S.No.	Entry	Days to 50% flowering	Mean node cross	Percent soft stalk	Remarks
516	1-90	72	2	12.5	
517	IS 1235	80	2	39.1	
518	RS/RS 5-1	78	2.08	41.7	
519	10-80	72	2.09	26.1	
520	1-99	70	2.15	0	
521	3-65	64	2.21	29.2	
522	1-53	71	2.25	0	
523	1-75	70	2.25	12.5	
524	SPV-69	69	2.27	0	
525	IS 11471	78	2.33	33.3	
526	1-70	72	2.36	0	
527	E 302	65	2.4	84	
528	IS 2209	68	2.41	35.3	
529	IS 637	65	2.41	86.4	
530	IS 4471	77	2.43	57.1	
531	(M35-1x148)-4	63	2.46	83.3	
532	1-60	71	2.56	31.3	
533	5-57	78	2.57	23.8	
534	PJ 35k	78	2.73	90.9	
535	11-38	71	2.78	69.6	
536	1-45	78	2.83	50	
537	2-45	71	2.95	30	
538	23-21	82	3	71.4	
539	3-59	64	3.33	95.2	
540	2-92	70	3.82	29.4	

APPENDIX-III

Charcoal rot reactions and days to 50% flowering of sorghum hybrids from mold resistance breeding project during rabi 1978-79 at ICRISAT Center.

S.No.	Entry	Days to 50% flowering	Mean node cross	Percent soft stalk
1	2219A x 50009	71	0	0
2	2219A x 50017	71	0	0
3	2219A x 50121-2	81	0	0
4	2219A x 50033	70	0	0
5	2219A x 50037	70	0	0
6	2219A x 50041	69	0	0
7	2219A x 50045	71	0	0
8	2219A x 50057	71	0	0
9	2219A x 50065	73	0	0
10	2219A x 50149-2	76	0	0
11	2219A x 50073	72	0	0
12	2219A x 50075	68	0	0
13	2219A x 50245-2	75	0	0
14	2219A x 50085	67	0	0
15	2219A x 50245-3	74	0	0
16	2219A x 50093	71	0	0
17	2219A x 50097	72	0	0
18	2219A x 50101	68	0	0
19	2219A x 51123	68	0	0
20	2219A x 50109	77	0	0
21	2219A x 50113	75	0	0
22	2219A x 50117	69	0	0
23	2219A x 51149	65	0	0
24	2219A x 50125	71	0	0
25	2219A x 50129	71	0	0
26	2219A x 50133	71	0	0
27	2219A x 51305	71	0	0
28	2219A x 51309	67	0	0
29	2219A x 50145	73	0	0
30	2219A x 51313	68	0	0

S.No.	Entry	Days to 50% flowering	Mean node cross	Percent soft stalk
31	2219A x 50153	68	0	0
32	2219A x 51325	69	0	0
33	2219A x 50161	68	0	0
34	2219A x 50165	70	0	0
35	2219A x 51349	70	0	0
36	2219A x 50173	67	0	0
37	2219A x 50177	67	0	0
38	2219A x 51365	71	0	0
39	2219A x 51373	71	0	0
40	2219A x 50189	73	0	0
41	2219A x 50193	73	0	0
42	2219A x 50197	72	0	0
43	2219A x 51391	68	0	0
44	2219A x 50205	67	0	0
45	2219A x 50209	72	0	0
46	2219A x 50213	69	0	0
47	2219A x 50217	75	0	0
48	2219A x 50473-2	69	0	0
49	2219A x 51413	68	0	0
50	2219A x 50229	72	0	0
51	2219A x 50233	72	0	0
52	2219A x 50237	72	0	0
53	2219A x 50239	71	0	0
54	2219A x 50241	73	0	0
55	2219A x 51431	72	0	0
56	2219A x 50249	70	0	0
57	2219A x 50253	66	0	0
58	2219A x 50257	70	0	0
59	2219A x 50261	67	0	0
60	2219A x 51441	71	0	0

S.No.	Entry	Days to 50% flowering	Mean node cross	Percent soft stalk
61	2219A x 51443	68	0	0
62	2219A x 50273	69	0	0
63	2219A x 51448	70	0	0
64	2219A x 50281	71	0	0
65	2219A x 50287	71	0	0
66	2219A x 51451	68	0	0
67	2219A x 50297	74	0	0
68	2219A x 51455	71	0	0
69	2219A x 50309	71	0	0
70	2219A x 50313	73	0	0
71	2219A x 50315	72	0	0
72	2219A x 50321	71	0	0
73	2219A x 50325	70	0	0
74	2219A x 50329	70	0	0
75	2219A x 6095-4	76	0	0
76	2219A x 50337	71	0	0
77	2219A x 50341	69	0	0
78	2219A x 50345	70	0	0
79	2219A x 50349	73	0	0
80	2219A x 50353	71	0	0
81	2219A x 50357	73	0	0
82	2219A x 50361	70	0	0
83	2219A x 50365	71	0	0
84	2219A x 50369	70	0	0
85	2219A x 50373	70	0	0
86	2219A x 50377	72	0	0
87	2219A x 50381	74	0	0
88	2219A x 51511	68	0	0
89	2219A x 50389	68	0	0
90	2219A x 50393	73	0	0

S.No.	Entry	Days to 50% flowering	Mean node cross	Percent soft stalk
91	2219A x 50397	72	0	0
92	2219A x 51705	70	0	0
93	2219A x 50401	70	0	0
94	2077A x 50579	69	0	0
95	2219A x 50409	73	0	0
96	2219A x 50413	69	0	0
97	2219A x 50417	69	0	0
98	2219A x 50421	71	0	0
99	2219A x 50425	69	0	0
100	2219A x 51719	69	0	0
101	2219A x 50429	72	0	0
102	2219A x 50433	70	0	0
103	2219A x 50437	70	0	0
104	2219A x 50441	71	0	0
105	2219A x 52755	70	0	0
106	2219A x 50449	69	0	0
107	2219A x 50045-1	76	0	0
108	2219A x 52761	73	0	0
109	2077A x 50073	81	0	0
110	2219A x 50465	71	0	0
111	2219A x 50811	68	0	0
112	2219A x 50473	70	0	0
113	2219A x 50477	71	0	0
114	2219A x 50479	81	0	0
115	2219A x 50481	72	0	0
116	2219A x 52777	70	0	0
117	2219A x 50489	71	0	0
118	2219A x 52781	69	0	0
119	2219A x 50497	69	0	0
120	2219A x 50501	70	0	0

S.No.	Entry	Days to 50% flowering	Mean node cross	Percent soft stalk
121	2219A x 50505	73	0	0
122	2219A x 52791	70	0	0
123	2219A x 50513	68	0	0
124	2219A x 50517	73	0	0
125	2219A x 52797	72	0	0
126	2219A x 52799	70	0	0
127	2219A x 50529	69	0	0
128	2219A x 52801	74	0	0
129	2219A x 52803	75	0	0
130	2219A x 50541	70	0	0
131	2219A x 50545	71	0	0
132	2219A x 50549	71	0	0
133	2219A x 52811	79	0	0
134	2219A x 52813	75	0	0
135	2219A x 50693	67	0	0
136	2219A x 50565	73	0	0
137	2219A x 52817	76	0	0
138	2219A x 52819	70	0	0
139	2219A x 52821	67	0	0
140	2219A x 52823	68	0	0
141	2219A x 50585	69	0	0
142	2219A x 50587	68	0	0
143	2219A x 50589	68	0	0
144	2219A x 52831	74	0	0
145	2219A x 50593	70	0	0
146	2219A x 52837	71	0	0
147	2219A x 50597	71	0	0
148	2219A x 52836	70	0	0
149	2219A x 50601	68	0	0
150	2219A x 52843	73	0	0

S.No.	Entry	Days to 50% flowering	Mean node cross	Percent soft stalk
151	2219A x 50721	79	0	0
152	2219A x 50607	69	0	0
153	2219A x 50609	67	0	0
154	2219A x 52851	78	0	0
155	2219A x 52853	76	0	0
156	2219A x 52855	76	0	0
157	2219A x 50615	70	0	0
158	2219A x 52857	68	0	0
159	2219A x 50619	70	0	0
160	2219A x 52863	71	0	0
161	2219A x 52865	70	0	0
162	2219A x 50627	68	0	0
163	2219A x 52871	71	0	0
164	2219A x 50625	72	0	0
165	2219A x 51361	73	0	0
166	2219A x 52874	71	0	0
167	2219A x 50637	72	0	0
168	2219A x 52878	70	0	0
169	2219A x 50641	71	0	0
170	2219A x 52877	73	0	0
171	2219A x 50457-3	75	0	0
172	2219A x 52880	70	0	0
173	2219A x 50649	70	0	0
174	2219A x 50651	69	0	0
175	2219A x 52883	70	0	0
176	2219A x 50653	68	0	0
177	2219A x 50695	67	0	0
178	2219A x 50657	70	0	0
179	2219A x 50659	67	0	0
180	2219A x 50661	68	0	0

S.No.	Entry	Days to 50% flowering	Mean node cross	Percent soft stalk
181	2219A x 50663	68	0	0
182	2219A x 50665	68	0	0
183	2219A x 50667	71	0	0
184	2219A x 50669	69	0	0
185	2219A x 51435	76	0	0
186	2219A x 50671	73	0	0
187	2219A x 51439	74	0	0
188	2219A x 50675	69	0	0
189	2219A x 50677	68	0	0
190	2219A x 50679	67	0	0
191	2219A x 50681	68	0	0
192	2219A x 50683	74	0	0
193	2219A x 50685	70	0	0
194	2219A x 50687	68	0	0
195	2219A x 50689	68	0	0
196	2077A x 50449	75	0	0
197	2077A x 50465	81	0	0
198	2219A x 51457	71	0	0
199	2219A x 51459	74	0	0
200	2219A x 50697	67	0	0
201	2219A x 50699	70	0	0
202	2219A x 50701	70	0	0
203	2219A x 50702	80	0	0
204	2219A x 50703	70	0	0
205	2219A x 50704	73	0	0
206	2219A x 50705	74	0	0
207	2219A x 50707	74	0	0
208	2219A x E 35-	69	0	0
209	2219A x 50711	72	0	0
210	2077A x 50525	78	0	0

S.No.	Entry	Days to 50% flowering	Mean node cross	Percent soft stalk
211	2219A x 50715	78	0	0
212	2219A x 50717	71	0	0
213	2219A x 51486	68	0	0
214	2219A x 51145	68	0	0
215	2219A x 50723	66	0	0
216	2219A x 50725	69	0	0
217	2219A x 50727	77	0	0
218	2219A x 50729	78	0	0
219	2219A x 50730	70	0	0
220	2219A x 50731	66	0	0
221	2219A x 51707	67	0	0
222	2219A x 50735	68	0	0
223	2219A x 50737	73	0	0
224	2219A x 50739	70	0	0
225	2219A x 51713	67	0	0
226	2219A x 51715	71	0	0
227	2219A x 50761	77	0	0
228	2219A x 50765-1	70	0	0
229	2219A x 50765-2	70	0	0
230	2219A x 50773	73	0	0
231	2219A x 50797	74	0	0
232	2077A x 52989	76	0	0
233	2219A x 50801	73	0	0
234	2219A x 52757	71	0	0
235	2219A x 50805	72	0	0
236	2219A x 50045-2	77	0	0
237	2219A x 51397	69	0	0
238	2219A x 51401	68	0	0
239	2219A x 51405	67	0	0
240	2219A x 51409	72	0	0

S.No.	Entry	Days to 50% flowering	Mean node cross	Percent soft stalk
241	2219A x 50077-1	74	0	0
242	2077A x 50085	76	0	0
243	2219A x 52775	79	0	0
244	2219A x 51425	71	0	0
245	2219A x 51427	72	0	0
246	2219A x 50845	65	0	0
247	2219A x 50843	67	0	0
248	2219A x 50081-3	81	0	0
249	2219A x 52789	68	0	0
250	2219A x 50093-3	80	0	0
251	2219A x 50863	65	0	0
252	2219A x 50865	65	0	0
253	2219A x 50873	65	0	0
254	2219A x 50877	65	0	0
255	2219A x 50881	73	0	0
256	2219A x 51447	67	0	0
257	2219A x 50889	67	0	0
258	2219A x 50961	72	0	0
259	2219A x 50977	72	0	0
260	2219A x 52809	73	0	0
261	2219A x 52871-2	71	0	0
262	2219A x 51458	73	0	0
263	2219A x 50983	68	0	0
264	2219A x 52815	69	0	0
265	2219A x 51463	67	0	0
266	2219A x 51465	73	0	0
267	2219A x 51025	67	0	0
268	2219A x 50245-1	69	0	0
269	2219A x 52825	72	0	0
270	2219A x 52827	69	0	0

S.No.	Entry	Days to 50% flowering	Mean node cross	Percent soft stalk
271	2219A x 51475	70	0	0
272	2219A x 51057	68	0	0
273	2219A x 51059	68	0	0
274	2219A x 50261-3	71	0	0
275	2219A x 52839	73	0	0
276	2219A x 51143	68	0	0
277	2077A x 51509	76	0	0
278	2219A x 51487	67	0	0
279	2219A x 51151-1	66	0	0
280	2219A x 51151-2	66	0	0
281	2219A x 51301	67	0	0
282	2219A x 52849	75	0	0
283	2077A x 51147	70	0	0
284	2219A x 51311	65	0	0
285	2219A x 52896	71	0	0
286	2219A x 51321	73	0	0
287	2219A x 52861	73	0	0
288	2219A x 51333	73	0	0
289	2219A x 51341	70	0	0
290	2219A x 52867	70	0	0
291	2219A x 51357	70	0	0
292	2219A x 52807	72	0	0
293	2219A x 50433-1	76	0	0
294	2077A x 50068	80	0	0
295	2219A x 51377	68	0	0
296	2219A x 51381	68	0	0
297	2219A x 51385	68	0	0
298	2219A x 50457-2	74	0	0
299	2219A x 51393	68	0	0
300	2077A x 52997	76	0	0

S.No.	Entry	Days to 50% flowering	Mean node cross	Percent soft stalk
301	2219A x 51479	67	0	0
302	2219A x 52881	71	0	0
303	2219A x 52882	74	0	0
304	2219A x 52884	82	0	0
305	2219A x 51421	72	0	0
306	2219A x 51423	72	0	0
307	2077A x 50369	81	0	0
308	2219A x 52887	72	0	0
309	2219A x 51429	72	0	0
310	2219A x 52889	72	0	0
311	2219A x 51433	73	0	0
312	2277A x 50397	82	0	0
313	2219A x 51437	74	0	0
314	2219A x 51301-1	69	0	0
315	2219A x 50041-3	76	0	0
316	2219A x 51469	70	0	0
317	2219A x 51445	71	0	0
318	2219A x 6123-1	76	0	0
319	2219A x 52800	68	0	0
320	2219A x 51449	73	0	0
321	2219A x 6123-4	73	0	0
322	2219A x 52999	68	0	0
323	2219A x 51717	67	0	0
324	2077A x 50445	75	0	0
325	2219A x 51721	70	0	0
326	2219A x 6075-2	77	0	0
327	2219A x 51461	67	0	0
328	2219A x 52753	68	0	0
329	2077A x 52987	76	0	0
330	2219A x 52875	73	0	0

