

# The Cucurbits and Nightshades of Renaissance England: John Gerard and William Shakespeare

*Jules Janick*

Department of Horticulture and Landscape Architecture  
Purdue University  
West Lafayette, Indiana 47907, USA

*Harry S. Paris*

Department of Vegetable Crops and Plant Genetics  
Agricultural Research Organization  
Neve Ya'ar Research Center  
PO Box 1021  
Ramat Yishay 30095, Israel

*Marie-Christine Daunay*

INRA  
UR 1052 Unité de Génétique et d'Amélioration des Fruits et Légumes  
F-84140 Montfavet, France

## ABSTRACT

John Gerard (1545–1612) author of the famous English *Herball* of 1597 and the playwright William Shakespeare (1564–1616) were contemporaries in London. Their references to cucurbits (Cucurbitaceae) and nightshades (Solanaceae) encapsulate knowledge of these plants from both a botanical and a literary perspective in the English Renaissance. The genera of Cucurbitaceae (*Bryonia*, *Citrullus*, *Cucumis*, *Ecballium*, *Lagenaria*, *Momordica*) and Solanaceae (*Atropa*, *Hyoscyamus*, *Mandragora*, *Physalis*, *Solanum*, *Withania*) had a rich history in both medicine and food production in Antiquity and Medieval

times in the Old World. The introduction of new crop genera (*Cucurbita*, *Capsicum*, *Nicotiana*, and other species of Solanaceae) into Europe and Asia after the European encounter with the New World had a profound impact on European botanical science and horticulture. References to cucurbits and nightshades in the 1597 *Herball* of John Gerard and the plays of Shakespeare reflect scientific and public awareness of these plants in the English Renaissance.

**KEYWORDS:** Cucurbitaceae; herbals; horticultural history; Solanaceae

- I. INTRODUCTION
- II. JOHN GERARD
  - A. Cucurbit Chapters
  - B. Nightshade Chapters
- III. WILLIAM SHAKESPEARE
  - A. Cucurbit References
    - 1. Coloquintida
    - 2. Gourd
    - 3. Marrow
    - 4. Squash
    - 5. Pumpkin
  - B. Nightshade References
    - 1. Henbane
    - 2. Mandrake
    - 3. Potato
- IV. THE CONNECTION BETWEEN GERARD AND SHAKESPEARE
- V. CONCLUSION
- LITERATURE CITED

## I. INTRODUCTION

The impact of botanical science and horticulture on the English Renaissance is reflected in the writings of two contemporaries: the herbalist John Gerard (1545–1612) and the playwright William Shakespeare (1564–1616), both known to us in unique portraits (Fig. 6.1). We have focused much effort on obtaining an improved understanding of the crop history of Cucurbitaceae and Solanaceae (Paris 2000, 2001, 2007; Paris and Janick 2005, 2008a,b; Paris et al. 2006, 2009, 2011, 2012; Janick and Paris 2006a,b; Daunay and Janick 2007; Daunay et al. 2007, 2008, 2009; Janick et al. 2007, 2010). Our present objective is to review and contrast the scientific tradition in Renaissance England concerning taxa of these families as expressed in Gerard's 1597 *Herball* with the contemporary literary tradition as expressed in quotations from Shakespeare's plays.

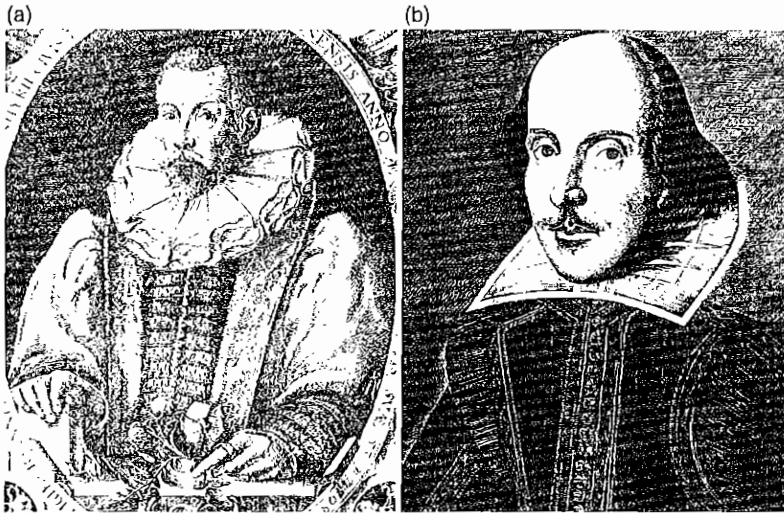


Fig. 6.1. (a) John Gerard holding a potato stem and used in frontpiece of the 1633 edition of Gerard's *Herball*. (b) William Shakesppeare based on the iconic engraving of Martin Droeshout in the first folio (1623).

