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ABSTRACT

This paper provides a third comparison of TPS-derived planting materials and farmer seed. In this comparison commercially produced first generation (g1) seedling tubers are compared against farmer seed in a fall season planting. Both yields and net returns to variable costs are higher for g1 seedling tubers than for farmers seed. This is contrary to results for g1 seedling tubers in the previous studies.

I. INTRODUCTION

Agricultural growth requires continuous improvement of crop production technology at the farm level. As a component of improved potato production technology, applied research at the International Potato Center (CIP) experiment station at Kafr El-Zayat has focused on producing seedling tubers from true (botanical) potato seed as an alternative type of planting material for farmers (El Bedewy et al, 1987).

On-farm research is considered an appropriate tool to verify research recommendations to potato growers. It also provides research feed-back regarding farmers' experience with the new technology. This research report continues the documentation of on-farm monitoring of the performance of seedling tubers compared to farmers' usual seed as reported in Crissman et al (1990) and Sabae et al (1990).

In Egypt, potato planting traditionally come from three different sources: imported European seed for spring planting , local farmer produced seed for fall planting and locally improved seed for winter and spring planting. This study was undertaken during the 1989 fall season. Farmers' fields in two different agroecological locations were monitored to compare seedling tubers and farmer produced seed. Net returns to variable costs and seed efficiency in terms of area and amount of seed used are calculated. The results of this additional season of monitoring further confirm the results of the earlier studies.

II. MATERIALS AND METHODS

The seedling tubers were produced by the Pioneer Seed Company (Egypt) and consisted only of the first generation multiplication (g1). This is in contrast to seedling tubers used in the previous study which were produced under experimental conditions. The quantity of available seedling tubers was sufficient for 37 farmers. Hence the study sample was limited to these farmers whose farms are located in seven different districts in three governances, Gharbia, Kafr El-Sheikh and Monofia. The farmers in the sample are thus those already inclined to accept a new technology.

For each of the 37 farmers data were collected for parcels planted with seedling tubers and the farmers own seed. The seedling tubers were the first generation (g1) progeny of crosses of Serrana x DTO-28 and Atzimba x DTO-28. Data were collected using a questionnaire during four visits during the production period September, 1989 to February, 1990.

Data collected included physical inputs and their costs, production and farm prices. Farm prices were used in calculating costs of inputs, while opportunity costs were applied when inputs were owned by the farmer. Since the progeny were not available in the market, their costs were based on the price previously calculated by El Bedewy and Crissman (1990) and El Bedewy et al (1990). Yields were estimated by harvesting three random replicates of one square meter. This was done for each variety or progeny in the parcel.

III. RESULTS AND DISCUSSION

Data collected through the questionnaire were analyzed and results are presented in the tables. Table 1 details the average amounts of physical inputs used in producing one hectare. The parcels planted with seedling tubers ranged in size from 500m2 to one hectare. The farmers treated the seedling tubers as different from seed tubers only in the seeding rate. Table 1 shows that there was little difference in the other inputs used for seedling tuber or seed tuber-based production.

Following provisional seeding rate recommendations from CIP, the farmers used about 750 kg/ha of seedling tubers as compared to over 4.5 t/ha for farmer seed. In addition to the different genetic potential of the progeny, this change in seeding rate represents the major difference in the seedling tuber technology versus seed tubers. While seedling tuber prices are approximately double those of seed tubers, the much lower seeding rate results in a seed cost for seedling tubers one third of that of seed tubers. With all other inputs being used in similar amounts, the difference in seed costs accounts for almost all the difference in total variable costs (Table 2). Pioneer based the price charged to farmers on data from El Bedewy et al (1990). It can be expected that Pioneer will increase prices in the future. Based on results in table 2 the farmers would be willing to pay up to $9.27 per kilogram of seed before using their own seed becomes more attractive. Prices received for production were similar. Using seedling tubers resulted in net returns to variable costs much superior to returns to using farmer produced seed.

Despite the lower seeding rate, yields per feddan of the seedling tubers were slightly superior to the farmers usual seed. The hybrid vigor of the progeny and the lack of yield depressing seed-borne diseases may explain this favorable result. The yield per ton of seed also is a useful measure of the efficiency of the input. In that respect seedling tubers were many times superior to seed tubers.

The cost of producing one unit of production is also an important criterion determining the characteristics of a new technology. Table 2 also shows that the average cost of producing one ton of potatoes declined from about $550 to $300. This is an indication of the potential for eventually reducing costs to consumers for potatoes purchased in the market.

IV. SUMMARY

This paper continues the comparative analysis of the performance of seedling tubers verses farmer seed initiated in Crissman et al (1990) and El Bedewy et al (1990). The principal difference is that only g1 seedling tubers were available and these seedling tubers were produced on a commercial rather than experimental basis.

The performance of the g1 seedling tubers was superior to that of the farmers seed. Yields per area were marginally higher and combined with lower variable costs produced net returns significantly higher. The other measures of seed performance, yield per unit of seed and cost per unit of production were also higher for seedling tubers. These results reverse the standing of g1 seedling tuber performance noted in the previous studies.

