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Horticulture Evaluation and Genetic Identification of Selected Le-Conte Pear Clone

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A SELECTED clone of Le- Conte pear was evaluated in comparison to Le-Conte old cultivar. Flowering of the selected clone was earlier by 7- 10 days. Maturity was 25-30 days earlier than the old cultivar. Whereas it produced fruits fewer than the old cultivar Le-Conte under the same conditions. No significant differences were observed between the new clone and the old cultivar within the vegetative growth . However, fruit physical prosperities increased significantly in the selected clone compared to the old cultivar. Chemically, the selected clone revealed a higher ratio of T.S.S / acidity than in Le-Conte cultivar. The same trend was noticed within total and reducing sugars. Yield was higher in the old cultivar than in the selected clone.

Screening of DNA by RAPD marker showed a total number of 74 amplicons with an average of 7-4 amplicon/ primer when ten primers were used. The highest number of polymorphic amplicon (2) produced by OPA17.The size of fragment varied from 280-1790 bp. Two negative unique markers were detected with the selected clone by OPA 17. These markers were located at 550 bp and150 bp. Meanwhile, OPG 06 revealed an unique positive marker at 450 bp.The estimated similarity between the selected clone and the old cultivar was 95.3.

Pear is considered an economically important fruit among other deciduous fruit trees and the fourth among all fruits in its global distribution (Vanneste *et al*., 2002). In Egypt, productivity of "Le Conte", the main pear cultivar (resulted as a hybrid between *Pyrus Communis* x *Pyrus Seratonia*) significantly varies from one year and location to another (Sanaa *et al*., 2012).

Evaluation and selection of a new clone or strain play an important role for improving fruit quality especially under Egyptian condition, while in pear genotype spread in a narrow wide. Le-Conte pear cultivar is the only cultivated one in Egypt. European pear (*Pyrus communins L.*) is grown in cold, moderate climate conditions. Commercial orchards consist of "Le-Conte" pear as the main cultivar, the yield varies from year to year. This variability has been attributed mainly to lack of adequate cross pollination; as well as, other factors can affect fruit set and yield like as fire blight (Lee, 1948) .

In Egypt, cultivated area reached 20400 feddans that produced about 124800 tons with an average production of 6.12 tons/ feddan according to Ministry of

Agricultural (2010). Many researchers have been attempted to increase productivity and quality of fruits. Pear production ranged from 5-6 tones per feddan with a farm gate currently supplies only 30 – 40% of market requirements (Mohamed *et al.*, 2012).

Plant varieties have certain characteristics including size, colour, flavor …ect, but which have occurred naturally without the intervention of man (Spencer, 2007). Plant strain characteristics have been "fixed" by nature and can be propagated by seed with resulting plants coming true to the parent plants with only minor differences. A cultivar is a plant which has been bred for desirable characteristics such as size, colour, yield, disease resistance etc., by means of hybridization i.e. the crossing of two or more different varieties of plants (Bailey, 1923). Clone, in the case of fruit always done by vegetative means in the form of cuttings, division, grafts, and budding (Trehane, 2004).

RAPD markers were developed by Williams *et al.* (1990). RAPD technique utilizes single arbitrary 10-mer oligonucleotides as primers to amplify discrete fragments of DNA in low-stringency polymerase chain reaction (PCR). RAPD markers require no prior knowledge of the DNA sequence, which makes them very suitable for investigation of species that are not well known. The method is fast and easy to perform (Williams *et al.*, 1993).

The objectives of the study were to evaluate a superior clone of local pear tree based on growth and yield performance, physical and chemical characteristics of the fruit and to develop RAPD marker based DNA fingerprinting for identification of the selected superior clone.

Materials and Methods

The present study was carried during two consecutive seasons from 2012/2013 on Le-Conte pear trees as well as selected pear clone budded on *Pyrus betulaefoli*a. All trees were (3 replications, old cultivar and one tree, selected clone) 5 years –old, planted at 5x5 and grown in sandy soil under drip irrigation at El-Hag Ibrahim El-Mongy farm at Kaffer Dawood village, Sadat city, El-Mounifia Governorate, Egypt. Four branches of two years old in four directions were tagged to determine the main characteristics of the tree as follow:

Data of both flowering and vegetative growth were recorded during the growing seasons 2012-2013, including dates of both beginning of flowering and fruit set during the studied seasons.

