



Carrot: History and Iconography

John Stolarczyk and Jules Janick

Carrot is one of the most important root vegetable plants in the world. In its wild state it is a tiny, bitter root with little appeal as a food, but years of human cultivation and domestication, with a helping hand from nature, has made it an extremely versatile vegetable, appearing in several colors, shapes, and sizes. Although cultivated for over 2000 years, and originally used only as a medicinal plant, the domestic carrot (*Daucus carota* var. *sativus*, *Apiaceae* or *Umbelliferae*) remains an important world crop with production expanding rapidly in Asia. Current world annual production is 27 million tonnes; the leading producing countries, China, Russia, and USA, produce 45% of World output (FAO, 2008). The swollen taproots are eaten both raw and cooked, in sweet and savoury dishes and it is known for its high beta-carotene content, which the body converts to Vitamin A. It also forms a major ingredient in the food processing industry, a significant constituent of cosmetic products and its image has long been used to symbolize healthy eating. The leaves are also consumed in salads and the seeds made into a herbal tea.

ORIGINS

The domestic carrot is a cool season biennial plant that grows a rosette of leaves in the spring and summer while building up the stout taproot, which stores large amounts of carbohydrates for the plant to flower in the second year. The flowering stem grows to about 1 m tall, with an umbel of white flowers. The roots are greatly enlarged and sweet with good storage ability. Predominantly a temperate climate plant, the carrot is also cultivated in tropical and subtropical regions, especially at high elevations. Originally wild in many parts of Europe and Asia it was first domesticated in Afghanistan, considered to be the primary center of diversity, and from there spread over Europe, the Mediterranean, and Asia, with Turkey recognised as a second center of diversity. During this spread across the world it introgressed with local wild types, some of which have existed since pre-historic times.

Although fossil pollen of the *Apiaceae* has been identified from the Eocene period (55 to 34 million years ago), the wide distribution of wild carrot, the absence of carrot root remains in archaeological excavations, and the scarcity of documentary evidence make it difficult to determine precisely where, when, and how carrot domestication was initiated. Cultivation of carrot in ancient times is still much disputed, mainly because the wild carrot, also known as Queen Anne's Lace, inter-crosses freely with the cultivated carrot. Seeds of wild and early domesticated carrot were used medicinally in the Mediterranean region before they were used as a root vegetable.

Wild Carrot

Wild carrot is indigenous to Europe, Northern Africa, and parts of western Asia, and seeds

have been found dating from Mesolithic times, approximately 10,000 years ago. Different forms of wild carrot, usually recognized as *D. carota* var. *carota*, have small spindle shaped, whitish, slender roots that are aromatic, and acrid with a disagreeable taste. In some countries it is considered a weed. Wild carrot and domesticated carrot continue to grow side by side in the modern world. It is a popular myth that domestic carrot was developed directly from wild carrot, probably because of its similar odor, leaf pattern and growth characteristics. Botanists have failed to develop an edible vegetable from the wild carrot and when the garden carrot reverts to an ancestral wild type it is quite distinct from the wild form.

The Domesticated Carrot

Almost five thousand years ago, carrots were first cultivated in the Iranian Plateau (Afghanistan, Pakistan, and Iran) and then in the Persian Empire (Brothwell and Brothwell, 1969). Color and flavor were the primary selection criteria for domestication. Root color changed significantly over the domestication period. Wild carrots are white or pale yellow, while purple or yellow were the first colors of domesticates. The domesticated types were divided into two subgroups: Eastern/Asiatic Group (var. *altorubens*) and Western Group (var. *sativus*) as described by Vavilov (1926, 1951).

The Eastern/Asiatic group, the original domesticates, have anthocyanin-pigmented roots, purple, pink, or orangey-yellow, that are often branched, with pubescent slightly dissected leaves that give the plant leaves a grey green appearance. Plants are prone to early flowering. The center of diversity was the Himalayan-Hindu Kush region (Kashmir-Afghanistan) and around Turkestan (Mackevic, 1929; Heywood, 1983). The purple types have poor storage quality and

erratic growth. The purple/red pigment based on anthocyanins turns brown upon cooking, and stains hands and cookware.

The Western group evolved later and has unbranched, carotenoid-pigmented roots that are yellow, orange or red, and occasionally white. The strongly dissected leaves are bright yellowish green and slightly hairy. Plants require extended exposure to low temperatures before bolting. The centre of diversity for the western carrot is the Anatolian region of Asia Minor (Turkey) and Iran (Vavilov, 1926, 1951). Orange carrots found in wild germplasm could suggest a Turkish origin (Simon, 2000). These orange types displaced the purple forms in Europe and the Mediterranean by the 17th century through human preference and selection, and formed the basis of modern commercial cultivars around the world, mainly because of their superior taste, versatility, and nutritional value. Thus, the Asia Minor/Mediterranean basin (Turkey) and temperate Europe regions have been considered a secondary center of origin for carrot and the majority of modern commercial cultivars belong to this group.

