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Rose species wealth: An overview

Sindhuja Suram

Abstract
Plant species are the gene pools for crop improvement. The rose species across the world lead to the improving new varieties. Most of the species are habituated to china. More than 350 promising varieties and 14 species are maintained in India. A total of 25 species in the genus Rosa have been reported to grow in the wild. Eight of these have contributed to the development of modern ornamentals in the group 'Hybrid Teas'. The use of wild roses for various purposes was studied. Distribution of all Rosa species available in India was mapped. Two species - *R. clinophylla* and *R. gigantea* perform well in a wide range of warm climates in India. *R. clinophylla* is perhaps the world's only tropical rose species. *R. gigantea* grows luxuriantly in sub-tropical climates without harsh frosts are the species habituated in India. A large number of heritage roses exist in India. Two of the most interesting of these 'found roses' are Telangana pink and Kakinada red rose. The mapped species will be acting as gene pools for future rose breeding in India.

Keywords: Rose species, breeding, genetic resources, wild roses, India

Introduction
The rose, the "Queen of flowers" belongs to genus Rosa and the Rosaceae family. Rose breeding started nearly a century and a quarter ago and first HT rose "La France" was developed by Guillot in France in 1867. Breeding of rose varieties in India started with Indian raised variety seems to one named "Dr. S.D. Mukherjee" introduced by B.K. Roychoudhary in 1935. The first phase of rose breeding in India was dominated by B.S. Bhatcharji, head of the well-known rose nursery at Deogarh, which is present on the border of Bengal and Bihar (Janakiram, 2015) [6].
Scientific rose breeding was started in early sixties by Dr. B.P. Pal, then Director, IARI, New Delhi who evolved 105 varieties. He was the first amateur to take up rose breeding as a hobby, as his main work in the field of agricultural science was the breeding of disease resistance strains of important crop plants. He started with open pollinated seeds of the well-known 'Gruss a Teplitz', bred by Geschwind and introduced by Lambert in 1897. His most elegant creations are 'Dr. M.S. Randhawa', 'Dr. Homi Bhabha' among HT types, and 'Banjaran' and 'Delhi Princess' among floribundas (Pal., 1991) [11].

Genetic resources
Genetic conservation is most important and special thrust must be given to ex situ conservation. All India Coordinated Floriculture Improvement Project, New Delhi contributed to documentation and conservation of genetic resources. A comprehensive germplasm collection of over 2000 rose varieties and species during the twenty five years, called the National Rose Collection, provided the best material for rose breeding. This includes hybrid tea, floribunda, polyantha, miniature, climbing roses and several Rosa species introduced from abroad through National Bureau of Plant Genetic Resources, New Delhi and other sources within the country. The experience gained with the assessment of the germplasm indicated that some of the famous roses, namely 'Super Star', 'Queen Elizabeth' and 'First Prize' (Chadha and Choudhary, 1986) [1] introduced from abroad performed well under Indian conditions. This lays importance on species diversity of rose.

Germplasm collection
The IARI maintains a rich germplasm collection of 350 promising varieties and 14 species Conventional hybridization and mutation breeding were employed for evolving new varieties (Gudin, 2000) [3].

14 species are: *Rosa tomentosa, Rosa dumalis, Rosa rubiginosa, Rosa banksia, Rosa brunonii, Rosa indica major, Rosa bourboniana, Rosa rubrifolia, Rosa multiflora, Rosa agastria, Rosa wichurana, Rosa moschata, Rosa macrophylla* and *Rosa nitida.*

The characteristics of rose species are as follows

Rosa moschata

There is a whole range of moschata-type roses (*R. ruscinonesis, R. abyssinica, R. freitagii, R. godefroyae, R. brunonii, R. sambucina*, etc.) extending from south of France over Northern Africa to Japan, which may or may not be species, natural hybrids or cultivars.109 Ivan Louette e.g. proposes R. *abyssinica*, which is found in Ethiopia, Eritrea, northern Somalia, southern Saudi Arabia, Yemen, as a possible parent of *R. damascene* (La Flore Jardinier *et al*., 1809) [8]. *R. moschata* has three main phenotypes: single (*R. moschata moschata*), double (*R. moshcata plena*), and very double (Manners, 2000) [9]. These phenotypes are similar in color, leaf structure, and size of rosebush, while they differ in flower appearance. The single musk has five petals and many reproductive organs. The double and very double musks have many petals and almost a complete absence of reproductive organs. The double musk has central petalloids that shrivel and turn brown in the sun, while the very double does not exhibit this "frying" phenomenon.