Vegetative growth

At the end of the growing seasons (mid August), four shoots (2 years-old) in four direction of selected clone and old cultivar trees were labeled for measuring parameters ,

- Shoot length (cm).
- Shoot diameter (cm).

- Leaf area (cm^2).
- Tree height (m).
- Tree diameter (m).
- Trunk diameter (cm) .

Flowering and fruiting

Fruit set (%)

The tagged four branches being mentioned before were used to determine the fruit set percentage. It was calculated in relation to the total number of flowers as follow:

Fruit set (%) = No. of developing fruit set /Total No. of flowers x 100

.

Spurs (%): It was calculated in relation to the shoot length as follow:

Spurs (%) = No. of spurs /shoot length x 100

Leaf chemical content

Leaf chemical contents were determined in mid-August of both experimental seasons. Samples of 30 leaves /tree were taken at random from the previously vegetative spurs on tagged shoots of each tree. leaf samples were washed with tap water, oven dried at 70 ^{o}C to a constant weight and grounded. The ground samples were digested with sulphoric acid and hydrogen peroxide according to Evenhuis and De Waard (1980) Total nitrogen and phosphorus were determined according to Evenhuis (1978) and Murphy and Riley (1962) and the colorimetric method for total carbohydrates (%) as outlined by Dubois *et al*. (1956). Potassium was determined by a flame Photometer model E.E/L. (Jackson, 1967). Fe, Zn and Mn were measured by Perkin–Elmer atomic absorption spectrophotometer model 2380 Al, according to Jackson and Ulrich (1959). Leaf chlorophyll reading was recorded using Minolta chlorophyll Meter SPAD-502(Minolta camera .Co, LtD Japan) at the field. Average of ten readings was taken from the middle of leaves from canopy tree (Yadava,1986).

Fruit physical properties

At picking date twenty fruits from each tree under study were chosen to determine the following parameters:

- Average fruit weight (gm).
- Average fruit volume (ml^3).
- Average fruit length (cm).
- Average fruit diameter (cm).
- Shape index (weight / volume ratio and length /diameter ratio).
- Fruit firmness was estimated as firmness (Ib /$Inch^2$) by Magness and Taylor pressure tester which has a standard 5/16 of inch plunger and recorded as Ib/$inch^2$.
- Normal and aborted seed number / fruit .

Fruit chemical properties

- Total soluble solids (T.S.S) was determined by a hand refractometer,
- Acidity of fruit juice was determined (as malic acid) by titration with 0.1 normal sodium hydroxide with phenolphthalein as an indicator, according to A.O.A.C (2005).
- Total sugars % content were determined according to Malik and Singh (1980).
- Total indols.
- Total phenols were determined with Folin-Coicagteu reagent according to the method of (Slinkard and Singleton, 1977).
- Total carbohydrates as outlined by Dubois *et al*. (1956).

Randomly Amplified Polymorphic DNA (RAPD)

RAPD-PCR3 Reactions

A set of ten random 10-mer primers (Table13) were used in the detection of polymorphism between a mutated selected clone of le- Conte pear and the commercial leconte pear. These primers were synthesized on an ABI 392 DNA/RNA synthesizer (Applied Biosystems) at AGERI. RAPD-PCR was carried out according to the procedure given by Williams et al. (1990***)*** with minor modifications. The amplification reaction was carried out in 25 ìl reaction volume containing 1X PCR buffer, 1.5 mM $MgCl_2$, 0.2 mM dNTPs, 1 ìM primer, 1 U Taq DNA polymerase and 25ng template DNA.

Thermocyling Profile and Detection of the PCR Products

PCR amplification was performed in a Perkin-Elmer/GeneAmp® PCR System 9700 (PE Applied Biosystems) programmed to fulfill 40 cycles after an initial denaturation cycle for 5 min at 94ºC. Each cycle consisted of a denaturation step at 94ºC for 1 min, an annealing step at 36ºC for 1 min, and an elongation step at 72ºC for 1.5 min. The primer extension segment was extended to 7 min at 72ºC in the final cycle.