S.No.	Entry	Days to 50% flowering	Mean node cross	Percent soft stalk
331	2077A x 52881	76	0	0
332	2077A x 50983	79	0	0
333	2219A x 52795	69	0	0
334	2077A x 50485	80	0	0
335	2077A x 50517	76	0	0
336	2219A x 51711	68	0	0
337	2219A x 6129-1	80	0	0
338	2219A x 51483	74	0	0
339	2219A x 51485	67	0	0
340	2219A x 6129-2	81	0	0
341	2219A x 52841	70	0	0
342	2219A x 6129-5	82	0	0
343	2219A x 6143-1-1	76	0	0
344	2219A x 51513	71	0	0
345	2077A x 52897	77	0	0
346	2219A x 52773	70	0	0
347	2077A x 52882	82	0	0
348	2219A x 50457-1	74	0	0
349	2219A x 53008	69	0	0
350	2219A x 51709	67	0	0
351	2219A x 51751	68	0	0
352	2219A x 53011	70	0	0
353	2219A x P-721	73	0	0
354	2219A x 52807	70	0	0
355	2077A x 50029	80	0	0
356	2219A x 6129-4	81	0	0
357	2219A x 51723	71	0	0
358	2077A x 52933	74	0	0
359	2219A x 52885	73	0	0
360	2219A x 53002	71	0	0

S.No.	Entry	Days to 50% flowering	Mean node cross	Percent soft stalk
361	2077A x 51449	81	0	0
362	2077A x 50367	69	0	0
363	2077A x 52883	76	0	0
364	2219A x 50117-4	70	0	0
365	2077A x 50481	83	0	0
366	2219A x 50277-3	74	0	0
367	2219A x 8272	71	0	0
368	2219A x 52835	68	0	0
369	2077A x 50513	76	0	0
370	2219A x 6123-2	76	0	0
371	2077A x 52941	77	0	0
372	2219A x 50037-3	76	0	0
373	2219A x 50041-1	76	0	0
374	2077A x 52880	75	0	0
375	2077A x 53004	70	0	0
376	2077A x 53007-1	79	0	0
377	2077A x 53007-2	71	0	0
378	2077A x 53011-2	70	0	0
379	2219A x 52888	69	0.03	0
380	2219A x 52793	71	0.04	0
381	2219A x 50862	72	0.04	0
382	2219A x 50617	65	0.04	0
383	2219A x 50433-3	74	0.04	0
384	2219A x 52859	75	0.04	0
385	2219A x 50277	70	0.04	0
386	2219A x 51701	69	0.04	0
387	2219A x 50525	69	0.04	0
388	2219A x 50509	71	0.04	0
389	2219A x 50493	69	0.04	0
390	2219A x 52873	69	0.04	0

S.No.	Entry	Days to 50% flowering	Mean node cross	Percent soft stalk
391	2219 x 50691	68	0.04	0
392	2219A x 50305	73	0.04	0
393	2219A x 52779	76	0.04	0
394	2077A x 50467	68	0.04	0
395	2219A x 50629	70	0.04	0
396	2219A x 50982	65	0.04	0
397	2219A x 53010	73	0.04	0
398	2219A x 52773	76	0.04	0
399	2219A x 50285-2-1	69	0.04	0
400	2219A x 50285-1	74	0.04	0
401	2077A x 50033	81	0.04	0
402	2077A x 50083	73	0.04	0
403	2219A x 50468	71	0.05	0
404	2219A x 50149	73	0.05	0
405	2219A x 50533	71	0.05	0
406	2219A x 51467	73	0.05	0
407	2219A x 50621	71	0.05	0
408	2219A x 50753	78	0.05	0
409	2219A x 50137	74	0.05	0
410	2219A x 50814	70	0.05	0
411	2219A x 50141	74	0.05	0
412	2077A x 50853	86	0.05	0
413	2219A x 50741	78	0.05	0
414	2219A x 50045-3	77	0.05	0
415	2219A x 52758	65	0.05	0
416	2219A x 50081-1	75	0.05	0
417	2077A x 50795	70	0.05	0
418	2219A x 50985	72	0.05	0
419	2219A x 52894	72	0.05	0
420	2219A x 50857	74	0.05	0

S.No.	Entry	Days to 50% flowering	Mean node cross	Percent soft stalk
421	2219A x 50201	70	0.05	0
422	2219A x 50285-3	74	0.05	0
423	2219A x 50025-1	79	0.05	0
424	2219A x 50081	71	0.05	0
425	2219A x 50719	70	0.05	0
426	2219A x 50285-2	75	0.05	0
427	2219A x 52878	76	0.05	0
428	2219A x 52891	75	0.05	0
429	2219A x 53009	71	0.05	0
430	2219A x 50989	67	0.05	0
431	2219A x 50473-1	70	0.05	0
432	2219A x 50225	74	0.05	0
433	2219A x 53004	71	0.05	0
434	2077A x 50477 dwarf	81	0.05	0
435	2219A x 52886	73	0.05	0
436	2219A x 50633	71	0.05	0
437	2219A x 50385	76	0.05	0
438	2077A x 50477	81	0.05	0
439	2219A x 50433-2	76	0.05	0
440	2219A x 50445	72	0.05	0
441	2077A x 50065	80	0.05	0
442	2219A x 50799	66	0.05	0
443	2219A x 50603	71	0.05	0
444	2219A x 51481	74	0.05	0
445	2219A x 50181	71	0.05	0
446	2077A x 52985	76	0.05	0
447	2077A x 53005	76	0.05	0
448	2219A x 50333	72	0.06	0
449	2219A x 50461	71	0.06	0
450	2077A x 50077	79	0.06	0

S.No.	Entry	Days to 50% flowering	Mean node cross	Percent soft stalk
451	2077A x 50115	75	0.06	0
452	2219A x 6143-3	76	0.06	0
453	2077A x 52817	82	0.06	0
454	2219A x 50457	71	0.06	0
455	2219A x 50149-3	76	0.06	0
456	2219A x 6143-5	76	0.06	0
457	2219A x 50635	73	0.06	0
458	2219A x 50221	74	0.06	0
459	2077A x 50409	76	0.06	0
460	2219A x 50069	72	0.06	0
461	2219A x 52829	70	0.06	0
462	2219A x 50169	67	0.06	0
463	2219A x 50559	71	0.06	0
464	2219A x 50835	73	0.06	0
465	2077A x 50377	80	0.06	0
466	2219A x 50803	72	0.06	0
467	2077A x 53006	73	0.06	0
468	2219A x 6123-3	77	0.07	0
469	2077A x 50425	76	0.08	0
470	2219A x 50695	66	0.08	0
471	2219A x 52998	71	0.08	0
472	2077A x 51301	76	0.08	0
473	2219A x 50277-2	75	0.08	0
474	2219A x 52898	69	0.08	0
475	2219A x 50141-1	73	0.08	0
476	2077A x 50453	76	0.08	0
477	2219A x 50045-2-1	69	0.08	0
478	2219A x 52763	75	0.08	0
479	2077A x 52931	75	0.08	0
480	2077A x 52841	76	0.08	0

S.No.	Entry	Days to 50% flowering	Mean node cross	Percent soft stalk
481	2077A x 52995	74	0.09	0
482	2077A x 50909	77	0.09	0
483	2219A x 50093-1	76	0.09	0
484	2219A x 50117-1	71	0.09	0
485	2077A x 50411	76	0.09	0
486	2219A x 50289	70	0.09	0
487	2219A x 52895	71	0.09	0
488	2219A x 50405	72	0.09	0
489	2077A x 52896	76	0.09	4.4
490	2219A x 52892	74	0.09	0
491	2219A x 50809	72	0.09	0
492	2219A x 50305-3	76	0.09	0
493	2219A x 52845	76	0.09	0
494	2219A x 50037-2	77	0.09	4.8
495	2219A x 50277-1	73	0.09	0
496	2219A x 50481-1	76	0.09	0
497	2219A x 50979	71	0.09	0
498	2219A x 50025-3	76	0.09	0
499	2219A x 50025-4	76	0.09	0
500	2219A x 50077-3	75	0.09	0
501	2219A x 50473-3	69	0.09	0
502	2219A x 50041-2	76	0.09	0
503	2077A x 52875	81	0.09	0
504	2219A x 50652	71	0.09	0
505	2219A x 50141-3	75	0.09	0
506	2077A x 50421	81	0.09	0
507	2219A x 50599	68	0.09	0
508	2219A x 50709	75	0.09	0
509	2219A x 51453	75	0.09	0
510	2219A x SPV-104	76	0.09	0

S.No.	Entry	Days to 50% flowering	Mean node cross	Percent soft stalk
511	2219A x 50885	67	0.09	0
512	2219A x 51137	68	0.09	0
513	2219A x 6095-6	75	0.09	0
514	2219A x 6095-3	76	0.09	0
515	2219A x 50643	71	0.09	0
516	2077A x P-721	75	0.09	0
517	2077A x 51723	75	0.1	0
518	2219A x 50501-3	81	0.1	0
519	2077A x 50053	81	0.1	0
520	2219A x 50605	71	0.1	0
521	2219A x 50245	72	0.1	0
522	2219A x 50089	67	0.1	5
523	2077A x 50455	76	0.11	0
524	2077A x 50093	81	0.11	0
525	2219A x 52890	72	0.11	0
526	2219A x 6143-1	76	0.11	0
527	2219A x 50501-1	76	0.11	0
528	2219A x 50399	69	0.11	0
529	2219A x 51473	75	0.11	0
530	2219A x 50185	71	0.11	0
531	2077A x 5301	76	0.11	0
532	2219A x 50453	71	0.12	0
533	2219A x 50025-2	77	0.12	0
534	2219A x 50117-2	73	0.12	0
535	2077A x 52832	70	0.12	0
536	2219A x 51301-2	74	0.13	0
537	2077A x 51455	76	0.13	0
538	2219A x 51029	72	0.13	0
539	2219A x 52787	76	0.13	0
540	2219A x 50611	70	0.13	0

S.No.	Entry	Days to 50% flowering	Mean node cross	Percent soft stalk
541	2077A x 52839	76	0.13	0
542	2219A x 50692	69	0.13	0
543	2219A x 51509	67	0.13	0
544	2077A x 50891	76	0.13	0
545	2219A x 50713	78	0.13	0
546	2077A x 50783	82	0.13	0
547	2077A x 50533	83	0.13	0
548	2219A x 50265	71	0.13	0
549	2077A x 51381	72	0.13	0
550	2219A x 50081-2	76	0.13	0
551	2077A x 50081	81	0.13	0
552	2077A x 50037	76	0.13	0
553	2219A x 52767	76	0.13	0
554	2219A x 50733	73	0.13	0
555	2219A x 52814	74	0.13	0
556	2219A x 51479	75	0.13	0
557	2219A x 50081-3	77	0.13	0
558	2077A x 50529	78	0.13	0
559	2077A x 51021	85	0.13	0
560	2219A x 53006	71	0.13	0
561	2219A x 52876	71	0.13	4.4
562	2219A x 50141-4	76	0.14	0
563	2219A x 53005	72	0.14	0
564	2219A x 50537	71	0.14	0
565	2219A x 50813	72	0.14	0
566	2219A x 52897	80	0.14	4.6
567	2077A x 52783	70	0.14	0
568	2077A x 52751	72	0.14	0
569	2219A x 53003	72	0.14	0
570	2077A x 50735	82	0.14	0

S.No.	Entry	Days to 50% flowering	Mean node cross	Percent soft stalk
571	2077A x 50441	82	0.14	0
572	2219A x 50431	75	0.14	0
573	2219A x 50561	72	0.14	0
574	2219A x 50569	73	0.14	0
575	2219A x 6067-1	76	0.14	0
576	2219A x 50485	71	0.14	0
577	2219A x 50595	72	0.14	0
578	2219A x 50261-2	76	0.14	0
579	2077A x 53008	78	0.14	0
580	2219A x 52847	76	0.15	0
581	2077A x 51433	81	0.15	0
582	2077A x 52869	74	0.15	0
583	2077A x 52895	74	0.15	0
584	2077A x 51379	70	0.15	0
585	2219A x 6129-3	80	0.15	0
586	2219A x 50623	71	0.15	0
587	2219A x 50077-2	75	0.15	0
588	2077A x 52975	84	0.15	0
589	2077A x 52937	75	0.15	0
590	2077A x 50416	79	0.16	0
591	2219A x 50557	74	0.16	0
592	2077A x 50433	75	0.17	4.4
593	2077A x 51317	82	0.17	0
594	2077A x 52929	74	0.17	0
595	2077A x 50715	81	0.17	0
596	2219A x 50005-3	70	0.17	0
597	2219A x 50037-1	77	0.17	5.6
598	2219A x 50121	72	0.17	0
599	2219A x 50001-1	73	0.17	0
600	2219A x 50029	71	0.17	0

S.No.	Entry	Days to 50% flowering	Mean node cross	Percent soft stalk
601	2077A x 53010	76	0.17	0
602	2219A x 50093-2	80	0.18	0
603	2219A x 50861	75	0.18	0
604	2219A x 50833	72	0.18	0
605	2077A x 51306	69	0.18	0
606	2219A x 50481-2	76	0.18	0
607	2077A x 53009	75	0.18	0
608	2219A x 6075-3	76	0.19	0
609	2219A x 50981	67	0.19	6.3
610	2219A x 53001	76	0.19	0
611	2077A x 52857	73	0.2	0
612	2219A x 50149-1	74	0.2	0
613	2077A x 50271	65	0.2	0
614	2219A x 50061-1	80	0.21	5.3
615	2077A x 50041	76	0.21	5.3
616	2219A x 50807	65	0.21	0
617	2219A x 51703	72	0.21	0
618	2219A x 6095-5	75	0.21	0
619	2077A x 52977	85	0.21	0
620	2219A x 50521	73	0.22	0
621	2077A x 51425	75	0.22	0
622	2219A x 50613	72	0.22	0
623	2219A x 6143-6	76	0.22	0
624	2219A x 50639	74	0.22	0
625	2077A x 51459	84	0.22	0
626	2077A x 52894	77	0.22	8.7
627	2219A x 53007	76	0.22	0
628	2219A x 50121-3	83	0.22	22.2
629	2077A x 50545 dwarf	83	0.23	0
630	2077A x 50069	79	0.23	4.6

S.No.	Entry	Days to 50% flowering	Mean node cross	Percent soft stalk
631	2219A x 50141-2	77	0.23	4.6
632	2219A x 52893	74	0.24	0
633	2077A x 52811	81	0.24	0
634	2219A x 50001-3	69	0.24	4.8
635	2077A x 50319	80	0.24	0
636	2077A x 50521 dwarf	77	0.24	0
637	2219A x 50105	75	0.25	0
638	2077A x 52797	76	0.25	4.2
639	2219A x 50305-2	75	0.25	0
640	2077A x 52983	77	0.25	6.3
641	2219A x 51477	75	0.26	0
642	2077A x 52935	78	0.26	0
643	2219A x 50289-2	81	0.27	0
644	2077A x 51341	80	0.27	6.7
645	2219A x 50469-1-1	69	0.27	0
646	2219A x 52892	72	0.27	0
647	2077A x 51373	81	0.27	0
648	2219A x 50481-3	76	0.28	0
649	2219A x 50645	74	0.29	0
650	2077A x 50413	79	0.29	0
651	2077A x 51421	80	0.29	0
652	2219A x 50155	75	0.29	0
653	2077A x 50599	75	0.29	0
654	2077A x 50113	80	0.29	5.9
655	2077A x 52927	75	0.29	0
656	2077A x 50545	81	0.29	0
657	2077A x 52812	76	0.29	4.2
658	2077A x 51309	76	0.29	4.8
659	2219A x 6095-2	74	0.29	5.9
660	2077A x 50361	79	0.29	0

