Journal of Plant Production

Journal homepage: www.jpp.mans.edu.eg
Available online at: www.jpp.journals.ekb.eg

Agromorphologic Characterization and Molecular Markers of some Teosinte (*Zea mexicana) Genotypes*

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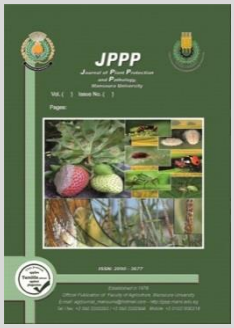

ABSTRACT

Two field experiments was conducted during the summer seasons of 2017 and 2018 to evaluate and identify five teosinte genotypes. A total of morphological characterization depends on stem anthocyanin coloration of sheath of the first leaf (ACS), shape of tip of the first leaf (ShT), wavy surface of blade (WSB), blade attitude of leaf just above upper ear (BAL), anthocyanin coloration of sheath in the middle of plant (ACSh), brace roots(ACBR), fresh anthers and flag leaf angle also, sparse types of spikelet. Values of quantitative traits i.e. fresh and dry yield (kg/plot) and its total, leaf ear width and length, plant height, No. of leaves/plante, No. of tillers and 100 grains weight were varied from trait to other mainly due to genetic background. Molecular marker RAPD analysis polymorphisms among genotypes were detected by five random primers. The high level of polymorphism was occurred with primer OP-C4 which showed 57.1% polymorphism, while the low level of polymorphism was 16.7 % in primer OP-A10. Cluster analysis showed differences between the genotypes which separated into two main clusters, the first cluster was further divided into two sub-clusters (IA and IB), sub-cluster IA Included Balady, Sakha and Dammietta, sub-cluster IB included Gemmeiza3 while, Gemmeiza4 was in a separate cluster. The results of this research of great importance to select the right material which can be used in plant breeding programs as they help for introducing a new variety. Farmer field trails are suggested before the submission of these new varieties to registration testing and its release.

Keywords: Teosinte (*Zea mexicana L.)*, characterization and molecular markers.

INTRODUCTION

Teosinte (*Zea mexicana L.)* popularly is considered as an ancestor of modern multiple rowed corn. It is a neglected fodder crop which has not received the attention it deserves and very little work has been done to explore its yield potentiality. It is an excellent multi-cut fodder which gives high yield of nutritious green fodder. As a fodder crop, it can be cultivated in any intensive fodder production system on account of its versatile adaptability and biomass production ability. It can be fed safely to animals as green, dry or as conserved fodder in the form of silage or hay even before flowering.

There is a little genetic diversity know among and within the cultivated varieties teosinte. However, these cultivars based on gradually narrower genetic variation. Consequently, the discernment of these varieties from each other for determining the genetic purity become more difficult. All species of teosinte, closely, resemble maize, with staminate flowers borne in tassels and pistillate flowers in axillary spikes. Teosinte has survived as a wild plant, because the pistil late spike breaks up at maturity to disperse the kernels, which, unlike maize kernels, are protected in heavy cellulose, lignin structures, called fruit cases which composed of hard segment of the rachis of the spike, and lignified outer glumes (Beadle, 1972). Many studies have demonstrated that there are lower levels of genetic diversity among inbreds than among landrace and teosinte populations for two reasons: demography (bottlenecks) and selection. Domestication and breeding bottlenecks have resulted in genome-wide reductions in genetic variation in maize relative to teosinte.

Determination of morphological characters andmolecular weights of new martial are essential requirement for their registration and release as commercial varieties and be used by the farmers. Cultivars are commonly identification based on morphological differences of seed, seedling and mature plant (IITA, 2015). PCR-based techniques such as random amplified polymorphic DNA (RAPD) have been widely used in genetic diversity studies of various crops. The aim of the study was characterizing five teosinte genotypes at morphological characters, examining the genetic variation and polymorphisms among them using RAPD-PCR techniques and estimating the genetic relationships among these genotypes.

