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Taxonomic Studies on *Rosa damascena* Miller Complex in Türkiye and Two New Species: *Rosa stipulata, Rosa comantema*

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Abstract
Rosa damascena Miller known as 'Oil rose, Isparta rose' in Türkiye was a species complex. It is considered to be formed by hybridization. There is not type specimen and no exact description of it. Economic importance of the species is very high. But, its systematic basis remained very weak. The study was conducted between 2009-2016. In the study, it was aimed to examine samples belonging to *R. damascena* found in Türkiye and to re-evaluate the taxonomical status of its allied taxa. Totally 164 samples were collected from gardens in all regions of Türkiye. The studies were conducted on herbarium materials and observations of living samples in gardens. There were three varieties of *R. damascena* in the country. These varieties were recorded as *R. d.* var. *trigintipetala, R. d.* var. *semperflorens,* and *R. d.* var. *versicolor*. However, there were no identification keys, descriptions, and type specimens of the varieties. In this study, ***R. damascena*** (including var. *trigintipetala*) has been redefined and its taxonomical foundation strengthened. Other varieties (var. *semperflorens* and var. *versicolor*) have been upgraded to the species category and renamed as ***Rosa stipulata*** sp. nov., ***Rosa comantema*** sp. nov., respectively to systematical rules. Lectotype of *R. damascena* was created and its current description was prepared. Our studies on the naming, description, and classification of cultivars continue.

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INTRODUCTION

It is known that roses have been benefited for at least 5000 years. One of the medicinal plants mentioned in a papyrus estimated to belong to 1550 BC is the rose. World-famous physicians such as Hippocrates (460-377 BC), Plinius (23-79 AC), Dioscorides (40-90 AC), and Galenos (129-199 AC) gave information on the use of rose in treatment (Baydar, 2007). The scholars from the Islamic world such as Al Kindî (801-873), Al-Dinawari (815-896), Avicenna (980-1037), Ibn al-Baytâr (1197-1248), Ibn Khaldun (1332-1406), Ishak bin Murad (14th century) and Esref bin Muhammed (15th century) also gave information on the use of rose and rose water (Altıntaş, 2010).

Nowadays, the species that are predominantly cultivated to obtain rose oil are *Rosa damascena* Miller, *R. alba* L., *R. moschata* J. Herrmann, and *R. centifolia* L. In some countries, *R. gallica* L., *R. alba*, *R. moschata*, *R. borboniana* Desp. etc are also grown roses for oil purposing. The most preferred of these species is *R. damascena* (Özçelik, 2010; Özçelik *et al,* 2011).

In Dissertatio Inauguralis Botanico-Medica de Rosa (Herrmann, 1762), the name *R. damascena* was first used. However, it was understood that the rose defined and named by Herrmann was not a Damascus rose species but a new undefined hybrid. Oil rose (Damascus rose) grown today was published with the same name (*R. damascena*) by Miller (Miller, 1768; Craker & Simon, 1986; Tucker, 2012). Miller (1768) is the oldest work that described *R. damascena*.

In Hegetschweiler (1840), *R. damascena* was specified as a species and its synonyms were given. But there was no information about its varieties. In Vilmorin's Blumengärtnerei (Siebert & Voss, 1896), it was stated that *R. gallica* has four varieties. One of these varieties was var. *damascena*. The name 'Trigintipetala' is mentioned for the first time in Dieck (1889). G. Dieck named a kind of oil rose as *Rosa gallica* var. *damascena* f. *trigintipetala*, inspired by the name 'trindafil'. The word 'Trigintipetala' in the rose is used to mean 30 petals. In Hegi (1923), *R. damascena* was defined and in it was stated that the most important of many garden forms was f. *trigintipetala*. The 'Trigintipetala' was specified as a cultivar of *R. damascena*. Only var. *semperflorens* was written as the lower taxon of *R. damascena* (Craker & Simon, 1986). According to Rehder's Classification of Roses in the 'Encyclopedia of Rose Science', *R. damascena* has two varieties as var. *trigintipetala* and var. *versicolor* (Roberts, Debener, & Gudin, 2003). In Flowers (2012), it is stated that there were three varieties of *R. damascena*. These varieties are: *R. damascena* 'Trigintipetala' (Kazanlik rose), *R. damascena* 'Versicolor' (York and Lancaster rose) and *R. damascena* 'Bifera' (Quatre Saisons or Autumn Damask). *R. damascena* was classified in Brumme & Gladis (2013) as follows:

R. × *damascena* Mill.
- var. *damascena*
  - f. *damascena*
  - f. *versicolor* (West.) Brumme et Gladis
  - f. *trigintipetala* (Dieck) R. Keller ex Asch. et Graebn.
- var. *semperflorens* (Loisel. et Michel) Rowley

Taxonomical works on garden roses are more difficult than on natural roses. For this reason, researchers avoid studying garden roses. Natural and naturalized rose species are described in the Flora of Europe (Tutin *et al,* 1968). Although *R. damascena* is grown in Europe, it is not included in the flora. 'Flora of Turkey' describing the vascular plants of Türkiye began to be published in 1965. This work, consisting of 11 volumes, is still the most basic systematic work on Türkiye's plants. In the 4th volume, Ö. Nilsson made a revision of the genus *Rosa* L. for Türkiye and stated that there were 24 wild species in the country. There is no systematic information about garden roses in the study. In the book, it was mentioned only the presence, cultivation, and utilization of *R. damascena* (Nilsson, 1972). It is likely to be in Palestine. But Palestinian Flora is not include this species (Zohary, 1987). Therefore, the systematic basis of the species has remained very weak.

It is mentioned as '*R. damascena* Mill.' in the Russian Flora (Komarov, Shishkin, & Yuzepchuk, 1971). The description has been

made with characteristics of more than one species: It is stated that it blooms in June-July, it is produced for ornamental purposes, it is of Near Asian origin, it was defined from a culture specimen, the type specimen is in London, and it is called as the Kazanlık rose. The flora contains more comprehensive information than other ones. However, most of the information given is incorrect. The most comprehensive study on Türkiye's old garden roses was made by Baytop (2001). It is written as *R.* × *damascena* in the book. According to the author, this hybrid has three varieties: var. *trigintipetala*, var. *semperflorens,* and var. *versicolor* (Baytop, 2001).

Recently, important systematic studies have been made on the roses in Türkiye and the world (Roberts *et al*, 2003; Özçelik, 2010; Özçelik, Yıldırım & Muca, 2013).

R. damascena is a systematically difficult species as described above. In a study conducted by us on Türkiye roses (Özçelik *et al,* 2009), *R. damascena* was evaluated as a species complex.

This study aims to reveal the systematic position of *R. damascena* that has not been clearly clarified until today and to introduce it on a modern systematic basis.

MATERIALS AND METHODS

Materials of this study, which was accomplished between 2009-2016, are *R. damascena* samples from Türkiye. All samples were collected by authors and preserved in the Hb. GUL. Totally 164 different samples collected from different regions of Türkiye were investigated in our study. Most of the investigated samples were available as outputs of a previously completed study (Özçelik *et al,* 2009). Most of these samples are grown and exhibited in the Suleyman Demirel Botanical Garden as living materials (in Isparta). In addition to the herbarium specimens collected in field studies, the herbarium specimens were also prepared from living samples in the Botanical Garden. During our study, photographs of living samples were also taken and observed over the years. These observations were important in revealing reliable and variable characters in systematic. In addition, some European states, Türkiye and neighboring countries were toured and observations were made in their gardens and production fields by us.

Plant terminology works (Baytop, 1998; J.G. Harris & M.W. Harris, 2006) were used during the examination of the taxonomical characteristics. In nomenclature and classifications, works (Komarov *et al*, 1971; Baytop, 2001; Roberts *et al*, 2003; Özçelik, 2010) related to the subject were used. A stereo microscope, precision ruler, and digital caliper were used in the examinations. Samples of *R. damascena* were diagnosed according to the current systematic literature and the cultural varieties they belong to were determined and described.

Since the description of species *R. damascena* is very complex and contradictory, the samples containing the whole species were grouped by us, regardless of the old descriptions and nomenclatures. These groups were defined according to modern systematic rules, and the diagnostic keys and diagnostic characters of the taxa were compared.

Detailed field records and Turkish local names of the samples have been given in Appendix 1.
The explanations of the abbreviations used in the article are as follows. N: North, E: East, A: Altitude, m: Meter/meters, L: Living samples, H: Herbarium specimen, P: Photograph in Appendix 1; Fl.: Flowering time (as Month), Hb.: Herbarium, GUL: Herbarium GUL (in Isparta, Süleyman Demirel University), Herbarium VANF (in Van Yüzüncü Yıl University), Herbarium ANK (in Ankara University).

RESULTS

Totally 164 samples belonging to *R. damascena* were examined. According to the findings, *R. damascena* was a complex consisting of different taxa. These taxa were named by us for the first time as different species: *R. damascena, R. stipulata,* and *R. comantema*. Such a distinction and classification were not made before. According to the current study, the taxonomic characters of the Turkish oil roses in the *R. damascena* complex were given in Appendix 2 comparatively.

New species from *R. damascena* complex, their identification key and taxonomic treatment:

1. Hypanthium wide at the base, glabrous appearly at least in the upper half; receptaculum densely woolly hairy; stipules broaded; prickles distinctly falcate ……. **2. *R. stipulata***
1. Hypanthium narrowed at the base, completely covered with glandular hairs or rarely glabrous; receptaculum not densely woolly hairy; stipules usually narrow; prickles straight or slightly curved back
2. Hypanthium elliptic like a weaving shuttle, not widened; leaves herbaceous, deciduous; flowering period short, petals pink, (1-)4-8 layered ……. **1. *R. damascena***
2. Hypanthium usually funnel-shaped, widened at the top, rarely semi-globular; leaves leathery, semi-deciduous or evergreen; flowering period long, petals in different colors and multi-layered ..... **3. *R. comantema***

Collection numbers of the collected samples, and the species they belong to according to the identification key were shown in Table 1.

