



## MORPHOLOGICAL STUDY OF GENUS *PUNICA* L. (PUNICACEAE) GROWN IN IRAQ IN THE PROVINCE OF THI QAR

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Article history:		Abstract:
<b>Received:</b>	26 <sup>th</sup> January 2024	Accuracy of phenotypic treatment of the genus <i>Punica</i> L. The pomegranate grown in Iraq in detail, starting with the stems, leaves, flowers, and fruits. The current study noted that the characteristics of the calyx and corolla have great taxonomic importance, in addition to the variations in the shapes and dimensions of the leaves. The study showed that the Pomegranate fruit is a false fruit, and that the fruit does not retain the remains of the calyx and stamens. The pollen grains were distinguished by their triangular holes, semi-triangular in the polar view, and oval in the equatorial view, and it was clear from their dimensions that they were small in size and light in weight, and this made them easy to spread by the wind. Pollen viability reached (85-90) %.
<b>Accepted:</b>	30 <sup>th</sup> March 2024	

**Keywords:** Planting dates, Foliar Nutrition, Humic acid, Maize

### INTRODUCTION

The genus *punica* L. Of the pomegranate family Punicaceae, and the genus has about (200) species in the world and is widespread in the Middle East.

Given the importance of the pomegranate family as it includes medicinal plants, its study constitutes a basic basis for important pharmaceutical studies and a continuation of research on this family in Iraq and the genus *punica* L. Shukri, (1994). One of its genera. This genus had not been previously studied in Iraq, and the current study is the first of its kind regarding the genus .

Punicaceae family have been used for centuries in ancient medicine, as the pomegranate plant is considered a pharmacy in itself. Many studies, laboratory and clinical scientific research have focused on testing the ability of pomegranate compounds to resist types of cancer, prevent inflammation and reduce the severity of some chronic diseases such as diabetes. It has been used Pomegranate and its products are used in preparing many medical treatments for eye diseases, allergies, cleaning the mouth, and treating heart disease and atherosclerosis.

Scientists also studied and tested different parts of pomegranate, which were used in folk medicine to treat many diseases, in order to identify the compounds responsible for this therapeutic property.

Most research has focused on its antioxidant, anti-cancer, anti-inflammatory and anti-diabetic properties, LANSKY, (2007).

Pomegranate peels and fruit flesh also help treat diarrhea and digestive system diseases .

Studies conducted have proven that pomegranate seed extract contains compounds that have an antioxidant capacity 2 to 3 times that of green tea. Many studies have shown the superior ability of these compounds in preventing oxidation and resisting free radicals, which exceeds the ability of natural antioxidants such as beta-carotene and citric acid. Ascorbic acid, and even some synthetic antioxidants such as BHA.

The antioxidant compounds in pomegranates are represented by Polyphenolics. These compounds are a source of two types of compounds, which are anthocyanins, which give pomegranate juice its distinctive red color, and hydrolycable tannins, the most important of which is Elhagic acid tana. These tannins are astringent substances that have the greatest ability. The antioxidant that characterizes pomegranate fruits and juice, as this compound has a 92% antioxidant capacity Ahmed et al.,( 2005)

- Anti-inflammatory

Studies conducted in vivo have shown the ability of some compounds found in pomegranates to prevent and inhibit the enzyme cyclooxygenase2 (COX), which directly affects inflammation through its ability to convert arachidonic acid into prostaglandins, which in turn mediate In inflammation, pomegranate seed oil can inhibit 37% of these enzymes LANSKY, (2007).

Anti-cancer

Many laboratory studies have shown the ability of pomegranate juice and extract to prevent the growth of prostate cancer in men, and to reduce the growth of breast cancer. This is due to the fact that pomegranates contain abundant amounts of **Elhagic acid**, as this acid has a superior ability to prevent cancerous growths such as skin and lung cancer, and it has been proven In numerous studies conducted on mice, it has been shown to prevent cancerous growths in both the liver and esophagus. Due to the ability of this acid to activate enzymes that destroy carcinogenic toxins in the liver and lungs, such as Quinone Reductase and Ghutathione Reductase enzymes.

It is one of the plants of the pomegranate family, Punicaceae, which has been known since the time of the ancient Egyptians. It is very old in Egypt, and the ancients knew it as arahmani, from which the Coptic name Armen or Ramen was derived, from which the Arabic name pomegranate was derived. Pomegranates have been cultivated since ancient times for their edible fruits and large ornamental flowers, and were known in ancient times by the Egyptian, Phoenician, Roman and Greek peoples Ahmed et al.,( 2005) .

