Chapter 13

Plant Iconography - A Source of Information for Archaeogenetics

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Abstract

Artistic works from prehistory and antiquity to the present constitute an alternate source of information on crop plants that become a valuable resource for investigations involving genetic and taxonomic information, as well as crop history. Sources of plant iconography include cave paintings, ancient mosaics, sculpture, carvings and inlays, frescos, tapestries, illustrated manuscripts, herbals, and books, as well as photographs of desiccated remnants.

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Introduction

Works of art from pre-history and antiquity to the present, constitute an alternate source of information on plants and crops (Janick, 2007). Plant iconography becomes a valuable resource for investigations involving genetic and taxonomic information, as well as crop history, including evolution under domestication, crop dispersal, lost and new traits. Crop images are one of the unequivocal tools for assessing the historical presence of botanical taxa in a particular region and are an especially valuable resource for determining morphological changes of crops from antiquity to the present (Gyulai *et al.* 2006, 2009; Dane and Liu 2007). Often early written descriptions are ambiguous and the confusion of plant names in ancient documents makes the image the "smoking gun" in determining the precise species involved, plus providing information on the presence of morphological characters that may be unclear from the text. Although a plethora of ancient plant images exists, they are widely scattered among libraries and museums, and are often difficult to locate and to access. Moreover, images are often copyrighted and costs for access tend to be high. Many museums and libraries restrict photography and restrict viewing of rare books, making research a difficult, time consuming and expensive activity. However, the digitization of information by some of the major world libraries has greatly facilitated the search for ancient illustrations, although they still remain expensive to publish. An attempt has been made to assemble illustrations of cucurbits and solanaceous crops (Janick *et al.*, 2006, 2007b). The purpose of this chapter is to review the role of crop iconography in understanding crop history and to introduce some sources for archaeogenetics.

There are numerous sources of plant iconography. These include cave paintings, ancient mosaics, sculpture, carvings and inlays, frescos, tapestries, illustrated manuscripts, herbals, and books, as well as photographs of desiccated remnants. In this paper, we will briefly review sources of crop images from a historical perspective. Examples of studies on crop iconography by the authors and colleagues are included in the References section (Daunay and Janick, 2007, 2008; Daunay *et al.*, 2007ab, 2008, 2009; Hummer and Janick, 2007; Janick 2002, 2004a,b, 2007; Janick and Caneva, 2005; Janick and Daunay, 2007; Janick and Paris, 2005, 2006a,b,c; Janick *et al.*, 2006, 2007a,b, 2009, 2010; Paris and Janick, 2005, 2008a,b; Paris *et al.*, 2006a,b, 2009; Renner *et al.*, 2008).

Epochs

The Paleolithic and Neolithic Record

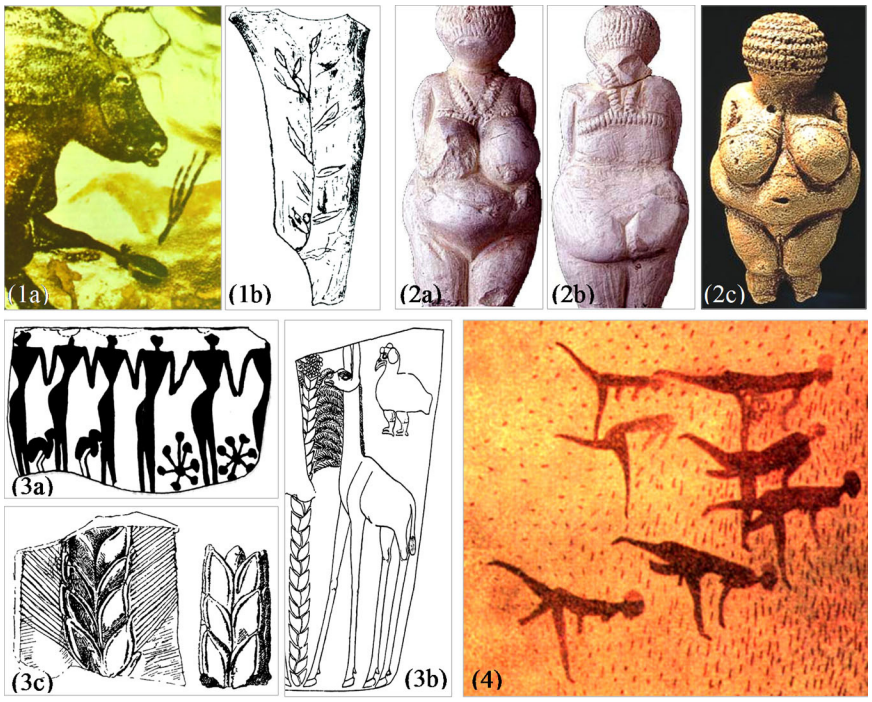
The Paleolithic Era (Old Stone Age) extends back 2.5 million years when primitive humans were hunters and gatherers and used stone tools, to the introduction of agriculture about 12,000 BP known as the Neolithic Era. Their culture survived chiefly though the remains of stone tools, whose features along with carbon dating can be used to determine chronology.

