

Investigation and value of qualitative and quantitative characteristics 10 of genotypes of figs.

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VI International
Symposium
on Fig

◎ **Keywords:** Fig, qualitative and quantitative characteristic, diversity, productivity

• **Time of study:** 2015-2019

• **Place of study:** Collection of fruit tree, Agriculture University of Tirana, germplasm field in Valias.

Aim of study:



- To evaluation, to study morphological traits, genetic diversity, characterization, chemical analyses traits for 10 genotypes in ex situ.

○ Objectives:

To evaluation of morphologic traits for 10 genotypes.

- VI International
- Symposium
- on Fig

Traits of figs



- 3. To investigate and characterization of genetic diversity for 10 genotypes.
- 4. To analyses chemical elements in cooperation of chemic laboratory/ UBT.
- 4. To determination of quantitative and qualitative traits for each genotypes.
- 5. To regeneration and multiplication of genetic material.
- 6. To documentation of 10 genotypes in ex situ.

INTRODUCTION

- Fig tree in Albania country is fruit important and older. Is very reach and a lot of sort.
- 3. Has more destination= 1. for fresh consume, 2. for dry consume, 3. for industry (jam, raki).
- 4. 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.
- 5. 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.

Methods

- Establish of germplasm field figs
- (collection of fruit tree in UBTirane), gathering of genetic material for fig varieties which are investigated, studied, characterization from in situ.
- Application according one scheme, 3 tree for each varieties. Every year:
- To replace for each varieties when have loss or don't rooting.

Materials

- To enrichment **accession figs.**
- To **multiplication accession** figs for material reserve.
- Materials: Samples, tree, chemic laboratory, refract meter, ruler, analytic balance.

Sample of one accession/rooting



Multiplication



Application some metho

Bag, vase, glasses plastic, rooting table
in screen house.



2006-2007



2019, Collection Valias



UNIVERSITETI BUCËSOR I TIRANËS
Instituti i Resurseve Gjenetike të Bimëve
Koleksioni Lushar i Fikut
Field collection of Figs
(*Ficus carica* L.)

Methods



- Analysing of traits morphologic of genotypes figs.
- Analysing of elements chemical for 10 genotypes figs.
- - physiology traits (vigor, flowering, productivity).
- Analysing of molecular for 10 genotypes.
- Analysing of statistical for 10 genotypes.
- Methods are:
- (DESCRIPTOR, PASSPORT, SCHED (IPGRI, ECPGR), ANOVA

Figs

- ◎ *Collection of Valsias (UBT) has been established according scheme, 3 tree for varieties, with distance 5 x 5 m row to row and tree to tree.*
- ◎ *For each phase has work methods.*

10 genotypes fig



◎ *Objective I :1. To evaluation of morphologic traits for 10 genotypes.*



◎ *Analyses of trait of leaves (form, type, shape of base, leaf dimensions).*

Different leaves

For 10 Genotypes  accession fig.



Cluster analyses for leaves 10 genotypes fig.

Number of Clusters	Distance	Leader	Joiner
14	0.484879873	1	9
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
1	5.170970776	1	4

Analysed of traits leaves.



- In this dendrogram are determinate three group 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 indexes shows us for determination traits, dominante.

Principal Components / Factor

Analysis

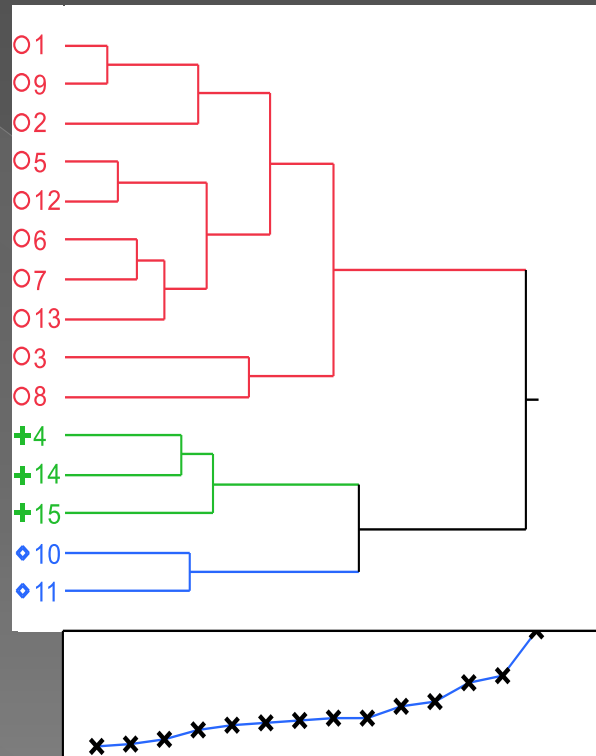
Principal Components: on Correlations

Number	Eigenvalue	Percent	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		100.000

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
Sinuse 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

Dendrogram / statistical analyses

In this dendrogram are determinate three group

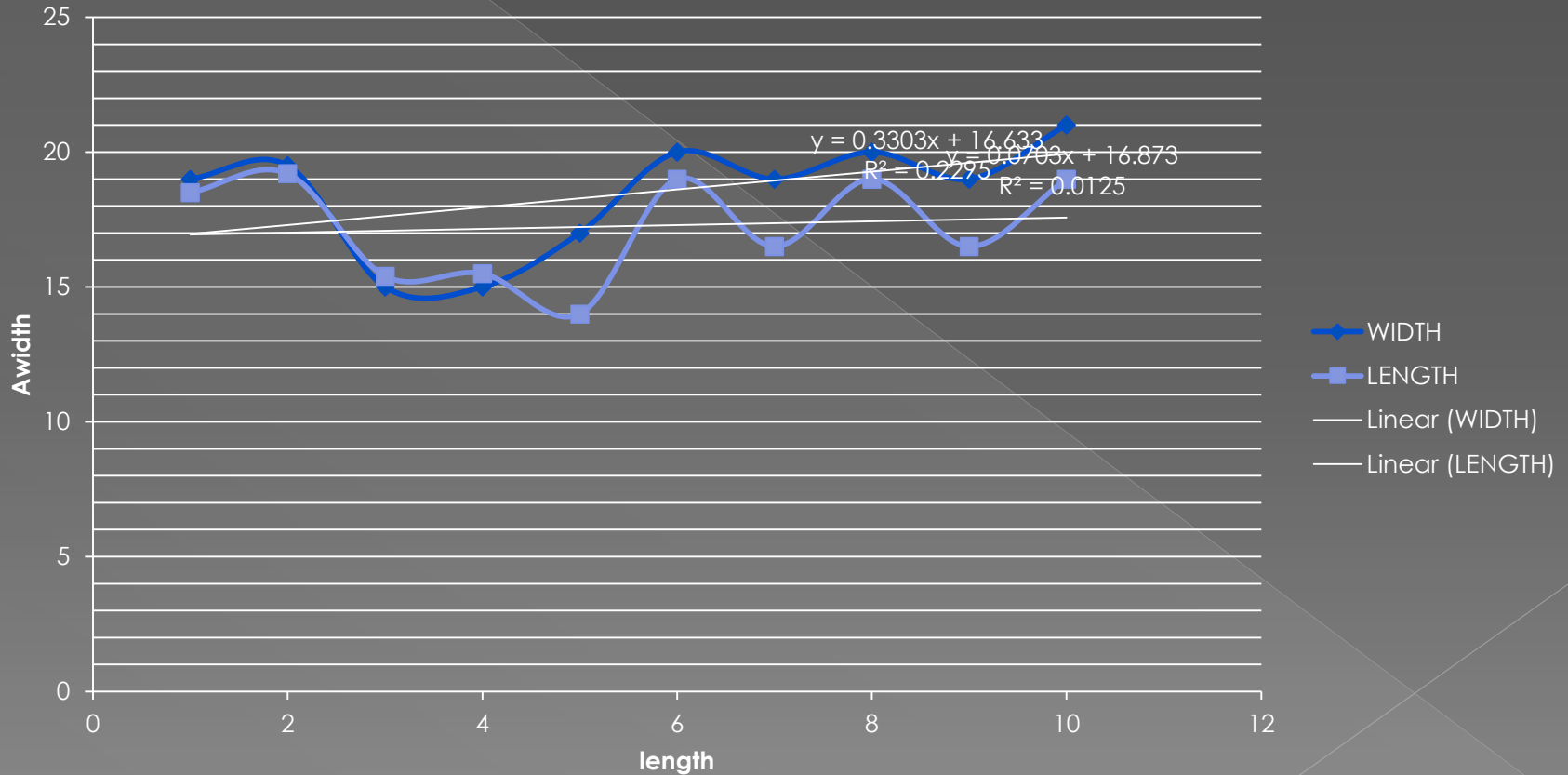


Statistic analyses for leaves

- 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.

