

Determining The Morphological and Yield Characteristics of Melon (*Cucumis melo* L.) Landrace From Canakkale-Turkey

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Abstract : This research has been carried out in order to determine some morphological and yield characteristics of melon landrace (Hırsız kaciran) grown in Canakkale. Research was laid out in randomized block design with four replications and 20 plants in each replication. *Cucumis melo* L. cv. Kırkağaç-637 was also used as control cultivar. In addition to fruit and yield characteristics seed germination tests were also performed. According to data; fruit weight, fruit diameter, total soluble solids of Hırsız Kaciran landrace was found as 1186,15 g, 126,5 mm and 8,4% respectively.

Keywords : Melon, landrace, yield

Introduction

Melon takes part in Cucurbitaceae family is evaluated as cold fruit rather than main foodstuff. Little fruits of melons take an important place in pickle industry. Anotolia, Iran, Afganistan, Middle Asia and Soutwest Asia is admitted as origin centers of melon. Wild types of melons are seen in this region. Melon was taken to the European countries taking from Van region by the Roman missioners (Vural et.al. 2000). Melons are classified up to their fruit shapes, skin colours, flesh colour, fleshe firmness, their aromas and cavity of seeds. Production of melon is approximately 20 millions tonnes in the world and China achieves 6.6 millions tonnes and Turkey takes part in the second line with the 1.8 millions tonnes production in 103.000 hectares area. Melon is produce relatively with local populations and open polinated cultivars while hybrids use in greenhouse and irrigated lands. In Turkey, melon cultivars consists of raund Kırkağaç (60%), elipse Kırkağaç (%30-35) and Yuva-Hasanbey (%5-10). Production of seeds are recieved 37.150 kg in local open polinated and 2.302 kg in hybrids in Turkey in 2007. On the other hand importation of seeds was made 5400 kg in open polinated types and 3288 kg in hybrid types in 2007 (Ünlü et. al., 2007). While mature fruits of melon is consumed freshly, there are also some other source of consuming. They are consuming as ice-cream, consuming as drink mixing with milk, using as essence, consuming in salads as immature, consuming in soups and as brines vegetables, using in diets because of consisting protein and vegetable oils (Anonymous, 2010).

Kaynaş et. al.(2003) carried a study out in order to determine the adaptation characteristics of melon and watermelon cultivars in Canakkale conditions. Types of watermelon used in experiment is 117 F1 and Crimson sweet and 2 melons are Topaz and Altınbaş. They reported that Topaz and 117 F1 cultivars can be suggested to region producers.

Abak (1991), made studies on devoloping melon agriculture in GAP under the circumstance of Şanlıurfa Harran plain. It is painted out the suitable types for locals establishing types, fertility and adaptation in melon.

Sarı et.al.(1994), made studies on effects on production grafted watermelon and melon in Çukurova university. She emphasis on fusarium is seen much more in ungrafted rather than grafted plots and can be seen dramatic increase in growth of fruits with using grafted seedlings .

Küçük et.al.(2002) collected samples from Kırkağaç, Hasanbey and Çinikız cultivars produced in three population in Agean region for melon selection improvement. Firstly Hasanbey population was held and the population which shows different two characters was divided into two groups and two types was asserted as

Hasanbey-1, Hasanbey-2. Candidates of melons were determined as Kırkağaç-589 and Kırkağaç-637 up to constitutions of fruits in the lines get from Kırkağaç population. Also Çinikiz-808 a new type come out from Çinikiz population. Hasanbey-1, Kırkağaç-589 and Kırkağaç-637 was register as new types in 1991.

Village populations named as local types or landraces, these wild relatives, old types are not used anymore. Genetics of vegetable sources include genetics knowledge types of one plant in DNA pod and they have the quality of being source for genetic variety. These valuable source is face to be in danger with the pressures of local and the others. Protection of these is a must by the way of taking guarantee to protection of vegetables of future, future of human beings.

10000 years ago, variety of genetics which was seen in the local types carries importance of being protected these types and being used in improvement since it reflects harmony to different local condition at the same time. Types of vegetables must have genetics in order to adapt changing ambient condition.

