

EVALUATION OF SOME NEW SWEET POTATO BREEDING LINES

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ABSTRACT *Two field experiments were conducted to develop new sweet potato lines from true seeds. The results could be summarized as follows :*

1- Significant differences were found among studied breed clonal lines in all experimental seasons in all studied traits.

2- Some of breeding lines showed good results for all parameters, while other lines showed good results for some parameters and bad results for others.

3- For number of leaves on main stem, the line No. 9 showed the highest value (56.50), followed by the line No. 10 with average value of 54.40 and significantly exceeded "Mabrouka" cv. (the highest check cv.) by 26.40 and 23.64 %, respectively, produced the largest number of leaves/main stem 71.89 and 56.10, respectively.

4- For leaf area, none of the resulted breed lines statistically exceeded or similar to the check cv. "Mabrouka" (the highest check cv.).

5- Significant differences among the evaluated breeding lines were observed in total tuber yield as weight of roots/plant. The highest total yield was recorded by the three lines No. 10, 16 and 35, since they produced more than 1.00 kg/plant. On the other hand, the lowest yield values were observed by the lines No. 3, 32, 33, 34, 55, 60, 65 and 73, where they gave total tuber yield less than 500 kg/plant. The remaining lines were found between the two mentioned values in this respect. Generally, the evaluated breeding lines significantly exceeded the check cvs. in total yield.

6- As for the number of tuber roots/plant it was ranged from 1.22 to 8.47 with a mean of 4.43 root/plant, in the breeding lines compared with 1.71 to 3.65 with a mean of 2.9 root/plant, in the check cultivars. The lines No. 35, 10, 61, 4, 9 and 16 produced the highest value in total root number. They gave number of roots ranging from 5.1 to 8.47 roots/plant. Unlikely, the lowest number of roots/plant (1.22, 2.56 and 2.67) was given by the lines 34, 36 and 65, respectively. The remaining lines were ranked between the two groups. Data also showed that except the line No. 34 all the obtained breeding lines outyielded the check cv. 925 and Jewel, respectively.

7- As for the average root weight (kg), there were significant differences in average root weight among the lines studied, since the mean values ranged from 0.091 to 0.235 kg. The line No. 62 produced the heaviest roots (0.235 kg)

followed by the line No. 36 with an average root weight of 0.217 kg. The average root weight was recorded in the line No. 73 (0.91 kg). The line No. 62 was significantly heavier than the check cv. Mabrouka.

8- As for the root length (cm), significant differences were detected among the lines studied in root length. The breeding lines produced roots with root length ranging from 9.33 to 21.16 cm. The lines No. 10, 19, 35 and 36 produced the longest roots. They, respectively, gave roots with a mean length values of 21.16, 20.25, 19.56 and 19.01 cm which significantly exceeded the remaining lines and check cultivars.

9- Tuber root diameter (cm), the studied new lines varied greatly in this trait. The average tuber root diameter in this lines ranged from 2.05 cm (in line 34) to 6.95 cm (in the line 4). The highest tuber root diameter values were observed by the lines 4, 23, 62 and 10. Their averages were 6.95, 6.32, 6.29 and 6.23 cm, respectively, while the lowest diameter values (2.05, 3.48, 3.53 and 3.98) were given by the lines No. 34, 52, 73 and 32, respectively.

10- The skin colour at the studied lines were varied greatly in root skin colour, the colour was visual determined based on scale from 1 to 9, from white to dark purple. However, seven degrees of skin colour were observed in roots of the breeding lines as follows : creamy-white (the line 55), brownish (such as No. 34, 37 & 60), pink (such as line No. 10, 19, 36, 65, 70 & 73), red (such as No. 3, 35 and 66), purplish-red (involved No. 9, 16 and 33), purple (line No. 4 & 62) and dark purple (which observed in the lines No. 23, 30, 32, 51, 52 & 61). The check cultivars 925, Jewel and Mabrouka produced tuber roots with skin colour of brownish, red and dark purple, respectively.

