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INVESTIGATING THE VARIATION OF MORPHOLOGICAL AND PHYSIOLOGICAL TRAITS OF NATIVE PEAR GENOTYPES OF SARDASHT CITY

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ABSTRACT

The pear, after apple, considered as the most important grainy fruits of the world and Iran. According to findings of researchers the west of Iran is part of the center of origin pear fruit and the West Azerbaijan province, according to the topographical status and geographical conditions, its vegetation has great diversity. Native Pear in this province, especially in the highlands and jungles of Sardasht city as types of wild pear has a great variety. Accordingly, investigating of the morphological and physiological traits of native pear of Sardasht based on national guideline tests for distinctness, uniformity, and stability (DUS) was conducted. There were, respectively 5and 9 traits of the shape of trees and one-year branch, among morphological traits and among physiological traits which 15 traits related to fruit, were investigated. This research, all genotype kinds of native pear, after identifying the trees and coding them was done in two stages and the considered traits were written and in a stage in the laboratory the chemical traits studied and statistical investigations were done using SPSS software. Chart analysis and resulted cluster analysis showed the number of 8 types of native pear genotype and showed its close relative value. In general, according to variance analysis of biochemical traits, the correlation was observed between all traits that most of the trees had abundant diversity. The collection of key traits was, well able to make differentiation and distinction between various native pear trees of Sardasht area.

Keywords: wild pear, morphological traits, physiological traits, DUS instructions, sardasht.

INTRODUCTION

The pear is the native fruit of western Asia and Eastern Europe, especially the regions of The Northwest and West of Iran and the Caucasus Mountains. In the type of pear, there are almost 20 different species that most of them don't have edible fruits and only used as a basis for common pears. Of the 20 species, 11 species are in Iran in which, 5 species distributed in Kurdistan and West Azerbaijan. Pear is one of the most important fruits in the world that among the seedy fruits after apple has the second grade. Pear tree relatively resistant against the cold of winter and can withstand up to -30 ° C. Therefore, this tree can be grown in a wide range of Iran and be one of the products of the country's exports and exchange (Mozaffari,1997). Free entry of foreign varieties, especially Bartlett leads to paying less attention to internal figures so that removing the native varieties and replacing them with foreign varieties or the other fruits, constantly increasing and there is a fear that in the not far future the species of native varieties destroyed and disappear from nature. including this we can mention Sanaly species that previously was one of the good native varieties ,but by the now remained only a name for orchardists or we can cite the varieties of Gaveh, Belan, Biareh,Shoteh and LaleAbbasi that merely a single tree remained in the region or maybe in all the nature (Davarynejad *et al*,2007)

Since each species has its unique genome with the loss of each variety many useful genes are destroyed that nature is incapable of regenerating them. On the other hand local varieties because of their genetic diversity and tolerance and compatibility which have obtained with their particular environmental conditions can be an important genetic basis for improving fruit trees (Mozaffari, 1997).

METHODOLOGY

Climatic characteristics of the location and the time of running experiments

This study was carried out in 2014 at the different places of Sardasht city with 1515 m above sea level and with "45 degrees and 48 minutes long - 36 degrees 9 minutes "latitude in the forest and various villages of Sardasht city (the villages of Mir Sheikh Heydar with 1670 m, height from sea, Ghazan village with 1400 m height from sea level, Gvalan with 1492 m height from sea level and Vargel with 1069 m height from sea level). Sardasht located in the south of west Azerbaijan and has a semi-humid climate. The average annual rainfall is 615.5 mm; maximum temperature is 37 ℃, the minimum temperature 9 ° C and sometimes reaches below zero and has 76 percent relative humidity (Sardasht weather data, 2012).

The experimental design and methodology

The research was carried out on some native wild pear genotypes of Sardasht located in different areas of the forest and its different areas. The study was conducted in a randomized complete block design with three replications, some morphological and physiological and biochemical characteristics of fruit and pear trees were studied. Therefore, in the current study attempted to while selecting the most important local Pear, take actions to evaluate in detail and accurate them based on national guideline tests for distinctness, uniformity and stability DUS)). In this study, while studying the efficacy of this procedure on evaluating the variety of local Pear genotype,

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the obtained information will be used for breeding programs and record the figures used.

