Preliminary Characterization of some Fig Biotypes in Romania

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ABSTRACT

Fig (*Ficus carica* L.) is an antique fruit species originated from Asia and spread all over the world. In Romania, many genotypes are found on mild climate zones, being cultivated in small gardens as ornamental and fruit plant. At the Bucharest Faculty of Horticulture recently, fig genotypes have been collected from different places, propagated and studied. This paper presents the first results regarding the characterization of some fig genotypes found in different areas of Romania. An Iraqian fig genotype was also characterized. On medium term, the team aims to identify local grown fig plants, to establish a fig distribution wide map in Romania and to analyse different plants parameters in order to decide the best genotypes to be planted in the future. Cuttings from different figs genotypes and different regions of Romania and Iraq were collected and rooted. After planting in pots, the new obtained plants where grown under controlled conditions for a year. By using the mother plants and/or the new propagated plants, several measurements and determinations were done in order to characterize each genotype. Leaves were studied and measured with Win Folia scanner and software, while fruits were observed, measured and total soluble solids was determined by refractometer. The collected biotypes are planted in four testing plots in different regions in Romania.

Keywords: *Ficus carica*, *fruits, leaves*

INTRODUCTION

The edible fig (*Ficus carica* L.) is an antique fruit species originated from Asia well known before wheat and frequently mentioned in the Bible and Koran. Egyptians, Persians, Greeks, Romans, Muslims, Jews were ancient peoples who very much appreciated fig fruits.

Fig belongs to *Moraceae* Family and has many cultivated varieties since historical times. Fig tree can reach 4 m high, has smooth light grey bark, thick branches and very large falling leaves, dark green coloured, with toothed and irregular edges.

Flowers are grouped in beautiful inflorescences and are pollinated by wasps. The fruits are large, round or pear shape, covered with a fairly thin skin, and can weight even more than 30-40 g. There are several coloured types of figs: violet, yellow and white. (Stănică *et al.*, 2003; Hoza, 2001)

The fruit has many nutraceutical properties and is usually consumed fresh or dried. There are several figs made products as jams, paste confection, canned foods, fruits in syrup, wine, juice, liquor etc. (Stănică *et al.*, 2011; Ghena *et al.,* 2010; Hoza, 2000).

Despite its varietal diversity, fresh fig is still considered a minor fruit in the Mediterranean countries trade. (Bandelj Mavsar *et al.,* 2008).

In Romania, many genotypes are found on mild climate zones, being cultivated in small gardens as

Tab. 1. Fig (*Ficus carica*) genotypes and their locations

No	Genotype	Origin
V1	Secuilor 1	Bucureşti, România
V2	Secuilor 2	Bucureşti, România
V3	Negoieşti 01	Prahova, România
V4	Str. Ştefan cel Mare	Bucureşti, România
V5	Muzeul Storck	Bucureşti, România
V9	Sebus	Oradea, România
V10	Stoica Dan	Mangalia, România
V11	Galben mare Giurgiu (Braniştea G.)	Giurgiu, România
V13	Galben-mare Otiman	Sviniţa, CS, România
V14	Viscool	Italia
V16	Zona Parcul Tineretului	Bucureşti, România
V17	Olimpia	Timişoara, România
V18	Smochin negru	Ploieşti, Prahova, România
V21	Str. Părintele Stăniloae	Bucureşti, România
V24	Facultatea de horticultură 1	Bucureşti, România
V26	Str. Dr. Constantin	Bucureşti, România
V28	Brazi	Brazi, Prahova, România
V34	Rot negru Otiman	Sviniţa, CS, România
V36	Bifera Bianca	Italia
V37	Natauwa	Italia
V38	Fig. Miele nero	Italia
V39	Fig. Bianca nero	Italia
V40	Fig. Awitato	Italia
V41	Fântânele Ph	Prahova, România
V42	Irak 1	Kerkuk, Irak
V44	Irak2	Kerkuk, Irak
V45	Irak 3	Kerkuk, Irak

ornamental and fruit tree. At the Bucharest Faculty of Horticulture recently, fig genotypes have been collected from different places around Romania, propagated and studied.