MATERIALS AND METHODS

Five teosinte genotypes belong to the species (*Zea mexicana* L.) were obtained from the Forage Crops Research Department, FCRI, ARC, Giza, Egypt. A field experiment was carried out at El-Serw Agric. Res. Station, Damietta Governorate (North Delta) ARC Egypt in 2017 and 2018 summer seasons. Seeds were grown at rate of 20kg/fed on May 7th2017, and the May 13th2018 and cultivated using the dry method (Afir) in a complete randomized block design with three replications. The

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DOI: 10.21608/jpp.2020.114573

experimental plot area was 6 m^2(3X2 m), 3 m length and 60 cm width. The preceding crop was berseem in both seasons. All other recommended cultural practices were done on time. As recommended three cuts were obtained under such conditions during the growing season, cuts were taken when plant height reached 90 to 120 cm according to USDA Plant Fact Sheet of mexican teosinte. Cuts were done about sixty days after planting for the 1st cut, the 2nd cut was taken after 32 days from the 1st one, and the last cut was taken after thirty days from the 2nd cut in both seasons. Fresh weight (kg/plot) for each cuts and dry weight (kg/plot) for each cut and its total, leaf ear width (cm), leaf ear length (cm), plant height, No. of leaves/plant, No. of tillers/plant and 100 grains weight.

At cutting time, ten plants from, each plot, were randomly taken to estimate different morphological characters according to the description, UPOV (1994) and Patrick (2016) were used as a guide in the selection of parameters and procedures for characterization (Tables 2 and 3). Data were subjected to ANOVA statistical analysis, using "MSTAT-C" computer software package. Least significant difference (LSD) method was used to test the differences among means of treatment at 5 % level of probability as described by Snedecor and Cochran (1980), and Waller and Duncan (1969). Analysis of variance of treatments difference was performed according to Steel and Torrie (1980). Bartlett test was done to test the homogeneity of error variances, the test was significant for all agronomic studied traits, thus the data of both years were not combined.

The laboratory studies were undertaken at Seed Science and Technology Laboratory Department, Field Crops Research Institute, ARC, Giza, Egypt. Hierarchical clustering analysis (dendogram) was then used to study selected accessions with some promising characters out of which those with high performing traits were selected (Du *et al.* , 2018). Molecular markers were determined for three samples representing five teosinte genotypes.DNA was extracted from the tissue of these gentypes using the DNA extraction kit (quigen inc.,cat.No. 69104,USA).DNA quality was tested using 1% agarose gel electrophoresis and its concentration was determined spectrophotometrically. Random oligonucleotide primers were screened and five of them which produced easily observable and repeatable fragments which used in PCR amplification (Table 1).

Table 1. The list of primer names and their mucleotide sequences use in this study.

No.	Name	Sequence
1	Op-A01	5' TCG GGG ATA G3'
2	OP-A10	5'CAA tcG CCG T3'
3	Op-B6	5'GTG ACC CCTC3'
4	OP-C4	5' CCG CAT CTA C3'
5	Op-C19	5'GAC GGA TCA G3'

The reaction conditions were optimized and mixtueres were prepared (30µl total volume) consisting of the following,DNAps 2.14 µl,MGC123,0 µl,lox buffe 3.0 µl,primer (10 um) 2.0 µl,Tag (5u/ µl)0.2 µl,emplate DNA (50 ng/ µl) 2.0 µl,H2O(dd) 17.4 µl.Amplification was carried out in a PTC-200 thermal cycler (MJR Research,watertown,USA) programed wasfollows. Determination, 94º C for 10 minutes, followed 40 cycles. Each cycle consisted of 1 minute at 94º C,1minute at 37º C, 2 minutes at 72º C, followed by a final extension time of 10 minutes at 72º C and 4º C (infinitives).Gel electrophoresis was applied according to Sambrook *et al.* (1989). RAPD products were separated on 1.2% agarose gels and bands were visualized with ethidium bromide. Bands were detected on UV.transilluminator and photographed by Gel documentation 2000. Bio-Rad. The bands were recorded as either present or absent into a database of 1 and Similarity, coefficients were calculated according to Dice matrix (Nei and Li ,1979). Constrauction of the dendrogram tree was perfored using the unweighed pair group methods based on arithmetic mean (UPGMA) in SPSS (2007) program version.