Table 1: Species of Turkish oil roses according to the identification key and their collection numbers

Species	Collection numbers
R. damascena Miller	Özçelik 254, 254 (1593-B), 508, 513-B, 522, 533, 599, 600, 610, 630, 631, 635-A, 635-B, 636, 637, 640, 645, 691, 692, 697, 698, 1300, 1516-A, 1516-B, 1520-A, 1525-A, 1537, 1573, 1591-B, 1593, 1616-A, 1635-A, 1659, 1687, 1708, 1719-A, 1912-B, 1914, 1986, 1986?, 1999, 2016, 2026, 2029, 2031, 2043, 2044, 2079, 2080, 2082-A, 2082-B, 2083, 2087, 2088, 2111, 2214, 2270, 2277, 2287, 2291, 2326, 2328, 2359, 2360, 2361, 2362, 2363, 2365, 2398, 2452, 2482-B, 2493, 2508, 2509, 2534, 2541, 2542-B, 2553, 2589, 2590, 2700, 2852, 2853-B, 2856, 2867, 2877, 2891, 2893, 2894, 2895, 3303, 3536, 3613, 13292; Yıldırım 2, 4, 5, 6, 7, 8, 9, 12.
R. stipulata Özçelik & Yıldırım	Özçelik 507, 509, 511, 512, 513-A, 568 (12407), 590, 597, 601, 603, 622-B, 1208, 1209, 1226, 1227, 1228, 1232, 1233, 1382-A, 1398, 1407-B, 1525-B, 1616-B, 1716, 1719-B, 1798, 1901, 1903, 2131, 2157, 2161-B, 2172, 2182, 2185, 2191, 2237, 2315, 2400, 2403, 2593, 2692, 3014, 3038, 3085, 3519, 3535, 3581, 13182; Yıldırım 10, 11
R. comantema Özçelik & Yıldırım	Özçelik 1601, 1660, 1909, 2030, 2885, 2886, 2887, 3511, 3753, 14063; Yıldırım 1, 3

Species names, synonyms, diagnosis (for *R. stipulata* and *R. comantema*), descriptions, phenological features, geographical distributions, common names, and uses were given below. In addition, distribution maps of the species in Türkiye according to Davis' (1972) Grid System were also presented. A comprehensive literature review was made when determining synonyms of the species. Nomenclatural (homotypic) synonyms based on the same type specimen were shown with ≡ and taxonomic (heterotypic) synonyms were shown with =

Rosa damascena Miller in The Gardeners Dictionary, Sect. ROSA. sp. 15, Icon 206 (1768).
Synonyms. Synonyms of the *R. damascena* are given below.
=*R. damascena* J. Herrmann: Herrman, 1762, p. 14.
≡*R. damascena* Mill.: Komarov *et al*, 1971, p. 361, Hegetschweiler, 1840, p. 483, Craker & Simon, 1986, p. 44, Roberts *et al*, 2003, p. 114, Güner, Aslan, & Ekim, 2012, p. 810.
≡*R. damascena* Mill. var. *trigintipetala* Dieck: Roberts *et al*, 2003, p. 814. Özçelik *et al*, 2013, p. 54.
≡*R. damascena* f. *trigintipetala*: Komarov *et al*, 1971, p. 361
≡*R.* × *damascena* Mill.: Brumme & Gladis, 2013, p. 11.

≡*R.* × *damascena* Miller var. *trigintipetala* (Dieck) Keller: Baytop, 2001, pp. 81, 87.
≡*R.* × *damascena* Mill. var. *damascena* f. *damascena*: Brumme & Gladis, 2013, p. 11.
≡*R.* × *damascena* Mill. var. *damascena* f. *trigintipetala* (Dieck) R. Keller ex Asch. et Graebn.: Brumme & Gladis, 2013, p. 11.
≡*R. gallica* L. var. *damascena* Mill.: Siebert & Voss, 1896, p. 254.
≡*R. gallica* L. var. *damascena* (Mill.) Voss: Brumme & Gladis, 2013, p. 11.
≡*R. gallica* var. *damascena* Voss: Roberts *et al*, 2003, pp. 114, 814, Baytop, 2001, p. 80.
≡*R. gallica* L. var. *damascena* Mill. f. *trigintipetala*: Dieck, 1889, p. 129.
≡*R. gallica* L. var. *damascena* (Mill.) Voss f. *trigintipetala* Dieck: Brumme & Gladis, 2013, p. 11.
≡*R. belgica* Mill.: Roberts *et al*, 2003, p. 814, Brumme & Gladis, 2013, p. 11.
≡*R. bifera* Pers.: Siebert & Voss, 1896, p. 254, Hegi, 1923, p. 993.
≡*R. bifera* Poir.: Brumme & Gladis, 2013, p. 11.
≡*R. calendarum* Borkh.: Hegetschweiler, 1840, p. 483, Siebert & Voss, 1896, p. 254, Hegi, 1923, p. 993, Brumme & Gladis, 2013, p. 11.
≡*R. centifolia bifera* Poir.: Hegetschweiler, 1840, p. 483, Siebert & Voss, 1896, p. 254.
≡*R. centifolia bifera* Poiret: Hegi, 1923, p. 993.
≡*R. hybrida bifera* hort.: Siebert & Voss, 1896, p. 254.
≡*R. multiflora* vel *polyanthos* Roess. non Thunb.: Brumme & Gladis, 2013, p. 11.
≡*R. polyanthos* Roess.: Roberts *et al*, 2003, p. 814.
≡*R. semperflorens* Desf.: Hegetschweiler, 1840, p. 483, Siebert & Voss, 1896, p. 254.
Type. Türkiye: Aydın: Koçarlı, Çakırbeyli village, house garden (N: 3745477, E: 02749761, A: 65-70 m), 25.11.2006, Özçelik 635-B (Lectotype in Hb. GUL!, VANF!, ANK!, Figure 1).

Figure 1A: A view of *R. damascena* (Lectotype specimen, Özçelik 635-B)

Figure 1B: Lectotype specimen of *R. damascena* (Özçelik 635-B)

Current description. Thick and sparse rhizomed, weak spreading with rhizomes. Thorny shrubs up to 200(-250) cm, Stems up to 20(-30) mm diameter, pale green or greyish. Generally densely or rarely loosely branching. There are prickles and bristles on the stem. Prickles 8-13 mm, ± straight or slightly curved back. Bristles up to 3(-4) mm, straight, deciduous as the stem aged. Stipules usually narrow, thin and long, generally shorter than mid of the petiole. Leaves deciduous in general. Mature leaves 50-150(-185) × 40-110(-130) mm. Petioles (6-)15-45(-55) mm, glandular hairy. Leaflets herbaceous, deciduous, (3-)5-7 for per leaf, green. Terminal leaflets (16-)20-50(-70) × 13-40(-55) mm, oval, rounded or slightly ovate, acuminate or not at the apex, main vein eglandular or sometimes glandular beneath; terminal petiolule 5-25(-45) mm. Inflorescence pseudocorymbuse, rarely a few or single flowered. Flowers usually clustered; pink or light pink and strongly fragrant; (1-)4-8 layered; (30-)40-70(-80) mm diameter. Pedicels 15-50(-65) × 0.6-1.5(-2) mm; covered with glandular hairs and glandular bristles, rarely eglandular; glandular hairs evident, 0.3-0.5 mm; glandular bristles (0.2-)0.4-1.6 mm. Hypanthium 4-10(-13) × 3-6(-9) mm, elliptic shaped like a weaving shuttle, narrower at the lower end, covered with glandular hairs and sparse bristle. Receptacle narrowed; the upper parts not hairy and not change the shape in fruit. Sepals 10-30(-45) mm; generally partite and two types; not enlarged at the base; inner surface lanate, outer surface covered with glandular hairs. Petals pink or light pink; lined up in (1-)4-8 layers. Stamens long, numerous and spirally arranged. Pistils numerous. Styles short white haired or not, sometimes united as a column and slightly elongated. Stigma glabrous and slightly wide. It usually does not form fruit or very few. Fruits tile red; 7-25 × 7-16 mm. No seeds in fruit or several, generally sterile. Fl. (4-)6(-7).

Geographical distribution. Türkiye, Bulgaria, Greece, N. Cyprus, Algeria, Tunisia, Morocco, Iran, Syria and Iraq?

R. damascena in Türkiye is not very common in East, Southeast and North Anatolia. Provinces where samples were collected: **A2**: Bursa, **A5**: Amasya, **A6**: Amasya/Samsun, **B1**: İzmir/ Balıkesir, **B3**: Afyonkarahisar/Isparta, **B4**: Konya, **B6**: Sivas, **C1**: Aydın, **C2**: Aydın/ Muğla/Burdur, **C3**: Antalya/Burdur/Isparta, **C4**: Karaman, **C6**: Hatay/Gaziantep, **C9**: Şırnak (Figure 2).

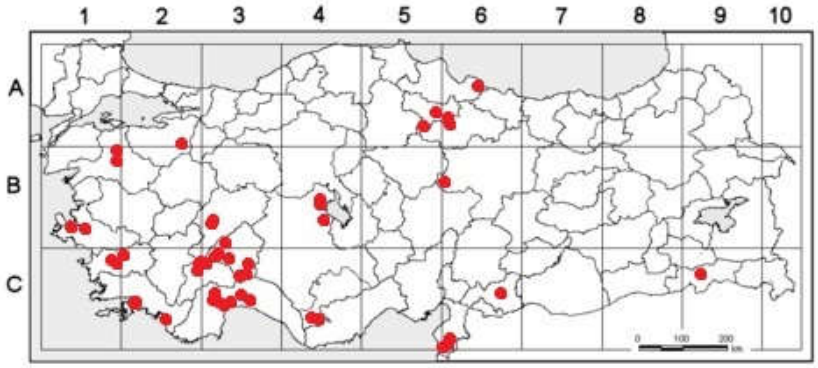

Figure 2: Geographical distribution in Türkiye of *R. damascena*

Phenology. Flowering from April end to June or beginning July. Fruiting in July-August. In its some culture forms, flowers fall off, fruit does not form. Seeds are usually sterile.

