IDENTIFICATION AND SELECTION OF SOME FEMALE FIG (FICUS CARICA L.) GENOTYPES FROM MARDIN PROVINCE OF TURKEY

MIKDAT SIMSEK1*, ERSIN GULSOY2, M ZEYDIN KIRAR3, YUSUF TURGUT4AND BEDRIYE YUCEL5

1Department of Horticulture, Faculty of Agriculture, Dicle University, 21280, Turkey
2Department of Horticulture, Faculty of Agriculture, Igdir University, 76000, Turkey
3Kayapinar District Municipality of Diyarbakir Province, 21070, Turkey
4Ministry of Food Agriculture and Livestock of Mardin Province, 47100, Turkey
5Science and Technology Application and Research Center, Dicle University, 12280, Turkey

*Correspondence author’s e-mail: mikdat.simsekicle.edu.tr

Abstract

Female fig genotypes in the Beyazsu region located between Nusaybin and Midyat districts (Mardin) in Turkey were selected using the weighted ranking method during years 2014-2015. Each selected genotype was identified. The total scores of the genotypes varied from 704 to 950. Fruit weight ranged from 47.68 to 72.68 g, ostiole width from 1.53 to 5.96 mm, total soluble solids (TSS) from 20.67 to 23.87% and acidity from 0.18 to 0.23%. All the genotypes had long petioles and green shoots. The leaf lobe shape was lyrate in two genotypes named MBSU16 and MBSU23, and latate in the rest of the genotypes. The tree growth habit was open in two genotypes named MBSU16 and MBSU24 but spreading in other genotypes. In conclusion, two genotypes MBSU11 and MBSU21 scored the highest in overall quality. These two genotypes should be preserved as genetic resources for future breeding programs.

Key words: Ficus carica L., Selection, Mardin.

Introduction

Fig (Ficus carica L.) is one of the world’s oldest horticultural crops. It is indigenous to many areas, ranging from Asiatic Turkey to Northern India, and local genotypes are cultivated in most Mediterranean countries (Kuden, 1996). The fig fruit is well known for its attractive taste and nutritive value, and mostly consumed as fresh (Solomon et al., 2010). Endemic to Turkey (Kuden & Tanriver, 1998), this plant can adapt readily to different soil and climatic conditions (Simsek, 2009a).

Turkey has been the prime fig producer for many decades, producing (298,914 tons) about one-fourth of all figs grown worldwide (1,115,849 tons). Egypt, Algeria, and Morocco also produce significant quantities of figs; 158,089, 117,100 and 101,989 tons annually, respectively (Anon., 2013). Table (fresh) figs are considered exotic in many European countries where they cannot be cultivated. Nevertheless, interest in fresh figs is increasing (Ozeker and Isfandiyaroglu, 1998).

Quite few Turkish scientists carried out identifications and selections of native fig populations from different areas, exhibiting different fruit, leaf, and tree characteristics (Aksoy et al., 1992; Ilgin, 1995; Caliskan & Polat, 2008; Simsek, 2009b; Gozlekci, 2010; Simsek & Kuden, 2010; Simsek, 2011; Simsek & Kuden, 2011; Caliskan & Polat, 2012; Sezen et al., 2014).

Beyazsu region, located between Nusaybin and Midyat districts (Mardin) in Turkey (Fig. 1), has a distinctive microclimatic environment derived most likely the Beyazsu waterfall. Around the waterfall area, climatic conditions are similar to the conditions of Mediterranean region. In this microclimate, fruit trees such as pomegranate, figs, walnut, almond and mulberry and forest trees such as pine, poplar and sycamore flourish (Fig. 2).

To our knowledge, no fig selection studies have been reported in Bayazsu region. Thus the present study was undertaken with aim of 1) selection, 2) identification and 3) preservation of genetic resources of superior fig genotypes.