11- Regarding tuber flesh colour, the studied lines varied greatly from white to dark orange. They can be classified into three groups based on their tuber flesh colour as follows : (1) white-cream group, such as the line No. 61, 62, 3 and 23; (2) yellow group, which involved three degrees of colour such as pale yellow (No. 55), yellow (No. 33 and 60) and dark yellow (No. 34); (3) orange group also had three degrees of colour, i.e. pale orange (No. 10), orange (No. 9, 19, 35 and 37) and dark orange which involved the lines No. 4, 16, 30, 33, 36, 51, 52, 65, 66, 70 and 73. The check cv. Jewel had dark orange colour, while Mabrouka and 925 cvs. gave roots with white flesh colour.

Key words: Sweet potato, Lines, Breeding, Characteristics.

INTRODUCTION

Sweet potato (*Ipomoea batatas* L.) is consider the sixth most important food crop in the world (Morrison et al., 1993). It is also, consider the dominant food crop in much of the countries specially in the tropical and subtropical countries.

Tuberous roots are a good source of carbohydrate, protein, vitamin C, carotene and some minerals.

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In Egypt, the average production is about 10.1 ton/fed. (Source : Division of Vegetables and Fruits Statistics, General Administration of Agric. Economic and Statistics, Min. of Agric., Egypt). Low production due to use old varieties in cultivation. Therefore, more attention must be given for increasing the total yield production in this crop.

The aim of this investigation is to develop some new lines by using the sexual reproduction.

MATERIALS AND METHODS

The objective of this research is to develop new sweet potato lines from true seeds.

Two field experiments were conducted at two locations, *i.e.*, Agricultural Experimental Farm, Faculty of Agriculture, Menoufiya University, Shebin El-Kom and Barrage Experimental Station of Horticulture Research Institute during 1994 and 1995.

The plant materials used in this study were true seeds of complex cross involving 26 parental cultivars. The seeds were brought from Coastal Research and Education Center, Charleston, Clemson University, South Carolina, U.S.A.

The seeds of sweet potato are hard and retain viability for 20 years or more. Germination is consequently very irregular unless some means of seeds scarification is used. Therefore, the seeds were soaked in concentrated sulfuric acid for 30 min. and washed in water (Jones *et al.*, 1986) before sowing.

In the first season (1994), the seeds were sown in nursery in February and the seedlings were transplanted in the fields in May. 327 different plants were resulted. Preliminary observations were recorded on the morphological features, flowering and tuber root yield for these plants as individuals.

In the second season (1995), the clonal progenies of only 24 selected plants from the 327 ones, beside the most common cultivars grown in Egypt, *i.e.* "925" and "Mabrouka" were evaluated in field experiment. The lines are No. 3, 4, 9, 10, 16, 19, 23, 30, 33, 34, 35, 36, 37, 51, 52, 55, 56, 60, 61, 61, 65, 70 and 73.

A randomized complete block design with three replicates was used in all evaluation experiments. Each plot contained 18 plants spaced at 90 x 50 cm.

Three cultivars, *i.e.* "925", "Jewel" and "Mabrouka", which widely used in Egyptian cultivation, were used as control in all evaluation experiments.

In all seasons, the planting date was 7th May. Usual fertilization, and irrigation were practiced as used with commercial production of sweet potato. The harvest was done at full maturity (about 180 days after transplanting).

The studied traits were :

1- Plant characters :

These characters were determined after 110 days from transplanting :

a- Number of leaves on the main stem.

This character was determined for three plants in each replicate in all seasons.

b- Leaf area : This character was determined for the fifth leaf from the top by cutting out ten leaf discs of three leaves from each plot using a cork borer and drying them in an oven at 70°C for 2 days. Based on the known dry weight of a known surface area of leaves, viz., leaf discs and total dry weight of leaves, leaf surface area was determined.

2- Yield :

This trait was determined at harvesting at 180 days after transplanting :

a) Total yield of tuber roots/plant.

b) Average number of tuber roots/plant.

c) Average tuber root weight (kg).

d) Tuber root length (cm).

e) Tuber root diameter.

f) Skin colour.

g) Flesh colour

Statistical Analysis :

All data obtained during both seasons of every experiment were subjected to statistical analysis according to Snedecor and Cochran (1972). Mean values represented the various investigated genotypes were compared by the Duncan multiple range test (Duncan, 1955).