Common names and uses. Common names of the species are as follows: Yağ gülü, Isparta gülü, Kazanlık gülü, Pembe gül, Hasgül. This species is an oil rose. It is predominantly grown to obtain essential oil, water, and jam of rose. There are many cultural forms produced for industrial purposes. It is mostly cultivated in Lakes Region.

Additional samples examined. See Appendix 1 for the examined samples list.

Rosa stipulata Özçelik & Yıldırım, sp. nov.
Synonyms. Synonyms of the *R. stipulata* are given below.
≡*Rosa semperflorens* (Loisel. et Michel) Özçelik & Yıldırım: Yıldırım, 2016, p. 137.
≡*R. damascena* Mill. var. *semperflorens* (Loisel. & Michel) Rowley: Craker & Simon, 1986, p. 44, Özçelik *et al*, 2013, p. 54, Brumme & Gladis, 2013, p. 11.
≡*R.* × *damascena* var. *semperflorens* (Loisel. & Michel) Rowley: Baytop, 2001, p. 82.
≡*R.* × *damascena* var. *semperflorens*: Roberts *et al*, 2003, p. 396.
≡*R.* × *damascena* var. *bifera*: Roberts *et al*, 2003, p. 396.
≡*R. bifera* (Poiret) Persoon: Baytop, 2001, p. 82.
≡*R. bifera* Pers: Craker & Simon, 1986, p. 44.
Type. Türkiye: Erzincan-Gümüşhane road, from Ahmediye Pass, ~5 km to Kelkit, Yeniyol village, garden side (N: 3954580, E: 03924375, A: 1830 m), 07.08.2007, Özçelik, 2182 (Holotype: **GUL**!, Isotypes: VANF!, ANK!, GUL!, Figure 3).

Figure 3A: A view of *R. stipulata* (Holotype specimen, Özçelik 2182)

Figure 3B: Holotype specimen of *R. stipulata* (Özçelik 2182)

Diagnosis. Affinis sed *R. damascena*; receptaculum ampliatus, basi lanatis morem pellis hispidus: stipulis broaded; calycis glabri semper superiori parte; aculeis distincte falcatis differt.

Description. Rhizomes thin and numerous, strongly spreads at the underground, close to the soil surface. Up to 150(-200) cm tall, densely thorny bushes. Stems up to (8-)10 mm diameter, generally purplish. Densely or loosely branching. New shoots red, purple in color, at the tip pink. There are prickles and bristles on

the stems. Prickles 8-10 mm, dense and distinctly falcate towards to the tip. Bristles dense on young shoots (rarely glabrous) and lower parts of the stem, up to 2-3(-5) mm, deciduous as the stem aged. The upper parts of the young stems is not spine. Stipules wide, generally longer than mid of petiole. Leaves deciduous. Petioles (7-)13-46 mm, rarely longer, glandular hairy/bristled. Mature leaves 45-130(-150) × 32-112 mm. Leaflets herbaceous, deciduous, (3-)5(-7) for per leaf, wrinkled surface, veins evident, dark green. Terminal leaflet (10-)20-55(-65) × 12-45 mm, generally oval; cuneat or obtus, rarely slightly cordate at the base; terminal petiolule 4-21 mm. Inflorescence usually single, rarely 2-3 flowered. The flowers are generally individual and thinned pedicel; dark pink, sometimes pale purplish, strongly fragrant; 5-8 layered; 40-70(-80) mm diameter. Pedicels 12-40(-47) × 0.5-1.5 mm, rarely up to 100 mm length; glandular or not; 0.4-1.4(-1.6) mm length bristles and 0.2-0.3 mm length hairs exist on the surface. Hypanthium 4-8 × 3-9 mm, semi-globular, rounded at the base but flat at the apex, covered with glandular hairs and bristles up to half or less, the upper part glabrous. Receptacle wide, the upper parts distinctly woolly hairy; not change the shape in fruit. Sepals 10-25(-30) mm; entire or nearly entire; wide at the base; inner surface covered with lanate hairs, outer surface covered with glandular hairs. Petals dark pink, sometimes pale purplish; lined up in 5-8 layers. Stamens numerous and spirally arranged; anthers basifix. Pistils numerous. Styles dense white pilose hairy. Stigma glabrous and wide. Usually forms very few fruits. Fruits tile red; 7-14 × 7-15 mm. Seeds in fruit absent or several, partially sterile. Fl. (4-)6(-7).

Geographical distribution. Türkiye, Syria, Iran, Iraq, Tunisia, Morocco, Algeria, Georgia, Arabia, N. Cyprus, Bulgaria, Greece, France, Bosnia and Herzegovina, Montenegro, Serbia and North Macedonia.

R. stipulata can be seen in every part of Türkiye. Provinces where samples were collected: **A5**: Amasya, **A6**: Tokat/Sivas, **A7**: Gümüşhane, **A8**: Rize/Artvin, **B1**: Aydın/İzmir, **B3**: Isparta/ Afyonkarahisar/Eskişehir, **B4**: Ankara/Konya/ Aksaray, **B6**: Sivas/Malatya, **B8**: Erzincan, **B9**: Erzurum/Muş/Van, **C2**: Denizli, **C3**: Antalya/ Isparta, **C4**: Konya/Karaman, **C9**: Van/Hakkari (Figure 4).

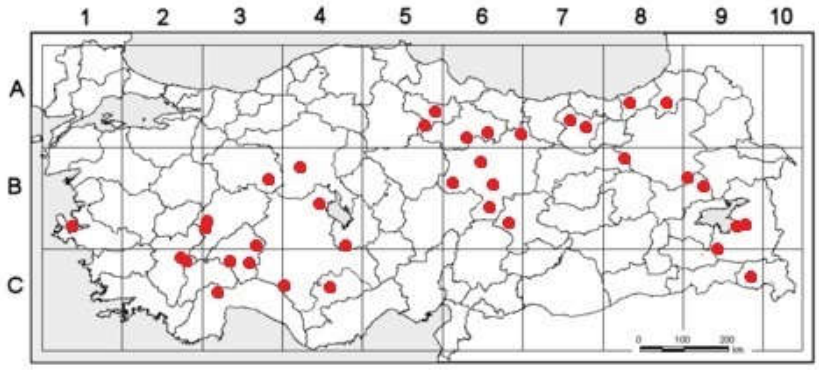

Figure 4: Geographical distribution in Türkiye of *R. stipulata*

Phenology. Flowering from April end to June or beginning of July. Fruiting in August.

Common names and uses. Common names of the species are as follows: Peygamber kokusu, Güla Muhammedi, Damask gülü, Şam gülü, Şimşiri gül, Ömer Hayyam Gülü. This species is partly landscape and partly oil rose. Rather, one or several are produced in home gardens for domestic needs. In the past, some cultivars were produced in the Lakes Region for industrial purposes and then abandoned.

Etymology. The epithet is preferred because of the prominence of stipules. The stipules of this species are wider than the other species.

Additional samples examined. See Appendix 1 for the examined samples list.

Rosa comantema Özçelik & Yıldırım, sp. nov.
Synonyms. Synonyms of the *R. comantema* are given below.
≡*Rosa versicolor* (West.) Özçelik & Yıldırım: Yıldırım, 2016, p. 158.
≡*R. damascena* Mill. var. *versicolor* West.: Roberts *et al*, 2003, p. 814, Özçelik *et al*, 2013, p. 54.
≡*R. damascena* var. *versicolor* Weston: Baytop, 2001, p. 81.
≡*R.* × *damascena* 'Versicolor': Baytop, 2001, p. 81.
≡*R. damascena variegata* Thory.: Roberts *et al*, 2003, p. 814.
≡*R.* × *damascena* Mill. var. *damascena* f. *versicolor* (West.) Brumme et Gladis: Brumme & Gladis, 2013, p. 11.
Type. Türkiye. Muğla: Köyceğiz, gardens of Metin Batur's historic mansions (N: 3659340, E: 02839525, A: 37 m), 10.02.2007, Özçelik 1601 (Holotype: **GUL**!, Isotypes: VANF!, ANK!, GUL!, Figure 5).

.

Figure 5A: A view of *R. comantema* (Holotype specimen, Özçelik 1601)

Figure 5B: Holotype specimen of *R. comantema* (Özçelik 1601)

Diagnosis. Affinis sed *R. damascena*, calycis infundibulum informibus solet raro semi-globosa; semi-folia decidua tempore florendi tempore petalis diversorum colorum Nunc multi; Basi lanatis et non widen Receptaculum pilosum; Adspectum graciliorem stipulas maioribus differt.

But closely allied to R. damascena, the calyx is usually funnel-shaped, rarely semi-globose; semi-deciduous leaves during the flowering season; petals of different colors, multi-layered; Hairy wooly base and does not widen; The page stub is different for larger.

