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The Importance of Rose and Rosehip Species in Past, Present, and Tomorrow

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Abstract **–** Rose and rosehip species have been important to people in different civilizations since the historical period. There are many natural and cultural *Rosa* species in Anatolia, which is an important area for Turks and has been a homeland for many years. In the study, information about the use of these species in the historical process, nutritional values, mythology and current developments were obtained. In addition, today, recommendations for these special species have been determined.

Keywords – Rose, Rosehip, Anatolia, Ancient Period

I. INTRODUCTION

Horticulture is basically a discipline concerned with the cultivation of plant material by humans for food supply, medicinal use, or functional and aesthetic purposes. They are a genetically diverse group and play an important role in the economy of modern society, but are also central to the healthy diets of urban populations. From this point of view, roses are an extremely important garden plant because they contain these features.

Roses have attracted the attention of people since ancient times with their magnificent habitus, aesthetic flowers, beautiful scents, nutritious fruits and mystical properties, and they have found their place in many science, social and fine arts sciences from agriculture to medicine, from literature to mysticism, from music to handicrafts.

Roses; named as the 'Queen of Flowers' by the Greek poet Sappho (Özcan, 2012), divine love was symbolized with the 'rose' by Fuzuli, Mevlana and other poets in Turkish-Islamic and Sufi sources (Demirel, 2004). The Prophet Muhammad was identified with the rose in Islamic history and art (Ceylan, 1999; Açıkel, 2018). In this context, 'rose' is a special flower integrated with human history. Evidence showing that roses were a part of social life in all civilizations established in different periods has reached the present day.

In museums located in different cities of our country, located in the Anatolian geography, where civilization dates back to ancient times, objects such as vases, goblets and bowls, coins with rose patterns, and jewelry, which are based on the 'rose' phenomenon in design, are exhibited. Roses depicted as wreaths on the floor mosaic found in Pergamon (Bergama) Antique City in İzmir can be shown as an example (Bingöl, 1997). There is *R.* x *damascena*, which is known as 'Yediveren', where he used roses called 'pillu' and God's flower in the Hittite period to make medicine, and during the Phrygian period, Midas took the roses he grew when leaving his palace around Eskişehir. It is known that there is a rose variety called sempervirens (Baytop, 1999; Melcherc, 2010).

In the Ancient Greek Period, the red rose was known as the symbol of Aphrodite (Gezgin, 2007), and the white rose was known as the symbol of Selene (Dugan, 2008). During this period, rose festivals called *'Rosalia'* were held for the dead.

This custom continued in the Roman period and cemeteries were decorated with roses to commemorate the dead (Goody, 2010). Important pipe factories in America, Europe, and Turkiye use the wood of the rose plant as raw material in their

production (Külli, 2021). That information indicates that roses burn slower compared to the other plant materials and can be used in fire suppression strips. At the same time, the fruits, leaves, shoots and branches of these plants create a food source for many wild animals (Baktır, 2015).

Native roses, which are usually found in more humidy and sunny parts, provide nutrient elements and shelter to a lot of fauna species (Gill and Pogge, 1974), such as birds and mammals. Roses have generally been identified with people throughout the historical process with their aesthetic flowers. The rosehip (*Rosa canina*) species, which is in the same genus taxonomically, is also important with its fruits. Not only *R. canina*, but also *R. rugosa* and *R. montana* are important rosehip species. In this review, the literature on the use of *Rosa* L. taxa in different areas in the historical period has been reviewed. For this, in addition to natural rose species, some cultural taxa and findings related to rose hips are also included.

II. TAXONOMY STUDIES IN ANCIENT TIMES

The first systematic study in *Rosa* L. taxa was made by Aristotle's student Theophrastos, and roses were also included in the work called Historia Plantarum. Theophrastos mentions three different *Rosa* L. taxa in the aforementioned work and it is assumed that these are *Rosa canina*, R. centifolia and R. sempervirens (Özcan, 2012). Some roses that were used at that time and still exist today; R. x damascena, R. moschata, R. hemisphaerica and R. centifolia species (Baktır, 2015). In addition, natural roses that are sectorally important are R. *canina*, R. foetida, R. dumalis and R. hemisphaerica (Şahin, 2011; Korkmaz and Özçelik, 2015).