S.No.	Entry	Days to 50% flowering	Mean node cross	Percent soft stalk
661	2219A x 51021	81	0.29	0
662	2077A x 50373	80	0.29	0
663	2219A x 52897	72	0.3	0
664	2219A x 6143-4	76	0.3	5
665	2077A x 50607	77	0.3	0
666	2077A x SPV-104	77	0.3	0
667	2219A x 50121-1	83	0.31	6.3
668	2077A x 50057	80	0.32	5.3
669	2077A x 52815	81	0.32	0
670	2077A x 50521	76	0.32	0
671	2077A x 51357	81	0.32	0
672	2077A x 52832	69	0.33	0
673	2077A x 51417	76	0.33	0
674	2077A x 50873	70	0.33	6.7
675	2219A x 6067-1-1	73	0.33	0
676	2077A x 52813	76	0.33	8.3
677	2219A x 52783	70	0.33	11.1
678	2077A x 50089	76	0.35	0
679	2077A x 52951	74	0.35	0
680	2219A x 50269	71	0.35	0
681	2219A x 52765	75	0.36	0
682	2077A x 52823	76	0.36	0
683	2077A x 50025	79	0.36	13.6
684	2077A x 51345	81	0.36	0
685	2077A x 52999	75	0.36	7.1
686	2219A x 53000	76	0.37	0
687	2077A x 50061	76	0.38	9.5
688	2077A x 51511	76	0.38	0
689	2077A x 50565	81	0.38	0
690	2077A x 52829	81	0.38	0

S.No.	Entry	Days to 50% flowering	Mean node cross	Percent soft stalk
691	2219A x 50117-3	73	0.38	0
692	2077A x 52974	70	0.38	0
693	2077A x 52943	76	0.39	0
694	2219A x 6095-1	74	0.39	0
695	2219A x 50469-1	70	0.39	5.6
696	2219A x 51027	72	0.4	0
697	2077A x 50393	82	0.4	10
698	2077A x 52876	81	0.4	0
699	2077A x 50889	76	0.4	0
700	2077A x 51465	69	0.4	0
701	2077A x 53011-1	77	0.4	0
702	2077A x 50221	81	0.41	0
703	2219A x 6143-2	78	0.41	0
704	2219A x 50001-2	71	0.41	5.9
705	2219A x 50821	72	0.41	4.6
706	2077A x 50573	81	0.43	14.3
707	2219A x 50061-3	76	0.43	0
708	2077A x 51447	79	0.43	0
709	2077A x 50437	76	0.43	0
710	2077A x 52874	74	0.44	0
711	2077A x 52821	76	0.44	6.3
712	2219A x 50501-2	80	0.44	6.3
713	2077A x 51485	76	0.44	0
714	2219A x 51301-3	74	0.45	5
715	2219A x 50647	71	0.45	0
716	2077A x 51355	81	0.45	0
717	2077A x 51361	80	0.45	0
718	2077A x 52781	80	0.45	0
719	2077A x 51487	76	0.47	10.5
720	2219A x 50017-2	81	0.48	0

S.No.	Entry	Days to 50% flowering	Mean node cross	Percent soft stalk
721	2077A x 52775	76	0.48	19.1
722	2219A x 50261-1 Clean	75	0.48	0
723	2077A x 50597	81	0.5	0
724	2077A x 52959	77	0.5	5.6
725	2077A x 50405	80	0.5	6.3
726	2077A x 51439	83	0.5	0
727	2077A x 51397	75	0.5	10
728	2077A x 50213	75	0.5	6.3
729	2077A x 51413	76	0.5	0
730	2219A x 50825	74	0.52	0
731	2077A x 50237	80	0.52	9.5
732	2219A x 50670	75	0.53	0
733	2077A x 52757	74	0.53	0
734	2219A x 50289-2	76	0.53	0
735	2077A x 51423	79	0.55	0
736	2077A x 50797	72	0.55	0
737	2219A x 51047	76	0.55	0
738	2077A x 52961	75	0.56	18.8
739	2077A x 50803	71	0.56	0
740	2077A x 50389	82	0.57	0
741	2219A x 50289-1	81	0.57	8.7
742	2077A x 50157	82	0.58	0
743	2077A x 51384	72	0.58	12.5
744	2219A x 50369-1	74	0.59	0
745	2077A x 52827	80	0.59	0
746	2077A x 52853	77	0.59	0
747	2219A x 50401-3	76	0.6	10
748	2077A x 50185	79	0.61	26.1
749	2077A x 50273	76	0.61	0
750	2077A x 51309	76	0.61	16.7

S.No.	Entry	Days to 50% flowering	Mean node cross	Percent soft stalk
751	2219A x 50009-1	76	0.61	0
752	2077A x 50505	76	0.61	16.7
753	2219A x 51708	76	0.62	0
754	2077A x 52791	81	0.62	0
755	2077A x 50577	78	0.62	4.8
756	2077A x 52957	82	0.62	0
757	2077A x 50013	80	0.62	0
758	2077A x Uchv-2	77	0.62	0
759	2219A x 50009-2	78	0.63	0
760	2077A x 50289	81	0.63	0
761	2077A x 50799	71	0.63	21.1
762	2077A x 50249	76	0.64	0
763	2077A x 50395	81	0.64	7.14
764	2219A x 50061-2	80	0.65	5
765	2219A x 50612	74	0.67	6.7
766	2077A x 52979	84	0.67	0
767	2077A x 50581	78	0.67	14.3
768	2077A x 52779	81	0.67	4.2
769	2219A x 6067-2	74	0.67	0
770	2077A x 52803	81	0.69	0
771	2077A x 50285	80	0.7	5
772	2077A x 53000	76	0.7	10
773	2077A x 51121	82	0.71	5.9
774	2077A x 50553	80	0.71	7.1
775	2077A x 51445	82	0.71	0
776	2077A x 52833	76	0.71	14.3
777	2077A x 51337	80	0.71	7.1
778	2219A x 50481-1-1	76	0.71	0
779	2077A x 50737	81	0.72	0
780	2077A x 52849	79	0.72	5.6

S.No.	Entry	Days to 50% flowering	Mean node cross	Percent soft stalk
781	2077A x 51717	74	0.73	9.1
782	2077A x 51713	75	0.73	13.3
783	2077A x 50739	83	0.73	6.7
784	2077A x 50845	70	0.73	5.1
785	2077A x 52851	76	0.74	15.8
786	2077A x 52759	71	0.74	5.3
787	2219A x 50469-2	77	0.75	33.3
788	2077A x 52889	75	0.75	0
789	2219A x 3016-3	83	0.76	5.9
790	2077A x 51325	78	0.78	16.7
791	2077A x 52769	76	0.79	33.3
792	2077A x 51722	65	0.79	4.2
793	2077A x 53003	72	0.79	5.3
794	2077A x 51483	78	0.8	28
795	2077A x 50811	77	0.8	13.3
796	2219A x 50005-1	75	0.8	5
797	2077A x 50709	80	0.8	5
798	2077A x 52831	76	0.8	16
799	2219A x 52771	74	0.81	0
800	2077A x 52951	75	0.82	31.8
801	2077A x 52873	76	0.83	33.3
802	2077A x 52777	79	0.84	10.5
803	2077A x 50521 medium	76	0.84	10.5
804	2077A x 52879	75	0.86	0
805	2077A x 51453	79	0.86	4.8
806	2077A x 53002	73	0.86	9.5
807	2219A x 50005	71	0.87	13
808	2077A x 52753	73	0.87	21.5
809	2077A x 51427	76	0.87	3
810	2077A x 50835	77	0.87	26.1

S.No.	Entry	Days to 50% flowering	Mean node cross	Percent soft stalk
811	2077A x 52867	76	0.88	23.5
812	2077A x 50137	79	0.88	5.9
813	2077A x 50293	82	0.89	5.6
814	2077A x 52945	75	0.89	5.6
815	2219A x 50673	74	0.9	0
816	2219A x 50305-1	75	0.9	10
817	2077A x 50365	76	0.9	9.5
818	2077A x 50049	78	0.9	10
819	2077A x 51715	82	0.91	18.2
820	2077A x 52981	83	0.91	18.2
821	2077A x 52837	76	0.91	13.6
822	2077A x 50629	81	0.93	0
823	2077A x 50341	81	0.93	0
824	2077A x 51329	81	0.93	0
825	2219A x 51048	76	0.94	16.7
826	2077A x 52761	73	0.94	0
827	2077A x 52899	75	0.94	11.8
828	2077A x 50217	82	0.94	11.1
829	2219A x 50469-3	80	0.94	29.4
830	2077A x 50827	71	0.95	0
831	2219A x 50581	71	0.95	0
832	2219A x 50289-3	76	0.95	9.1
833	2219A x 50105-1	82	0.95	15.8
834	2077A x 52765	76	0.95	15
835	2077A x 50193	81	0.95	10
836	2077A x 50609	79	0.95	0
837	2077A x 52819	80	0.95	0
838	2077A x 51321	82	0.96	4.2
839	2219A x 50105-3	81	0.96	8.7
840	2077A x 51305	76	1	5.6

S.No.	Entry	Days to 50% flowering	Mean node cross	Percent soft stalk
841	2077A x 51721	81	1	9.1
842	2077A x 50353	80	1	10.5
843	2077A x 52767	76	1	31.8
844	2077A x 51397	70	1	25
845	2077A x 50691	81	1	8.3
846	2077A x 50109	84	1	0
847	2077A x 51479	83	1	12.5
848	2077A x 51393	80	1	0
849	2077A x 50623	82	1	0
850	2077A x 52903	78	1	0
851	2077A x 51483	80	1	0
852	2077A x 50807	72	1	0
853	2077A x 50305	81	1	0
854	2077A x 50699	74	1	5.9
855	2077A x 52884	74	1	10
856	2077A x 52847	77	1	15
857	2077A x 50245	76	1.04	17.4
858	2077A x 52799	76	1.04	13
859	2219A x 50017-3	80	1.04	12.5
860	2077A x 50121	82	1.05	5
861	2219A x 50369-2	74	1.05	4.8
862	2077A x 50097	80	1.05	0
863	2077A x 51327	78	1.05	9.5
864	2077A x 52878	80	1.06	17.7
865	2077A x 50881	80	1.07	13.3
866	2077A x 50317	81	1.08	30.8
867	2077A x 50129	76	1.09	9.1
868	2077A x 50281	77	1.09	0
869	2219A x 50105-2	83	1.1	15
870	2077A x 51409	81	1.1	10.5

S.No.	Entry	Days to 50% flowering	Mean node cross	Percent soft stalk
871	2077A x 51923	74	1.11	16.7
872	2219A x 52898	76	1.12	4
873	2219A x 3016-1	82	1.13	6.7
874	2077A x 50173	76	1.14	28.6
875	2077A x 50017	79	1.15	15.4
876	2077A x 50205	81	1.15	0
877	2077A x 50117	80	1.15	5
878	2077A x 52763	73	1.17	8.7
879	2077A x 50021	77	1.19	18.8
880	2077A x 50269	80	1.2	20
881	2077A x 52971	83	1.2	0
882	2077A x 52912	74	1.2	20
883	2077A x 51353	81	1.21	12.5
884	2077A x 50725	81	1.21	14.3
885	2077A x 50125	82	1.21	5.3
886	2077A x 50357	80	1.22	22.2
887	2077A x 52871	75	1.22	38.9
888	2077A x 50981	79	1.22	17.4
889	2077A x 51333	79	1.23	13.6
890	2077A x 52907	79	1.23	23.1
891	2077A x 50313	81	1.23	7.69
892	2077A x 50153	69	1.24	29.4
893	2077A x 52901	74	1.24	0
894	2077A x 52955	78	1.24	4.8
895	2077A x 52885	75	1.25	25
896	2077A x 50881-2	76	1.25	25
897	2077A x 52825	76	1.26	26.3
898	2219A x 50369-3	76	1.26	10.5
899	2077A x 50105	82	1.26	5.3
900	2077A x 52969	80	1.26	10.5

S.No.	Entry	Days to 50% flowering	Mean node cross	Percent soft stalk
901	2219A x 6075-1	77	1.26	0
902	2077A x 52917	74	1.27	26.7
903	2219A x 50401-2	76	1.27	4.6
904	2077A x 50633	79	1.27	6.7
905	2077A x 52771	76	1.27	36.4
906	2077A x 51457	76	1.29	35.7
907	2077A x 52755	75	1.31	25
908	2077A x 50349	80	1.32	27.3
909	2077A x 52861	79	1.32	15.8
910	2219A x 50573	74	1.32	0
911	2077A x 50229	82	1.33	25
912	2077A x 50141	80	1.33	26.7
913	2077A x 50595	81	1.33	22.2
914	2077A x 50277	81	1.35	5.9
915	2077A x 52967	79	1.35	29.4
916	2077A x 50189	82	1.35	15
917	2077A x 50835	82	1.38	25
918	2077A x 52783	81	1.38	15.4
919	2077A x 50045	79	1.39	17.4
920	2077A x 52787	81	1.4	33.3
921	2077A x 52887	77	1.4	30
922	2077A x 50165	72	1.4	10
923	2077A x 52915	78	1.42	36.8
924	2077A x 50321	81	1.43	19.1
925	2077A x 50101	81	1.43	14.3
926	2077A x 52809	76	1.44	33.3
927	2077A x 52949	76	1.44	25
928	2077A x 51513	76	1.45	50
929	2077A x 51461	72	1.45	18.2
930	2077A x 50675	79	1.45	40

S.No.	Entry	Days to 50% flowering	Mean node cross	Percent soft stalk
931	2077A x 52886	80	1.45	20
932	2077A x 52898	80	1.45	5.9
933	2077A x 50695	70	1.47	35.3
934	2077A x 51707	76	1.47	20
935	2077A x 50337	78	1.47	11.8
936	2077A x 52843	80	1.5	25
937	2219A x 50577	73	1.5	0
938	2077A x 50149	69	1.5	31.3
939	2219A x 50009-3	76	1.5	38.9
940	2077A x 52890	74	1.52	42.9
941	2219A x 50591	70	1.52	0
942	2077A x 51473	83	1.52	24
943	2077A x 51705	80	1.52	8.7
944	2077A x 50979	79	1.53	40
945	2077A x 52845	77	1.53	17.7
946	2077A x 51709	81	1.53	13.3
947	2077A x 52953	75	1.57	57.1
948	2077A x 51344	80	1.6	35
949	2077A x 52913	79	1.6	0
950	2077A x 50878	82	1.6	40
951	2077A x 52793	76	1.61	11.1
952	2219A x 3016-2	82	1.64	42.9
953	2077A x 52773	81	1.64	9.1
954	2077A x 50677	82	1.64	4.6
955	2077A x 51369	81	1.65	20
956	2077A x 50693	71	1.65	20
957	2077A x 50233	81	1.67	33.3
958	2077A x 52039	79	1.67	27.8
959	2077A x 50161	76	1.68	26.3
960	2219A x 50001-3	71	1.68	36.4