About 500,000 years ago, a surge of hominid expansion occurred from populations that had a brain capacity of 1100–1300 cc, a species now known as archaic *Homo sapiens*. This group gave rise to Neanderthals; brawny, large brained, tool-making humans that appeared in Europe about 250,000 years ago but were destined to be overtaken by an African group via Asia, *Homo sapiens* or Cro-Magnon, the human species that is us. About 200,000 years ago, these two groups coexisted but Neanderthals disappeared about 25,000 to 30,000 years ago. Legacies of this new group, in the form of cave paintings, emphasized the hunt and represent the beginning of art history. The images were mostly of animals but included plants (Tyldesley and Bahn, 1983) (Figure 1). Some sculptures of voluptuous women (Figure 2) known as Venuses, still present an emotional impact related to the keen interest of early humans in fertility, but evidence of clothing made from plant and animal sources indicates the development of weaving and textile technology. The spread of agriculture about 10,000 to 12000 BP occurred in a relatively short period of time and this "sudden" transformation in culture is referred to as the Neolithic Revolution. Crop plants can be identified in Neolithic and Bronze Age images (Figure 3, 4).

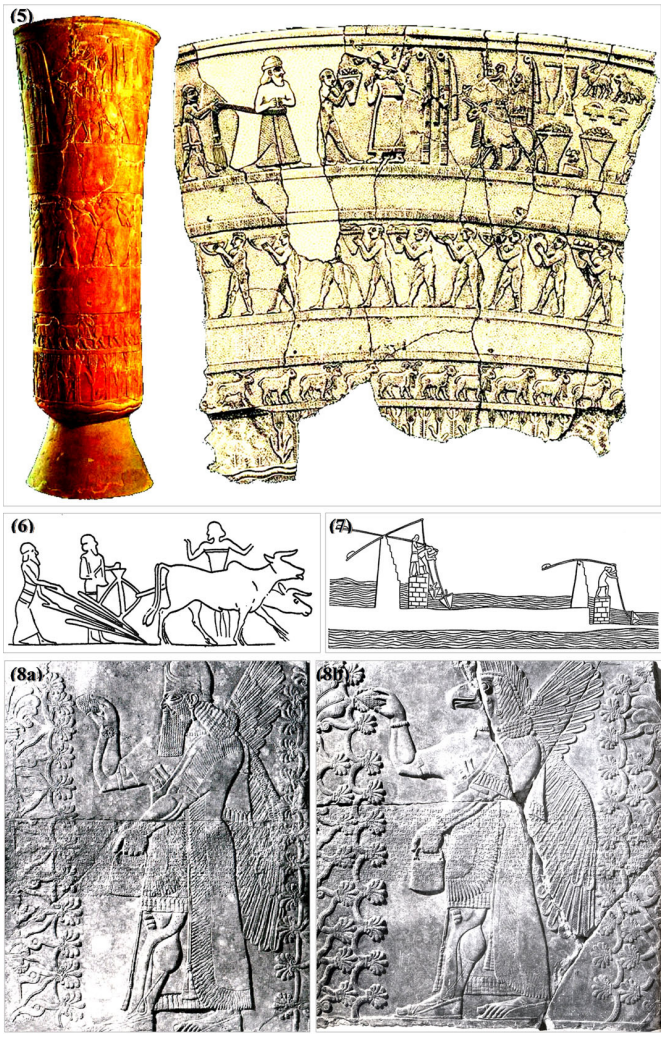
Mesopotamia

The ancient Near East cultures known as Mesopotamian civilization are largely based on Semitic populations that existed between the Tigris and Euphrates Rivers that soon expanded to the area known as the Fertile Crescent, which includes parts of present day Israel, Jordan, Lebanon, Syria, Iraq, and Iran. A second Neolithic Revolution between 6000 and 3000 BCE (the Bronze Age), involved the change from villages to urban centers and the development of a settled agriculture coinciding with the beginning of fruit culture. This is well documented in the decorations of a vase, (Figure 5), late 4th millennium BCE, found in Uryuk (biblical Erekh), an ancient city on the Euphrates north of

present-day Basra, Iraq, that is associated with Sumerian civilizations, where writing was invented. Other evidence of agricultural technology includes the refinement of a plow with a seed drill (Figure 6), date palm pollination (Figure 7), and irrigation technology (Figure 8).



Figures 1- 4. The Paleolithic and Neolithic Records. Figure 1. Paleolithic images of plants (17 - 30,000 years BCE): *(a)* aurock with a primitive image of a plant; *(b)* a more sophisticated image showing stem and leaves carved on a reindeer horn (Source: Tyldesleay and Bahn, 1983). *Figure 2.* Woman figurine of the Paleolithic period *(a, b)* showing evidence of textile technology. (source: Janick, 2007); *(c)* Woman figurine ('Venus' from Villendorf) discovered in 1908 by Hungarian archaeologist József Szombathy at a paleolithic site (ca. 25,000 years BCE) near Willendorf, Austro-Hungary. *Figure 3.* Neolithic and Bronze age representatives of crops where plants can be identified: *(a)* pottery image form Tejpe Sialk, Iran, 7000 BCE; *(b)* predynastic Egyptian image of palm tree and gazelle 5000 BP; *(c)* cereal carvings, Egyptian first dynasty 5000 BCE (Source: Janick, 2007). *Figure 4.* Women gathering grain, Tassilil n'Ajjer, Algeria (5000-6000 BCE) (Source: Musée de l'Homme, Paris).