The yellow/orange color of western carrots is caused by the plastid-bound pigment carotenoids, carotene, and xanthophyll. White carrots contain only traces of pigment, mainly carotene and xanthophyll (Ladizinsky, 1998). The yellow and white types probably originated by mutation. Purple carrots contain anthocyanins, a powerful antioxidant, whilst red contain lycopenes, good for eye health, and also found in tomato (Rubatzky et al., 1999).

The modern carrot appears to derive from a combination of mutation and selection from a complex gene pool. These involve yellow rooted eastern carrots, cultivated white-rooted derivatives of wild carrot (grown as medicinal plants since classical times), and wild unselected populations from Europe and the Mediterranean (Banga, 1957a, b, 1963a, b; Heywood, 1983). Orange carrots probably arrived from mutations of yellow forms, and then from human selection, commonly thought to be originated in the Netherlands.

HISTORY AND ICONOGRAPHY

One of the problems in unravelling the ancient history of carrot is that there is confusion between parsnip and carrot (Hedrick, 1919). The distinction between the two was finally clarified when Linnaeus published *Species Plantarum* in 1753, creating scientific nomenclature. He



called carrots *Daucus carota* (combining Greek and Latin names) and parsnips *Pastinaca sativa*.

Antiquity

The Greeks refer to wild carrot as *keras*, *staphylinos agrios*, and *daukos* and early forms of carrot began to be cultivated in the last few centuries BCE (Dalby, 2003). Carrot (*karo*) was first mentioned in the third century BCE by Diphilus of Siphnos. Theophrastus (371-287 BCE) in *Enquiry into Plants IX;15* states that *daukon* grows in Arcadia and is saffron colored (Hort, 1926). It seems clear that the Greeks were aware of carrot, wild carrot, and parsnips.

Wild carrot was reported as a medicinal plant in the gardens of ancient Rome, where it was used as an aphrodisiac and in some cases as part of a concoction to prevent poisoning. In fact the seeds of wild carrot contain estrogen, and in some cultures are used as an effective method of contraception. Archaeobotanists using DNA analysis have found Roman-made pills recovered from a 130 BCE shipwreck that appear to contain carrot (Fleischer et al., 2010).

The famous herbal *Peri Ylis Iatrikis* (Latinized as *Materia Medica*) written in Greek about 65 CE by Pedanius Dioscorides, a Roman army physician from Anazabos, Cilicia (now Turkey), describes *staphylinos*, which bears umbellae of white flowers, which are purple or red in the middle (Beck, 2005). This characteristic can only apply to carrot as parsnip has yellow flowers. Both wild [*agrios*] and cultivated [*hemeros*] forms are discussed. The wild plant was thought to ward off reptiles, aid in conception, act as a diuretic, aphrodisiac, and even as an abortifacient when used as a vaginal suppository [pessary]. The cultivated carrot was described as more edible but less medicinally effective.

Interestingly there is also a reference to *daukos* called *Cretan* in which both the seed and root draw out the menstrual period, foetus, and urine, relieve colic, allay chronic coughs, come to the aid of people bitten by poisonous spiders when drunk with wine, and disperse swellings. The Cretan carrot is a related plant, *Athamanta cretensis* sometimes called candy carrot (Candie was the ancient name for Crete). Dioscorides also refers to a plant he called *elaphoboscon*, that had umbellae with yellow flowers. No other umbelliferous plant has yellow flowers and an esculent root except parsnip. The white, sweet edible root is described at about three fingers long and a finger thick with stalk and is used as a vegetable when fresh. Thus, Dioscorides clearly distinguishes carrot from parsnip.

At about the same time, the Roman historian Pliny the Elder (23-79), in *Historia Naturalis* written in the year 77 refers to a plant grown in Syria resembling a parsnip, called *gallicam* in Italy and *daucos* in Greece:

“Petronius Diodotus has distinguished four kinds of *daucus*, which it would be useless here to describe, the varieties being in reality but two in number. The most esteemed kind is that of

Crete [*Daucus creticus* or *Athamanta cretensis*], the next best being the produce of Achaia, and of all dry localities. It resembles fennel in appearance, only that its leaves are whiter, more diminutive, and hairy on the surface. The stem is upright, and a foot in length, and the root has a remarkably pleasant taste and smell. This kind grows in stony localities with a southern aspect.