Pomegranates belong to the Roman family Punicaceae, and the genus *Punica* is the only one in the family and includes two plant species, the first is *Punica granatum* and the second is *Punica protopunica* LANSKY, (2007 ).

Pomegranates belong to the Roman family Punicaceae, and the genus *Punica* is the only one in the family and includes two plant species, the first is *Punica granatum* and the second is *Punica protopunica* The pomegranate plant, *Punica granatum* L., was classified in 1753 AD by the scientist Linn.

Classification of the pomegranate plant *Punica granatum* L. Eid, Saladin (1971) Type : Fruitful pomegranate

**Division : Spermaphytes**

**Sub- Division : Angiospermes**

**Classe : Magnoliopsida**

**Ordre :Myrtales**

**Family : Punicaceae**

**Genus : Punica**

**Species : *Punica granatum* L.**

**Common name : *Punica granatum* L**

**Scientific name: *Punica granatum* L**

**France name : *grenadier***

**English name : *pomegranate***

**Arabic name ( Romane ) .**

**MATERIAL AND METHOD**

During the current research, reliance was made on fresh samples that were taken from public and private gardens, nurseries and orchards from different regions of Thi Qar Governorate and its environs for the period between (2023-2024), and after collecting the samples, the Phenotypic characteristics of the samples, whose number ranged from (15-30) A sample of the gender studied. Measurements were taken for the collected samples, ranging between (5-15) measurements for each trait, and the studied plant samples were examined using a dissecting microscope of the type A.Kruss Otronic, which was used to study the phenotypic characteristics of the *punica* plant. As for the anatomical side of the leaf, the preparation of the epidermis was prepared from soft samples that were preserved in ethyl alcohol at a concentration of 70%, and the watering method was adopted with some changes Al- Mayah ,(1983). The edge was used using the method of stripping off and peeling in order to obtain both the upper and lower epidermis, using a dissecting blade and forceps with two fine ends, and placed on a clean glass slide, and a drop of glycerin was placed on it, then covered with a cover of the slide, and it was ready for examination. Measurements of the stomata and their shapes were taken under the compound microscope. Type LB-210 Labomed, INC, using an ocular micrometer and under 40X magnification. The samples were also photographed with a camera mounted on a **Micros Austria** microscope. As for the preparation of pollen Al- Mayah , (1983) . I used the watering method by taking fresh buds during the flowering season, where the anthers were taken from unopened ripe flowers from the fresh and preserved samples with a concentration of (70%) ethyl alcohol directly, and the whole flower was transferred to a clean glass slide and opened with two dissecting needles, and after opening the anthers and removing The rest of it was transferred to another clean glass slide, using a drop of safranin-glycerin dye, covered with a slide cover, and examined using the oil immersion lens of the compound microscope LB-210 Labomed and using the ocular micrometer. Approximately (5-45) pollen grains were measured and photographed. The samples were used using a digital camera mounted on a Micros Austria microscope, and the following characteristics were studied Erdtman , (1952) , Erdtman, (1971) .

- 1- The grain diameter in the equatorial view.
- 2- The diameter of the grain in the polar view.
- 3- Calculate the P/E value to find out the pollen grains.
- 4- Exine wall thickness of pollen grains.
- 5 Determine the size of pollen grains based on the axis lengths of the pollen grain.

As for the vitality of pollen grains, I used Aceto-Carmine stain, where the percentage of pollen grains was calculated by calculating whether the pollen grains were pigmented or not, and according to the equation

Number of pigmented pollen grains

Percentage of pollen viability= -----

----- x100

### Number of pollen grains

The models were photographed using a mounted on a Micros Austria microscope under an oil immersion lens .

digital camera

## RESULTS AND DISCUSSION

### Phenotypic characters

#### Habitat and Duration

The genus *punica* is a small tree or shrub with deciduous leaves in dry areas. The pomegranate has many branches and is cylindrical, smooth, tan, and flexible. Some of the side branches turn into short thorns. The height of the tree usually reaches meters, ranging between (4-5) metres, although it may be much higher than that. The branches tend to extend outward due to the weight of the fruits, as they sag and hang on the ground.

#### Stem (plate 1)

The stem is cylindrical, dark brown in color, rough in texture, and contains a thin, striped peel containing small fine hairs. The length of the stem ranges between (1 and 5) m and its width ranges between (4) m.