Description. Generally without rhizome. Shrubs, up to 100(-250) cm. Stems up to (8-)10 mm diameter, pale green or greyish. Loosely branching. There are prickles and bristles on the stems, prickles dominate to bristles. Prickles big-strong, almost thin on young shoots, loosely in general, 3-8(-10) mm, ± straight or slightly curved back towards to the tip. Bristles small-weak, 2(-3) mm. Stipules narrow, rarely wide, generally longer than mid of the petiole. Leaves semi-deciduous or evergreen. Mature leaves (50-)75-145(-160) × (40-)50-115 mm. Petioles (15-)20-40(-50) mm, rarely longer, glandular hairy. The leaves are usually leathery and do not fall in winter, with (3-)5-7(-9) leaflets, green. Terminal leaflets 20-55(-65) × 15-46 mm, generally oval or elliptic-oval, sometimes ovate; main vein glandular or rarely eglandular beneath; terminal petiolule 5-15(-22) mm. Inflorescence corymbuse, rarely single flowered, flowers 30-70(-80) mm diameter, with variable colors and weak fragrant. Pedicels thickened towards the tip, (8-)13-45(-100) × 1-2(-2.6) mm, bristles and glandular hairs or not exist on the surface; bristles 0.3-1.5 mm, glandular hairs 0.2-0.5(-0.7) mm. Hypanthium (3.8-)5-12(-15) × (3.6-)6-12(-20) mm, usually funnel-shaped or rarely semi-globular, gradually narrows to the base or round at the base, glabrous or covered with glandular hairs. Receptacle wide, the upper part hairless and not change the shape in fruit. Sepals (9-)15-30(-35) mm, widened at the base; inner surface covered with lanate and outer surface glandular hairs. Petals color variable, showy, generally pink, sometimes red or white, usually lined up multilayers or rarely 2-3 layered. Stamen and pistil numerous. Styles white hairy, stigma glabrous and slightly wide. Usually forms very few fruits. Fruits tile red, 10-15 × 7-15(-20) mm. Seeds absent or several, generally sterile. Fl. 4-9(-11).

Geographical distribution. Türkiye, Bulgaria, Greece, N. Cyprus, Tunisia, Morocco, Algeria, Iran.

R. comantema is seen in Lakes Region, Aegean, South West Anatolia and Thrace in Türkiye. Provinces where samples were collected: **A1**: Edirne, **B1:** /İzmir, **C2**: Muğla/Aydın, **C3**: Antalya/Burdur/Isparta, **C4**: Konya (Figure 6).

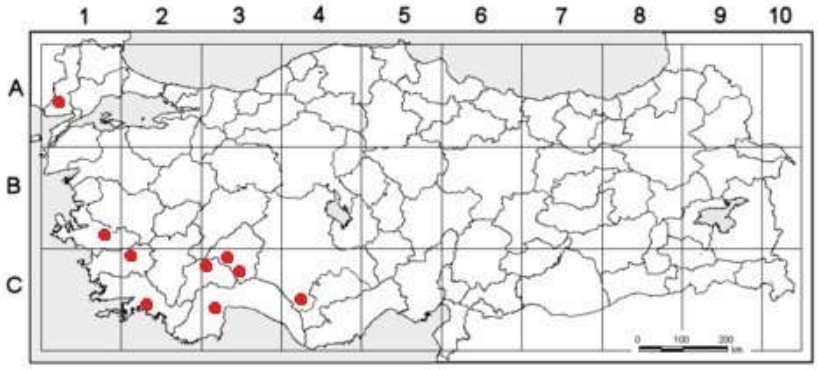

Figure 6: Geographical distribution of *R. comantema* in Türkiye

Phenology. Flowering from April to November, fruiting from June to November.

Common names and uses. Common names of the species are as follows: Yediveren, Onbiray gülü, Ateş gülü, Paşagülü. *R. comantema* is grown for landscape, domestic food and cosmetic needs.

Etymology. The epithet is preferred due to the long flowering period of the species. Other species have a shorter flowering period.

Additional samples examined. See Appendix 1 for the examined samples list.

DISCUSSION

Species in the *R. damascena* complex are not wild. These species are produced for different purposes and local names are given according to the purpose of use. There are many cultural varieties of these species and these varieties are confused with each other. Our work continues to solve this problem.

The author of the *R. damascena* was written as 'Mill.' in some studies (Komarov *et al*, 1971; Craker & Simon, 1986; Roberts *et al*, 2003; Baydar NG, Baydar H & Debener, 2004; Kazaz, Erbaş & Baydar, 2009; Rusanov, Kovacheva & Stefanova, 2009; Shawl & Adams, 2009; Kovacheva, Rusanov & Atanassov, 2010; Özçelik, 2010; Timor, 2011; Perumal, Sambanda Moorthy & Savitha, 2012; Tucker, 2012; Özçelik *et al*, 2013). Its author was also written as 'Miller' in various works (Hegi, 1923; Nilsson, 1972; Baytop, 1990, 2001; E. Basim & H. Basim, 2003; Başer, Kürkçüoğlu & Özek, 2003; Kurhade, Vite & Nanguda, 2011). There is not an author name after the name of *R. damascena* in the Miller (1768). This publication (Miller, 1768) is the original species publication; a very old. The writing of the author's name was forgotten under the conditions of that day or the writing of a name was ignored because the rules of the systematic were in the process of being created. The correct name of the species author is Miller. Abbreviations of author names can be made by only the author according to systematic rules. Other researchers may not shorten the name of a genre author. Therefore, 'Mill.' abbreviation is unacceptable and the correct spelling for the species should be *R. damascena* Miller.

Our study lasted for years, continued on living samples in SDU Botanical Garden and on herbarium specimens in the GUL Herbarium (Isparta). In SDU Botanical Garden, almost 350 genotypes of genus *Rosa* collected from all regions of Türkiye are grown and on display. There are approximately 4000 *Rosa* specimens in the Hb. GUL from all of Türkiye. As such, it is perhaps the richest herbarium in the world for the genus *Rosa*. 164 of these collections belong to an ancient garden rose species that has been called *R. damascena* in this day.

R. damascena complex has a distinct intraspecific diversity, showing some morphological differences. Baytop (2001) partially drew attention to the differences in *R. damascena* and divided it into three varieties (*R. damascena* var. *trigintipetala, R. damascena* var. *semperflorens* and *R. damascena* var. *versicolor*). However, there is no identification key and diagnosis in his book.

There was no correct and valid description and particularly an address of type specimen for *R. damascena* complex. Its original description covers the diagnostic characteristics of the three species described here. Therefore, the species description has been updated. Its type specimen is missing, so a lectotype was created. In the current study, varieties were upgraded to the species category, identification key and diagnosis of the species were prepared for the first time.

The name *R. damascena* was preserved because it is the oldest and valid name. Var. *trigintipetala* has remained as *R. damascena* in accordance with the rules of nomenclature. Other populations were renamed as two new species: *R. stipulata* and *R. comantema*

In this paper, a taxonomic study has been conducted on *R. damascena* complex and as a result of the study, this species has been divided into three species. 12 of collected samples were identified as *R. comantema*, 50 as *R. stipulata,* and 102 as *R. damascena*.

The varieties belonging to *R. damascena* (var. *trigintipetala,* var. *semperflorens,* and var. *versicolor*) have been increased to the species category in the paper. There are significant taxonomic differences among these three species. There are even some diagnostic differences among the samples of each species (cultivars). Our studies on cultivars of these species have been continuing.

R. damascena is a rose species of hybrid origin. Although there are different *Rosa* taxa that are considered as oil roses, the first rose that comes to mind is *R. damascena*. According to the available literature, there are several varieties of *R. damascena*, but information about the taxonomic status of both *R. damascena* and its varieties is contradictory. The original publication of *R. damascena* is very old. There is no type specimen, a serious description, and diagnostic characters in the original publication (Miller, 1768). Thus, the description of the species was also quite incomplete and contradictory. For this reason, a Lectotype was created for *R. damascena* from our samples and the current description was prepared.

Miller (1768)'s original description of *R. damascena* includes the three species (*R. damascena, R. stipulata,* and *R. comantema*) in this paper. For this reason, the original description of *R. damascena* is not correct and can not be used in the systematic. Although the original publication of *R. damascena* is a new species publication, it is introduced in the related work for gardening and landscaping purposes. This work has been taken as a basis by agriculturalists and landscapers, and the agricultural features of the species have always come to the fore (Baytop, 2001; Roberts *et al*, 2003; Özçelik *et al*, 2013).

The original species description and diagnose for *R. damascena* are given in Miller (1768, p.987-988) as follows:

Diagnose of *R. damascena:* 'Caule aculeato, pedunculis hispidis, calycibus pinnatifidis hirsutis. Rose with a prickly stalk, bristly foot-stalks to the flowers and wing-pointed hairy empalements. *R. damascena.* Lob. Icon 206. Damask rose'.

Description: 'This rose with prickly stalks eight or ten feet high; covered with a greenish bark and armed with short spines. The leaves are composed of two pair of oval lobes, terminated by an odd one; they are of a dark green on their upper side, but pale on their under; the borders frequently turn brown, and are slightly sawed; the foot-stalks of the flowers are set with prickly hairs; the empalement of the flower is wing-pointed and hairy: the flowers are of a soft pale red, and not very double, but have an agreeable odour; the Heps are long and smooth.'

'The monthly rose, the striped monthly rose, the York and Lancaster rose and Mrs. Hart's rose: These are all supported to be varieties of the Damask rose. The white Monthly, the white Damask: are varieties of the Damask rose'.

This information is for agricultural purposes or genus *Rosa* characteristics. Not for diagnostic of *R. damascena* species. Even in the original publication, varieties that is, the variation of the species, and the economic importance of these differences are mentioned. The garden sample of Miller (1768) carries species more than one. Because not all of these characters are not found in one species. Characters of all three species mentioned in this article are included. Today the species is known as oil rose, Damask rose, and *R. damascena*. However, the description does not exactly fit to *R. damascena. R. damascena* has not been seen in Syria by us. The samples called Damascus Roses in Damascus and Palmyra belong to *R. stipulata*.

According to our observations, leaves are semi-deciduous in *R. comantema;* petals are numerous in flowers of each of three species, pink (light pink, dark pink) or sometimes pale purplish. Petal colors in *R. comantema* variable. Their hypanthium characters are important in diagnoses. Hypanthium is elliptic like a weaving shuttle (but narrower at the lower end) in *R. damascena*; semi-globular (not narrowed at the base and flat at the apex) in *R. stipulata*; generally, funnel-shaped or rarely semi-globular in *R. comantema*.