The inferior sorts are found growing everywhere, upon declivities for instance, and in the hedges of fields, but always in a rich soil. The leaves are like those of coriander, the stem being a cubit in length, the heads round, often three or more in number, and the root ligneous, and good for nothing when dry. The seed of this kind is like that of cumin, while that of the first kind bears a resemblance to millet; in all cases it is white, acrid, hot, and odoriferous. The seed of the second kind has more active properties than that of the first; for which reason it should be used more sparingly.

If it is considered really desirable to recognize a third variety of the *daucus*, there is a plant of this nature very similar to the *staphylinos*, known as the ‘*pastinaca erratica*,’ with an oblong seed and a sweet root. Quadrupeds will touch none of these plants, either in winter or in summer, except indeed, after abortion. The seed of the various kinds is used, with the exception of that of Crete, in which case it is the root that is employed; this root being particularly useful for the stings of serpents. The proper dose is one drachma, taken in wine. It is administered also to cattle when stung by those reptiles.” (Bostock, 1855, XXV, 64).

In speaking of the medicinal virtue he adds “the cultivated form has the same as the wild kind, though the latter is more powerful, especially when grown in stony places.” Pliny called its root *pasticana gallica*, “food for Gauls.” Pliny speaks of four kinds of wild carrot (*daucus*), some of which “grow everywhere on earthy hills and cross-paths having leaves like those of coriander, a stem a cubit high and round heads.”

Among other vegetables that Syria produces, Pliny refers to one very similar to the *staphylinos*, and known to some persons as “*gingidion*,” (wild or French carrot) only that it is more slender than the *staphylinos* and more bitter, though it has just the same properties. Eaten either raw or boiled, it is very beneficial to the stomach, as it entirely absorbs all humours with which it may happen to be surcharged (Bostock, 1855, XX, 16).

There is an intriguing wall painting of a food scene in the Roman tavern in Ostia (Caseggiato del Termopoli) built in the Trajanic-Hadrianic period 98-138 (Fig. 1) that closely resembles carrot or parsnip. If this is so, it is the first known depiction of one of these root vegetables from any period.

Galen (2nd century CE) was the first to use the words *daucus* and *carota* to distinguish carrot from parsnip (*pastinaca*). Galen confirms that *carota* was cultivated when he wrote that the

Figure 1. Carrot or parsnip from a wall painting in a Roman tavern in Ostia (Caseggiato del Termopoli), early 2nd century CE, <http://www.ostia-antica.org/regio1/2/2-5.htm>.



root of the wild carrot was less fit to be eaten than the domestic one (Grant, 2000; Dalby, 2003).

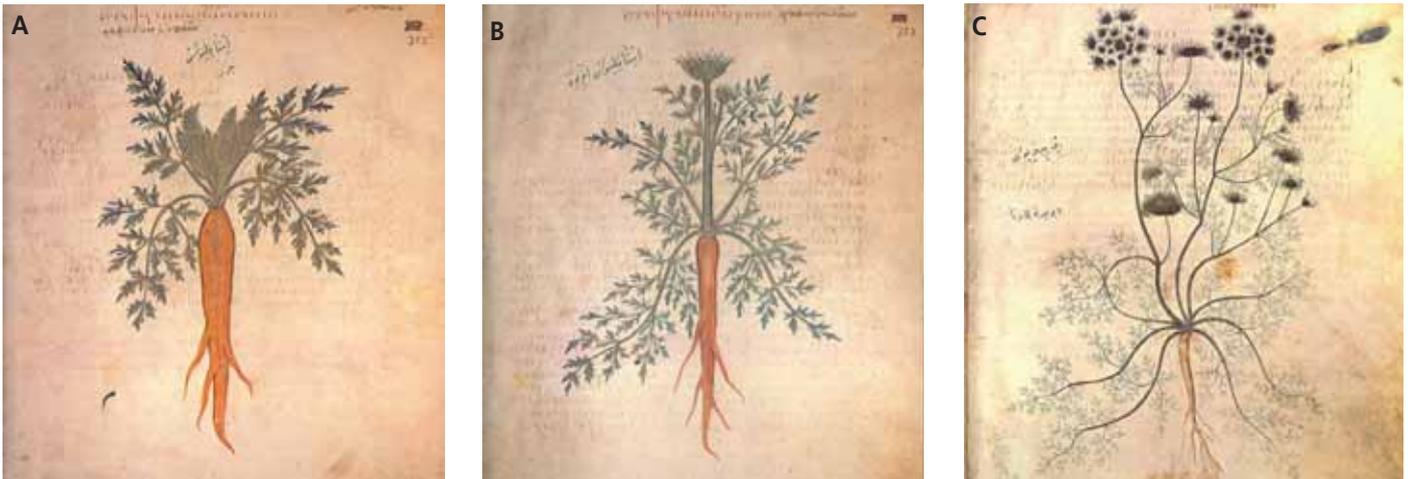
This name for the garden carrot is found first in the Roman writings of Athenaeus in 200, and in a book on cookery by Apicius Czcilius in 230 in which 3 recipes specifically include carrot. One in particular draws interest as it is entitled “*Carotae seu pastinacae*,” suggesting that it is a recipe for carrots, with parsnip as a substitute. Apicius was a gourmet and always tried to include the best ingredients. So here he is perhaps suggesting that carrot is preferred to parsnip.

