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Genotype Studies at ICRISAT

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Abstract

Genotype experiments carried out at ICRISAT Center during 1976–78 are described. A sorghum/pigeonpea experiment in 1977 examined 17 genotypes of pigeonpea with a standard sorghum genotype. Sorghum produced yields ranging from 82 to 99% of the sole-crop yield, but no differences were significant. The pigeonpea genotypes achieved yields ranging from 36 to 73% of their sole-crop yields, giving total land equivalent ratios (LERs) up to 1.66. Although absolute pigeonpea yields in intercropping were obviously dependent to some extent on sole-crop yields, this dependency only accounted for 40% of the variability in intercrop yields. There were indications that the most suitable pigeonpea plant type had a reasonably compact growth in the early stages to avoid competition from the sorghum but a spreading habit later to utilize resources after sorghum harvest.

In two experiments, three millet genotypes were examined in all combinations with four groundnut genotypes. The first experiment was a split-plot design with millet genotypes in the main plots; the second was a strip-plot design. Yield advantages up to 25–30% were achieved. It was concluded that the magnitude of the yield advantage was mainly determined by the groundnut genotype, whereas the proportion of groundnut yield to millet yield was mainly determined by the millet genotype.

Three sorghum/millet genotype experiments are described. The first was an unreplicated experiment in which 48 genotypes of pearl millet were grown with a standard sorghum genotype. Correlations between yield advantage and a range of millet plant characters did little to help identify which characters were most desirable in intercropping. Two later experiments examined four sorghum genotypes in combination with four millet genotypes. Yield advantages ranged up to just over 30%. These were considered to be very large advantages for two such similar crops; this combination is particularly worthy of further study.

Genotype Identification

It has frequently been stressed that identification of suitable genotypes is likely to be one of the major ways in which intercropping performance can be improved. There have been attempts to identify suitable genotypes simply on the basis of their known sole-crop performance (Baker 1974; Finlay 1974; Francis et al. 1976; IRRI 1974; Wein and Nagju 1976), but these seem to have met with little success. In fact, some time ago, Harper (1961), as a result of his competition studies, pointed out that "the behavior of mixed stands is not predictable from the behavior of pure stands." Recent knowledge has improved this situation a good deal, and many research workers have begun to formulate fairly specific ideas of genotype requirements for given situations. But the extent to which this can be done varies enormously with the crop being considered and the role it plays in a given intercropping situation. For example, it may be relatively easy to define genotype requirements for a crop which is very dominant and which represents the major component in an intercropping system. But it may be much more difficult to define requirements, or predict performance, for a crop which is the dominated one and which is essentially

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growing in an environment which has been modified by the dominated crop. Furthermore, the situation is complicated by the fact that the intercropping performance of a given genotype must be judged not just by its own yield but also by the competitive effect it has on the other crop, and even very dominated crops can show genotype differences in terms of the competitive effects on the other crop. Thus, there seems little doubt that genotypes which are intended to be grown in a given intercropping situation should be at some stage selected actually in that situation.

The objectives of selection can be very simply stated as the selection of genotypes which minimize intercrop competition and maximize complementary effects. Ideally this should involve the identification of suitable plant characters which can best achieve these effects and which can serve as the basis for more meaningful future selection. But in many situations, knowledge of these competitive and complementary effects is still much too limited and selection is still largely empirical.

At ICRISAT, genotype identification for intercropping is a field that has received a good deal of emphasis. This paper briefly describes the experimental approaches being used and some of the results obtained. Although many experiments have contained some aspect of genotype comparisons, the main emphasis has been with three combinations — sorghum/pigeonpea, millet/groundnut, and sorghum/millet—so the work is discussed under these headings.