Rosa persica

Among these taxa, *R. persica* Michx. has different characteristics from other wild species: the leaf is simple and without stipules. Therefore, this species is treated by some taxonomists as a different genus, Hulthemia. However, the flower of this species is yellow with a deep red or brown center, and an English breeder used this species in his breeding program and raised cultivars with basal blotches (Harkness, 1976) [4]. *R. persica* is distributed in the semi-desert region of Asia, ranging from Iran and Afghanistan in the south through Kazakhstan and north to southwestern Siberia.

R. platyacantha

R. platyacantha belongs to section Pimpinellifoliae and is distributed in Xinjiang. This species is quite similar to *R. spinosissima* and is differentiated by having broad based thorns. The distribution of this species in Xinjiang is concentrated in and around the Tianshan mountains and the roses grow on the slopes of mountains and the banks of rivers. These areas were located about 700 m to 2000 m above sea level. The color of flowers is clear yellow with no fading as flowering advances. There is much variation in flower shape and size, and the largest is more than 7 cm in diameter. The flowering season is May to July depending on the height above sea level. In the best flowering season, the scene of yellow flowers with Tien Shan white spruce is really splendid. The clear yellow color is an important gene resource for reintroducing the color to modern cultivated roses.

R. spinosissima

R. spinosissima also belongs to section Pimpinellifoliae and is distributed from Europe to Far East Asia. In Xinjiang, a variety of this species, *R. spinosissima var. altaica* is distributed. The name of the variety, altaica, is derived from the Altai Mountains, which are located in the northeast border region between Xinjiang, Russia, and Kazakhstan. This species is differentiated from *R. platyacantha* by having bristles and prickles (thorns) on the stem. Around the Altai Mountains, this species grows on the steep slopes of mountains and along riversides.

R. banksiae* var. *normalis

R. banksiae var. *normalis*, belonging to the section Banksianae, is distributed from central China to southeast China. This species is a tree climber, and grows as a large rambler with many fragrant white flowers. The flowering season is May. In Yunnan province, this species is growing by the roadside from Kunming to Dali and it is like the Japanese wild rose, *R. multiflora*, which grows throughout Japan.

***R. gigantean* in China**

R. gigantea is one of the most important species in its role as an ancestral rose in the origin of Chinese cultivated roses. The fragrance of Tea roses owes its origin to this rose, which is named in Chinese, Da Hua Xiangshui Yueji (large-flowered fragrant rose). This species is distributed from Yunnan to Myanmar.

R. tunquinensis

The species plant is a large shrub with many white flowers emitting a musklike fragrance. This species distributed in the southernmost part of south-east Asia.

Rosa chinensis semperflorens

Also called as ever blooming rose**.** The two-metre high plants have many rather lanky stems with long delicate oval pointed leaves and very dainty semidouble flowers in small clusters at the top of the bush. Sometimes the flowers are single, but more often they have two or three rows of very delicate maroon petals, though occasionally a flower will be pink. It has been growing on these two Indian Ocean islands since the middle of the 18th century or perhaps earlier. It was introduced by J. Harrington to the Calcutta Botanic Garden in 1803, and in 1813 Roxburgh recorded it in St. Helena (Roxburgh and Hortus Bengalensis, 1814) [13].

Rosa damascene

A widely cited study has established via DNA analysis that both the summer and the Autumn Damask have originated from the crossing (*R. moschata x R. gallica*) x R. fedtschenkoana.96 "Ornamental Plants from Russia" also mentions Himalayas, Mongolia, northern China and Afghanistan, so a certain distribution in the directions of nomadic expansion seems to have happened. On the other hand, "Flora of Pakistan" treats it as a synonym of Rosa webbiana, and "Flora of the USSR" states "This species … appears to be one of the many races of the composite species *R. webbiana*". (Flora of USSR, 1971) They compared DNA sections of 5 roses received from Beales ('Quatre Saisons', 'Quatre Saisons Blanc Mousseux', 'Kazanlik', 'York and 119 Lancaster', '*R. gallica officinalis'*), three examples of *R. phoenicia*, two *R. moschata* (from Chiba University and a seedling from Chiltern), two *R. moschata nepalensis* (from the Hiroshima Botanical Garden) and one *Rosa moschata plena* from the same accession. In the comparative direct sequencing of certain spacer regions of chloroplast DNAs, an exact equivalence was seen between regions of *R. moschata* nepalensis with *R. damascena*, from which Iwata *et al*. conclude that *R. moschata* is one of the female parents. Iwata *et al*. 2000 [5] seem to make no differentiation between *R.*

moschata and *R. brunonii*. One of the primer sequences of *R. damascena* was identical to that of *R. fedtschenkoana*.