An alphabetical recension of the *Materia Medica* of Dioscorides was illustrated in 512 (*Juliana Anicia Codex*) for presentation to Juliana Anicia, the daughter of Emperor Anicius Olybrius. A facsimile of this herbal with commentary by Otto Mazel has been published (*Der Wiener Dioskurides*, 1998, 1999). This most famous herbal illustrates cultivated and wild carrots (Fig. 2). Figure 2A, the first clear depictions of an orange carrot, is labelled *Staphylinos Keras* (or cultivated carrot) and portrays a deeply orange straight root with rosette of leaves that looks very close to our modern carrot. Figure 2B, labelled *Staphylinos Agrios* (wild carrot) shows a plant in flower with slender orange roots. Figure 2C, labelled *Gingidion*, shows a flowering plant with an extremely fine yellow root and has been identified as *Daucus gingidium*. *Elaphoboscom* (parsnip) is illustrated separately.

Medieval

In 795 King Charlemagne included carrots in the list of plants recommended for cultivation in the Frankish empire covering western and central Europe (Fox, 1933). Throughout the Dark Ages and early Middle Ages, carrots and parsnips were the main starchy vegetables for ordinary people in Europe, as they were easy to grow and store and a very welcome food to eat during the lean winter months. In the *Geoponica*, a 20 volume work compiled during the 10th century in Constantinople for the Byzantine emperor Constantine VII Porphyrogenitus, *daucos* is named among kitchen vegetables. Colored illustrations of carrot do not appear again until

Figure 2. Cultivated and wild carrots from the *Juliana Anicia Codex* of 512: (A) *Staphylinos Keras*, the cultivated carrot; (B) *Staphylinos Agrios*, the wild carrot, but appears to be a primitive type of cultivated carrot; (C) *Gingidion*, the wild carrot (*Daucus gingidium*).



the 11th century but, as typical of early medieval images, are very crude, yet nevertheless quite accurate (Fig. 3).

Towards the end of the Dark Ages, purple, red, and yellow carrots were reintroduced to Europe from Central Asia by the Arabs. Around 950, Ibn Sayyār al-Warrāq of Baghdad produced a cookbook, the most comprehensive work of its kind with more than 600 recipes that included red-orange, yellow or white carrot (*jazar*) (Harvey, 1992). These were cultivated in Persia in 900, Iran and northern Arabia and the Middle East, in the 10th century, in Syria about the 11th century, and in Europe about 1100 (Banga, 1957a, 1963a). Carrots were valued for their sugar content and sweet dishes like jam, syrups and desserts, and became part of traditional English cookery during this medieval period.

The late 11th century witnessed an intriguing manuscript *Bodleian 130*, *Herbal of Pseudo-Apuleius*, which illustrates carrot root, leaves and flower quite accurately with yellow-orange

roots (Fig. 3A). The script indicated that the Greeks called it *staphylimagrium*, others called it *giger* or *egggon*, the Romans called it *udonaulion*, the Carthaginians called it *siccansade*, the Calabria (Italy) called it *pastinaca silvatica*. The text states: "It grows in stony places and mounds; for women who suffer at childbirth and are not purged. With *Herba pastinaca*, cooked, together with the same water in which it was cooked, you take 30 peppercorns; mix together and give to drink; she will be purged. The same recipe as written above also works against toothache." Two manuscripts, Ashmole 1462 labelled *Pastinaca Silvatica* (Fig. 3B, a yellow/orange root) and Ashmole 1431 labelled *Pastinaca* (Fig. 3C, a darker red root), contain essentially the same text.

Arab traders and Moorish invaders brought carrots to the Northern Mediterranean, while at the same time carrots travelled eastwards along the caravan routes and the Silk Road (Davidson, 1999; Grigson, 1974; Dalby, 2003). By the 12th

century carrots were reported in Spain, followed by Italy in the 13th, and France, Germany, Holland and England by the 14th century.