Sorghum/Pigeonpea

In India the sorghum/pigeonpea situation is one from which the farmer's requirement is to produce a "full" sorghum yield (i.e., as much as a sole crop) and as much "additional" pigeonpea yield as possible. Current evidence (ICRISAT 1978; Shelke 1977) suggests this is best achieved by having the intercrop population of each crop the same as its sole-crop optimum. In this situation, the sorghum is very much the dominant crop and the growth of pigeonpea is very much suppressed. In effect, this means that although there is still some scope for identifying a suitable sorghum genotype (e.g., an early, short type to minimize competition on the pigeonpea), the main scope must lie in identifying pigeonpea genotypes which will withstand the early sorghum competition and then be able to utilize resources reasonably efficiently after sorghum harvest.

In 1977, in conjunction with the pigeonpea breeding work, genotypes which had undergone early selection in a cereal intercropping situation were grown with and without a standard CSH-6 sorghum in a yield trial. The pigeonpea genotype ICP-1, which was used as standard in most other ICRISAT trials, was also included as a check. The genotypes were in main plots on 135-cm rows at 25 000 plants/ha. The sorghum was sown in two rows at 45 cm between the pigeonpea, giving the standard 2 sorghum: 1 pigeonpea row arrangement used in other experiments. One main plot of sole sorghum was included, and the subplots were used for a comparison of "uniform rows" on 45 cm with the "paired-rows" arrangement that sorghum occupied in the intercrop. The experiment was grown on a medium deep Vertisol. A basal dressing of 52 kg P_2O_5/ha was applied throughout, and a topdressing of 80 kg N/ha was given to the sorghum.

The paired-row arrangement of sole sorghum yielded slightly lower (3693 kg/ha) than uniform rows (3952 kg/ha), but the difference was not significant, so the uniform row yield was used to calculate the LER values. Intercrop sorghum yields varied between 82 and 99% of this sole-crop yield, but, again, differences were not significant; thus, no assumption is made that these different values indicate real effects of pigeonpea competition, though they do influence total LER values. For pigeonpea yields, the interaction between genotype and the intercropping comparison was not significant, so individual genotype effects have to be interpreted with care. Sole-crop yields were quite good, four genotypes recording higher yields than the 1389 kg/ha of ICP-1 (Table 1). Intercrop yields ranged from 36 to 73% of sole-crop yields, the decrease being largely due to decreased pods per plant.

To some extent, absolute intercrop yields were simply a reflection of sole-crop yields, and the top seven genotypes were common to both situations, though not in exactly the same order. However, Figure 1 illustrates that, although this relationship held true in a general way (Fig. 1a), only 40% of the variation in intercrop yield could be attributed to variation in sole-crop yield (i.e., $r^2 = 0.4$). This is sup-

Table 1. Pigeonpea genotypes in sorghum/pigeonpea intercropping.

Genotype	Pigeonpea yield (kg/ha)		Sorghum yield (kg/ha)	LER			Pigeonpea harvest index	
	Sole	Intercrop		Pigeonpea	Sorghum	Total	Sole	Intercrop
185-9	1699	850	3804	0.51	0.96	1.47	0.25	0.33
6982-6	1525	842	3931	0.57	0.99	1.56	0.23	0.33
1-6	1428	740	3640	0.52	0.92	1.44	0.26	0.34
2223-3	1407	815	3630	0.58	0.91	1.50	0.22	0.31
ICRISAT-1	1389	757	3386	0.57	0.85	1.43	0.22	0.30
2223-1	1376	885	3344	0.63	0.84	1.48	0.26	0.33
830-2	1323	799	3899	0.63	0.98	1.62	0.23	0.31
3156-2	1296	619	3381	0.60	0.85	1.45	0.27	0.36
1951-1	1264	585	3973	0.46	1.00	1.46	0.28	0.37
3048-10	1226	619	3757	0.50	0.95	1.45	0.27	0.35
3193-12	1222	512	3232	0.42	0.82	1.24	0.26	0.39
HY3C-E-20	1185	463	3500	0.36	0.88	1.25	0.23	0.29
HY3C-E-12	1169	503	3323	0.43	0.84	1.27	0.26	0.31
2023-7	1148	661	3930	0.59	0.99	1.58	0.23	0.29
185-8	1106	718	3198	0.66	0.81	1.47	0.23	0.31
1196-2	1063	530	3645	0.49	0.92	1.42	0.26	0.30
1900-11	1058	720	3677	0.73	0.93	1.66	0.22	0.31
Sorghum (sole)		*	3952			1.0	1.0	
Mean	1287	683		0.54	0.91	1.46	0.25	0.33
SE(M) ±			NS	0.1	NS	0.12		
CV (%)			16.3	34.9	16.5	16.4		