RESULTS AND DISCUSSION

Table (2) shows morphological traits of teosinte genotypes where stem Anthocyanin coloration of sheath of the first leaf (ACS) was very strong in Sakha, whereas, strong in Damietta, Gemmeiza 3, Gemmeiza 4 and Balady. The Shape of tip of the first leaf (ShT)was pointed to round for all genotypes.Wavy surface of blade (WSB) was absent except in Balady was medium. Blade attitude of leaf just above upper ear (BAL) was recurved in Sakha, slightly recurved in Dammietta , Gemmeiza 3 and Gemmeiza 4, whereas, strongly recurved in Balady. Anthocyanin coloration of sheath in the middle of plant (ACSh) was strong in Sakha, while medium in Damietta, whereas, absent in Gemmeiza 3,Gemmeiza 4 and Balady. Anthocyanin coloration of brace roots(ACBR) was medium in Sakha and Balady, whereas,weak in Damietta, Gemmeiza 4,while strong in Gemmeiza 3. Both of Anthocyanin coloration on glume base (ACGB) and Anthocyanin coloration on fresh anthers(ACA) were absentexcept in Balady was present. Flag leaf angle (FLA) was found >45 in Sakha, Damietta, Gemmeiza 3 and Gemmeiza 4, whereas, Balady showed <45 angle of flag leaf. Leaf angle play important role in the stress condition. The angle of leaf is critical for the incidence of radiations, therefore, affect photosynthesis. Sparse types of spikelets were found in all the studied genotypes. Density of spikelets is important for the amount of pollen production. Similar results reported by (Amarjeet, 2019).

Tables (3 and 4) show fresh and dry yields (kg/plot) of teosinte genotypes. There were significant differences for the individual cutting as well as total fresh and dry yields (kg/plot) in the two seasons. Fresh yield of Gemmiza 4 genotype recorded 6.34 and 7.51 kg/plot in the first cut followed by Balady genotype in the 1st and Gemmiza 3 in the 2nd seasons, respectively. Sakha genotype achieved the lowest one in the two seasons. In addition, in the second and third cuts the same trend was observed for forage fresh weight, Gemmiza 4 recorded 10.86 and 10.74 kg/plot in the first and second seasons. Total fresh weight of forage fresh weight was significantly varied between all genotypes, Gemmiza 4 recorded the high value 27.51 and 26.59 kg/plot in the first and second seasons, respectively. Whereas, Sakha recorded the low one (13.45 and 13.75 kg/plot) in the two seasons.

Table 2. Morphological traits of teosinte genotypes.

Code	Characters	Characters degree				
		S	D	G3	G4	B
ACS	Anthocyanin coloration of the first leaf sheath.	VS	S	S	S	S
STL	Shape of tip of the first leaf.	PR	PR	PR	PR	PR
WSB	Wavy surface of blade.	A	A	A	A	M
BAL	Blade attitude of leaf just above upper ear.	R	SlR	SlR	SlR	SR
ACSP	Anthocyanin coloration the middle sheath of plant.	S	M	A	A	A
ACBR	Anthocyanin coloration of brace roots.	M	W	S	W	M
ACGB	Anthocyanin coloration on glume base.	A	A	A	A	P
ACA	Anthocyanin coloration on fresh anthers.	A	A	A	A	VS
FLA	Flag leaf angle.	>45	>45	>45	>45	<45
DS	Density of Spikelets.	SP	SP	SP	SP	SP

S=Sakha; D=Damietta; G3=Gemmeiza 3;G4=Gemmeiza 4; B=Balady.VS = Very Strong; S=Strong;PR = Pointed to Round; A = Absent; R = Recurved; P = Present;SlR =Slightly Recurved; SR = Strongly Recurved; W = Weak; M = Medium; SP = Sparse.

Table 3. Fresh weight and total fresh weight of different cuts of teosinte genotypes (kg)/plot) in 2017 and 2018 growing seasons.

