

SUMMARY

Six experiments were carried out at Sids Agricultural Research Station, Beni Suef Governorate, Egypt, during 1987 and 1988 seasons, to study the possibility of intercropping each of soybean, maize and sesame with cotton, using either the normal or the double population density per unit area.

In each season, three separate experiments were undertaken, for intercropping the three summer crops, soybean, maize and sesame with cotton.

In each experiment, four intercropping systems were evaluated, in comparison with the pure stand of both intercrop components. Intercropping was done in all cases in alternate single ridges (1 : 1). The following four systems were included :

- 1- 50% : 50% of the standard population density of each intercrop.
- 2- 50% : 100% of the standard population density of cotton : soybean, maize or sesame.
- 3- 100% : 50% of the standard population density of cotton : soybean, maize or sesame.
- 4- 100% : 100% of the standard population density of cotton : soybean maize or sesame.
- 5- Sole cropping of cotton at 70000 plants/fad. as the standard density.
- 6- Sole cropping of soybean at 140000 plants/fad, or sole cropping of maize was at 23333 plants/fad or sole cropping of sesame at a standard density of 70000 plants/fad.

Doubling the standard density (100%) was followed by growing on both sides of the ridge, whereas the standard density was attained by growing on one side.

Sowing date of soybean was followed 6 days later after cotton using the wet method of planting, whereas maize and sesame were sown at the same time with cotton. Harvesting was followed at maturity.

Fertilizer application, irrigation and other cultural treatments were similar either for intercropping treatments or for pure stand. The experiments were arranged in a completely randomized block design with four replications.

Data on growth, yield and its components and some quality characters (for cotton) were collected. Results could be summarized as follows :

I- First Experiment :

Intercropping Cotton and Soybean

- 1- Intercropping reduced cotton plant height and number of fruiting branches/plant, particularly when intercropping was followed at higher cotton population densities.
- 2- Number of total bolls per plant was reduced when cotton was intercropped at higher densities, but when intercropping was done at lower densities (cotton and soybean) number of bolls/plant was increased in one season only.
- 3- Weight of seed cotton/boll was not significantly affected by

intercropping, whereas seed index was significantly affected only in one season with no specific trend for its response to intercropping.

- 4- Seed cotton yield/plant was significantly reduced when intercropping was followed under higher population density, but under lower densities an increase was recorded when intercropping was followed at 50% : 50% of the standard pure stand densities.
- 5- Intercropping cotton and soybean significantly reduced seed cotton yield estimated as the "actual" intercropped yield. "Adjusting" the seed cotton yield/fad. on unit area basis "adjusted yield" showed that intercropping increased cotton yield in some intercropping patterns but decreased the yield with some other patterns.
- 6- Intercropping affected the percentage of surviving plants in the second season where a reduction in the percentage of survival plants was associated with the higher densities.
- 7- Lint percentage, fiber fineness and fiber strength were not significantly affected by intercropping.
- 8- Intercropping decreased soybean plant height in the first season, whereas an increase in plant height was recorded in the second season.
- 9- Intercropping increased number of branches/plant in soybean. Number of pods/plant was increased in the second season when intercropping was done at lower densities.
- 10- Seed index of soybean increased by intercropping in the first season, but decreased in the second one, showing no definite

trend for intercropping on this character.

- 11- Seed yield/plant in soybean increased in the first season due to intercropping, but decreased in the second one when intercropping was followed at higher densities.
- 12- Seed yield of soybean/fad estimated as "actual" yield was significantly reduced by intercropping. "Adjusting" the yield on unit area basis showed a marked increase in seed yield due to intercropping. The increase reached 63% and 28% in the first and second season, respectively.
- 13- Straw yield of soybean estimated as "actual" yield was reduced, due to intercropping, but a marked increase was observed with straw yield/fad "adjusted" on unit area basis.
- 14- Increasing the population density of soybean intercropped with cotton decreased markedly the percentage of surviving plants at harvest, compared with sole cropping.
- 15- Land equivalent ratio for intercropping cotton and soybean showed promising result for intercropping. An increase of 53% in the first season and 7% in the second one in land usage was recorded due to intercropping.
- 16- Relative crowding coefficient exceeded one in all systems indicating yield advantage with intercropping. Soybean coefficient (K_s) was almost higher than cotton coefficient (K_c).
- 17- Aggressivity showed that cotton was dominant only in two systems in the second season, whereas soybean was dominant in all systems in the first season and in two systems in the second one.