The discovery of a large quantity of what appear to be processed carrot roots was found in the main market square in Krakow, Poland, in an organic layer dated to the 14th century (Mueller-Bienik, 2010). The exquisitely illustrated manuscripts known as the *Tacuinum Sanitatis*, a medieval handbook on wellness, commissioned by northern Italian nobility during the last decades of the 14th century contains images of plants called *pastinace* but some of them are obviously carrot (Fig. 4).

Herbals

The advent of printing in the 15th century and the technology of the woodblock print had an enormous influence on books about plants. The 15th and 16th centuries – the age of exploration and the beginnings of scientific inquiry – saw an unprecedented demand for the printed

Figure 3. Orange and reddish carrots from 11th century manuscripts: (A) *Herba pastinaca*, *Pseudo-Apuleius*, *Dioscorides*, from Bury St Edmunds, England. (B) *Pastinaca Silvatica*, Bodleian Image Ashmole 1462; (C) *Pastinaca*, Bodleian Image MS Ashmole 1431.



Figure 4. Peasant digging carrots from the *Tacuinum Sanitatis*, Roma 4182, 1380-1400. The long, thin roots, either purple or light yellow, intermingled in the foreground row and in the harvested pile clearly represent carrot. The Latin text reports that pastinace stimulates sexual intercourse but slows down digestion, and that the purple type, ripe in winter, is the best.



herbal by physicians, apothecaries, and wealthy people who needed a source for remedies that existed at the time. For the first time carrot root colors were accurately described while hand-tinted editions confirm what color was being referred to in the text, Leonhart Fuchs in 1542 in his *Historia Stirpium (On the History of Plants)* described red and yellow garden carrots and wild carrots, but names them all *Pastinaca*. The famous Flemish physician and botanist Rembert Dodoens is best known for his herbal *Cruydeboeck*, written in old Flemish and published in 1554 (Fig. 5). It was illustrated by 715 woodcuts of plants, including many copies from those in the Fuchs herbal. He indicates the localities and times of flowering in the Low Countries. The work was used for several centuries as a standard reference book for physicians, and the Latin translation was used by Gerard as a source for his now-famous 1597 *Herball, The Historie of*

Figure 5. Yellow and red carrots from Rembert Dodoens' *Cruydeboeck*, 1554.



Plantas. Gerard uses the English name carrot, but in Latin calls it *Pastinaca*: *P. sativa* var. *tenuifolia*, the yellow carrot and *P. sativa atro-rubens*, the red carrot. He distinguishes parsnips from carrots, calling the former *P. latifolia sativa* and the latter *P. latifolia sylvestris* and expresses dissatisfaction with the name similarity. He notes *Daucus* as a name for carrot used by Galen, but notes that many Roman writers called it *pastinace* or other names.

Renaissance Paintings

The villa of Agostino Chigi in Rome contains decorations by Raphael Sanzio made between 1515 and 1517. The ceiling of the loggia of Cupid and Psyche derived from the *Metamorphoses (Golden Ass)* of Apuleius in the 2nd century contains festoons painted by Giovanni Martini da Udine that illustrate 160 species of plants. An orange carrot appears alongside a purple root (Fig. 6). Another ceiling panel depicts an orange carrot alongside a white rooted parsnip.

Figure 6. Orange and purple carrot from the Loggia of Cupid and Psyche, figures painted by Raphael Sanzio, festoon painted by Giovanni Martini da Udine, 1515-1518.



The emergence of Dutch and Spanish paintings depicting market and kitchen scenes in the 16th century coincides with the period and location that carrot was further developed in Europe. Figures 7-9 provide examples of the colors and shapes of carrot and parsnip roots and similar paintings from the same era and locality were used as evidence by Banga (1963b) to develop his treatises on the origin and distribution of western carrots.

Figure 7. Purple and pale yellow carrots in Vegetable Market (1655-1665), Nicolaas Maes (Dutch) (Rijksmuseum, Amsterdam).

