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Investigation and Value of Qualitative and Quantitative Characteristics 10 of Genotypes of Figs

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Abstract

The study was carried out using the germplasm of fig trees from the national collection at the Agriculture University of Tirana. The collection contains several varieties of fig collected from different areas for purposes of conservation and preventing further genepool depletion. 10 genotypes of fig were analysed for quantitative and qualitative characteristics. All genotypes express especially dominant traits such is: colour of fruit, internal colour of fruit, lenticels, taste of fruit, cavity of fruit, length of fruit, form of fruit, form of leaves, type of leaves, genetic traits. This study are analyses quantitave traits such as: weight fruit, weight of tree/fig, Weight is variable parameter and depend on the age of fig tree, growth of tree, variety of the fig tree as well as adaptions of land and climatic condition because varieties have different origin. At all varieties are adapted to soil and climatic condition due to varieties having different origins. All examined varieties, are well adapted to soil and climatic in climatic condition. For varieties which are with maturity of times weight of fig tree is different, in the first maturity of fruit fig weight is a big than second maturity of fig tree weight. There are the less beffer fig trees than uniffer figs. Dominant uniffer varieties mature in August-September. However, last year we analyses with method: Reference AOAC 934.06, Sugar 21.73 2018, 2019; acidity was analyses AOAC 942.15 g/l All parameters were analyses statistical.

Keywords

Fig, Qualitative, Quantitative Characteristic, Diversity, Productivity

1. Introduction

Fig tree in Albania country is fruit important and older, very reach and a lot of sorts. Has more destination: 1. For fresh consume, 2. For dry consume, 3. For industry (jam, rakee). It is popular fruit, in every garden and orchard of private family you can found two or more fig tree one variety or two or three variety. Before years ago when economy was collective has been more block with figs, but more when economy pass in private economy this block separate in private family for administration**.** Creating a collection of fruit and fig species in particular as one of the most varied species in our country was a necessity of the time. There is now a collection that has a rich germoplasm of fig species from all over the country.

2. Materials and methods

The study was conducted during 2016-2019 and has analyses of morphological, phenological traits in 16 genotypes, but in this study, we will expose only 10 genotypes varieties which are in ex situ collection. The analyses were carried out of 10-20 leaves, 10-20 fruit for 10 genotypes. For 10 genotypes were analyses some characteristics such are: For leaves, dimension (length x width), lobes number, forms of leaf, type of leaf, sinus, etc, and for fruits, dimension of fruit

(length x width), forms of fruit, color of fruit, age of tree, destination of fruit, crops number, weight of fruit, weight of tree, % sugar, % acidity, humidity, etc. At all characterizes of genotypes were characterization according descriptor of ECPGR, IPGRI, and composed passport for each accessions.

3. Results and discussion

From the study of 10 genotypes figs in the germplasm field is arrived in conclusion results that represent a visible genetic variability which consists of the leaf shape in the form of the crown in the form of fruit, represent a large variability of the traits. In foliar analysis, the foliage variability apparent in the form of leaf which moves from type A to type H, number of lobes from 3 lobes to 5 lobes, type of leaves from spatulate to lyrate, form of leaves base from trunk to decurrant [1]. In addition to the genetic features, the phenotypic features of the plant as well as the dimensions of the leaf, dimensions of the tail, sinuses are analyzed. All are photographed and statistically analyzed.

Table 1. Indexs of accessions leaves ex situ collection Valias/UBTirane

No.	Code/national	Code/bgj	Ll/cm	llxlw	llxlw	Type of leaves	Shape of leaf base	Leaf stalk length	Petiol of length/cm	Density of hear
13	ALB026	4246	19.0	18.5	351.5	E	cordate	6.6	6.5	none
2	ALBO26	4244	19.5	19.2	374.4	G	decurrently	7.0	7.0	none
3	ALB026	4243	15.0	15.4	231.0	B	cordate	10.5	5.0	intermediate
4	ALB026	4235	15.0	15.5	232.5	G	decurrente	7.8	5.0	sparse
5	ALB026	4238	17.0	14.0	238.0	B	cordate	7.5	6.0	intermediate
6	ALB026	4240	20.0	19.0	380.0	D	calcarate	6.6	6.0	intermediate
7	ALB026	4234	19.0	16.5	313.5	G	decurrently	6.7	9.0	intermediate
8	ALB026	--------	20.0	19.0	380.0	D	calcarate	6.6	6.0	intermediate
9	ALB026	4237	19.0	16.5	313.5	G	decurrently	6.7	9.0	intermediate
10	ALB026	4239	21.0	19.0	399.0	B	cordite	6.5	8.0	intermediate