II - Second Experiment :

Intercropping Cotton and Maize

- 1- Intercropping reduced cotton plant height, number of fruiting branches/plant and total number of bolls/plant, compared with sole cotton cropping, particularly when intercropping was done under higher densities.
- 2- Weight of seed cotton/boll and seed index in cotton were not significantly affected by intercropping.
- 3- Seed cotton yield/plant was significantly reduced by intercropping. The reduction was more serious when intercropping was followed under higher densities.
- 4- Seed cotton yield/fad. estimated as "actual" yield was significantly reduced due to intercropping. "Adjusting" the yield on unit area basis showed also that intercropping caused significant reductions in seed cotton yield. The yield reduction was more serious in the second season and reached 66%.
- 5- Cotton stand at picking was not significantly affected by intercropping cotton and maize.
- 6- Lint percentage was reduced in the first season as a result of intercropping.
- 7- Fineness and strength of cotton fiber were not significantly affected by intercropping in cotton and maize.
- 8- Plant height of maize was not significantly affected by intercropping, while area of topmost ear leaf was increased due to

- intercropping maize with cotton at lower densities.
- 9- Number of ears/plant was increased by intercropping, whereas ear weight was increased when intercropping was followed at 50% of the standard density, compared with sole cropping.
 - 10- Weight of 100 kernels was reduced due to intercropping at higher densities.
 - 11- Grain yield/plant was increased when intercropping was done at lower densities.
 - 12- Increasing maize population density slightly increased percentage of barren plants and significantly reduced maize stand at harvest.
 - 13- Grain yield of maize/fad estimated as "actual" yield was significantly reduced by intercropping. "Adjusting" the yield on unit area basis indicated that intercropping markedly increased grain yield. Increases reached 48% and 77% in the first and second season, respectively.
 - 14- Estimation of LER showed values exceeding one in the first season and in two systems out of four in the second one. LER reached 1.13 in the first season and 1.06 in the second one. Best result was with intercropping cotton and maize at 50% : 100%, of the pure stand density, respectively.
 - 15- Relative crowding coefficient showed that maize was superior to cotton with greater contribution. K_m exceeded one and K_c was lower than one in all systems.
 - 16- Aggressivity indicated that maize was the dominant component and cotton was the dominated intercrop.

III - Third Experiment :

Intercropping Cotton and Sesame

- 1- Intercropping at higher cotton population densities reduced plant height, number of fruiting branches, total number of bolls and seed cotton yield per plant.
- 2- weight of seed cotton/boll as well as seed index in cotton were not significantly affected by intercropping.
- 3- Seed cotton yield/fad. estimated as the "actual" yield was significantly reduced by intercropping. "Adjusting" the yield on unit area basis showed that intercropping cotton with sesame had no adverse effect. All increases or decreases recorded in intercropped yield were not significant, compared with pure stand cotton.
- 4- Intercropping cotton and sesame had no significant effect on the percentage of surviving cotton plants at picking.
- 5- Lint percentage as well as fineness, and strength of cotton fiber were not significantly affected by intercropping.
- 6- Intercropping at higher sesame population density reduced sesame plant height, number of capsules/plant and seed yield/plant.
- 7- Seed index and percentage of surviving plants at harvest of sesame were not significantly affected by intercropping.
- 8- "Actual" seed yield/fad of intercropped sesame was significantly reduced. "Adjusting" seed yield on unit area basis indicated

that intercropping favourably affected seed yield. Increases of 24-44% in the first season and 24-59% in the second one were obtained over pure stand yield due to intercropping.

9- Land equivalent ratio showed that intercropping cotton and sesame increased land usage by 13-15% in the first season and 10-24% in the second one.

10-Relative crowding coefficient exceeded one under all intercropping systems with one exception in the second season. Sesame coefficient (K_{ses}) was higher than cotton coefficient (K_c) under most systems of intercropping.

11-Aggressivity showed that sesame was the dominant component and cotton was dominated under all systems in both seasons with one exception.