RESULTS AND DISCUSSION

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The following Tables (1-3) showed the combined data of the two experimental seasons (1994 & 1996), for 24 new sweet potato lines and three check cultivars with regard to some foliage and tuber root characteristics.

1- Foliage characteristics :

a- Number of leaves on the main stem :

Data in Table (1) indicated significant differences among the studied genotypes in this trait. The number of leaves on main stem ranged from 24.84 (in the line 66 to 56.50 (in the line 9). The new lines 9, 10, 23, 32 and 30 showed the maximum values. Their average number of leaves were 56.50, 54.40, 45.97, 45.84 and 44.50, respectively.

On the other hand, the lowest number of leaves was reflected by the lines 66, 34, 60, 16, 3, 33 and 36, they showed 24.84, 27.67, 28.17, 28.84, 28.90, 30.17 and 30.34 leaves, respectively.

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Table (1) : Mean performance of the evaluated sweet potato breeding lines and check cultivars for number of leaves and leaf area (combined data) at Shebin El-Kom and Barrage Experimental St. (1994 & 1996).

Genotypes No.	No. of leaves	Leaf area (cm²)
3	28.90 n	34.68r
4	40.17g	56.23l
9	56.50a	71.96i
10	54.40b	108.20b
16	28.84n	65.11i
19	41.90f	37.57q
23	45.97c	85.78e
30	44.50d	83.31f
32	45.84c	26.15s
33	30.17m	87.82d
34	27.67n	33.88r
35	43.85de	53.00m
36	30.34m	50.63n
37	34.95k	103.72c
51	32.67l	38.20q
52	38.50i	50.70n
55	35.34k	57.11l
60	28.17n	40.41p
61	39.84gh	74.43h
62	38.84hi	77.43g
65	33.34l	64.05ik
66	24.84o	52.49m
70	39.83gh	75.25h
73	37.00i	44.54o
925	42.67ef	45.52o
Jewel	38.50i	63.46k
Mabrouka	44.00d	124.93a

* Means within a column followed by different letters are significantly different at the 0.05 level.

The number of leaves in the remaining new lines, *i.e.*, 35, 19, 4, 61, 70, 62, 52, 37, 65 and 51 ranged from 32.671 (in the line 51) to 43.85 (in the line 35). Similar results were obtained by Bourke (1984), who found significant varietal differences for this trait in sweet potato cultivars.

b- Leaf area (cm²) :

As shown in Table (1) the genotypes studied significantly differed in this trait. The average leaf area (cm²) ranged from 26.15 (in the line 32) to 108.20 (in the line 10). Moreover, the lines 10, 37, 33, 23, 30 and 62 produced the maximum leaf area. Their averages were 108.20, 103.72, 87.82, 85.78, 83.31 and 77.43, respectively. Meanwhile, the lines 32, 34, 3, 19, 51 and 60 gave the lowest values (26.15, 33.88, 34.68, 37.54, 38.20 and 40.41, respectively).

Concerning the remaining lines, *i.e.* No. 70, 61, 9, 16, 65, 55, 4, 35, 66, 52, 36 and 73 were intermediate in this respect. Since their values ranged from 75.25 cm (in the line 70) to 44.54 cm² (in the line 73). Our results were in agreement with those obtained by Fathy (1979) and Medeiros *et al.* (1990) regarding the differences among sweet potato cvs. for leaf area.

2- Total yield and tuber root characteristics :

a- Total yield (kg/plant) :

Significant differences among the evaluated breeding lines were observed in total tuber yield as weight of roots/plant (Table 2). The highest total yield was recorded by the three lines No. 10, 16 and 35, since they produced more than 1.00 kg/plant. On the other hand, the lowest yield values were observed by the eight lines No. 3, 32, 33, 34, 55, 60, 65 and 73, where they gave total tuber yield less than 0.500 kg/plant. The remaining lines were found between the two mentioned values in this respect.