Material and Methods

A total of 54 table fig genotypes were studied in Beyazsu (Mardin) region of southeast Turkey in 2014 and 2015. The region is situated between 37°16’3.23" N - 41°18’4.60" E coordinates in North part and 37°5’52.84" N – 14°42’5" E coordinates in South part, with 350 to 1000 m altitude (Anon., 2016). Six superior female fig genotypes were selected, while other were eliminated using a weighted ranking method (Aksoy, 1991). Thirty fruits were randomly collected from each fig genotypes per year, placed immediately on ice, and stored at 0°C for further analyses. Titratable acidity and total soluble solids (TSS) were evaluated three times annually. pH and TSS data were obtained using pH meter and hand-held refractometer, respectively. Titratable acidity was determined through titration with 0.1 M NaOH to an endpoint of pH 8.10. Fruit length and width, neck length, ostiole width, the fruit shape index, leaf width, leaf length, and petiole length, were measured digitally. Fruit weight was measured with digital balance with a sensitivity of 0.01 g. The fruit shape index was calculated by dividing fruit width by length. Morphological characteristics of tree, fruit and leaf of all genotypes were recorded to descriptors for fig (Ficus carica L.) (Anon., 2003). All data were subjected to analysis of variance with the aid of SPSS Inc (PASW Statistics 18).
Fig. 1. Beyazsu region (Mardin) in Turkey (Anon., 2016).

Fig. 2. A portion of Beyazsu region (Anon., 2016).
## Results

According to weighted ranking method of selected female fig genotypes, the highest point score was 950 (MBSU11) and the lowest 704 (MBSU16). The notable point scores of MBSU21, MBSU23, MBSU27 and MBSU34 genotypes were 880, 794, 790 and 780, respectively. Significant fruit characteristics of superior fig genotypes from Beyazsu region are shown in Table 1. Fruit weight of fig genotypes and cultivars is an important variation. The fruit weight of fig accessions from Beyazsu region ranged from 47.68 g (MBSU27) to 72.68 g (MBSU11). The fruit width and length ranged between 46.94 mm (MBSU34) and 6.67 mm (MBSU11) and 44.03 mm (MBSU23) and 60.15 mm (MBSU11), respectively. The fruit shape index of genotypes in Beyazsu region ranged from 0.96 and 1.17. All the fig genotypes had a neck ranging between 4.04 mm (MBSU16) and 6.02 mm (MBSU21). The ostiole widths of the fruits were measured between 1.45 (MBSU16) and 5.96 mm (MBSU34). The soluble solids (TSS), pH, acidity and TSS/acidity of the fig fruit juice ranged from 20.67 (MBSU16) to 23.87% (MBSU23), from 4.73 (MSBU16) to 4.93 (MSBU11), from 0.18 (MSBU16 and MSBU21) to 0.23 (MSBU23) and from 102.33 (MSBU23 to MSBU27), respectively. The number of lobes in the leaf were 3 in four genotypes (MBSU11, MSBU21, MSBU27 and MBSU34) and 5 lobes in the remaining genotypes, the number of leaves per shoot from 10.04 (MBSU34) to 11.7 (MBSU23), leaf length from 23.1 cm (MBSU21) to 32.5 cm (MBSU34) and petiole length from 10.6 cm (MBSU21) to 13.9 cm (MBSU23) (Fig. 3). Significant botanic identification of superior fig genotypes from Beyazsu region are shown in Table 2. Fruit skin cracking was very minute in our selected fig genotypes. There was no difference in ease of peeling; all of the fig genotypes were easy to peel. Little variation was detected in skin cracking as the fig genotypes usually had no cracks.

## Discussion

In this study, the results obtained related to the point scores of genotypes were different somewhat from the previous findings in Mardin province but not in the same area (Polat & Caliskan, 2008; Simsek, 2009a). The total points awarded in the cited works were 480–850 (Polat & Caliskan, 2008) and 532–894 (Simsek, 2009a). The reasons for such differences can be variations in genetic characteristics, climatic and soil conditions, and culture techniques (pruning, irrigation, and fertilization regimes).