4. Clustering History

Number of Clusters	Distance	Leader	Joiner
13	0.594754460	5	12
13	0.594754460	5	12
12	0.798004456	6	7
11	1.111620413	6	13
10	1.300695333	4	14
9	1.393160712	10	11
8	1.489857821	1	2
7	1.587540605	5	6
6	1.668723370	4	15
5	2.065863034	3	8
4	2.307710288	1	5
3	3.021051708	1	3
2	3.304895497	4	10

5. Multivariate

Principal components/ factor analyses and correlations

Number	Eigen value	Percent	cum percent
1	2.2806	45.611	45.611
2	1.2885	25.771	71.382
3	0.7948	15.896	87.278
4	0.4924	9. 849	97.127
5	0.1437	2.873	100.000Eigenvectors

Length leave	0.59439	-0.11787	0.36163	-0.03014	0.70790
Width leave	0.58997	0.08406	0.32756	-0.31494	-0.66211
Length leave	0.49442	0.08080	-0.48344	0.70694	-0.12462
Sinuses length sec	0.14026	0.73375	-0.44334	-0.44780	0.21182
No of lobe	-0.18577	0.65888	0.57590	0.44678	-0.00948

Statistical analysis of fig leaves statistically confirms a great variability, a noticeable diversity, has a variable distribution, within leaf traits there are deviations and variations but and within varieties there is variability visible in leaf form, at its base, in the number of lobes.

In terms of quantitative indicators of leaf distance, leaf area variability is not large and is influenced by environmental factors and is a phenotypic variation.

