GSC Biological and Pharmaceutical Sciences
eISSN: 2581-3250 CODEN (USA): GBPSC2
Cross Ref DOI: 10.30574/gscbps
Journal homepage: https://gsconlinepress.com/journals/gscbps/

(REVIEW ARTICLE)

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The cultivation of *Melocactus*

Domenico Prisa *

CREA Research Centre for Vegetable and Ornamental Crops, Council for Agricultural Research and Economics, Via dei Fiori 8, 51012 Pescia, PT, Italy.

GSC Biological and Pharmaceutical Sciences, 2023, 23(02), 085–090

Publication history: Received on 20 March 2023; revised on 01 May 2023; accepted on 04 May 2023

Article DOI: https://doi.org/10.30574/gscbps.2023.23.2.0176

Abstract

Cacti are icons of our time. Symbols of the 21st century lifestyle, they populate the windowsills of city flats and family villas, decorate shop windows and office desks. Each species has a characteristic that catches the eye: the colour, the bizarre shape, the thorns, the fascinating flowers. As the name suggests, succulents store water in their tissues, roots and thick, fleshy stems. Often counted apart, cacti are a type of succulent that has adapted to survive in the most inhospitable conditions on Earth. Their reputation as 'die-hards' makes these resilient plants easy to handle even for the novice. This review describes the characteristics and cultivation methods of one of the most interesting cacti, the *Melocactus*.

Keywords: Cactus; Melocactus; Plants botany; Popular melocactus; Ornamentals

1. Introduction

1.1. Historical background

The name *Melocactus* was first used by Tournefort in 1701, from the Latin melo (an abbreviation of melopepo, a term with which Pliny the Elder indicated the melon). Before Tournefort it had been given the name *Echino Melocactus* [1]. In 1753 Carl Linnaeus described 22 species in *Species Plantarum*, among which one was named *Cactus Melocactus*. N.H. Link and C. Otto (1827) described the genus *M.* including 4 species, of which only one is now accepted. The first extensive study was published by F. Miquel in 1840 with 34 species. Subsequent work showed that only 6 of these species could be accepted, the others being synonyms [2]. Britton & Rose (1919-1923) following the priority rule reverted to Linnaeus' original name Cactus. Nigel P. Taylor's (1991) monograph on the *Melocactus* of Central and South America contributed to the clarification of the taxonomy of the genus, which now comprises 33 species, 2 natural hybrids and 11 subspecies [3].

2. Plant morphology

Melocactus are among the cacti those that first arrived in Europe in the 15th century and have since held a special fascination for hobbyists [4]. They are distributed from the west to the south of Mexico, Ecuador, Cuba, El Salvador, the Caribbean, from the Amazon to the northeast of Brazil, southern Peru. Many species are endangered in their places of origin, so almost all cultivated plants are born from seed [5]. When growing, *Melocactus* go through two distinct phases: in the juvenile phase they do not reproduce and look like normal globular cacti; in the adult phase, 7-8 years after sowing, a substantial change takes place that leads to the emission of the cephalium, a mass of densely spiny areoles that houses the reproductive structure [6] (Figure 1). At this stage the plant ceases stem growth, but if the cephalium is damaged the plant resumes multi-headed growth (Figure 2). The cephalium continues to develop slowly for many years

* Corresponding author: Domenico Prisa

in conjunction with the production of flowers and fruit, in some cases it can reach a height of one metre. The stem is green or blue, solitary, not caespitose, globose, depressed, has 8 to 27 vertical ribs, deeply furrowed, no tubercles, small areoles. The spines, from 3 to more than 20, are well developed and with little differentiation between central and radial. The flowers appear in the terminal part of the cephalium, open in late spring or autumn, depending on the species, and last about 6 hours, are among the smallest of the cactaceae, are tubular in shape and range in colour from red to pink [7].