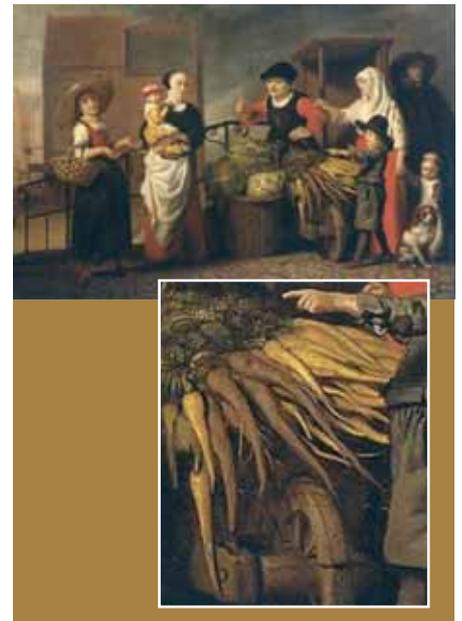


Figure 8. Still life with Game, Vegetables and Fruits of Juan Sánchez Cotán (Spanish), 1602, showing purple and yellow carrot (left) and radish (Museo del Prado, Madrid).



Figure 9. Yellow carrots and parsnips from The Greengrocer 1731, Willem van Mieris (Dutch) (Wallace Collection London).



The Modern Era

European carrot improvement began with material imported from Arab countries, consisting of a purple type, called red by authors before 1700, and a yellow type. Purple types were noted in France in the 1300s and a bit later in Holland and Germany. The yellow forms were noted in England, France and Germany in the 1500s. The yellow carrot became more generally used than purple and it gradually spread throughout Europe superseding the purple in the 16th century (Banga, 1957b).

By the 1700s, Holland was a leading country in carrot development and Banga proposed that "modern" orange version is directly descended from the Dutch-bred carrots of that time. The 'Horn' carrots (named after the town of Hoorn and common in Amsterdam about 1610) were developed in Holland, and the 'Long Orange' was likely to be from selection of a yellow, possibly crossed with an orange/red variety that was unpalatable (Fig. 10). By 1763 carrots were classed as one of four types: 'Long Orange' and three cultivars of Horn Carrot – 'Late Half Long', 'Early Half Long', and 'Early Scarlet Horn'. The modern western orange cultivars of carrots derive from these four types (Smarrt and Simmonds, 1976).

Figure 10. Carrots from Vilmorin's Vegetable Garden (1586). (A) Early Horn; (B) Dutch Horn.



English Horn, or Half-long Scarlet, Carrot.



Dutch Horn Carrot.

In the 18th and 19th centuries an increasing amount of horticultural literature emerged and carrots were included in several homeopathic remedies. For instance John Wesley's little treatise entitled *Primitive Physic; Or, an Easy and Natural Method of Curing Most Diseases* (1761);

chiefly relied on native plants; he advised the sufferer of asthma to "live a fortnight on boiled Carrots only, it seldom fails." A carrot poultice is also recommended for putrid wounds.

Carrot arrived in America with the Pilgrims in 1609 and soon became part of the staple diet. It was also adopted by the native Indians as a food source. The British took the carrot to Australia in 1788. The cheap and accessible orange root was constantly popular as a staple food throughout Victorian times. Many books and literature on household management extolled the virtues of the versatile and tasty humble carrot such as *Mrs Beeton's Cookbook* of 1861, the most famous and esteemed English cookery book of that era, bringing basic cooking advice to the masses in a form and structure that is still used.

World War II revived the popularity of the carrot, elevating it from a mere animal feed to a major food source. The character Doctor Carrot (Fig. 11) was devised in 1941 by the UK Ministry of Food to promote carrots as a substitute for other more scarce vegetables in the campaign called Dig for Victory. The legend about eating carrots to improve night blindness has its roots in World War II when the British government, urging people to grow and eat carrots to ease food shortages, put out a story that the consumption of special high carotene carrots was the reason for the success of the Royal Air Force gunners during the blitz, as a ruse to obscure the launch of the new airborne radar system as well as the use of red light (which helps preserve night vision) in aircraft instruments. Eating carrots does not improve your vision, but the lack of vitamin A can cause night blindness, and carrots are high in vitamin A.

Figure 11. Dr Carrot, a UK promotion in 1941 during World War II.



Recent Developments

In the 1960s, carrots became more standardised as supermarkets demanded uniform size and shape. The supermarket boom continued into the 1970s. Pre-packaging became the order of the day and gave the producers more advertising and marketing opportunities with brightly colored orange striped plastic bags, making the carrots inside look even more attractive, a practice that continues today. Breeders introduced literally hundreds of cultivars; the most widely favored types grown in temperate climates are 'Danvers', 'Imperator', 'Nantes' and 'Chantenay', whereas in subtropical areas 'Kuroda', 'Brasilia' and tropical 'Nantes' are popular.

In China and Japan, however, yellow and red types are very popular. The purple and yellow carrot varieties are making a comeback and

are proving popular in the farmers markets in the US and the UK. In a quite bizarre way the purple carrot has turned full circle and the color originally used to dye the royal robes of ancient Afghans is now an essential part of the food coloring industry.