Genetics of vegetable source are loading because of overusing of the source, genetics introductions, pollution, climate changes, loss, decrease, cutting to pieces of the land, development pressure and genetics erosion. Protection of genetics of vegetable source is vegetable source in their countries protects or saves genetics of vegetable source in their countries applying international protection strategies. Types of plants are taken under protection either in their nature or out of it in genebanks. Today and the next natural experiments has to be ready for improvements. Using wealth of biology of a country in its own progress and moving it into action needs to be determined by its wealth. Not paying attention to this and not doing anything for short investments means the same with the destruction of economic potential which can be left the next generations.

Local populations becoming with the effects of natural selection have to be protected in order to provide maintaining agriculture. They have great important in ecological agriculture. They are quite rich as they contain genetics and cultural specialities. They have many characteristics by the way of quality, resistance to pest and diseases and fertility.

Material and Method

The seeds of Hırsız Kacıran melon population which is produced in small areas by the local producers and consumed by families and being in local bazars in Çanakkale has been used as plant material and Kırkağaç-637 melon cultivar is as a control. Hırsız Kacıran population was collected by the producers in Kepez county of Çanakkale.

Method

Both seeds were planted directly with randomized block design with 4 replication and 20 plants in each replication. Seeds were sown at 21st of May and each parcel is lay out in 530 m². In each replication of 5 plants were left for seed harvest and experiments were on 15 plants.

Before the planting, field have fertilized with manure (4tonne/da) and also 15 kg/daN (NH₄NO₃), 20kg/da P₂O₅ (TSP) and 15 kg/da K₂O (K₂SO₄) applied. At time of flowering and 8 kg/da N added to each parcel. Drip irrigated plants hoed two times before plants have 6-7 leaves.

For plant protection; all plants sprayed with fungicide against fungal diseases. Totaly four harvests done for both cultivars in experiment.

Criteria below was determined during and at the end of experiment.

- The time passing from sowing to harvest (day):
- The time passing from flowering to harvest (day)
- The time between sowing and flowering (day)
- Fruit weight (g): weighing by randomly selected 5 plants in each harvest for each replication with digital balance (0,01 sensibility).
- Fruit length (mm): measuring the fruit length by randomly selected 5 plants in each harvest for each replication with strip and digital compass.
- Fruit diameter (mm): measuring the fruit diameter by randomly selected 5 plants in each harvest for each replication with strip and digital compass.
- Total Soluble Solids (%): measuring the TSS by randomly selected 5 plants in each harvest for each replication with hand refractometer.

- Flesh thickness (cm): measuring the fruit flesh thickness by randomly selected 5 plants in each harvest for each replication with digital compass.
- Seed weight (g): weighing the total fresh seed weights of randomly selected 5 plants in each harvest for each replication with digital balance (0,01 sensibility).
- Skin colour: by observation
- Skin (outher layer of pericarp) thickness (mm): measuring the fruit pericap thickness by randomly selected 5 plants in each harvest for each replication with strip and digital compass.
- Yield per plant (g/plant): weighing and added the perivious weight of randomly selected 5 plants in each harvest for each replication with digital balance (0,01 sensibility).
- Yield per decare (kg/da)

Data were subjected to ANOVA test for statistical analysis and “Minitab 13” statistical software was used for statistical analysis. Differences among the averages were tested at P=0.05 significance levels.

For germination test; Germination of seeds were carried out in petri dishes (9 cm diameter) containing two Whatman (No:1) filter paper imbibed with 8 ml of distilled water. Three replicates of 50 seeds were germinated in each seed lot. Seeds were allowed to germinate at 25 °C in the dark for 14 days. 2 mm radicle protrusion was accepted for as germination.

Cold test was carried out on each cultivars with three replications of 50 seeds were sown 4 cm deep in compost in sandwich boxes and wetted with 50 ml water. Sandwich boxes with lid on were kept at 10 °C for 7 days in the dark. They were then transferred to 25 °C and normal seedlings that appeared at the surface were counted after 10 days. High temperature germination test in each cultivar was conducted on three replicates of 50 seeds at 35 °C by the same way.