Melocactus are self-pollinating and an important role in pollination is played by hummingbirds and insects. The fruits are juicy, edible, white, pink, magenta or reddish (Figure 2). The seeds are black, globular, ovoid, and can be spread by running water after falling at the foot of the plant, but dispersal is mainly by insects, birds and even reptiles (Brazilian iguanas). The root system of *Melocactus* is highly developed, consisting of long, fibrous roots that ensure good anchorage in the soil. *Melocactus* belongs to the subfamily Cactoideae, tribe Cereeae [8].

Figure 1 Detail of *Melocactus* plant

Figure 2 Detail of the cephalium and fruit of *Melocactus*

3. Cultivating *Melocactus*

Melocactus is widely believed to be difficult to grow, this bad literature stems from the fact that in the past these plants were imported as adults, with few or no roots, mistreated in transit, so they were often doomed to die. The best way to obtain *Melocactus* is to sow them, at a temperature of 25 °C they grow easily and grow without major problems if kept moist during the growing season. In their first winter the seedlings can be kept at around 15°C, watering them

sporadically so that they do not shrivel up. The following year they can be transplanted into 6 cm pots. Like all tropical cacti, *Melocactus* cacti do not tolerate cold and excess water, especially after the release of the cephalium. Some species, especially the Caribbean ones, have to be kept at about 16 °C in winter, so a good solution might be to keep them indoors; in that case, the plants should be lightly watered, or only nebulised, Specimens with cephalium have great difficulty in sprouting new roots once they have lost them due to cold and dampness [9]. On the surface, *Melocactus* would appear to resist the cold, but after a couple of years, having exhausted their reserves, they die. Those who cannot keep the plants at the required temperature resort to grafting, which can be carried out on *Eriocereus jusbertii*, *Trichocereus spachianus* or *pachanoi*, when the seedlings have reached a size of about 2 cm. The graft carrier can be concealed by a layer of sand. An intermediate graft on *Pereskiopsis* is possible but not essential [10]. They fear moisture and rot easily. *Melocactus* prefer an acidic compost e.g. 2 parts peat and 1 part pozzolan or pumice, very well drained. They need direct sun and repotting in spring every 2-3 years, which should be avoided after the cephalium has emerged. Fertilise once a month during the growing season with a product with a high potassium content. In view of the fact that it does not emit suckers, reproduction is by seed, although growth is slow [11]. Currently, experiments have shown that the application of microbial biofertilisers based on mycorrhizae and Effective microorganisms in the growth substrate can significantly increase plant development and root biomass (Figure 3).

Figure 3 Effect of microbial biofertilisers on *Melocactus* plants

4. Some of the most popular *Melocactus*

4.1. *Melocactus bahiensis* (Britt. et Rose)

4.1.1. Etimology

The name of the genus, first used by Tournefort, derives from the Latin melo (short for melopepo, a term used by Pliny the Elder for melon) or from cactus for the round or cylindrical cephalium. Place of origin Brazil, in the state of Bahia**.**

4.1.2. Description

Stem first spherical, later, when adult, more or less elongated, 10 cm and more high with a diameter of approx. 15 cm, dark green. The ribs are 10-12, 2.5 cm wide at the base, acute and raised; each has 6-7 whitish areoles with 7-10 radial spines 2.5 cm long and 4 central spines that are about 1 cm longer [12]. All spines are brown. The cephalium is not very tall and has many reddish-brown bristles; small pink flowers sprout on it and give rise to oblong, 1.5 cm long, red fruits. This species is one of those in which a division of the cephalium may occur with age. Sometimes new shoots may be produced through it which in turn will develop a new cephalium, but this event is very rare in cultivation [2].

4.1.3. Cultivation

Very sensitive to stagnant moisture and easily attacked by rot. Propagation is from seed, very slow growing, possibly hastened by grafting. Winter temperature should never fall below 15-18°C, while in summer it prefers full sun.