S.No.	Entry	Days to 50% flowering	Mean node cross	Percent soft stalk
961	2077A x 52835	81	1.68	21.1
962	2077A x 52891	74	1.68	42.1
963	2077A x 50891	71	1.7	30
964	2077A x 52919	74	1.71	14.3
965	2077A x 51711	76	1.71	28.6
966	2077A x 50345	80	1.71	28.6
967	2077A x 52905	78	1.71	14.3
968	2077A x 52801	81	1.72	5.6
969	2077A x 52790	69	1.74	15.8
970	2077A x 50329	80	1.77	36.4
971	2077A x 51365	80	1.77	4.6
972	2077A x 50733	78	1.78	43.5
973	2077A x 51512	76	1.8	30
974	2077A x 51471	75	1.81	38.1
975	2077A x 52863	82	1.81	25
976	2077A x 50683	80	1.86	42.9
977	2077A x 50627	79	1.87	33.3
978	2077A x 50257	82	1.89	11.1
979	2219A x 3016-5	82	1.9	40
980	2077A x 52998	76	1.9	40
981	2077A x 50649	82	1.93	42.9
982	2077A x 52888	75	1.94	17.7
983	2077A x 52893	76	1.94	55.6
984	2077A x 51477	83	1.96	25
985	2077A x 50707	78	2	50
986	2077A x 50297	82	2	44.4
987	2077A x 50763	78	2	66.7
988	2077A x 50261	80	2.04	17.4
989	2077A x 52973	84	2.09	9.09
990	2077A x 52925	75	2.1	30

S.No.	Entry	Days to 50% flowering	Mean node cross	Percent soft stalk
991	2077A x 50201	82	2.13	25
992	2077A x 50145	60	2.14	33.3
993	2219A x 3016-4	81	2.14	25.7
994	2077A x 50673	80	2.19	37.5
995	2077A x 52855	79	2.2	0
996	2077A x 52877	81	2.2	40
997	2077A x 50625	81	2.2	30
998	2077A x 52469	80	2.25	40
999	2077A x 50711	80	2.28	44.4
1000	2077A x 50613	82	2.29	42.9
1001	2077A x 51377	81	2.3	52.2
1002	2219A x 50017-1	81	2.31	43.8
1003	2077A x 50833	76	2.32	47.4
1004	2077A x 51719	81	2.33	91.7
1005	2077A x 52789	76	2.35	50
1006	2077A x 52892	76	2.41	47.1
1007	2077A x 50133	80	2.42	52.6
1008	2077A x 50619	79	2.43	33.3
1009	2077A x 50815	80	2.44	55.6
1010	2077A x 52805	76	2.45	54.6
1011	2077A x 52909	73	2.61	16.7
1012	2077A x 52795	76	2.65	58.8
1013	2077A x 52911	76	2.67	66.7
1014	2077A x 50825	83	2.87	40
1015	2077A x 50635	79	2.88	53
1016	2077A x 50265	81	3	35.3
1017	2077A x 52921	73	3	35
1018	2077A x 52865	77	3	75
1019	2077A x 50685	81	3.32	31.8

APPENDIX-IV

Days to 50% flowering and reactions of Charcoal rot resistance breeding progenies (F3's) to Charcoal rot inoculations during rabi 1978-79 at ICRISAT Center.

S.No.	Entry	Days to 50% flowering	Mean node cross	Percent soft stalk
1	GC-1137 x IS 4242	64	0.17	0
2	(M35-1 x M1032)-6	65	0.21	0
3	[14-40 x (SC 423 x CS3541)-85]-4	64	0.22	0
4	[20-67x(10680 x CS3541)-4]-7	64	0.25	0
5	IS 1331 x IS 3443	63	0.26	0
6	(M35-1 x M1032)-7	71	0.28	0
7	(13-35 x IS 3443)-3	64	0.28	2.2
8	CK 60B x SC 329	67	0.28	0
9	[16-9 x (SC 423xCS3541)-85]-3	82	0.29	4.4
10	[16-9x(CS 3541 x 148)-4]-4	62	0.3	3.6
11	[22-22 x(SC-423xCS3541)-61]-2	74	0.3	2.1
12	[GC-1137 x E-12-5)-3	63	0.3	0
13	[16-9 x (SC 423xCS3541)-61]-10	75	0.31	0
14	[16-9x(SC-423xCS3541)-61]-5	62	0.32	0
15	[(B.Y.x D-181 F5-10)xSPV 104]-3	72	0.36	5.3
16	14-40 x SC-120-4	66	0.36	0
17	16-9 x SPV-35	64	0.37	0
18	[14-40 x (SC-423xCS3541)-85]-3	71	0.4	5.3
19	(555 x IS 3443)-2	65	0.41	0
20	(E-145 x A-1012)-1	72	0.43	0
21	(13-35 x IS 3443)-7	63	0.43	7.1
22	20-67 x Q.52115	64	0.45	2.2
23	[16-9 x (CS 3541 x 148-4)]-1	63	0.46	5
24	[16-9x(SC-423xCS3541)-61]-3	76	0.47	6.8
25	(FLR-226 x E-36-1)-1	63	0.47	0
26	(13-35 x IS 3443)-2	66	0.48	0
27	[14-40x(SC 423xCS3541)-85]-12	62	0.49	7.2
28	[FLR-226 x IS 3443)-2	64	0.49	0
29	[16-9x(SC-423xCS3541)-85]-5	75	0.49	5.3
30	[14-40x(SC-423xCS3541)-85]-18	76	0.49	0

S.No.	Entry	Days to 50% flowering	Mean node cross	Percent soft stalk
31	GC 1137 x E-12-5)-1	66	0.49	7.1
32	E-145 x A-1012)-2	63	0.49	5.6
33	20-67 x E-185-2)-4	75	0.51	12.5
34	[9-42x(SC-423xCS3541)-61]-2	65	0.51	5
35	(M-35-1 x M-1033)-3	72	0.52	0
36	[(B.Y.xD-181 F_5-10-2)xSPV-104]-7	74	0.53	2.6
37	14-40 x SC-120-2	74	0.53	7.9
38	[18-83x(SC-423xCS3541)-23]-7	83	0.55	7.9
39	[18-83x(SC-423xCS3541)-23]-1	82	0.55	8.8
40	(IS 3443 x 13-35)-3	67	0.55	0
41	(22-40 x ENT 31)-3	77	0.56	2.2
42	[16-9x(SC-423xCS 3541)-61]-5	63	0.56	5.6
43	(9-42 x SPV-104)-9	71	0.56	11.5
44	[14-40x(SC-423xCS3541)-85]-6	64	0.57	13.8
45	(20-67 x SB-1067)-4	82	0.57	6.5
46	(22-40 x SPV-105)-1	80	0.58	9.4
47	(US/R(M)C_1S_4-22-1-1-1xE-36-1)-4	66	0.58	7.5
48	($UchV_2$ x 20-67)-1	68	0.58	7.4
49	(13-35 x IS 3443)-8	63	0.58	4
50	[14-40x(SC-423xCS3541)-61]-5	77	0.58	12.1
51	(M35-1 x M-1032)-5	71	0.59	4.5
52	(13-35 x IS 3443)-1	64	0.59	2.2
53	[16-9x(SC-423 x CS3541)-61]-11	75	0.59	6.3
54	1-14 x 20-67	77	0.59	5.1
55	(US/R(M)C_1S_4 162-1-1-1xIS 3443)-4	64	0.6	3.8
56	(20-67 x Moti)-2	63	0.6	11.6
57	[14-40x(954068xCS3541)-60]-8	64	0.61	17.5
58	(M-35-1 x M-1049)-5	72	0.64	14.3
59	(20-67 x E-185-2)-5	75	0.64	2.5
60	[14-40x(SC-423xCS3541)-61]-3	77	0.64	15.5

S.No.	Entry	Days to 50% flowering	Mean node cross	Percent soft stalk
61	CK-60B x R16	66	0.64	5
62	(FLR-226 x E-36-1)-1	63	0.65	9.1
63	[14-40 x (954068xCS3541)-60]-2	77	0.66	0
64	[22-22x(SC-423xCS3541)-61]-1	77	0.67	10.5
65	M 35-1 x M-1032)-8	72	0.68	6.3
66	[14-40 x(SC423xCS3541)-85]-16	63	0.68	0
67	[18-83 x (SC 423xCS3541)-23]-8	84	0.68	14.7
68	[16-9 x(SC423xCS3541)-61]-9	77	0.68	3.8
69	20-67 x SB 1067)-3	76	0.69	2.3
70	[16-9 x (CS 3541 x 148-4)]-3	75	0.69	7.1
71	M-35-1 x M-1017)-1	72	0.69	0
72	(E-145 x 13-35)-2	64	0.7	0
73	(9-42 x SPV-104)-6	76	0.71	11
74	[16-9x(SC-423xCS3541)-61]-6	64	0.71	6.1
75	14-40 x SC 120-1	65	0.72	10
76	(M 35-1 x M 1049)-8	82	0.72	7.9
77	(E 145 x A 1012)-4	66	0.72	3.3
78	[14-40x(10680xCS3541)-4]-4	65	0.72	8
79	11-69 x P-3	72	0.72	8.3
80	[18-83x(SC 423xCS3541)-47]-1	78	0.73	15
81	20-67 x Moti)-5	63	0.74	5.6
82	E 145 x A 1012)-3	64	0.74	6.3
83	SB 1066 x 22-40)-1	68	0.74	6.3
84	9-42 x (CS 3541 x 148)-4]-2	64	0.74	0
85	(ENT 31 x RS/RS 4-1-2)-5	65	0.75	1.9
86	[18-83x(SC-423xCS3541)-2-3]-3	80	0.75	22.1
87	[16-9x(SC 423xCS3541)-61]-8	66	0.75	23.8
88	M-35-1 x M 1049)-10	77	0.75	6.3
89	16-9 x E-35-1)	64	0.76	20.6
90	[SPV-35 x(SC 423xCS3541)-16]-1	69	0.76	5.3

S.No.	Entry	Days to 50% flowering	Mean node cross	Percent soft stalk
91	GC 1137 x M 35-1	77	0.76	8.3
92	IS 12666C x (B.YxD.181-F5-10-2)	64	0.76	10
93	[22-22 x (SC 423xCS3541)-61]-4	76	0.77	0
94	[(BYxD-181 F5-10-2)xSPV-104]-1	78	0.77	6.3
95	(M-35-1 x M 1049)-2	62	0.78	26.7
96	M-35-1 x M-1033)-1	71	0.78	7.8
97	M 35-1 x M 1009)-1	82	0.78	0
	(US/R(M)C_1S_4-642-1-1-1xIS 3443)-1	62	0.79	2.3
99	[(B.YxD-181 F_5-10-2)xSPV-104]-2	78	0.79	7.1
100	(20-67xSB-1067)-1	82	0.8	8.4
101	(555 x IS 3443)-1	64	0.8	9.6
102	[14-40x(SC-423xCS3541)-85]-17	71	0.81	11
103	[(B.YxD-181 F_5-10-2)xSPV-104]-5	78	0.81	17.9
104	[16-9x(SC-423xCS3541)-61]-1	65	0.81	9.1
105	[18-83x(SC-423xCS3541)-47]-2	84	0.82	12.4
106	(US/R(M)C_1S_4-642-1-1-1xIS 3443)-2	63	0.82	2.3
107	(13-35 x IS 3443)-6	63	0.82	9.5
108	FLR-101 x IS 3443	65	0.82	8.8
109	(9-38 x E-36-1)-2	77	0.83	3.6
110	M-35-1 x GC 318	82	0.83	16.7
111	(13-35 x IS 3443)-5	64	0.83	0
112	(22-40 x P-3)-9	79	0.84	6.9
113	14-40 x SC 120-5	66	0.84	2.9
114	(M 35-1 x M 1032)-9	74	0.84	17
115	(22-40 x ENT 31)-2	68	0.84	5.4
116	20-67x(10680 x CS 3541)-4]-3	74	0.84	2.1
117	IS 3443 x 13-35)-2	69	0.84	10.4
118	16-9 x SPV 105)-4	72	0.85	5
119	16-9 x SPV 105)-3	71	0.85	0
120	9-42 x (CS 3541 x 148)-4]-3	73	0.85	22.5

S.No.	Entry	Days to 50% flowering	Mean node cross	Percent soft stalk
121	[14-40x(SC-423xCS3541)-85]-13	63	0.85	15.2
122	(M 35-1 x M 1043)-6	82	0.85	14.3
123	[9-42 x (CS 3541 x 148)-4]-1	75	0.85	0
124	(E 145 x 13-35)-3	66	0.86	13.1
125	(M 35-1 x M 1049)-3	74	0.86	9.4
126	(20-67 x Moti)-4	73	0.86	18.6
127	(ENT-31 x RS/RS4-1-2)-5	73	0.87	16.5
128	[18-83 x (SC423xCS3541)-23]-6	83	0.87	34.5
129	20-67 x IS 3574	68	0.87	11.1
130	(E 185-2 x 20-67)-1	68	0.88	8
131	(16-9 x SPV 105)-5	72	0.88	4.3
132	(Diallel 848-1-2xIS 3443)-3	66	0.88	0
133	[11-69x(SC 423xCS3541)-23]-9	64	0.89	9.4
134	(SB 1066 x 16-9)-1	66	0.89	2.8
135	(SPV-35 x M 35-1)-4	75	0.89	16.7
136	[22-22x(SC 423xCS 3541)-61]-3	76	0.9	10.5
137	20-67 x Moti)-1	63	0.91	18.6
138	20-67 x E 185-2)-2	78	0.92	11.1
139	16-9 x E 35-1)-3	64	0.92	15.9
140	(US/R(M)C1S4-22-1-1-1xE-36-1)-5	64	0.93	14.2
141	M 35-1 x M 1033)-5	77	0.93	9.4
142	9-42x(SC-423xCS 3541)-10]-1	64	0.93	10.9
143	16-9x(SC-423xCS3541)-61]-12	82	0.95	14.6
144	22-40 x SPV 105)-4	80	0.95	16.3
145	22-40 x P-3)-5	76	0.95	12.8
146	IS 6928 x IS 410)-2	71	0.95	6
147	[(B.YxD-181F5-10-2)xSPV 104]-8	77	0.95	13.9
148	[14-40x(SC.423xCS3541)-85]-11	73	0.96	15.9
149	IS 6928 x IS 410)-4	70	0.96	6.7
150	CS 3541 x M 35-1	77	0.96	10

S.No.	Entry	Days to 50% flowering	Mean node cross	Percent soft stalk
151	[SPV-35x(SC-423xCS 3541)-16]-6	68	0.96	5.9
152	[22-40 x SPV 105)-3	82	0.96	14.6
153	[9-42x(SC-423xCS3541)-16]-2	65	0.96	43.5
154	[14-40x(10680xCS3541)-4]-2	64	0.97	2.5
155	(16-9xE-35-1)-1	66	0.97	0
156	[SB 1066x(10222xCS3541)-10]	66	0.97	8.3
157	[SPV-35x(SC 423xCS3541)-16]-5	69	0.98	9.6
158	(US/R(M)C_1S_4-22-1-1-1xE-36-1)-3	67	0.98	11.6
159	(M-35-1 x M 1017)-3	73	0.98	17.6
160	[9-42x(SC-423xCS3541)-16]-1	66	0.98	2.9
161	(20-67 x E 185-2)-1	78	0.99	47.7
162	(555 x E 35-1)-6	64	0.99	16.5
163	(13-35 x E 36-1)-1	64	0.99	6.5
164	(IS 3572 x 20-67)-2	64	0.99	11
165	[14-40x(SC 423xCS3541)-85]-7	66	1	20.5
166	14-40x(SC 423xCS 3541)-61]-2	62	1	13.9
167	14-40x(SC-423xCS 3541)-60]-5	63	1	0
168	IS 3572 x 20-67)-1	82	1.01	11.1
169	20-67 x E 135-2)-3	76	1.03	20
170	UchV2 x 20-67)-3	71	1.03	17.6
171	16-9 x(CS 3541 x 148-4)-2	74	1.03	11
172	[9-42x(SC 423xCS3541)-10]-2	65	1.03	25.8
173	B-16 x SPV-86	82	1.03	16.4
174	(GC 1137 x E 12-5)-2	71	1.03	0
175	ENT 31 x US/R(M)C_1S_4-225-1-1-1	66	1.03	16.1
176	[14-40x(SC-423xCS3541)-61]-4	77	1.04	7.5
177	14-40 x SC 120-6	66	1.05	25
178	(9-42 x SPV-104)-4	82	1.06	16.4
179	(US/R(M)C_1S_4-22-1-1-1xE-36-1)-2	66	1.06	10.5
180	(16-9 x E 35-1)-7	64	1.06	17.4