IV. REFERENCES

Crissman, C.C., M.F. Sabaa, R. El Bedewy & M.F. Sharaf. 1990. Agroeconomic Evaluation of Different Types of Potato Planting Material in Egypt. Social Science Department Working Paper 1990-4 International Potato Center, Lima Peru. 24 p.

R. El Bedewy and C.C. Crissman. 1990. Costs of Seedling Tubers Produced from True Potato Seed: An Estimate Based on Experimental Production in Egypt. Social Science Department Working Paper 1990-6. International Potato Center, Lima Peru. 10 p.

_____, M.F. Sabaa, C.C. Crissman & M.F. Sharaf. 1990. Costs of Seedling Tubers Produced from True Potato Seed in the Spring Season in Egypt, 1989. Social Science Department Working Paper 1990-7. International Potato Center, Lima Peru. 13 p.

_____, C. Engels & J. Schwenkel. 1987. Potential of Using True Potato Seed. CIP Circular. vol 15 no. 4, Dec 1987.

Sabaa, M.F., R. El Bedewy, C.C. Crissman & M.F. Sharaf. 1990. Agroeconomic Evaluation of Different Types of Potato Planting Material for the Spring Season in Egypt, 1989. Social Science Department Working Paper 1990-5. International Potato Center, Lima, Peru. 10 p.

Table 1. Potato production input use per hectare, Egypt, Fall Season, 1990.

Activity	Seedling Tubers	Seed Tubers
No of observations	37	37
Labor (days)	137.8	133.8
Animal Hours	58.1	60.2
Tractor Hours	34.8	37.6
Irrigation Pump Hours	36.9	40.2
Motor Sprayer Hours	26.4	23.8
Fertilizer (kg)		
N	433.8	440.2
P_2O_5	151.9	193.3
K_2O	137.1	105.5
Manure (cubic meters)	76.2	90.5

Source: Own Survey

Table 2. Yields, Returns and Costs of Potato Production in US Dollars per Hectare, Egypt, Fall Season, 1990

	Seedling Tubers	Seed Tubers
Number of observations	37	37
Returns to Variable Inputs:		
Seed Rate (kg/ha)	746.9	4,752.1
Seed Price ($/kg)	2.59	1.35
Seed Cost	1,934.47	6,415.33
Labor Cost	1,626.42	1,513.28
Machinery Cost	673.07	658.93
Animal Cost	227.57	230.78
Fertilizer Cost		
N	763.07	804.86
P_2O_5	228.86	258.83
K_2O	48.21	52.07
Pesticides	762.43	741.21
Manure	406.93	308.57
Total Variable Costs	6,671.03	10,983.46
Yield (tons/ha)	21.9	20.2
Output price ($/ton)	872.26	912.38
Total Revenue	19,102.49	18,430.08
Net Returns to Variable Costs	12,431.46	7,446.62
Rate of Return	1.9	0.7
Measures of Seed Efficiency		
Yield (tons/ton of seed)	29.3	4.3
Costs/Unit production	304.61	543.73

Source: Own Survey

Appendix Table 1. Potato production input use per feddan, Egypt, Fall Season, 1990.

Activity	Seedling Tubers	Seed Tubers
No of observations	37	37
Labor (days)	57.9	56.2
Animal Hours	24.4	25.3
Tractor Hours	14.6	15.8
Irrigation Pump Hours	15.5	16.9
Motor Sprayer Hours	11.1	10.0
Fertilizer (kg)		
N	182.2	148.9
P_2O_5	63.8	81.2
K_2O	57.6	69.5
Manure (cubic meters)	32	38

Source: Own Survey

Appendix Table 2. Yields, Returns and Costs of Potato Production in Egyptian Pounds per Feddan, Egypt, Fall Season, 1990.

	Seedling Tubers	Seed Tubers
Number of observations	37	37
Returns to Variable Inputs:		
Seed Rate (kg/feddan)	313.7	1195.9
Seed Price (LE/kg)	0.96	0.50
Seed Cost	301.2	997.5
Labor Cost	253.0	235.4
Machinery Cost	104.7	102.5
Animal Cost	35.4	35.9
Fertilizer Cost		
Nitrogen	118.7	125.2
P_2O_5	35.6	40.2
K_2O	7.5	8.1
Pesticides	118.6	115.3
Manure	63.3	48.0
Total Variable Costs	1038.3	1726.3
Yield (tons/feddan)	9.2	8.5
Output price (LE/ton)	323.06	337.92
Total Revenue	2973.4	2885.2
Net Returns to Variable Costs	1935.1	1159.2
Rate of Return	1.86	0.7
Measures of Seed Efficiency		
Yield (tons/ton of seed)	29.3	4.3
Costs/Unit production	112.8	202.2

Source: Own Survey

Note: One Feddan is .42 ha and EL 2.70 is US$1.