This paper presents the first results regarding the characterization of some Romanian and Iraqian fig genotypes. After the identification of as many as possible local fig genotypes, a distribution wide map in Romania will be made. By analysing different plants/fruit parameters the best genotypes will be proposed to be planted in the future.

MATERIALS AND METHODS

Cuttings from different figs genotypes and different regions of Romania were collected and rooted. One genotype from Iraq was also included in the trial, in order to test its adaptation to the local Romanian growing conditions.

After rooting the new obtained plants were planted in pots and grown under controlled conditions (cold glasshouse) for a year. By using the mother plants and/or the new propagated plants, several measurements and determinations were done in order to characterize each genotype.

From all the formed leaves grown in the first year, four average looking were studied and measured with WinFolia scanner and software, while fruits were observed, measured and total soluble solids was determined by refractometer.

Table 1 presents the different genotypes identified.

From each genotype, leaves were analysed with WinFolia, a computer image analysis system

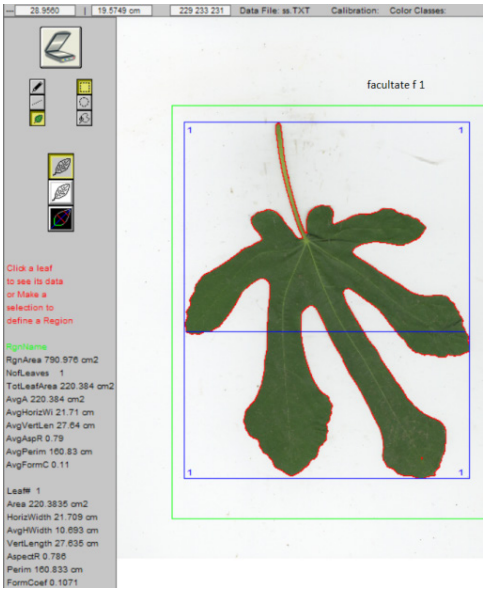

Fig. 1. V24 genotype scanned with WinFolia software

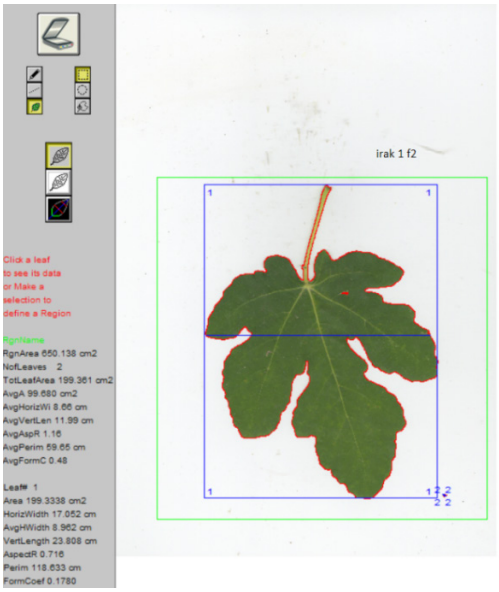

Fig. 2. V42 genotype scanned with WinFolia software

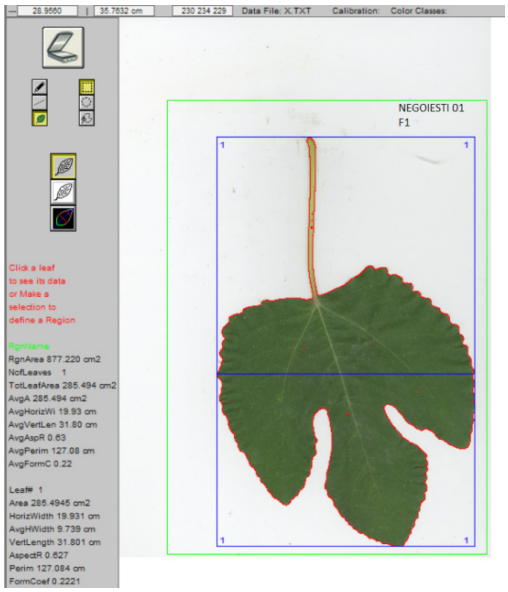

Fig. 3. V3 genotype scanned with WinFolia software

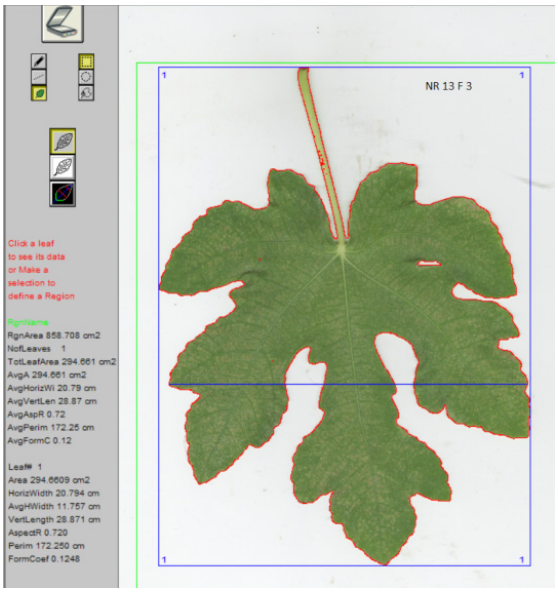

Fig. 4. V13 genotype scanned with WinFolia software