In previous works, Sezen et al. (2014) reported fruit weight from 14.9 to 44.1 g on a large number of fig accessions sampled in Coruh valley in Turkey. Gozlekci (2011) carried out a selection study on figs in Kemer and Alanya districts belongs to Antalya province, found that fruit weight was between 14.7 and 60.5 g in Kemer district, while varied from 13.8 to 48.5 g in Alanya district. Previously fruit weights of fig accessions from Turkey and different countries showed great variability that varied from 9 to 134 g (Chessa & Nieddu 1990; Iğin 1995; Kuden et al., 1995; Bostan et al., 1998; Aksoy et al., 2003; Ferrara & Papa 2003; Karadeniz, 2003; Caliskan & Polat 2008; Simsek, 2009a; Simsek 2009b, Simsek and Kuden 2011; Sezen et al., 2014). Sezen et al. (2014) reported fruit width between 29.3 mm and 45.9 mm and fruit length between 28.6 mm and 46.7 mm, respectively. Our fruit weight and length results were between above literature and also our results are parallel to the findings of previous reports (Iğin, 1995; Kuden et al., 1995; Ozkaya, 1997; Kuden & Tanriver, 1998; Ferrara & Papa, 2003; Caliskan & Polat, 2008; Simsek, 2009a, b; Simsek 2009b, Simsek and Kuden 2011). Aksoy et al. (1992) reported that the fruit size (width and length) and fruit weight were considered as an important trait in the fresh consumed figs. Small fig fruits are used for canning, whereas big ones are consumed as fresh in general, particularly Mediterranean (Gozlekci, 2011) and Southeast Anatolia region in Turkey (Simsek, 2009b).

Gozlekci (2011) reported fruit shape index fig accessions were between 0.77 and 1.16. Fruit shape index of our fig genotypes were acceptable, similar to data in previous studies (Bostan et al., 1998; Simsek, 2009a, b; Gozlekci 2011; Sezen et al., 2014). The fruit shape index (width/length) is very important criteria especially for of packaging and transportation. All fig genotypes studied were commercially viable in terms of fruit shape.