Correlation (width x length distance)

Distance leaves



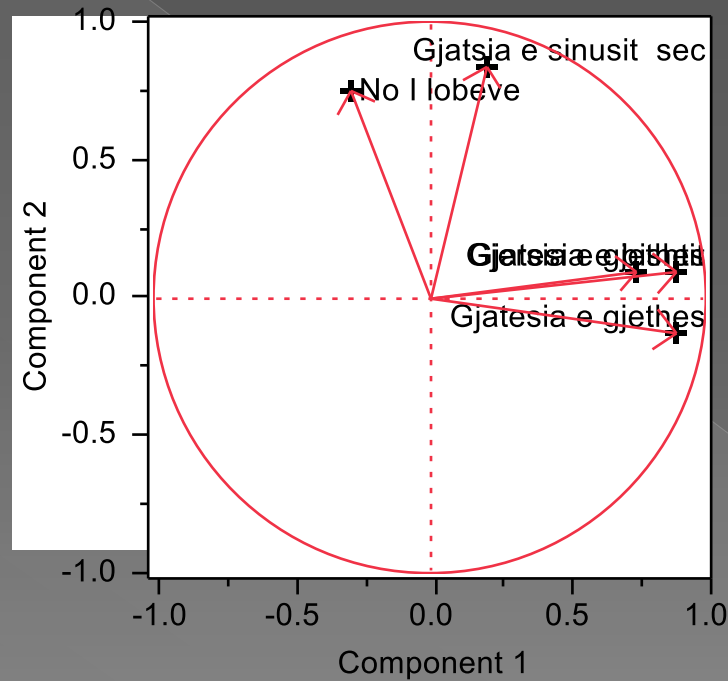
Variation coefficient values

- 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.
R=0.8

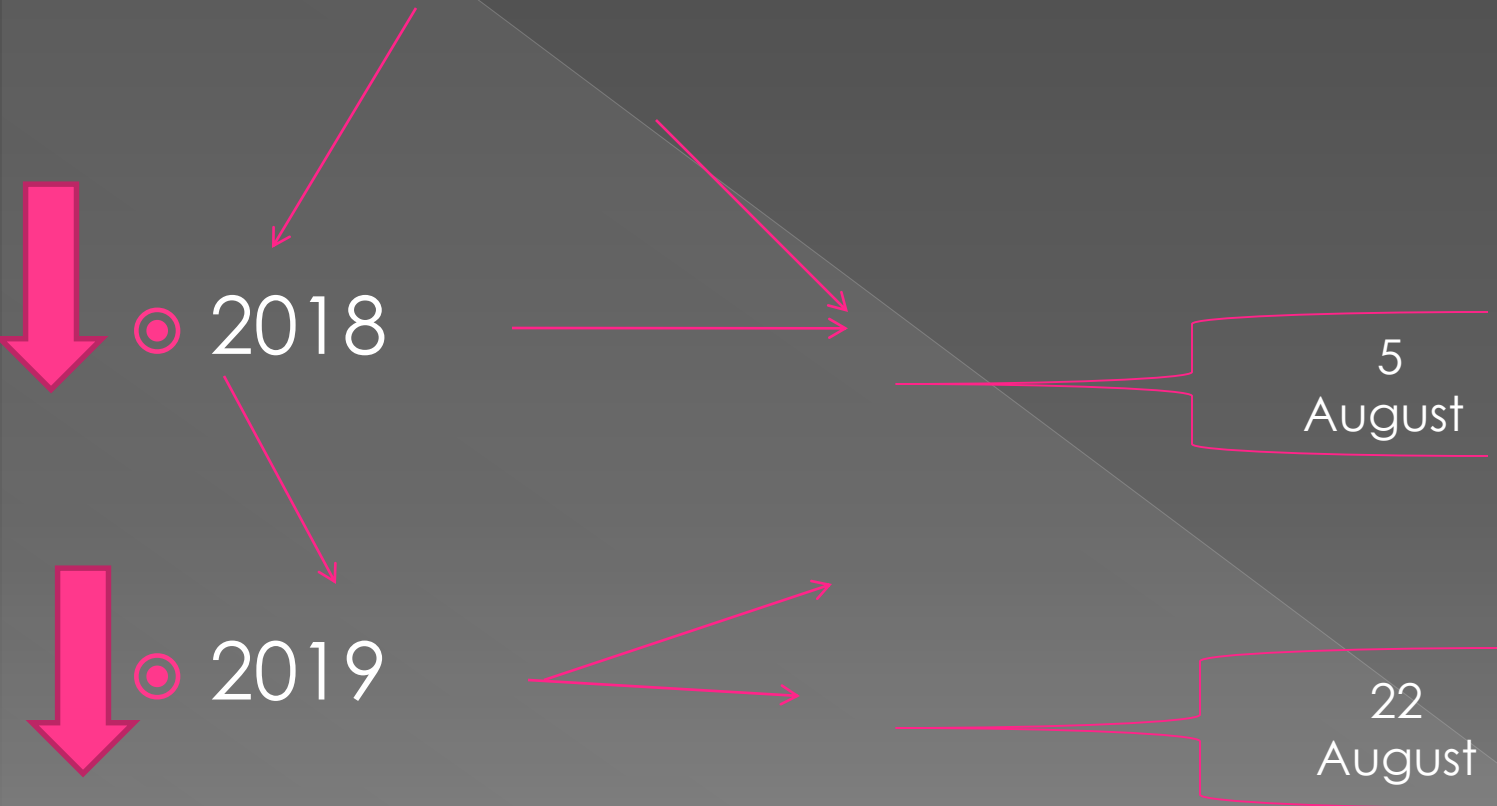


Statistical Analyses of traits leaves figs.