Figures 5-8. Mesopotamia. *Figure 5.* The Uryuk vase (ca, late 4th millennium BCE, Attendants offer fruit in a wedding ceremony, probably between a priest king and the goddess Innana (Istar). Note the presence of barley and sesame at the bottom next to the river (Source: Pollack, 1999). *Figure 6.* A Babylonian scratch plow with seed drill from a Cassie cylinder seal, 2nd millennium BCE (Source: Singer *et al.,* 1954). *Figure 7.* Raising water from the river with a shaduf by Assyrians. From the palace of Sennacherib at Nineveh, Mesopotamia, 7th century BCE (Source: Singer *et al.,* 1954). *Figure 8a,b.* Date palm pollination depicted in Assyrian bas reliefs, 883–859 BCE. The pollinator assumes the form of a godlike figure (genie) and the date palm has been transformed into a symbolic tree (Source: Paley, 1976).

Ancient Egypt

Paleolithic-Neolithic artifacts along the Nile date back 12,000 years. Nubian, Ethiopian, and Libyan populations fusing with Semitic and West Asian immigrants formed a people and created the Egypt of history. A continuous 6000 year record exists with a unique and productive agriculture at its base. Knowledge of the history of Egyptian agronomy and horticulture can be gleaned from the archeological record and is supported by surviving written Egyptian documents, temple inscriptions, tombs paintings, as well as commentary from Antiquity such as the Hebrew Bible, the Greek historian, Herodotus (484–413 BCE), and the Greek philosopher and botanist, Theophrastus (372–288 BCE).

The ancient technology of agriculture can be vividly reconstructed from the artistic record, paintings and sculpture in tombs and temples dating onward from 3000 BCE. Agricultural activities were favorite themes of artists, who illustrated lively scenes of daily life that adorn the tombs of the pharaohs and dignitaries. The artistic genius engendered by Egyptian civilization, the superb condition of many burial chambers, and the dry climate have made it possible to reconstruct a detailed history of agricultural technology. Ancient Egypt is shown to be the source of much of the agricultural technology of the Western World. Illustrations of these artifacts can be gleaned in four key references: Keimer (1924), Singer *et al.* (1954), Darby *et al.* (1977), and Manniche (1989). The Museum of Agriculture in Cairo has a rich collection of artifacts, including desiccated plant specimens.

Examples of the presence of plant images from ancient Egypt are shown in a brief sampling of the artistic record. This includes harvest of pomegranates, grape harvest and wine making (Figure 9), and a collection of cucurbits (Figure 10). The absence of images of cucumber (*Cucumis sativus* L.) supports the conclusion that the many reference to cucumbers in English translations of ancient texts should be understood as snake melons, *Cucumis melo* L. subsp. *melo* Flexuosus group (Janick *et al.*, 2007a).

Pre-Columbian America

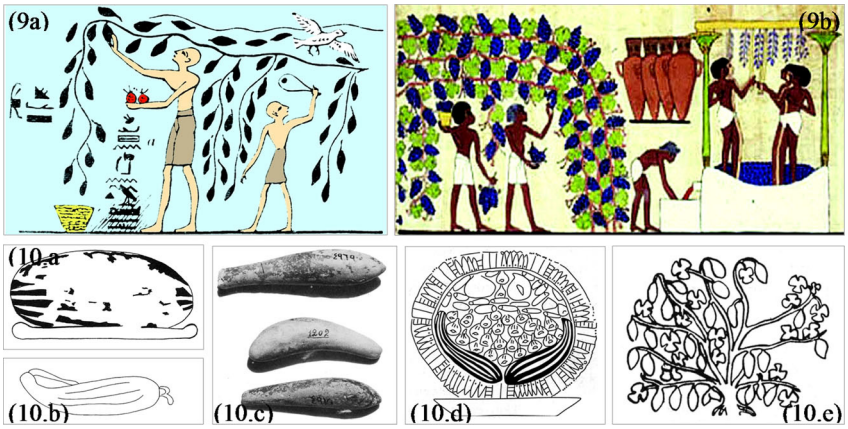
Aztec, Maya and Inca cultures in the Americas at the time of the encounter of Columbus with the New World, were monumental civilizations similar in many ways to that of ancient Egypt of 2000 BCE, with a developed agriculture, enormous temples in the form of pyramids, pictorial writing, a system of cities and government, a bewildering theology, and magnificent art. There was a dark

side, too, of human sacrifice, cannibalism, slavery, and constant warfare. The rich art of these civilizations include embroideries (Figure 11) and ceramics that celebrate the domestication of indigenous crops (Figure 12). Unfortunately, many of the codices were destroyed by the conquistadores and the church. Native artists post-Columbus made detailed illustrations of potato culture in the form of a calendar (Figure 13) as gifts to the King of Spain.