Generally, the evaluated breeding lines significantly exceeded the check cvs. in total yield. The weight of tuber roots was ranged from 0.194 to 1.088 with a mean of 0.626 kg/plant, in the studied lines, compared with 0.351 to 0.463 with a mean of 0.398 kg/plant in the check cvs. It is easily observed that, 13 lines significantly outyielded the cultivar "Jewel" (the highest check cv.) in average total yield. The percentage of increase in these lines was ranged from 19.87 % in the line 36) to 134.99 % (in the line 35). While, most lines (21 ones) significantly outyielded the check cv. "Mabrouka" by percentages ranging from 23.93 % (in the line 33) to 209.97 % (in the line 35). It is a very good result when some of our breeding new lines outyielded the commercial cultivars "Jewel" and "Mabrouka". Then, it could be concluded that, these new lines are very good and could be recommended as new cultivars for using in commercial production. Varietal differences in total yield of sweet potato were also found by many authors among there were Chiappe *et al.* (1984), who revealed that the best root yield were obtained from Maleno cv. (30 t/ha), Ihuance cvs. (20 t/ha), Alcalá (18 t/ha) and Buen

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Pobre (16 t/ha). Tao *et al.* (1986) found that the cultivar "83-Shenjin" has yield of 394.6 g/plant, this value was 31.53 higher than that of the control "Xushu 18". Reddy *et al.* (1996) found that the "Vikram" genotype recorded the highest average yield (59.1 t/ha), "C-43" (44.5 t/ha), "X-91" (44.5 t/ha), "X-38" (44.2 t/ha) and "H-268" (43.5 t/ha).

b- Number of tuber roots/plant :

Data concerning total tuber root number per plant are shown in table (2). Average number of tuber roots/plant was ranged from 1.22 to 8.47 with a mean of 4.43 root/plant, in the breeding lines, compared with 1.71 to 3.65 with a mean of 2.90 root/plant, in the check cultivars. The lines No. 35, 37, 10, 61, 4, 9 and 16 produced the highest values in total root number. They gave number of roots ranging from 5.10 to 8.47 roots/plant. Unlikely, the lowest number of roots/plant (1.22, 2.56 and 2.67) was given by the lines 34, 36 and 65, respectively. The remaining lines were ranked between the two groups.

Data also showed that, except the line No. 34, all the obtained breeding lines outyielded the check cv. "Mabrouka" in total tuber roots/plant. While, 35 and 37 lines surpassed the check cv. "925" and "Jewel", respectively. They surpassed "925" cv. by proportion ranged from 10.68 % (in the line 51) to 135.05 % (in the line 35).

These results are in agreement with those obtained by Sun (1992), who found that the number of tuber was 3-5 tubers/plant in new sweet potato genotypes. Reddy *et al.* (1996) found that the highest average number of tubers was 7.1 roots/plant in the cultivar "Vikram".

c- Average tuber root weight (kg) :

Data of the average root weight are listed in Table (2). There were significant differences in average root weight among the lines studied, since the mean values ranged from 0.091 to 0.235 kg. The line No. 62 produced the heaviest roots (0.235 kg), followed by the line No. 36 with an average root weight of 0.217 kg. On the other hand, the lowest root weight was recorded in the line No. 73 (0.091 kg).

Comparing the various breeding studied new lines with the check cvs., showed that only the line No. 62 was signh avier than the check cv. "Mabrouka" (the highest check cv.). Meanwhile, the percentage increase in a root weight was ranged from 18.57 % (in the line 65) to 67.86 % (in the line 62) relative to the check cv. "Jewel", while the increases ranged from 24.76 % in the line 32 to 123.81 % (in the line 62) compared with the check cv. "925".

d- Tuber root length (cm) :

Data of root length are shown in Table (2). From this table, significant differences were detected among the lines studied in root length. The breeding lines produced roots with root length ranging from 9.33 to 21.16 cm. The lines No. 10, 19, 35 and 36 produced the longest roots. They,

Table (3): Mean performance of the evaluated breeding lines and and cheek cultivars for total yield of tuber roots, number of roots per plant, average of tuber root weight (kg) and tuber root length (cm) (combined- data) at Shebin El-Kom and Barrage Experimented St. (1994 & 1996).