that performs morphological measurements. The system is composed by a scanner Epson Expression 11000 XL and a software designed for measuring the leaf area.

The principal leaf analysed parameters were: total area, perimeter, horizontal width, vertical length and shape coefficient (4 π A/ p2, A = leaf area and p = leaf perimeter) (Win Folia, 2015).

Fruits were measured with digital callipers and weighted with technical balance Partner PS1200.R2. For each genotype some morphological parameters such as fruit weight, length, width, ostiole diameter; peduncle length, diameter and shape were measured; fruit skin colour, rust and side cracking were also determined (Fig. 6-7). Total soluble solid content were determined with Kruss digital refractometer DR301-95.

RESULTS AND DISCUSSIONS

From each genotype were collected and analysed four leaves per plant scanned with WinFolia software (Fig. 1-4)

Tab. 2. Leaf analysis of studied fig genotypes

Genotype	Length (cm)	Width (cm)	Perimeter (cm)	Shape coefficient
V1	28.51	8.98	140.70	0.14
V2	30.09	10.92	138.60	0.16
V3	32.02	9.17	126.07	0.22
V4	32.25	8.14	115.67	0.24
V5	30.62	10.16	123.74	0.23
V9	15.90	15.10	124.05	0.20
V11	28.27	9.84	127.40	0.19
V13	29.60	9.72	97.78	0.22
V14	24.93	9.27	111.71	0.21
V16	19.83	13.64	138.61	0.24
V17	23.49	9.59	132.23	0.14
V18	26.16	7.66	110.71	0.19
V21	16.3	17.5	133.22	0.15
V24	27.44	9.60	158.01	0.101
V26	30.60	10.09	169.37	0.10
V28	20.61	8.11	114.65	0.13
V34	16.18	6.25	76.65	0.18
V36	26.56	9.13	144.09	0.12
V37	23.92	8.95	102.74	0.23
V38	21.87	10.00	92.85	0.78
V39	23.68	9.80	107.29	0.22
V40	22.40	9.40	96.05	0.28
V41	21.41	8.80	133.09	0.11
V42	24.93	9.27	111.71	0.21
V44	27.37	8.87	118.81	0.19
V45	24.63	8.47	117.77	0.16