ported by the fact that the considerable variation in pigeonpea LER which occurred was not related to sole-crop yield (Fig. *1b*). Thus, intercrop performance, as indicated by the LER, was dependent on crop characters, which were not directly related to sole-crop performance. This is particularly borne out by the result for the genotype 1900–11, which gave the lowest yield but the highest LER. This was thought to be because it had compact growth in the early stages (thus to some extent avoiding competition with the sorghum) combined with a more spreading habit later; compactness per se did not seem desirable because the two most compact genotypes (the two HY-3Cs) gave low sole-crop yields and low LERs.

Harvest indices of the pigeonpea are also given in Table 1. Unfortunately, estimates of this character were not very accurate; only a small part of the plot (5.4 m^2) could be sampled for final dry-matter yield because the major part of the plot was left to assess ratooning ability of the genotypes. However, the data show that, for all genotypes, there was a constant increase in harvest index due to intercropping; the mean increase was from a mean value of 0.25 for sole crops to a mean value of 0.33 for intercropping. (Much bigger effects have been recorded in other experiments; in one particular experiment, which will be referred to later, harvest index was almost doubled by intercropping.) This effect obviously occurs because sorghum competition takes place during the period of early vegetative growth of the pigeonpea. But it is an extremely important effect, and it allows a greater compensation of seed yield after sorghum harvest than would otherwise be possible. For example, in this experiment, the total dry matter for intercropped pigeonpea at final harvest only averaged 40% of the sole crop, but seed yield averaged 54% of the sole crop. (In the experiment referred to above where effects were greater, an intercrop dry-matter yield equivalent to 40% of the sole-crop yield produced a seed yield equivalent to 70% of sole crop.)

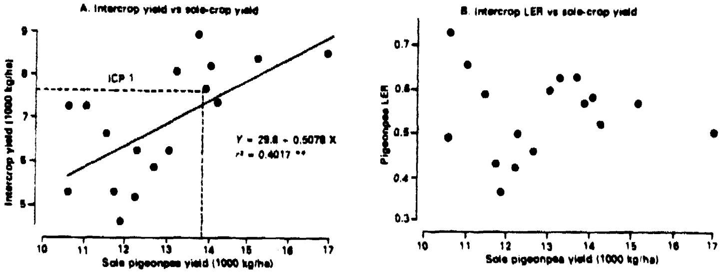


Figure 1. Relationship of intercrop yield and LER with sole-crop yield for 17 genotypes of pigeonpea.

This experiment is being repeated this season with some changes to include a few different genotypes; one notable inclusion is a promising hybrid C-11 which appears to be performing very well. In general, pigeonpea growth is much better than last season, and it is anticipated that yields in intercropping will be equivalent to a larger proportion of their sole crop. It is of interest, however, that this greater pigeonpea growth does not seem to have had any effect on sorghum yield. Sole sorghum yielded 4588 kg/ha: the average sorghum yield in intercropping was 95% of this, and the lowest was still equivalent to 88%.

Pearl Millet/Groundnut

Little information is available on the suitability of genotypes of either groundnut or millet when grown together as intercropping combinations. Two experiments described here were designed to have a preliminary look at some plant characters which were considered likely to be important. In the first experiment, three millet genotypes differing mainly in height and four groundnut genotypes differing in growth habit and maturity period were examined in all combinations: exact details are shown in Table 2.