The steps of carrying out the experiment

After identifying the desired location and the considered tree, the traits were evaluated based on national guidelines on distinction tests, uniformity of stability using the instructions provided by the International Union for the Protection of new plant Varieties. Taking notes of trees was done, in two stages of active growth period of trees from the mid-May to mid-June and the time of ripening and harvesting of the fruit from the mid- August to the mid- October in a year. The study of biochemical traits is done in mid-May to early November. Desired traits based on separation time priority and in the action stage the noting and sampling was done at least on three trees.

Figure-1. Flowering and fruiting some native pear trees.

Figure-2. Trunks of some trees, pear trees.

Figure-3. Fruits harvested from some local pears.

Biochemical studies

Measuring ion leakage

For this purpose, at first the samples of the leaves, weighed at rate of 0.5 grams and rinsed with distilled water the putted into test tubes, containing 20 ml of distilled water. The tubes were shake in 150 rpm and for 30 minutes by the shaker device (FINETECH model, built in Company of Ferdoos), then ion leakage of (L1) solution was measured by conductivity meter (aqualyticsensdirect CD24), then the samples for 15 minutes at 95° Placed in the hot water and at end the ion leakage of (L2) leakage after reaching equilibrium with ambient temperature measurement condition, the rate of ion leakage (damage to the cell membrane) was calculated from the following equation.

EL (%)=(L1.L2) ×100

Determination of total acidity

For this purpose 25 cc of taken fruit juice in an Erlen, reached to 2. cc with distilled water, and then eight drops of phenolphthalein was added to the solution and then by help of NaOH1. 0 normal, operation titration is done until the color change, then the volume of consumed NaOH and based on related equation the value of acidity was calculated according to acidity.

Acidity = V×0.0064×100.S
S = Amount of sample in terms of cc
V=the volume of consumed NaOH
Citric acid equivalent =0.0064
Chl(a,b)=[20.4(D645)+8.02(D663)] × V⁄(1000×W)
The rate of red light absorbance in wavelength = related D
The volume of extract of V:
The weight of wet sample of W:
C(x+c) = (1000A470-1.82 Ca - 85.02Cb).198
In the above equations Ca is a Chlorophyll,Cb is Chlorophyll of bC(x+c),the value of Carotenoids and A is the value of absorption in different wavelengths.

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The measurement of fruit sugar by Fehling method

Titration method in the vicinity of Fehling solutions was used for measuring Sugar of Banana, for this purpose 25 ml was taken from smoothie extract of fruit and was poured in a 100 ml Erlenmeyer and added to it 25 ml distilled water and 10 ml of concentrated hydrochloric acid and for ten to fifteen minutes to emergence the light brown color was placed on a hot water bath(In this way, all the available sugar in the juice is converted into sugar resuscitation),then using digital Ph meter(Ph 3110 model, built in WTW company of Germany) and the NaOH 10 and %1 and 0.1 normal, its acidity neutralized and its Ph reached to 7 and at the end using distilled water ,its volume reached to 100cc and completely shaked. Each of the Fehling solutions A,B which was prepared previously, was used and poured in a 50 cc Earlen and a few drops of methylene blue were added to it, then the pale brown juice was poured in Burt and the titration operation was done in vicinity of hot source until appearance red brick color. The used extract for titration was registered and finally by putting it on the following formula the percentage sugar content in the extract was determined.

F Standard sugar factor

9.5 g of sucrose in 200 ml of distilled water was poured, and then 5 ml of concentrated hydrochloric acid added to it, and was placed in experimental temperature for two days and in the third day with NaOH 1,0 and 10 normal, reached to 1000 ml volume, then some of it poured into a graduated burette and tittered with 5 ml Fehling A ,5 ml Fehling B+ and a drop of metilen blue that the rate of used sucrose solution in titration was equal to standard figure of F.

V= The volume of extract used for titration

Constant figure=0.00095

Preparation method for Fehling A:17.32 g of copper sulfate is reached to 250 ml

Preparation method for Fehling B: double tartrate of Potassium sodium with 86.5 g plus 15 g NaOH reached to 250 ml volume.