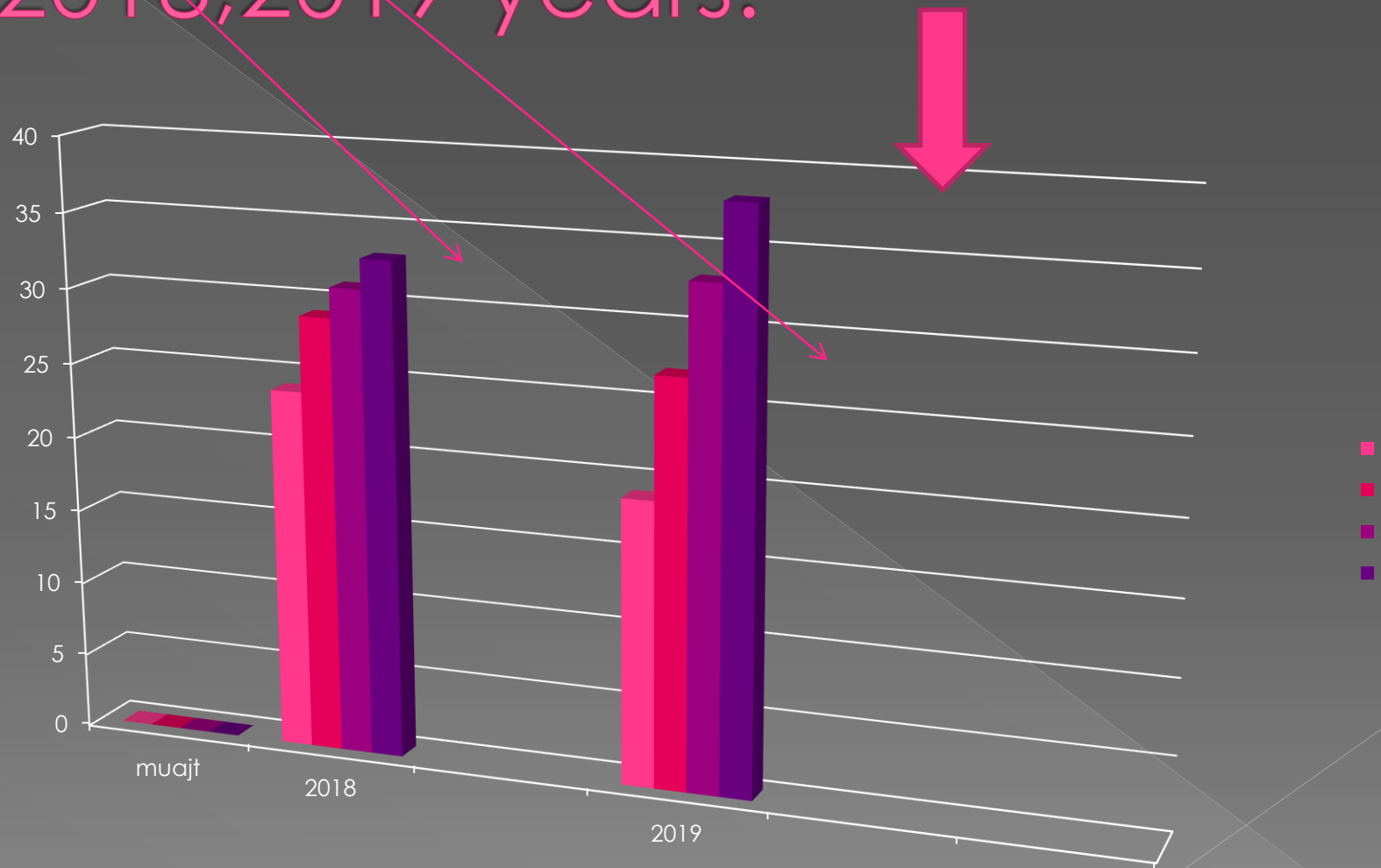
The sinus length is indexes which help in analyses diversity of leaves genotypes.



Temperature is important factor in ripening of fruit fig.



Average Temperature for 2018, 2019 years.



Temperature main factor in development and maturity fruit.

- Temperatures during the years ... have been characterized by a rise in temperature above that forecast, above normal. For May the difference was 2.2°C . In June there was a difference of 2°C and an amount of rainfall. Within one day up to 25 millimeters of rain per day. in August begins stabilization with a deviation of 1.9°C .

2018



- 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 grazing until fermentation in the branches caused the sugar content to be lower.

2019



- For 2019 we have a very different situation, in May the temperatures are the same as in April, lower than previous years around -1.1°C , accompanied by heavy rains and intensities throughout May. Temp had a decrease -1.9°C . in June a normality with the report began. In July the temperatures reached $30-33^{\circ}\text{C}$. In August the temp marked a rise after 8 day to $38^{\circ}-40^{\circ}$ a rise of $1-4^{\circ}$. Certainly the climate elements as the main elements of fig vegetation had its effects on the delay in ripening compared to the previous year.

Indicators of some traits in 10 fig genotypes in collection

No	Kode	Fruit distance (lengthxwidth) cm	Weght fruit /2018	Weght fruit gr /2019	% Sugar /2018	% sugar 2019	Maturity 2018	Maturity 2019
1	ALB026	3.5x2.5	45	40	11	16	5August	25August
2	Al026	5.5x 6.0	40	40	11	26	5 August	26August
3	ALBO26	4.5x5.0	50	50	17	26	5August	25August
4	ALB026	4.0x4.5.	40	40	13	23	5August	15 August
5	ALB026	6.0x7.2	65	70	11	22	5August	25August
6	ALB026	6.0.x5.0	35	35	17	15	5Agust	25August
7	ALB026	5.0 x 5.0	45	40	20	23	5August	29August
8	ALB026	4.5x5.0	35	30	21	29	5August	25August
9	ALB026	6.0x6.0	80	70	19	21	5Agust	25August
10	ALB026	5.5x5	45	40	17	19	5Agust	25August

Index fruit fig



- In this table are analysed three main traits of fruit, distance, fruit weight and % sugar 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

OTHER CHARACTERISTICS



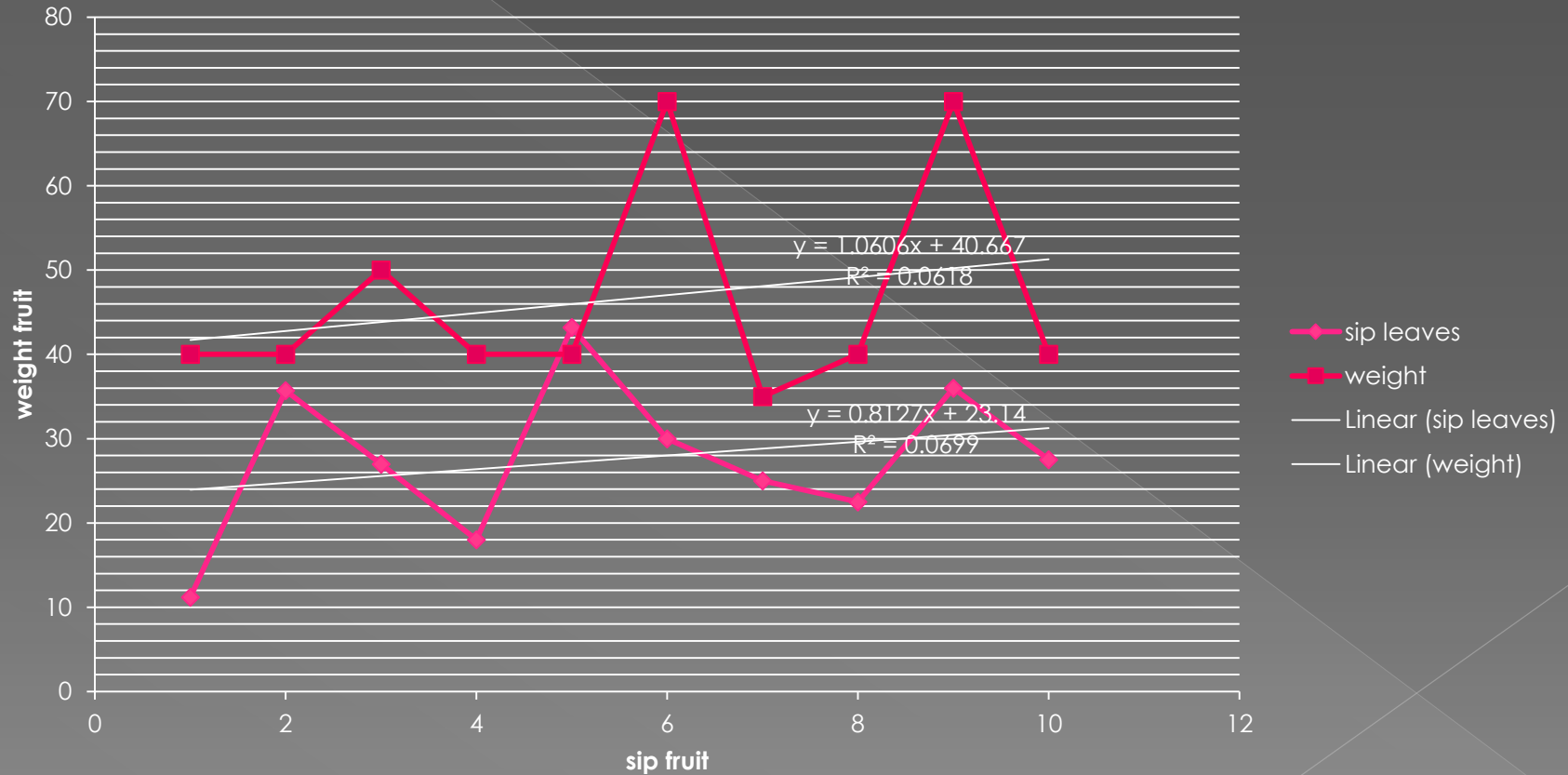
- The time of fruit ripening is different for each varieties but in 2018 fruit has been riped 5-10 days ago, as a result of the temperatures that characterized 2018 as explained below. In 2019 fruit ripening was realized in time. This collection has some fig varieties with a variety on fruit color from dark green to light green, to violet to black. The diversity of color is very noticeable