In Baytop (2001), it was written that flowers are 60-70 mm in diameter, semi-doubled; the petals pink or red; the styles come out of hypanthium and free; its fruit spheroidal. According to our study, the flowers are (30-)40-70(-80) mm in diameter, (1-)4-8 layered; the petals pink, but not red; the styles come out of hypanthium but united or free; the fruits elliptic, but not spheroidal. The reason for these different findings is high number of samples from different countries and species. We examined is due to the fact that they come from different regions of the country. Our observations on living samples in the field for years and the species distinction can be clearly defined. Baytop (2001) conducted research in only one region (the Thrace region). However, it is very meaningful in terms of emphasizing that Miller's (1768) description of the species is insufficient and wrong.

In Roberts *et al* (2003), the following information was given about *R. damascena:* 'Shrubs to 2 m; stems usually with numerous stout hooked prickles, sometimes mixed with glandular bristles; leaflets usually 5, rarely 7, ovate to ovate-oblong, 2-6 cm long, simply serrate,

glabrous above, more or less pubescent beneath; petioles prickly; stipules sometimes pectinate; flowers blush to red, double, in corymbuses, on slender glandular-hispid and prickly pedicels; sepals reflexed during anthesis, deciduous, glandular-hispid on back like receptacle; fruits obovoid, 2.5 cm long, bristly, red.' According to our study, plant up to 2(-2.5) m; stems with prickles and bristles; leaflets (3-)5-7; flowers dark or light pink; the fruits 0.7-2.5 cm long, bristly, tile red. The other characteristics are compatible with Roberts *et al* (2003).

It was stated that pedicels of *R. damascena* cultured in Türkiye and Bulgaria are glabrous (Baytop, 2001). It is very different from the original description of *R. damascena* with this characteristic. Rose gardens have been visited in Türkiye, Bulgaria, Iran, and France during our studies, but flowers with glabrous pedicels of the species have not been seen. The sample studied by Miller (1768) should probably belong to *R. comantema.* It is distinguished as a new species in the paper. It was written that flowers of *R.* × *damascena* 'Versicolor' (*R. damascena* var. *versicolor*) are multilayered, petals partially pale pink and partially dark pink (Baytop, 2001). In Roberts *et al* (2003), *R. damascena* 'Versicolor' was mentioned with the following information. 'Flowers semidouble, white and striped and blotched pink, or some flowers white and some pink'. According to our studies, flowers of *R. comantema* are multi-layered but petals are dark or light pink, striped white or variable.

It was stated that the flowers of *R. damascena* 'Trigintipetala' are semidouble and red (Roberts *et al*, 2003). In our study, it has been observed that *R. damascena* has pink or light pink flowers.

It was written that dense and strong prickly shrub, up to 100 cm, flowers multi-layered, petals pink (the middle part is darker), blooms from June to Autumn about *R.* × *damascena* var. *semperflorens* (Baytop, 2001). These properties are similar to our findings in *R. stipulata.* However, unlike the literature. It has been observed that the plant is up to 200 cm in height, petals sometimes purplish.

R. damascena is an industrial purposing plant species is cultivated widely in order to obtain rose oil and rose water in Bulgaria, Türkiye, and Iran. Production of rose essential oil in these countries is based on very old times but no study on the systematic of it and other oil roses has been found. However, it has been learnt that four cultural varieties belonging to *R. damascena* were registered under the names 'Svezhen, Iskra, Elejna, and Janina' in Research Institute for Roses Aromatic and Medicinal Plants in Bulgaria. It is not known which corresponded to which kind of cultivars in Türkiye. Because it is not done cultured as the rose kind in the country. In Türkiye, its cultivars and their numbers are not known in today. This work should be done in a short time and the cultivars with economic value should be registered and commercialized. In the coming period, cultivars of these species must be name, descriptions and identification keys will be made.

As a taxonomic term, variety was defined as the differences in a natural plant species changed by an accidental cause due to the climate, soil, heat, winds, etc. by Linnaeus (Clausen, 1941). Variety was defined as 'It is a unit formed as a result of genetic or non-genetic differences within the same region. In the formation of these differences, conditions such as habitat and climate play a role' in Seçmen, Gemici, & Görk (2004), similar to Linnaeus' description.

In conclusion, differences between the samples of *R. damascena* can not be explained by variety taxonomically. Moreover, live plant samples in the collection were seen to retain their differences even though they were grown in the same ecological conditions. These important differences among the samples suggest that there is speciation. It is thought that taxa, which are expressed as a variety, form or cultivar are different species that differ significantly from each other.

For this reason, the *R. damascena* complex, which has been expressed as a species till today, has been divided into three species by us and rearranged as follows:

Rosa damascena Miller
Rosa stipulata Özçelik & Yıldırım, sp. nov.
Rosa comantema Özçelik & Yıldırım, sp. nov.

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Appendix 1. Field records of oil roses samples in *R. damascena* complex

Line no.	Collection no.	Collection date	Locality	Coordinate and altitude	Local name	Material
1	Özçelik 254	2006	Isparta: House garden	N: 3745 E: 3030 A: 1150 m		L, H, P
2	Özçelik 254 (1593-B)	2006	Isparta: House garden	N: 3745 E: 3030 A: 1150 m		L, H, P
3	Özçelik 508	05.04.2006	Amasya-Turhal road, ±25 km to Turhal, petrol(oil) station garden	N: 4027180 E: 03606375 A: 531 m		H
4	Özçelik 513-B	05.04.2006	Sivas: Gemerek, Sızır town, fruit garden	N: 3918885 E: 03557550 A.: 1382 m	Peygamber kokusu	L, H, P
5	Özçelik 522	24.04.2006	Antalya: Serik, Gebiz town, İsa Kutlu's house garden	N: 3717134 E: 03100313 A: 500 m	Gül	L, H, P
6	Özçelik 533	27.06.2006	Gaziantep: Gaziantep University, Faculty of Science and Art, garden of biology department	N: 03721212 E: 3700870 A: 530 m		L, H, P
7	Özçelik 599	10.10.2006	Amasya: Ezinepazar town, roadside, mosque garden	N: 4034224 E: 03605790 A: 690 m	Gül, Reçel gülü	L, H, P
8	Özçelik 600	10.10.2006	Amasya: Ezinepazar town, roadside, mosque garden	N: 4034224 E: 03605790 A: 690 m		H
9	Özçelik 610	10.10.2006	Amasya: Göynücek, Karayakup village, Ahmet Günlükçü's house garden	N: 4023 E: 3825 A: 700 m		L, H, P
10	Özçelik 630	04.11.2006	Burdur: Karakent village, garden of Hüseyin Koca's house garden	N: 3743162 E: 02959937 A: 950 m	Yağ gülü	L, H, P
11	Özçelik 631	04.11.2006	Burdur: Başmakçı village, house garden	N: 3746319 E: 03000889 A: 1425 m		L, H, P
12	Özçelik 635-A	25.11.2006	Aydın: Koçarlı, Çakırbeyli village, house garden	N: 3745477 E: 02749761 A: 65-70 m	Hasgül	L, H, P
13	Özçelik 635-B	25.11.2006	Aydın: Koçarlı, Çakırbeyli village, house garden	N: 3745477 E: 02749761 A: 65-70 m	Hasgül	L, H, P
14	Özçelik 636	25.11.2006	Aydın: Koçarlı, Çakırbeyli village, field side	N: 3745477 E: 02749761 A: 65-70 m		L, H, P
15	Özçelik 637	25.11.2006	Aydın: Koçarlı, Çakırbeyli village, across the cemetery	N: 3745477 E: 02749761 A: 65-70 m		L, H, P
16	Özçelik 640	25.11.2006	Aydın: Koçarlı, Çakmar village, Şerif Duman's house garden	N: 3745477 E: 02749761 A: 35 m	Isparta gülü, Peygamber gülü, Hasgül	L, H, P

17	Özçelik 645	26.11.2006	Aydın: Köşk, garden of Seyit Arslan's house	N: 3751083 E: 02757991 A: 64 m		L, H, P
18	Özçelik 691	23.10.2006	Muğla: Gökova Forest Nursery	N: 3700 E: 2830 A: 85 m		L, H, P
19	Özçelik 692	23.10.2006	Muğla: Gökova Forest Nursery	N: 3700 E: 2830 A: 85 m		L, H, P
20	Özçelik 697	23.10.2006	Muğla: Gökova Forest Nursery	N: 3700 E: 2830 A: 85 m		L, H, P
21	Özçelik 698	23.10.2006	Muğla: Gökova Forest Nursery	N: 3700 E: 2830 A: 85 m		L, H, P
22	Özçelik 1300	14.12.2006	Şırnak: around Kaymakam çeşmesi	N: 3731 E: 4227 A: 1390 m	Şilan	L, H, P
23	Özçelik 1516-A	25.01.2007	İzmir: Urla, Özbek village, house garden	N: 3821954 E: 02641688 A: 9 m		H
24	Özçelik 1516-B	25.01.2007	İzmir: Urla, Özbek village, house garden	N: 3821954 E: 02641688 A: 9 m		L, H, P
25	Özçelik 1520-A	25.01.2007	İzmir: Urla, Özbek village, house garden	N: 3821954 E: 02641688 A: 9 m	Onbiray gülü	L, H, P
26	Özçelik 1525-A	27 01.2007	İzmir: Urla, Özbek village, house garden	N: 3821954 E: 02641688 A: 100 m		H
27	Özçelik 1537	26 01.2007	İzmir: Eskiizmir, house garden	N: 3922251 E: 02706189 A: 120 m	Muhammediye gülü	L, H, P
28	Özçelik 1573	12.02.2007	Muğla: around exit of Ula district	N: 3706575 E: 28888660 A: 572 m		H
29	Özçelik 1591-B	11.02.2007	Muğla: Ula, Gökçe village, house garden	N: 3700937 E: 0282938 A: 10 m		L, H, P
30	Özçelik 1593	11.02.2007	Muğla: Ula, Gökçe village, house garden	N: 3700937 E: 0282938 A: 10 m		L, H, P
31	Özçelik 1616-A	07.02.2007	Antalya: Korkuteli, Bozova village, across the mosque, Agriculture Credit Cooperative garden	N: 3712 E: 3017 A: 900 m		L, H, P
32	Özçelik 1635-A	24.02.2007	Antalya: Varsak neighbourhood, house garden	N: 3653087 E: 03043324 A: 140 m		L, H, P
33	Özçelik 1659	26.02.2007	Antalya: Bahtılı village, Grade School garden	N: 3653087 E: 03043324 A: 40 m		L, H, P
34	Özçelik 1687	12.03.2007	Antalya: Korkuteli, Yazır village, petrol (oil)	N: 3653087 E: 03043324		L, H, P