Analysis of data

The results of the experiment using computer software SPSS version 16 was analyzed and to draw some charts Microsoft Office Excel (2010) software was used. The used tests include correlation, analysis of variance, regression, cluster analysis.

RESULTS

Correlation Test

At the intersection of each row and column is written, 1 numerical Table that equals between the two variables in the Pearson correlation coefficient. The sign of ** means significance of the correlation between two variables in the 0.01 level and the sign of * means significance of the correlation between two variables in the 0.05.

Correlation test

At the intersection of each row and column is written 1 numerical Table that equals to the coefficient of Pearson correlation between two variables. The sign of ** means the significance of correlation between two variables in 0.01 level and the sign of * means the significance of correlation in the 0.05 level. Among all traits under study the correlation of all traits in table 1 was investigated. And results suggest that the correlation between shootgenerations with growth power, the thickness of tail with bulge,the tail status to the branch with length, showing very meaningful and direct relationship at %1 confidence. according to obtained results by Yermin, in pear in the fruits that the number of its carpels is less than 5, in some of pear verities cause to increase weight of the fruit. Also results of research suggest that the correlation of distance of stipules with power of growth and shoot generation, Tss with bulge, the background color of skin with bulge and depth of the troughs with bulge, density of tilts with status of the shell, Position of vegetative bud development of the branch length, and the state of tail to the branch with power of growth in the %5 are meaningful and have direct relationship.

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Table-1. The characteristics of traits.

	The power of growth	bulge	Shell status	Growth habit	Branch generation	Power of growth
The power of growth	1					
Branch generation	.832**	1				
Growth habit	0.104	0.099	1			
Shell status	0.21	0.245	0.272	1		
Bulge of the fruit	-0.386	-0.364	-0.231	-0.347	1	
Length of leaf	0.298	0.174	-0.413	-0.055	0.167	1
Stipules	-0.172	-0.045	-0.387	0.358	-0.228	0.124
Fruit PH	0.285	0.341	-0.008	-0.358	0.022	0.125
Fruit EC	0.181	0.161	-0.222	0.232	-0.189	-0.04
Fruit TSS	-0.044	0.012	0.311	0.101	-.482*	-0.25
Fruit TA	0.085	0.119	-0.072	-0.039	-0.029	0.192
Whole sugar	-0.01	0.06	0.135	-0.163	-0.024	-0.203
Color of sepal (beginning of summer)	0.236	0.243	0.169	0.163	0.019	0.271
Length of fruit	0.02	-0.072	-0.075	-0.297	0.296	0.356
The greatest diameter of fruit	0.036	-0.155	-0.289	-0.443	0.351	0.664**
Size of fruit indentation	-0.06	-0.099	0.156	-0.145	0.397	0.065
Symmetry(l Longitudinal section)	-0.009	-0.147	-0.085	-0.407	0.4	0.471*
Side profiles	0.281	0.043	0.413	-0.102	-0.222	-0.131
Background color of fruit skin	-0.058	0.047	-0.112	0.306	-0.159	-0.299
The relative area of patina margin troughs of the end	0.07	0.106	0.136	0.148	-.479*	-0.169
The length of fruit tail	-0.073	-0.057	-0.078	-0.317	0.356	0.307
The length of tail	-0.206	0.098	-0.016	0.279	-0.265	-0.029
The state of tail fruit to the bud	-0.124	-0.277	-0.217	-0.188	.684**	0.37
The depth of tail hole	-.504*	-0.427	-0.076	-0.033	0.278	-.596**
The state of petals	.460*	0.27	0	-0.278	-0.113	0.408
The end of indentation	-0.448	-0.065	0.241	0.015	0.018	-0.081
Meat texture	0.198	0.112	-0.203	-0.444	0.147	-0.037
Succulent of fruit	-0.088	-0.058	-0.094	0.064	-0.098	-0.2
Maturity time for freshness of fruit	.473*	0.448	0.373	0.01	-0.055	0.002
Length	-0.166	-0.227	-0.302	-0.231	0.232	0.118
Width	0.17	0.226	-0.101	0.128	0.161	0.123
Billow of axis	.475*	0.341	-0.381	-0.198	-0.23	0.147
Anthocyanin pigments	0.253	0.052	-0.101	-0.235	-0.106	0.337
Tilt density	0.205	0.237	-0.042	0.084	-.482*	0.23
Growth	0.09	0.001	0.055	-.520*	-0.11	-0.036
Length of internode	.488*	0.446	-0.322	0.107	-0.085	0.307
Dominant color of face	0.103	-0.018	0	0.08	-0.087	0.38
Number of lenticels	0.228	0.371	0.014	0.146	-0.269	-0.283
The shape of bud	0.387	0.195	0.032	-0.301	-0.041	0.334
The position of bud growth to the branch	0.012	0.106	-0.018	-0.183	-0.42	-0.345
The size of bud support Patina margin troughs of the end	0.272	0.236	-0.1	-0.291	-0.029	.570*