Other characteristics

- Another feature is the internal fruit which is different in different varieties, diversity between varieties is the very visible, this traits, distinguish one to others varieties, we can observed same color of fruit but difference is in internal. fruit. But also other traits, such as the amount of fruit, the cavity, the tail of the fruit, etc.

1. Distance (width x length)
2. Weight fruit/gr

Correlation between two traits of genotypes figs

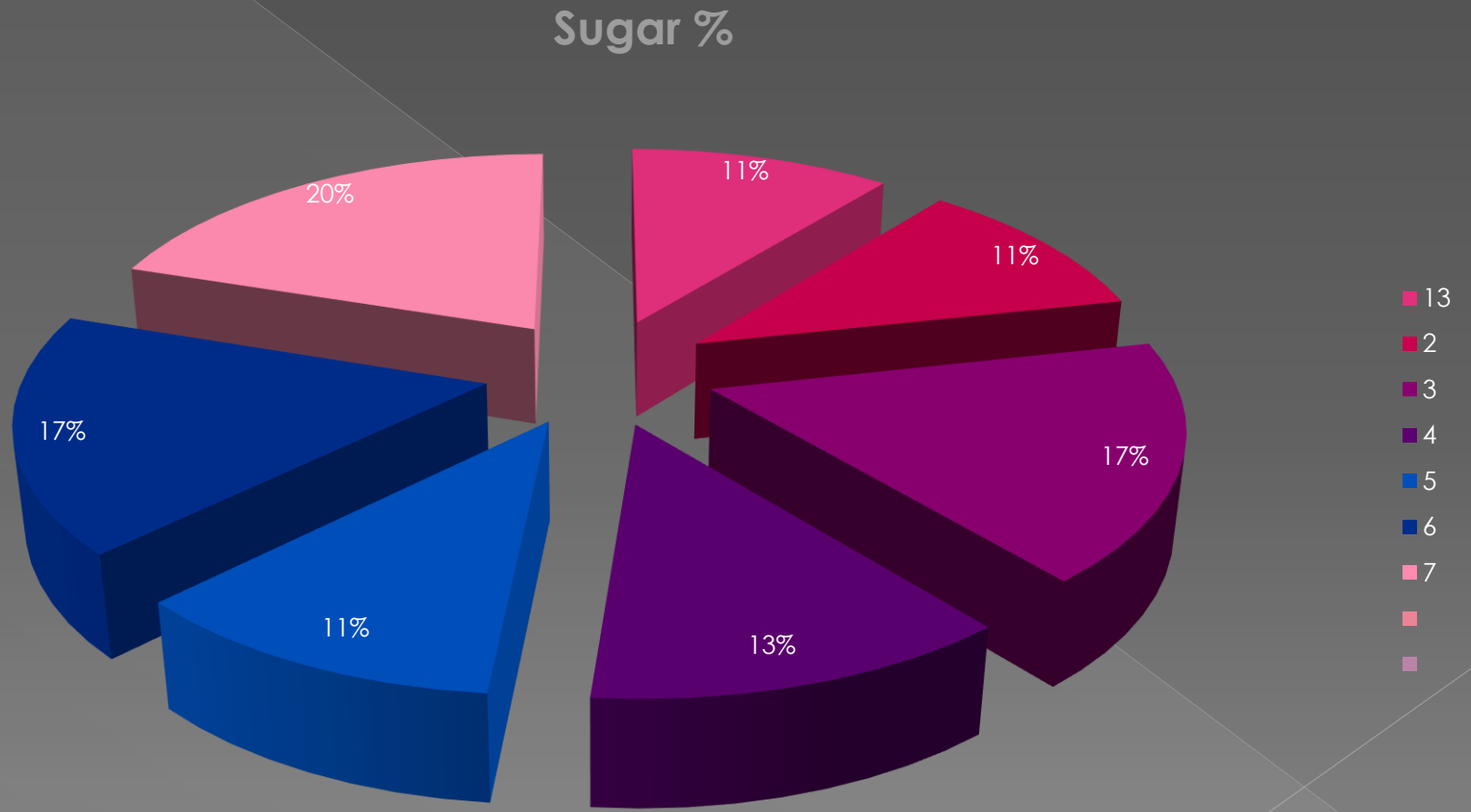


Correlation



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

Figure 1: Analyses for sugar % of different accession figs 2018



2019-% SUGAR FOR 10 FIG GENOTYPES