Rosa centifolia

The hundredpetaled red rose or yellow hundredpetaled rose [i.e. *R. hemisphaerica*]. The name *Rosa provincialis*, which became a synonym of *R. centifolia*. While they might not have bred *R. centifolia*, the Dutch certainly perfected it in the XVII/XVIIIth centuries, as they did with the Tulip.

Rose edouard

The origination of 'Rose Edouard' as a chance seedling formed among hedges of Bengal roses and Rosa bifera, and that Bréon discovered this in a hedge on the property of M. (Jean Loiseleur and Deslongchamps. 1844) [7]. The Madras rose, or Rose Edward, a variety of *R. centifolia*, is the most common, and has multiplied so fast within a few years, that no garden is without it; it blossoms all the year round, producing large bunches of buds at the extremities of its shoots of the year; but, if handsome, well-shaped flowers are desired, these must be thinned out on their first appearance, to one or two, or at the most three on each stalk. It is a pretty flower, but has little fragrance. This and the other double sorts require a rich loam rather inclining to clay, and they must be kept moist (Frederic and Barlow Speede, 1850) [2].

The legacy species of the China rose

China roses arrived in Europe in the late 18th and early 19th centuries from southern Yunnan, China and other parts of Southeast Asia, to forever change the course of rose breeding and culture in the western world. *Rosa chinensis* var. *spontanea* and *Rosa odorata var. gigantea*, both thriving at Quarryhill, are the two native Chinese species widely believed to have contributed most to the China and Tea roses, two groups that have maintained their separate identities despite extensive hybridization. Descendants of China roses include the Noisettes (China x Musk Rose) and Tea-Noisettes, Bourbons (China x Autumn Damask), Teas (Tea-Scented China x Bourbon/Noisette), Hybrid Chinas (China/Noisette/Bourbon x Once-blooming European varieties), Hybrid Perpetuals (Hybrid China x Portland/ Noisette/Bourbon), Hybrid Teas (Hybrid Perpetual x Tea), Polyanthas (China/Tea x *Rosa multiflora/Rosa wichurana*), and Floribundas (Polyantha x Hybrid Tea). Clearly, these relatively few Chinese introductions from two hundred years ago have had a profound and lasting influence on horticulture and the seemingly endless appetite for roses of every size, scent and shape.

***Rosa odorata*: The tea rose legacy**

European Tea Roses originated from cultivated varieties that evolved over many centuries in Southeast Asian gardens, loosely named *Rosa odorata* and most likely parented by the Wild Tea Rose, *R. odorata* var. *gigantea*. Two of the four stud roses, Hume's Tea-Scented China (cream to pink colored, named 'Spice' in this garden) and Park's Yellow Tea-Scented China (now lost), introduced treasured Tea Rose traits to the western world: fruity or peppery scents resembling crushed tea leaves, large shiny petals and glossy green foliage, repeat blooming, and new floral shades of ivory, cream, yellow, pink, copper and apricot. Hume's was combined with Bourbons and Noisettes to produce the first pink Teas while Park's crossed with Noisettes created the first yellow Teas. Old Teas from the 1800's, now rare, were absorbed through successive hybridizing with once-blooming Hybrid Chinas, their descendent, moderately repeat-blooming Hybrid Perpetuals, and many others, giving rise to ever more popular rose classes. These breeding efforts mainly strove to combine traits of the Old (European) roses - including distinctively scented and uniquely colored flowers, often thickly packed with petals - with those of the Chinas and Teas, resulting in the following descendants: Polyanthas, some of which combined Teas with the clustering species *R. multiflora* and, to a lesser extent, *R. wichurana*, producing dwarf shrubs with bouquet-like clusters of small flowers; Hybrid Teas, the largest, most recognized and successful of all rose classes in history; Floribundas, in all respects larger-scale but similar to Polyanthas, derived from crossing the latter with the Hybrid Teas. The Tea Rose lineage has certainly produced abundant floral riches.