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	Stipules	Stipules distance from the base of the petiole	PH	Ec	Tss	TA
stipules	1					
Stipules distance from the base of the petiole	0.296	1				
PH	-0.087	0.417	1			
Ec	-0.17	0.121	-0.183	1		
Tss	0.217	-0.087	0.21	-0.221	1	
TA	-0.236	-0.141	-0.201	0.203	-0.278	1
Whole sugar	0.01	0.25	.630**	-0.125	0.439	-0.234
Colored sepals (early summer)	0.285	0.378	0.139	-.60**	0.104	-0.024
length	-0.361	0.243	0.327	0.119	-0.171	-0.043
The greatest diameter	-0.234	0.191	0.153	-0.111	-0.304	0.168
Ratio of diameter to length	-0.372	0.067	0.121	0.07	0.019	-0.096
size	-0.386	0.123	0.221	0.057	-0.286	0.037
Symmetry (in longitudinal section)	-.554*	-0.274	0.341	0.218	0.132	0.115
Sides of profiles	0.032	-0.171	-0.266	0.223	0.097	-0.02
Ground color	0.183	0.141	-0.012	-0.263	0.277	-.472*
Color of face	-0.153	-0.044	0.24	-0.418	0.229	-0.414
Relative area of patina margins at the end	-0.203	0.123	0.346	-0.076	-0.234	-0.106
Length of tail	0.153	0.248	-0.188	0.027	0.188	-0.027
Thickness of tail	-0.141	0.118	0.098	0.03	-0.207	-0.026
Status of tail to the	0.029	-0.205	-0.156	0.235	0.202	-0.288
Depth of tail hole	-0.337	-0.114	0.146	-0.244	-0.165	0.327
State of sepals	0.039	-.519*	-0.236	-0.111	0.171	0.224
Meat texture	0.272	-0.277	-0.287	0.104	0.253	0.439
Succulent of fruit	-.611**	0.098	0.231	0.084	-0.284	0.212
Maturity of fruit freshness	0.181	-0.243	-0.295	-0.382	-0.27	0.298
length	0.116	0.279	0.452	-0.135	0.029	0.026
width	-0.149	0.425	0.252	0.37	-0.198	-0.126
Axis billow	0.042	0.207	0.197	0.098	-0.153	-0.334
Anthocyanin pigments	-0.083	0.258	0.152	0.349	0.068	0.222
Tilt density	-0.308	-0.03	0.22	-0.21	-0.021	-0.223
growth	0.103	.768**	0.235	0.175	-0.063	-0.177
Internode length	-0.104	0.233	0.095	0.038	-0.319	0.353
Dominant color of face	0	0.141	-0.102	0.463	-0.263	-0.012
Number of Lenticels	-.499*	0.221	0.294	0.234	-0.295	0.06
The shape of bud	-0.167	-0.364	-0.106	-0.041	0.137	0.017
Position of vegetative bud development of the branch	-0.279	0.155	0.176	-0.135	-0.344	.517*
Size of bud support	-0.403	0.293	0.295	0.248	-0.151	0.033

