

DISCUSSION

Growing environment and soybean yield

The average farm yield of soybean at the Chom Thong LRA in 1989 season was very low. Yield survey of 42 farms revealed an average yield of 139 kg/rai with 38 percent less than the 1988 average (Hanviriyapant, 1990). The main contributing factors to these variations of soybean yield were the amount and distribution of rainfall. In the 1989 season the amount of rainfall of 708 mm accounted for 73 percent of the 25-year average, and 63 percent of the 1988 rainfall. It was also marked by uneven distribution, with 60 percent of the total rainfall was in the month of October. A number of dry spells occurred during the soybean growing period notably at early establishment, and from flowering to seed formation (R1 to R5). The soil moisture contents at 20 and 40 cm depth also indicated less moisture availability to crop during this period. Therefore the condition was not favourable to sustain high soybean yield in 1989. In general, water stress occurs when 50 percent of the total available water is depleted. The crop yield would certainly be affected if water stress occurs during critical periods such as during pod development for soybean (Oldeman and Frere, 1982). In summary the moisture conditions was not optimal for soybean growth and development in the 1989 season.

Range of temperature in the area varied from 24 to 36°C during the soybean growing period. This would consider to be optimal temperature for soybean growth (Hinson and Hartwig, 1982).

The soil chemical analysis of the 12 farms indicated that soil properties in general would be classified as low to medium soil productivity for soybean production according to the Department of Agriculture's criteria (Tearanant, 1980). The less favourable chemical properties were low pH (< 5.5) and low to medium levels of available phosphorus. Farmers did not lime their soils, but did apply combined fertilizers at varying rates. However, when one considered the crop growth and yield of this rainfed soybean and compared it with the irrigated soybean grown under optimal condition (Maneevan, 1990), the rainfed soybean at the Chom Thong LRA could only achieve about 40 percent of the optimal irrigated soybean yield.

Stability of soybean varieties

The two soybean varieties, SJ 5 and CM 60, when subjected to fertilizer treatments and tested over 12 sites, showed a similar direction of positive response to favourable environments. Both varieties gave equal rates of response to varying environments at each fertilizer treatment. However with higher dosage of fertilizer application, both varieties were less stable as indicated by higher values of regression coefficients.

On average, the CM 60 gave significantly higher yields than SJ 5 in all environments; but it also showed higher variation than SJ 5 when treated with 1.5-4.5-3.0 kg/rai of N-P₂O₅-K₂O.

When examining the response of soybean varieties to fertilizer treatments, the SJ 5 showed a linear response with similar variation in each treatment. The CM 60 on the contrary responded equally to the half and full dosage of fertilizer treatments. The evidence would indicate no advantage for high dose of fertilizer (3-9-6) when CM 60 was used. This was also supported by the economic assessment. Since fertilizer application was commonly practised by the soybean farmers in the area, simple revision to new variety of CM 60 would be appropriate for yield improvement. It was also observed that the demand for CM 60 variety had been increasing. The variety proved to be a higher yielder than the SJ varieties (Kaewmeechai *et al*, 1990), its larger seed size was also much preferable to the growers. Consequently, the seed price of CM 60 variety is always higher than the SJ varieties. It was then strongly recommended that CM 60 variety should be extended to the seed growers in the LRA at Chom Thong.

Recommendation domain

By designing a series of combination of soybean variety and fertilizer package as ways to differentiate upland farmers into homogeneous groups, the analysis had provided information for grouping farmers into one recommendation domain. The newly released variety CM 60 was superior than SJ 5 variety in all

environments, fertilized and unfertilized plots. The test environments provided response to good and poor management which represented the yield variations in the area, ranging from 135 to 220 kg/rai.



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