Intercrops were grown in a row arrangement of 1 millet : 3 groundnut. Sole crops of all genotypes were included, and all treatments were grown in 30-cm rows. The millet genotypes were arranged in main plots and the groundnut genotypes as subplots; the millet sole plots were achieved by having an extra plot on the end of each main plot, and the groundnut sole plots were arranged as a separate main plot. The experiment was sited on an Alfisol which received a basal 52 kg/ha of P_2O_5, and the millet was topdressed with 80 kg/ha of N.

Sole-crop yields and LER values are given in Figure 2. Performance of the various combinations in terms of yield advantages showed quite large differences. Two combinations gave LER values less than 1, namely TMV 2 and MK 374 groundnut with PHB 14 millet. The other ten combinations gave LERs ranging from 1.06 to 1.30, and seven of these had values of 1.10 or more. But few consistent genotype effects emerged. One exception was M-13 groundnut, which gave high LERs with all three millet genotypes. This was probably attributable to the fact that its maturity period was over a month longer than the millets. However, MK 374 groundnut, which had a similar maturity to M-13, gave little evidence of any worthwhile yield advantage.

Millet was the more competitive crop, achieving a mean LER value of 0.46, which was almost twice its "expected" LER of 0.25. Groundnut achieved a mean LER of 0.68, which was only slightly less than its "expected" LER of 0.75. Thus, on an average, yield advantages were mainly due to "extra" millet yield. Rather surprisingly, all three millet genotypes showed considerable differences in yield across the groundnut genotypes, and overall intercropping performance appeared to be more closely related to millet yields than to groundnut yields. This would seem to suggest that although

Table 2. Genotype characteristics in pearl millet/groundnut experiment.

Millet	Height (cm)	Days to 50% flowering	Groundnut	Growth habit	Maturity in experiment
GAM 73	120	62	TMV 2	Bunch	98
PHB 14	150	57	R33-1	Semispreading	113
IVS-AS75	170	61	M 13	Runner	125
			MK 374	Runner	125

groundnut was the less competitive crop, it still had important competitive effects on the millet. But this suggestion is not well supported by the subsequent experiment.

In the second experiment conducted in 1978, the groundnut genotypes were the same; all the millet genotypes were changed, but they still represented three types very similar to the early ones. The experimental design was changed to a strip-plot one. Millet genotypes were run as strips in one direction and groundnut genotypes as strips in the other direction. A "nil-genotype" strip was included for each crop to provide sole-crop plots of the other crop genotypes. Other details were the same as the first experiment.

It is evident from Figure 2 that yield advantages were more consistent and differences between the combinations were much smaller. Considering the groundnut effects, combinations with M-13 groundnut were again the best, and the mean ranking across all millet genotypes was the same as in the previous experiment, i.e. M-13, R33-1, TMV 2, and MK 374; however, yield advantages were much more consistent and even the MK 374 combinations averaged 15% yield advantage.

Yield advantage for the millet genotypes meaned across groundnut genotypes were extremely constant, all averaging around 20%. However, the millet genotypes did show different competitive abilities, which altered the proportions of millet to groundnut; in the order, BK 560, GAM 73C1, and Ex-Bornu, the proportion of millet decreased and the proportion of groundnut increased. No millet genotype showed any real evidence of being differentially affected by different groundnut genotypes as appeared to be the case in the first experiment. The apparent effects in that experiment were probably due to variability because of the rather low millet yields. In this second experiment, millet yields were high and quite consistent. Putting rather more emphasis on this second experiment, therefore, it appears to be the groundnut genotype which mainly determines the level of yield advantage, but it is the millet genotype which mainly determines the proportion of millet yield to groundnut yield.

Sorghum/Pearl Millet

This combination was first included in an early genotype study which was conducted in 1976 in cooperation with the millet breeders. Forty genotypes of pearl millet were intercropped in a simple nonreplicated layout with three crops of very different growth patterns — setaria, sorghum, and pigeonpea. Growth of setaria and pigeonpea was very poor, and harvest data were recorded only for the millet/sorghum combination. Planting arrangement for this was two rows of millet to one of the sorghum in 37.5-cm rows. (This arrangement was largely decided by what was a convenient standard for all combinations and this was a particularly suitable arrangement for millet/pigeonpea.) In addition, the millet genotypes were grown as sole crops both at an optimum population (220 000 plants/ha) and at a much lower population (44 000 plants/ha); this low population was included to try to get a measure of the "plasticity" of the different genotypes to see how this might be related to intercropping performance.