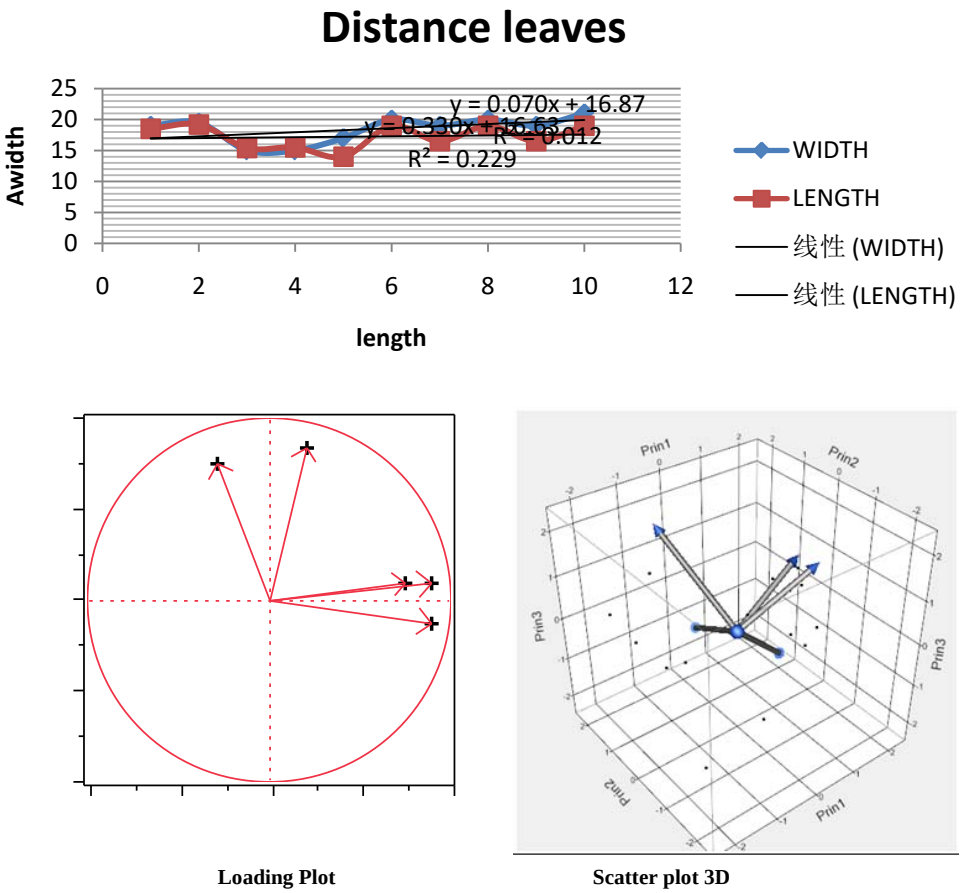


Figure 1. Distance leaf.

Sinus is one main index of genetic diversity which exposed distance between sorts.

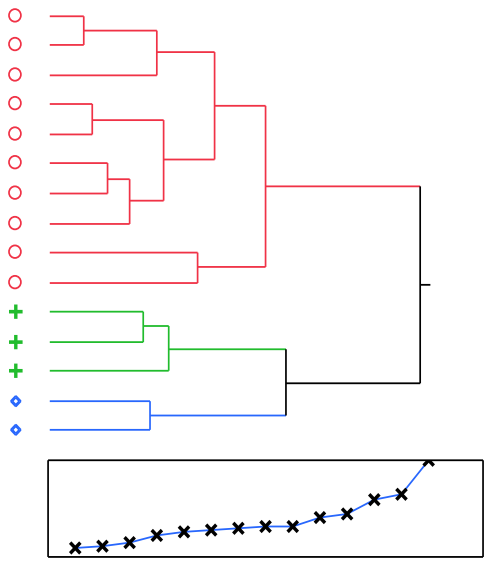


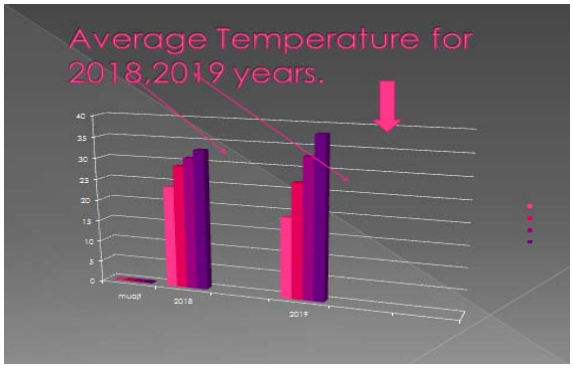
Figure 2. Dendogram 1 of leaves analyses.

In this dendograms, they are determinate three groups which are grouped according same or similar traits. Eight genotypes are grouped in one group, three genotypes are grouped in the second group for similar traits and two genotypes are grouped in the third group for similar traits. The traits of one group genotypes don't found in different groups, this is index which shows us for determination traits, dominant. The color fruit of figs tree are to link with polyphenols, flavonoids, anthocyanins and antioxidant capacity. Extracts of dark varieties showed higher content of photochemical and antioxidant compared to lighter colored varieties. In this collection found different color fruit from black to red, to violet to dark green to green etc. This index show for chemical elements which determination fruit color and pulp color and those are ant cyan and polyphenol groups.