The amplification products were resolved by electrophoresis in a 1.5% agarose gel containing ethidium bromide (0.5ug/ml) in 1X TBE buffer at 95 volts. PCR products were visualized on UV light and photographed using a Polaroid camera. Amplified products were visually examined and the presence or absence of each size class was scored as 1 or 0, respectively.

Data were statistically analyzed in random design according to the method of Sendecor and Cochran (1990), L.S.D at 5% level was used for comparison between means of each treatment.

Results and Discussions

Flowering development

Table 1 shows dates of beginning flowering, fruit set and harvest during 2012&2013 season under study. The new clone was earlier in flowering, fruit set and picking dates compared with the old cultivar Le-Conte pear trees. Beginning of flowering was in 28/2and 27/2 compare with Le-Conte it was in 7/3 in both

seasons under study. Whereas, beginning of fruit set was in 2/3 for the new clones and in 10/3 for the old cultivar (Le- Conte).Herein ,the suggested mature day for the new clo ne were in 22/6&28/6 in two seasons under study but the nature dates of Le-Conte trees was in late of July or early August. These results are in a same line with Chan -Chung *et al.* (1997), Bahlool *et al.* **(**2000**)** and Ito *et al.* (2004) in their studies on pears.

TABLE 1. Beginning of flowering ,fruit set and fruit harvest during the two seasons 2012 / 2013 .

Genotype	Beginning of flowering		Beginning of fruit set		Beginning of harvest	
	Season 2012	Season 2013	Season 2012	Season 2013	Season 2012	Season 2013
Selected clone	28/2	27/2	2/3	2/3	22/6	28/6
Old cultivar	7/3	7/3	10/3	10/3	30/7	1/8

Vegetative growth

Table 2 pointed to shoot length (cm), shoot diameter (cm), leaf area (cm^2) and chlorophyll content during seasons 2012 & 2013.It was noticed that there are slight differences between the selected clone (78.0 & 72.02 cm and 1.00 & 0.97 cm) and old cultivar trees (76.83 & 68.50 cm and 1.00 & 0.90 cm) in both shoot diameter and shoot length, respectively. The difference did not significant. While, leaf area was increased significantly in the selected clone (32.20 & 31.72 cm^2) compared with old cultivar (30.35 & 31.05 cm^2), respectively during the two seasons under study. Also, chlorophyll content was increased in the selected clone (57.62 & 53.45) compare by the old cultivar (44.86 & 50.09) in both Seasons. Those results are in agreement with Bahlool *et al.* (2000) and, Colaric *et al.* (2007) who mentioned that more nodes and leaves per shoots were formed as result of shoot growth reduction.

TABLE 2 Vegetative growth during the two seasons 2012 / 2013.

Genotype	Shoot length (cm)		Shoot diameter (cm)		Leaf area (cm^2)		Chlorophyll content	
	Season 2012	Season 2013	Season 2012	Season 2013	Season 2012	Season 2013	Season 2012	Season 2013
Selected clone	78.0 A	72.02 A	1.00 A	0.97 A	32.20 A	31.72 A	57.62 A	53.45 A
Old cultivar	76.83 A	68.50 A	1.00 A	0.90 A	30.35 B	31.05 A	44.86 B	50.09 B

Means within each column followed by the same letter(s) are not significantly different at 5% level

Leaf mineral content

Data presented in Table 3 show the means value of leaf mineral content on both selected clone and old cultivar in both seasons under study (2012 & 2013) . It is noticed that there were a differences between the selected clone and old cultivar in macro and micro –elements content. Either N (%), K (%) or Cu

(mg/kg) were increased in selected clone but P (%), Fe (mg/kg), Mn (mg/kg) and Zn (mg/kg) were higher in the old cultivar leaves.