Lines	Total yield of tuber root		No. of roots per plant	Average tuber root weight (kg)	Tuber root length (cm)
	Kg/plant	Ton/feddan			
3	0.473 ^{g-i*}	4.73 ^{g-i*}	3.31 ^l	0.143 ^{e-h}	13.73 ^k
4	0.702 ^d	7.02 ^d	5.46 ^d	0.129 ^{g-j}	11.55 ^{mn}
9	0.598 ^f	5.98 ^f	5.33 ^{de}	0.113 ^{i-j}	13.78 ^k
10	1.055 ^a	10.55 ^a	5.99 ^c	0.176 ^{cd}	21.16 ^a
16	1.048 ^a	10.48 ^a	5.10 ^{ef}	0.206 ^b	14.83 ^j
19	0.694 ^d	6.94 ^d	4.36 ^h	0.160 ^{d-f}	20.25 ^b
23	0.873 ^{bc}	8.73 ^{bc}	4.49 ^h	0.195 ^{bc}	15.21 ^{lj}
30	0.517 ^{g-i}	5.17 ^{g-i}	4.96 ^{fg}	0.104 ^{kl}	12.33 ^l
32	0.435 ^{i-k}	4.35 ^{i,k}	3.33 ^l	0.131 ^{g-i}	15.29 ⁱ
33	0.435 ^{i-k}	4.35 ^{i-k}	4.79 ^g	0.091 ^l	15.38 ⁱ
34	0.194 ^m	1.94 ^m	1.22 ^o	0.159 ^{d-f}	16.30 ^h
35	1.088 ^a	10.88 ^a	8.47 ^a	0.128 ^{g-k}	19.56 ^c
36	0.555 ^{fg}	5.55 ^{fg}	2.56 ^m	0.217 ^{ab}	19.01 ^d
37	0.611 ^{ef}	6.11 ^{ef}	6.56 ^b	0.093 ^l	15.58 ^l
51	0.516 ^{g-i}	5.16 ^{g-i}	4.04 ⁱ	0.128 ^{g-k}	16.95 ^g
52	0.682 ^{dc}	6.82 ^{de}	4.43 ^h	0.154 ^{d-g}	9.33 ^o
55	0.365 ^{kl}	3.65 ^{kl}	3.54 ^{kl}	0.104 ^{kl}	17.11 ^g
60	0.481 ^{g-i}	4.81 ^{g-i}	3.32 ^l	0.145 ^{e-h}	11.40 ⁿ
61	0.800 ^c	8.00 ^c	5.54 ^d	0.144 ^{e-h}	14.81 ^j
62	0.893 ^b	8.93 ^b	3.79 ^{i-k}	0.135 ^a	17.68 ^{ef}
65	0.443 ^{i-k}	4.43 ^{i,k}	2.67 ^m	0.166 ^{de}	17.27 ^{fg}
66	0.538 ^{f-h}	5.38 ^{f-h}	4.43 ^h	0.122 ^{h-k}	11.82 ^m
70	0.97 ^d	6.97 ^d	4.88 ^{fg}	0.143 ^{e-h}	16.39 ^h
73	0.348 ^l	3.48 ^l	3.82 ^{lj}	0.091 ^l	16.18 ^h
Check cvs:					
925	0.382 ^l	3.82 ^l	3.65 ^{jk}	0.105 ^{j-l}	13.49 ^k
Jewel	0.463 ^{h-j}	4.63 ^{h-j}	3.33 ^l	0.140 ^{f-h}	11.91 ^{lm}
Mabrouka	0.351 ^l	3.51 ^l	1.72 ⁿ	0.206 ^b	17.71 ^e

* Mean within a column followed by different letters are significantly different at the 0.05 level.