Genotypes	First cut		Second cut		Third cut		Total fresh yield	
	2017	2018	2017	2018	2017	2018	2017	2018
Sakha	3.17	3.13	4.99	5.68	5.28	4.95	13.45	13.75
Damietta	3.72	3.17	7.27	6.04	6.21	4.92	17.25	14.13
Gemmiza 3	3.66	5.57	7.86	8.88	6.46	6.28	17.99	20.72
Gemmiza 4	6.34	7.51	10.86	10.74	10.32	8.05	27.51	26.59
Balady	5.38	4.09	10.53	8.02	8.36	5.47	24.27	17.58
LSD 0.05	1.07	1.03	1.91	1.24	1.75	0.76	3.29	1.88

It is clear that from the table 4, statistical analysis indicated significant differences among different genotypes in dry yield kg/plot. Gemmiza 4 recorded the high means in the different cuts (4.72 and 5.08 kg/plot) over cuts in the two seasons) while, Balady genotype ranked the second one in the two seasons. Also, the total dry weight (kg/plot) of teosinte genotype behavior the same trend. Similar results have been reported by Patrick *et al.* (2008) and Habiba Hend *et al.* (2018).

Table 4. Dry weight (kg/plot) and total dry yield of different cuts of teosinte genotypes in 2017 and 2018 growing seasons.

Genotypes	First cut		Second cut		Third cut		Total dry yield	
	2017	2018	2017	2018	2017	2018	2017	2018
Sakha	0.52	0.51	1.14	1.21	0.69	1.13	2.34	2.85
Damietta	0.65	0.52	1.49	1.29	0.86	1.06	3.01	2.87
Gemmiza 3	0.61	0.899	1.67	1.92	0.79	1.43	3.08	4.25
Gemmiza 4	1.02	1.029	2.32	2.20	1.38	1.85	4.72	5.09
Balady	0.88	0.609	2.32	1.71	1.20	1.26	4.39	3.57
LSD 0.05	0.22	0.29	0.39	0.29	0.32	0.20	0.66	0.43

Data of leaf ear width and length in Table (5 and 6) show significant differences between genotypes in all cuts in the first and second season. The highest mean of leaf ear width in the first cut was 4.62 cm and 5.07 cm in the first and second season, respectively recorded from Gemmiza 3 whereas, Gemmiza 4 recorded the lowest mean (3.12 and 3.45 cm) in the two season. Meanwhile, leaf ear length achieved significantly between genotypes in the first and second seasons, Gemmiza 4 recorded 77.25 and 77.50 cm in the first cut in two seasons. On the other hand, Sakha recorded the lowest mean in the first cut in the first seasons. Regarding the second and third cut, leaf ear width and length of teosinte plants recorded the same trend of first cut in the first and second seasons. These results are in accordance with Habiba Hend *et al.* (2018).

Table 5. Leaf ear width (cm) of different cuts of teosinte genotypes in 2017 and 2018 growing seasons.

Genotypes	First cut		Second cut		Third cut	
	2017	2018	2017	2018	2017	2018
Sakha	3.55	3.55	3.62	3.72	3.07	3.0
Damietta	4.33	4.13	3.52	4.00	3.42	3.43
Gemmiza 3	4.62	5.07	3.72	3.87	4.40	4.55
Gemmiza 4	3.12	3.45	3.85	3.77	2.52	2.47
Balady	4.13	4.05	3.55	3.75	3.05	2.9
LSD 0.05	0.35	0.58	0.21	0.16	0.20	0.14

Table 6. Leaf ear length (cm) of different cuts of teosinte genotypes in 2017 and 2018 growing seasons.

Genotypes	First cut		Second cut		Third cut	
	2017	2018	2017	2018	2017	2018
Sakha	69.3	69.5	53.0	67.3	39.5	39.8
Damietta	69.5	70.0	86.3	85.8	51.5	53.5
Gemmiza 3	75.0	74.5	101.8	84.8	66.3	64.8
Gemmiza 4	77.3	77.5	109.8	109.0	72.0	71.0
Balady	75.5	75.5	83.7	84.5	64.3	64.3
LSD 0.05	0.9	1.1	3.7	7.4	4.2	1.7

Data in Table (7) show significant differences between plant heights of teosinte genotypes. Gemmiza 4 produced the high plant height value which recorded 81.5 cm for Gemmiza 4 while Sakha genotype recorded the low mean followed by Damietta genotype which recorded 71.8 cm. These results are in accordance with Habiba Hend *et al.* (2018) who reported that plant height was affected the different morphological characters.