TABLE 3. Leaf chemical content

Genotype	N %	P%	K%	Cu mg/Kg	Fe mg/Kg	Mn mg/Kg	Zn mg/Kg
Selected clone	1.91	0.10	2.17	3.00	311	8.78	30.0
Old cultivar	1.36	0.11	1.62	2.40	441	9.51	43.90

Development of leaf area

Data in Table 4 and Fig .1 showed the development on leaf area from 22/6 until 1/8 in both seasons under study (2012 & 2013). The selected clone recorded the highest value of leaf area than in the local cultivar (22/6 &1/8) in both studied seasons.

TABLE 4. Development of leaf area

Genotype	22/6		15/8	
	Season1	Season2	Season1	Season2
Selected clone	31.53 A	32.93 A	32.20 A	31.72 A
Old cultivar	23.37 B	25.67 B	30.35 B	31.05 A

Means within each column followed by the same letter(s) are not significantly different at 5% level

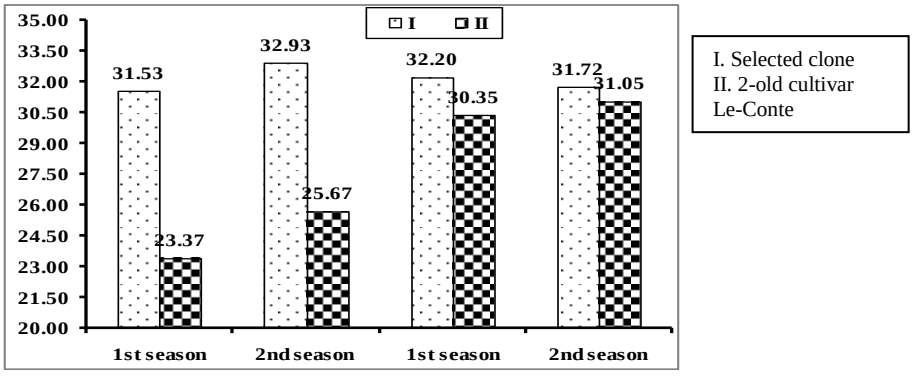

Fig. 1. Development of leaf area (cm^2)

Tree shape

Regarding the tree height, tree diameter, trunk diameter and tree colour there were differences between the selected clone tree and old Le-Conte cultivar. It was noticed that the selected clone was gray in colour, medium in size, had trunk diameter of 41.5 cm, tree diameter of 6.0 m and 3.5 m height. Whereas , old Le-Conte cultivar tree was brown, medium with trunk diameter of 35.0 cm, tree diameter of 6.5 m and 3.75 m height (as being cleared in Table 5).

TABLE 5. Tree character

Genotype	Tree height (m)	Tree diameter (m)	Tree colour	Diameter of trunk (cm)	Tree size
Selected clone	3.5	6.0	Gray	41.5	Medium
Old cultivar	3.75	6.5	Brown	35.5	Medium

Fig. 2. Selected clone during dormant period

Fig. 3. Selected clone during growth season

Tree fruiting

As being cleared in Table 6 the selected clone gave a higher spurs number (15.33 & 17.33) compared with the old Le-Conte cultivar trees (13.00 &12.00) which subsequently affected fruit set .Whereas, old le-Conte cultivar trees gave a higher yield 58.76 & 53.50 Kg tree compared with the selected clone 52.41 & 52.15, respectively during seasons 2012&2013 under study. These findings are in harmony with Chan -Chung *et al*. (1997), Bahlool *et al*. (2000), Ito *et al*. (2004) and Fayek *et al*. (2011) in their studies on pears.

TABLE 6. Fruit set (%) and yield (Kg/tree) during 2012/2013 seasons.

Genotype	Spurs %		Fruit set (%)		Yield(Kg/tree)	
	Season 2012	Season 2013	Season 2012	Season 2013	Season 2012	Season 2013
Selected clone	19.65 A	24.06 A	2.17 A	2.14 A	52.41 B	52.15 B
Old cultivar	16.92 B	17.52 B	1.38 B	1.60 B	58.76 A	53.50 A

Means within each column followed by the same letter(s) are not significantly different at 5% level

Fruit physical properties

Obtained data during both 2012 and 2013 seasons cleared the differences between the selected clone and old Le-Conte cultivar fruit physical properties as being tabulated in Table 7. It is clear that all fruit physical properties were increased significantly in the selected clone compared with the old cultivar. The selected clone revealed the high values of fruit weight (398.2 & 318.8 g),fruit size (363.4 & 317.20 cm^3), fruit length (10.50 & 10.73 cm) and fruit diameter (8.71 & 9.09). While the old Le-Conte cultivar detected the low values of fruit weight (182.7 & 186.2 g), fruit size (181.3 & 178.9 cm^3), fruit length (8.57 & 8.69 cm) and fruit diameter (6.83 & n6.69), respectively. These results are in harmony with Li-Tain *et al*. (1996) and Pierre (2001) on apple and Bahlool *et al*. (2000) on pear.