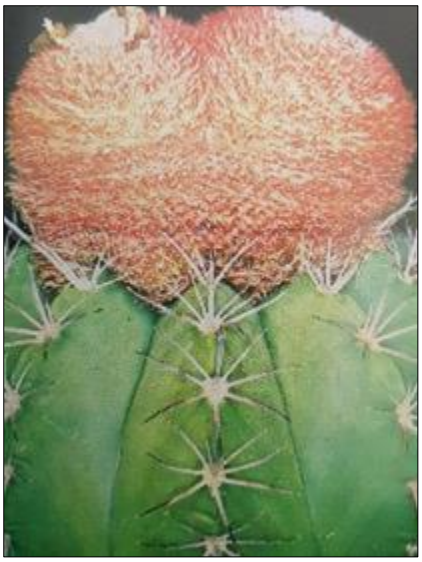

Figure 4 *Melocactus bahiensis* [2**]**

4.2. *Melocactus concinnus* (Buin et Bred)

4.2.1. Description

Native to Brazil, in the state of Bahia, at about 1000 m, under typical scrub vegetation (caatinga), in very dry rocky and sandy soil. This species, found in 1968, has a strongly globular-depressed stem, about 10 cm high and with a slightly larger diameter, green or glaucous green. The ribs are 10-13, acute and tuberculate, with transverse depressions between the tubercles on which the white, felt-like areoles are set, sunken [13]. There are 7 radial spines, 2 of which are very short, 4 curved about half a cm long, and one, 2.5 cm long and stronger, projecting downwards. There is only one central spine, just over 1 cm long. All spines are first reddish with a pale base, then grey with a brown tip. The cephalium is only about 3 cm high, but rather wide, with a diameter of 6-7 cm; the part of the new growth is covered with thick white wool, interspersed with red bristles that become predominant in the older growth [14]. The flowers, about 2 cm long and 6-7 cm wide, are carmine red and the fruits are red or purplish pink. It is characteristic of the genus that the ripe fruits fall off, becoming membranous [2].

4.2.2. Cultivation

Fibrous roots do not need much space, and relatively small pots are safer. Watering must be judicious. Propagation is by seed [15].

Figure 5 *Melocactus concinnus* [2]

4.3. *Melocactus guaricensis* (Croiz)

4.3.1. Description

Native to Venezuela, in the state of Guàrico, hence the name. This species, classified fairly recently by Léon Croizat, an American botanist specialising in South American flora, has a spherical or conical, truncated stem, up to 10 cm high with a diameter of around 9 cm [16]. The ribs are about 10, wide, obtuse, slightly tuberculate at the margin when the plant is young, with more pronounced relief on the old part; the areoles appearing on them are slightly sunken, whitish [17]. The spines, undifferentiated between radial and central, are 7-9, almost 2 cm long, all slightly curved initially and rigid later on; the colour varies from dark yellow to dark brown. The cephalium is hemispherical, 4 cm high and 9 cm in diameter, covered with white hairs interspersed with red bristles [18].

4.3.2. Cultivation

Desires half shade and a winter minimum of around 10°C; growth is rapid and the stems need support. Propagation is by cuttings.

Figure 6 *Melocactus guaricensis* **[2]**

5. Conclusion

So-called 'succulents' represent an intriguing, vast, multifaceted and multi-coloured universe. The general idea that these botanical species only grow in arid areas is not exactly correct. In fact, this type of plant lives mainly in semi-desert areas, in various corners of the planet: from the Brazilian tropical forests to South America, from the Mediterranean to the Andes, but also in Africa, Australia and some Asian regions. They have adapted perfectly to survive even in the most hostile environments for other life forms. With the passage of time, they have aroused increasing curiosity and have spread almost everywhere for ornamental purposes, also thanks to their rusticity, which makes their cultivation rather easy. This review describes the characteristics of one of the most distinctive cacti, the *Melocactus*, a plant that can be found mainly in Brazil, with its particular shape and the presence of the cephalium, which makes it one of the most distinctive cacti.

Compliance with ethical standards

Acknowledgments

The article is part of the "Microsuc" project: microorganisms for the growth and protection of cacti and succulent plants

Disclosure of conflict of interest

No conflict of interest.

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