			station garden	A: 40 m		
35	Özçelik 1708	12.03.2007	Antalya, Korkuteli, Yazır village, touristic facilities garden	N: 3701131 E: 03022269 A: 1020 m		L, H, P
36	Özçelik 1719-A	17.03.2007	Afyonkarahisar: Sandıklı, Karacaören village, house garden	N: 3827147 E: 03015821 A: 1115 m	Çalı gülü, Isparta gülü	L, H, P
37	Özçelik 1912-B	16.04.2007	Karaman: Ermenek, city center, cemetery	N: 3638254 E: 03254050 A: 1700 m		H
38	Özçelik-1914	16.04.2007	Karaman: Ermenek, Tepebaşı (Halimiye) village, house garden	N: 3640 E: 3243 A: 1100 m		L, H, P
39	Özçelik 1986	28.05.2007	Isparta: Sütçüler district, house garden	N: 3729 E: 3058 A: 1005 m	Isparta gülü, Gül	L, H, P
40	Özçelik 1986?	28.05.2007	Isparta: Sütçüler, house garden	N: 3729 E: 3058 A: 1005 m	Isparta gülü, Gül	L, H, P
41	Özçelik 1999	19.05.2007	Isparta: Keçiborlu, Kılıç village, house garden	N: 3756444 E: 03017750 A: 1010 m	Katmer gül, Yağ gülü	H
42	Özçelik 2016	22.05.2007	Antalya: Serik, Aşağı Belkıs village, house garden	N: 3654642 E: 03106847 A: 8 m		L, H, P
43	Özçelik 2026	26.05.2007	Isparta: Sütçüler, Şeyhler village	N: 3727 E: 3051 A: 410 m	Isparta gülü	L, H, P
44	Özçelik 2029	26.05.2007	Isparta: Sütçüler, Şeyhler village, house garden	N: 3727 E: 3051 A: 410 m		H
45	Özçelik 2031	26.05.2007	Isparta: Sütçüler, Şeyhler village, house garden	N: 3727 E: 3051 A: 410 m		H
46	Özçelik 2043	26.05.2007	Isparta: Sütçüler, city center	N: 3729 E: 3058 A: 1003 m		H
47	Özçelik 2044	16.06.2007	Isparta: Keçiborlu, around Kılıç village road junction, Petrol(oil) station	N: 3757285 E: 03019443 A: 1019 m		H
48	Özçelik 2079	25.06.2007	Burdur: Burdur-Yeşilova road, around Aşağı Müslümler village road junction, roadside	N: 3738907 E: 03004055 A: 860 m		H
49	Özçelik 2080	30.06.2007	Burdur: Kavacık village, rose garden	N: 3742917 E: 03000883 A: 1100 m	Isparta gülü, Yağ gülü	H
50	Özçelik 2082-A	30.06.2007	Burdur: Başmakçı village, rose fields	N: 3746319 E: 03000889 A: 1425 m	Isparta gülü, Yağ gülü, Yalınkat	H
51	Özçelik 2082-B	30.06.2007	Burdur: Başmakçı village, rose fields	N: 3746319 E: 03000889 A: 1425 m	Isparta gülü, Yağ gülü,	H

					Yalınkat	
52	Özçelik 2083	30.06.2007	Burdur: Başmakçı village, rose fields	N: 3746319 E: 03000889 A: 1425 m	Isparta gülü, Yağ gülü	H
53	Özçelik 2087	30.06.2007	Burdur: Başmakçı village, Grade School garden	N: 3746319 E: 03000889 A: 1425 m	Isparta gülü, Yağ gülü	H
54	Özçelik 2088	30.06.2007	Burdur: Başmakçı village, rose fields	N: 3746319 E: 03000889 A: 1425 m	Isparta gülü, Yağ gülü	H
55	Özçelik 2111	27.07.2007	Isparta: Isparta-Uluborlu road, ±7 km to Uluborlu district, rose fields	N: 3808 375 E: 03028099 A.:1154 m	Isparta gülü, Yağ gülü	H
56	Özçelik 2214	12.08.2007	Samsun: Terme, Yenidoğan neighbourhood, Kocaman village road, house garden	N: 4111694 E: 03658228 A: 20 m		H
57	Özçelik 2270	12.09.2007	Hatay: Antakya, purchased from tree nursery	N: 3613282 E: 03608725 A: 120 m		L, H, P
58	Özçelik 2277	13.09.2007	Hatay: Antakya, Akevler neighbourhood, Şükrü Balcı Street, house garden	N: 3613282 E: 03608725 A: 120 m		L, H, P
59	Özçelik 2287	13.09.2007	Hatay: Samandağ-Yayladağı road, petrol(oil) station	E: 3501553 N: 03601502 A: 406 m		L, H, P
60	Özçelik 2291	13.09.2007	Hatay: Yayladağı, Karaköse village, house garden	E: 3501553 N: 03601502 A: 406 m	Turuncu gül	L, H, P
61	Özçelik 2326	16.09.2007	Balıkesir: Atatürk neighbourhood, Hayrettin Paşa Street, house garden	N: 3939582 E: 02753932 A: 180 m	Isparta gülü, Misk gülü	L, H, P
62	Özçelik 2328	16.09.2007	Balıkesir: Davutlar village, house garden	N: 3939582 E: 02753932 A: 180 m	Reçel gülü	L, H, P
63	Özçelik 2359	23.09.2007	Isparta: Keçiborlu district, Senir town cemetery	N: 3748834 E: 03017385 A: 866 m		H
64	Özçelik 2360	23.09.2007	Isparta: Keçiborlu district, Senir town cemetery	N: 3748834 E: 03017385 A: 866 m		H
65	Özçelik 2361	23.09.2007	Isparta: Keçiborlu district, Senir town cemetery	N: 3748834 E: 03017385 A: 866 m		H
66	Özçelik 2362	23.09.2007	Isparta: Keçiborlu district, Kılıç village, house garden	N: 3748834 E: 03017385 A: 866 m		H
67	Özçelik 2363	23.09.2007	Isparta: Keçiborlu district, Kılıç village, house garden	N: 3748834 E: 03017385 A: 866 m		H
68	Özçelik 2365	30.09.2007	Isparta: Işıkkent neighbourhood, behind	N: 3744450 E: 03029031		H

			of Grade School of Borsa, house garden	A: 1200 m		
69	Özçelik 2398	06.10.2007	Konya: Cihanbeyli district, house garden	N: 3857542 E: 03236677 A: 1136 m		L, H, P
70	Özçelik 2452	12.11.2007	Muğla: Fethiye, Kayaköy village, house garden	N: 3634745 E: 02905181 A: 123 m		L, H, P
71	Özçelik 2482-B	17.11.2007	Bursa: İnegöl, Turgutalp village, fruit garden	N: 4002601 E: 02922890 A:739 m		H
72	Özçelik 2493	22.11.2007	Isparta: Keçiborlu, Kılıç village, rose garden	N: 3756444 E: 03017750 A: 1010 m		H
73	Özçelik 2508	01.03.2008	Isparta: Sütçüler district, around the Vocational High School, house garden	N: 3729 E: 3058 A: 1003 m	Pembe gül	L, H, P
74	Özçelik 2509	01.03.2008	Isparta: Sütçüler, house garden	N: 3729 E: 3058 A: 1003 m	Reçel gülü, Pembe gül	L, H, P
75	Özçelik 2534	29.03.2008	Konya: Cihanbeyli, Karşıyaka neighbourhood, farm of Mesut Eren	N: 3857542 E: 03236677 A: 1136 m		L, H, P
76	Özçelik 2541	29.03.2008	Konya: Entrance to Konya by Cihanbeyli, flour factory garden	N: 4188613 E: 36 459600 A: 1023 m		L, H, P
77	Özçelik 2542-B	29.03.2008	Konya: Alpaslan neighbourhood, Uluırmak street, Elmacı cemetery	N: 3749872 E: 03230819 A: 1030 m		L, H, P
78	Özçelik 2553	Haziran 2008	Afyonkarahisar: Sinanpaşa, around Mahmari bridge, Petrol(oil) station garden	N: 3836890 E: 03016936 A: 1189 m		L, H, P
79	Özçelik 2589	31.05.2008	Isparta: Senir town, rose garden	N: 3756444 E: 03017750 A: 1010 m		H
80	Özçelik 2590	31.05.2008	Isparta: Keçiborlu, Kılıç town, around sand quarries, rose garden	N: 3756444 E: 03017750 A: 1010 m		H
81	Özçelik 2700	02.07.2008	Amasya: Around Hızırpaşa neighbourhood, foothills of Kırklar mountain	N: 4039613 E: 03548536 A: 400-500 m		H
82	Özçelik 2852	31.12.2008	Antalya: Korkuteli, Yazır vilage, 12 km to Korkuteli, house garden	N: 3701131 E: 03022269 A: 1020 m		L, H, P
83	Özçelik 2853-B	31.12.2008	Antalya: Korkuteli, Yazır village, house garden	N: 3701131 E: 03022269 A: 1020 m	İtgülü	H
84	Özçelik 2856	31.12.2008	Antalya: Korkuteli, Yeni neighbourhood, Antalya	N: 3703713 E: 03012666 A: 987 m		H