Findings And Discussion

Data for yield and some quality parameters can be seen in Table 1. All parameters on yield and yield parameters are found to be significant at 0.05 level. According to analysis; average fruit weight is found as 1186 g in Hırsız Kaçiran and 2336 g in Kırkağaç-637. Yield per plant is occurred as 2901,34g and in 6126,60g Hırsız Kaçiran and Kırkağaç-637. Similarly yield on decare are found higher in Kırkağaç (1997kg/da) than in Hırsız Kaçiran (916,5kg/da). As relatively to fruit weight, fruit length and fruit diameter are also found to be higher in Kırkağaç-637 (216,9 mm and 184,8mm) than Hırsız Kaçiran (134,6mm and 126,5 mm). For consumer demand generally larger melon and watermelon cultivars are less in attraction. Markets for especially local and domestic bazars public concern is from the moderate sizes. From this point of view local genotype Hırsız Kaçiran landrace has an advantage although its yield occurs less than the control plant. Total soluble solids occur as 8,4% and 12,5% in Hırsız Kaçiran and Kırkağaç-637. Hırsız Kaçiran has low total soluble solids that means less sweet than Kırkağaç-637. Normally melon cultivars has total soluble solids between 8-15%. From this point of view it has an alternative choice for the consumers who does not like more sweets even for the diabetics. Nevertheless, flavour of Hırsız Kaçiran is very significant as compare with Kırkağaç-637. Skin thickness is measured as 2,33 mm and 7,28 mm in Hırsız Kaçiran and Kırkağaç-637 respectively. Very low skin thickness is an advantage for the consumers but vice versa a disadvantage for postharvest and transportation. Further studies must be lay out for solving this problem. Flesh thickness is obtained as 2,42 and 4,29 cm for Hırsız Kaçiran and Kırkağaç-637.

Cultivar	Fruit weight (g)	Fruit length (mm)	Fruit diameter (mm)	TSS (%)	Seed weight (g)	Skin thickness (mm)	Flesh thickness (cm)	Yield per plant (kg/da)
Hırsız Kaçiran	1186 B	134,6 B	126,5 B	8,4 B	41,98 B	2,33 B	2,42 B	2901,34 B
Kırkağaç-637	2336 A	216,9 A	184,8 A	12,5 A	54,51 A	7,28 A	4,29 A	6126,60 A
LSD	215	5,466	2,465	0,3182	3,866	0,3182	0,5032	150,5

Table 1. Statistical analysis results for yield and quality parameters

Days harvest from sowing is counted as 81,25 and 73 for Hırsız Kaçiran and Kırkağaç respectively. Although Kırkağaç reaches maturity approximately 9 days earlier than Hırsız Kaçiran, 81 day can be consider as a medium vegetation for vegetables. Besides this melon is planting as a second crop after wheat in the region. Hırsız Kaçiran can be evaluated from this point also.

Cultivar	Days to harvest from sowing (day)	Days to harvest from flowering (day)	Days to flowering from sowing (day)
Hırsız Kaçiran	81,25 A	39,50 A	41,75
Kırkağaç-637	73,00 B	31,00 B	42,00
LSD	3,528	2,054	Ö.D.

Table2. Statistical analysis results for days to flowering and harvest

Skin colour, flesh colour and seed colours of observed fruits from each replacation has been lay out in Table3. Skin colour of Hırsız Kaçiran is mainly white. Skin has slices on the outer layer with green-yellow strips on the slices. Flesh colour at maturity is mainly white but around the seeds colour becomes yellow-orange. Seed colour occurs as light yellow.

Cultivars	Skin colour at maturity	Flesh colour at maturity	Seed colour
Hırsız Kaçiran	Main colour is white Slices have Green-Yellow colour	Main colour is white, seed cavity around is; yellow –orange	Light yellow
Kırk Ağaç-637	Main colour is yellow, have randomly black spots on it	Light green- white, seed cavity around is; orange	Yellow

Table 3. Skin colour, flesh colour and seed colour of Hırsız Kaçiran and Kırkağaç-637

Seed width, seed length, hypocotyl radicle ratio and 1000 seed weight of tested plants can be seen in Table 4.

Cultivar	Seed width (mm)	Seed length (mm)	1000 seed weight (g)	Hypocotyl/Radicula ratio (H/R)
Hırsız Kaçiran	10,405	4,55	37,3	5,18
Kırkağaç-637	11,825	4,82	41,63	6,72

Table 4. Seed width, length hypocotyl/radicula and 1000 seed weight of tested plants

From the harvested fruits means of a thousand seed weight is calculated as 37,3 g while the seed width and length is 10,404 and 4,55 mm respectively. At germinated seedlings hypocotyl radicle ratio is calculated as 5,118.