## II. JOHN GERARD

The 1597 *Herball* of John Gerard (1545–1612) (Gerarde 1597) is the best-known botanical work published in Renaissance England (Rohde 1922; Woodward 1928; Arber 1938; Henry 1975). It has remained popular for over 400 years for its horticultural lore, its collection of medical plant “virtues,” and, not the least, its graceful and delightful English prose.

Gerard was born in Cheshire, England and attended a village school in Wisterson (Henry 1975). He was apprenticed for a career of a surgeon in 1562 and achieved eminence in his profession, being elected Master of the Company of Barber-surgeons. He traveled the Baltic coast to Denmark, Sweden, Poland, and Russia. Gerard's reputation, however, rests on horticulture. As early as 1577, Gerard superintended several gardens and the plant collection of William Cecil (Lord Burghley, the first minister of Queen Elizabeth I) including his residence in the Strand and at Theobalds, Herfordshire. In 1586, Gerard was appointed curator of the college of Physicians physics garden. His own garden at Holborn, between Chancery Lane and Fetter Lane, included “*all rare simples*” and “*all manner of strange trees, herbs, roots, plants, flowers, and other rare things . . .*” (Henry 1975). Gerard's list of plants in his Holborn

garden, *Catalogus arborum*, (Gerard 1596), amended several years later, was the first garden catalogue printed in English and included over a thousand entries including the first published mention of potato, under the name "*Papus orbiculatus*." However, Gerard's most famous work is his *Herball or General Historie of Plants*, published in 1597 and dedicated to Lord Burghley. The opening sentence of his preface is an example of his style:

*Although my paines have not been spent (curteous Reader) in the gracious discoverie of golden Mines, not in the tracing after silver veines, wherby my native country might be enriched with such merchandise as it hath most in request and admiration; yet hath my labour (I trust) been otherwise profitably employed, in descrying of such a harmlesse treasure of herbes, trees, and plants, as the earth frankly without violence of fereth unto our most necessarie uses.*

The *Herball* has a circuitous history. The publisher, John Norton, had commissioned a certain Dr. [Robert] Priest, a London physician, to translate *Stirpium Historiae Pemptades Sex* (1583) of the Flemish botanist Rembert Dodoens (1517–1585) from Latin into English who however died before completing the task. The fate of Priest's translation is obscure. Gerard stated in his preface that he never saw it, but in a commendatory letter printed in the *Herball*, Stephen Bredwell acknowledged Priest as follows: "*D. Priest, for his translation of so much as Dodonaeus, that thereby left a tombe for his honorable sepulture.*" This sentence contradicted Gerard's account: "*... doctor Priest, one of our London Colleagues hath (as I heard) translated the last edition of Dodonaeus, which meant to publishe the same, but being prevented by death, his translation likewise perished.*"...: This contradictory statement plus the bald-face fib (*as I heard*) has sullied Gerard's reputation (Arber 1938).

Gerard's 1597 *Herball* turned out to be an amalgam of the English translation of Dodoens' *Stirpium Historiae Pemptades Sex*, of 1583 reconfigured in the arrangement of Mathias de L'Obel and Pena's *Nova stirpium adversaria* of 1570 (Arber 1938), supplemented by Gerard's own personal observations from his gardens, his considerable scholarship, and his correspondence with contemporary herbalists and plant collectors. The text of Gerard is structured as successive items (*the kindes, the description, the place, the time, the names, the temperature the nature and virtues*), whereas Dodoen's text, although dealing with the same topics, is written at length without subdivisions. Gerard's English text is florid with interjected comments whereas the Latin text of Dodoens is concise and abbreviated. In general, Gerard's plant descriptions match those of Dodoens. The *Herball* of Gerard contained about

1,800 woodcuts, and while some of them had been used by Dodoens in his *Stirpium Historiae Pemptades Sex*, most were from the collection of the publisher Nicolaus Bassé of Frankfurt. Bassé published his illustrations several years prior to Gerard's *Herball*, in the *Eicones Plantarum seu stirpium* of the German botanist Jacobus Theodorus, Tabernaemontanus (Theodorus 1590). Gerard had difficulties, however, reconciling these woodcuts with his text, and Mathias de l'Obel (Latinized as Lobelius) (1539–1616) was brought in by the publisher to assist in this project. Difficulties ensued and l'Obel was dismissed by Gerard on the grounds that he had forgotten his English (Arber 1938)!