Sources

Mosaics and Inlays

The assemblage of images from small pieces of colored glass, stone, or gems referred to as mosaics, date to the third millennium BCE. Mosaics were popular in ancient Greece and Rome and survive in Christian and Islamic art up to the present. Mosaics were prominent as decorations on floors, walls, and ceilings of private residences and public buildings, especially churches,



Figures 9-10. Ancient Egypt. Figure 9. Fruit harvest in ancient Egypt: *(a)* pomegranate harvest and a boy using a sling to chase birds; *(b)* wine production with collection of grapes under a pergola (Source: Janick, 2007). *Figure 10.* Cucurbit images in ancient Egypt: *(a)* watermelon (*Citrullus lanatus)* showing oblong striped fruit, Old Kingdom, *(b)* snake melons (*Cucumis melo* subsp. *melo* Flexuosus Group) with striations, with attached peduncle and corolla, 18th Dynasty; *(c)* a basket of striped melons and dates from a wall painting at Thebes, 18th Dynasty, *(d)* wooden models of melon, New Kingdom; *(e)* carving of squirting cucumber (*Ecballium elaterium*) based on thick root, bushy growth habit, and small oval in an image of an early botanical collection on the walls of the temple of Karnak ca. 1450 BCE (Source: Janick *et al.,* 2007a).

Figures 11-13. Pre-Columbian America. Figure 11. Capsicum pepper in pre-Columbian America: *(a)* embroidery showing fruits held by a man and two fruits in chords around his neck, 400-500 CE; *(b)* pottery from Peru, Mochica period (1–600 CE) (Source: Daunay *et al.,* 2008). *Figure 12.* Pre-Columbian ceramic jars from Peru: *(a)* peanut; *(b)* potato; *(c)* squash; *(d)* cacao pod (Source: Leonard, 1973). *Figure 13.* Planting and harvesting of potato by the Incas (1580) (Source: Leonard, 1973).

mosques, palaces or mansions and constitute some of the glories of ancient, medieval, and Renaissance art in the West. Many thousands of ancient mosaics have been preserved and are actively studied by art historians and can be accessed online. Mosaic art spread throughout the Roman Empire and are particularly rich in areas that today are in Italy, Tunisia, Libya, Syria, and Turkey. The Hatay (Antakya) Archeological Museum has a splendid collection from the ancient city of Antioch of ancient Syria (Hatay province, however, is now part of Turkey) based on discoveries in 1932–1939.

Roman mosaics include rich scenes of plants and agricultural crops. One panel (Figure 14) from the 3rd century CE depicts agricultural scenes and contains the first image of grafting along with other scenes of fruit culture. Examples of cucurbits and other fruits are shown in Figure 15.

Mughal mosaics are found among the decorations of the Taj Mahal, constructed in Agra, India, by Shah Jahan from 1632 to 1658 as a memorial to his wife known as Mumtaz Mahal (Janick *et al.* 2010). Islamic decoration restricts graven images of humans but is rich in botanical subjects and includes floral inlays known as *pietra dura* (Figure 16) and sculpted bas reliefs known as *dados* (Figure 17). The plant images are rich in ornamental geophytes (bulb crops) common to the region.

Sculptures

Plants in sculptured form are found in Egyptian, Greek, Roman, Indian and Renaissance art. In ancient Egypt, the papyrus and lotus were symbols of the upper and lower Nile region; and the reunification of Egypt in the third millenmium BCE is shown in illustrations where these two plants are intertwined (Figure 18.a) and these forms are also found in architectural columns (Figure 18B). A Roman bas relief of snake melon from Merida, Spain is identified by its leaves and striated fruit (Figure 19). The cathedral bronze doors in Pisa, Italy dated 1601, are rich in sculpted food crops that surround the panels of religious scenes and include eggplant, cucumber, and a large, ribbed, tomato (Figure 20).

