



## A COMPARISON STUDY ON YIELD AND FRUIT QUALITY OF SOME POMEGRANATE CULTIVARS UNDER ASSIUT GOVERNORATE CONDITIONS

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### ABSTRACT

This work was carried out on six pomegranate cultivars namely: Wardy, Araby, Manfalouty, Nab El Gamal, Hegazy, and Montakhab through two successive seasons grown in a private farm at Assuit government trees were about 13 years and planting distance was 5X5m. Assuit is governorate considered one of the most important pomegranate producers and exporters in Egypt. The yield and some fruit physical and chemical properties of six different pomegranate cultivars (*Punica Granatum* L.) were investigated. This investigation aimed to study tree yield and the main fruit characteristics of six commercial pomegranate cultivars. The average fruit yield / tree lies between 38.10–59.90 kg, fruit weight 130.96–399.77g, fruit volume 125.7–520 cm<sup>3</sup>, fruit diameter 6.23–9.60 cm, fruit shape index 1.00–1.10 respectively. Fruit dry matter 20.49 – 38.57, in addition, total soluble solid content was found between 8.00–16.67, titratable acidity ranged between 0.25–0.53, TSS / Acid ratio between 0.27–0.63, total sugars 9.13–11.86, reducing sugars 1.22%–5.80, respectively.

Finally it could be concluded that, Manfalouty and Hegazy cultivars recorded most excellent physical, chemical and visual characteristics which are preferred.

### INTRODUCTION

Pomegranate is a highly valued crop and is widely cultivated in Mediterranean countries. It is one of the important fruit of tropical and subtropical regions. Pomegranate (*Punica Granatum* L.) belongs to the punicaceae family and is one of the oldest known edible fruits (Pekmezci and Erkan 2003). It is an ideal crop for the sustainability of small holding, as pomegranate is well suited to the topography and agro climate of arid and semi-

arid regions, (Ercilis and GAZED 2010).

Local pomegranate germplasm collections have been established in several Mediterranean countries, including Spain, Morocco, Tunisia, Greece, Turkey and Egypt (Mars, 2000). In addition, pomegranate trees have great adaptability to adverse climatic conditions, such as saline soil and drought conditions (Seoulveda et al 2000). Assuit Governorate is one of the densest areas as for as pomegranate plantations are concerned. The pomegranate area of Assuit Governorate was estimated to be about 8242 Fadden's produced 58491 Tons M.A.L.R. (2011).

Fruits ripen about 6-7 months after flowering and are harvested when qualities are deemed most appropriate for expected use (Morton 1987). Minimum maturity for wonderful in California based on titratable acidity less than 1.85% and color darker than an established reference (Kader 2006). Soluble solids of the cultivars examined did not vary greatly from mid August through mid November and the principal acid was tartaric and citric (Legua et al 2000). It is considered one of the most important fruit of the tropical and subtropical areas because of low maintenance, cost, good yield, good keeping quality and ability to thrive with limited moisture (Indian council of Agricultural research 2005). Mansour (2010) reported that, pomegranates are cultivated in upper Egypt particularly in Assuit, fruit color yellow white to deep dark red. The average yield of a fully grown tree (8–15 years) is 200 fruits varieties: Araby, Manfalouty, Banaty, Hegazy, Balady, Wardy, Yellow, Black and Nabel Gamal. Fruits are found at the market from July till October.

### MATERIALS AND METHODS

This investigation was carried out in a private farm at Assuit Governorate during two successive seasons, 2006 and 2007. Pomegranates (*Punica granatum* L.) Wardy, Araby, Manfalouty, Hegazy, Nabel Gamal and Montakhab cultivars were used

for this study. The trees were 13 years old in a state of moderate vigor, rather uniform in shape and size, planting distance was 5 m apart in clay loam soil. This experiment was arranged in a complete random design including six replicates each of single tree for each cultivar. Fruits of each tree ( in Kg ) were harvested in bulk at one of the recommended maturity standard outlined by **Ahmed (1974); Ahmed (1978); El-Kassas (1984); El-Salhy (1985) and Osama (1992)**. Picking date under the condition of this present was from mid-August through mid November.