The *Herball*, despite its errors, proved to be a substantial and important work of great interest to contemporary botanists, gardeners, apothecaries, and physicians, as its scope included detailed descriptions of the plants as well as their culinary, ornamental, and medicinal properties, supplemented with commentary related to his gardening observations. Gerard, above all, wrote with felicity and style, and the charm of his prose has done much to make the *Herball* a beloved work of English. The *Herball* was without competition in England for 36 years. When it was learned that a new English herbal by John Parkinson was in the offing, a second edition of Gerard's *Herball* was commissioned and undertaken with the well-known London apothecary Thomas Johnson. The publisher John Norton died in 1633 but the rights passed to others and the 2nd edition was published the same year (reprinted in 1636) by a consortium of Adam Isslip, Joice Norton (likely John Norton's widow), and Richard Whitaker (Gerarde and Johnson 1633). This edition, has corrections and emendations indicated by special markings. The illustrations of the original *Herball*, however, were replaced with the ones obtained from the publisher Christophe Plantin of Antwerp (1513–1588), and augmented to 2,766. Many new plants were described, including the banana. The popularity of the second edition continued through the 19th century and a facsimile was published by Dover in 1975. Our focus, however, is on Gerard's original work of 1597, so as to allow a more relevant comparison between his work and the references made by Shakespeare.

### A. Cucurbit Chapters

Six genera of Old World cucurbits (*Bryonia*, *Citrullus*, *Cucumis*, *Ecballium*, *Lagenaria*, and *Momordica*) and one New World genus (*Cucurbita*) are discussed in the *Herball* (Table 6.1). In keeping with Dodoens's 1583 *Stirpium Historiae Pemptades Sex*, most of them are in contiguous chapters, 65, 306–307, and 327–333.

Table 6.1. Cucurbits in Gerard's *Herball* (1597).

Chapter	Chapter name	Taxon based on description	Latin name of drawing	Taxon based on drawing
65	The male Balsam apple	<i>Momordica balsamina</i>	<i>Balsamina mas</i>	<i>Momordica balsamina</i>
306	White Bryonic	<i>Bryonia alba</i>	<i>Bryonia alba</i>	<i>Bryonia alba</i>
326	Common cucumber	<i>Cucumis sativus</i>	<i>Cucumis vulgaris</i>	<i>Cucumis sativus</i>
	Turkie cucumber	<i>Cucurbita pepo</i>	<i>Cucumis lurcicus</i>	<i>Cucurbita pepo</i>
	Adders cucumber	<i>Cucumis melo</i>	<i>Cucumis anguina</i>	<i>Cucumis melo</i>
	Peare fashion cucumber	<i>Cucumis sativus</i>	<i>Cucumis pyriformis</i>	<i>Cucumis sativus</i>
	Spanish cucumber	<i>Cucurbita pepo</i>	<i>Cucumis ex Hispanico semine natus</i>	<i>Cucumis sativus</i>
327	Wilde cucumber	<i>Ecballium elaterium</i>	<i>Cucumis asininus</i>	<i>Ecballium elaterium</i>
328	Citrull cucumber	<i>Citrullus lanatus</i>	<i>Citrullus officinarum</i>	<i>Citrullus lanatus</i>
	Small Citrul	<i>Citrullus lanatus</i>	<i>Citrulus minor</i>	<i>Cucurbita pepo</i>
329 (1st)	The wilde Citrull or Coloquintida	<i>Citrullus colocynthis</i>	<i>Colocynthis</i>	<i>Citrullus colocynthis</i>
	Peare fashioned Coloquintida	<i>Cucurbita pepo?</i>	<i>Colocynthis pyriformis</i>	<i>Cucurbita pepo</i>
329 (2nd)	The muske melon	<i>Cucumis melo</i>	<i>Melo</i>	<i>Cucumis melo</i>
	Sugar melon	<i>Cucumis melo</i>	<i>Melo saccharinus</i>	<i>Cucumis melo</i>
	Peare fashion melons	<i>Cucumis melo</i>	<i>Pyromelo</i>	<i>Cucumis melo</i>
	Spanish melons	<i>Cucumis melo</i>	<i>Melo Hispanicus</i>	<i>Cucumis melo</i>
330	The great long Pompion	<i>Cucurbita pepo</i>	<i>Pepo maximus oblongus</i>	<i>Cucurbita pepo</i>
	The great round Pompion	<i>Cucurbita pepo</i>	<i>Pepo maximus rotundus</i>	<i>Cucurbita pepo</i>
	The great flatbottom'd Pompion	<i>Cucurbita pepo</i>	<i>Pepo maximus compressus</i>	<i>Cucurbita pepo</i>
	The great buckler Pompion	<i>Cucurbita pepo</i>	<i>Pepo maximus clypeatus</i>	<i>Cucurbita pepo</i>
	—	—	<i>Pepo Indicus minor rotundus</i>	<i>Cucurbita pepo</i>
	—	—	<i>Pepo Indicus angulosus</i>	<i>Cucurbita pepo</i>