S.No.	Entry	Days to 50% flowering	Mean node cross	Percent soft stalk
181	[SPV-35x(SC 423 x CS 3541)-16]-4	74	1.06	0
182	(E 145 x 13-35)-1	63	1.06	26.5
183	(16-9 x E 35-1)-6	64	1.07	20.3
184	(FLR 274 x E 36-1)-8	77	1.07	3.8
185	[14-40x(SC-423xCS3541)-61]-1	64	1.08	33.1
186	(M 35-1 x M 1031)-2	73	1.1	26.8
187	[18-83x(SC-423xCS3541)-23]-2	84	1.1	17.7
188	SB 412 x M 35-1	68	1.1	44.8
189	(22-40 x P-3)-1	68	1.1	3.8
190	[14-40x(SC-423xCS3541)-85]-10	64	1.1	17.3
191	(E 185-2 x 20-67)-2	72	1.1	8.5
192	[14-40 x(SC 423xCS3541)-85]-1	64	1.1	14.1
193	(ENT 31 x RS/RS$_4$-1-2)-3	73	1.11	0
194	(13-35 x E 36-1)-2	63	1.11	2.9
195	(UchV2 x 20-67)-2	64	1.11	26.1
196	[SPV 35x(SC 423xCS3541)-16]-7	65	1.11	15.9
197	(M-35-1 x M 1009)-2	70	1.12	19.7
198	(555 x E 35-1)-3	63	1.12	11.9
199	(SB 1066 x 16-9)-3	73	1.13	9
200	[14-40x(954068xCS3541)-60]-4	64	1.13	3.3
201	(SPV-35 x M 35-1)-1	72	1.13	25
202	[14-40x(954068xCS3541)-60]-1	65	1.14	25.4
203	(13-35 x E 36-1)-3	66	1.14	5.3
204	[(WAx Nigerian Bulk)x22-40]-2	75	1.14	10.7
205	20-67 x (10222 x CS3541)-12	72	1.14	4.8
206	[11-69x(SC 423xCS3541)-23]-6	70	1.14	0
207	[US/R(M)C$_1$S$_4$-22-1-1-1xE-36-1)-1	64	1.14	28.6
208	[14-40x(SC 423 x CS3541)-85]-9	64	1.16	11.5
209	[(B.Y.xD.181F$_5$-10-2)xSPV-104)]-	84	1.16	14.3
210	[14-40x(954068xCS3541)-60]-3	71	1.16	18.1

S.No.	Entry	Days to 50% flowering	Mean node cross	Percent soft stalk
211	14-40x(10222xCS3541)-13]-2	66	1.17	17.2
212	SPV-35x(SC 423 x CS3541)-16]-1	66	1.17	24.1
213	IS 6928 x IS 410)-1	71	1.17	0
214	11-69x(SC 423xCS3541)-23]-3	82	1.17	16.7
215	M 35-1 x M 1033)-4	71	1.17	24.3
216	[14-40x(SC 423 x CS 3541)-85]-15	75	1.17	7.7
217	9-42 x (10680 x CS 3541)-4	73	1.17	0
218	(9-42 x CS 3541)-2	77	1.18	20.1
219	(555 x E 35-1)-7	65	1.18	10.4
220	[20-67 x (10262 x CS3541)-2]-1	71	1.18	24
221	(9-42 x CS 3541)-1	76	1.18	63.4
222	[16-9x(SC 423 x CS3541)-61]-7	64	1.18	11.5
223	[(BY.D-181F_5-10-2)xSPV-104]-6	84	1.18	9.1
224	[18-83 x (SC-423 x CS 3541)-23]-5	82	1.19	22.4
225	[14-40 x (954068 x CS3541)-60]-6	71	1.19	0
226	(9-42 x SPV 104)-10	68	1.19	2.4
227	(M 35-1 x M 1049)-7	77	1.19	42.5
228	M 35-1 x M 1049)-1	82	1.19	17.7
229	16-9 x SPV 105)-1	64	1.19	25
230	IS 6928 x IS 410)-3	72	1.19	11.5
231	(16-9 x E 35-1)-5	63	1.19	24.7
232	(M 35-1 x M 1049)-4	77	1.19	27.8
233	20-67 x SWARNA	77	1.21	4.4
234	[(WA x Nigerian Bulk) x 22-40]-1	70	1.21	16.7
235	(22-40 x SPV 105)-1	84	1.22	18.9
236	[16-9x(SC 423 x CS 3541)-61]-14	82	1.22	23.6
237	[14-40x(SC 423 x CS 3541)-85]-2	73	1.23	15.6
238	IS 3691 x SPV-104	64	1.23	13.9
239	(Diallel 848-1-2 x IS 3443)-2	74	1.23	9.9
240	(13-35 x IS 3443)-4	64	1.24	5.3

S.No.	Entry	Days to 50% flowering	Mean node cross	Percent soft stalk
241	ENT 31 x FLR 266	71	1.24	9.5
242	[20-67 x (10262xCS3541)-2]-2	71	1.24	14.3
243	[11-69x(SC 423 x CS 3541)-23]-7	77	1.24	40.2
244	(M 35-1 x M 1032)-3	82	1.25	6.3
245	(555 x E 35-1)-2	63	1.25	29.3
246	ENT 31 x 13-35	65	1.26	21.4
247	9-42 x (10262 x CS 3541)-1	82	1.26	12.4
248	[14-40x(10222xCS3541)-13]-3	64	1.26	18.4
249	[16-9x(SC 423xCS3541)-85]-2	78	1.27	28.5
250	(M 35-1 x M 1009)-5	66	1.27	21.6
251	(ENT 31 x RS/RS4-1-2)-2	70	1.28	20
252	(9-42 x SPV 104)-5	74	1.28	27.4
253	[20-67x(10680xCS3541)-4]-6	71	1.28	16.1
254	[16-9x(SC 423 x CS 3541)-85]-4	80	1.29	28.6
255	(Diallel 848-1-2 x IS 3443)-1	71	1.29	17.4
256	V 604 x SPV 104	63	1.29	20.8
257	[18-83x(SC 423 x CS 3541)-23]-9	84	1.3	25.3
258	(22-40 x P-3)-3	74	1.31	22.8
259	(22-40 x P-3)-2	77	1.31	14.5
260	(22-40 x SPV 105)-5	78	1.32	20.2
261	[9-42x(SC 423 x CS 3541)-61]-6	71	1.32	34.9
262	(SPV 35 x M 35-1)-2	73	1.32	18.2
263	[22-40 x SPV 105)-9	84	1.33	19.6
264	(20-67 x E 185-2)-6	77	1.33	2.9
265	[SPV 35 x (SC 423xCS 3541)-16]-3	65	1.33	30.6
266	[18-83x(SC 423 x CS 3541)-47]-3	82	1.34	20.1
267	[14-40x(10680 x CS 3541)-4]-1	67	1.34	15.7
268	[20-67 x (10680 x CS 3541)-4]-8	72	1.35	16
269	(9-42 x SPV 104)-3	77	1.35	30
270	(555 x E 35-1)-8	62	1.35	25.8

S.No.	Entry	Days to 50% flowering	Mean node cross	Percent soft stalk
271	FLR 274 x E 36-1)-4	78	1.36	21
272	555 x E 35-1)-5	65	1.37	26
273	14-40 x (SC 423 x CS 3541)-85]-8	63	1.37	3.3
274	16-9x(SC 423 x CS 3541)-61]-13	84	1.37	15.8
275	20-67 x SB 1067)-2	78	1.38	30.7
276	(FLR 274 x E 36-1)-6	78	1.38	29.3
277	14-40 x SC 120-3	69	1.38	2.4
278	(FLR 274 x E 36-1)-3	78	1.38	11.9
279	(9-42 x SPV 104)-1	82	1.39	30
280	(M 35-1 x M 1049)-9	82	1.4	33.9
281	9-42 x SPV 104)-2	82	1.41	5
282	555 x E 35-1)-4	64	1.42	23.7
283	20-67 x (10680 x CS 3541)-4]-2	68	1.43	13.1
284	M 35-1 x M 1017)-2	73	1.43	40
285	16-9 x (SC 423 x CS3541)-61]-2	73	1.44	29.4
286	FLR 274 x E 36-1)-5	78	1.46	17.2
287	20-67 x Moti)-3	73	1.47	35.4
288	[16-9x(SC 423 x CS 3541)-85]-1	82	1.47	9.5
289	S_4-642-1-1-1xIS 3443)-3	74	1.47	18.8
290	9-42x(SC 423 x CS 3541)-61]-1	65	1.47	31.58
291	16-9 x SPV 105)-6	71	1.47	23.5
292	14-40x(SC 423 x CS3541)-85]-5	73	1.47	62.5
293	ENT 31 x RS/RS_4-1-2)-1	72	1.49	29.1
294	FLR 274 x E 36-1)-7	82	1.49	30.6
295	11-69 x (SC 423xCS 3541)-23]-4	71	1.49	23
296	[14-40 x (10680 x CS 3541)-4]-6	67	1.49	25.9
297	[9-42x(SC 423 x CS 3541)-61]-3	71	1.49	20
298	[14-40x(10222 x CS 3541)-13]-1	63	1.5	22.8
299	E 185-2 x 20-67)-3	72	1.5	13.2
300	(22-40 x SPV 105)-8	84	1.5	25.5

S.No.	Entry	Days to 50% flowering	Mean node cross	Percent soft stalk
301	(ENT.31 x RS/RS4-1-2)-4	73	1.5	13
302	(M-35-1 x M 1009)-4	82	1.51	10.5
303	(555 x E 35-1)-1	65	1.53	24.2
304	M 35-1 x GC 497	78	.53	24.9
305	20-67 x P 4-8	68	.53	16.7
306	SPV 35 x (IS 12622xCS 3541)-1	66	.54	18.2
307	[20-67x(10680xCS3541)-4]-1	77	.55	13.5
308	US/R(M)C_1S_4-260-1-1-1xE-36-1	81	.55	23.7
309	(22-40 x SPV 105)-6	84	.58	19.6
310	(22-40 x ENT 31)-1	77	1.59	13.2
311	[20-67 x (10680xCS3541)-4]-5	79	1.59	46.4
312	[11-69x(SC.423xCS.3541)-23]-8	71	1.59	16.8
313	(16-9 x SPV 105)-2	77	1.62	30.1
314	[9-42x(SC.423xCS3541)-61]-7	69	1.64	31.6
315	(M 35-1 x M 1032)-4	77	1.67	41.3
316	(22-40 x P-3)-8	77	1.67	25.7
317	(9-42 x SPV 104)-8	71	1.68	1.8
318	[14-40x(SC.423xCS3541)-85]-14	63	1.68	14.7
319	(FLR 274 x E 36-1)-2	78	1.68	25.2
320	(FLR 274 x E 36-1)-1	84	1.69	25.6
321	[20-67x(10680xCS3541)-4]-4	72	1.69	26.9
322	E 36-1 x RS/R	77	1.7	20
323	[14-40x(10680xCS3541)-4]-3	64	1.71	15.4
324	(M 35-1 x M 1009)-3	77	1.72	9.1
325	[SB 1066x(CS 3541x148)-4]	74	1.72	19.4
326	[20-67x(10680xCS3541)-4]-7	72	1.74	39.7
327	(9-38 x E 36-1)-1	80	1.74	17
328	555 x SPV 104	79	1.75	5.6
329	[14-40x(954068xCS3541)-60]-7	66	1.75	10.9
330	(22-40 x P-3)-4	76	1.76	21.9

S.No.	Entry	Days to 50% flowering	Mean node cross	Percent soft stalk
331	(SB 1066 x 22-40)-2	67	1.76	29.8
332	22-22 x (10222 x CS 3541)-10	83	1.82	16
333	(9-42 x SPV 104)-7	72	1.83	9.5
334	[14-40 x (10680xCS3541)-4]-5	65	1.84	4.8
335	11-69 x DJ 1195	73	1.84	10.5
336	11-69x(SC.423xCS.3541)-23]-1	65	1.85	40.5
337	11-69x(SC 423 x CS 3541)-23]-2	71	1.86	24.4
338	SPV 35 x M 35-1)-1	73	1.86	30.1
339	20-40 x P-3)-6	74	1.94	41.2
340	[18-83x(SC 423 x CS 3541)-23]-4	78	1.97	38.9
341	ENT 31 x US/R(M)C_1S_4-22-1-1-1	73	1.97	30
342	(20-40 x SPV 105)-10	84	1.97	31.5
343	(SB 1066 x 16-9)-2	74	2	29.2
344	(22-40 x P-3)-7	74	2.03	44.6
345	[9-42x(SC 423 x CS 3541)-61]-4	73	2.09	46.9
346	11-69x(SC 423 x CS 3541)-23]-5	73	2.13	4.8
347	SB 1066 x 20-67)	67	2.14	33
348	9-42 x CS 3541)-3	78	2.15	42.5
349	M 35-1 x M 1009)-6	82	2.16	42.9
350	16-9 x E 35-1)-2	65	2.16	74.2
351	(22-40 x SPV 105)-7	84	2.26	47.4
352	[9-42 x (SC 423 x CS 3541)-61]-5	71	2.63	26.6

APPENDIX V

Charcoal rot reactions and days to 50% flowering of sorghum advanced population breeding material during Rabi 1978-79 at ICRISAT Center.