Illustrated Manuscripts

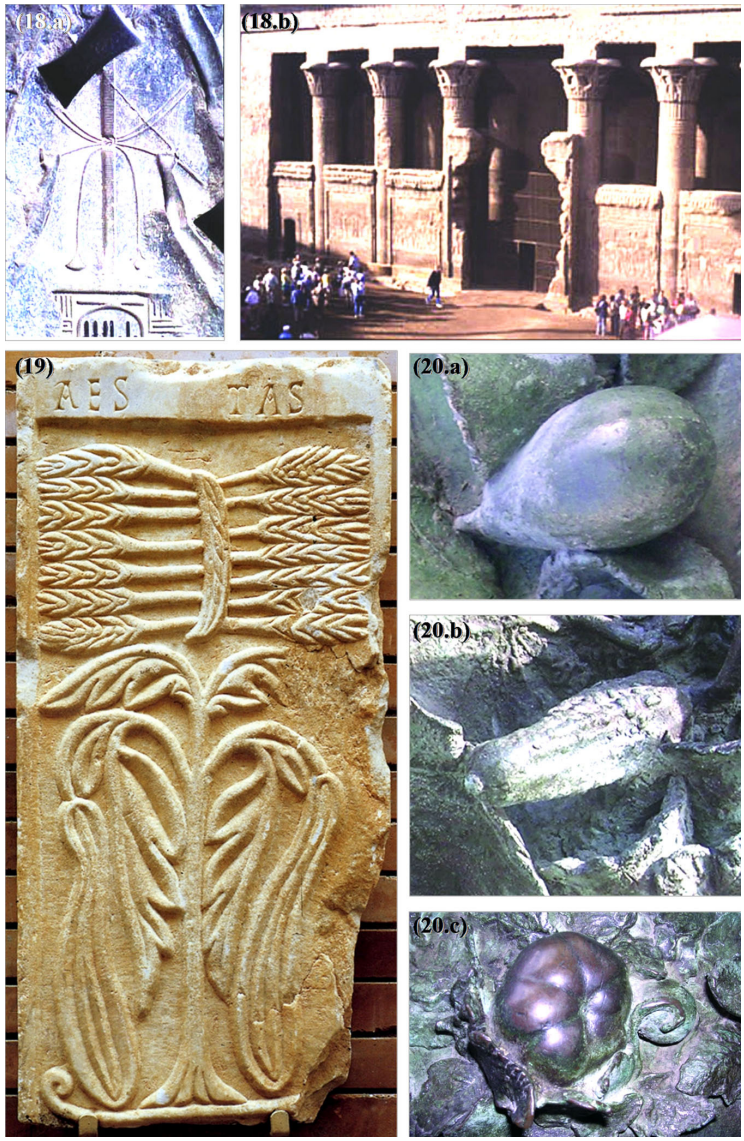
The *Juliana Anicia Codex (JAC*) or *Codex Vindobonenis*, 512 CE, is a magnificent, illustrated manuscript from late antiquity found in Constantinople and based on the famous herbal *Peri Ylis Iatrikis* (Latinized as *De Materia Medica, On Medical Matters*) originally written about 65 CE by the Roman army

Figures 14-17. (Continued)

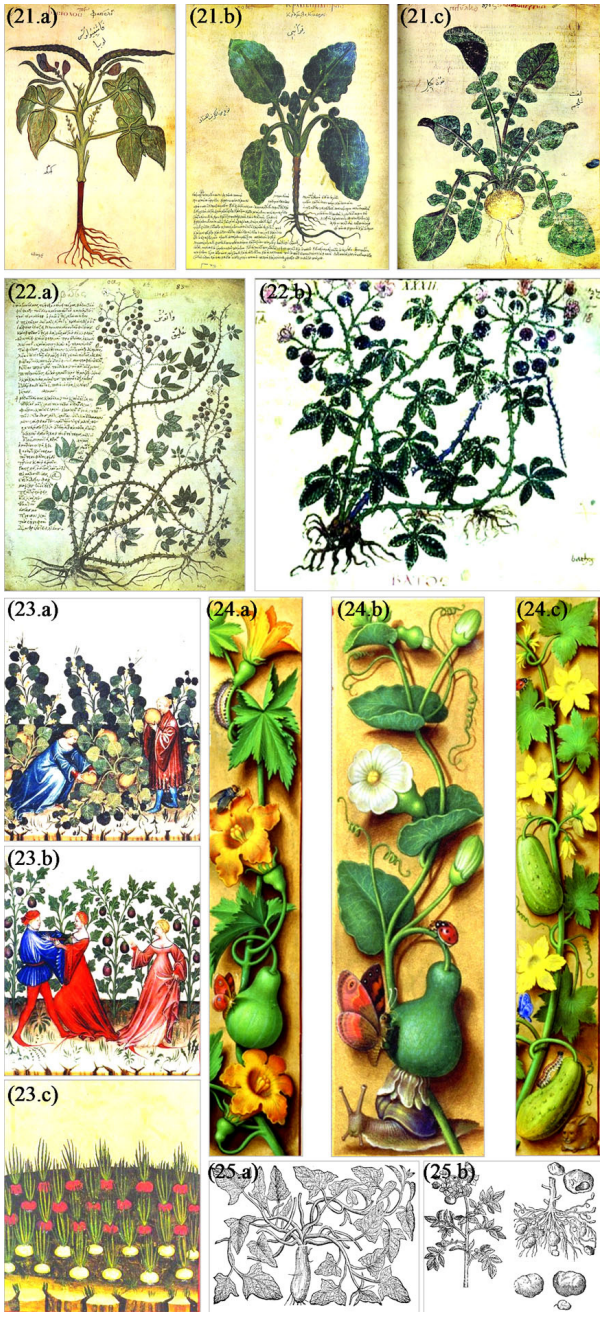
Figures 14-17. Mosaics and Inlays. Figure 14. Roman pomology in mosaics from St. Roman-en-gal, 3rd century CE: *(a)* detached scion grafting; *(b)* fruit harvest; *(c)* juice extraction (Source: Janick, 2007). *Figure 15.* Cucurbits in Roman mosaics; *(a)* long fruited melon (*Cucumis melo* Flexuosus Group) with small yellow-orange corollas clinging to the acute stylar end from Tunisia, 2nd century; *(b)* immature and mature long fruited melons showing fruit splitting. Tunisia 3rd century; *(c)* round fruited melon *Cucumis melo* showing striping, Tunisa. 4th century; *(d)* bottle gourd (*Lagenaria siceraria*) showing characteristic swelling on the pedunular end; *(e)* youth holding bottle gourd in right hand and watermelon (*Citrullus lanatus*) in left hand and, in mosaic named August, Tegea Episkopi, late 4th to 5th century Peloponnese (Source: Janick *et al.,* 2007a). *Figure 16.* Floral inlays in the Taj Mahal (1632-1658): chrysanthemum (*Chrysanthemum*), central flower, plus Siroi lilies (*Lilium mackliniae*) on either side. (Source: Janick *et al.,* 2010). *Figure 17.* Floral bas relief in the Taj Mahal (1632–1658): (dado) of cut stem in an urn include iris in center and in descending order are columbine (*Aquilegia* sp.), daffodil (*Narcissus* sp.), columbine, windflower (*Anemone* sp.), tulip, (*Tulipa* sp.) windflower, capsule of poppy (*Papaver* sp.), delphinium (*Delphinium* sp.) (Source: Janick *et al.,* 2010).