## Table 1

<table>
<thead>
<tr>
<th>Genotypes</th>
<th>Fruit weight (g)</th>
<th>Fruit length (mm)</th>
<th>Fruit width (mm)</th>
<th>Fruit shape index</th>
<th>Neck length (mm)</th>
<th>Ostiole width (mm)</th>
<th>TSS (%)</th>
<th>pH</th>
<th>Acidity (%)</th>
<th>TSS/A cidity</th>
</tr>
</thead>
<tbody>
<tr>
<td>MBS 11</td>
<td>72.68</td>
<td>60.15</td>
<td>66.67</td>
<td>1.11</td>
<td>5.57</td>
<td>3.96</td>
<td>22.60</td>
<td>4.93</td>
<td>0.19</td>
<td>116.99</td>
</tr>
<tr>
<td></td>
<td>± 3.35</td>
<td>± 3.09</td>
<td>± 2.59</td>
<td>± 0.08</td>
<td>± 0.04</td>
<td>± 0.17</td>
<td>± 0.27</td>
<td>± 0.15</td>
<td>± 0.01</td>
<td>± 4.76</td>
</tr>
<tr>
<td>MBSU16</td>
<td>46.27</td>
<td>44.26</td>
<td>51.89</td>
<td>1.17</td>
<td>4.04</td>
<td>1.45</td>
<td>20.67</td>
<td>4.73</td>
<td>0.18</td>
<td>117.10</td>
</tr>
<tr>
<td></td>
<td>± 1.71</td>
<td>± 1.35</td>
<td>± 0.91</td>
<td>± 0.02</td>
<td>± 0.37</td>
<td>± 0.12</td>
<td>± 0.50</td>
<td>± 0.23</td>
<td>± 0.03</td>
<td>± 20.58</td>
</tr>
<tr>
<td>MBSU21</td>
<td>58.78</td>
<td>52.72</td>
<td>50.88</td>
<td>0.97</td>
<td>6.02</td>
<td>1.53</td>
<td>22.13</td>
<td>4.83</td>
<td>0.18</td>
<td>125.96</td>
</tr>
<tr>
<td></td>
<td>± 2.06</td>
<td>± 3.90</td>
<td>± 1.01</td>
<td>± 0.06</td>
<td>± 0.17</td>
<td>± 0.18</td>
<td>± 0.15</td>
<td>± 0.15</td>
<td>± 0.04</td>
<td>± 27.49</td>
</tr>
<tr>
<td>MBSU23</td>
<td>51.43</td>
<td>44.03</td>
<td>51.39</td>
<td>1.18</td>
<td>4.39</td>
<td>3.56</td>
<td>23.87</td>
<td>4.80</td>
<td>0.23</td>
<td>102.33</td>
</tr>
<tr>
<td></td>
<td>± 2.52</td>
<td>± 4.46</td>
<td>± 1.20</td>
<td>± 0.10</td>
<td>± 0.38</td>
<td>± 0.38</td>
<td>± 0.15</td>
<td>± 0.10</td>
<td>± 0.01</td>
<td>± 3.11</td>
</tr>
<tr>
<td>MBSU27</td>
<td>47.68</td>
<td>49.05</td>
<td>50.71</td>
<td>1.03</td>
<td>5.78</td>
<td>3.13</td>
<td>21.63</td>
<td>4.77</td>
<td>0.21</td>
<td>102.78</td>
</tr>
<tr>
<td></td>
<td>± 2.58</td>
<td>± 6.30</td>
<td>± 7.82</td>
<td>± 0.06</td>
<td>± 0.25</td>
<td>± 0.27</td>
<td>± 0.35</td>
<td>± 0.21</td>
<td>± 0.03</td>
<td>± 14.37</td>
</tr>
<tr>
<td>MBSU34</td>
<td>49.58</td>
<td>49.51</td>
<td>46.94</td>
<td>0.96</td>
<td>5.84</td>
<td>5.96</td>
<td>22.90</td>
<td>4.77</td>
<td>0.19</td>
<td>122.75</td>
</tr>
<tr>
<td></td>
<td>± 3.03</td>
<td>± 5.86</td>
<td>± 1.31</td>
<td>± 0.09</td>
<td>± 0.38</td>
<td>± 0.15</td>
<td>± 0.10</td>
<td>± 0.15</td>
<td>± 0.01</td>
<td>± 3.40</td>
</tr>
<tr>
<td>Mean</td>
<td>54.40</td>
<td>49.95</td>
<td>53.08</td>
<td>1.07</td>
<td>5.27</td>
<td>3.26</td>
<td>22.30</td>
<td>4.81</td>
<td>0.20</td>
<td>114.65</td>
</tr>
<tr>
<td>SD</td>
<td>9.62**</td>
<td>6.86**</td>
<td>7.12**</td>
<td>0.11**</td>
<td>0.84**</td>
<td>1.59**</td>
<td>1.06**</td>
<td>0.16**</td>
<td>0.03**</td>
<td>15.99**</td>
</tr>
<tr>
<td>Max.</td>
<td>76.19</td>
<td>61.93</td>
<td>69.13</td>
<td>1.26</td>
<td>6.19</td>
<td>6.12</td>
<td>20.2</td>
<td>4.6</td>
<td>0.14</td>
<td>90.00</td>
</tr>
<tr>
<td>Min.</td>
<td>44.87</td>
<td>39.33</td>
<td>45.53</td>
<td>0.90</td>
<td>3.76</td>
<td>1.31</td>
<td>24.0</td>
<td>5.1</td>
<td>0.24</td>
<td>157.14</td>
</tr>
</tbody>
</table>

**Statistically significant at 0.01**
Table 2. Some significant botanic identification of superior fig genotypes from Beyazsu region.