S.No.	Entry	Days to 50% flowering	Mean node cross	Percent soft stalk
1	A 9445-3	66	0	0
2	A 9445-1	66	0	0
3	A 9535 Bulk	70	0.05	0
4	A 9445-4	66	0.05	0
5	A 11650-3	69	0.06	0
6	A 11654 Bulk	67	0.06	0
7	A 11653 Bulk	67	0.06	0
8	A 9445-2	66	0.07	0
9	A 11650-4	72	0.09	0
10	A 11653-4	68	0.09	0
11	A 11651-3	72	0.17	0
12	A 11613 Bulk	75	0.17	0
13	A 11614-2	70	0.18	0
14	A 11607-2	78	0.2	0
15	A 11642-2	76	0.21	0
16	A 11638 Bulk	77	0.22	0
17	A 12530 Bulk	70	0.22	0
18	A 11606-10	82	0.23	0
19	A 11643-1	70	0.24	5.9
20	A 9632 Bulk	74	0.24	0
21	A 11606-1	82	0.25	0
22	A 16087-3	82	0.25	0
23	A 11618-1	72	0.25	0
24	A 16088 Bulk	78	0.25	0
25	A 11706 Bulk	68	0.26	0
26	A 9626 Bulk	72	0.26	0
27	A 16087-4	78	0.26	0
28	A 11659 Bulk	89	0.29	0
29	A 11657 Bulk	73	0.3	0
30	A 11610-1	78	0.3	0

S.No.	Entry	Days to 50% flowering	Mean node cross	Percent soft stalk
31	A 11643-2	70	0.3	0
32	A 16087-2	78	0.3	4.4
33	A 12584-3	72	0.32	4.6
34	A 11655	70	0.32	0
35	A 11653-5	68	0.32	0
36	A 11606 Bulk	73	0.35	0
37	A 9313-2 Bulk	73	0.35	0
38	A 9614 Bulk	70	0.38	0
39	A 11645 Bulk	72	0.38	0
40	A 11642-1	72	0.38	0
41	A 12584-1	70	0.39	0
42	A 11606-7	80	0.39	0
43	A 11651-1	72	0.4	0
44	A 11651-2	72	0.42	0
45	A 11621-2	76	0.44	0
46	A 12536 Bulk	70	0.45	5
47	A 11616 Bulk	85	0.47	0
48	A 11644 Bulk	66	0.47	0
49	A 11652 Bulk	72	0.47	0
50	A 11606-2	82	0.48	0
51	A 11666 Bulk	82	0.5	8.3
52	A 11642 Bulk	68	0.5	0
53	A 11621-1	76	0.52	4.4
54	A 11651 Bulk	72	0.52	8.7
55	A 11621-3	76	0.53	0
56	A 11658 Bulk	73	0.53	0
57	A 9574-1	69	0.54	0
58	A 9756 Bulk	77	0.55	4.6
59	A 11657-3	71	0.55	0
60	A 11653-3	68	0.55	0

S.No.	Entry	Days to 50% flowering	Mean node cross	Percent soft stalk
61	A 11606-5	82	0.55	0
62	A 11660-1	72	0.56	4
63	A 11653-2	66	0.57	4.4
64	A 11616-3	82	0.58	0
65	A 11607-1	78	0.6	4
66	A 12584-2	72	0.6	4
67	A 11650-1	74	0.61	0
68	A 11606-8	76	0.61	0
69	A 11613-1	75	0.61	11.1
70	A 11657-1	71	0.62	0
71	A 12529 Bulk	70	0.64	0
72	A 11610 Bulk	82	0.65	0
73	A 12551 Bulk	68	0.67	8.3
74	A 11653-1	72	0.68	0
75	A 11610-3	78	0.68	4
76	A 11665 Bulk	82	0.68	10.5
77	A 11616-1	84	0.68	5.3
78	A 11619 Bulk	76	0.71	4.8
79	A 16087-1	82	0.71	0
80	A 11646 Bulk	73	0.71	0.1
81	A 11658-2	72	0.73	3.9
82	A 12562	89	0.73	6.7
83	A 9419 Bulk	78	0.75	0
84	A 11645-1	74	0.76	0
85	A 11658-1	72	0.78	0
86	A 9562 Bulk	76	0.8	4
87	A 9436 Bulk	82	0.81	9.5
88	A 9442 Bulk	82	0.81	0
89	A 9313-1	73	0.83	0
90	A 11618-3	78	0.84	8

S.No.	Entry	Days to 50% flowering	Mean node cross	Percent soft stalk
91	A 9631 Bulk	72	0.88	4.2
92	A 9032	70	0.9	9.5
93	A 11650-2	74	0.91	4.6
94	A 11657-2	82	0.94	5.6
95	A 9551 Bulk	82	0.96	3.9
96	A 12553 Bulk	66	0.96	15.4
97	A 9532 Bulk	76	1	5.6
98	A 11616-4	84	1	0
99	A 11605-2	75	1	0
100	A 16046 Bulk	78	1	12.5
101	A 16084 Bulk	78	1	0
102	A 11618 Bulk	76	1	0
103	A 11608 Bulk	78	1.04	0
104	A 9574-3	69	1.04	8.7
105	A 12523 Bulk	72	1.04	8.7
106	A 16057 Bulk	76	1.05	0
107	A 9384 Bulk	70	1.06	11.1
108	A 16068 Bulk	82	1.08	7.7
109	A 11614-1	75	1.08	0
110	A 9301 Bulk	82	1.09	26.1
111	A 11610-4	76	1.1	0
112	A 11616-2	82	1.1	10
113	A 11660-2	72	1.11	5.3
114	A 11610-2	78	1.13	4.2
115	A 11606-9	82	1.13	4.4
116	A 12550 Bulk	70	1.14	9.1
117	A 11649 Bulk	73	1.27	0
118	A 9769 Bulk	76	1.29	20.8
119	A 9742 Bulk	72	1.37	5.3
120	A 9501 Bulk	74	1.38	12.5

S.No.	Entry	Days to 50% flowering	Mean node cross	Percent soft stalk
121	A 12501 Bulk	78	1.39	17.4
122	A 11607-3	78	1.43	28.6
123	A 9595 Bulk	69	1.48	9.5
124	A 11607-4	76	1.5	5
125	A 12561 Bulk	78	1.53	20
126	A 12618 Bulk	78	1.54	38.5
127	A 11618-2	72	1.79	57.1
128	A 12584-4	74	1.83	22.2
129	A 11663 Bulk	84	2.23	9.1
130	A 11666-1	79	2.29	57.1

APPENDIX VI

Ergot reactions and days to 50% flowering of sorghum mold resistant breeding progenies in the initial screening during the 1978 late rainy season at ICRISAT Center.

S.No.	Entry	Days to 50% flowering	Mean percent* Honey dew	Mean percent* Sclerotia	Rust**
1	M 36543	68	1.4	2	1
2	M 36049	67	1.4	3	1.5
3	M 36014	66	1.4	2	1.5
4	M 36538	71	1.5	3	1
5	M 411-3	54	1.5	3	1
6	M 36111	67	1.7	3	3
7	M 36488	67	1.8	2	2
8	M 36166	66	1.9	3	2
9	M 36101	70	1.9	3	1.5
10	M 36016	68	2	2	2
11	M 36011	69	2	2	1.5
12	M 36367	64	2	3	2
13	M 36284	70	2.1	3	2
14	M 36651	54	2.1	3	3
15	M 36637	67	2.2	2	1.5
16	M 35007	67	2.2	2	3
17	M 36005	66	2.2	3	2.5
18	M 36013	70	2.2	2	3
19	M 35052	53	2.3	3	2
20	M 36423	66	2.3	2	3
21	M 36283	66	2.3	3	3
22	M 36459	62	2.3	2	3
23	M 36385	67	2.3	3	2
24	M 35115	59	2.4	3	1.5
25	M 36377	67	2.4	2	1.5
26	M 36282	69	2.4	3	2
27	M 36332	67	2.4	5	3
28	M 36102	70	2.6	3	2
29	M 447-3	55	2.6	2	4
30	M 35160	66	2.7	3	1.5

S.No.	Entry	Days to 50% flowering	Mean percent* Honey dew	Mean percent* Sclerotia	Rust**
31	M 36004	63	2.7	4	3
32	M 36405	62	2.7	3	1.5
33	M 36110	62	2.7	3	2
34	M 36057	73	2.7	5	2
35	M 36457	60	2.7	3	2
36	M 36387	60	2.8	3	4
37	M 36044	71	2.8	3	3
38	M 36358	70	2.8	3	1.5
39	M 36308	67	3	5	1.5
40	M 36399	69	3	5	3
41	M 35034	54	3.1	5	1.5
42	M 35104	59	3.1	3	3
43	M 36464	69	3.1	5	2
44	M 36353	53	3.1	3	1.5
45	M 36259	67	3.2	5	3
46	M 35173	56	3.2	3	3
47	M 4043-4	51	3.2	2	2
48	M 2189	55	3.2	10	4
49	M 36288	66	3.2	3	2
50	M 36289	65	3.3	5	2
51	M 36276	62	3.3	3	2
52	M 36275	62	3.3	3	1.5
53	M 36008	61	3.3	3	2
54	M 5301	60	3.4	3	1
55	M 36174	54	3.4	3	2
56	M 36340	67	3.4	3	3.5
57	M 36098	62	3.5	8	2
58	M 6545	59	3.5	5	2
59	M 406-3	52	3.6	5	3
60	M 36023	64	3.6	3	3

S.No.	Entry	Days to 50% flowering	Mean percent* Honey dew	Mean percent* Sclerotia	Rust**
61	M 36109	62	3.6	3	2
62	M 35108	54	3.6	5	1.5
63	M 36278	69	3.6	5	2
64	M 36625	68	3.7	3	1.5
65	M 36036	64	3.7	3	2.5
66	M 36027	64	3.8	3	3
67	M 36099	65	3.9	3	3
68	M 36019	67	3.9	5	2
69	M 4085	55	3.9	3	4
70	M 36364	69	4	5	2
71	M 35131	60	4	5	1.5
72	M 36015	65	4	2	1.5
73	M 36104	67	4.1	5	1.5
74	M 36185	62	4.1	3	2
75	M 425-19-2	50	4.1	8	4
76	M 36279	66	4.1	3	1.5
77	M 36084	63	4.1	5	2
78	M 2349	56	4.1	5	3
79	M 2625	56	4.2	3	3
80	M 36038	67	4.2	3	2
81	M 36500	60	4.2	5	3
82	M 36640	69	4.2	3	3
83	M 3425	55	4.2	3	1.5
84	M 35161	66	4.2	5	1.5
85	M 36260	64	4.3	5	3.5
86	M 35363	63	4.3	5	1.5
87	M 35067	64	4.3	5	2
88	M 406-14-2	58	4.3	5	5
89	M 36483	53	4.4	3	3
90	M 35006	66	4.4	5	2

S.No.	Entry	Days to 50% flowering	Mean percent* Honey dew	Mean percent* Sclerotia	Rust**
91	M 36304	61	4.4	3	1.5
92	M 36012	73	4.4	8	2
93	M 36378	61	4.4	5	2
94	M 36424	66	4.4	5	4
95	M 35013	64	4.5	3	1.5
96	M 35033	60	4.5	8	2
97	M 35366	60	4.5	5	1.5
98	M 36454	62	4.5	5	2
99	M 36546	65	4.5	8	1.5
100	M 3939	56	4.5	5	1.5
101	M 36458	66	4.5	2	2
102	M 36368	67	4.5	3	1.5
103	M 36636	66	4.6	3	1.5
104	M 36311	63	4.6	3	3
105	M 5673	52	4.6	1	1.5
106	M 4043-1	53	4.6	3	3
107	M 35208	60	4.6	5	4
108	M 36629	63	4.6	3	3
109	M 36115	65	4.6	5	3.5
110	M 3233	66	4.6	8	2
111	M 35036	54	4.7	5	2.5
112	M 36369	62	4.7	3	1
113	M 36032	70	4.7	5	2
114	M 35009	65	4.7	5	2
115	M 36205	65	4.7	5	4.5
116	M 36175	60	4.8	10	3
117	M 36277	62	4.8	5	2
118	M 35200	56	4.8	5	3
119	M 35184	62	4.8	5	3
120	M 36287	65	4.8	5	1.5

S.No.	Entry	Days to 50% flowering	Mean percent* Honey dew	Mean percent* Sclerotia	Rust**
121	M 36234	71	4.9	5	2
122	M 36003	67	4.9	8	1.5
123	M 35133	56	4.9	5	2
124	M 36273	63	4.9	3	2
125	M 36337	62	4.9	3	2.5
126	M 5361	50	4.9	5	2
127	M 4337	58	5	5	2.5
128	M 4397-3	52	5	3	2
129	M 36155	54	5	5	3
130	M 405-17	55	5	3	1.5
131	M 36162	65	5	5	1.5
132	M 36199	63	5	10	3
133	M 36515	64	5	8	1.5
134	M 35046	60	5	5	2.5
135	M 36250	71	5	5	2
136	M 36135	67	5.1	8	1.5
137	M 36473	65	5.1	3	2
138	M 36465	65	5.1	5	2
139	M 2201	65	5.1	5	1.5
140	M 3217	62	5.1	2	1.5
141	M 407-15	60	5.1	8	1.5
142	M 36471	66	5.2	5	1
143	M 36024	63	5.2	8	2
144	M 6569	59	5.2	3	2
145	M 36086	60	5.2	5	1.5
146	M 35024	62	5.3	5	1.5
147	M 36397	56	5.3	3	4
148	M 36590	63	5.3	5	2
149	M 36206	67	5.3	8	4
150	M 407-9-1	58	5.4	8	2

S.No.	Entry	Days to 50% flowering	Mean percent* Honey dew	Mean percent* Sclerotia	Rust**
151	M 36463	62	5.4	3	2.5
152	M 36182	67	5.4	5	3
153	M 36189	60	5.4	5	3
154	M 35066	61	5.4	5	3
155	M 36037	62	5.5	5	1.5
156	M 3549	60	5.5	3	1.5
157	M 36392	52	5.5	5	3
158	M 35003	65	5.5	5	1.5
159	M 35181	61	5.6	12	4
160	M 36290	65	5.6	3	3
161	M 36589	62	5.6	3	3
162	M 3847	52	5.6	8	4
163	M 2613	59	5.6	3	2
164	M 36270	75	5.6	5	3.5
165	M 36412	65	5.6	8	3
166	M 35191	60	5.7	8	2
167	M 35162	62	5.7	8	1.5
168	M 36130	63	5.7	5	2.5
169	M 2257	56	5.8	3	2
170	M 36359	69	5.8	8	3
171	M 6885	60	5.8	6	2.5
172	M 35195	56	5.8	8	3.5
173	M 36105	67	5.8	8	2
174	M 36433	56	5.8	5	3
175	M 36402	66	5.8	5	3
176	M 36001	65	5.8	8	2.5
177	M 35025	62	5.8	5	3
178	M 35002	66	5.9	8	2
179	M 35127	64	5.9	8	2
180	M 35043	55	5.9	5	2.5

S.No.	Entry	Days to 50% flowering	Mean percent* Honey dew	Mean percent* Sclerotia	Rust**
181	M 35116	59	5.9	5	3
182	M 35142	50	5.9	5	3
183	M 36285	63	6	3	2
184	M 36509	66	6	8	1.5
185	M 35041	59	6	5	2
186	M 36348	56	6	5	2.5
187	M 36544	67	6.1	8	2
188	M 35217	56	6.1	5	3
189	M 36054	74	6.1	5	1.5
190	M 35170	60	6.1	5	2
191	M 36432	53	6.2	5	3
192	M 36149	54	6.2	5	3
193	M 423-23-2	63	6.2	10	1
194	M 36242	60	6.2	5	3
195	M 36140	60	6.2	5	3
196	M 35132	56	6.2	5	2
197	M 36048	65	6.2	8	2
198	M 36384	69	6.2	3	3
199	M 36203	63	6.2	5	2
200	M 36047	66	6.2	5	2
201	M 36343	61	6.2	8	2
202	M 36079	63	6.3	10	2
203	M 36309	60	6.3	3	1.5
204	M 36122	64	6.3	3	1.5
205	M 36026	65	6.3	5	3
206	M 36444	62	6.3	5	2
207	M 36380	66	6.3	5	3
208	M 36200	65	6.3	5	1.5
209	M 4043-3	60	6.3	3	2
210	M 36072	55	6.3	5	2.5