Intercropping performance was assessed both in terms of the individual millet performance and in terms of the combined intercropping performance (total LER). The basic objective of the experiment was to try to pinpoint desirable intercropping characters by calculating regressions of the intercropping performance on a large number of measured plant characters. It was because of this approach that

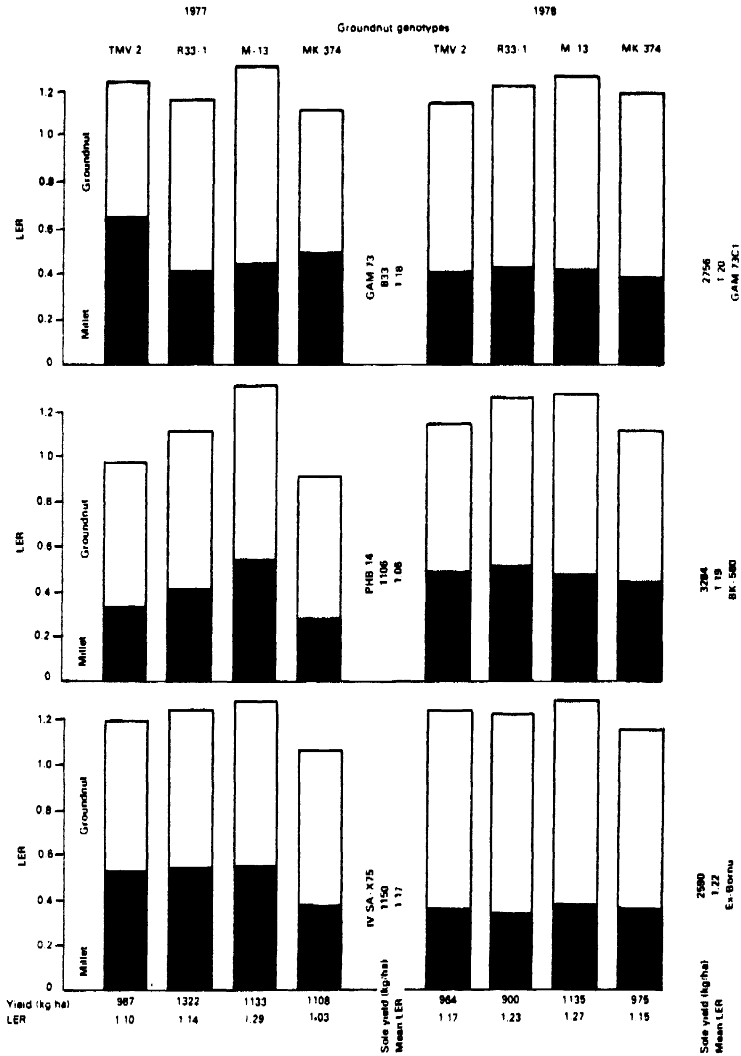


Figure 2. Pearl millet/groundnut genotypes in intercropping.

replication was sacrificed in favor of a large number of genotypes. However, this technique did not work out very satisfactorily. The best regressions for individual millet performance were on difference in height, difference in maturity, and a simple estimate of the rate of stem elongation (height/time to flowering), but even a combined regression with all three characters only accounted for approximately 30% of the variation in millet performance. The best combined intercropping performance seemed to be where millet LER was particularly high and sorghum LER was still maintained at a reasonable level.

The plasticity of the individual plant was estimated by calculating the intercept value of the linear regression of the reciprocal of yield per plant on population, using the two sole treatments at low and optimum population (after Holliday 1960). A low intercept value describes a "flat-topped" yield per unit area/plant population response curve which must occur because of highly "plastic" changes in yield per plant. But the data showed little evidence of the intercept being related either to millet performance or to combined intercropping performance. This was at least partly because of the inaccuracy of the data but it may also be partly because "plasticity" is a character which is more important in situations where there are large temporal differences in crop-growth patterns — e.g., a better correlation might have been expected in millet/pigeonpea than in this millet/sorghum situation.