#### Leaves (plate 2)

The pomegranate leaf is lanceolate, narrow and elongated, shiny on the upper surface and smooth. It is opposite each other on the branches. Opposite. Its length ranges from (3) to (7) cm and its width is (2) cm.

#### Flowers (plate 3)

The flowers are large red, consisting of a fleshy cup with fused sepals, and the corolla consists of (5) to (8) petals . The stamens are often red and loose, and the stamens emerge from the inner surface of the sepal, which extends to the top of the ovary. The sepals are red in color, like the sepals and petals, and the stigma is embedded between the stamens, which are small and green in color. The ovary is small and consists of two layers separated by a transparent membrane, and each layer consists of several chambers, five in one of the two layers. There are three in the other layer, and these chambers are connected by thin, transparent membranes, and each protruding chamber is a part of the ovary wall to which the seed placenta is attached.

#### Fruits (plate 4)

The cover of the fruit is the calyx tube in which the ovary has grown, and the top of the fruit is the sepals themselves, with the stamens inside them. The color of the peel varies from yellowish or greenish white to dark crimson to black depending on the variety. The pomegranate is considered a false fruit that the fruit keep the calyx and stamens Upon maturity .

#### Seeds

The seeds are ribbed, their outer shell is a thin gelatinous layer (sweet or acidic juice, depending on the plant variety). Inside is the juice, which varies in color from yellowish white to crimson, and the fruit's cover is dark, which varies according to the variety. The inner layer of the outer peel is horny skin, inside which the embryo is located .

#### Flowering period

Pomegranate generally grows during the spring and fall seasons when outdoors, as the fruits usually ripen in the summer in the month of March and continue until the end of October depending on the region and according to the varieties .

#### Stomata (plate 5)

The stomata in the epidermis have an important role in the process of regulating the exchange of gases in the processes of respiration and photosynthesis. This is in addition to regulating the release of water from the plant in the form of steam in the process of transpiration. It has been shown through the current research that the stomata are of the Anisocytic type, as subsidiary cells are not distinguished in the epidermis. It was noted that the shape of the guard cells surrounding the renal-renal stoma is rather short .

#### Pollen study (plate 6)

The shapes and sizes of pollen grains have taxonomic significance Al-Kateb, (2000) , as the current study showed that pollen grains of the (*Punica* genus) are small in size, ranging in diameter between (10-25) microns, and were of light weight, transmitted by wind or insects (honey bees) and self-pollinated, except It was observed that most of the varieties had a degree of self-sterility, hence the importance of cross-pollination. They were triangular to semi-circular in shape, with three holes in the polar view (Plate 6,a and ovate in the equatorial view (Plate 6,b) .The study also showed that the pollen grains had a grainy wall containing grooves with a thickness of ( 1-1.5) micron as pollen vitality reached ( 85-90 ) %