Table 2. Index's of fruit figs genotypes for 2018, 2019 years

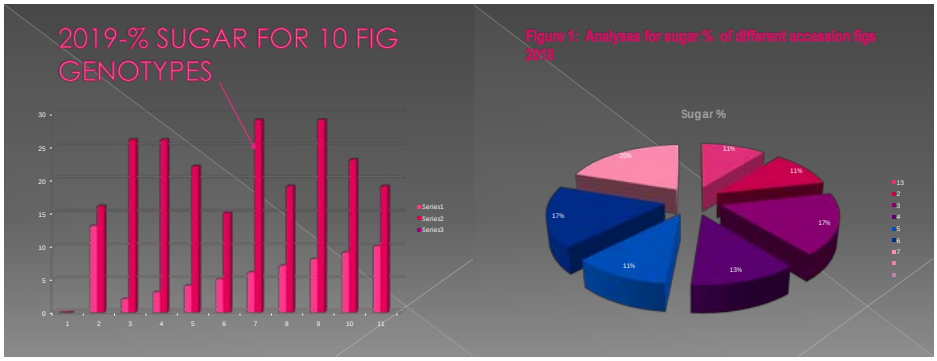
No	Code	Fruit distance (length width) cm	Weight fruit GR /2018	Weight fruit go /2019	% Sugar /2018	% Sugar/ 2019	Maturity 2018	Maturity 2019
1	ALB026	3.5x2.5	25	20	11	16	5 August	25 August
2	Al026	5.5x 6.0	43	40	11	26	5 August	26 August
3	ALBO26	4.5x5.0	55	50	17	26	5 August	25 August
4	ALB026	4.0x4.5.0	42	40	13	23	5 August	15 August
5	ALB026	6.0x7.2	70	70	11	22	5 August	25 August
6	ALB026	6.0.x5.0	40	35	17	15	5 August	25 August
7	ALB026	5.0 x 5.0	43	40	20	23	5 August	29 August
8	ALB026	4.5x5.0	35	30	21	29	5 August	25 August
9	ALB026	6.0x6.0	75	70	19	21	5 August	25 August
10	ALB026	5.5x5	46	40	17	19	5 August	25 August

In Table 2, it analyzed three main traits of fruit, distance, fruit weight and % sugars were analyzed, fruit distance is different in the 10 fig genotypes, the other trait is fruit weight which differs from one varieties to another. Weight is a quantitative trait and depends on agronomic factors [2], the time of fruit ripening is different for each variety but in 2018 fruit have been ripe 5-10 days ago, as a result of the temperatures that characterized 2018 as explained below. In 2019, fruit ripening was realized in time. This collection has some fig varieties with a variety of fruit color from dark green to light green, to violet to black. The diversity of color is very noticeable [2]. Another traits is the internal pulp which is different in different varieties, diversity between varieties is the very visible, this traits are different from one to others varieties. We can find the figs varieties with same color but different in traits in pulp color, in taste, in seed number, in cavity, in destination of fruit, in time of ripening, in pollination request, etc.



Figures 3. Average temperature for 2018, 2019 years.

In Figure 3, temperatures during the years have been characterized by a rise in temperature above forecast normal. In May, the difference was 2.2ºC. In June, there was a difference of 2ºC and an amount of rainfall. Within one day up to 25 millimeters of rain per day. In August, begins stabilization with a deviation of 1.9ºC. This temperature has had an impact on the growth, ripening and formation of fig fruit. For 2018, it was observed a deviation from the normal of 5-10 days ago and not only in one variety but in all varieties in the collection. During the year there was an increase in fruit size but also a wet until fermentation in the branches caused the sugar content to be lower. For 2019, we have a very different situation, in May the temperatures are the same as in April, lower than previous years around -1.1ºC, accompanied by heavy rains and intensities throughout May. Temp had a decrease -1.9ºC. In June, normality with the report began. In July the temperatures reached 30-33ºC [18]. In August, the temp marked a rise after 8 days to 38-40ºC a rise of 1-4ºC. Certainly, the climate elements as the main elements of fig vegetation had its effects on the delay in ripening compared to the previous year.



Figures 4. Percent of Sugar, for 2018, 2019 years.

In Figure 4, we can observed a different varieties figs with different sugar percent which begin 10-11% - 22- -22%. The percent of sugar depend from ripening time, from intensity solar, from temperature in the time of maturity. From year to year, the percent of sugar is different, moving from year to year 2-4%, in the last year the ripening phase has moved 5-10 days. In this graphic, we analyzed acidity content which is different in different of genotypes fig. We can observed acidity content is low, because is high the percent of sugar. When the percent of sugar is high the percent of acidity is low.