S.No.	Entry	Days to 50% flowering	Mean percent* Honey dew	Mean percent* Sclerotia	Rust**
211	M 36055	68	6.3	5	3.5
212	M 36131	62	6.4	5	2
213	M 36339	66	6.4	3	2
214	M 35111	62	6.4	5	2
215	M 36096	60	6.4	3	1.5
216	M 35109	60	6.4	8	1.5
217	M 34356	63	6.4	10	2.5
218	M 35163	56	6.4	10	2.5
219	M 36346	67	6.5	8	1.5
220	M 36091	65	6.5	10	1.5
221	M 36624	66	6.5	3	2
222	M 36186	54	6.5	5	3
223	M 6845-2	59	6.5	2	2
224	M 36496	64	6.5	10	1.5
225	M 35005	60	6.5	8	2
226	M 36177	53	6.5	5	2
227	M 4159	53	6.6	10	5
228	M 36222	66	6.6	8	1.5
229	M 36472	65	6.6	10	3
230	M 36494	62	6.7	5	3
231	M 36545	60	6.7	5	2
232	M 36341	63	6.7	8	3
233	M 35166	62	6.7	8	2
234	M 35038	55	6.7	8	1.5
235	M 36620	60	6.8	8	2
236	M 36376	60	6.8	5	3.5
237	M 2893	61	6.8	5	3
238	M 36562	59	6.8	8	3
239	M 35114	59	6.8	5	3
240	M 36204	63	6.9	8	1.5

S.No.	Entry	Days to 50% flowering	Mean percent* Honey dew	Mean percent* Sclerotia	Rust**
241	M 36040	61	6.9	10	2
242	M 36499	63	6.9	10	2
243	M 36430	61	6.9	8	3
244	M 36415	66	6.9	5	3
245	M 36251	62	6.9	8	3
246	M 4337-2	58	6.9	2	3
247	M 36548	63	6.9	5	1.5
248	M 36487	56	7	3	3
249	M 36261	52	7	5	3
250	M 2849	63	7	3	2
251	M 36466	61	7.1	5	1
252	M 36477	62	7.1	5	2
253	M 434-1	59	7.1	5	2
254	M 36374	65	7.1	5	3
255	M 36634	71	7.2	5	1.5
256	M 36146	54	7.2	3	3
257	M 36062	60	7.2	8	1.5
258	M 35054	60	7.2	5	3
259	M 36370	59	7.3	5	3
260	M 36071	60	7.3	10	1.5
261	M 36373	66	7.3	3	1
262	M 35039	54	7.3	5	1.5
263	M 36452	62	7.3	8	3
264	M 3569	56	7.3	5	1
265	M 425-19-1	60	7.3	10	4
266	M 36307	63	7.3	5	1.5
267	M 36125	62	7.3	5	3
268	M 35086	60	7.4	5	1.5
269	M 35017	56	7.4	5	2
270	M 35091	54	7.4	8	2

S.No.	Entry	Days to 50% flowering	Mean percent* Honey dew	Mean percent* Sclerotia	Rust**
271	M 36631	60	7.4	5	1.5
272	M 36083	60	7.4	8	2
273	M P-4-8	59	7.5	3	2.5
274	M 36132	64	7.5	3	1.5
275	M 2305	60	7.5	3	3
276	M 2613-1	56	7.5	3	2
277	M 425-19-3	53	7.5	5	2
278	M 36413	61	7.6	10	3
279	M 36120	63	7.6	8	3
280	M 36164	66	7.6	8	2
281	M 36034	67	7.6	5	1.5
282	M 35035	62	7.6	8	1.5
283	M 411-1	60	7.6	3	1.5
284	M 36120	56	7.6	10	3
285	M 35144	60	7.6	12	2.5
286	M 5509	59	7.7	5	2
287	M 36066	62	7.7	5	2.5
288	M 36061	60	7.7	8	1.5
289	M 36456	62	7.8	5	2
290	M 36393	60	7.8	8	3
291	M 36535	60	7.8	5	1.5
292	M 35059	62	7.8	8	1.5
293	M 36582	60	7.9	5	1.5
294	M 36081	65	7.9	10	2
295	M 36244	52	7.9	5	3
296	M 36100	61	8	8	1.5
297	M 36302	62	8	8	2
298	M 35194	56	8	5	2.5
299	M 36060	60	8	5	2
300	M 35180	62	8	8	3

S.No.	Entry	Days to 50% flowering	Mean percent* Honey dew	Mean percent* Sclerotia	Rust**
301	M 2561	55	8	10	1.5
302	M 35214	59	8.1	8	4
303	M 35135	62	8.1	8	2
304	M 36327	62	8.1	5	1.5
305	M 36108	60	8.2	12	1.5
306	M 36652	62	8.2	10	3
307	M 35099	60	8.2	8	1.5
308	M 36114	66	8.2	8	3
309	M 36142	60	8.2	10	3
310	M 36193	56	8.2	5	3
311	M 36630	64	8.2	3	3
312	M 35094	65	8.2	8	2
313	M 36095	70	8.3	8	1.5
314	M 35020	64	8.3	8	1.5
315	M 36045	61	8.3	5	1.5
316	M 36493	65	8.3	8	3
317	M 36506	60	8.4	5	1.5
318	M 36078	59	8.4	8	3
319	M 35008	64	8.4	5	2
320	M 36498	64	8.5	5	2
321	M 35125	60	8.5	8	1.5
322	M 35051	60	8.5	8	1.5
323	M 36446	63	8.5	5	2
324	M 36561	62	8.5	5	2.5
325	M 36284	66	8.5	8	2
326	M 36381	63	8.5	5	1.5
327	M 35152	62	8.5	10	2.5
328	M 36159	54	8.5	8	3.5
329	M 36478	56	8.5	8	3
330	M 36050	62	8.5	5	2

S.No.	Entry	Days to 50% flowering	Mean percent* Honey dew	Mean percent* Sclerotia	Rust**
331	M 36633	56	8.5	8	1.5
332	M 36335	60	8.6	8	2.5
333	M 36344	73	8.7	10	3
334	M 35145	60	8.7	8	3.5
335	M 36455	64	8.8	5	2
336	M 36490	64	8.8	5	2
337	M 36575	64	8.8	10	1.5
338	M 35213	59	9	5	4
339	M 35228	65	9	10	3
340	M 36216	60	9	12	1.5
341	M 36654	56	9	10	3
342	M 35023	60	9	8	3
343	M 7093	66	9	10	2
344	M 5417	61	9	3	2
345	M 36305	65	9	8	1.5
346	M 35064	62	9	5	1.5
347	M 35102	61	9	12	2
348	M 4397-2	56	9	15	3
349	M 35121	60	9	10	1.5
350	M 36220	66	9.2	10	1.5
351	M 35094	62	9.2	5	3
352	M 36354	60	9.2	8	1.5
353	M 2929	60	9.2	3	1.5
354	M 36365	59	9.2	5	3
255	M 2461-1	58	9.2	3	2
356	M 36655	60	9.2	8	4
357	M 36470	64	9.2	10	3
358	M 35089	60	9.3	8	2
359	M 35227	61	9.3	10	4
360	M 36039	63	9.5	5	2

S.No.	Entry	Days to 50% flowering	Mean percent* Honey dew	Mean percent* Sclerotia	Rust**
361	M 36644	54	9.5	5	3
362	M 35075	62	9.5	10	1.5
363	M 36350	60	9.5	8	3
364	M 36522	60	9.5	8	3
365	M 36485	60	9.5	5	2
366	M 35053	53	9.5	5	1.5
367	M 448-15	50	9.5	10	2
368	M 36382	56	9.5	8	4
369	M 35054	62	9.6	5	2.5
370	M 36181	60	9.6	8	3
371	M 35113	60	9.6	15	2
372	M 36292	67	9.7	8	2
373	M 36329	62	9.7	5	2
374	M 36070	60	9.7	6	3
375	M 36253	60	9.7	5	3.5
376	M 36429	60	9.8	12	4
377	M 35047	67	9.8	8	1.5
378	M 36145	67	9.8	5	3
379	M 36133	53	9.8	5	4
380	M 36565	63	9.8	8	3
381	M 36080	62	9.8	5	3
382	M 36336	64	9.8	8	2
383	M 405-27	52	9.8	15	5
384	M 36074	6	9.9	5	3
385	M 36403	60	9.9	8	2
386	M 36172	62	9.9	8	3.5
387	M 35055	60	9.9	8	1.5
388	M 36345	64	9.9	8	2
389	M 36281	65	10.	8	1.5
390	M 36075	60	10.	5	3

S.No.	Entry	Days to 50% flowering	Mean percent* Honey dew	Mean percent* Sclerotia	Rust**
391	M 36121	65	10.	8	2
392	M 36379	63	10.	8	3
393	M 36474	60	10.	3	3
394	M 36274	63	10.	5	2
395	M 3145	64	10.	10	3
396	M 36468	63	10.	8	2
397	M 36272	62	10.	8	2
398	M 36147	54	10.1	5	3
399	M 457-8-3	54	10.1	20	5
400	M 36533	64	10.1	15	2
401	M 35032	60	10.2	12	1.5
402	M 35088	60	10.3	5	2.5
403	M 36161	60	10.3	8	2
404	M 35175	59	10.3	5	2
405	M 35186	60	10.3	5	4
406	M 448-15	56	10.4	10	5
407	M 36461	61	10.4	10	2.5
408	M 36492	63	10.4	8	4
409	M 35045	59	10.5	10	1.5
410	M 457-8-1	59	10.5	8	2.4
411	M 35103	56	10.5	10	1.5
412	M 36280	62	10.5	5	1.5
413	M 35138	56	10.5	5	4
414	M 35044	60	10.5	8	2
415	M 35148	55	10.5	8	1.5
416	M 36462	60	10.6	5	1.5
417	M 35057	60	10.6	5	2
418	M 35073	63	10.6	10	3
419	M 36126	59	10.6	8	3
420	M 36322	66	10.6	10	1.5

S.No.	Entry	Days to 50% flowering	Mean percent* Honey dew	Mean percent* Sclerotia	Rust**
421	M 36357	64	10.6	8	1
422	M 4347	60	10.7	6	3
423	M 36127	60	10.7	5	3
424	M 36573	65	10.8	8	2.5
425	M 36176	64	10.9	5	4
426	M 36029	66	11	5	2
427	M 36053	61	11.	15	2
428	M 35174	61	11	12	3
429	M 36372	62	11	15	4
430	M 36536	65	11.	5	1.5
431	M 36119	60	11.	5	3
432	M 36264	53	11.	5	3
433	M 35139	55	11.1	10	3
434	M 35081	63	11.3	10	2
435	M 36170	60	11.3	8	3.5
436	M 36619	59	11.3	10	1
437	M 35201	56	11.4	5	3.5
438	M 36469	60	11.4	12	2
439	M 410-30	65	11.5	5	3
440	M 35141	60	11.5	12	2
441	M 424-23-3	63	11.5	3	2
442	M 35040	60	11.5	12	2
443	M 36411	53	11.5	5	4
444	M 36352	60	11.5	5	3.5
445	M 36143	56	11.5	5	3.5
446	M 3145-1	62	11.5	5	2
447	M 4043-2	52	11.5	5	3
448	M 35011	60	11.5	30	2
449	M 36422	60	11.5	8	3.5
450	M 36137	64	11.5	15	3

S.No.	Entry	Days to 50% flowering	Mean percent* Honey dew	Mean percent* Sclerotia	Rust**
451	M 36178	53	11.5	5	4
452	M 36160	66	11.5	8	3
453	M 35021	60	11.5	5	2
454	M 36247	56	11.5	5	3
455	M 437-8-1	62	11.5	10	1.5
456	M 36489	60	11.6	10	1.5
457	M 36317	60	11.6	5	3
458	M 36576	60	11.7	5	1.5
459	M 36558	59	11.7	12	1.5
460	M 36537	60	11.7	10	1.5
461	M 36065	65	11.7	15	2
462	M 35026	60	11.8	8	3
463	M 36116	61	11.9	8	3
464	M 36188	62	11.9	10	2
465	M 36113	59	12	5	2
466	M 35022	54	12	8	2
467	M 36300	59	12	8	1.5
468	M 36088	62	12	5	2
469	M 36257	64	12	8	4
470	M 36043	62	12.	15	2
471	M 35049	56	12	8	2
472	M 36169	61	12	10	3.5
473	M 4129	56	12	6	1
474	M 36445	63	12.	20	1.5
475	M 36224	59	12.	12	3
476	M 36265	56	12.	5	3
477	M 2493	55	12.	5	3
478	M 36248	56	12.	5	2
479	M 36198	53	12	8	1.5
480	M 36138	55	12	5	1.5

S.No.	Entry	Days to 50% flowering	Mean percent* Honey dew	Mean percent* Sclerotia	Rust**
481	M 36553	62	12.2	10.	2
482	M 35060	60	12.2	8	2
483	M 35058	60	12.3	12	2
484	M 35020-1	60	12.3	8	2.5
485	M 35020-2	62	12.4	12	2
486	M 2089	60	12.4	10	2
487	M 36567	56	12.5	8	1.5
488	M 36121	67	12.5	8	2
489	M 35072	62	12.5	15	1.5
490	M 35100	60	12.5	10	1.5
491	M 36215	61	12.5	8	2
492	M 35083	60	12.5	15	2.5
493	M 457-8-2	56	12.5	5	5
494	M 36355	64	12.5	10	2
495	M 35136	55	12.7	5	4
496	M 36315	60	12.8	15	2
497	M 36294	60	12.9	8	1.5
498	M 36476	67	12.9	8	1.5
499	M 35015	65	12.9	8	2
500	M 35050	60	13.	8	3
501	M 36046	64	13.	10	1.5
502	M 36031	62	13.	12	2
503	M 36418	67	13.	10	2
504	M 36069	56	13.	10.	3
505	M 36653	62	13.	12.	3
506	M 35078	62	13.	12.	3
507	M 36486	56	13	10.	2
508	M 36426	69	13.	10	3.5
509	M 36398	63	13.3	10.	4
510	M 35157	60	13.3	8	3

S.No.	Entry	Days to 50% flowering	Mean percent* Honey dew	Mean percent* Sclerotia	Rust**
511	M 35095	60	13.3	15	2.5
512	M 36547	60	13.3	5	1.5
513	M 36291	62	13.4	8	2
514	M 36214	56	13.5	12	2
515	M 36089	65	13.5	10	2
516	M 36064	56	13.5	5	3
517	M 36112	63	13.5	8	2.5
518	M 35030	60	13.5	8	3.5
519	M 35048	59	13.5	12	2.5
520	M 35110	56	13.5	5	2
521	M 36648	60	13.5	20	4
522	M 36479	62	13.5	8	2
523	M 36068	60	13.5	8	2
524	M 36258	62	13.6	8	2
525	M 36338	64	14	12	3
526	M 36041	56	14	10	3
527	M 36425	60	14	10	3
528	M 35171	60	14	10	4
529	M 36051	64	14	20	1.5
530	M 36225	56	14.	8	4
531	M 36391	56	14.	5	2.5
532	M 36417	62	14	8	1.5
533	M 36420	63	14.	15	4
534	M 36514	60	14.	10	2
535	M 36226	56	14.1	8	3
536	M 36491	64	14.1	5	2
537	M 36410	60	14.1	8	1.5
538	M 5801	60	14.2	15	4
539	M 35028	63	14.2	15	1.5
540	M 36271	71	14.3	30	3.5