TABLE 7. Fruit physical properties during 2012 / 2013 seasons.

Genotype	Fruit weight (g)		Fruit size (cm^3)		fruit length (cm)		Fruit diameter (cm)		Fruit firmness ($Lb/Inch^2$)	
	Season 2012	Season 2013	Season 2012	Season 2013	Season 2012	Season 2013	Season 2012	Season 2013	Season 2012	Season 2013
Selected clone	398.2 A	318.8 A	363.4 A	317.2 V	10.50 A	10.73 A	8.71 A	9.09 A	13.50 A	13.55 A
Old cultivar	182.7 B	186.2 B	181.3 B	178.9 B	8.57 B	8.69 B	6.83 B	6.69 B	13.95 B	13.90 A
L.S.D	11.51	7.157	14.02	6.680	0.699	1.348	1.301	1.595	0.762	1.452

Means within each column followed by the same letter(s) are not significantly different at 5% level

Fruit shape index

Data being illustrated in Table 8 indicated that there were no significant differences in weight to volume (W/V).While length to diameter (L/D) recorded slight significant differences between the selected clone and the old cultivar.

TABLE 8. Fruit shape index during seasons 2012/2013.

Genotype	W/V ratio		L/d ratio	
	Season2012	Season2013	Season2012	Season2013
Selected clone	1.100 A	1.04 A	1.12 A	1.140 B
Old cultivar	1.00 A	1.04 A	1.27 A	1.30 A

Means within each column followed by the same letter(s) are not significantly different at 5% level

A significant differences were observed between the selected clone and old cultivar, in respect of normal seeds per fruit. The selected clone showed a higher number of normal seeds (5.33&5.33) than the old cultivar (2.00&1.67) in both studied seasons, respectively (Table 9). On the other hand, aborted seeds per fruit were detected in both of the selected clone and the old cultivar. Number of aborted seeds per fruit were lower in the selected clone than in the old cultivar (4.67&4.67), (200&2.00), respectively in both of the studied seasons.

Fig. 4. Shap index of selected clone fruit

TABLE 9. Normal and aborted seed number/fruit during the two seasons (2012 & 2013)

Genotype	Normal seeds		Aborted seeds	
	Season 2012	Season 2013	Season 2012	Season 2013
Selected clone	5.33 A	5.33 A	2.00 B	2.00 B
Old cultivar	2.00 B	1.67 B	4.67 A	4.67 A

Means within each column followed by the same letter(s) are not significantly different at 5% level

Fruit development

Fruit length development was significantly varied among the selected clone of Le-Conte pear and the old cultivar (Table 10 & Fig.5). It is cleared that the selected clone had a higher length beginning from 16/6 to 22/7 compared with the old cultivar. Also, fruit diameter goes in the same trend of fruit length within the same dates (Table 10 & Fig.6).

TABLE 10. Development of fruit length and fruit diameter during season 2013.

Date	Mean length (cm)				Mean diameter (cm)	
	Selected clone	Old cultivar	Mean	Selected clone	Old cultivar	Mean
16/6	8.20 b	5.43 d	6.82	6.78 b	3.93 f	5.36
22/6	10.13 a	6.57 c	8.35	9.17 a	5.20 cd	7.19
1/7	7.93 b	5.63 cd	6.78	6.17 bcd	4.30 ef	5.24
7/7	10.13 a	6.57 c	8.35	8.67 a	5.43 cd	7.05
15/7	7.70 b	5.30 d	6.50	6.37 bc	4.22 ef	5.30
22/7	10.20 a	6.63 c	8.42	8.42 a	5.50cd	6.96
Mean	9.05	6.02		7.60	4.76	

