sub-apical in the resistant varieties except in Co 449 (Table 1). Apical germpore might perhaps make entry of the promycelium of smut spores adhering to buds.

The positive correlation between smut incidence, bud size and sprouting were significant (Table 2). Correlations were also found between internode borer incidence, bud sprouting and smut incidence. The sprouting observed during this investigation was due to attack by internode borer. This insect damage induced sprouting of buds immediately below the point of attack. The effect then appears to spread to all lower buds. The incidence of internode borer was higher in smut susceptible varieties. It was also evident that varieties with larger buds were more likely to sprout and contract smut infection. The percentage of sprouting in the varieties Co 449 and Co 658 were low, despite the high internode borer incidence. It could be due to smaller size buds. In general, varieties with triangular buds are susceptible to smut.

REFERENCES

APPALANARASIAH, P. (1961) Review of work on sugarcane smut, **Ind.J.Sug.Res. Dev., 7:** 34-40

FAWCETT, G.L. (1946) Departmento de Botanicay Fit opatologia. Ex Memoria annual del ano 1945 **Rev.Industr.Agric.Tucuman 36:** 165-166.

SINGH, K. and BUDHRAJA, T.R. (1964) The role of bud scales as barriers against smut infection **Proc.All. Ind.Conf.Sug.Res.Dev.Workers, Coimbatore 5:** 687-691.

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EFFECT OF INTERCROPPING OF BLACK GRAM GENOTYPES ON THE SEED COTTON YIELDS UNDER RAINFED VERTISOLS

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ABSTRACT

Field investigations were carried out at the Agricultural Research Station, Kovilpatti during 1990-91 and 1991-92 to find out the effect of intercropping of black gram genotypes on the yields of *Gossypium hirsutum* and *G.arboreum* cotton varieties *viz.*, MCU 10 and K 10 under rainfed vertisols. It was observed that cotton intercropped with black gram genotypes KBG 512 recorded a mean seed cotton yield of 602 kg/ha with MCU 10 and 1073 kg with K 10, respectively. Net monetary returns and LER were also higher when cotton was intercropped with black gram genotype KBG 512. The other black gram genotypes tested reduced the cotton yield in both the species of cotton varieties.

KEY WORDS : Black gram, Intercropping, Effect, Seed Cotton Yield

In the rainfed vertisols of southern districts of TamilNadu, cotton is one of the important cash crops grown by farmers, in an area of 1.5 lakh ha. Depending upon the receipt of monsoon rains and choice, farmers grow either *Gossypium hirsutum* or *G.arboreum* cotton species. Intercropping of cotton with pulses is a viable technology in drylands as it gives higher total productivity and income per unit area of land apart from improving soil fertility. Genetic nature of component crops grown plays an import role in the success of intercropping. Balasubramanian (1987) reported that black gram as the best pulse crop suitable for intercropping in *G.hirsutum* and *G.arboreum* cotton under rainfed conditions. Balasubramanian *et al.* (1994) also observed that black gram was the best suitable intercrop for combodia cotton. But intercropping of cotton with black gram can adversely affect the yield of cotton. On the contrary Bavale and Vyahalkar (1981) reported increased yields of cotton due to intercropping with black gram and green gram. Singh and Chauhan (1981) found no adverse effect on cotton yields due to mung intercropping which has dwarf and compact growth habit. Hence the present investigation was taken up to investigate the effect of black gram genotypes as intercrop on seed cotton yield

Table 1. Effect of intercropping of black gram genotypes on seed cotton yield, monetary returns and LER

Treatments	1991				1992				Two years mean			
	Yield (kg/ha)		Mone-tary return (Rs/ha)	LER	Yield (kg/ha)		Mone-tary return (Rs/ha)	LER	Yield (kg/ha)		Mone-tary return (Rs/ha)	LER
Cotton + black gram genotypes	Black gram	Cotton			Black gram	Cotton			Black gram	Cotton		
Experiment - I												
Cotton MCU 10 + KBG 512	308	926	10027	1.37	347	278	8703	1.42	528	602	6365	1.40
Cotton + Vamban 1	143	868	8379	1.27	158	223	1685	1.17	151	546	5032	1.22
Cotton + VB 3	133	839	8063	1.23	121	203	1868	1.20	127	521	4966	1.22
Cotton Pant U 30	149	608	6211	0.97	151	199	1299	1.12	150	404	3755	1.05
Cotton + Co BG 305	249	689	7600	1.09	58	211	1691	1.18	204	450	4646	1.14
Cotton + Co 5	241	724	7841	1.09	167	213	1627	1.16	204	469	4784	1.15
Cotton + KBG 368	208	781	8095	1.16	183	206	1572	1.15	196	494	4834	1.16
MCU 10 Cotton pure crop	-	910	7735	1.00	-	262	842	1.00	-	586	4288	1.00
SE_d	16	28	-	-	7	10	-	-	-	46	-	-
CD (P = 0.05)	47	86	-	-	21	31	-	-	-	155	-	-
Experiment - II												
Cotton K10 + KBG 512	282	1678	12881	1.36	342	467	5879	1.89	312	1073	9230	1.88
Cotton + Vamban 1	141	1591	11329	1.26	146	387	2692	1.17	144	989	7011	1.22
Cotton + VB 3	123	1533	10826	1.28	125	333	3069	1.21	124	933	6948	1.25
Cotton Pant U 30	132	1244	9010	1.16	125	325	2417	1.11	129	985	5714	1.14
Cotton + Co BG 305	259	1389	10842	1.17	121	314	2293	1.15	190	852	6568	1.15
Cotton + Co 5	229	1476	11197	1.21	129	375	2939	1.20	179	926	7068	1.21
Cotton + KBG 368	201	1505	11190	1.22	175	337	2921	1.19	188	921	7056	1.21
K 10 Cotton pure crop	-	1620	10530	1.00	-	430	2476	1.00	-	1025	6503	1.00
SE_d	11	60	-	-	5	24	-	-	-	50	-	-
CD (P = 0.05)	34	179	-	-	16	72	-	-	-	167	-	-