Two further experiments have been carried out with sorghum/millet, but these have examined relatively few combinations (four sorghum × four millet genotypes) sown in alternate rows and replicated four times. In the first experiment, all intercrop combinations and sole plots were arranged in randomized blocks. The genotypes were:

Sorghum

- A GE 196 — Grain grass type, short and early (1.2 m and 48 days to 50% flowering).
- B IS 9237 — Mold resistant line, medium height and maturity (1.9 m and 68 days).
- C CSH-6 — Hybrid, medium height and early (1.7 m and 58 days).
- D Y 75 — Yellow endosperm type, tall and late (2.3 m and 71 days).

Pearl millet

- a GAM 75 — Short and late (1.3 m and 62 days).
- b GAM 73 — Short and early (1.3 m and 53 days).
- c PHB 14 — Tall and early (1.7 m and 58 days).
- d Ex-Bornu — Tall and late (2.1 m and 71 days).

Yields and mean LERs are given in Table 3. Strictly speaking, this combination should perhaps be assessed on the basis of whether intercropping exceeds the sole-crop yield of the higher-yielding component. However, LERs are used here because the initial objective with this crop combination is to determine if these very similar crops are capable of giving any increase in physiological efficiency when intercropped together.

In general, pearl millet was much the more competitive crop giving mean LERs well over 0.5, while the mean sorghum LERs were often less. The millet genotypes GAM 75, GAM 73, and PHB 14 performed similarly when averaged over the sorghum genotypes (average LER 0.64) but the tall, late Ex-Bornu performed better, giving an average LER of 0.79. All millet genotypes performed much better with the short, early, grain grass sorghum (averaging 0.92 LER); with the other sorghums, performance was reasonably constant, giving an average LER of 0.60.

Sorghum performance, averaged over millet genotypes, increased in the order of genotypes listed above and ranged from an LER of 0.20 for GE 196 to 0.66 for Y75. CSH-6 performed relatively well insofar as it yielded better than the taller and later IS 9237 and did not really cause any greater decrease in millet yield. All sorghum genotypes performed poorest with the late, tall Ex-Bornu. With the other millets there was little difference, except for a relatively good performance of CSH-6 with PHB 14.

Figure 3a shows the combined performance of both crops as an LER diagram. There was consistent evidence that this combination can give advantages: 13 of the 16 combinations gave LERs greater than 1, 10 of these showed advantages of 10% or more; and the maximum values showed advantages of over 30%. Some of the advantages could be partly attributed to differences in height or maturity. Thus the two highest advantages occurred with the latest

Table 3. Yields (kg/ha) and mean LERs of pearl millet/sorghum intercropping, Alfisol, 1976–77.

Millet yields

Millet genotype	Sole crop	With sorghum genotype				Mean intercrop yield	Mean intercrop LER
		GE 196	IS 9237	CSH-6	Y 75		
GAM 75	800	830	480	420	440	540	0.68
GAM 73	1370	1120	760	690	740	830	0.61
PHB 14	2020	1720	1190	1100	1060	1270	0.63
Ex-Bornu	2030	2090	1440	1460	1450	1610	0.79
Mean	–	1440	970	920	920	–	–
Mean LER	-	0.92	0.62	0.59	0.59	-	-

LSD (0.05) to compare mean intercrop yields = 180.
LSD (0.05) to compare mean intercrop yields = 220

Sorghum yields

Sorghum genotype	Sole crop	With millet genotype				Mean intercrop yields	Mean intercrop LER
		GAM 75	GAM 73	PHB 14	Ex-Bornu		
GE 196	1380	350	300	280	190	280	0.20
IS 9237	3150	840	1020	1090	940	970	0.31
CSH-6	3110	1640	1500	1980	1170	1570	0.51
Y 75	1580	1080	1200	1270	660	1050	0.66
Mean	2310	980	1010	1160	740	-	-
Mean LER	-	0.42	0.44	0.50	0.32	–	-