Noisettes, Tea-Noisettes & Bourbons

In 1802, wealthy rice farmer and skilled gardener, John Champneys of Charleston, South Carolina, made rose breeding history when he created 'Champneys' Pink Cluster' by crossing the stud China Rose 'Parsons' Pink China' (called 'Old Blush' in this garden) with the European *Rosa moschata* (Musk Rose). This hybrid combined the shrubby habit and large, open, aromatic clusters of the Musk with the semidouble, blush/pink color and continuous blooms of the China. From this one cross and its equally well-known offspring, 'Blush Noisette', the Noisette brothers of France, working both in Europe and the US, developed their namesake and seminal class of roses. Further hybridizing with Tea Roses produced the Tea-Noisettes, with climbing habits and smaller clusters of larger, tea-scented flowers.

The Bourbon Roses originated on Isle de Bourbon in the Indian Ocean, from the garden of Edouard Perichon where the original 'Rose Edouard' was discovered in 1817, a fortuitous hybrid of the Autumn Damask and 'Parsons' Pink China'. Seeds and cuttings were sent by the Parisian botanist Bréon to the gardener of King Louis Philippe of France, where most Bourbons were later produced and popularized between 1820 and 1870. The mysterious Autumn Damask, at that time unique in blooming past spring into summer and even autumn, presents another ancient rose story that melds with that of the China roses. The result combined the damask's classic scent (found in rose oil, or attar) with the rose-colored and more continuous blooms of the Chinas, in plants displaying waxy, grey-toned foliage and stout, prickly stems.

Rosa moschata

The Musk rose, single with very few petals and the "Autumn Damask" very double with a profusion of petals. Given the choice, it is the latter, given its many petals that one would guess showered the great man. The only wild roses (rose species) displaying the characteristic of remontancy are: *Rosa chinensis* (South West China), *Rosa fedtschenkoana* (it is native to the foothills of the Ala Tau, Tian Shan and Pamir-Alai mountain ranges in central Asia and northwest China.) The wild habitat of *R. moschata* has been the subject of much confusion, and it has never been found truly wild. It probably arose in the western Himalayan area, and was selected for its relative thornlessness, its excellent scent and late flowering, as well as its medicinal value as a purgative. Ivan Louette, the Belgian rosarian, has made a detailed study of this plant, and related forms in Iran (Rix *et al*., 1994) [12].

Rosa rugosa

Rosa rugosa occurs naturally in Eastern Asia from Ochotsk and southern Kamchatka to Korea and the northern parts of Japan and China.

The Damask Rose *Rosa x damascene*

The Damasks comprise two distinct forms: The Summer Damasks and the Autumn Damasks. The former flower once only and are large, thorny quite open growing shrubs with intensely fragrant pink to white flowers. The latter, the subject of this essay, are shorter more compact shrubs with the ability to repeat flower in autumn, their colour range include pink and red varieties. "Ispahan" a widely grown garden variety is an example of *R. damascena*. The garden hybrid *Rosa centifolia* is derived in part from *R. damascena*, as are the Bourbons, Portland and the Hybrid Perpetuals. *Rosa damascena* is widely cultivated commercially throughout Iran (Persia). In the year 2000, three Japanese biochemists, Messrs. Iwata H, Kato T, Ohno S. working for the Wakunaga Pharmaceutical Company, in Hiroshima published gene sequences which show that *Rosa damascena* is actually a hybrid of (*Rosa moschata x Rosa gallica*) x *Rosa fedtschenkoana* (Iwata *et al*., 2000) [5]. They examined the relationship between Damask varieties and their putative ancestors at the molecular level. Random polymorphic DNA analysis of the Damask varieties proved that they had an identical profile, indicating they were established from a common ancestor. They identified the three Rosa species, *R. moschata*, *R. gallica* and *R. fedtschenkoana*, as parental species of the original hybridization that contributed to forming the four oldest Damask varieties by sequencing the internal transcribed spacer of ribosomal DNA.

Rosa fedtschenkoana

A suckering shrub up to 2m high, with greyish leaves and slightly scented white flowers, around 5cm across, significantly it blooms from June to September. The hips are bristly and orange-red. It is native to a range comprising central Asia, in the Ala-tau, Tien Shan and Pamir-Alai, extending into North West China (Rix *et al*., 1994) [12].