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respectively, gave roots with a mean length values of 21.16, 20.25, 19.56 and 19.01 cm, which significantly exceeded the remaining lines and check cultivars. They surpassed the check cv. "Mabrouka" (the highest check cv.) by 19.48, 14.34, 10.45 and 7.34 %, respectively. While, large number of the lines (19 ones) significantly exceeded the "Jewel" cv. in root length by proportion 15.28 % (in the line 3) to 77.67 % (in the line 10). On the other hand, the shortest roots, i.e. 11.82, 11.55, 11.40 and 9.33 cm, were given by the lines No. 66, 4, 60 and 52, respectively.

The results are in harmony with those of El-Shimi (1996) and El-Denary (1998) who reported significant differences in tuber root length among sweet potato lines and cultivars studied. The "US No. 1" has roots with 7.5-23 cm long. El-Shimi (1996) found that tuber root length (cm) of sweet potato cultivars "925", "1135" and "Mabrouka" were 22.3, 17.4 and 20.4, respectively. El-Denary (1998) found that tuber root length of sweet potato cvs. "Mabrouka", "Mansoura", "Golden Bright" and the line "925" were 29.9, 19.1, 13.8 and 17.4 cm, respectively.

e- Tuber root diameter (cm) :

Data of tuber root diameter are shown in Table (3). The studied new lines were varied greatly in this trait. The average tuber root diameter in this lines ranged from 2.05 cm (in the line 34) to 6.95 cm (in the line 4). The highest tuber root diameter values were observed by the lines 4, 23, 62 and 10. Their averages were 6.95, 6.32, 6.29 and 6.23 cm, respectively. While, the lowest diameter values (2.05, 3.48, 3.53 and 3.98) were given by the lines No. 34, 52, 73 and 32, respectively.

Comparing the various breeding studies lines with the check cvs. showed that only the line No. 4 had roots with diameter significantly higher than that of "Mabrouka" (the highest check cv.) by 7.25 %. While, the line No. 23 and 62 gave roots with diameter approximately similar to those of this check cultivar.

These results agreed with Hall (1993) who found that the varieties "Karingkit", "Kadulaw" and "US No. 1" had 10 cm for 1st and 2nd and 5-9 cm for the 3rd, respectively. El-Denary (1998) found that tuber root diameter of sweet potato cvs. "Mabrouka", "Mansoura", "Golden Bright" and the line "925" were 4.8, 3.5, 4.8 and 5.1 cm, respectively.

f- Skin colour :

Data concerning root skin colour in the evaluated new lines and the check cvs. are listed in Table (3). Skin colour of roots was visual determined based on scale from 1 to 9. The studied lines were varied greatly in root skin colour from white to dark purple. However, seven degrees of skin colour were observed in the roots of the breeding lines as follows : creamy- white (the line No. 55), brownish (such as No. 34, 37 & 60), pink (such as line No.

Table (3): Mean performance of the evaluated sweet and Barrage Experimented St. potato breeding lines and cheek cultivars for tuber root diameter, skin and flesh colour (Combined-data) at Shebin El-Kom and Barrage Experimented St. (1994 & 1996).

Lines	Characters	Tuber root diameter (cm)	Skin colour	Flesh colour
3		4.86 ^h	6 Red**	2 Cream***
4		6.95 ^a	8 Purple	8 Dark orange
9		4.85 ^{hi}	7 Purplish red	7 Orange
10		6.23 ^c	6 Pink	6 Pale orange
16		5.68 ^b	7 Purplish	8 D. orange
19		4.31 ^{ki}	6 Pink	7 Orange
23		6.32 ^{bc}	9 Dark purple	2 Orange
30		4.69 ^l	9 Dark purple	8 D. orange
32		3.98 ^h	9 Dark purple	4 Yellow
33		4.47 ^l	7 Purplish red	8 D. orange
34		2.05 ^p	5 Brownish	5 Dark yellow
35		5.25 ^{fg}	6 Red	7 Orange
36		5.52 ^e	6 Pink	8 D. orange
37		5.47 ^{ei}	5 Prownish	7 Orange
51		4.26 ^{lm}	9 Dark purple	8 D. orange
52		3.48 ^o	9 Dark purple	8 D. orange
55		4.03 ^{mn}	1 Creamy-white	3 Pale yellow
60		5.04 ^{gh}	5 Prownish	4 Yellow
61		5.95 ^d	9 Dark purple	1 White
62		6.29 ^{bc}	8 Purple	1 White
65		5.01 ^{gn}	5 Pink	8 D. orange
66		4.55 ^{jk}	6 Red	8 D. orange
70		4.68 ^l	5 Pink	8 D. orange
73		3.53 ^o	5 Pink	8 D. orange
Check cvs:				
202 (925)		4.55 ^{jk}	5 Prownish	1 White
205 (Jewel)		5.46 ^{ei}	6 Red	8 D. orange
206 (Mabrouka)		6.48 ^b	9 Dark purple	1 White