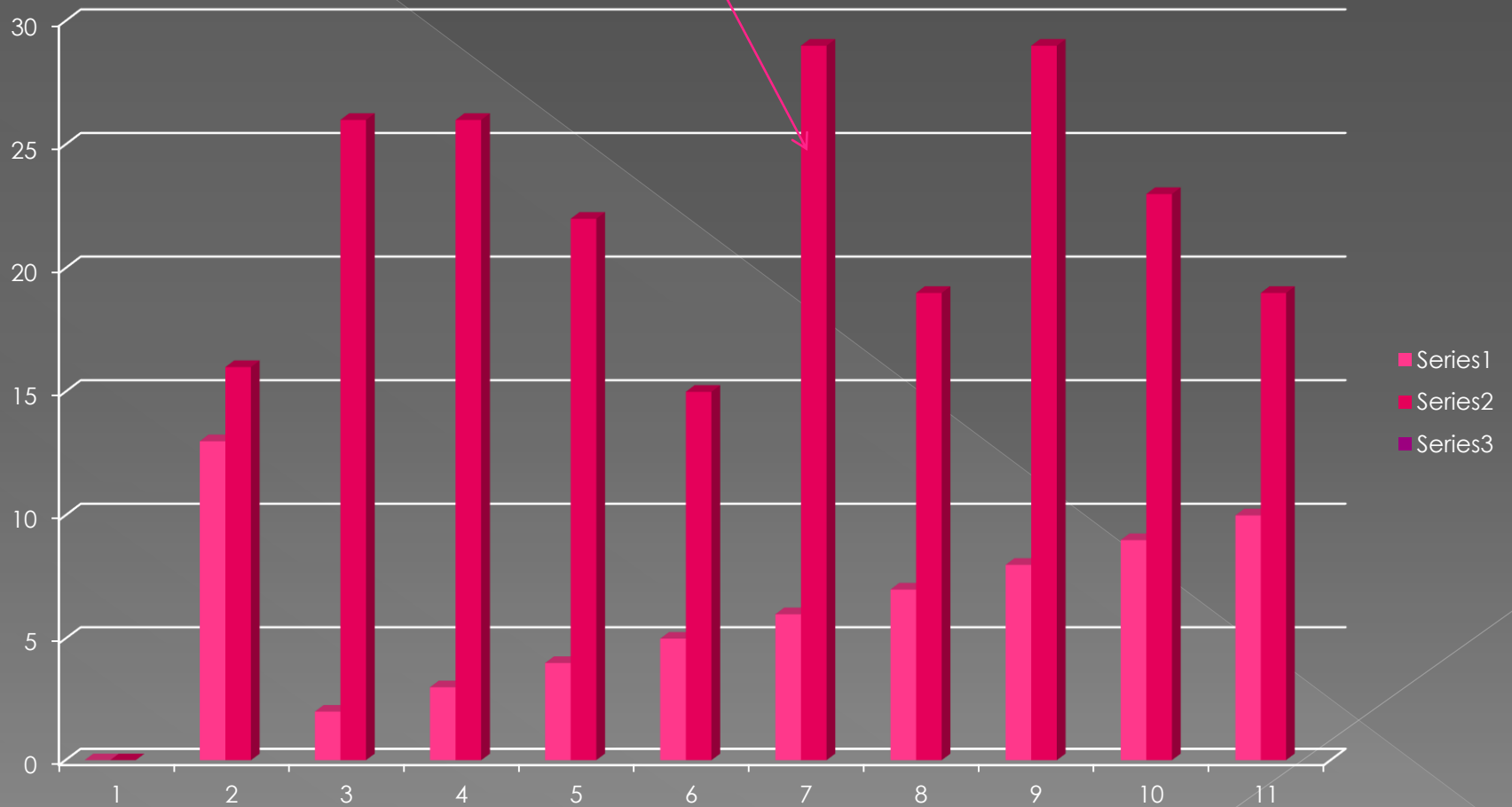
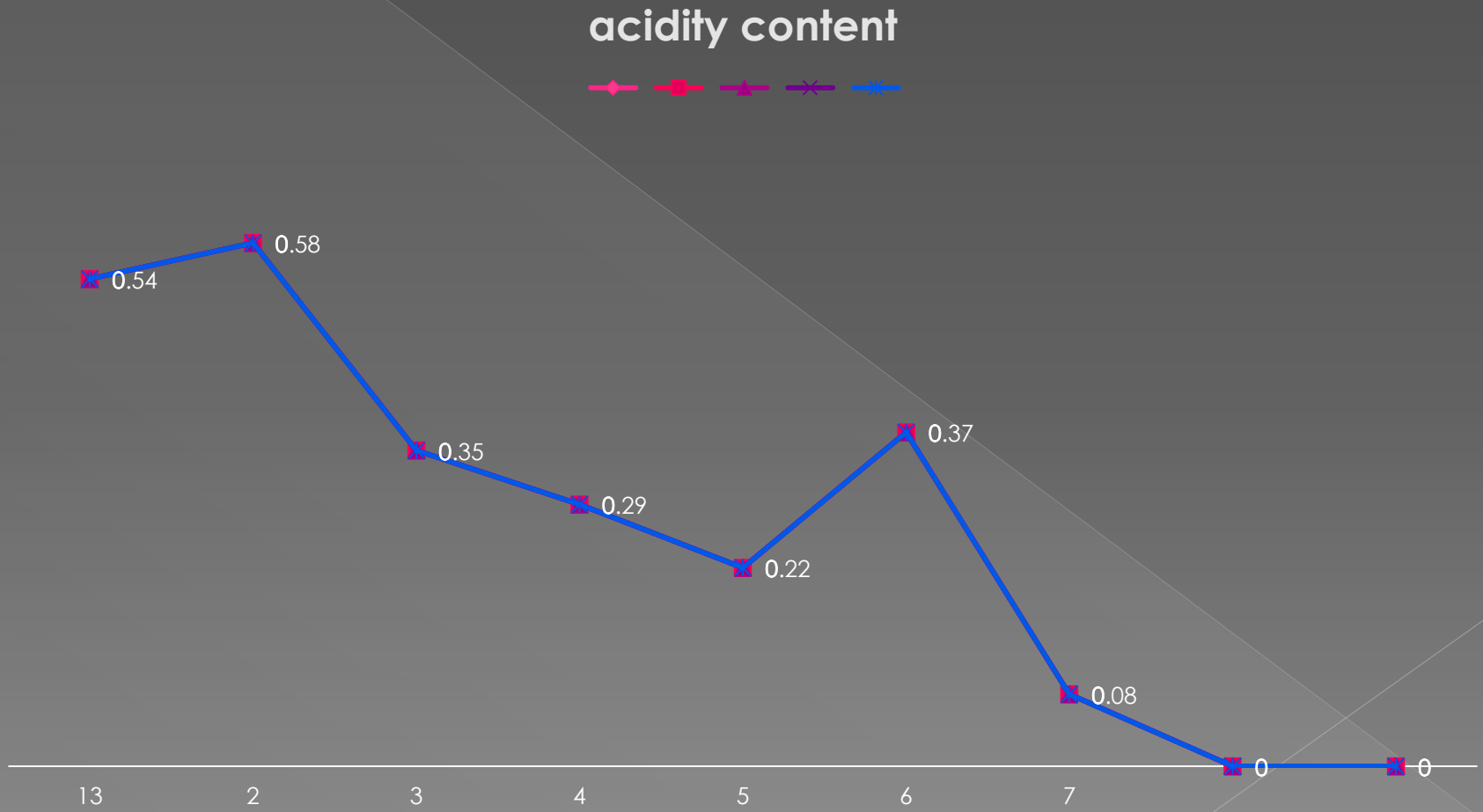


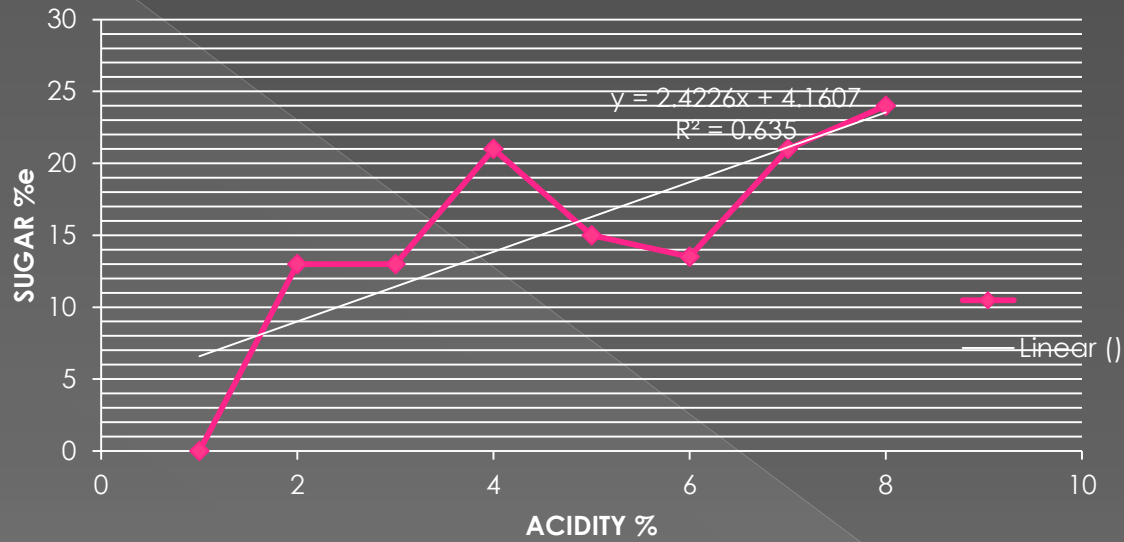
Figure 2: Analyses for acidity of different accession figs



Chemical analyses

- In this graphic we can observe different varieties of figs with different sugar percentages which begin at 10-11% - 22% - 22%. The percentage of sugar depends on ripening time, solar intensity, and temperature during ripening. From year to year the percentage 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 analyze acidity content, which is different in different fig genotypes. When the percentage of sugar increases, the percentage of acidity is low.