S.No.	Entry	Days to 50% flowering	Mean percent* Honey dew	Mean percent* Sclerotia	Rust**
541	M 36320	61	14.3	15	1.5
542	M 4693	52	14.5	5	2.5
543	M 36559	56	14.5	5	4
544	M 35077	60	14.5	8	2
545	M 36180	64	14.5	15	1.5
546	M 36201	66	14.5	18	1.5
547	M 36383	66	14.7	15	3
548	M 36303	59	14.8	5	1.5
549	M 35274	59	14.8	30	2
550	M 475-29	55	15.	10	3.5
551	M 36574	60	15.	10	2
552	M 35062	60	15	8	2.5
553	M 36103	63	15.	10	2
554	M 36482	52	15.	10	4
555	M 35096	63	15	5	2
556	M 36237	60	15.1	25	3.5
557	M 36267	61	15.1	25	2
558	M 36475	65	15.3	12	2.5
559	M 36349	63	15.5	20	2
560	M 36646	60	15.5	8	3
561	M 36447	59	15.5	10	5
562	M 35105	56	15.5	8	2
563	M 36333	60	15.5	10	2
564	M 36467	62	15.8	10	3
565	M 35205	59	15.8	8	4
566	M 36507	60	16	12	1.5
567	M 36073	62	16.	15	2
568	M 36171	60	16.2	5	3
569	M 36009	62	16.2	18	4
570	M 36362	56	16.2	5	3

S.No.	Entry	Days to 50% flowering	Mean percent* Honey dew	Mean percent* Sclerotia	Rust**
571	M 35159	61	16.3	8	2
572	M 35203	56	16.3	8	3.5
573	M 36427	63	16.5	25	3
574	M 36396	63	16.5	15	1
575	M 35122	60	16.5	15	3
576	M 36593	56	16.5	8	3
577	M 36394	60	16.5	10	2.5
578	M 36235	56	16.6	3	4
579	M 35151	63	16.6	20	4
580	M 2269	59	17	10	2
581	M 35004	58	17.	15	2.5
582	M 35124	60	17.	10	1.5
583	M 36124	60	17	8	2
584	M 36035	56	17.	15	3
585	M 36269	61	17.2	15	3
586	M 36404	62	17.3	10	2
587	M 36025	60	17.5	12	3
588	M 36042	60	17.5	20	2
589	M 3113	56	17.5	15	3
590	M 36312	53	17.7	8	2.5
591	M 36082	56	17.8	25	2
592	M 36407	64	17.8	8	2
593	M 36421	63	17.9	5	2
594	M 36254	56	18.	5	3
595	M 36183	56	18.	15	3
596	M 35106	49	18.9	25	3
597	M 36263	59	19.	15	3
598	M 36401	62	19.	20	3.5
599	M 35212	60	19	20	2
600	M 35155	60	19.	20	3

S.No.	Entry	Days to 50% flowering	Mean percent* Honey dew	Mean percent* Sclerotia	Rust**
601	M 36428	62	19	15	2
602	M 35118	52	19.5	15	3
603	M 36136	56	19.5	15	2.5
604	M 36342	60	19.5	15	2.5
605	M 2101	54	19.6	50	1.5
606	M 36395	66	20.	20	1.5
607	M 36267	60	20.5	18	4
608	M 36208	62	20.5	15	3.5
609	M 36650	62	20.5	12	3
610	M 36328	60	21.	20	1.5
611	M 35076	62	21.	20	1.5
612	M 35134	55	21.1	18	2.5
613	M 35093	61	21.6	20	1.5
614	M 36211	62	21.7	20	1.5
615	M 36540	62	22	25	1.5
616	M 36059	53	22	15	1.5
617	M 36321	60	22.5	12	2
618	M 36409	60	22.5	20	2
619	M 36416	63	23	25	2
620	M 36154	63	23.5	20	3.5
621	M 6733	60	23.8	15	2
622	M 36141	56	25	20	4
623	M 36542	60	25	10	3
624	M 36129	67	25.5	30	1.5
625	M 36334	59	27.5	12	2
626	M 36484	61	27.5	30	2
627	M 36123	56	27.5	8	3
628	M 36497	56	28	25	3
629	M 36570	56	28.5	25	1.5
630	M 36152	52	28.5	15	2

S.No.	Entry	Days to 50% flowering	Mean percent* Honey dew	Mean percent* Sclerotia	Rust**
631	M 36325	61	29.5	15	1.5
632	M 36316	59	29.5	18	2
633	M 36232	56	30	8	3
634	M 36240	60	31.5	12	3.5
635	M 3833	52	32	30	2
636	M 36238	54	34.7	15	2
637	M 36539	56	36.5	30	3
638	M 35063	60	38	30	3
639	M 6845-1	62	41.5	60	2.5
640	M 36021	63	41.5	25	2
641	M 35167	60	43.5	15	2
642	M 35222	59	45	25	3
643	M 35143	56	47.5	25	3
644	M 36209	56	49	15	1.5
645	M 4129-2	56	49.5	25	2
646	M 36148	53	50.5	15	3
647	M 35211	56	53.	25	3.5
648	M 36388	56	60.	35	3
649	M 36033	56	62.2	50	3
650	M 36414	56	64.5	20	3.5
651	M 36212	63	96.5	60	3.5

* Average of 10 inoculated panicles in a single row

** Rust score on 1-5 scale where 1=no infection, 5=severe rust infection

APPENDIX VII

Ergot reactions and days to 50% flowering of sorghum germplasm lines screened during the 1978 late rainy season at ICRISAT Center.

S.No.	Entry	Days to 50% flowering	Mean percent* Honey dew	Mean percent* Sclerotia	Rust**
1	IS 956	53	1	1	2.5
2	IS 6759	66	1	2	2
3	IS 6991	53	1.3	2	3.5
4	IS 2465	50	1.5	2	2.5
5	IS 7438	67	1.5	2	3
6	IS 2782	74	1.8	2	3
7	IS 3938	49	1.8	3	3
8	IS 9180	49	2	3	4
9	IS 2468	54	2.1	3	4
10	IS 7821	63	2.1	1	1.5
11	IS 9784	54	2.2	2	1.5
12	IS 1107	51	2.2	3	1.5
13	IS 8980	65	2.4	2	2.5
14	IS 7561	66	2.5	2	1.5
15	IS 7555	68	2.6	3	2
16	IS 7856	75	2.6	3	1.5
17	IS 9676	55	2.7	5	2.5
18	IS 3495	53	2.7	5	3.5
19	IS 7830	71	2.8	2	2
20	IS 8585	53	2.9	5	4
21	IS 7390	66	3.1	5	3.5
22	IS 9737	54	3.2	5	4
23	IS 2007	60	3.3	5	1.5
24	IS 7565	71	3.4	5	2
25	IS 8971	63	3.4	3	3.5
26	IS 9674	54	3.5	5	2.5
27	IS 29	66	3.5	5	3
28	IS 2824	53	3.5	5	1.5
29	IS 30	71	3.6	6	2
30	IS 8243	68	3.6	2	3

S.No.	Entry	Days to 50% flowering	Mean percent* Honey dew	Mean percent* Sclerotia	Rust**
31	IS 7359	66	3.6	5	3
32	IS 7081	60	3.7	3	2
33	IS 8016	64	3.7	5	2.5
34	IS 7579	50	3.7	5	2.5
35	IS 7984	56	3.8	5	3
36	IS 7791	66	3.8	3	2.5
37	IS 7927	64	4	5	3
38	IS 9899	54	4	5	2
39	IS 6958	53	4	5	1.5
40	IS 7563	64	4	3	1.5
41	IS 2223	60	4	5	3.5
42	IS 8283	56	4	3	1.5
43	IS 7535	74	4.2	3	2
44	IS 1195	54	4.2	3	4.5
45	IS 9664	50	4.2	5	4
46	IS 887	53	4.3	5	3
47	IS 7590	74	4.3	5	1.5
48	IS 889	53	4.3	5	2
49	IS 10803	69	4.4	5	2
50	IS 21	65	4.4	8	2.5
51	IS 2455	59	4.4	3	3.5
52	IS 6827	64	4.4	5	2.5
53	IS 7080	58	4.5	5	4
54	IS 3443	52	4.6	3	1.5
55	IS 5168	70	4.7	5	2.5
56	IS 10333	70	4.7	10	2.5
57	IS 2550	56	4.7	3	1.5
58	IS 3744	56	4.8	5	2
59	IS 9672	54	4.8	5	1.5
60	IS 8169	56	4.8	5	1.5

S.No.	Entry	Days to 50% flowering	Mean percent* Honey dew	Mean percent* Sclerotia	Rust**
61	IS 7023	60	4.9	5	2.5
62	IS 7909	64	5	8	3.5
63	IS 928	60	5	6	2.5
64	IS 6891	56	5.1	5	2
65	IS 7860	75	5.2	3	2
66	IS 5157	62	5.2	5	4
67	IS 2871	63	5.2	8	1.5
68	IS 7673	74	5.3	3	2
69	IS 10576	68	5.3	20	3
70	IS 2217	55	5.3	5	2.5
71	IS 9091	64	5.4	5	3
72	IS 8724	63	5.5	5	2.5
73	IS 7378	66	5.5	3	2.5
74	IS 8110	51	5.6	8	4
75	IS 399	71	5.7	15	2
76	IS 9836	55	5.8	15	1.5
77	IS 7775	50	5.9	5	2
78	IS 13	64	6.3	12	2.5
79	IS 10422	62	6.3	8	2
80	IS 10731	56	6.4	8	1.5
81	IS 10726	62	6.5	5	2
82	IS 8778	60	6.5	10	3
83	IS 9695	51	6.5	8	3
84	IS 6965	56	6.5	8	3
85	IS 10440	67	6.6	8	3.5
86	IS 6822	63	6.6	10	2.5
87	IS 2212	56	6.6	5	2
88	IS 3911	56	6.7	5	1.5
89	IS 938	62	6.8	8	1.5
90	IS 8930	65	6.8	8	3

S.No.	Entry	Days to 50% flowering	Mean percent* Honey dew	Mean percent* Sclerotia	Rust**
91	IS 2594	56	6.9	3	3.5
92	IS 9677	56	6.9	8	2
93	IS 5623	73	7.	10	4
94	IS 10507	56	7	8	4
95	IS 15779	56	7	10	2.5
96	IS 8609	63	7.	8	3
97	IS 7786	63	7	10	2
98	IS 2862	53	7.1	10	2
99	IS 8935	63	7.2	8	4
100	IS 15646	55	7.2	10	3
101	IS 8886	68	7.2	15	3
102	IS 2058	69	7.4	10	2.5
103	IS 5759	55	7.5	8	3
104	IS 10644	60	7.5	15	2.5
105	IS 10634	51	7.5	12	3
106	IS 7978	59	7.5	12	2
107	IS 8284	64	7.6	5	2.5
108	IS 454	54	7.7	5	1.5
109	IS 2446	71	7.7	10	3
110	IS 5	62	7.8	10	2.5
111	IS 2045	53	7.8	5	2
112	IS 7350	51	8	12	2
113	IS 8306	55	8.1	10	2
114	IS 7952	56	8.3	12	2.5
115	IS 8607	63	8.3	5	2.5
116	IS 8702	59	8.4	15	2.5
117	IS 10404	61	8.5	15	3
118	IS 10370	60	8.9	8	4
119	IS 10499	56	9	10	3.5
120	IS 4342	51	9	8	3.5

S.No.	Entry	Days to 50% flowering	Mean percent* Honey dew	Mean percent* Sclerotia	Rust**
121	IS 10250	61	9.3	15	2.5
122	IS 3797	56	9.3	8	2
123	IS 2010	48	9.4	8	3.5
124	IS 9835	55	9.5	12	1.5
125	IS 3872	52	9.5	8	2
126	IS 2351	53	9.5	5	2
127	IS 142	60	9.8	20	5
128	IS 2021	56	10	15	4
129	IS 3679	51	10	8	1.5
130	IS 4586	62	10.1	5	4
131	IS 4150	62	10.1	20	3.5
132	IS 9626	60	10.5	12	3.5
133	IS 10473	60	10.5	15	2.5
134	IS 9607	56	10.5	12	1.5
135	IS 6705	55	10.5	15	3.5
136	IS 2670	63	10.7	8	2
137	IS 1220	56	10.7	10	2
138	IS 8936	64	10.9	12	4
139	IS 3786	62	11.	8	2
140	IS 2175	56	11.4	15	1.5
141	IS 1456	60	11.5	10	4.5
142	IS 8160	60	11.5	12	1.5
143	IS 7386	66	11.8	10	3
144	IS 7224	64	11.8	15	3.5
145	IS 6717	56	12	20	3.5
146	IS 10500	61	12.2	20	3
147	IS 5181	60	12.2	8	2
148	IS 6715	56	12.5	15	3.5
149	IS 2230	60	12.5	12	1.5
150	IS 3804	62	12.5	12	2.5

S.No.	Entry	Days to 50% flowering	Mean percent* Honey dew	Mean percent* Sclerotia	Rust**
151	IS 4890	64	12.5	20	5
152	IS 2227	60	13.	12	3
153	IS 10718	56	13	20	1.5
154	IS 8051	56	13	20	3.5
155	IS 6784	56	13	12	4
156	IS 3912	60	13.	15	2.5
157	IS 6248	60	13.5	15	2.5
158	IS 3967	60	13.5	15	2
159	IS 10636	55	13.5	15	3.5
160	IS 1258	59	13.5	10	4.5
161	IS 6908	56	14.	12	3.5
162	IS 2723	60	14.4	12	2.5
163	IS 5632	70	14.5	15	4
164	IS 3956	60	14.5	12	3
165	IS 8307	66	14.8	20	1.5
166	IS 10497	60	15	20	3.5
167	IS 519	60	15.	15	1.5
168	IS 10509	60	15.	25	3.5
169	IS 7584	60	15.2	20	3
170	IS 12427	54	15.3	12	5
171	IS 10418	63	15.5	20	3
172	IS 10400	56	15.5	20	4
173	IS 453	60	15.5	20	1.5
174	IS 5065	69	16.2	10	3
175	IS 10508	60	16.4	25	4
176	IS 1207	54	16.5	25	1.5
177	IS 9627	59	16.5	15	2.5
178	IS 6953	50	16.5	15	1.5
179	IS 2233	59	16.5	15	3
180	IS 4878	62	16.8	15	3

S.No.	Entry	Days to 50% flowering	Mean percent* Honey dew	Mean percent* Sclerotia	Rust**
181	IS 10733	54	17.5	20	5
182	IS 5237	64	17.5	20	4
183	IS 5726	56	17.6	15	2
184	IS 7783	56	18	18	3.5
185	IS 3959	63	18.2	22	1.5
186	IS 10302	60	18.2	25	2.5
187	IS 3309	65	18.3	15	3
188	IS 3957	60	18.3	12	2.5
189	IS 6449	69	18.5	25	3.5
190	IS 3958	60	19	18	2
191	IS 10510	60	19.	25	3.5
192	IS 4889	63	19.5	35	3.5
193	IS 5259	56	19.5	20	2.5
194	IS 2011	51	19.6	20	4
195	IS 1480	60	20	20	4
196	IS 5779	60	23.5	20	2.5
197	IS 7086	50	24.	25	2
198	IS 4057	51	24..	25	4
199	IS 8070	50	28.	25	3
200	IS 4050	50	30	25	4
201	IS 4671	59	31.5	25	3.5
202	IS 15341	54	36.8	25	2.5
203	IS 3931	59	50.5	60	3
204	IS 6027	49	63.5	80	4

* Mean percent spikelets infected in 10 inoculated panicles.

** Rust reaction was scored on a 1-5 scale, where 1=no infection and 5=severe rust infection.

NOTE TO THE READER

This is an informal report of work for June 1978-May 1979. This report is designed to stimulate thinking and comments from professional colleagues and is not to be considered as a formal publication bearing the endorsement of the Institute.