Table 6.1. (Continued)

Chapter	Chapter name	Taxon based on description	Latin name of drawing	Taxon based on drawing
	—	—	<i>Pepo Indicus fungiformis</i>	<i>Cucurbita pepo</i>
331	The great wilde Pompion	<i>Cucurbita pepo</i>	<i>Pepo major sylvestris</i>	<i>Cucurbita pepo</i>
	The small wilde Pompion	<i>Cucurbita pepo</i>	<i>Pepo minor sylvestris</i>	<i>Cucurbita pepo</i>
332	Snake gourde	<i>Lagenaria siceraria</i>	<i>Cucurbita anguina</i>	<i>Lagenaria siceraria</i>
	Bottle gourdes	<i>Lagenaria siceraria</i>	<i>Cucurbita lagenaria</i>	<i>Lagenaria siceraria</i>
333	Wilde bottle gourde	<i>Lagenaria siceraria</i>	<i>Cucurbita lagenaria sylvestris</i>	<i>Lagenaria siceraria</i>
	Mushrome wilde gourde	<i>Lagenaria siceraria</i>	<i>Cucurbita sylvestris fungiformis</i>	<i>Cucurbita pepo</i>

Balsam apple appears in Chapter 65, entitled “*Of Balme apple, or apple of Hierusalem,*” a translation of the text in the *Pemptades* of what Dodoens called “Charantia,” with a few interjections by Gerard. Gerard associated this plant with other cucurbits, commenting that the balsam apple must be planted in April “*even as muske Melons and Cucumbers and such like cold fruits are*” and he noted that “*in the apple lieth great broade flat seede, like those of Pompion or Citrull.*” The corresponding images show two plants, a fruitful one called the male balsam apple (Fig. 6.2A), and the other the female balsam apple bearing only a few fruits. The former is *Momordica balsamina* L., the latter is not a cucurbit. The terms “male” and “female” do not indicate plant sexuality, but are derived from medieval thinking in reference to plant vigor.

Bryony also appears separately, as Chapter 306 “*Of Brionie, or the white Vine*” in the *Herball*. Gerard’s description is merely a translation of that of Dodoens, until his personal observation that “*The Queens chiefe Chirurgion, Master William Goodorous, a very curious and learned gentleman, shewed me a roote heereof, that waied halfe an hundred weight, and of the bignesse of a childe, of a yeere olde.*” Gerard indicated that the white bryony was ubiquitous, that it “*groweth almost every where among pot herbes, hedge bushes, and such like places.*” The description and illustration (Fig. 6.2B) indicate *Bryonia alba* L. The ensuing subjects, Chapter 307 “*Of blacke Bryonie, or the wilde vine*” and