Rosa gallica

A deciduous shrub forming large patches of shrubbery, the stems are clothed with prickles and glandular bristles. The leaves are pinnate, with three to seven bluish-green leaflets. The flowers are clustered one to four together, single with five petals, fragrant, deep pink. The hips are globose to ovoid, 13 mm. in diameter, and are orange to brownish.

Japan

The wild roses find in Japan are: *Rosa nipponensis, R. hirtula and R. fujisanensis*, as natural habitats of alpine roses native to Japan. In Fuji-Hakone-Izu National Park, *R. onoeihakonensis* and *R. sambucina* in forestry areas and mainly near woodland paths or streams. Roses on Riversides and Seashores: R. *rugosa*.

Singapore

Roses grafted on *R. Fortuniana* are also becoming available, and the hope is that these will thrive in Singapore's weather as successfully as the *R. fortuniana*-grafted roses that flourish in the hot southern regions of the USA.

Rose species in India

A total of 25 species in the genus Rosa have been reported to grow in the wild. Eight of these have contributed to the development of modern ornamentals in the group 'Hybrid Teas'. The use of wild roses for various purposes with special emphasis on the use of the fruits (rose hips) e.g. as food, animal feed and for therapeutic applications was studied. Distribution of all Rosa species available in India was mapped and utility and potential of these species was compiled to facilitate collection, conservation and utilization (Misra and Misra, 2002) [10].

Of the species occurring in India, *R. centifolia, R. gallica, R. macrophylla, R. gigantea, R. foetida, R. moschata, R. multiflora* and *R. webbiana* have been reported to produce hips that are rich in vitamin C. Therapeutic value has been reported for hips of *R. centifolia* and *R. chinensis*.

Warm climate rose breeding has been largely neglected in the world. Tropical countries depend almost completely on roses bred for cold hardiness in Europe and the U.S.A. These roses have a very short life in our heat, excepting in some favoured locations. As the Western breeding for cold hardy roses progressed from generation to generation, these roses became less and less suitable for warm areas. The early H.T.'s, for e.g.,' La France' from Europe and 'Radiance' from the U.S., were comparatively better suited for warmth, but the newer varieties, excepting for some 'freaks' cannot be grown in a sustainable way.

It is indeed fortunate that these two species - *R. clinophylla* and *R. gigantea* perform well in a wide range of warm climates. *R. clinophylla* is perhaps the world's only tropical rose species. *R. gigantea*, on the other hand, grows luxuriantly in sub-tropical climates without harsh frosts. In addition, it is blessed with great vigour and disease resistance. It is our submission that there is no doubt that these two species are the logical start for warm climate rose breeding.

R. clinophylla

Three forms exist, adapted to warm moist climate (Bengal form), warm dry climate (Chota Nagpur form) and sub-tropical climate (Himalayan foothills and some other mountain ranges). The Bengal form is, by any criterion, the most tropical form of this species. Its habitat is described, with eye-catching detail in the 'Himalayan Journals' of J.D. Hooker, the famous plant explorer who came upon this species when his explorations brought him from the foothills of the Himalayas to the plains of North Bengal, by the banks of a tributary of the River Ganges.

R. gigantea

Securing plant material of *R. gigantea* was even more complicated. The species was available at the very end of the Eastern Himalayas, with a concentration of occurrence in the mountains of Manipur State, in North East India. A visit to the Botanical Survey of India's Herbarium in Kolkata in 1990, gave us a clue. One of the original specimens collected by Sir George Watt in 1882 was available in the herbarium. Two other approaches in clinophylla breeding have also been tried. The first is to use a complex heat resistant seedling, which has the genes of 'Bonica' and some Tea roses as the seed parent, with 'Pink-Pink'. One result has been a dwarf healthy shrub which flowers freely in shades of pink with a white eye. The second approach is to use a species hybrid

seedling of *clinophylla* x *gigantea* with other roses. One interesting result is a cross with 'Mrs. B.R. Cant'. A further cross of this with the found China rose, 'Telengana Pink' has led to an elegant H.T. form climber which will be the basis of further work. Work with R. gigantea has been somewhat easier as genes of this species are present in garden roses though perhaps remotely. Two types of crosses have been used. The first is crosses of *R. gigantea* with 'Reve d'Or' mentioned earlier as doing well in India. The second is a cross of *R. gigantea* into the orange red H.T.