Figure 2: Correlation between sugar % and acidity % for 10 genotypes figs.



correlation

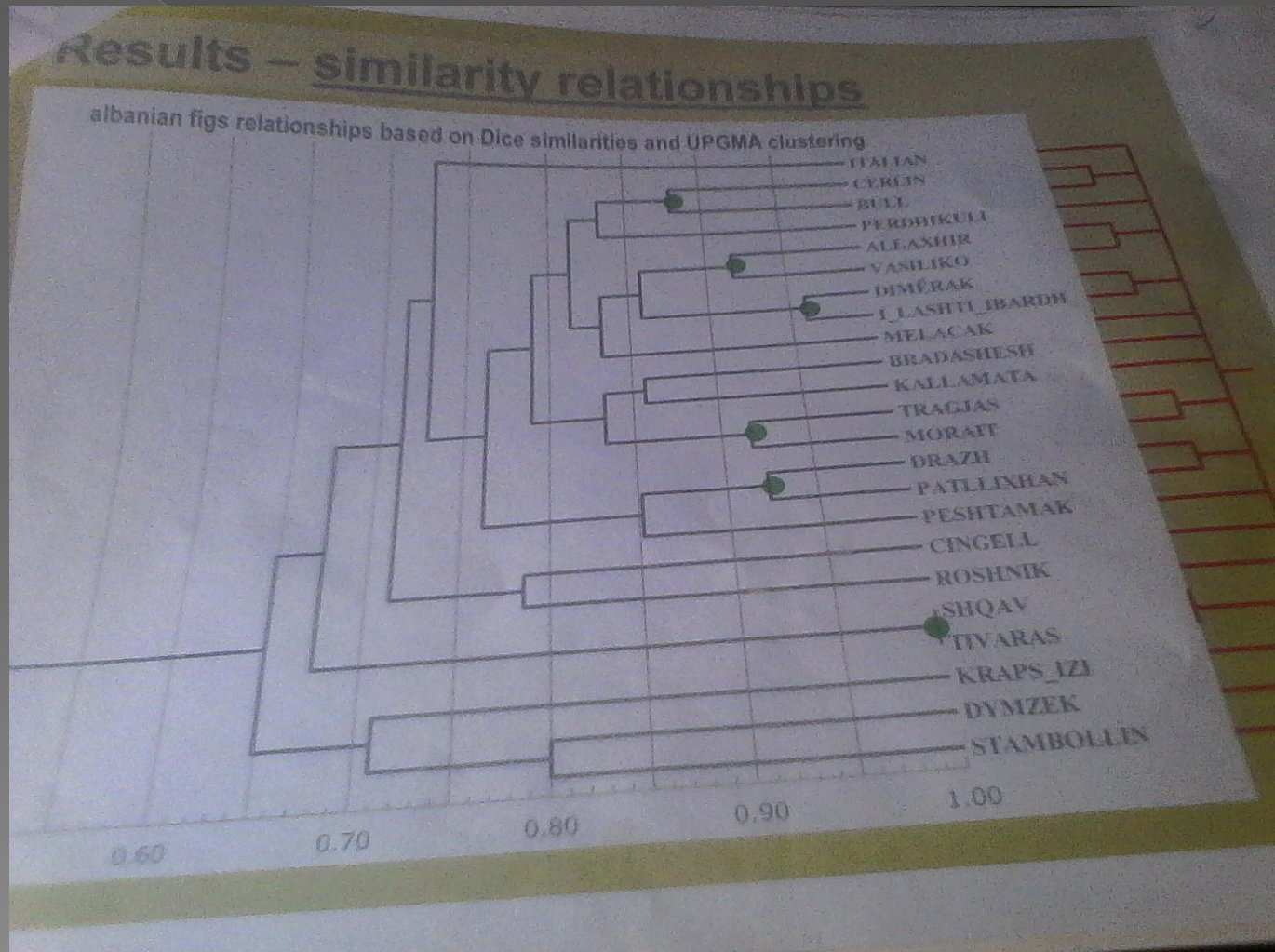


- This is a simple correlation, coefficient that measures the strength of the linear relationship y and x and $r = 0.635$. This the correlation is a positive correlation. This correlation coefficient (r) measures the linear relationship between the values of x and the values of y . The value of y is a dependent value and the value of x is independent value.

Molecular identification

- From the molecular study done in 2016 by the (P.Resta, T Koka) DNA of 23 varieties, it resulted that 6 varieties similars 6 other varieties. Albanian figs relationships based on dice similiraties and UPGMA clustering. The similarity is in the color of the fruit, or in the shape of the fruit
- etc traits.....

Results-similarity relationships



Identification molecular

- 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. Which varieties have common traits and which have their own characteristics that are not related to other varieties. The study found that links between varieties, and others are peculiar in their kind. All 10 genotypes are already in the germplasm collection in Valias / UBTirane.

Which are similar varieties
from this study ?