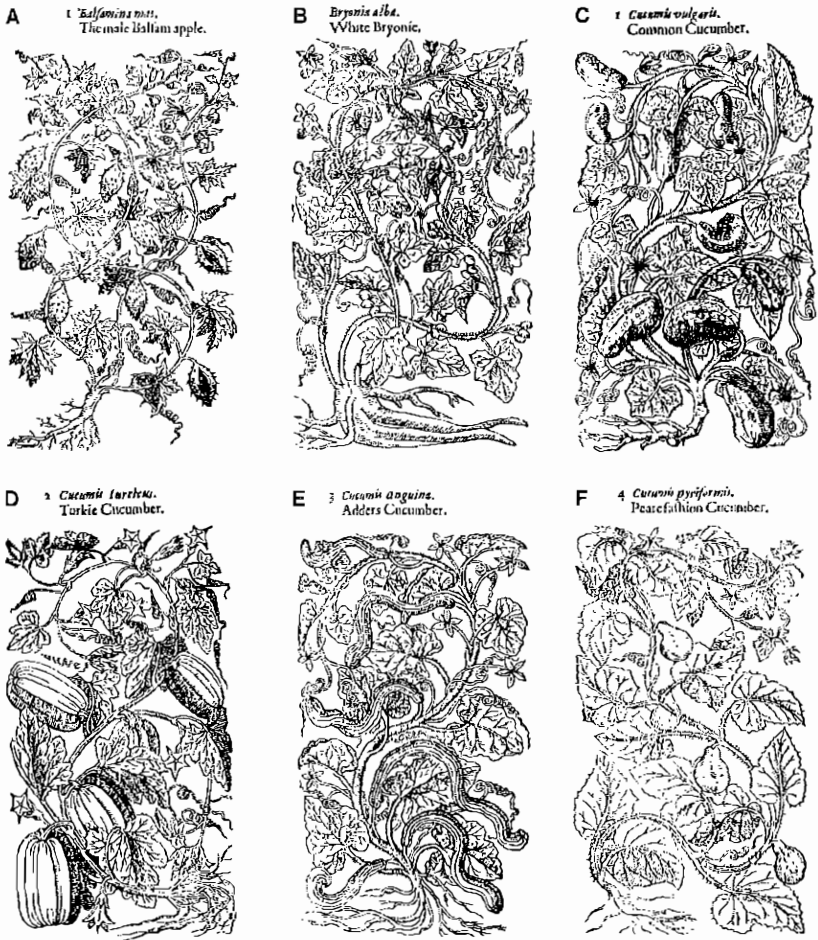


Fig. 6.2 (A–F). The cucurbit species illustrated in Gerard's 1597 *Herball*: (A) *Momordica balsamina* L.; (B) *Bryonia* L. sp.; (C). *Cucumis sativus* L. American Pickling Group; (D) *Cucurbita pepo* L. subsp. *pepo* Pumpkin Group; (E), *Cucumis melo* subsp. *melo* Flexuosus Group; (F). *C. sativus*.

Chapter 308 “Of *Bryonie* of Mexico” are not cucurbits. Gerard indicated that the latter is not really bryony as its roots are insipid whilst the roots of true bryony are bitter.

The contiguous cucurbit chapters in Gerard's *Herball* begin with Chapter 326 “Of Cucumbers,” Gerard explaining: “There be divers sorts