The natural colorant from purple carrots is used in a myriad of items such as candies, juices, and fruit preparations. Many countries are now marketing "rainbow" carrots, mixed bags of red, yellow, white, purple and orange carrots, and this novelty seems to be successful (Fig. 12).

Modern breeding now concentrates on producing strains with even coloring, uniform size,

Figure 12. A wide range of carrots available today (photo credit USDA).



tender flavor, and greater yield (Simon, 2000). Greater resistance to bolting is another aim of breeders together with carrot fly resistance and, increasing tolerance to heat and drought. Carotene (present in small amounts in wild carrot) has been increased by centuries of selection and development but volatile oils have been decreased in this process, affecting flavor.

Baby carrots were created in the late 1980s as a way of making use of carrots that are too twisted or knobbly for sale as full-size. These were heavily promoted in the US in 2010 through a \$25 million campaign to attract young people to eat more carrots through the "Eat 'em like junk food" campaign. They are on sale in school vending machines and via seasonal promotions such as "Scarrots" at Halloween! Some baby types are actually young carrots planted at very high densities and generally are more expensive but most are "created" from pieces of larger roots (Fig. 13).

The virtues of carrot are still being expanded in the 21st century. In 2008 a "super carrot" was announced containing much higher levels of calcium. Carrots have been promoted as a future ingredient in biofuels. A polymer derived from

Figure 13. Organic baby carrots (Grimmway image).



carrots and other root vegetables is now used to fabricate a racing car steering wheel and fishing rods. The oil from carrot seeds has proved to be an excellent lubricant in industrial applications. Carrot appears in a multitude of skin and hair care products. Finally, a plant compound found in carrots called luteolin has been shown to help reduce age-related inflammation in the brain and memory deficits (Johnson, 2010).

Parsnip - The Cinderella of the Vegetable Kingdom

If carrot is the Prince Charming of the root vegetables, then parsnip is surely Cinderella, unloved, ignored, and rejected. This sweet and delicious root vegetable, resembling an overgrown ivory-skinned carrot, probably had equal and aristocratic status with the carrot in Greek and Roman times and its spread into Western Europe is not separately documented. Historical references to carrot and parsnip are intertwined; early medieval carrots and parsnips were both thin and woody and mostly of a vaguely whitish color. This being the case, almost everyone up to the early modern period can perhaps be forgiven for failing to distinguish between the two, however frustrating this may be for the food and agricultural historian.

In classical and medieval writings both vegetables seem to have been sometimes called *pastinaca* and without associated evidence of color or taste, it is difficult to distinguish the two. By the Middle Ages the parsnip was a popular vegetable in Europe, particularly as fleshier and tastier roots were developed, and often used to sweeten dishes in the absence of sugarcane not yet imported in bulk from the New World plantations and at a time when honey was a rare and expensive luxury. Before the potato arrived in Europe, parsnip was the staple starch crop.

Gerard's 1597 *Herball*, speaking of its uses as a vegetable, observes: "The Parsneps nourish more than do the Turneps or the Carrots, and the nourishment is somewhat thicker, but not faultie nor bad. There is a good and pleasant foode or bread made of the rootes of Parsneps, as my friend Master Plat hath set forth in his booke of experiments. It is said that Marmalade made with the roots, and a small quantity of sugar, will improve the appetite, and serve as a restorative to invalids."

Although parsnip was introduced by Europeans into North America with the carrot, it never really sustained favor and was placed in the shadow of the gorgeous carrot and the more productive potato. This under-rated vegetable needs further attention from the scientific community as there is a genuine fear that it will disappear into obscurity. Like Cinderella it deserves a much higher standing amongst its peers.

ACKNOWLEDGEMENTS

Appreciation is expressed to B.C. Barker-Benfield, Philipp W. Simon, Judith Taylor, Bill Thayer, and Anna Whipkey for assistance with this manuscript. We acknowledge Bodleian Library, Imperial War Museum, Museo del Prado, Rijksmuseum, Royal Botanic Gardens at Kew Library, Staatliche Museen, Wallace Collection London.