<table>
<thead>
<tr>
<th>Genotypes and botanic identifications</th>
<th>MBSU11</th>
<th>MBSU16</th>
<th>MBSU21</th>
<th>MBSU23</th>
<th>MBSU27</th>
<th>MBSU34</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1. Biological characters</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.2. Full maturity</td>
<td>Mid-season (11-31 August)</td>
<td>Mid-season (11-31 August)</td>
<td>Mid-season (11-31 August)</td>
<td>Mid-season (11-31 August)</td>
<td>Mid-season (11-31 August)</td>
<td>Mid-season (11-31 August)</td>
</tr>
<tr>
<td>1.3. Harvest period</td>
<td>Long (41-60 days)</td>
<td>Very long (&gt;60 days)</td>
<td>Long (41-60 days)</td>
<td>Very long (&gt;60 days)</td>
<td>Long (41-60 days)</td>
<td>Long (41-60 days)</td>
</tr>
<tr>
<td>1.4. Apical dominance</td>
<td>Absent</td>
<td>Absent</td>
<td>Absent</td>
<td>Absent</td>
<td>Absent</td>
<td>Absent</td>
</tr>
<tr>
<td>1.5. Crop setting fruit (Breba)</td>
<td>Absent</td>
<td>Absent</td>
<td>Absent</td>
<td>Absent</td>
<td>Absent</td>
<td>Absent</td>
</tr>
<tr>
<td>1.6. Crop setting fruit (Main crop)</td>
<td>Present</td>
<td>Present</td>
<td>Present</td>
<td>Present</td>
<td>Present</td>
<td>Present</td>
</tr>
<tr>
<td>1.7. Crop setting fruit (Late crop)</td>
<td>Absent</td>
<td>Absent</td>
<td>Absent</td>
<td>Absent</td>
<td>Absent</td>
<td>Absent</td>
</tr>
<tr>
<td><strong>2. Growth characters</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.1. Tree growth habit</td>
<td>Spreading</td>
<td>Open</td>
<td>Spreading</td>
<td>Spreading</td>
<td>Open</td>
<td>Open</td>
</tr>
<tr>
<td>2.2. Tree vigour</td>
<td>High</td>
<td>Intermediate</td>
<td>High</td>
<td>High</td>
<td>High</td>
<td>Intermediate</td>
</tr>
<tr>
<td>2.3. Relative degree of branching</td>
<td>Dense</td>
<td>Intermediate</td>
<td>Dense</td>
<td>Dense</td>
<td>Dense</td>
<td>Intermediate</td>
</tr>
<tr>
<td>2.4. Terminal bud colour</td>
<td>Green</td>
<td>Light green</td>
<td>Green</td>
<td>Light green</td>
<td>Light green</td>
<td>Green</td>
</tr>
<tr>
<td>2.5. Terminal bud shape</td>
<td>Spherical</td>
<td>Conical</td>
<td>Spherical</td>
<td>Conical</td>
<td>Spherical</td>
<td>Conical</td>
</tr>
<tr>
<td>2.6. Shoot colour</td>
<td>Green</td>
<td>Green</td>
<td>Green</td>
<td>Green</td>
<td>Green</td>
<td>Green</td>
</tr>
<tr>
<td>2.7. Shoot length</td>
<td>Long</td>
<td>Medium</td>
<td>Long</td>
<td>Long</td>
<td>Long</td>
<td>Medium</td>
</tr>
<tr>
<td>2.8. Shoot width</td>
<td>Thick</td>
<td>Medium</td>
<td>Thick</td>
<td>Medium</td>
<td>Thick</td>
<td>Medium</td>
</tr>
<tr>
<td>2.9. Tendency to form suckers</td>
<td>Medium</td>
<td>Medium</td>
<td>Medium</td>
<td>Medium</td>
<td>Medium</td>
<td>Medium</td>
</tr>
<tr>
<td>2.10. Burknots quantity</td>
<td>Rare</td>
<td>Frequent</td>
<td>Rare</td>
<td>Frequent</td>
<td>Rare</td>
<td>Frequent</td>
</tr>
<tr>
<td><strong>3. Leaf characters</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.1. Leaf shape</td>
<td>Base cordinate, three-lobed</td>
<td>Base calcarate, lobes lyrate</td>
<td>Base cordinate, three-lobed</td>
<td>Base calcarate, lobes lyrate</td>
<td>Base cordinate, three-lobed</td>
<td>Base cordinate, three-lobed</td>
</tr>
<tr>
<td>3.2. The lobe shape</td>
<td>Late</td>
<td>Late</td>
<td>Late</td>
<td>Late</td>
<td>Late</td>
<td>Late</td>
</tr>
<tr>
<td>3.3. Density of hairs/spicules on leaf upper surface</td>
<td>Sparse</td>
<td>Dense</td>
<td>Sparse</td>
<td>Dense</td>
<td>Sparse</td>
<td>Dense</td>
</tr>
<tr>
<td>3.4. Density of hairs or spicules on lower surface</td>
<td>None</td>
<td>None</td>
<td>None</td>
<td>None</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>3.5. Leaf colour</td>
<td>Green</td>
<td>Light green</td>
<td>Green</td>
<td>Green</td>
<td>Green</td>
<td>Green</td>
</tr>
<tr>
<td>3.6. Petiole colour</td>