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	Whole sugar	Sepal color (early summer)	length	The greatest diameter	Ratio of length to diameter
Whole sugar	1				
Sepal color (early summer)	0.106	1			
length	0.414	0.062	1		
The greatest diameter	0.122	0.062	.709**	1	
Ratio of length to diameter	0.327	0.168	.620**	0.183	1
size	0.236	0.02	.937**	.818**	.565*
symmetry	0.213	-0.36	0.214	-0.002	0.061
Profile of sides	-0.002	-0.4	-0.28	-0.284	-0.434
The color of skin background	-0.196	0.229	-0.35	-0.351	-0.252
Relative area of Patina margin troughs	0.339	0.066	.660**	.621**	0.134
Length of tail	0.116	0.187	0.149	-0.096	0.18
Thickness of tail	0.09	0.013	.473*	.622**	0.257
State of tail to the	0.133	-0.214	-0.07	-0.359	0.263
Depth of tail hole	-0.151	-0.064	0.075	0.415	-0.29
State of sepals	-0.138	-0.092	-0.2	-0.178	-0.144
Meat texture	0.077	0	-0.42	-0.234	-0.211
Succulent of fruit	0.207	-0.076	0.399	0.236	0.043
Maturity for fruit freshness	-0.344	0.278	-0.34	0.059	-0.343
length	0.261	0.133	-0.24	-0.244	-0.112
width	0.131	-0.051	0.448	0.295	0.035
Shape of endExcept tip	0.251	-0.151	0.211	0.185	0.197

	size	Symmetry (in longitudinal section)	Sides profile	Ground color
size	1			
Symmetry (in longitudinal section)	0.178	1		
Sides profile	-0.406	0.112	1	
Ground color	-0.448	-0.231	0.044	1
Face color	0.415	0.074	-0.355	-0.136
Relative area of margin of end indentation	.631**	0.058	-0.176	-0.321
Length of tail	-0.015	-0.425	0.177	0.418
Thickness of tail	.549*	-0.083	-0.168	-.554*
The curvature of the tail	0.024	0.148	0.097	0.198
State of tail to teh	-0.146	-0.228	0.175	-0.018
Depth of tail hole	0.171	.486*	0.077	-0.13
State of sepals	-0.162	-0.115	0.25	-0.065
Meat Firmness	-0.219	-0.062	-0.084	0

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	Relative area of margin indentation	Length of tail
Relative area of margin indentation	1	
Length of tail	-0.045	1
thickness of tail	.543*	-0.396
State of tail to the	-0.231	0.087
Depth of tail hole	0.163	-0.382
State of sepals	0.05	0.284

	State of tail to the fruit axis	**Depth of tail hole**	**State of sepals**
State of tail to the	1		
Depth of tail hole	-.783**	1	
State of sepals	-0.02	-0.059	1
Meat firmness	0.305	-0.21	0
Succulent	-.477*	.540*	-0.081
Maturity time for freshness	-0.121	0.144	0.02
length	-0.177	0.12	-0.108
width	-0.096	0.122	-.573*
End figure except tip	0.267	-0.096	-0.369
Length of sharp tip	-0.128	0.196	0.211
Billow of axis	-0.183	0.1	-0.36
Anthocyanin pigments	-0.248	0.023	0.071
Tilt density	-0.15	0.211	-0.155
growth	0.019	-0.089	-.601**
Length of internode	-.463*	0.168	-0.124
Dominant color of face	0.049	-0.301	-0.078
Number of lenticel	-0.387	0.387	-0.295
The shape of tip of the bud	-0.099	0.285	0.116
Position of vegetative bud development of the branch	-.729**	.622**	-0.015
Size of bud support	-.502*	0.339	-0.136

	Meat texture	**The succulence of fruit**
Meat texture	1	
The succulence of fruit	-0.274	1
Maturity for freshness	0.441	-0.19
length	0.125	0.131
width	-0.241	0.337
Ratio of length to width	0.387	0.073
Length of sharp tip	0.08	0.166
Billow axis	-0.453	0.036
Anthocyanin pigments	-0.045	0.25
Tilt density	-0.23	0.227
growth	-0.317	0.017
Length on internode	-0.127	0.326
Dominant color of face	0.151	0.262