physician Pedanius Dioscorides (20–70 CE) born in Anazarbus, Cilicia, in what is now southeastern Turkey. The manuscript, made for the daughter of the Roman emperor Anicius Olybrius, contains descriptions, medical uses, and illustrations of almost 400 plants listed alphabetically and can now be accessed through a two-volume facsimile edition, *Der Wiener Dioskurides* (1998, 1999). There is an English translation by Beck (2005) of the reconstructed, original, non-alphabetic Dioscoridean manuscript in German by Wellman (1906–1914). Four examples of crop information from the *JAC* are included in Figure 21.a,b,c, and 22.a. The painting of cowpea (*Vigna unguiculata*) shows indeterminate plant growth, an interesting genetic variant in this species. The illustration of two brassicas show the non-heading trait in cabbage and rather typical morphology of turnip. Finally, an elegant depiction of blackberry (Figure 21.a) shows primocane fruiting and rooting of shoots but there are botanical inaccuracies in leaf morphology and petal number (Hummer and Janick 2007). A similar drawing (Figure 22.b) in a later recension (ca. 675) of Dioscorides called *Codex Neapolitanus*, although not as fine as that of the *JAC*, is botanically more accurate in reference to leaf and petal morphology, indicating that both drawings derive from a lost template.

A late medieval example of crop illustrations can be found in a series of lavish versions of manuscripts known as the *Tacuinum Sanitatis* (*Tables of Health*), which were probably prepared as royal gifts in Europe. There are six major works (one is divided) in libraries in Liège, Vienna, Rome, Paris, and Rouen, which were commissioned by northern Italian nobility during the last decade of the 14th century and the course of the 15th century (Paris *et al.*, 2009;



Figures 18-20. Sculptures. *Figure 18.* Sculptured plants in ancient Egypt. *(a)* Intertwining of lotus and papyrus symbolizing the reunification of upper and lower Egypt. Source Cairo Museum; *(b)* The Ptolomeic Temple of Khnum (Kom Ombo) at Esna (2nd century BCE) showing columns representing papyrus and lotus (Photo by J. Janick). *Figure 19.* Marble relief entitled summer from Merida, Spain 4th century with sheaf of wheat and melon (*Cucumis melo* Flexuosus Group) showing dentated leaf and striated fruits (Source: Janick *et al.,* 2007a). *Figure 20.* Sculpted images of eggplant *(a)*, cucumber *(b)*, and tomato *(c)* in the bronze doors of the Cathedral in Pisa (1601) (Photo by J. Janick).



Figures 21-25. (Continued)

Figures 21-25. Illustrated Manuscripts. Figure 21. Crop illustrations from the *Juliana Anicia Codex* of 512 CE: *(a)* cowpea (*Vicia unguiculata*) showing indeterminate growth habit. *(b)* non-heading cabbage (*Brassica oleracea*) *(c)* turnip (*Brassica rapa*) (Source: Der Wiener Dioskurides, 1998, 1999). *Figure 22.* Blackberry (*Ruus ulmifolius*): *(a) Juliana Anicia Codex*; *(b) Codex Neapolitanus*. *Figure 23.* Crops of the *Tacuinum Sanitatis*, 14th century. *(a)* melon (*Cucumis melo* subsp. *melo*) from *Vienna 2644*, with golden large round fruit that are obviously aromatic as one is being sniffed by the courtier in the red gown, *Vienna 2644*; *(b)* aubergine / eggplant (*Solanum melongena*) with developing globose, purple fruit borne near plant apices is shown behind a fondling couple being admonished by a lady, implying that eggplant has aphrodisiacal properties, *Vienna 2644 (c)* Onion (*Allium cepa*) from showing red and white bulbs, *Roma 4182*. (Source: Paris *et al.,* 2009; Daunay *et al.,* 2009). *Figure 24.* Cucurbits of the *Les Grandes Heures d'Anne de Bretagne* (1503–1508): *(a)* Quegourdes de Turquie (*Cucurbita pepo*); *(b)* Quegourdes (*Lagenaria siceraria*); *(c)* Concombres (*Cucumis sativus*) (Source: Paris *et al.,* 2006a). *Figure 25.* Woodcuts of *(a)* sweet potato (*Ipomoea batatas*) and *(b)* potato (*Solanum tuberosum*) from the 1597 *Herball* of John Gerard(e).