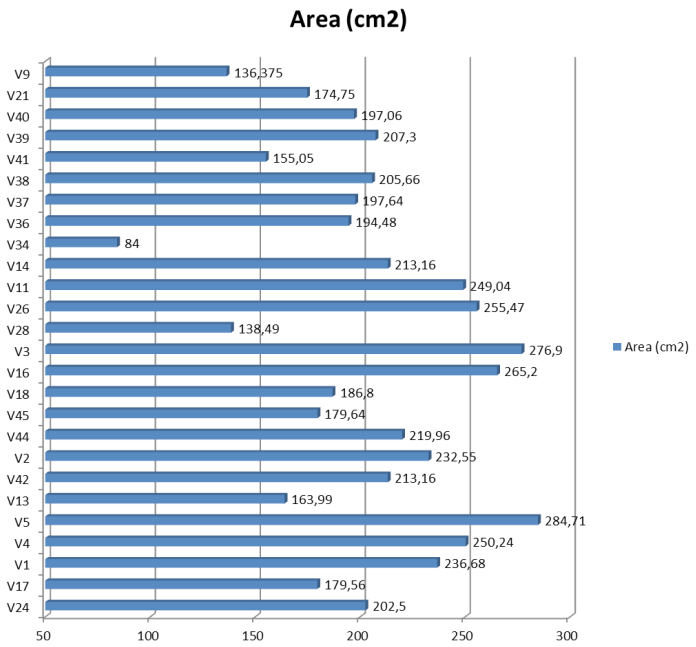

Fig. 5. Fig genotypes leaf area

a. b. c.

Fig. 6. Fig fruits (a - V55, b - V36, c - V28)

a. b.

Fig. 7. Fig fruits (a – V13, b – V34)

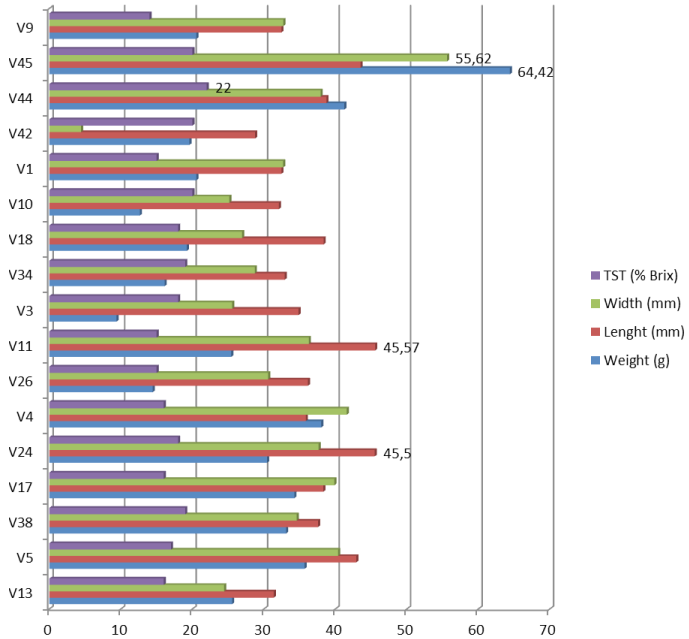

Fig. 8. Fig fruit parameters

Leaf shape varied from a single to three, five and seven lobes respectively.

Leaf length varied from 15.9 cm (V9) to 32.25 cm (V4) and width varied from 6.25 cm (V34) to 17.50 cm (V21). Leaf perimeter varied from 76.65 cm (V34) to 169.37 cm (V26) (Tab. 2).

Total leaf area varied from 84.21 cm^2 (V34) to 284.71 cm^2 (V5) (Fig. 5).

Fruit colour varied from light green, yellow, brown green to dark mauve. Pulp internal colour varied from pink, amber, red to dark red (Fig. 6-7).

Fruit average weight varied from 9.39 g (V3) to 64.42 g (V45). Fruit length varied between 28.77 mm (V42) to 45.57 mm (V11) and width between 4.43 mm (V42) to 55.62 mm (V45). Total soluble solid content measured varied from 14% (V9) to 22% (V44) (Fig. 8).

CONCLUSIONS

The analysis of fig genotypes showed an important genetic variability for all the analysed characters. According to leaf analyses, we can identify some categories of leaf typologies. The observations are in progress and will continue for the introduced biotypes and supplementary observations will be made for the ripening time. The collected biotypes are planted in 2017 and studied in four testing plots at Pietroasa Viticulture and Wine Processing Research Station, Dăbuleni Research Station, Faculty of Horticulture and Svinița Village, Mehedinți.

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