The results of No. of leaves/plant at harvest (table 8) significantly varied among teosinte genotypes in the first and second seasons. The highest value 13.75 was obtained from Gemmiza 4 followed by Gemmiza 3 which recorded 13 in the first season. While, in the second season, the same trend in the 1st season was observed. Meanwhile, the lowest value was obtained fromSakha in the two seasons. These results are in harmony with Habiba Hend *et al.* (2018). They reported that Gemmiza 3 and Gemmiza 4 produced the best No. of leaves/plant in the two seasons.Data presented in table (7) illustrated also that teosinte genotype significantly differed in No. of tillers/plant. The high No. of tillers in the first season recorded from Gemmiza 4 (9.5) and (15.5) in the second season. While the low one recorded from Sakha 1 in the two seasons. Teosinte genotypes were varied significantly in 100-grains weight. The high mean of 100 grains weight recorded from Gemmiza 4, Gemiza 3 and the low one observed from Sakha in the first season. Meanwhile in the second season, the genotype of Gemmiza 4 recorded the high mean value.

Table 7. Plant height (cm), No. of leaves/plant and 100-grain weight (gm) of teosinte genotypes in 2016 and 2017 growing season.

Genotypes	Plant height		No. of tillers/plant		No. of leaves/plant		100-grain weight	
	2017	2018	2017	2018	2017	2018	2017	2018
Sakha	70.250	70.0	6.3	10.0	11.5	6.0	8.03	8.65
Damietta	71.8	68.5	7.3	10.3	12.3	7.3	8.70	8.90
Gemmiza 3	75.5	84.3	9.5	12.0	13.0	9.8	10.70	11.03
Gemmiza 4	81.5	86.8	9.5	12.8	13.8	10.8	11.58	11.90
Balady	77.0	75.0	7.5	11.5	11.8	8.0	10.13	9.83
LSD 0.05	6.3	5.8	1.3	1.8	2.0	1.6	0.66	0.66

The data obtained in table (8) and Fig. (1) Showed that with the primer A1 the total number of band obtained were 7 bands. The molecular size of these bands ranged between 1260-270 b.p.It could be also noticed that in Balady, Sakha, Damietta and Gemmeiza3 all bands were appeared except No.6 and No.7 with molecular size of 380b.p. and 270 b.p. respectively; in Gemmeiza4 all bands were appeared except No.1 with molecular size of 1260 b.p.On the other hand, there were 4 bands which appeared in all genotypes, these bands No.2, 3, 4 and 5 with molecular sizes of 840, 760, 630 and 540 b.p. and the bands No.6 and 7 with molecular size of 380 and 270 b.p. appeared in Gemmeiza4 only. The results also cleared that the number of bands obtained in each genotype were ranged between 5-6 bands.

Table 8. RAPD - PCR analysis of DNA polymorphic using A1 primer.

Bands		Genotypes				
Number	M.W bp	Balady	Sakha	Damietta	Gemmeiza 3	Gemmeiza 4
1	1260	1	1	1	1	0
2	840	1	1	1	1	1
3	760	1	1	1	1	1
4	630	1	1	1	1	1
5	540	1	1	1	1	1
6	380	0	0	0	0	1
7	270	0	0	0	0	1
Total		5	5	5	5	6

The data obtained in table (9) and Fig.(1) showed that with the primer A10 the total number of band obtained were 6 bands. The molecular size of these bands ranged between 360, 1500 b.p.It could be also noticed that all bands were appeared in all genotypes except band No.1 with molecular size of 1500 b.p did not appear only in Gemmeiza4. The results also cleared that the number of bands obtained in each genotype were ranged between 5-6 bands.

Table 9. RAPD - PCR analysis of DNA polymorphic using A10 primer.