Selected fruits before seed harvest, harvested and seeds separated by hand. Separated seeds washed under tap water and then dried at incubator until the seed humidity levels reaches to 10%. Standard germination, cold and heat tests performed on the harvested seeds. Results can be seen in Figure 1 and 2.

According to results; standard germination means are 92,5% and 96,5% for Hırsız Kaçiran and Kırkağaç-637. Cold test results are 48,5% and 57% while heat test are 63,5% and 71,5% for Hırsız Kaçiran and Kırkağaç-637 respectively. Hırsız Kaçiran has also moderate tolerance to low and high soil temperatures and it can be grown in a long period during the months (May-October).

Hırsız kaçiran is a local landrace for Canakkale and its province. So it has a well adaptation especially for the region ecological situations. Whereas open pollinated and hybrid cultivars claimed to be more resistant to pest and diseases and also more productive. Landraces are found in areas where crop species first arose through domestication, Turkey also lies within the board region of domestication of several crops. Therefore, there are highly variable domesticated crops as well as landraces with unique characteristics in Turkey. Introducing the new crops, nitrogen fertilizers and increase in commercial trades in agriculture reduce the ratios of landrace productions. Sustainable development requires human beings to raise and improve their quality of life in harmony with and by conserving the balance of ecosystems, they are part of and which supply the fundamental support to sustain their lives. The development of new and innovative policies for the sustainable use of biodiversity necessitates, foremost, a fundamental revision of national land-use policies and an earnest change in national policies concerning agriculture, animal husbandry, employment and health. In this regard endangered species, endemic species, their ecosystems and natural habitats must be protected. The relationship between species conservation and sustainable development is important for biodiversity. The market prices of endangered species, especially those which are of economic value, are high because of scarcity (Tüzün and Sezer, 2002; Tan,1996). Most of landraces maintain a high level of genetic heterogeneity. This will be a key role for the further studies.