			street, around Yeşil mosque, house garden			
85	Özçelik 2867	08.01.2009	Isparta: Keçiborlu, Senir town, Sebat rose oil factory fields	N: 3757285 E: 03019443 A: 950 m		L, H, P
86	Özçelik 2877	19.01.2009	İzmir: Urla, Özbek village, cemetery	N: 3821954 E: 02641688 A: 9 m		L, H, P
87	Özçelik 2891	27.01.2009	Antalya: around Bahtılı village road junction, house garden	N: 3653087 E: 03043324 A: 40 m	Ölü gülü	L, H, P
88	Özçelik 2893	Ekim 2008	Isparta: SDU Botanical Garden	N: 3744450 E: 03029031 A: 1100 m		H
89	Özçelik 2894	Ekim 2008	Isparta: SDU Botanical Garden	N: 3744450 E: 03029031 A: 1100 m		H
90	Özçelik 2895	Ekim 2008	Isparta: SDU Botanical Garden	N: 3744450 E: 03029031 A: 1100 m		H
91	Özçelik 3303	2008	Isparta: SDU Botanical Garden	N: 3744450 E: 03029031 A: 1100 m		L, H, P
92	Özçelik 3536	20.03.2012	Isparta: Aksu, Yakaavşar town, disrupted rose garden	N: 4572461 E: 02513692 A: 1240 m		L, H, P
93	Özçelik 3613	03.03.2013	Isparta: Keçiborlu, Kılıç town, rose garden	N: 3748834 E: 03017385 A: 866 m		L, H, P
94	Özçelik 13292	12.01.2011	Antalya: Entrance to Korkuteli by Yazır village, house garden	N: 3703 E: 03012 A: 985 m		L, H, P
95	Yıldırım 2	02.03.2013	Isparta: SDU Botanical Garden	N: 3744450 E: 03029031 A: 1100 m		L, H, P
96	Yıldırım 4	02.03.2013	Isparta: SDU Botanical Garden	N: 3744450 E: 03029031 A: 1100 m		L, H, P
97	Yıldırım 5	02.03.2013	Isparta: SDU Botanical Garden	N: 3744450 E: 03029031 A: 1100 m		L, H, P
98	Yıldırım 6	02.03.2013	Isparta: SDU Botanical Garden	N: 3744450 E: 03029031 A: 1100 m		L, H, P
99	Yıldırım 7	02.03.2013	Isparta: SDU Botanical Garden	N: 3744450 E: 03029031 A: 1100 m		L, H, P
100	Yıldırım8	02.03.2013	Isparta: SDU Botanical Garden	N: 3744450 E: 03029031 A: 1100 m		L, H, P
101	Yıldırım 9	02.03.2013	Isparta: SDU Botanical Garden	N: 3744450 E: 03029031 A: 1100 m		L, H, P
102	Yıldırım 12	Mayıs 2015	Isparta: Around SDU Farmer Training Center	N: 3744450 E: 03029031		L, H, P,

				A: 1100 m		
103	Özçelik 507	04.04.2006	Amasya: around Direkli village, mosque garden	N: 4040080 E: 03559379 A: 1270 m	Gül	L, H, P
104	Özçelik 509	05.04.2006	Tokat: Tokat-Sivas road, 5th km., in front of the mosque	N: 4015324 E: 03632798 A: 500 m		L, H, P
105	Özçelik 511	05.04.2006	Sivas: Sivas-Kayseri road, Eskiköy village, 38 km to Sivas, around petrol (oil) station	N: 3929867 E: 03648316 A.: 1375 m		H
106	Özçelik 512	05.04.2006	Sivas: Gemerek, Eğerci town, fruit garden	N: 3914328 E: 03558134 A: 1157 m	Gül	L, H, P
107	Özçelik 513-A	05.04.2006	Sivas: Gemerek, Sızır town, fruit garden	N: 3918885 E: 03557550 A: 1382 m	Peygamber kokusu	L, H, P
108	Özçelik 568 (12407)	07.07.2006	Erzincan-Erzurum road, 70 km to Erzurum, limestone areas	N: 3948069 E: 04031855 A: 1650-1900 m		L, H, P
109	Özçelik 590	11.10.2006	Ankara: Polatlı, Yenidoğan village, abandoned school garden	N: 3941337 E: 03215032 A: 815 m	Yağ gülü	L, H, P
110	Özçelik 597	10.10.2006	Amasya: Göynücek, Kervansaray village	N: 4034 E: 03605 A: 690 m	Gül	L, H, P
111	Özçelik 601	10.10.2006	Amasya: Ezinepazar town, roadside, mosque garden	N: 4034224 E: 03605790 A: 690 m		H
112	Özçelik 603	10.10.2006	Amasya: Ezinepazar town, roadside, mosque garden	N: 4034224 E: 03605790 A: 690 m		L, H, P
113	Özçelik 622-B	12.11.2006	Denizli: Bozkurt, Beylerli village, around Airport, cemetery	N: 3745 E: 2940 A: 450 m		H
114	Özçelik 1208	19.07.2006	Van: Bahçesaray, Kavuşşahap Mountains, foothills of Deve mountain	N: 3802 E: 4256 A: 1800 m	Masur	H
115	Özçelik 1209	19.07.2006	Van: Bahçesaray, the cave where Müküs river comes out, rocky and stony areas	N: 3810 E: 4247 A: 2000 m	Masur	H
116	Özçelik 1226	17.07.2006	Muş: Malazgirt, 2 km north of Yukarıkıcık village, steppe area	N: 3914726 E: 4224165 A: 1646 m	Kuşburnu, Şilan	H
117	Özçelik 1227	30.07.2006	Erzurum: Karaçoban, around Kırmızı Tuzla, riverside	N: 3917412 E: 4206330 A: 1576 m	Kuşburnu, Şilan	H
118	Özçelik 1228	30.07.2006	Muş: Malazgirt, between Hasanpaşa-Kardeşler villages	N: 3921826 E: 4223806 A: 1722 m	Kuşburnu, Şilan	H

119	Özçelik 1232	25.07.2006	Van: Küçükerek Mountain, around Karpuzalan village, garden side	N: 3830 E: 4327 A: 1750 m	Kuşburnu, Şilan	H
120	Özçelik 1233	25.07.2006	Van: Küçükerek Mountain, road of Karpuzalan village, roadside	N: 3830 E: 4327 A: 1720 m	Kuşburnu, Şilan	H
121	Özçelik 1382-A	25.06.2007	Eskişehir: Sivrihisar, fountain side	N: 3927 E: 3123 A: 1100 m		H
122	Özçelik 1398	02.07.2007	Sivas: Gürün, 4.5 km to Gürün, highways maintenance station garden	N: 3845 E: 3701 A: 1650 m	Kuşburnu	H
123	Özçelik 1407-B	07.07.2007	Malatya: Darende, Ayvalı village	N: 3843 E: 3736 A: 1230 m	Kuşburnu	H
124	Özçelik 1525-B	27 01.2007	İzmir: Urla, Özbek village, house garden	N: 3821954 E: 02641688 A: 100 m		L, H, P
125	Özçelik 1616-B	07.02.2007	Antalya: Korkuteli Bozova village, across the mosque, Agriculture Credit Cooperative garden	N: 3712 E: 3017 A: 900 m		L, H, P
126	Özçelik 1716	17.03.2007	Afyonkarahisar: Sandıklı, Karacaören village, house garden	N: 3827147 E: 03015821 A: 1115 m	Yediveren	L, H, P
127	Özçelik 1719-B	17.03.2007	Afyonkarahisar: Sandıklı, Karacaören village, house garden	N: 3827147 E: 03015821 A: 1115 m	Çalı gülü, Isparta gülü	L, H, P
128	Özçelik 1798		Karaman: Demiryurt train station	N: 3719449 E: 0330203 A: 1014 m	Gül	L, H, P
129	Özçelik 1901	14.04.2007	Konya: Bozkır, Aliçerçi village cemetery	N: 3715412 E: 03208739 A: 1280 m		L, H, P
130	Özçelik 1903	14.04.2007	Konya: Ahırlı, Aliçerçi village	N: 3715412 E: 03208739 A: 1280 m	Kırmızı gül	L, H, P
131	Özçelik 2131	23.07.2007	Aksaray: Sultanhanı, Bozcaarmut village, 8 km to Eşmekaya village	N: 3843286 E: 03623794 A: 1515 m	Yağ gülü	L, H, P
132	Özçelik 2157	26.07.2007	Sivas: Gürün, Suçatı town, Hacılar neighbourhood, house garden	N: 3843277 E: 03722133 A: 1250 m	Şurup gülü	L, H, P
133	Özçelik 2161-B	26.07.2007	Malatya: Darende, Mehmetpaşa neighbourhood, Şekeroğlu street, house garden	N: 3832617 E: 03729729 A: 1063 m		L, H, P
134	Özçelik 2172	04.08.2007	Sivas: Kangal, Tahtalı village, mosque garden	K: 3915 E: 3710	Reçel gülü, Gül	L, H, P