Daunay *et al.*, 2009; Janick *et al.*, 2009). The text is based on an 11th-century Arabic manuscript, *Taqwim al-Sihha bi al-Ashab al-Sitta* (*Rectifying Health by Six Causes*), written as a guide for healthy living by the Christian Arab physician known as Ibn Butlan (d. 1063). Vivid agricultural imagery includes scenes of the harvest of vegetables, fruits, flowers, grains, and culinary and medicinal herbs, accompanied by a brief summary of the health aspects of the subject. Each of the manuscripts are drawn by different artists but are obviously related. The *Vienna codex Ser. N. 2644* contains the most accurate depictions, which include 9 cereals, 26 vegetables, 33 fruits, 3 flowers, and 21 culinary and medicinal herbs. The illustrations show crops at the optimal state of maturity and, moreover, are a rich source of information on life in the feudal society, with nobles engaged in play and romance while laborers work on the estate. A selection of crops from two versions of *Tacunum Sanitatis* is presented in Figure 23.

A French Royal prayer book, known as *Les Grandes Heures d'Anne de Bretagne* (*Manuscript Latin 9474*), contains prayers with illustrated margins, and full page monthly calendars and paintings of religious themes (Paris *et al.*, 2006). This stunningly illustrated manuscript was prepared for the personal use of Anne de Bretagne (1477–1514), twice Queen of France as wife of Charles VIII and Louis XII, by the famous artist Jean Bourdichon (1457–1521), probably painted between 1503 and 1508, about a decade from the return of Columbus to Spain. There are miniature paintings of plants and small animals, mostly insects, on each page that can be searched on www.hort.purdue.edu/newcrop/bilimoff/default.html. Well over 300 plant species are included. This work contains the

first European illustration of a non-esculent gourd of *Cucurbita pepo* subsp. *texana* (Figure 24). The seed source for this gourd cannot be determined but could have been obtained from various sources. Seeds from the voyages of Columbus were transmitted in 1494 by Peter Martyr D'Angheria, Tutor to the Spanish royal household, to Cardinal Asconio Sforza secretary of state to the Vatican and seed could have reached France this way. Other possibilities include the voyages of Europeans, including Amerigo Vespucci who entered the Gulf of Mexico as early as 1498, or from various Bretons or Norman who reached the Americas by 1503, returning with parrots and Brasilwood.

Printed Herbals

Herbals, botanical works emphasizing medical uses of plants, are one of the most important sources of plant iconography (Eisendrath, 1961). A splendid introduction to the field can be found in Agnes Arber's 1938 book on herbals. While many herbals can be found in specialized library collections, they are scattered and difficult to locate and access, as a result of their value. Moreover, their nomenclature is not consistent and there is often a lack of adequate indices. Facsimile editions exist for a number of printed herbals, including the 1542 herbal of Leonhard Fuchs (Meyer *et al*., 1999), the 1597 edition of the *Herball* of John Gerard(e) (Theatrum Orbis Terrarum) and the 1633 edition of Gerard amended by Johnson (Dover Publ.). The illustrations of Renaissance herbals are derived mostly from woodcuts and sometimes from original painted drawings. However, many herbals copy parts of text and woodcuts from previous herbals or are based on an exchange of woodblocks by printers, thus they often contain errors in identification. Woodcuts of sweet potato (*Ipomoea batatas*) and potato (*Solanum tuberosum*), the first printed illustration of potato in Europe, from the famous English *Herball* of John Gerard(e) (1597) are presented in Figure 25. Gerard is responsible for the confusion between potato, *Solanum tuberosum* (Indian name *papas*) and sweet potato, *Ipomea batatas* (Indian name *batatas*), because he labeled his printed illustration of potato, the first one to be published in Europe, *Battata Virginiana sive Virginianorum & Pappus*, *Potatoes of Virginia*; Virginia being the area where the tubers he grew in his garden came from. A study of the iconography of the Solanaceae (Daunay *et al.*, 2008) shows the richness of information found in herbals. In the 17th and 18th centuries, botanical art became a sensation and many Royal collections of plant images called florilegias were made for their sheer beauty and for conveying the knowledge of exotic plants brought back by travelers around the world. They became the

source of floral art for commercial uses such as fabrics and wallpaper. A useful list of florilegias and botanical codices can be found in Wikipedia.