REFERENCES

- Banga, O. 1957a. Origin of the European cultivated carrot. *Euphytica* 6:54-63.
- Banga, O. 1957b. The development of the original European carrot material. *Euphytica* 7:64-76.
- Banga, O. 1963a. Main Types of the Western Carotene Carrot and Their Origin. W.E.J. Tjeenk, Willink, Zwolle, The Netherlands.
- Banga, O. 1963b. Origin and distribution of the western cultivated carrot. *Genetica Agraria* 17:357-370.
- Beck, L.Y. (trans.). 2005. Dioscorides Pedanius of Anazarbus: *De Materia Medica*. Oolms-Weidmann, Hildesheim, Zurich.
- Bostock, J. 1855. *The Natural History. Pliny the Elder, with Copious Notes and Illustrations*. Taylor and Francis, Red Lion Court, Fleet Street.
- Brothwell, D. and Brothwell, P. 1969. *Food in Antiquity*. Johns Hopkins Univ. Press, Baltimore. p.111-112.
- Dalby, A. 2003. *Food in the Ancient World from A to Z*. Routledge Taylor & Francis Group, London and New York. p.75.
- Davidson, A. 1999. *Oxford Companion to Food*. Oxford Univ. Press, Oxford. p.741.
- Der Wiener Dioskurides. 1998, 1999. 2 vol. Akademische Druck-u Verlagsanstalt, Graz.
- FAO. 2008. FAOSTAT, Rome.
- Fleischer, R.M., Touwaide, A., Appetiti, E., Harbaugh, D. and Kress, J. 2010. Composition of pharmaceuticals from a 1st century BC/AD Roman shipwreck based on chloroplast DNA sequences. Fourth Intl. Symp. on Biomolecular Archaeology, Copenhagen. (http://www.isba4.net/ISBA4_FINAL.pdf)
- Fox, H.M. 1933. *Gardening with Herbs for Flavor and Fragrance*. Macmillan, New York. (Reprinted Dover Publ., Inc., 1970, p.45.)
- Gerard(e), J. 1597. *The Herball or General Historie of Plantes*. John Norton, London.
- Grant, M. 2000. *Galen on Food and Diet (translation and notes)*. Routledge Taylor & Francis Group, London and New York. p.151.
- Grigson, J. 1974. *World Atlas of Food*. Mitchell Beazley, London. p.170.
- Harvey, J.H. 1992. Garden plants of Moorish Spain: A fresh look. *Garden History* 20(1):71-82.
- Hedrick, U.P. 1919. *Sturtevant's Edible Plants of the World*. J.B. Lyobn, Albany, N.Y. p.265.
- Heywood, V.H. 1983. Relationships and evolution in the *Daucus carota* complex. *Israel J. Bot.* 32:51-65.
- Hort, A.F. (trans.). 1926. *Theophrastus: Enquiry into Plants*. Loeb Classic Library, Cambridge, Mass.
- Johnson, 2010. Luteolin inhibits microglia and alters hippocampal-dependent spatial working memory in aged mice. *J. Nutr.* (<http://jn.nutrition.org/content/140/10/1892.abstract>)
- Ladizinsky, G. 1998. *Plant Evolution under Domestication*. Kluwer Academic Publishers, The Netherlands. p.192.
- Mackevic, V.I. 1929. The carrot of Afghanistan. *Bul. Appl. Bot., Genetics Plant Breed.* 20:517-562.
- Mueller-Bienik, A. 2010. Carrot (*Daucus carota* L.) in Medieval Kraków (S. Poland): A cultivated form? *J. Archaeolog. Sci.* 37(7):1725-1730.
- Rubatzky, V.E., Quiros, C.F. and Simon, P.W. 1999. Carrots and Related Vegetable Umbelliferae. CAB International, Wallingford. p.2-9.
- Simon, P.W.W. 2000. Domestication, historical development, and modern breeding of carrot. *Plant Breed. Rev.* 19:147-190.
- Smartt, N.W. and Simmonds, J.W. (eds.). 1976. *Evolution of Crop Plants*. 2nd ed. Longman Sci. & Technol., Harlow. p.291-293.
- Vavilov, N.I. 1926. *Centres of Origin of Cultivated Plants*. Leningrad.
- Vavilov, N.I. 1951. The origin, variation, immunity and breeding of cultivated plants. *Chron. Bot.* 13:1-366 (translated from Russian by Starr Chester)
- Wesley, J. 1761. *Primitive Physic; Or, an Easy and Natural Method of Curing Most Diseases*. General Books LLC (2009) - Paperback - 112p. (also on Google Books, pdf)

ABOUT THE AUTHORS



John Stolarczyk



Jules Janick

John Stolarczyk is the Founder and Curator of the on line World Carrot Museum (www.carrotmuseum.com) based in the UK. The mission of the virtual museum is to educate, inform and amuse visitors through the collection, preservation, interpretation and exhibition of objects relating to the carrot. Email: curator@carrotmuseum.com

Jules Janick is the James Troop Distinguished Professor in Horticulture, Department of Horticulture & Landscape Architecture, Purdue University, West Lafayette, Indiana, USA. Email: janick@purdue.edu