				A: 1560 m		
135	Özçelik 2182	07.08.2007	Erzincan-Gümüşhane road, from Ahmediye Pass, ± 5 km to Kelkit, Yeniyol village, garden side	N: 3954580 E: 03924375 A: 1830 m		L, H, P
136	Özçelik 2185	08.08.2007	Gümüşhane: Around of Provincial Agriculture Directorate, gardens of historic mansions	N: 4031565 E: 03923536 A: 1080 m	Reçel gülü	L, H, P
137	Özçelik 2191	09.08.2007	Gümüşhane: Torul, Altınpınar town, Çitderesi village, house garden	N: 4031947 E: 03917141 A: 972 m	Gül, Kokulu gül	H
138	Özçelik 2237	26.08.2007	Afyonkarahisar: Sandıklı, Başağaç vilage, 38 km to Afyonkarahisar, house garden	N: 3816208 E: 03011231 A: 1076 m		L, H, P
139	Özçelik 2315	16.09.2007	Denizli: Honaz, Yokuşbaşı village, house garden	N: 3742654 E: 3333696 A: 986 m		H
140	Özçelik 2400	06.10.2007	Konya: Cihanbeyli, house garden	N: 3857542 E: 03236677 A: 1136 m		H
141	Özçelik 2403	06.10.2007	Konya: Cihanbeyli, Kandil town, house garden	N: 3857719 E: 03230333 A: 1215 m		H
142	Özçelik 2593	Tem. 2007	Rize: Dağbaşı neighbourhood, house garden	K: 4101 E: 4032 A: 20 m		L, H, P
143	Özçelik 2692	01.07.2008	Sivas: Koyulhisar, Yalnıztepe village, 19 km to Koyulhisar, mosque garden	N: 4014348 E: 3757807 A: 725 m		H
144	Özçelik 3014	13.09.2007	Van: Yaşar Altaylı's house garden	N: 3704383 E: 4112886 A: 478 m	Şimşiri gül	L, H, P
145	Özçelik 3038	29.06.2008	Artvin: Sarıgöl village, stream side	N: 4058097 E: 4128957 A: 951 m	Kuşburnu	H
146	Özçelik 3085	15.07.2008	Hakkari: Zap Valley, Üzümcü village, riverside and in garden	N: 3729612 E: 43 35177 A: 1130 m	Şilan	H
147	Özçelik 3519	30.11.2011	Isparta: Şarkikaraağaç, Çiçekpınar town, Çördük village cemetery	N: 3804 E: 3119 A: 1150 m	Gül	L, H, P
148	Özçelik 3535	20.03.2012	Isparta: Aksu, Yakaafşar town, disrupted rose garden	N: 4572461 E: 02513692 A: 1240 m	Yağ gülü	L, H, P
149	Özçelik 3581	18.04.2012	Afyonkarahisar: Sinanpaşa village, around Mahmari bridge	N: 3816208 E: 03011231 A: 1076 m		L, H, P
150	Özçelik 13182	21.07.2010	Erzincan-Erzurum road, Sümer mosque garden	N: 3946301 E: 04024214 A: 1450 m		L, H, P

151	Yıldırım 10	02.03.2010	Isparta: SDU Botanical Garden	N: 3744450 E: 03029031 A: 1100 m	L, H, P
152	Yıldırım 11	Mayıs 2015	Isparta: Around SDU Farmer Training Center	N: 3744450 E: 03029031 A: 1100 m	L, H, P
153	Özçelik 1601	10.02.2007	Muğla: Köyceğiz, gardens of Metin Batur's historic mansions	N: 3659340 E: 02839525 A: 37 m	L, H, P
154	Özçelik 1660	26.02.2007	Antalya: Bahtılı village, Grade School garden	N: 3653087 E: 03043324 A: 40 m	L, H, P
155	Özçelik 1909	15.04.2007	Konya: Hadim, around of city center, cemetery	N: 37105 E: 032148 A: 1150 m	H
156	Özçelik 2030	26.05.2007	Isparta: Sütçüler, Şeyhler village, house garden	N: 3727 E: 3051 A: 410 m	H
157	Özçelik 2885	27.01.2009	Antalya: Bahtılı village, around Grade School	N: 3653087 E: 03043324 A: 40 m	L, H, P
158	Özçelik 2886	27.01.2009	Antalya: Bahtılı village, around Grade School	N: 3653087 E: 03043324 A: 40 m	L, H, P
159	Özçelik 2887	27.01.2009	Antalya: Bahtılı village, Grade School garden	N: 3653087 E: 03043324 A: 40 m	L, H, P
160	Özçelik 3511	03.11.2007	Edirne: İpsala, Bozkurt neihgborhood, mosque garden	N: 40 5450 E: 0262256 A: 46 m	L, H, P
161	Özçelik 3753	24.05.2014	Burdur: İnsuyu cave road	N: 3739610 E: 03022570 A: 1178 m	H
162	Özçelik 14063	24.05.2014	Isparta: Işıkkent neighbourhood	N: 3744450 E: 03029031 A: 1200 m	H, P
163	Yıldırım 1	02.03.2013	Isparta: SDU Botanical garden	N: 3744450 E: 03029031 A: 1100 m	L, H, P
164	Yıldırım 3	02.03.2013	Isparta: SDU Botanical garden	N: 3744450 E: 03029031 A: 1100 m	L, H, P

Appendix 2. Taxonomic characters for distinguishing of Turkish oil roses in *R. damascena* complex

Diagnostic characters	***Rosa damascena*** Miller	***Rosa stipulata*** Özçelik & Yıldırım	***Rosa comantema*** Özçelik & Yıldırım
Ability to form new plants by underground parts	Thick, deeply and sparse rhizomed, rhizomes weak.	Thin and close to the soil surface, numerous rhizoms; rhizomes thin, horizontal.	Without rhizome or rarely rhizomed.
Stem and branching	Up to 200(-250) cm tall, 20(-30) mm diameter, pale green or greyish. Generally densely or rarely loosely branching. Suitable for whipping pruning.	50-150(-200) cm tall, up to (8-)10 mm diameter, generally purplish. Densely or loosely branching. Partly suitable for whipping pruning.	Up to 200(-250) cm tall, (8-)10 mm diameter, pale green or greyish. Loosely branching. Not suitable for whipping pruning.
Status of Thorn and Indumentum	Prickles straight or slightly curved back towards to the tip, 8-13 mm. Bristles less frequent, straight, up to 3(-4) mm, deciduous as the stem aged.	Prickles dense and distinctly falcate towards to the tip, 8-10 mm. Bristles dense on young shoots and lower parts of the stem, up to 2-3 (-5) mm, deciduous as the stem aged.	Prickles big-strong; almost thin on young shoots, loosely in general, 3-8(-10) mm, straight or slightly curved back towards to the tip. Bristles small-weak, 2(-3) mm. Prickles dominate to bristles.
Stipules	Usually narrow, thin and long. Usually does not reach the mid of the petiole.	Wide, usually longer than mid of the petiole.	Narrow, rarely wide, generally longer than mid of the petiole.
Leaves	Deciduous. Mature leaves 50-150(-185) × 40-110 (-130) mm.	Deciduous. Mature leaves 45-130(-150) × 32-112 mm.	Semi-deciduous. Mature leaves (50-)75-145 (-160) × (-40)50-115 mm.
Petioles	Petiole (6-)15-45(-55) mm, glandular hairy.	Petiole (7-)13-46 mm, rarely longer, glandular hairy/bristled.	Petiole (15-)20-40(-50) mm, rarely longer, glandular hairy.
Leaflets	Herbaceous, often exfoliating; green. It do shed in winter in general. Terminal leaflets (16-)20-50(-70) × 13-40(-55) mm, oval, rounded or slightly ovate, acuminate or not at the apex, main vein eglandular or sometimes glandular beneath; terminal petiolule 5-25(-45) mm.	Herbaceous, often exfoliating; wrinkled surface, veins evident, dark green. They do shed in winter. Terminal leaflet (10-)20-55(-65) × 12-45 mm, generally oval; cuneat or obtus, rarely slightly cordate at the base; terminal petiolule 4-21 mm.	Usually leathery and do not shed in winter; green. Terminal leaflets 20-55(-65) × 15-46 mm, generally oval or elliptic-oval, sometimes ovate; main vein glandular or rarely eglandular beneath; terminal petiolule 5-15(-22) mm.
Flowering Time (Months)	(4-)6(-7)	(4-)6(-7)	4-9(-11)
Inflorescence	Pseudocorymbuse, rarely a few or single flowered.	Usually single, rarely 2-3 flowered.	Corymbuse, rarely single flowered.

Flowers	Flowers clustered, rarely a few or single; pink or light pink and strongly fragrant; (1-) 4-8 layered; (30-)40-70(-80) mm diameter.	Flowers clustered, rarely a few, usually single; dark pink, sometimes pale purplish; strongly fragrant; 5-8 layered; 40-70(-80) mm diameter.	Flowers generally soliter, rarely a few; in variable colors; weak fragrant; 30-70(-80) mm diameter.
Hypanthium in Flowering Time	Elliptic shaped like a weaving shuttle, narrower at the lower end; covered with glandular hairs and sparse bristle. 4-10(-13) × 3-6(-9) mm.	Spherical or flattened spherical; semi-globular, rounded at the base but flat at the apex, covered with glandular hairs up to half or less. 4-8 × 3-9 mm.	Usually funnel-shaped, rarely semi-globular; gradually narrowed to the base or round at the base; glabrous or covered with glandular hairs. (3.8-)5-12(-15) × (3.6) 6-12(-20) mm.
Receptacle	Narrowed; the upper parts not hairy and not change the shape in fruit.	Wide, the upper parts distinctly hairy; not change the shape in fruit.	Wide; the upper parts not hairy and not change the shape in fruit.
Calyx	Sepals 10-30(-45) mm, generally partite and two types, not widened at the base.	Sepals 10-25(-30) mm, entire or nearly entire, widened at the base.	Sepals (9-)15-30(-35) mm, widened at the base.
Corolla	Petals pink or light pink; lined up in (1-) 4-8 layers.	Petals dark pink or reddish (sometimes slightly purplish); lined up in 5-8 layers.	Petals generally pink or light pink; color variable. Usually multi-layered or rarely 2-3 layered.
Pistils	Styles short white haired or not, sometimes united as a column, slightly elongated and come out of hypanthium. Stigma glabrous and slightly wide.	Styles dense white pilose hairy. Stigma glabrous and wide.	Styles white hairy. Stigma glabrous and slightly wide.
Hypanthium in Fruiting/ Seeding	Usually forms very few fruits. Fruits tile red; 7-25 × 7-16 mm. Seeds in fruits absent or several, generally sterile.	Usually forms very few fruits. Fruits tile red; 7-14 × 7-15 mm. There are few or no seeds in the fruit; partially sterile.	Usually forms very few fruits. Fruits tile red; 10-15 × 7-15(-20) mm. Seeds in fruits absent or several, generally sterile.