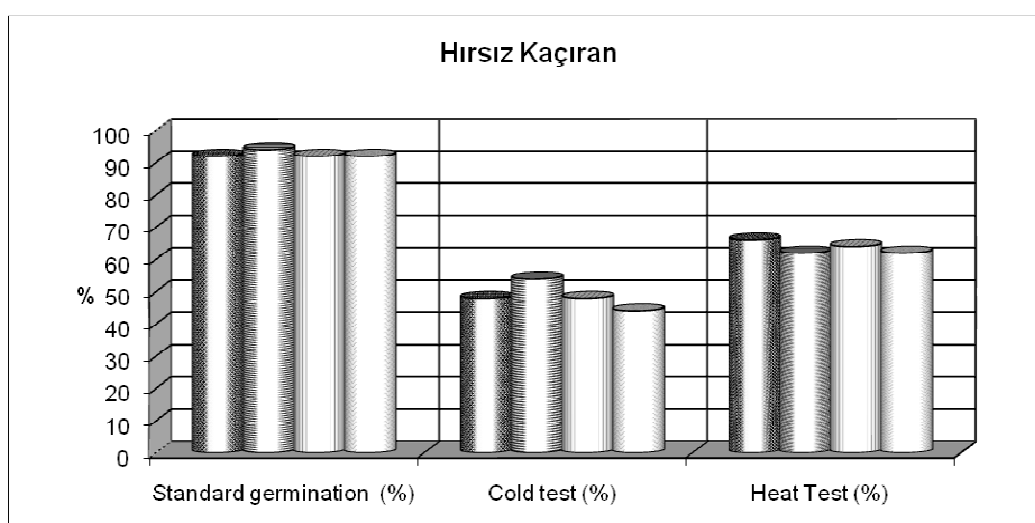


Figure 1. Mean values of germination, cold and heat tests of Hırsız Kaçiran

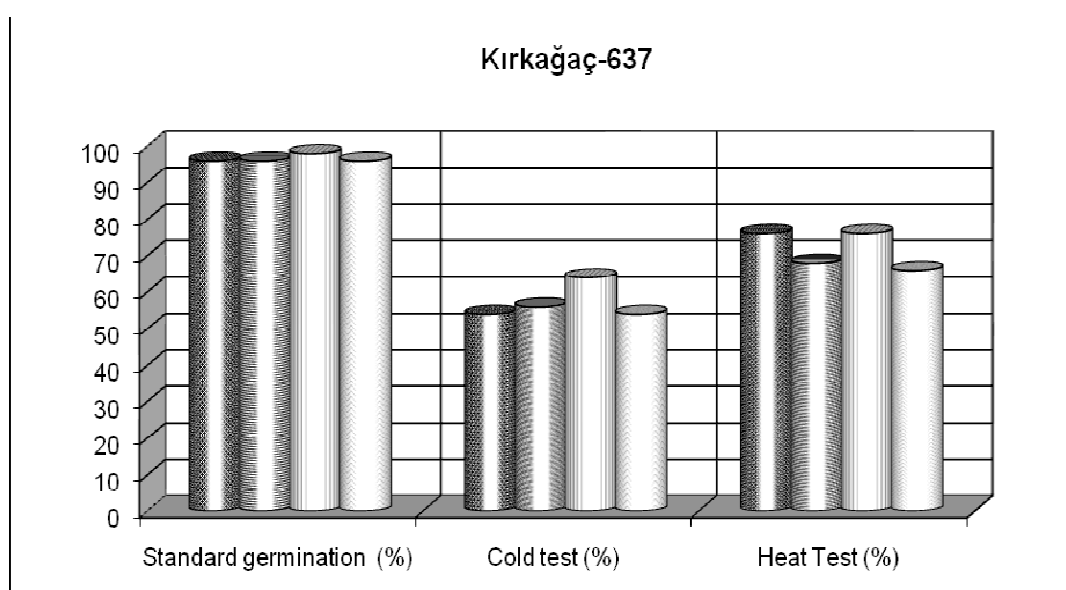


Figure 2. Mean values of germination, cold and heat tests of Kırkağaç-637

References

Abak, K., 1991. Köy Hizmetleri Araştırma Enstitüsü. Şanlıurfa.

Anonymous, 2005. www.die.gov.tr/istatistikler

Anonymous, 2010. www.fao.org

Coşkun, R., Ünlü, M., Eren, A., Köksal, Y., Ünlü, A. 2008. Bazı Kavun Saf Hatlarının Morfolojik Karakterizasyonu ile *Fusarium oxysporum* F. Sp. Melonis'e <reaksiyonlarının Tespiti ve Hibrit Çeşit Islahı Amacıyla Kullanımına Yönelik Çalışmalar. VII. Sebze Tarımı Sempozyumu 26-28 Ağustos 2008 Yalova

Kaynaş, K., Kuzucu C., Kaya S., Tatlıç, N. 2003. Bazı kavun ve karpuz çeşitlerinin kalite ve verim özelliklerinin belirlenmesi. V. Sebze Sempozyumu Bildirileri. 21-24 Eylül 2004 Çanakkale.

Küçük, A., Abak, K. ve Sarı, N., 2002. Cucurbit genetic resources collections in Turkey. First AD HOC Meeting on Cucurbit Genetic Resource. 19 January 2002 Adana, Turkey. 46-51

Sarı, N., Pıtrat, M, H., Abak, K., Yücel, S. 1994. Türkiye'de yaygın olarak yetiştirilen karpuz ve kavun çeşitlerinin bazı fungal hastalıklara ve virüslere karşı reaksiyonları. Çukurova Üniv. Ziraat Fakültesi 25. Kuruluş Yılı Özel Sayısı, Yayın No:105, 37-50.

Tüzün, G., and Sezer, S. 2002. National Report on Sustainable Development. World submit on Sustainable Development, Johannesburg. Ankara, The National Programme on Environment and Development.

Tan, A. 1996. Turkey Country Report. Fao International Technical Conference on Plant Genetic Resources, 17-23 June, Leipzig. Germany.

Vural, H., Eşiyok, D., 2000. Kültür Sebzeleri (Sebze Yetiştirme) Ege Üniversitesi Ziraat Fakültesi Bornova, İzmir.