<td>Green</td>
<td>Light green</td>
<td>Green</td>
<td>Green</td>
<td>Green</td>
<td>Green</td>
</tr>
<tr>
<td>3.7. Petiole length</td>
<td>Long</td>
<td>Long</td>
<td>Long</td>
<td>Long</td>
<td>Long</td>
<td>Long</td>
</tr>
<tr>
<td>3.8. Tendency to form suckers</td>
<td>Medium</td>
<td>Medium</td>
<td>Medium</td>
<td>Medium</td>
<td>Medium</td>
<td>Medium</td>
</tr>
<tr>
<td><strong>4. Fruit characters</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.1. Fruit shape</td>
<td>Oblate</td>
<td>Oblate</td>
<td>Oblate</td>
<td>Oblate</td>
<td>Oblate</td>
<td>Oblate</td>
</tr>
<tr>
<td>4.2. Fruit width</td>
<td>Very large</td>
<td>Large</td>
<td>Large</td>
<td>Large</td>
<td>Large</td>
<td>Large</td>
</tr>
<tr>
<td>4.3. Fruit length</td>
<td>Long</td>
<td>Short</td>
<td>Medium</td>
<td>Short</td>
<td>Medium</td>
<td>Short</td>
</tr>
<tr>
<td>4.4. Fruit neck length</td>
<td>Medium</td>
<td>Short</td>
<td>Medium</td>
<td>Short</td>
<td>Medium</td>
<td>Short</td>
</tr>
<tr>
<td>4.5. Osteole width</td>
<td>Large</td>
<td>Medium</td>
<td>Large</td>
<td>Large</td>
<td>Very large</td>
<td>Large</td>
</tr>
<tr>
<td>4.6. Drop at the eye</td>
<td>Absent</td>
<td>Absent</td>
<td>Absent</td>
<td>Absent</td>
<td>Present</td>
<td>Absent</td>
</tr>
<tr>
<td>4.7. Shape of the fruit stalk</td>
<td>Variously enlarged</td>
<td>Variously enlarged</td>
<td>Long and slender</td>
<td>Long and slender</td>
<td>Variously enlarged</td>
<td>Long and slender</td>
</tr>
<tr>
<td>4.8. Abnormal fruit formation</td>
<td>None</td>
<td>None</td>
<td>None</td>
<td>Searce</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>4.9. Ease of peeling</td>
<td>Easy</td>
<td>Easy</td>
<td>Easy</td>
<td>Easy</td>
<td>Easy</td>
<td>Easy</td>
</tr>
<tr>
<td>4.10. Fruit skin cracks</td>
<td>Minute cracks</td>
<td>Minute cracks</td>
<td>Minute cracks</td>
<td>Minute cracks</td>
<td>Minute cracks</td>
<td>Minute cracks</td>
</tr>
<tr>
<td>4.11. Resistance to osteole-end cracks</td>
<td>Resistant</td>
<td>Resistant</td>
<td>Resistant</td>
<td>Resistant</td>
<td>Resistant</td>
<td>Resistant</td>
</tr>
<tr>
<td>4.12. Abnormal fruit formation</td>
<td>None</td>
<td>None</td>
<td>None</td>
<td>Searce</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>4.13. Fruit skin ground colour</td>
<td>Light green</td>
<td>Light green</td>
<td>Yellow green</td>
<td>Green</td>
<td>Yellow</td>
<td>Yellow green</td>
</tr>
<tr>
<td>4.14. Fruit skin over colour</td>
<td>Absent</td>
<td>Absent</td>
<td>Other</td>
<td>Yellow</td>
<td>Green</td>
<td>Purple</td>
</tr>
<tr>
<td>4.15. Pulp internal colour</td>
<td>Pink</td>
<td>Amber</td>
<td>Pink</td>
<td>Amber</td>
<td>Red</td>
<td>Amber</td>
</tr>
<tr>
<td>4.16. Fruit cavity</td>
<td>Very small</td>
<td>Very small</td>
<td>Very small</td>
<td>None</td>
<td>Very small</td>
<td>Small</td>
</tr>
</tbody>
</table>
Caliskan & Polat (2008) reported 1.0-8.9 mm long neck in the fruits of fig genotypes whereas Sezen et al. (2014) found longer neck, 2.77 mm-13.32 mm. No neck and short neck length in fig fruits is preferred by growers because damages may occur during harvest (Ozeker & Isfandiyaroglu, 1998; Simsek, 2009a, b). Simsek (2009a) reported ostiole width ranging between 3.58 and 4.44 mm. A large ostiole width on fig fruit is an undesirable characteristic as pests and pathogens enter fig fruit easily (Can, 1993; Simsek, 2009b). Therefore, fig fruits with narrower ostiole widths are preferred by consumers; the fruit are less susceptible to decays compared to fruit with wider ostiolum. Ostiole width was reported as 0.60-9.10 mm (Aksoy et al., 1992), 2.44-3.90 mm (Simsek, 2009b), 2.25-8.93 mm (Gozlekci, 2011) and 2.56-6.70 mm (Sezen et al., 2014) in different fig growing areas in Turkey. Our results are in accordance with above mentioned studies.