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Number of lenticel	-0.31	.538*
	width	**Ratio of length to width**
width	1	
Ratio of length to width	0.148	1
Billow axis	.463*	-0.368
Anthocyanin pigments	.485*	0.353
Tilt density	.477*	0.134
Growth	.563*	0.092
Length of internode	0.265	0.167
Dominant color of face	0.418	0.189
Number of lenticel	.573*	0.045
The shape of bud tip	0.208	0.077
Position of vegetative bud development to the branch	0.128	0.165
The size of bud support	.566*	0.074

	Billow of longitudinal axis	**Anthocyanin pigments of growing tip**	**Tilt density**	**growth**	**The length of internode**
Billow of longitudinal axis	1				
Anthocyanin pigments	0.008	1			
Tilt density	0.188	0.422	1		
growth	.494*	0.068	0.006	1	
The length of internode	-0.037	.675**	0.238	-0.121	1
Dominant color of face	0.039	0.315	0.152	0.083	0.164
Number of lenticel	0.356	.545*	.699**	0.216	0.454
The shape of tip of the bud	-0.221	0.203	0.278	-0.163	-0.001
Position of vegetative bud development of the branch	0.19	0.246	0.102	0.104	.469*
The size of bud support	0.319	.645**	0.404	0.303	.517*

	The dominant color of the sun	**Number of lenticels**	**Position of vegetative bud development of the branch**
The dominant color of face	1		
Number of lenticels	0.163	1	
Position of vegetative bud development of the branch	0	0.334	1
The size of bud support	0.329	.707**	.531*

Correlation is significant at the %5 level **Correlation is significant at the %1 level

Cluster analysis

Cluster analysis, hierarchical clustering on morphological, physiological and biochemical kinds of wild pear tree

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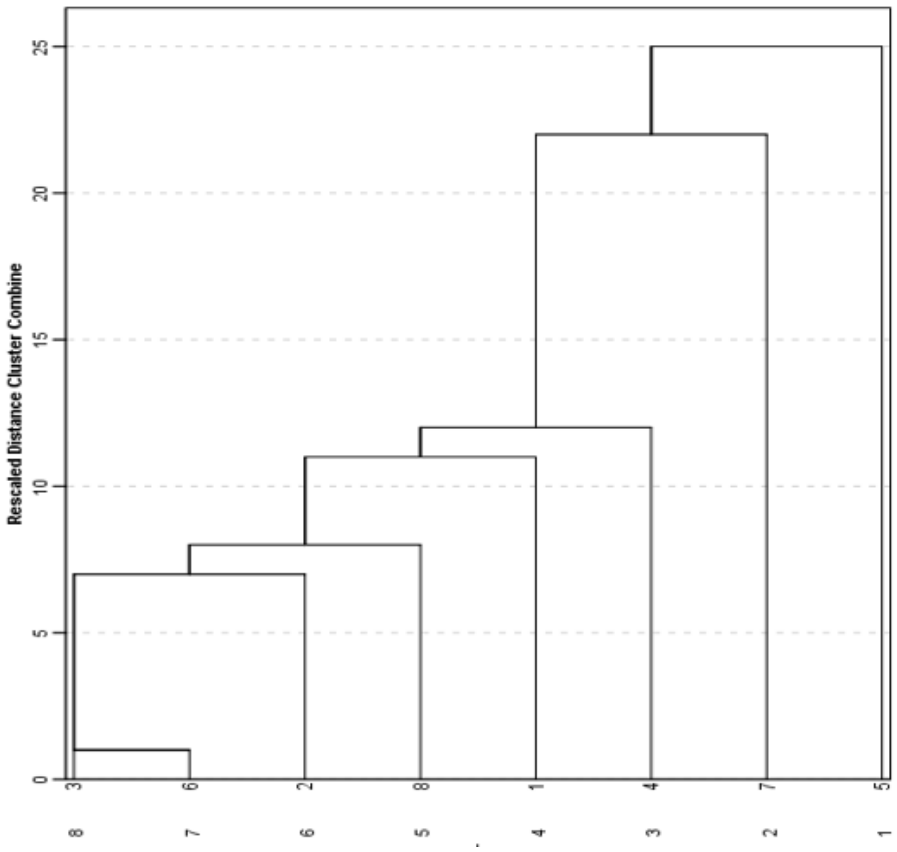

Figure-4. Dendrogram of morphological, physiological and biochemical of 8 genotype of native Pear.