MATERIALS AND METHODS

Field experiments were conducted for two years *viz*., 1990-91 and 1991-92 at the Agricultural Research Station, Tamil Nadu Agricultural University Kovilpatti to identify the best black gram genotypes suitable for intercropping with *G.hirsutum* (MCU 10) and *G.arboreum* (K 10) cotton species during North East monsoon season under rainfed conditions. The soil was deep vertisols, texonomically classified as typic chromosterts having low available N,P and high available K with neutral soil reaction. Sowing was taken on 7.10.90 during 1990-91 and on 26.10.91 during 1991-92. The rainfall during 1990-91 was 450 mm (normal), whereas it was only 268 mm (35% deficit over normal) during 1991-92 crop period. Seven black gram genotypes *viz*., KBG 512, Vamban 1, VB 3, Pant U30, Co BG 305, Co 5 and KBG 368 were tested with MCU10 *(G.hirsutum)* and K.10 *(G.arboreum)* cotton as intercrops. Two experiments were conducted for the two cotton species separately in a randomised block design replicated thrice. Cotton was sown in paired rows with a spacing of 30/60 x 30 cm for MCU 10 30/60x15 cm for K 10. In the interspace, two rows of black gram genotypes were sown at 10cm plant to plant spacing. Recommended fertiliser schedule of 40:20 kg/ha N and P was given to cotton alone. Need based plant protection measures were adopted against the pests and diseases.

RESULTS AND DISCUSSION

The results (Table 1) revealed that seed cotton yield of both the cotton species was influenced by black gram intercropping. In the first year (1990-91), maximum seed cotton yield (926 kg/ha)

was obtained from MCU 10 when it was intercropped with black gram genotype KBG 512. However, it was on par with that of sole crop of MCU 10 cotton (910 kg/ha) and intercropped with Vamban.1 (868 kg/ha). Influence of black gram intercropping under K 10 cotton also indicated that KBG 512 genotype registered a maximum seed cotton yield of 1678 kg/ha followed by pure cotton 1620 kg/ha. The rest of the genotypes tried reduced the seed cotton yield in both the cotton species.

Regarding the black gram yield, KBG512 genotype recorded significantly higher yield of 308 kg/ha with MCU 10 and 282 kg/ha with K 10 cotton and it was found to be superior than the rest of the genotypes.

Economics worked out on net returns indicated that the black gram genotype KBG 512 with cotton (K 10) registered a higher net return of Rs.12881/ha whereas with MCU 10 cotton, it had given Rs.10027/ha. LER was also higher when KBG 512 was intercropped with MCU 10 and K 10 cotton.

During 1991-92, the withdrawal of North East monsoon was earlier besides there was a deficit of 35 per cent rainfall. As such the yield level of cotton was comparatively low during the year.

The influence of black gram genotypes on the yield of cotton under intercropping system showed that the seed cotton yield of MCU 10 was higher under KBG 512 and it was on par with the pure crop of cotton. With K 10 cotton also, black gram KBG 512 produced maximum seed cotton yield following the identical trend as observed in MCU 10 cotton.

The yield of black gram showed that even during low rainfall, KBG 512 performed better under intercropping situation. It had recorded a maximum grain yield of 347 kg/ha with MCU 10 and 342 kg/ha with K 10 cotton, respectively which were higher than that of the previous year when the rainfall was normal. Economics and LER worked out for 1991-92 also showed that cotton-black gram intercropping association with KBG 512 recorded higher net return and LER with both cotton species.

The pooled mean yield of cotton as well as the black gram and their economic returns evoked a similar trend of results. Growing black gram KBR 512 as intercrop registered a seed cotton yield of 602 kg in *G.hisutum* (MCU 10) and 1073 kg/ha in *G.arboreum* (K 10) cotton besides giving 328 and 321 kg of black gram. Mean net return of Rs.6365/ha with MCU 10 and Rs.9230/ha with K 10 cotton was obtained when KBG 512 was grown as intercrop.

KBG 512 possesses excellent genetic potential to produce higher grain yield under intercropping system particularly under deficit rainfall conditions. More over, the plant architecture was so compact that it does not compete with cotton for resources and found to be complementary in enhancing the yield of cotton. This is in confirmity with the findings of Singh and Chauhan (1981).

From the above, it can be concluded that black gram KBG 512 was the ideal genotype for intercropping with the cotton *G.hirsutum*(MCU10) and *G.arboreum* (K 10) since it has performed well under normal as well as deficit rainfall conditions. The same genotype was released as K 1 black gram by Tamil Nadu Agricultural University during 1994.

REFERENCES

BALASUBRAMANIAN, T .N. (1987) Performance of *arboreum* and *hirsutum* cotton under intercropping (Black gram) and land management practices. Ph.D. Thesis, Tamil Nadu Agricultural University, Coimbatore, India.

BALASUBRAMANIAN, R., KRISHNASAMY, .S MANO HARAN, S. and VELAYUTHAM, A. (1994). Studies on intercropping of pulses in summer cambodia cotton. **Madras agric.J.,81:** 342-344.

BAVALE,B.L. and VYAHALKAR, G.R. (1981) Studies on planting pattern, intercropping and nitrogen economy in NHH1 (Godavari) hybrid cotton under rainfed condition. **Cotton Dev.,11:**1-3.

SINGH, V. and CHAUHAN, P.S. (1981) Companion cropping in rainfed hybrid cotton. **Indian J.Agron.,26:**450-451.

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