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Plate 1



Plate 2



Plate 3



Plate 4

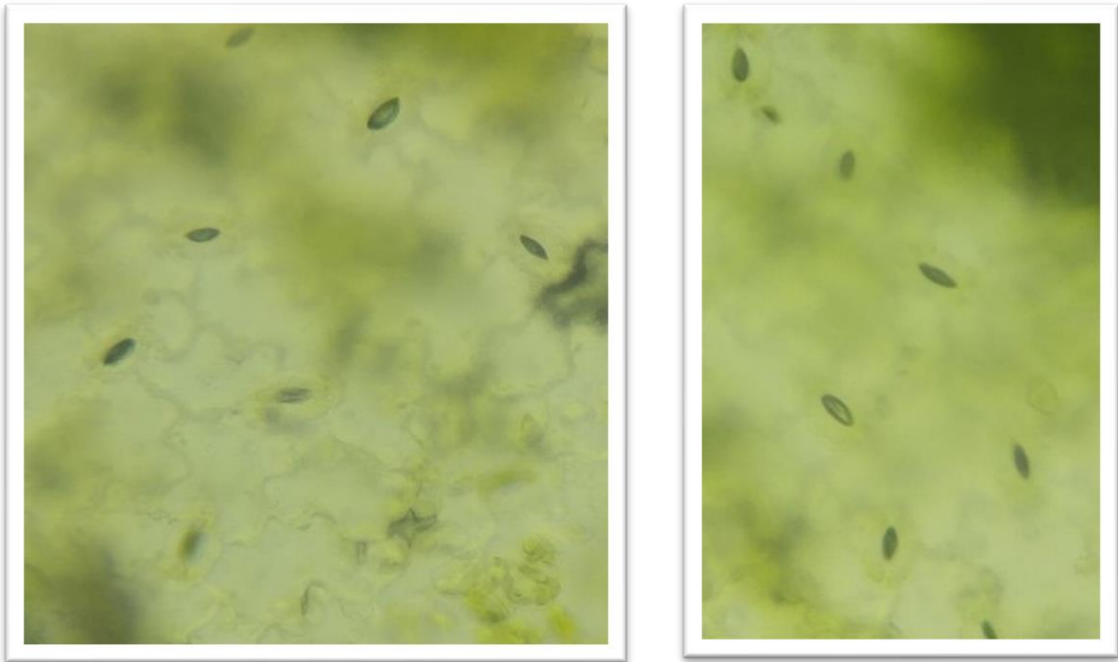


Plate 5

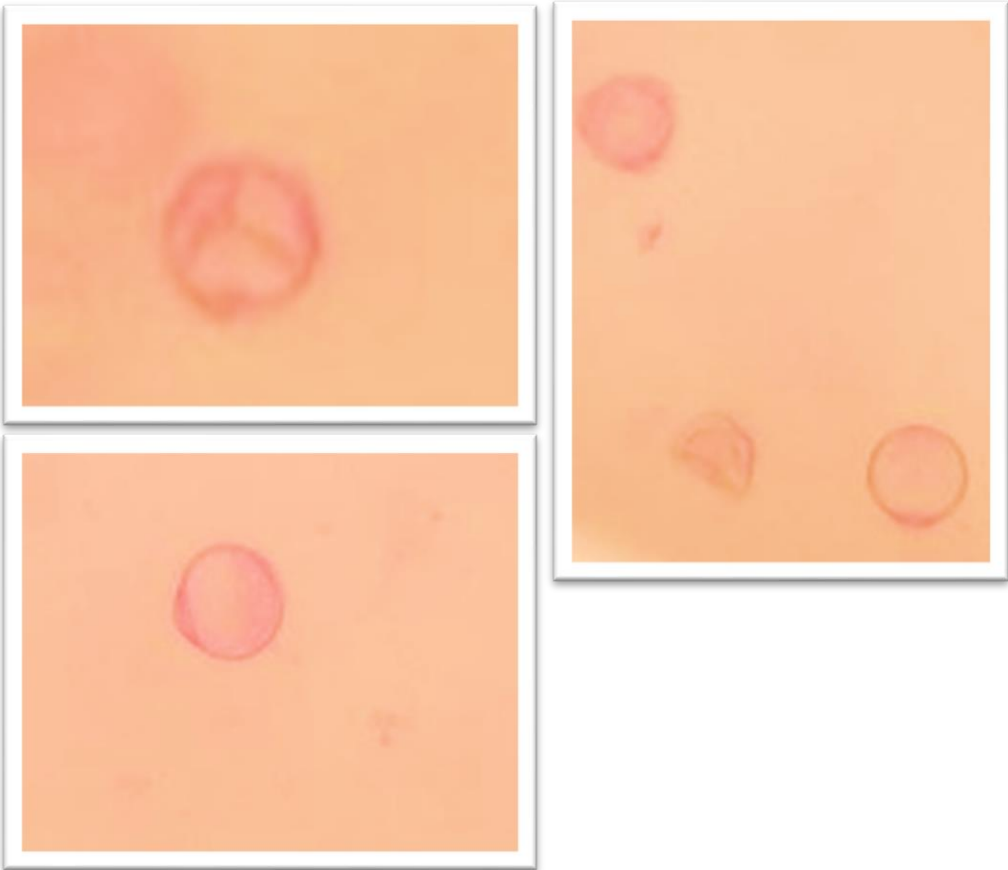


Plate 6 ,a

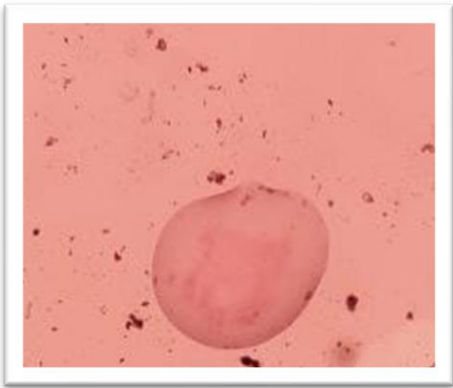


Plate 6 ,b