Means within each column followed by the same letter(s) are not significantly different at 5% level

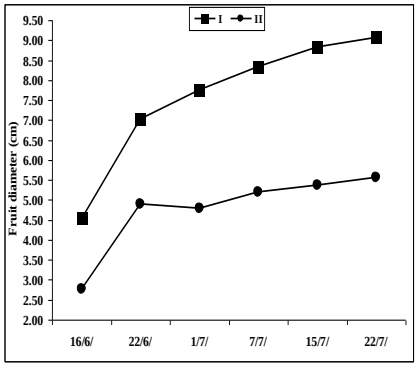

Fig. 5. Development of fruit length

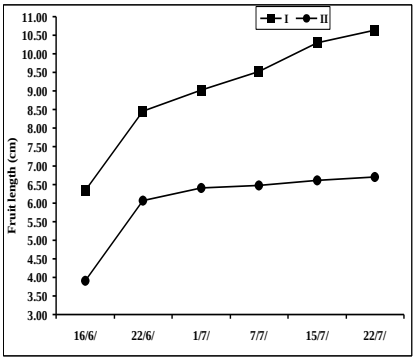

Fig. 6. Development of fruit diameter

Fig.7. Fruit dimension of selected clone (22/7)

Fruit chemical properties

Fruit chemical properties of fruits is demonstrated in Table 11 Selected clone showed the highest significant TSS % (15.67 & 14.10) and TSS/acidity (37.32 & 34.73) compared with the old cultivar in both seasons under study. While, acidity recorded a lower value in the first season and in the second season with no significant variance.

TABLE 11. Chemical properties of fruits during the two seasons (2012/ 2013) .

Genotype	T.S.S (%)		Acidity (%)		T.S.S/acidity	
	Season2012	Season2013	Season2012	Season2013	Season2012	Season2013
Selected clone	15.67 A	14.10 A	0.42 B	0.41 A	37.32 A	34.73 A
Old cultivar	12.30 B	12.13 B	0.46 A	0.43 A	26.95 B	28.54 B

Means within each column followed by the same letter(s) are not significantly different at 5% level

Moreover, chemical compound of fruits included total carbohydrates, total indols, total phenols ,total sugars , reducing sugars and non-reducing sugars always recorded higher values with the selected clone, when compared with the old cultivar fruits except for reducing sugars for the two seasons under study

(Table12). Similar results were found by Fayek *et al.* (2004), Fayek *et al.* (2011) and Bahlool *et al.* (2000) in Le-Cont pear Cultivar.

TABLE 12. Chemical compound of fruits during seasons 2012/2013.

Genotype	Carbohydrates /100mg	Indols /100mg	Phenols /100mg	Total sugars	Reducing sugars	Non-reducing sugar
Selected clone	42.073 A	0.00012 A	0.07733 A	5.135A	2.766 B	2.369 A
Old cultivar	41.950 B	0.00035 B	0.0955 B	4.576 B	3.473 A	1.103 B

Means within each column followed by the same letter(s) are not significantly different at 5% level

Fingerprint Detected by Randomly Amplified Polymorphic DNA (RAPD)

In the present study ten primers were screened with the DNA of the new selected Clone and commercial Le-Conte pear. These primers generated reproducible and easily scorable RAPD profiles (Fig.8) .The total number of amplicon results from the ten primers was 74 with an average of 7.4 amplicon/ primer. The amplified amplicons ranged from 4 to 11 (Table 13). Polymorphic amplicons ranges from 0 to 2. Primer OPA02 and OPA17 produced the highest number of amplicons (11). While the lowest number of amplicons was produced by OPG06 (4). The highest number of polymorphic amplicons (2) produced by OPA17. While, the highest (25%) percentage of polymorphism produced by OPG06 . The average number of polymorphic fragments was 0.3. Earlier *Anna and Elzbieta (2000)* identified 26 pear cultivars using RAPD markers and found that a result of reactions carried out with RAPD 25 primers, 103 polymorphic DNA fragments were obtained. The largest number of polymorphic DNA fragments (7-8) was produced in reactions with the primers OPT 15, OPG 16 and OPG 19. The size of fragments varied from 280 to1790 bp and the degree of DNA polymorphism was estimated at 56.3%.