III. ROSES AND ROSEHIPS IN ANATOLIAN CULTURE

Rosa L. taxa belonging to the *Rosaceae* family, which are generally distributed in all regions of Turkey, are found naturally in Central/Western Asia, Europe, the Caucasus, North Africa, Iran and the North and West parts of Iraq and Northern Afghanistan (Ekincialp et al. et al., 2007; Korkmaz and Özçelik, 2015; Özçelik and Koca, 2021). There are many natural roses in Anatolia. However, an exact number cannot be given for the number of natural roses due to reasons such as difficulty in classification according to systematic keys and polyploidy. Natural rose species are generally used in fruit growing and are called rose hips in many sources. Rosehip fruits, which are also extremely valuable in terms of ethnobotany, are in some regions; 'yaban gulu', 'silan', 'deligul', 'gulelma', 'itgulu', 'domuz turbu', 'askil', 'askergülü', ‘ip burması’, ‘askil’, ‘askergülü’, ‘ip burnu’, ‘sıtma gülü’, ‘yozgül’, ‘şeytan gülü’, ‘piçgül’, ‘öküzgözü’, ‘ayıburnu’, ‘ayıgülü’, ‘çiğil’, ‘civil’, ‘fukara portakalı’ and ‘yiric (Işık and Kocamaz, 1992; Baytop, 1999; Güneş and Şen, 2001; Özçelik, 2010; Orhan and Hartevioğlu, 2013; Özçelik, 2013; Özçelik and Koca, 2021). Rosehip, which is called 'dog rose' in Latin; It is known as 'dog rose' in English. It has been stated that the root of wild rose is called dog rose because it heals a person bitten by a rabid dog (Secundus, 2017). In this respect, similar names can be seen even in different regions in the cultural sense. Medical uses and myths seem to play a role in this case.

Rosa L. taxa in Anatolia have been evaluated for various purposes since ancient times. In Turkish gastronomy, the fruit and petals of *R. canina* are also used in making marmalade, compote, paste, sherbet and molasses. The petals of *R. centifolia* are mixed with Papaver rhoeas leaves in making sherbet. *R. montana* is used against intestinal and stomach ailments in the region of the Black Sea Region. R. sempervirens against malaria and hemorrhoids in the Marmara Region and against constipation in the Aegean Region, *R. damascena*, known as Isparta or oil rose, in the field of food, folk medicine and cosmetics; *R. canina* fruits grown in the Eastern Anatolia Region are used to give red color in dyeing (Tonbul and Altan, 1986; Tuzlacı, 2005; Tuzlacı, 2006; Yücel, 2008; Tuzlacı, 2011).

IV. NUTRITION VALUES AND CONTENTS

Plants have gained great importance in the drug discovery and development process due to their secondary metabolite content (Bose et al., 2019; Fascella et al., 2019; Mamat et al., 2020). After the development of spectroscopy in the 19th century, secondary metabolites have been detected in roots, leaves, fruits and seeds of plants. Identification and quantification of bioactive compounds of plants are important for use in food and pharmacy (Mohammed et al., 2019; Ungurean et al., 2020; Saygı, 2021). For example, the roots and false fruits of the *R. pimpinellifolia* species are used in traditional medicine for the treatment of hemorrhoids, various infections, abdominal pain

complaints, heart diseases, flu and anemia (Altundağ and Öztürk, 2011; Özgen et al. 2012; Güven et al., 2021). . It has also been stated that the same species may have positive effects against cancer cells in humans (Ayazoğlu Demir et al., 2021). According to studies on English flora, fruits of different rosehip species were used as food in the late Neolithic, Iron Age, Ancient and Middle Ages (Godwin, 1975; Tomlijenovic et al., 2021). As a result of the archaeological studies carried out in Diyarbakır, the remains of *Rosa* belonging to the neolithic age were found (Özdoğan and Başgelen, 2007).

R. *canina, R. rugosa* and *R. montana* taxa are the most commonly used species in industry and are known as 'rosehip'. The most important characteristics affecting the quality of the fruits of these species are taste and aroma. The soluble solids content of fruits is directly related to taste, and sugars make up a large part of the water-soluble dry matter. Rosehip has always been appreciated as a cheap source of vitamin C in times of war and economic depression due to its biological and nutritional values. Rosehip fruits contain vitamins A, B1, B2, E, C, P, and K (Roman et al., 2013; Öz et al. et al., 2018; Fascella et al., 2019; Fetni et al., 2020). In this context, the rosehip (*Rosa* L.) plant maintains its importance in folk medicine and medicine since historical times. It has been stated that rosehip fruits contain high levels of vitamin C, that vitamin C is necessary for the formation of collagen, and that, together with the vitamins A and E they contain, they are used against many ailments (Keleş and Kökosmanlı, 1996). For example, rose hips are also used in Sweden to make a popular soup (Nyponsoppa) rich in vitamin C (Uggla, 2004). In addition, these fruits; It is used for vitamin enrichment of marmalade, jam, beverage, fruit/detox juices (Jacobi, 1994).