Bands		Genotypes				
Number	M.W bp	Balady	Sakha	Dammietta	Gemmeiza 3	Gemmeiza 4
1	1500	1	1	1	1	0
2	1200	1	1	1	1	1
3	920	1	1	1	1	1
4	780	1	1	1	1	1
5	600	1	1	1	1	1
6	360	1	1	1	1	1
Total		6	6	6	6	5

The data obtained in table (10) showed that with the primer B6 the total number of band obtained were 4 bands. The molecular size of these bands ranged between 1060-500 b.p. It could be also noticed that the bands No.1and 3 with molecular sizes of 1060 and 640 b.p. respectively appeared in all genotypes, the band No.2 with molecular size of 840 b.p. appeared in all genotypes except Balady and the band No.4 with molecular size of 500 b.p. appeared in Damietta, Gemmeiza3 and Gemmeiza4. The results also cleared that the number of bands obtained in each genotype were ranged between 3-5 bands.

Table 10. RAPD - PCR analysis of DNA polymorphic using B6 primer.

Bands		Genotypes				
Number	M.W bp	Balady	Sakha	Dammietta	Gemmeiza 3	Gemmeiza 4
1	1060	1	1	1	1	1
2	840	0	1	1	1	1
3	640	1	1	1	1	1
4	500	0	0	1	1	0
5	420	1	1	1	1	1
Total		3	4	5	5	4

The data obtained in table (11) and showed that with the primer C4 the total number of band obtained were7 bands. The molecular size of these bands ranged between 3300 - 280 b.p.

It could be also noticed that the band No.1 with molecular size of 3300 b.p. appeared only in Gemmeiza3, the band No.2 with molecular sizes of 840 b.p. appeared in all genotypes except Gemmeiza4, the bands No.3, 4 and 6 with molecular size of 700, 620 and 6 b.p. appeared in all varieties, the band No.5 with molecular sizes of 470 b.p. appeared only in Gemmeiza4, the band No.7 with molecular sizes of 280 b.p. appeared in all varieties except Gemmeiza3. The results also cleared that the number of bands obtained in each genotype were ranged between 5-6 bands.

Table 11. RAPD - PCR analysis of DNA polymorphic using C4 primer.

Bands		Genotypes				
Number	M.W bp	Balady	Sakha	Dammietta	Gemmeiza 3	Gemmeiza 4
1	3300	1	0	0	1	0
2	840	1	1	1	1	0
3	700	1	1	1	1	1
4	620	1	1	1	1	1
5	470	0	0	0	0	1
6	400	1	1	1	1	1
7	280	1	1	1	0	1
Total		6	5	5	5	5

The data obtained in Table (12) and Fig.(1) showed that with the primer C19 the total number of bands obtained were 7 bands. The molecular size of these bands ranged between 1500-320b.p. It could be also noticed that the band No.1 with molecular size of 1500 b.p. appeared in Balady, Sakha and Damietta, the bands No.2, 4, 5, 6 and 7 with molecular sizes of 1150, 920, 600, 480 and 320 b.p. respectively were appeared in all varieties, the band No.3 with molecular size of 1000 b.p. appeared only in Gemmeiza4. The results also cleared that the number of bands obtained in each genotype were ranged between 5-6 bands.

Table 12. RAPD - PCR analysis of DNA polymorphic using C19 primer.

Bands		Genotypes				
Number	M.W bp	Balady	Sakha	Dammietta	Gemmeiza 3	Gemmeiza 4
1	1500	1	1	1	0	0
2	1150	1	1	1	1	1
3	1000	0	0	0	0	1
4	920	1	1	1	1	1
5	600	1	1	1	1	1
6	480	1	1	1	1	1
7	320	1	1	1	1	1
Total		6	6	6	5	6