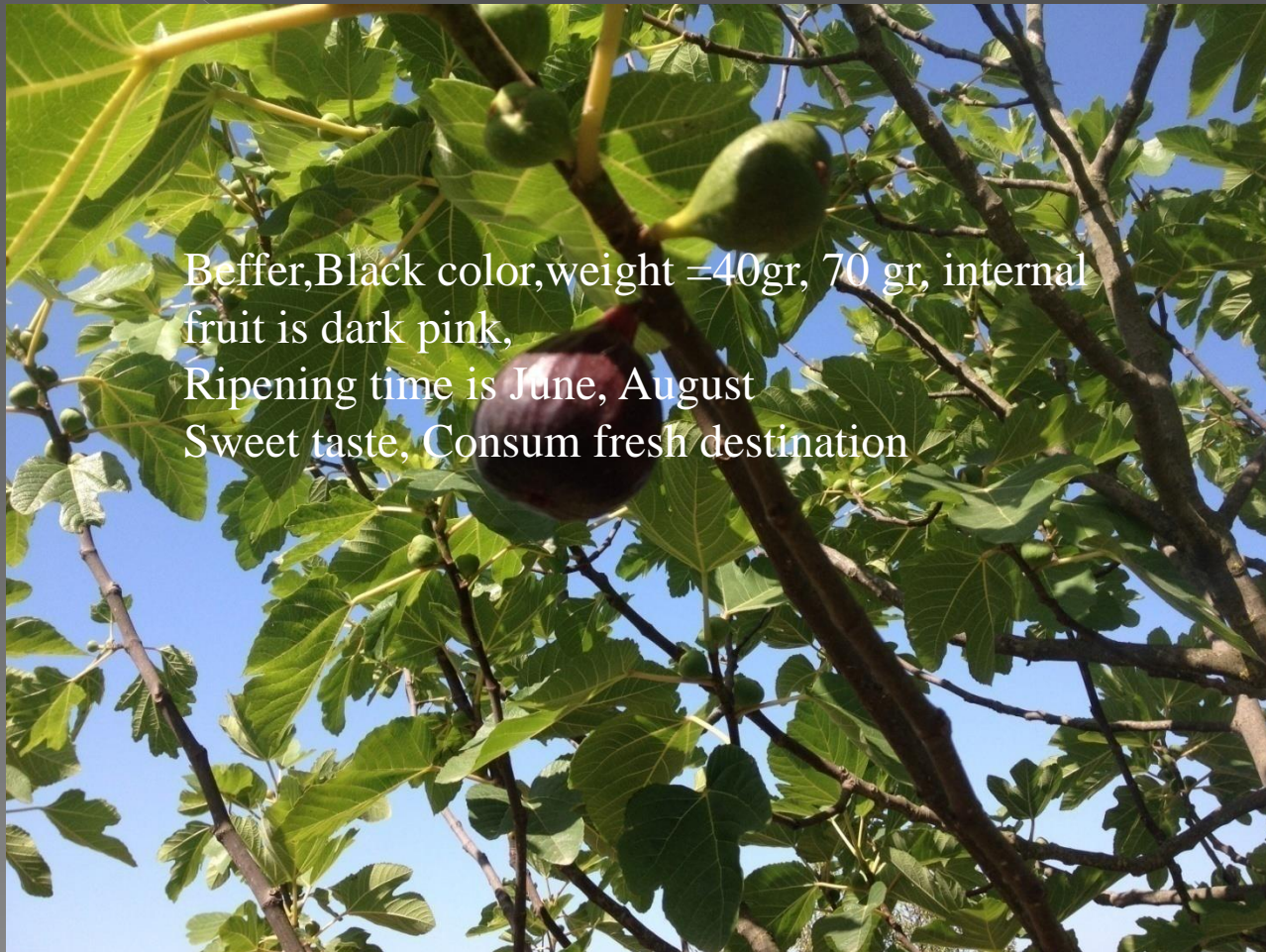
Allaxhir+Vasiliko



10 genotypes figs

- To investigate and characterization of genetic diversity for 10 genotypes.
- 2. Passport
- Documentation

ALB026-AGB4234 (Samj



Beffer, Black color, weight = 40gr, 70 gr, internal
fruit is dark pink,
Ripening time is June, August
Sweet taste, Consum fresh destination

ALB026-AGB4244



Uniffer, color fruit is green ,
form fruit is oblate ,internal
fruit is red, ripening time is
August, weight = 40 gr, fresh
consume.



ALB026 –



Uniffer ,color fruit is
hight green to violet
Weight = 30 gr, ripening
time is August, taste is
sweet, Consum fresh
destination .



ALBO26 –AGB4243



Uniffer, color fruit is black, Weight = 50 gr,
Ripening time is August, taste is very sweet,
fresh destination.

ALB026-AGB



Uniffer, color fruit is green, Weight =70 gr , ripening time is August
Taste is Sweet,
Consum destination :

ALB026- 4246



Uniffer, color
fruit is black,
form fruit is
spheric, weight
= 40 gr, fresh
consume.



ALBO26 – AGB4242

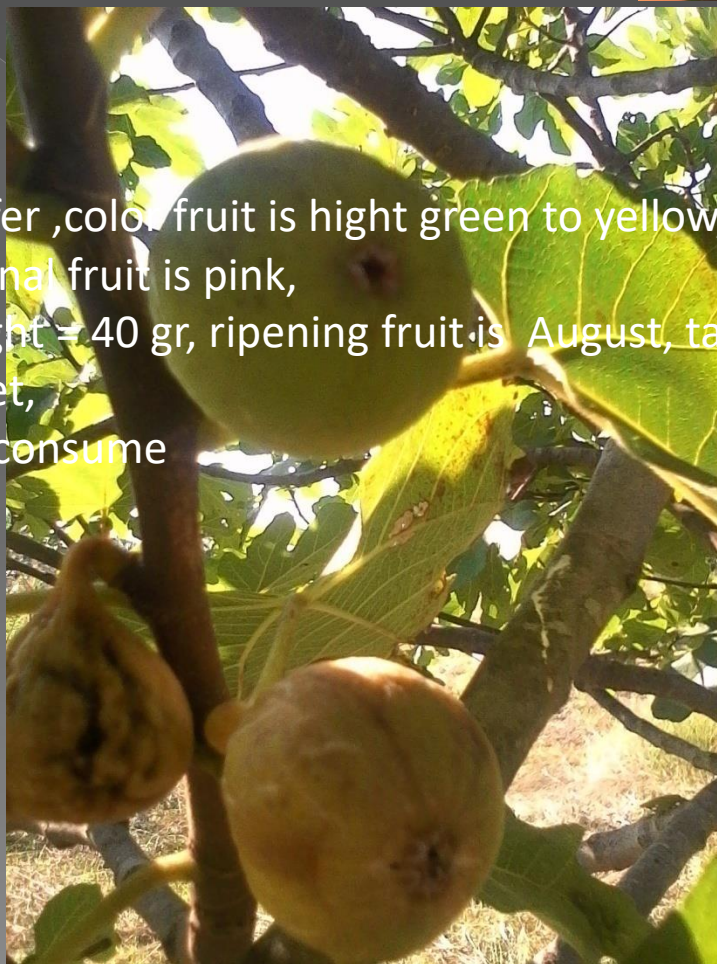


Uniffer, color fruit is dark green, Weight = 30 gr, Ripening time is August, taste is sweet, Consum destination.

ALB026-AGB



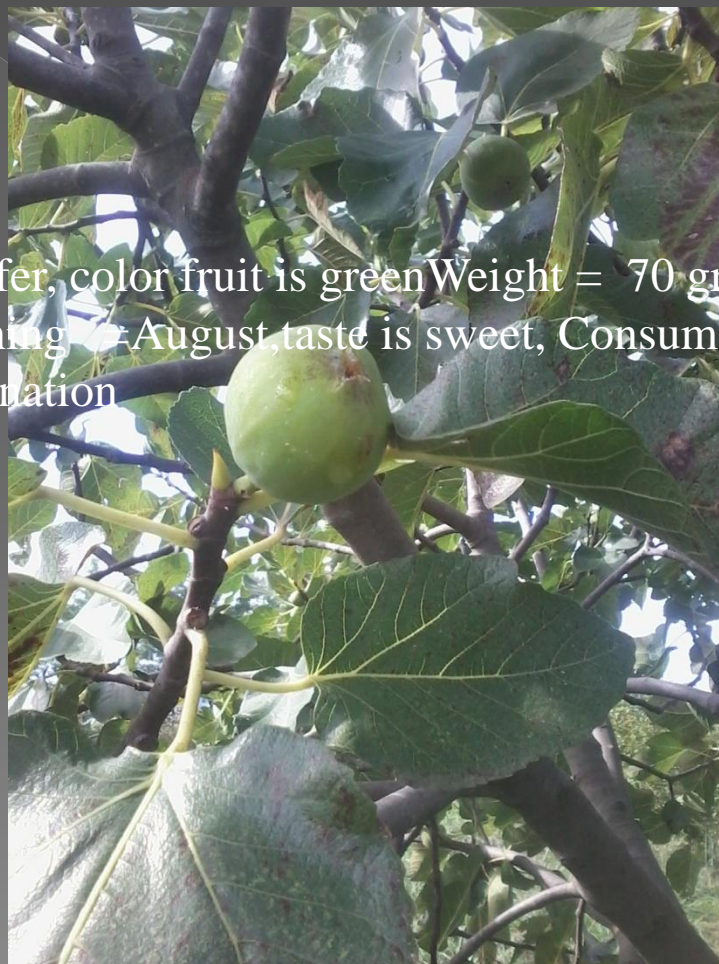
Uniffer ,color fruit is high green to yellow,
internal fruit is pink,
Weight = 40 gr, ripening fruit is August, taste is
Sweet,
dry consume