Paintings

Paintings from antiquity to the present have often used plants and crops as themes for their aesthetic and/or symbolic value. Frescoes, paintings on flesh plaster, on walls and ceilings are well- preserved since the pigments seep into the plaster. The frescoes of Pompeii and Herculaneum in Italy have been preserved as a result of the eruption of Vesuvius in the year 79 and are valuable resources for ancient depictions of plants. Examples include images of figs and peach from Pompeii (Figure 26).

Paintings of plants increased during the Italian Renaissance. The Roman residence (now known as Villa Farnesina) of the wealthy Roman financier Agostino Chigi, decorated between 1515 and 1518, is a splendid source of crop images. The ceiling of the Loggia of Cupid and Psyche illustrate scenes from *Metamorphoses* (*The Golden Ass*) by Apuleius, a 2nd century CE Roman author, painted in fresco by Raphael Sanzio and his assistants, including Giovanni Martini da Udina, who was responsible for the festoons that are a fantastic source of crop images. The thousands of images of 163 species in 49 botanical families include some of the first illustrations of New World plants (Janick and Caneva, 2005; Janick and Paris, 2006a). The site can be navigated on http://www.hort.purdue.edu/newcrop/udine/default.html where individual species can be accessed. Included are the first images of maize, showing three distinct phenotypes (Figure 27.a,b,c). The different traits include ear shape, row number, silk color, and the presence of a phenotype called tassel seed in the short ears; this same trait can be shown in a pre-Columbian stone carving (Figure 27.d) and a photograph from primitive maize (Figure 27.e).

A genre of Baroque paintings known as still life (*natura morta*), emphasizing fruits vegetables, and flowers, is a rich source of information from the 17th and 18th centuries (Zeven and Brandenburg, 1986). A classic painting (Figure 28) by Michelangelo Merisi, also known as Cavaraggio, is considered the first fruit portrait, and contains evidence of damage inflicted by various diseases and pests (Janick. 2004a). Baroque painters found scenes of everyday life intriguing subjects to paint, and fruit and vegetable markets increasingly became a common subject. Two example of fruit market paintings are shown in Figure 29.a,b). The Flemish painter Pieter Aertsen painting entitled the *Produce Seller* (1567) is rich in *Brassica* crops including head cabbage (7 green and 1 red) as well

Figures 26-29. Paintings. Figure 26. Roman frescoes from Pompeii (1st century CE): *(a)* basket of purple and green figs; *(b)* large, green, and freestone peach (Source: Jashemski, 1979). *Figure 27.* Images of maize in the Villa Farnesina (1515-1519): *(a)* long ears; *(b)* middle sized ears; *(c)* short ears. The tassel seed character in the short ears can be compared with *(d)* Aztec image and *(e)* photographs of primitive maize from Peru.

Source: Janick and Caneva, 2005. *Figure 28.* Caravaggio's painting entitled *Still life of a Basket of Fruit* (1601) shows various disease symptoms including anthracnose on a Figure leaf, scab on a quince leaf, codling moth injury in a apple, Oriental fruit moth damage on a peach leaf, leaf roller damage on a pear, grape mummies, and grasshopper injury on grape leaves (Source: Janick, 2004a). *Figure 29.* Baroque market scenes: *(a)* Produce Seller (1567) by Pieter Aertsen (source; Honig, 1998). *(b)* The Fruit Seller (1580) by Vincenzo Campi (Source: Paris and Janick 2005).

as cauliflower and various cucurbits including bottle gourd, melon, pumpkin, and cucumber and also includes Belgium waffles! *The Fruit Seller* by Vincenzo Campi (1580) displays a plethora of fruits and vegetables in Italian markets included in the upper right a box of pears and young squash, *Cucurbita pepo* subsp. *pepo* Cocozelle group, with flowers attached, still a common commodity in Mediterranean countries (Janick and Paris, 2005; Paris and Janick, 2005; Tóth *et al.* 2007). Other noteworthy painters of crop images include Giovanna Garzoni (1600–1679) and Bartolomeo Bimbi (1648–1723).

Conclusions

This chapter of plant iconography should be considered a very brief introduction to the subject. The collection of images of individual crops combines the field of art, history, and crop evolution and genetic diversity. An analysis of the iconography of the *Solonaceae* (Daunay and Janick, 2007; Daunay *et al.*, 2008) suggests the various difficulties involved for the interpretation of the illustrated information. Plant iconography is an outstanding resource for research on crop history and diversity but unfortunately, the source of many of these works and in particular those from the East are difficult to access for most Western researchers. The Chinese and Indian literature, in particular, are difficult to access. For example, we have been hard-pressed to find ancient images of eggplant in India, despite the fact that eggplant is indigenous there. All of our leads so far have come up as dead ends. Thus, the researcher of plant iconography is urged to seek a wide collaboration with scientists in various locations to assist in the quest. Clearly what is needed are databases of plant images of cultivated plants, a cooperative venture between historians, artists, and crop researchers.

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