On the other hand, RAPD markers identify the selected clone and the commercial cultivar by unique positive and/or negative markers (Fig.9). Two negative unique markers were detected with the new selected clone by the OPA17. These markers were located at 550bp and 150bp. Meanwhile, OPG06 revealed a unique positive marker which scored at 450bp. Sixty decamer primers were screened, generating polymorphic patterns for 10 of 12 genotypes analyzed it was possible to find genotype-specific RAPDs and fragment patterns which could be used for cultivar identification (Oliveira *et al*., 1999).

To examine the genetic relationships between the two pear genotypes based on the RAPD results, the scoring data resulting from the RAPD marker were analyzed using the Dice similarity coefficient. The estimated similarities between the two genotypes were 95.3%, this similarity level was high. This might be due to the use of random primers which is not accurate in the discovering of genetic differences like specific primers.

Oliveira *et al.* (1999) and Khalil and Abd-Alla, 2002) realized that, cophenetic matrix computed from the tree matrix showed a significant correlation of 96.8% with the original similarity matrix. The similarities established among the different genotypes of *P. communis* and between different species were close to those usually accepted.

TABLE 13. Total number of amplicons, monomrphic amplicons, polymorphic amplicons and percentage of polymorphism revealed by RAPD markers.

Primer	Sequence	Total number of amplicons	Monomorphic amplicons	Polymorphic amlicons	Percentage polymorphism
OPA-01	TGCCGAGCTG	7	7	---	0.00
OPA-02	AGGTGACCGT	11	11	---	0.00
OPA-03	GTTTCGCTCC	7	7	---	0.00
OPA-06	GGTGACGCAG	6	6	---	0.00
OPA-13	TGGGGGACTC	9	9	---	0.00
OPA-16	GTAGACCCGT	5	5	---	0.00
OPA-17	GTGAGGCGTC	11	9	2	18.18
OPA-20	CCGCATCTAC	7	7	---	0.00
OPG-06	TGTCATCCCC	4	3	1	25.00
OPG-12	GTTGCCAGCC	7	7	---	0.00
Total		74	71	3	43.8
Mean		7.4	7.1	0.3	4.38

Similarity

	1	2
1	100	95.3
2	95.3	100

Conclusions

The comparison among the selected clone and old cultivar showed significant differences. The selected clone described with earlier in flowering, fruit set, harvest and the highest leaf area. Also, it gave the biggest fruit weight and size, the equatorial fruit dimensions are tallest. Their chemical properties including TSS, acidity, total sugars, indols and phenols were best than in the old cultivar. It could be recommended by using of horticulture practice for increasing its yield and propagate it vegetative and studying its behavior on both *Pyrus communis and Pyrus betulaefoli* rootstock. The new selected clone recorded a genetic similarity with the old cultivar estimated by 95.3.

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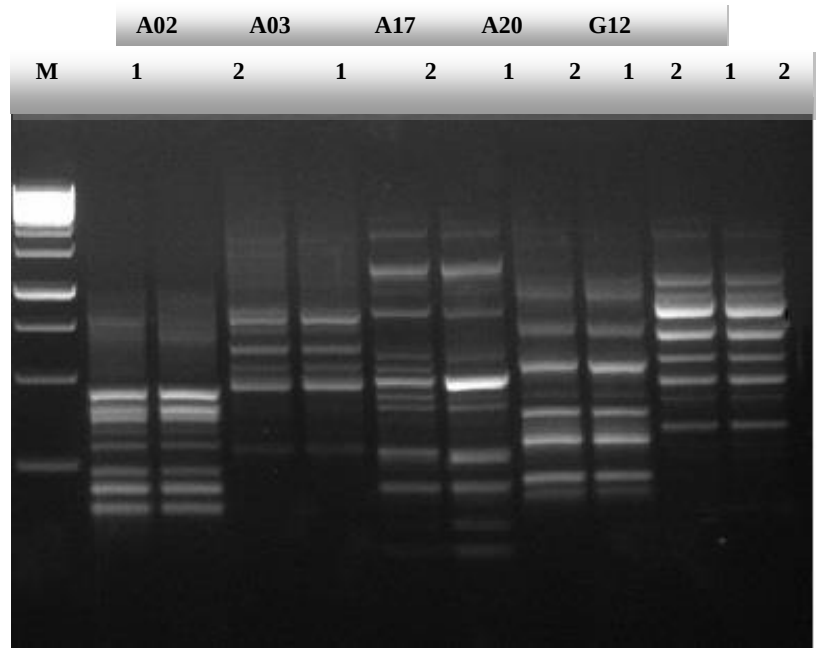