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Table-2. Average and deviation from the mean of 6 clusters obtained from the 20 traits of native Pear.

cluster	1			2		3			4		
Varities	1 & 4			2		5				3	
	mean		Percent deviation from total average	mean				Percentage deviation from total	mean		Percentage deviation from total
The power of growth	5.33		-0.07	6.33	0.93	5.00		-0.4	5.67		-0.4
Shoot generatio	5.56		-0.62	6.67	0.49	5.67		-0.51	5.67		-0.51
Growth habit	3.2		-0.22	3.83	0.33	3.00		-0.5	4.00		-0.5
State of the shell	2.28		0.03	2.33	0.08	2.00		-0.25	2.00		-0.25
bulge	1		0.00	1.00	0.00	1.oo		0	1.00		0
length	4.89		-0.30	5.33	0.14	5.67		0.47	5.67		0.47
dtipule	9		0.00	9.00	0.00	9.00		0.00	9.00		0
Stipules distance from the base of	4.78		-0.08	4.33	-0.53	4.33		-0.52	4.33		-0.53
PH	3.79		-0.14	3.85	-0.09	3.81		-0.12	4.05		0.12
Ec	4.9		-0.2	4.19	-0.93	6.45		1.41	6.3		1.18
Tss	20.51		0.28	21.68	1.45	17.4		-2.83	23		2.77
TA	0.97		-0.14	1.3	0.19	1.61		0.5	1.02		-0.09
Whole sugar	10.01		0.36	10.9	1.25	8.2		1.45	10.4		0,75
The color of sepals (early summer(	3.11		-0.07	3.5	0.32	3		-0.18	3		-0.18
length	4.67		-0.7	5.67	0.3	6.33		0.96	6.33		0.96
The greatest diameter	5.22		-0.34	5.67	0.11	5.67		0.1	6.33		0.77
Ratio of Length to diameter	4.11		-0.29	4.67	0.27	5.67		1.2	5		0.6
Position of maximum	1.94		0.05	2	0.11	2.33		0.44	2.33		0.44
size	4.44		-0.91	5.67	0.32	6.33		0.98	7		1.65
Symmetry in longitudinal section	1.83		-0.28	2.5	0.39	2		-0.11	2.33		0.22

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5		mean	6.67	7	3.17	2.33	1	5.67	9	5.67	4.17	6.66	20.53	1.13	10.44	2.67	6.33	6.33	4	1.67	6.33	2.33
	8	Percentage deviation from total	1.27	0.82	-0.33	0.08	0	0.48	0	0.18	0.24	1.54	0.3	0.02	0.79	-0.51	0.96	0.77	-0.4	-0.22	0.98	0.22
6	7	mean	7	6.33	3.67	2	1	5	9	4.33	4.27	5.86	17.33	0.99	7.86	3	5	5	4.33	2	5	3
		Percentage deviation from total	0.93	0.82	0.17	0.75	0	0.48	0	-0.53	0.34	0.74	-2.9	-0.12	-1.79	-0.18	-0.37	-0.56	-0.07	0.11	-0.35	0.89
		Total mean	4.32	6.18	3.5	2.25	1	5.19	9	4.86	3.93	5.12	20.23	1.11	9.65	3.18	5.37	5.56	4.4	1.89	5.35	2.11

The comparison of grouping genotype of native pear according to morphological, physiological and biochemical traits showed that, the grouping of the genotypes according to all traits, better