To study both physical and chemical fruit properties, 10 fruits were taken from the previously tagged main branches just before harvesting all fruit on each tree fruits were similar in their date of fruit setting. Fruit of each tree cultivar were harvested and taken fruit weight (g) and numbers of fruits per tree were determined.

The yields (Kg/tree) in each replicate for each cultivar under study were recorded for each cultivar. All fruit samples were tested for average fruit weight, fruit volume, fruit length , fruit diameter , and fruit shape index. Fruit dry matter percentage and total soluble solid (TSS) as percent are determined by a hand refractometer. Total acidity as percent, was estimated as critic acid, by titrating of 0.1N Sodium Hydroxide against 5 ml juice using phenolphthalein as an indicator Maturity index was expressed as total soluble solid / acid ratio. Reducing and total sugar percentage were determined in Juice according to the method of ( lane ) and ( Eynon) as discribed in the **A.O.A.C. (1975)**. Statistical analysis was carried out according to (**Sendecor and Cochran, 1980**). Tree Means were Compared using L.S.D. Values at 0.05 level.

## RESULTS AND DISCUSSION

Data in **Table (1)** showed yield, fruit weight, fruit volume, fruit length and fruit diameter of some pomegranate cultivars under Assuit governorate conditions in 2006 and 2007 seasons.

### Yield / tree (Kg)

Highest significant values were recorded by Manfalouty and Hegazy cultivars in both seasons.

### Fruit weight

Manfalouty cultivars had highest significant fruit weight in both seasons.

### Fruit volume

In both seasons highest significant fruit volume was recorded by Manfalouty cultivar.

### Fruit length

In the first season Nabel Gamal gave higher significant value than most of other cultivars.

In the season second season Manfalouty showed higher significant value than most of other cultivars.

### Fruit diameter

Higher significant value was noticed by Manfalouty than most of other cultivars in the first season, but in the second season Manfalouty and Hegazy had higher significant values than first and last cultivars.

### Fruit shape index

Insignificant differences could be noticed among cultivars in both seasons.

Data in **Table (2)** showed the fruit dry matter percentage, total soluble solid percentage , TSS / Acid ratio, total sugar percentage and reducing sugar percentage of some pomegranate cultivars under Assuit governorate conditions in 2006 and 2007 seasons.

### Fruit dry matter percentage

In the first season Montakhab cultivar showed highest significant value but in the second season insignificant differences could be noticed among cultivars.

### Total soluble solid percentage

Wardy cultivar had higher significant value than Araby and Nab el Gamal in the first season. In the second season Montakhab gave higher significant value than most of other cultivars.

### Acidity %

Montakhab cultivar recorded highest significant value in the first season. The second season Araby and Hegazy cultivars had recorded lowest significant values.

### TSS / Acid ratio

Wardy and Hegazy cultivars showed higher significant value than Araby and Nab el Gamal in the first Season. In the second season Hegazy cultivar had higher significant value than Araby and Nab el Gamal cultivars.

### Total sugar percentage

Montakhab cultivars recorded showed insignifi-

cant value in both seasons.



**Reducing sugar percentage**

In the first season Wardy and Araby cultivars gave lowest significant value than Montakhab . In the second season Montakhab cultivar had lowest significant value.

Date in **Table (3)** showed that peel color, fruit shape and kernel color some pomegranate.

**Peel color**

Montakhab and Hegazy recorded preferred peel color more than other cultivars.

**Fruit shape**

Fruit round shape concenter preferred fruit shape which noticed by all fruit cultivar except Araby and Montakhab.

**Kernel color**

Dark red color kernel recorded by Manfalouty and Hegazy.

Finally it could be concluded that, Manfalouty and Hegazy cultivars recorded most excellent physical, chemical and visual characteristics which are preferred.

**Table 3.** Peel color, fruit shape and kernel color of some pomegranate cultivar under Assuit governorate conditions in 2006 and 2007 seasons:

Variety	Peel color	Fruit shape	Kernel color
Wardy	Yellow red	Rounded	Dark pink
Araby	Light yellow	Slatted	Light red
Manfalouty	Pink red + dark red	Rounded	Dark red
Hegazy	Pink red + dark red	Rounded	Dark red
Nabel-Gamal	Red yellow	Rounded	Red
Montakhab	Light pink	Slatted	Light yellow

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