* Mean within a column followed by different letters are significantly different at the 0.05 level.

** where: 1 white-cream, 2 yellow, 3 orange, 4 brownish, 5 pink, 6 red, 7 purplishred, 8 purple and 9 dark purple-black (for skin colour)

*** Where: 1 white, 2 cream, 3 pale yellow, 4 yellow, 5 deep yellow, 6 red, 7 violet, 8 purple and 9 other (for flesh colour)

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10, 19, 36, 65, 70 & 73), red (such as No. 3, 35 and 66), purplish-red (involved No. 9, 16 and 33), purple (line No. 4 & 62), and dark purple (which observed in the lines No. 23, 30, 32, 51, 52 & 61). The check cultivars "925", "Jewel" and "Mabrouka" produced tuber roots with skin colour of brownish, red and dark-purple, respectively.

These results are confirmed with those of Nayar *et al.* (1984) who found forms with white and pink skin in roots of sweet potato lines. The red skin colour of roots was also recorded by Kukimura *et al.* (1992).

g- Flesh colour :

Regarding tuber flesh colour, the studied lines varied greatly from white to dark orange (deeply orange) flesh colour (Table 3). They can be classified into three groups based on their tuber flesh colour as follows : (1) white-cream group, such as the line No. 61, 62, 3 and 23; (2) yellow group, which involved three degrees of colour such as pale yellow (No. 55), yellow (No. 32 and 60) and dark yellow (No. 34); (3) orange group, also had three degrees of colour, *i.e.* pale orange (No. 10), orange (No. 9, 19, 35 and 37) and dark orange which involved the lines No. 4, 16, 30, 33, 36, 51, 52, 65, 66, 70 and 73. The check cv. "Jewel" had dark orange colour, while "Mabrouka" and "925" cvs. gave roots with white flesh colour.

Similar results were obtained by many workers, white-cream flesh colour was reported by Nayar *et al.* (1984) and Yamakawa *et al.* (1995). Cultivars and lines with orange flesh colour were previously listed by Sheng and Wang (1992). The orange group of flesh colour was also reported by Hamilton *et al.* (1986) who found that, tuber flesh colour varied from no orange to dark orange in materials studied. Lastly, the yellow and pale yellow flesh colour was previously observed in roots of sweet potato lines evaluated by Oh *et al.* (1995).

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دراسة تقييم بعض سلالات البطاطا الجديدة

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الملخص العربي

أجريت تجربتين حقليتين لتقييم سلالات جديدة من البطاطا مستنبطة من البذور على بعض الصفات الخضرية للنباتات .. وأظهرت النتائج مايلي :

١- بعض السلالات أظهرت نتائج جيدة في كل الصفات وبعض السلالات أظهرت نتائج جيدة في بعض الصفات الأخرى ويمكن اعتبارها سلالات جيدة.

٢- أعطت السلالة رقم "٩" أعلى عدد من الأوراق على الساق الرئيسي (٥٦,٥٠ ورقة) حيث كانت متفوقة عن الصنف مبروكة وهو أعلى الأصناف الكشافة، وفي الموسم الثاني زاد الصنف الكشاف " ٩٢٥" بنسبة ٦٨,٩٥، ١٩,٦٧ في الموسم الأول والثاني على التوالي.

٣- لوحظ إختلافات معنوية بين السلالات التي تم تقييمها بالنسبة للعدد الكلي للدرنات بالوزن بالنسبة للنبات الواحد. وكانت أعلى قيمة سجلت للمحصول في السلالات الثلاثة رقم ١٠، ١٦، ٣٥ حيث أنهم أعطوا أكثر من ١ كجم للنبات الواحد.