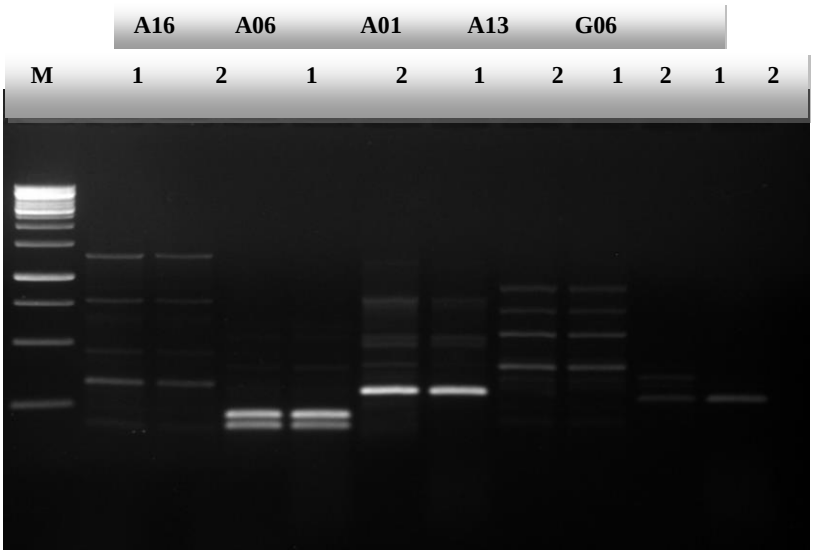

Fig. 9. RAPD profiles for the new clone and local Le-Conte cultivar as detected with primers M: 1Kb ladder DNA

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التقييم البستانى والتعريف الوراثى لسلاله ليكونت منتخبه

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تم تقييم سلاله خضريه جديده من الكمثرى الليكونت ومقارنتها بالصنف المعروف. لوحظ ان هذه السلاله المنتخبه مبكره التزهير بحوالى ٧-١٠ يوم عن الصنف العادى ، كذلك مبكره النضج بحوالى ٢٥-٣٠ يوم. فى حين انها تنتج عدد ثمار اقل عن الصنف الليكونت المعروف تحت نفس الظروف .

لم يكن هناك فرق معنوى ملحوظ بين السلاله المدروسه والصنف العادى من ناحيه النمو الخضرى ، فى حين زادت الصفات القياسيه لثمار السلاله المنتخبه زياده معنويه عن الصنف العادى. وعلى المستوى الكيماوى سجلت السلاله المنتخبه نسبه اعلى فى الموادالذائبه الصلبه الى الحموضه عن الصنف المعروف.واخذت السكريا ت الكليه والمختزله نفس الاتجاه،كان المحصول اقل فى السلاله المنتخبه عن الصنف المعروف .

عند اختبار الDNA باستخدام ال RAPD ماركر تم الحصول على ٧٤ باند بمتوسط ٧,٤ باند للبادئ الواحد عند استخدام ١٠ بادئات . انتج البادئ OPA17 اعلى عدد من الحزم المختلفه (٢). اختلف حجم هذه الحزم وتتراوح مابين ٢٨٠-١٧٩٠ . تم الحصول على معلمين فريدين من النوع السالب باستخدام البادئ OPA17 عند مستوى 550bp و 150 bb.فى حين اعطى البادئ OPG 06 معلم فريد موجب عند مستوى 450bp . وسجلت السلاله المنتخبه درجه قرابه مع الصنف المعروف بقيمه ٩٥,٣ .