THE PERFORMANCE OF NEW SOYBEAN CULTIVARS AT MAHA ILLUPPALLAMA

V. Arulnandhy, Research Officer,
Regional Research Centre, Maha Illuppalama.

INTRODUCTION:

Soybean (Glycine max (L) Merrill) is one of the most important crops today because it provides both high quality protein and oil and the aminoacid pattern in protein approaches the optimum recommended by the Food and Agricultural Organisation of the United Nations for human consumption. The soybean cultivation has been increased tremendously during the past few years in this country, which in turn demands high yielding cultivars. It is also noticed that seed deterioration in storage is one of the major constraints in soybean production in Sri Lanka. The new cultivars dealt in this paper were bred and selected for high yield and superior storability as well.

This paper deals with the results of five new soybean cultivars and one standard cultivar, namely Pb-1, from several experiments carried out inthe Agricultural Research Station, Maha Illuppallama between 1980 and 1983.

MATERIALS AND METHODS:

These experiments were conducted during the years 1980, 1981, 1982 and 1983 in both Yala and Maha seasons at the Agricultural Research Station, Maha Illuppallama. Each experiment was designed as a randomized complete block with four replications.

Planting during each season commenced at the appropriate time. Normal field preparation was carried out by tractors, with an initial ploughing and a subsequent harrowing and levelling. A plot consisted of four rows, three metres long and spaced 40 cm. apart. planting was on ridges. The plants were thinned out at one week after planting to obtain the required plant population. A basal fertilizer dressing of N:P:K = 20:26:33 was given at planting with seed inoculation with the commercial rhizobium culture 'NITRAGIN-S'. Two weedings were given at two and four weeks after planting. Supplimentary irrigations were provided as and when necessary . The observations taken are given below :-

YIELD :This was measured by harvesting the centre two rows in each plot. Seed weight was adjusted to 12% moisture.

DAYS TO MATURITY - Period between date of planting and date of 95% of pods were mature in plot.

PLANT HEIGHT - Average height of 10 plants selected randomly in the centre two rows in each plot at maturity.

ONE HUNDRED SEED WEIGHT - Taken after the seeds are cleaned and dried, then adjusted to 12% moisture.

SEED QUALITY - Ranked visually from 1-3, where 1=good, 2 = fair, 3 = poor.

STORABILITY - This was determined by storing the seeds under ambient conditions and germination tests were performed at one month intervals up to 12 months. Seeds from experiments conducted in Maha 1980/81 and Maha 1982/83 were used to evaluate storability.

RESULTS AND DISCUSSION:

YIELD: Performance of the cultivars was variable within and between seasons. None of the cultivars showed consistantly high yields. The variability in performance may be due to the fact that soybean cultivars show high response to slight variations in climate and soil including water availability. However, the new cultivars gave higher seed yields than the standard cultivar Pb-1 in every season with few exception (Table 1). The cultivars F73-14-18-3(1)2(2) and PM-78-8-5-19 in Yala 1981, PM-78-2-5-25 in Yala 1982, F73-14-18-3(1)2(2) again in Maha 1982/83, and PM-78-13-5-12 and PM-78-6-5-13 in Yala 1983 were found significantly superior to the standard cultivar Pb-1. Thus all the new cultivars gave significantly higher yields than Pb-1 at least in one season. Averaged over seven seasons, the increased seed yield of these cultivars over Pb-1 ranged from 5 to 28 percent.

DAYS TO MATURITY:

Days to maturity of the new cultivars ranged from 89 to 101 (Table 2). The cultivar PM-78-6-5-13 matured in 89 days, wh ich was the earliest among the new cultivars and was the same as the standard cultivar Pb-1 while the others matured one or two weeks later than Pb-1.

PLANT HEIGHT:

All these new cultivars showed determinate growth habit and the plant height at maturity ranged from 50.5 to 85.7 cm (Table 2). The tall cultivars were found to lodge slightly.

SEED WEIGHT AND QUALITY:

Seed weight has been demonstrated to be genetically inherited varietal characterestic. The range of one hundred seed weight of these cultivars was 9.3 to 16.2 grams (Table 2). The seed quality of the new cultivars was ranked good to fair. Generally, the seed quality of the cultivars that are small with shiny seed coat is superior to large seeded cultivars with dull seed coat in most cases. It was observed by few other workers that small seeds haboured less seedborne fungi, which are a prime cause for seed deterioration.

STORABILITY

The cultivar PM-78-2-5-25 with the smallest seed possessed the best storability characterestic as compared to the others (Table 2). All the new cultivars, excluding F73-14-18-3(1)2(2), maintained a germination percentage of above 80 for a period of 6-8 months as compared to 3-4 months in the case of Pb-1, whch was the same with F73-14-18-3(2)2(2). High seed yield in the latter cultivar compansates its low storability (Tables 1 and 2).

SUMMARY AND CONCLUSION

Five new soybean cultivars along with a standard cultivar Pb-1 were tested for their performance during 1980, 1981, 1982 and 1983 in both Yala and Maha seasons.

Yield of the cultivars was variable within and among seasons. However, all the new cultivars have given significantly higher seed yield than the standard cultivar Pb-1 at least in one season. On the average, the new cultivars produced 5-28 percent more seed than Pb-1. One of the

new cultivars matured as early as the standard cultivar Pb-1 while the others matured one or two weeks later. Plant height ranging from 50 to 86 cm in these cultivars did not cause much lodging. Small to medium size and fair to good quality seed have been acceptable. The cultivar PM-78-2-5-25 with the smallest seed possessed the best storability characterestic while the other new cultivars were found superior instorability to Pb-1 except F73-14-18-3(1)2(2) which was not inferior to Pb-1.