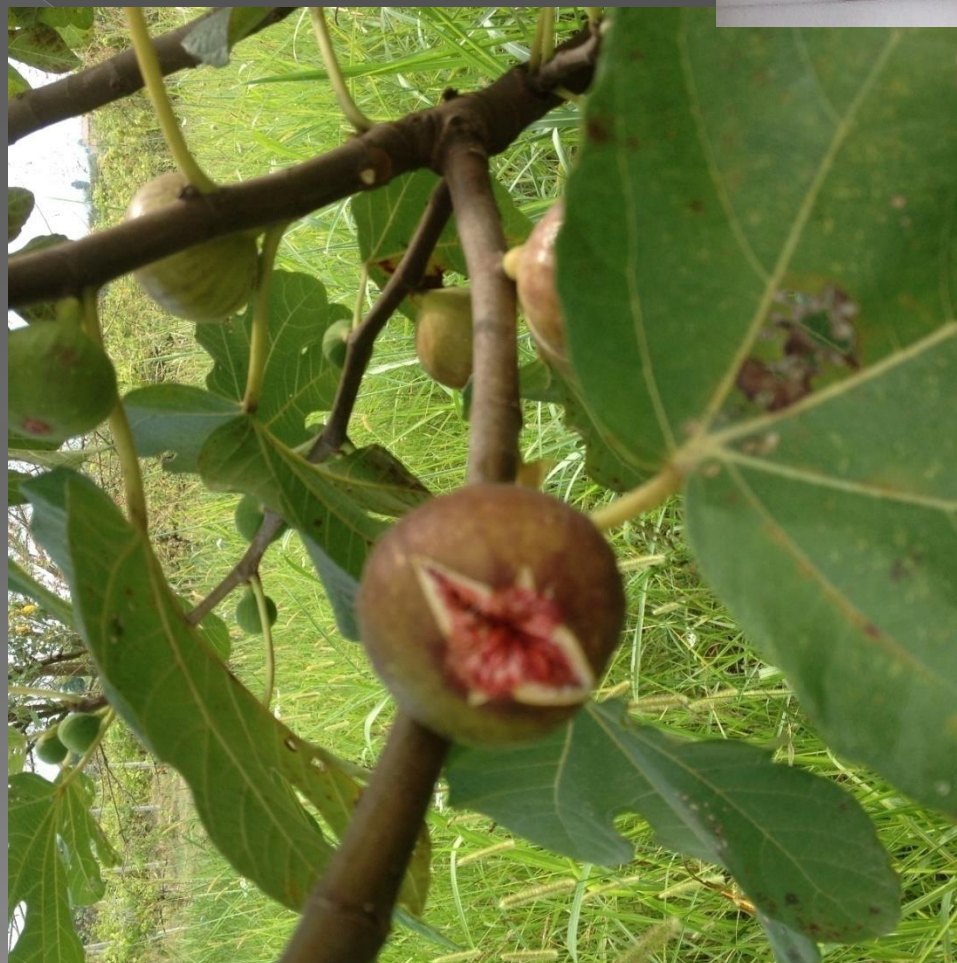
ALB026-AGB4241



Uniffer, color fruit is green Weight = 70 gr
ripening in August, taste is sweet, Consum
destination



ALB026-AGB4235



Uniffer, color fruit is red, internal color is red
Weight = 50 gr,
Maturity = August
Taste is very sweet, Consum destination

Quantitative accession (variety)



Scheme of Valias genetic collection/UB Tirane



Documentation according ECPGR



I. TE DHENA PER EKSPLORIMIN E RESURESVE GJENET

ID	Speciet	Kodi skedes	Kodi eksplorimit	Emri shkencor i tax	Familja	Gjinia	Specia	Autori species	Eksploruesit	Data Eksplorimit
ID	Species	Sked Code	Exploration Code	Taxon Scientific Name	Family	Genus	Species	Species authority	Explorators	Exploration Date
Alb026	Ficus carica L	10	TK10	Ficus carica L	Moraceae	Ficus	Fic carica L	Eisen	TatjanaKoka	
Alb026	Ficus carica L	6	TK6	Ficus carica L	Moraceae	Ficus	Fic carica L	Eisen	TatjanaKoka	19960816
Alb026	Ficus carica L	7	TK7	Ficus carica L	Moraceae	Ficus	Fic carica L	Eisen	TatjanaKoka	19960903
Alb026	Ficus carica L	24	TK24	Ficus carica L	Moraceae	Ficus	Fic carica L	Eisen	TatjanaKoka	19960903
Alb026	Ficus carica L	21	TK21	Ficus carica L	Moraceae	Ficus	Fic carica L	Eisen	TatjanaKoka	1990905
Alb026	Ficus carica L	3	TK3	Ficus carica L	Moraceae	Ficus	Fic carica L	Eisen	Tatjana Koka	20000820
Alb026	Ficus carica L	8	TK8	Ficus carica L	Moraceae	Ficus	Fic carica L	Eisen	TatjanaKoka	19960816
Alb026	Ficus carica L	4	TK4	Ficus carica L	Moraceae	Ficus	Fic carica L	Eisen	TatjanaKoka	19970825
Alb026	Ficus carica L	13	TK13	Ficus carica L	Moraceae	Ficus	Fic carica L	Eisen	TatjanaKoka	20010820
Alb026	Ficus carica L	22	TK22	Ficus carica L	Moraceae	Ficus	Fic carica L	Eisen	TatjanaKoka	20160628
Alb026	Ficus carica L	34	TK34	Ficus carica L	Moraceae	Ficus	Fic carica L	Eisen	TatjanaKoka	19990826
Alb026	Ficus carica L	5	TK5	Ficus carica L	Moraceae	Ficus	Fic carica L	Eisen	TatjanaKoka	20030820
Alb026	Ficus carica L	9	TK9	Ficus carica L	Moraceae	Ficus	Fic carica L	Eisen	TatjanaKoka	19970818
Alb026	Ficus carica L	2	TK2	Ficus carica L	Moraceae	Ficus	Fic carica L	Eisen	TatjanaKoka	19960817
Alb026	Ficus carica L	1	TK1	Ficus carica L	Moraceae	Ficus	Fic carica L	Eisen	TatjanaKoka	20040819
Alb026	Ficus carica L	23	TK23	Ficus carica L	Moraceae	Ficus	Fic carica L	Eisen	TatjanaKoka	19970825
Alb026	Ficus carica L	15	TK15	Ficus carica L	Moraceae	Ficus	Fic carica L	Eisen	TatjanaKoka	19980828
Alb026	Ficus carica L	19	TK19	Ficus carica L	Moraceae	Ficus	Fic carica L	Eisen	TatjanaKoka	19980828
Alb026	Ficus carica L	12	TK12	Ficus carica L	Moraceae	Ficus	Fic carica L	Eisen	TatjanaKoka	19970825
Alb026	Ficus carica L	14	TK14	Ficus carica L	Moraceae	Ficus	Fic carica L	Eisen	TatjanaKoka	19970925
Alb026	Ficus carica L	11	TK11	Ficus carica L	Moraceae	Ficus	Fic carica L	Eisen	TatjanaKoka	19970825
Alb026	Ficus carica L	20	TK20	Ficus carica L	Moraceae	Ficus	Fic carica L	Eisen	TatjanaKoka	
Alb026	Ficus carica L	15	TK15	Ficus carica L	Moraceae	Ficus	Fic carica L	Eisen	TatjanaKoka	19980902
Alb026	Ficus carica L	18	TK18	Ficus carica L	Moraceae	Ficus	Fic carica L	Eisen	TatjanaKoka	19950620
Alb026	Ficus carica L	40	TK40	Ficus carica L	Moraceae	Ficus	Fic carica L	Eisen	Tatjana Koka	20020820
Alb026	Ficus carica L	33	TK33	Ficus carica L	Moraceae	Ficus	Fic carica L	Eisen	Tatjana Koka	20110305
Alb026	Ficus carica L	33/1	TK33/1	Ficus carica L	Moraceae	Ficus	Fic carica L	Eisen	Tatjana Koka	20050820
alb026	Ficus carica L	17	TK17	Ficus carica L	Moraceae	Ficus	Fic carica L	Eisen	Tatjana Koka	20050820
alb026	Ficus carica L	17	TK17	Ficus carica L	Moraceae	Ficus	Fic carica L	Eisen	Tatjana Koka	20000625

on farm



On farm



On farm – 3 varieties for market



Agriculture University of Tirana.

*Thank you for attention
From Prof Ass Dr Tatjana Kokaj*