Heritage roses/species of India

A large number of heritage roses exist in India, a few discovered, and many awaiting discovery. Two of the most interesting of these 'found roses' are Telangana pink and Kakinada red rose.

Telangana pink

Telangana pink, widely grown, and which extends to Thailand. This rose has defied identification even by the well-known rose authority Mr. Fred Boutin of California, USA. Telengana Pink is very well adapted to warm climates.

Kakinada red rose in India

'Kakinada Red' was named after the port town in India by Girija and Viru Viraraghavan. That is one of the most interesting old roses there. Kakinada Red is used in garland making, it has few prickles, is semi-double to double, is nicely scented with more of a sweet fragrance than a damask scent. It was mentioned in the 'Mystery Roses of India' (in Rosa Mundi's publication, 'Mystery roses Around the World') "While the roses we have mentioned so far appear in various historical records, they have not yet been located in present-day India." Based on their researches, much more important is the rare rose which has existed there for a long time. So the rose 'Kakinada Red' is certainly an exotic old one.

Among the several heritage roses available are four 'found roses' with the study names of 'Renu's Apricot Tea', 'Rajakkad China', 'Madurai Tea' and 'Holiday Home Climber'. The first is from our friend Renu's garden in the Western Ghat area (Cardamom Hills) of Kerala State, 1100 m. altitude, and Rajakkad China is from the Palni Hills, an eastern offshoot of the Western Ghats, found in the garden of Rajakkad Resort, at about the same altitude. 'Madurai Tea' was located in the 'plants for sale' in a nursery in Madurai town (Tamil Nadu). The 'Holiday Home Climber' is a very vigorous climber with large single flowers in pink and white. It is remontant. The foliage has China rose characteristics and is growing well in Mrs. Helga Brichet's garden.

Genetic stock developed at IIHR genetic stocks

IIHRRs-1 for Resistance to powdery mildew; IIHRRs-2 for Thornless and resistant to powdery mildew; IIHRP-13 for Resistance to thrips, red colored flower with fragrance; IIHRP 2-28-1 for Bicolor flower consisting vermilion red shading towards orient pink with dark green and IIHRP 3-18-2 Long straight flower stalk and less thorns are the genetic stocks registered at IIHR as genetic stocks

CSIR- Institute of Himalayan Bio-resource Technology (IHBT), Palampur, Himachal Pradesh: The institute standardized the production and processing technologies of aromatic roses and released five varieties of *Rosa damascena*, namely, 'Indica',' Jwala', 'Super Jwala', 'Himroz' and 'Hot Himroz'. Wild strains of rose species collected from Himachal Pradesh were evaluated for their seed oil contents and quality of the oil for the selection of better rose seeds oil producing strains. The range of percent seed oil recovery from different strains was varied from 1.3 to 9.9 percent. Rose seed oil of some of the strains having better food values. CSIR-IHBT standardized the rose plants multiplication protocol through *in vitro*. Cytological studies in four strains of wild roses belonging to *Rosa brunonii, R. alba, R. cathayensis* and *R. multiflora* were characterized cytologically. All the indigenous strains of roses were observed to be diploid with a chromosome count of 2n = 14. These rose strains are very vigorous in growth, exhibit winter activeness. Institute registered the four germplasm like IHBTWR-24 (INGR 08066/IC549905), IHBT- WR-16 (INGR 08067/ IC549906), IHBT- WR-23 (INGR 08068/IC549907) and IHBTWR-21 (INGR 08069/IC549908) in NBPGR, New Delhi. CSIR Central Institute of Medicinal and Aromatic Plants (CIMAP) Lucknow developed high oil bearing aromatic rose variety 'Noorjahan'. It yields 25-30 q/ha flowers in plains, however in temperate region flower is 40-45 q/ha and oil produced 600-800g and 1 to 1.5 kg/ha, respectively.

Conclusion

A total of 25 species in the genus Rosa have been reported to grow in the wild. Eight of these have contributed to the development of modern ornamentals in the group 'Hybrid Teas'. The use of wild roses for various purposes with special emphasis on the use of the fruits (rose hips) e.g. as food, animal feed and for therapeutic applications was studied. Distribution of all Rosa species available in India was mapped and utility and potential of these species was compiled. *R. centifolia, R. gallica, R. macrophylla, R. gigantea, R. foetida, R. moschata, R. multiflora* and *R. webbiana* are producing hips that are rich in vitamin C. These species will act as gene pool reserves for future rose breeding in India.

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