LSD (0.05) to compare mean intercrop yields = 180.
LSD (0.05) to compare mean intercrop yields = 220.

sorghum + earliest millet (32% with Y 75 + PHB 14) and the earliest sorghum + latest millet (31% with GE 196 + GAM 75). Also, the third highest advantage was when there was the biggest height difference (Y 75 + GAM 75). But other effects could not be explained in these terms — e.g., CSH-6 + PHB 14 gave an 18% advantage with little difference in maturity and no difference in height. Regressions were computed of intercropping advantage (total LER) on height and maturity differences. Maturity appeared to have more influence than height, but even their combined effect only accounted for 22% of the variation in LER.

The subsequent experiment was carried out in 1978 largely to verify these surprisingly large advantages obtained with two such similar component crops. As the genotypes in the first experiment had not provided as big a range as initially anticipated, some of these were changed; the new range was:

Sorghum	*Pearl millet*
M 35662 — Early dwarf	GAM 73 C1 — Early dwarf
CS 3541 — Late dwarf	GHB 1399 — Late dwarf
CSH-6 — Early tall	BJ 104 — Early medium
KP-Hybrid — Late tall	SYN 7708 — Late medium

In this experiment, a strip-plot design was used as described for the second millet/groundnut experiment. The results of this experiment are not yet fully available, so they are only referred to very briefly. They are presented in Figure 3*b* as an LER diagram, and it can be seen that the general pattern of results is reasonably similar to the earlier experiment

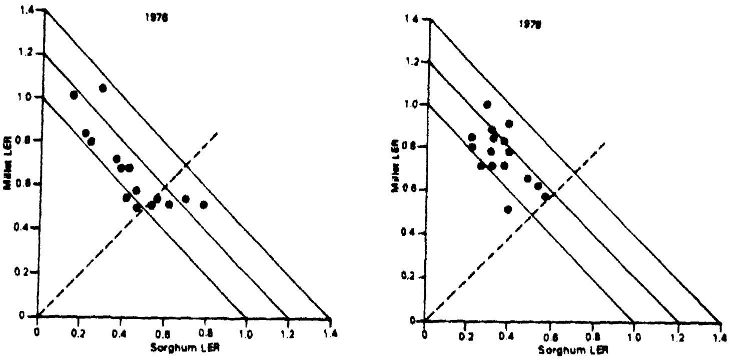


Figure 3. Intercropping experiments with four genotypes of pearl millet × four genotypes of sorghum.

(Fig. 3a). Again, two of the combinations achieved advantages of just over 30%, and 10 of the 16 combinations gave advantages of over 10%. First indications are that advantages were not very closely related to maturity or height differences, so again there seemed to be other characters involved. In view of these relatively large effects, this combination would seem worthy of more attention.

Predicting the Performance of a Given Genotype in Intercropping

Considerable attention has been given to trying to predict the performance of genotypes when grown in different environments as sole crops. A common method has been to examine genotype performance against a range of "environmental index" values which are based on mean yields at different locations (e.g., Finlay and Wilkinson 1963). This same technique has recently been used to predict intercropping performance in different locations (Francis et al. 1975). But a rather different problem is how to predict the performance of a genotype when it is intercropped with different genotypes of another crop. The Finlay and Wilkinson type of analyses suggests a means of doing this by using yields of the genotypes of the other crop as a measure of the 'competitive environment.' This approach is illustrated in Figures 4 and 5 for the millet/sorghum genotype data given in Figure 3a. Figure 4 shows the individual yields of the millet genotypes plotted against the *mean* yields of the sorghum genotypes; also, of course, individual sorghum yields can be plotted against mean millet yields. The advantage of using mean yields of the second crop genotypes is that these give a better measure of the average competitive abilities of the genotypes; in terms of the Finlay and Wilkinson analysis, they give a better measure of the "competitive environment" provided by these genotypes. Figure 5 shows fitted regression lines for both crops. It must be emphasized, however, that these regression lines are given here purely for illustrative purposes, since the pearl millet "environments" were rather limited to allow extrapolation of sorghum genotype performance. Also, a background statistical analysis would normally be required to identify whether there were statistical differences between genotype responses and whether these responses could be validly described by linear relationships.