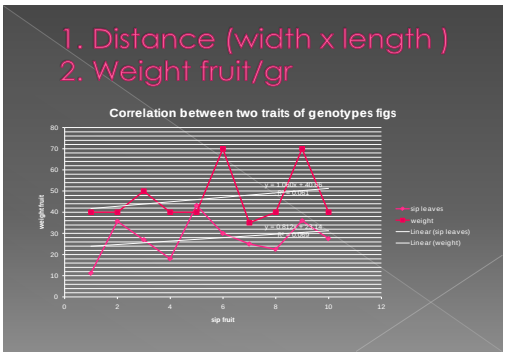


Figure 5. Correlation of two traits.

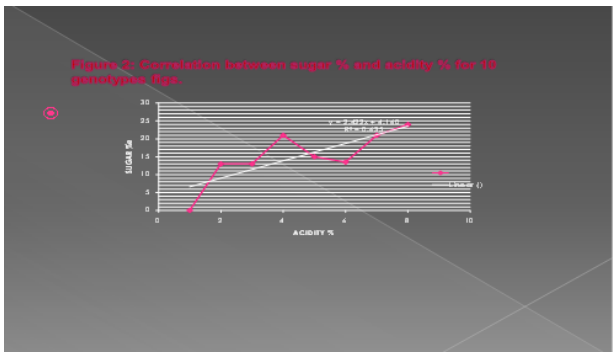


Figure 6. Correlation between sugar and acidity.

Weight is trait important of fruit for market with fresh destination. This traits is link with dimension fruit (width x length), surface fruit according Figure 5. In this correlation, Figure 6 showed link between traits, r= 0.069 is positive.

This is a simple correlation, coefficient that measures the strength of the linear relationship y and x and r= 0.6. 635. This the correlation is a positive correlation. This correlation coefficient (r) measures the linear relationship between the values of x and the values of y. The value of y is a dependent value and the value of x is independent value. In this study, some traits in the 10 fig genotypes were characterized. The main features are qualitative and quantitative. Based on the molecular study conducted in 2016 in collaboration with P. Resta and T. Koka, it has been possible to identify the diversity of the varieties and their similarity [4]. Which varieties have common traits and which have their own characteristics that are not related to other varieties (see Figure 7 and Figure 8). The study found that links between varieties, and others are peculiar in their kind. All 10 genotypes are presented in the collection in Valias/UBTirane.

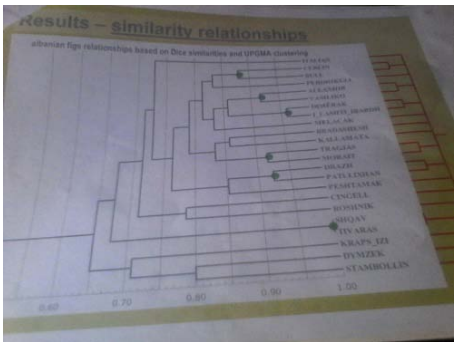


Figure 7. Dendogram of AND, molecular identification fig varieties.

Figure 8. Similar varieties.

6. Documentation

The other phase of this study is documentation of figs genotype according ECPGR documentation; this documentation is different in the characterization and classification. Until now, we are in registration phase and are not on informatization system in the ECPGR, We hope in the future (see Figure 9).

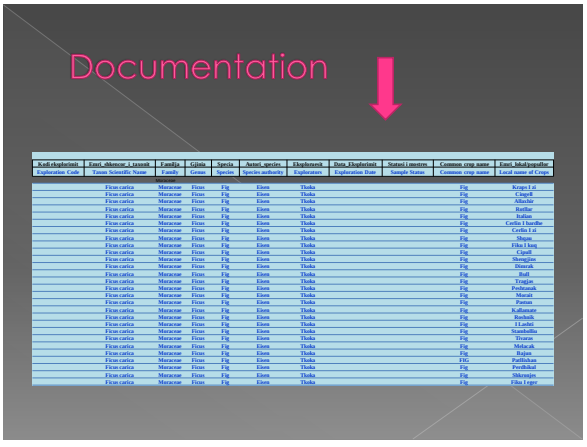


Figure 9. Documentation according ECPGR.

7. Conclusion

From the study, it seems very clear that all 10 genotypes of figs have very valuable qualitative and quantitative features and with a very obvious diversity. In all its features, this diversity is visible both visually and chemically, molecularly and statistically. And in quantitative terms, it has a high productivity and an adaptability to soil conditions.

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