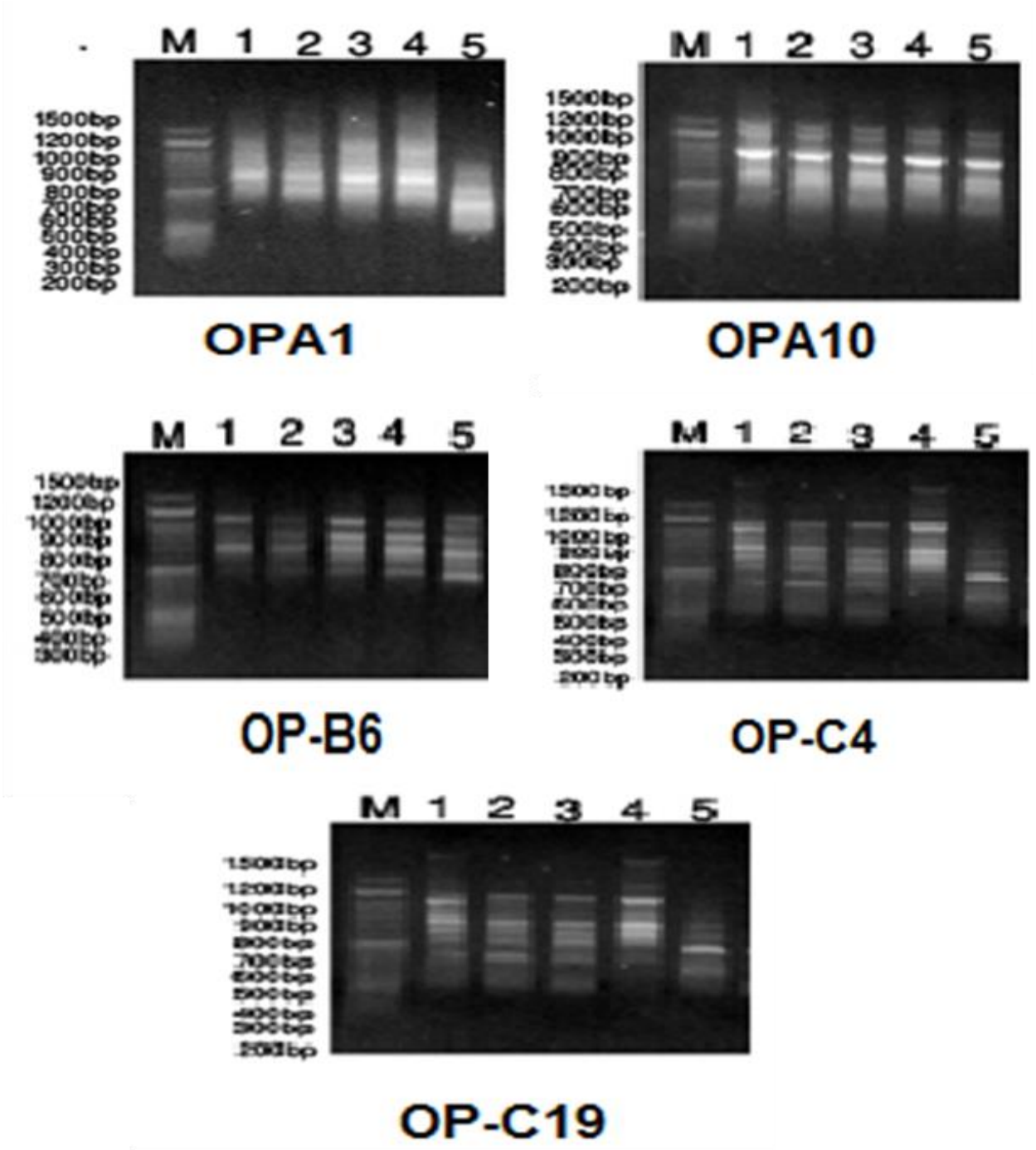

Fig. 1. RAPD primer PCR analysis of the teosine genotypes generated by the five primers (A1, A10, B6, C4 and C19).

All used primers produced polymorphic bands. Before achievement of calculations, unclear bands were deleted and were not interred in calculations. Total numbers of bands were 44 that among generated 32 different polymorphic bands were obtained (Table 13) using 5 primers. Five to seven polymorphic bands were generated for all primers in which maximum polymorphism (7 bands) was observed for primer A01, C4 and C19 and minimum polymorphism (5 bands) was observed for primer B6.These results are in agreement with Liu *et al.* (2017).

Table 13. List of the primer names, their nucleotide sequences and Levels of polymorphism based on RAPD analysis.

