Maize/cowpea intercrop: the effect of varying the relative time of sowing of the component crops

F. Ofori and W.R. Stern

School of Agriculture (Agronomy), University of Western Australia
Nedlands, W.A. 6009

Intercropping is the growing and harvesting of two or more crops - usually a cereal and a legume - in the same field during a growing season. The practice is widely used in the tropics and semi-arid tropics (3) and results in better crop products, higher combined yields and consequently higher land use efficiency. Intercropping advantages can be estimated from the land equivalent ratio (LER), the sum of the quotients of mixture yields and sole crop yields; there is an advantage to intercropping when LER >l and none when it is <l (1). At an irrigated site, 120 km south of Perth, we are studying the inter- relationship between components of a commonly used intercrop mixture.

Methods

In the summer of 1982/83, an experiment was conducted at Waroona (32? 51'S, 115? 55'E) to study the effects of varying the relative time of sowing of the component crops. It was a randomised complete block design with the following treatments: sole crops of maize and cowpea, and a mixed stand of maize and cowpea planted simultaneously on 19 December, 1982; in the remaining treat- ments, mixed stands of maize and cowpea were planted 10 or 21 days apart. The plants were established in rows (1m for maize and 0.5m for cowpea in both sole and mixed treatments) with optimal densities of maize of 50,000 plants/ha and of cowpea of 100,000 plants/ha. LER values were calculated to estimate the relative advantages of the intercropping treatments.

Results and Discussion

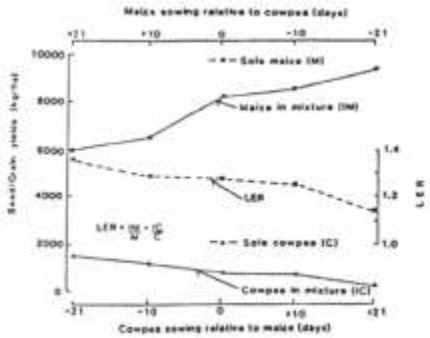

Fig. 1. Yields of component crops, when sown differentially land equivalent ratio (LER) of the maize/cowpea intercrop. Sole crops were established only at simultaneous sowing. ie. 0 days.

Results are summarised in Fig l. Maize yields in mixtures were 5,900 to 9,300 kg/ha and at simultaneous sowing, the maize yield was 85 per cent of the sole crop. The cowpea yields in mixtures were 350 to 1,500 kg/ha and at simultaneous sowing, 43 per cent of the sole crop yield. Even though intercropping reduced the yields of the component crops there was, in terms of LER, a clear advantage of intercropping over sole cropping and this ranged from 14 to 35 per cent. Planting maize before cowpea suppressed cow- pea yield more than the effect on maize yield of planting cowpea earlier. Although there was no significant difference between LER values of any of the mixtures, the LERs followed the trend of cowpea yields rather than the maize yields. This is consistent with observations elsewhere (2) and tends to support the idea that the advantage in mixtures, accrues from the legume component.

1. Mead, R. and Willey, R.W. (1980). Expl. Agric. 16, 217-22. 28.

2. Spitters, C.J.T. (1983). Neth. J. Agric. Sci. 3, 143-155.

3. Willey, R.W. (1984). The prospects for intercropping. In: R.C. Muchow (ed.) Agro-research for Australia's semi-arid tropics (in press).