Taking an analogy from other analyses, the slope of a given regression line in Figure 5 can be taken to indicate "general intercropping compatibility" and the deviations from it "specific intercropping compatibility." The ad-

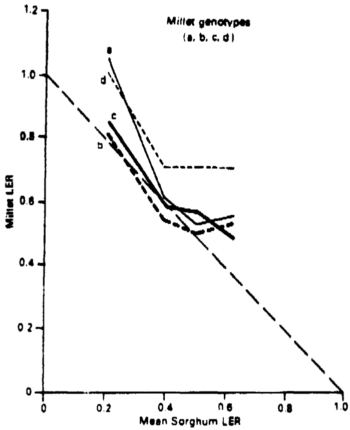
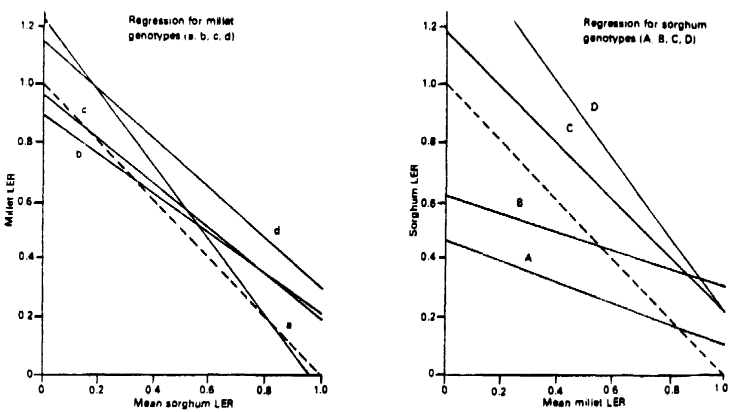


Figure 4. Intercropping compatibility in a pearl millet/sorghum genotype experiment at ICRISAT.

vantage of plotting in LER terms is that the values indicated by the regression lines are particularly meaningful. Ignoring, for convenience, the negative sign of the slope, a slope equal to 1 indicates a genotype which can be expected to give the same relative intercropping advantage (or disadvantage) over a wide range of genotypes of the other crop; a slope less than 1 indicates a genotype more likely to give an advantage in "environments" where the other crop is dominant; and a slope greater than one indicates a genotype more likely to give an advantage when that genotype itself is dominant. The magnitude of any expected advantage from a given genotype also depends on the "height" of the regression line: this could be indicated by the mean yield, but experimentally this depends on the range of "environments" being examined. It would be more useful, therefore, to define an "expected" value for a standard point on the horizontal axis. Thus a "50% compatibility value" could be defined as the "predicted" LER value of a given genotype when an associated crop gives an LER value of



Examples:

		50% compatibility value (y at $x = 0.5$)	General intercropping compatibility (slope)	r^2
Pearl millet (GAM 73)	b	0.56	-0.7183	0.79
Sorghum (CSH 6)	C	0.68	-0.9829	0.48

Figure 5. Intercropping compatibility in a pearl millet/sorghum genotype experiment at ICRISAT.

0.5. To take two examples, the sorghum genotype C has a 50% compatibility value of 0.68 and a slope virtually equal to 1 (again ignoring sign); thus this genotype can be expected to give an yield advantage of about 18% (i.e., a total LER of about 1.18) in combination with a wide range of pearl millet genotypes. Similarly, pearl millet genotype D, with a 50% compatibility value of 0.74 and a slope of 0.7451, could be expected to give about a 24% yield advantage when an associated sorghum crop gives a 50% yield, and this advantage would be expected to decrease if the millet genotype were more dominant but increase if the associated sorghum were more dominant.