Soluble solids, pH, acidity and TSS/acidity of the fig fruit juice were previously reported as 20.1-27.4%, 4.5-5.4, 0.09-0.26% and 81.3-257.3, respectively (Caliskan & Polat, 2008) in Mediterranean region, and 18.25-23.43%, 4.67-6.04, 0.14-0.23% and 63.11-137.03, respectively (Simsek, 2009b) in Southeast Anatolia region. The TSS/acidity ratio is one of the important attributes in fruit taste (Karacali, 2002). Preferred ratio varies with the use of fig fruits, but ratios provide guidance in the genotypes and cultivars for specific uses (Can, 1993; Simsek, 2009b; Simsek & Kuden, 2011). Our results are in the range of acceptable values for table figs. Soluble solids, pH, acidity and TSS/acidity of fruit juice in fig genotypes are affected by genotypic diversity, maintenance requirements and ecological conditions (Simsek, 2009a). Our results on the leaf area and the number of leaves per shoot are similar to the works done by Polat & Ozkaya (2005) and Simsek (2009a). Fig leaf dimensions are very important determinants; photosynthetic production rises as the leaf area increases. Leaf dimensions of plants are affected by genetic characteristics, maintenance requirements, and ecological conditions.

Fig skin cracking was very minute in our selected fig genotypes, which also noted by Ozker & Isfandiyaroglu (1998) as well; the extent of cracking was less than that reported by Polat & Caliskan (2008). Easy peeling is a crucial criterion for commercial purpose. Thus, skin cracking, peeling and other morphological characteristics of our fig genotypes are acceptable, similar to the results of previous researchers (Polat & Caliskan, 2008; Simsek, 2009a, b; Caliskan & Polat, 2012; Sezen et al., 2014). Fig morphological characteristics are affected by genetic features, maintenance requirements, and climatic and soil conditions.

Conclusions

The fig genotypes in Beyazsu region (Mardin) of Turkey were first selected then some fruit and leaf characteristics were identified. The present study revealed that there was a significant biodiversity on most of morphological characteristics among selected genotypes. It is necessary to develop new table fig cultivars to foster sustainable increase in fruit production, with consideration of maturation periods, fruit quality, and the preferences of fig consumers. In view of the total scores of the selected genotypes, MBSU11 and MBSU21 may be considered as the best genotypes for fresh consumption. These fig genotypes might be used for future breeding studies therefore their germplasms should be preserved. Moreover, adaptation studies for the two genotypes should be conducted for various ecological conditions.

References

Aksoy, U. 1991. Descriptors for Fig (Ficus carica and Related Ficus sp.). Ege University, Faculty of Agriculture, Department of Horticulture, Izmir-Turkey.


Anonymous. 2003. IPGRI, “Descriptors for Fig (Ficus carica L.),” International Plant Genetic Resources Institute (IPGRR), Rome, Italy and International Center for Advanced Mediterranean Agronomic Studies (CIHEAM), Paris, 52 p.


Can, H.Z. 1993. A study on the determination of some characteristics of selected table figs in Aegean region. Ege University Graduate School of Applied and Natural Science, (MSc Thesis), (in Turkish), Izmir, Turkey.


Kuden, A.B. 1996. Mediterranean selected fruits intercountry network (mesfin) under the aegis of FAO. *Plant Resources of Fig*.


(Received for publication 22 February 2016)