Able to discriminate genotypes based on the similarity of appearance or origin of the dispersion and accordingly the studied pears divided into six categories or clusters (Figure-4). In this grouping the genotypes of Houri 1 and Lahore placed in the first cluster, and the mean of pears of this cluster, in terms of traits of fruit length and PH of fruit in comparison to other clusters was at the lower level of other clusters but in terms of traits of growth power, shoot generation and growth habit, length, EC and he greatest diameter had negative standard deviation, it means in comparison with others were at the lowest level. The species of Krozo was in the second cluster and its mean in terms of EC traits in comparison with other clusters had less value. And other traits had high values to the other clusters and had the positive standard deviation that is in comparison with others were at the higher level. Krosk species was alone, in the third cluster that the mean of power traits, the distance of stipule from the base of the petiole and TSS to the other clusters was on the lower level and in most of the traits had negative standard deviation and was at a low level. The genotype of Spi in the fourth cluster that the traits of PH and TSS to the other clusters were at the higher level and the traits of growth power, the state of shell and habit of growth had negative standard deviation. The tree of Sevharmeh in the fifth cluster that only in the trait of sepal's color was at lower level in comparison with others and in all traits had positive standard deviation, that is in comparison with others was at higher level and finally the genotype of Ghonchke that was alone in the sixth genotype, that in this cluster all traits were at high level and had positive standard deviation in all traits .according to this clustering we can conclude that the types of pear genotype have very large dispersion. In general, comparing results of morphological and physiological traits of these genotypes indicating a significant difference of genotype grouping based on morphological characters.it seems that the traits under study in this research are able to, nicely separate genotypes according to an origin and apparent similarities.

DISCUSSION AND CONCLUSIONS

The trees always take certain genetic characteristics in relation to the main habitat. Researchers believe that climatic factors very important to create variation in morphological and physiological characteristics of trees. In contrast, trees create different ecotypes for resistance to different ecological conditions by changing their morphological characteristics. According to the study of diversity in the traits of growth power of trees, the crown of the tree and branches generation is evident among pear verities. In this paper, the inferential statistics was carried out. Firstly, variance analysis was done for chemical traits (PH, EC, TSS, TA and whole sugar). Biochemical traits of all types of pear genotypes, which including 8 genotypes were analyzed. In the traits of EC, TA and whole sugar in the %1 level the difference was significant in the part of variance analysis of succulent fruit of pear about 8 genotypes of native pear were compared and it was determined that with %95 mean the succulent of pear in all types of genotype is different. in the second part of the test, correlation of all traits has done in this test, places that are meaningful between two correlation variable in the %5marked with an asterisk and

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in the %1 marked with 2 asterisks. In the variables of the tree, the correlation between shoot generation and growth power is meaningful. In the one-year branch, the correlation was significant between the length of internodes with the position of bud growth and size of bud support as well as the correlation was meaningful between the number of lenticels with the size of bud support and correlation between the position of growth and with the size of bud support was significant. In lamina of leaf, the correlation between the mode of the branch and margin cut, between the lengths with the ripple of the longitudinal axis and also between widths with the ripple of length axis, was significant. In biochemical traits correlation between pH and total sugar is significant. From hierarchical clustering analysis using the Euclidean distance in the morphological, physiological and biochemical types were identified all types of native Pear that the native pear genotypes can be divided into 6 clusters. The dendrogram graph indicates this result. Multiple linear regression in the traits of fruit was performed by the forward method and in this method, three variables of the state of the tail to the fruit axis, meat texture, and symmetry in longitudinal section, in three phases gained the necessary criteria for entering to the models. In all three models, the regression was significant and the variables well justified the changes. Also, the residuals were normally distributed. Multiple linear regression in the traits of the tree was performed with entering method. in this method the regression was significant and the variables of power growth, growth habit, a bulge of the trunk and the status of the shell was entered into the model at %5 level. According to the distribution charts, three variables of the power of growth, growth habit and the status of shell had the direct relationship with branch generation and bulge of the trunk had the reverse relationship with branch generation. In this model the residual regression is normal.

According to obtained results from variance analysis of biochemical traits and comparing mean, correlation among all morphological and physiological traits, dendrogram of all the attributes and multiple regression of fruit characteristics, we can conclude that there is very difference in the morphological and physiological traits of 8 genotype of native pear and in terms of dendrogram and the most studied areas are divided into 6 groups and we can say that the diversity is very high and have large numbers and enormous genetic diversity. Chart analysis and dendrogram obtained from cluster analysis have shown 8 native genotype pear and the overall key traits of instruction nicely able to separate and distinct different points of pear native tree.

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