Primer name	Sequence (5'→3')	Polymorphic bands	Monomorphic bands	Total bands	%Polymorphism
OP- A01	5´ TCG GGG ATA G 3`	7	3	10	42.85
OP-A10	5´CAA TCG CCG T 3`	6	1	7	16.66
OP-B6	5´ GTGACCCCTC 3`	5	2	7	40
OP-C4	5´ CCG CAT CTA C 3`	7	4	11	57.14
OP-C19	5` GAC GGA TCA G 3`	7	2	9	28.57
Total	----------	32	12	44	----

Dendogram using Average Linkage (Between Groups):

The dendrogram based on RAPD analysis (Fig. 2) separated the studied genotypes into two main clusters, the first cluster was further divided into two subclusters (IA and IB), subcluster IA Included Balady, Sakha, Damietta. Subcluster IB included Gemmeiza3, Gemmeiza4 was in a separate cluster.The genotypes might be classified into three distinguished groups, Also, it might help in breeding programs. These results are in agreement with and Khatab *et al.* (2016).

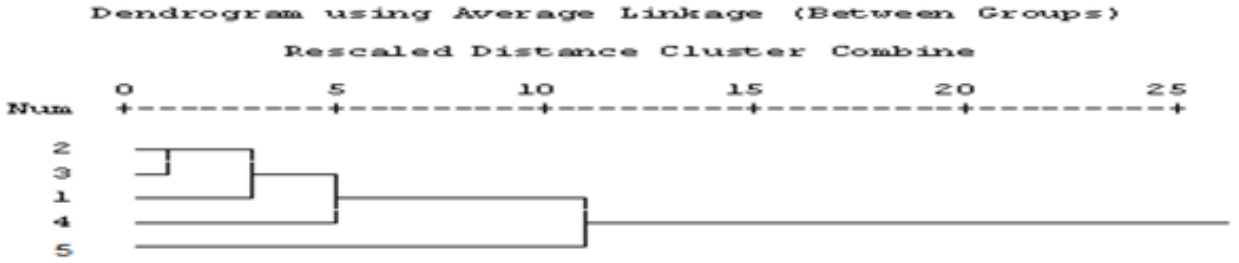

Fig. 2. The dendogram of the genetic distances between the teosinte genotypes based on RAPD analysis. Balady (1), Sakha (2), Damietta (3), Gemmeiza3 (4) and Gemmeiza4 (5).

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الصفات المورفولوجية والمحصولية والمعلمات الجزيئية فى بعض التراكيب الوراثية من الذرة الريانة

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أجري البحث بهدف دراسة المورفولوجي المحصولي والبيوكيمائى لبعض التراكيب الوراثية من الذرة الريانة حيث تم التوصيف والتمييز وفقاً للقواعد الدولية ودليل توصيف الأصناف الجديدة الصادر عنالإتحاد الدولي لحماية الأصناف النباتية الجديدة .ولتحقيق هذا الهدف أجريت التجارب المعملية بمعامل وحدة تكنولوجيا البذوربالمنصورة معهد بحوث المحاصيل الحقلية – مركز البحوث الزراعية وأجريت التجارب الحقلية لخمسة أصناف من الذرة الريانة (ريانه بلدي – ريانه سخا – ريانه دمياط – جميزه 3 – جميزه 4) بمزرعة قسم بحوث العلف بمحطة بحوث السرو في موسمي 2017،2018.اظهرت النتائج تفوق جميزه 3 وجميزه 4 علي باقي الاصناف لكل الصفات المدروسة وتوصي باستخدامه كأصناف مبشرة من الذرة الريانة.أظهرت نتائج تحديد المعلمات الجزيئية وجود تباين واضح بين التراكيب الوراثية وتم تقسيم الأصناف المدروسة إلى مجموعتين رئيسيتين ، وتم تقسيم المجموعة الأولى أيضًا إلى مجموعتين فرعيتين (IA و IB) ، وشملت المجموعة الفرعية (IA) الاصناف بلدي وسخا ودمياط وتضمنت المجموعة الفرعية (IB) صنف جميزة 3 وكان الصنف جميزة 4 في مجموعة منفصلة. النتائج المتحصل عليها ذات أهمية خاصة في برامج التربية وانتاج اصناف جديدة. وتقترح الدراسة اجراء تجارب فى حقول المزراعين قبل تسجيلها واطلاقها للتداول كأصناف تجارية.