V. USES IN PHARMACOLOGY

Rosa L. fruits are important for traditional pharmacological applications. Fruit extracts/oils have remarkable antioxidant and antimicrobial potential and should therefore be considered valuable components for functional food studies. Rosehip seed oil is valuable raw material for the development of herbal cosmetics and skin care products such as lotions, creams. The seeds of many products containing bioactive compounds such as rosehip are classified as waste during the processes in the factory, and it is stated that the effective use of these waste products is limited (Szentmihályi et al., 2002; Başer, 2009; Ahmad et al., 2015; Ahmed et al., 2016; Vasic et al. et al., 2020). The seeds in question intensely contain unsaturated fatty acids such as linoleic acid (C18:2n6c), oleic acid (C18:1n9c), a-linolenic acid (C18:3n3) (McGaw et al., 2002; Nowak, 2005; Ercişli et al. et al., 2007; Machmudah et al., 2007; Kazaz et al., 2009; Kızıl et al., 2018; Vasic et al., 2020; Hatipoğlu, 2022).

Fatty acids extracted from *Rosa* L. seeds show significant antibacterial, antioxidant, anti-inflammatory and anti-cyanobacterial activity (McGaw et al., 2002; Wang et al., 2015). Rosehip seeds are rich in essential fatty acids carotenoids and vitamin A (retinol). It has been stated that they are used in skin problems such as dermatitis, eczema, acne and burns, as well as their rich chemical content, anti-aging and moisturizing properties (Ahmad et al., 2015). Essential fatty acids are fatty acids that have more than two bonds, cannot be produced in the human body and must be obtained through diet (Bruneton, 1993; Cunnane and Anderson, 1997). It is stated that essential fatty acids have effects in the body such as modulation of membrane structure, formation of eicosanoids (prostaglandins, leukotrienes and thromboxanes), control of possible permeability of other membranes and regulation of cholesterol synthesis (Feller and Gawrisch, 2005; Schmitz and Ecker, 2008; Güven et al., 2021).

VI. LANDSCAPE ARCHITECTURE AND ROSES

Plants are used with their aesthetic and functional properties in landscape design and planning studies. Everyone knows the aesthetic features of roses, which are grown/used in home gardens, parks and botanical gardens almost all over the world, and one of the most important cultural plants with their beauty throughout history. Roses can be used both in large areas and, at limited spaces such as terraces and balconies, as they show different characteristics such as shrubs, shrubs and groundcovers. However, *Rosa* L. taxa have an extremely important functional potential in landscape planning studies. These plants are very suitable for erosion control and planting of unproductive areas, plantation of medians and slopes and border plants due to their deep root development, and drought tolerance. Especially bush-shaped rose species are recommended for the

rehabilitation of landscape areas (Meyer, 2008). Although there is a wide variety of rose taxa in the world today; Due to the abundance of roses cultivated and the number of newly bred varieties increasing day by day, studies are continuing to determine some characteristics of roses. While landscape roses are propagated mainly by cuttings or grafting methods, rootstocks are propagated by seeds (Uggla, 2004). In the studies of growing rosehip saplings for fruit growing, the method of propagation with cuttings is also used. The reason for using this method is that individuals obtained from seed propagation method differ due to *Canina* meiosis (Gudin et al., 1990; De Cock et al., 2008).

VII. CONCLUSIONS AND RECOMMENDATIONS

The rose/rosehip plant is evaluated both as a valuable ornamental/landscape plant and in the category of fruit, beverage and spice plant. The basis of this problem is that rosehip production is obtained from trees with unknown names, varieties or types, and standardization in production is not provided. These plant resources, which are very important in terms of breeding, should be brought to fruit growing. In addition, rosehip plants are cut to be used as fuel, their fruits are harvested unconsciously and cause the existing natural resources to not be used effectively. On the other hand, in order to meet the food needs of the increasing human population, it is necessary to carry out some practices such as increasing agricultural production in a sustainable way and product diversification. All seasons are experienced in Anatolia, where Turks have lived for many years. In dense regions, steppe with hot and arid climate is dominant. When performing landscape planning studies, it is imperative to choose plant materials with high drought tolerance in regions with hot and semi-arid climates such as steppes. In this context, the usability of rose varieties for different economic purposes should be investigated. On the other hand, in order to meet the food needs of the increasing human population, it is necessary to increase agricultural production in a sustainable way and to make some applications such as product diversification.

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