٤- بالنسبة لعدد الدرنات للنبات الواحد، أعطت السلالات رقم ٣٥، ١٠، ٦١، ٤، ٩، ١٦ أعلى قيمة في العدد الكلي للجنور، حيث أعطت عدد من الجنور يتراوح بين ٥,١ إلى ٨,٤٧ جذر/نبات.

٥- بالإشارة إلى وزن الجنور بالكيلوجرام، فقد وجدت فروق معنوية في متوسط وزن الجذر في السلالات تحت الدراسة حيث تراوحت بين ٠,٠٩ إلى ٠,٢٣٥ كجم. أعطت السلالة رقم ٦٢ أعلى وزن للجنور (٠,٢٣٥ كجم) تبعها السلالة رقم ٣٦ بمتوسط وزن للجنور (٠,٢١٣ كجم). سجلت أقل قيمة في وزن الجنور في السلالة رقم ٧٣ (٠,٠٩١ كجم)، وتفوقت السلالة ٦٢ معنويا في وزن الجنور عن الصنف القياسي "مبروكة".

٦- وجدت فروق معنوية في أطوال جذور السلالات الجديدة المختبرة وقد تراوحت أطوال الجذور بين ٩,٣٣ إلى ٢١,١٦ سم. كما اختلفت أقطار هذه الجذور إختلافا كبيرا بين السلالات المختبرة حيث تراوحت أقطار الجذور ما بين ٢,٠٥ سم للسلالة رقم ٣٤ إلى ٦,٩٥ سم للسلالة رقم ٤.

٧- اختلفت السلالات تحت الدراسة إختلافا كبيرا في لون الجذر، وقد تم تدرج لون الجذر بقيم تراوحت بين ١ إلى ٩. وبصفة عامة تم تقسيم السلالات إلى ٧ طرز بالنسبة للون الجذر كما يلي : كريمي أبيض (السلالة ٥٥)، بني (السلالات ٣٤، ٣٧، ٦٠)، قرمزي (السلالات ١٠، ١٩، ٣٦، ٦٥، ٧٠، ٧٩)، أحمر (السلالات ٣، ٣٥، ٦٦)، بنفسجي محمر (السلالات ٩، ١٦، ٣٣)، بنفسجي (السلالتين ٤، ٦٢) واللون البنفسجي الداكن (السلالات رقم ٢٣، ٣٠، ٣٢، ٥١، ٥٢، ٦١). أظهرت جذور الأصناف القياسية مثل ٩٢٥، جويل، مبروكه جنورا ذات لون بني، أحمر ، بنفسجي داكن للأصناف الثلاث على الترتيب.

٨- بالنسبة للون اللحم في جذور السلالات تحت الدراسة فقد اختلفت كثيرا في هذه الصفة، حيث تراوحت من الأبيض إلى البرتقالي الداكن. ويمكن تقسيمهم إلى ثلاثة مجموعات كالآتي : أبيض - كريمي وشملت السلالات رقم ٦١، ٦٢، ٣، ٢٣؛ والمجموعة الثانية شملت ثلاث تحت مجموعات بالنسبة للون اللحم : اللون الأصفر الباهت السلالة رقم ٥٥، اللون الأصفر السلالات رقم ٣٢، ٦٠، الأصفر الداكن السلالة ٣٤، المجموعة الثالثة ذات اللون الأصفر البرتقالي وبدأت باللون البرتقالي الباهت في السلالة ١٠ والبرتقالي الفاقع في السلالات رقم ٩، ١٩، ٣٥، ٣٧ واللون البرتقالي الداكن وشملت السلالات رقم ٤، ١٦، ٣٠، ٣٣، ٣٣، ٣٦، ٥١، ٥٢، ٦٥، ٦٦، ٧٠، ٧٣. كان لون اللحم في الصنف القياسي Jewel أصفر داكن، بينما في الصنفين مبروكه ، ٩٢٥ أعطت جذور ذات لون لحم أبيض.