Thus, it appears that the new cultivars included in these tests are superior to the standard cultvar Pb-1 either in seed yield or in both seed yield and storability and possess other agronomical characteristics which are highly desirable.

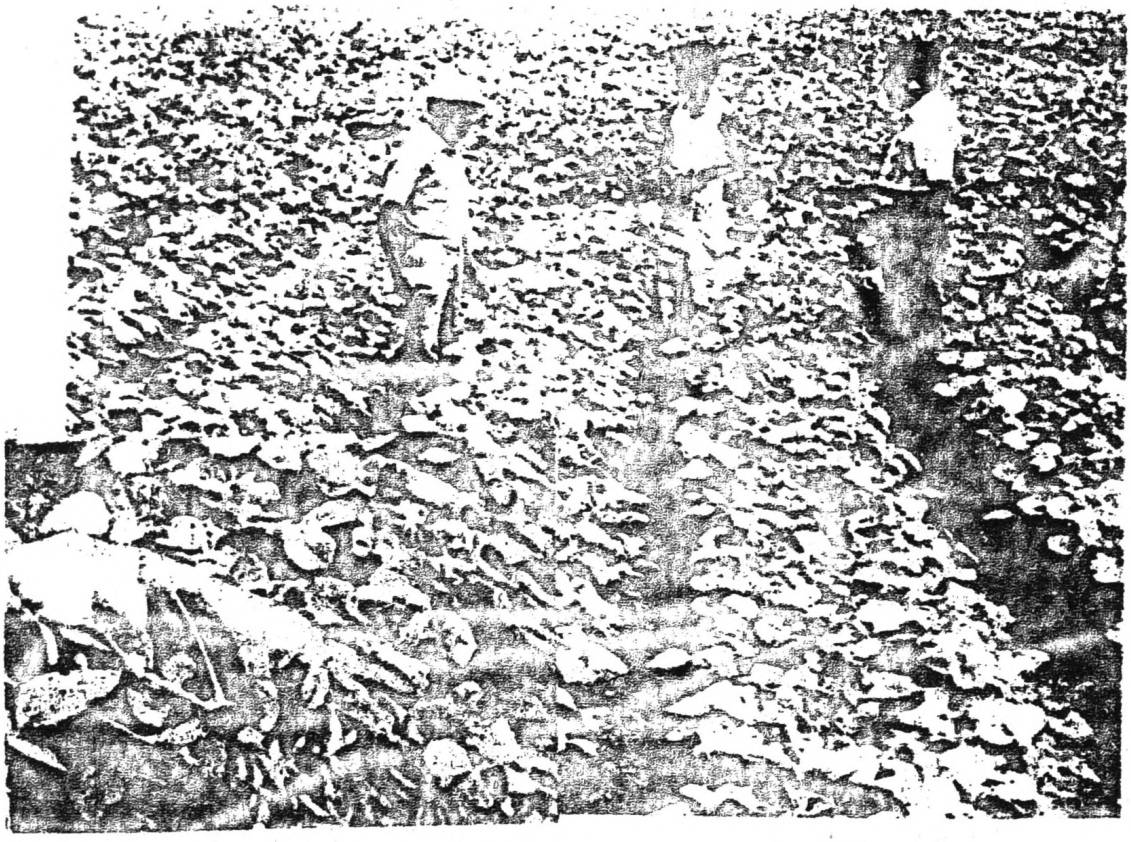

TABLE : 1 Seed yield of five new and one standard soybean cultivars tested in seven seasons at Maha Illuppallama.

Cultivar	Yala 1980	Maha 1980/81	Yala 1981	Maha 1981/82	Yala 1982	Maha 1982/83	Yala 1983	Mean	Percent of check (Pb-1)
F73-14-18-3(1)2(2)	3459*	3949	3262	2904	-	3437	3034	3241	128
PM-78-2-5--25	2805	2926	2751	2807	3009	-	3095	2899	112
PM-78-13-5-12	2986	2820	2262	2311	2540	2805	3344	2724	107
PM-78-6-5-13	2736	2625	2667	2485	2515	2639	3265	2705	106
PM-78-8-5-19	2695	2368	3129	2457	2113	3168	2853	2683	105
Pb-1 (Standard)	2665	2582	2278	2352	2393	2747	2757	2553	100
L.S.D.(P=0.05)	-	-	516	N.S.	546	519	428		
C.V. in %			10.09	14.17	20.80	12.08	14.87		

* Seed yield in Kg/ha.

\+ N.S.= Not significant.

TABLE: 2. Some important agronomical characteristics of five new and one standard Soybean cultivars.
(Average of seven seasons - Yala 1980 to Yala 1983).

Cultivar	Days to maturity.	Plant height at maturity in cm.	100 seed weight in grams.	Seed Quality.*	Storage period in months.
F73-14-18-3(1)2(2)	95	50.5	16.2	2	3 - 4
PM-78-2-5-25	99	30.7	9.3	1	8
PM-78-13-5-12	101	83.6	11.9	2	6 - 8
PM-78-6-5-13	89	54.4	12.6	1	6 - 8
PM-78-8-5-19	100	35.7	12.4	1	6 - 8
Pb-1 (Standard)	88	51.5	12.4	1	3 - 4

* Seed quality where 1 = good, 2 = fair and 3 = poor; Evaluation was done with the seeds from experiments conducted in Maha 1982, 83 and Yala 1983.