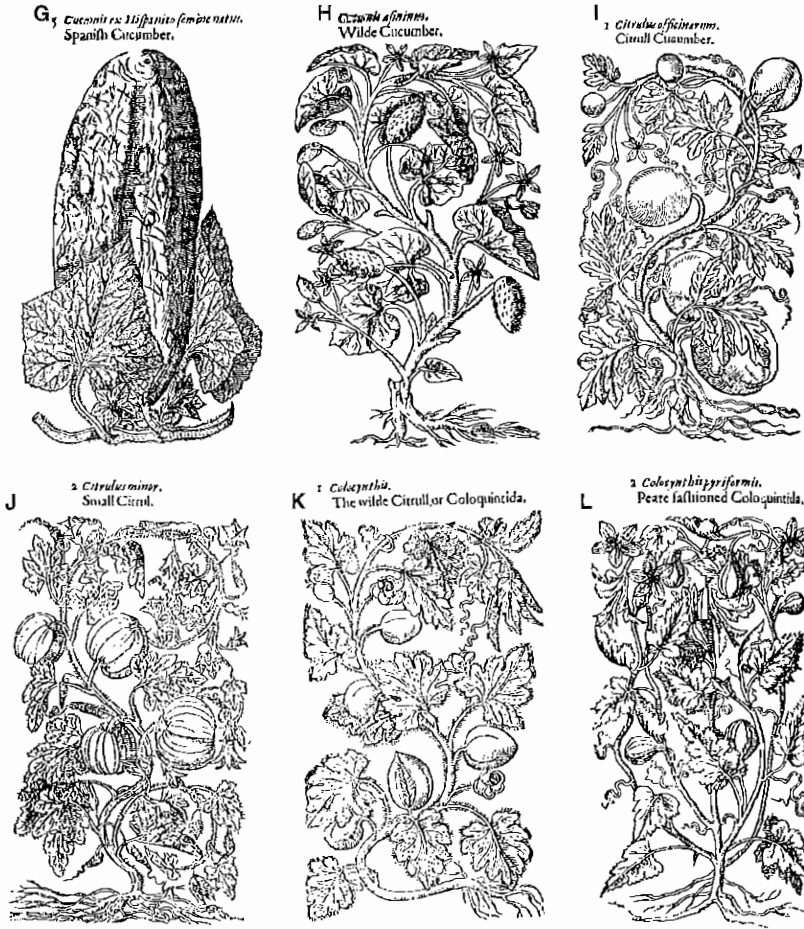


Fig. 6.2 (G–L). The cucurbit species illustrated in Gerard's 1597 *Herball*: (G) *C. sativus*; (H) *Ecballium elaterium* (L.) A. Rich.; (I) *Citrullus lanatus* (Thunb.) Matsum. & Nakai; (b) (J) *Cucurbita pepo* subsp. *pepo* Pumpkin Group; (K) *Citrullus colocynthis* (L.) Schrader; (L) *Cucurbita pepo* subsp. *texana* (Schoele) Filov.

of Cucumbers; some greater, others lesser' some of the Garden; some wilde; some of one fashion; and some of another, as shall be declared in this chapter." Indeed, this short introduction, in quaint English prose, is original and moreover, exactly captures Dodoens' succinct Latin: De Vulgo Dictis Cucumeribus, What is Commonly Called Cucumber. Gerard described five such "cucumbers."

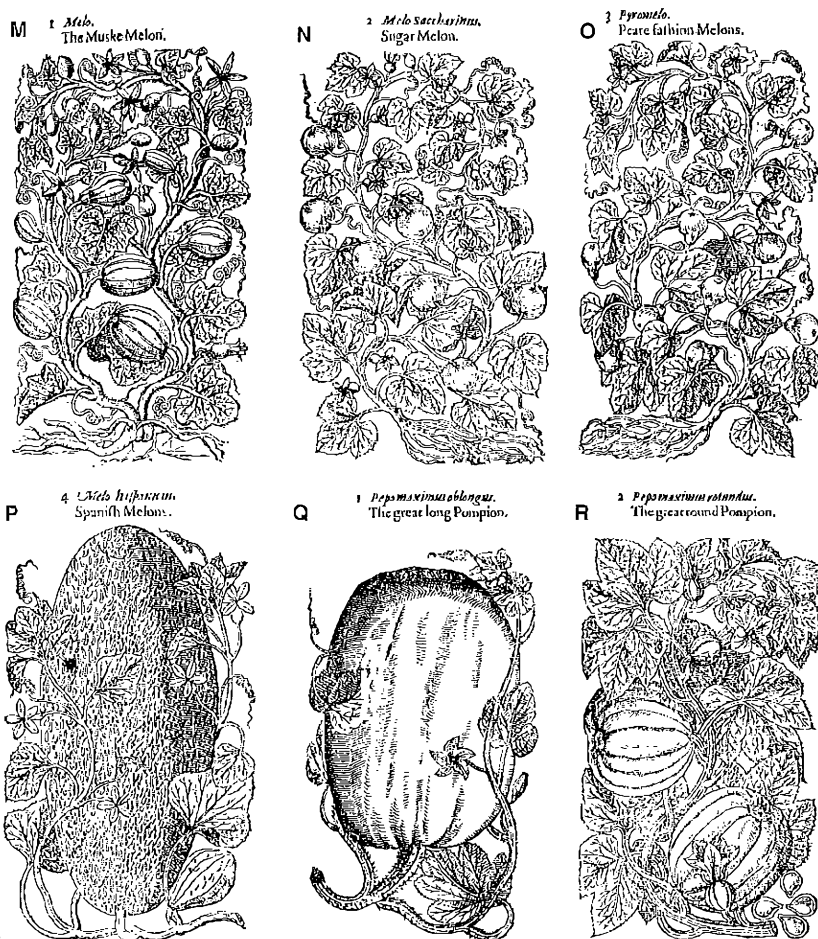


Fig. 6.2 (M-R). The cucurbit species illustrated in Gerard's 1597 *Herball*: (M) *C. melo* subsp. *melo* Cantalupensis Group; (N) *C. melo*; (O) *C. melo*; (P) *C. melo* subsp. *melo* Reticulatus Group; (Q) *Cucurbita pepo* subsp. *pepo* Pumpkin Group; (R) *Cucurbita pepo* subsp. *pepo* Pumpkin Group.

The description of the first "cucumber," a direct translation from Dodoens' *Pemptades*, is of a branched, trailing plant having rough stems and leaves, bearing tendrils and small yellow flowers. The fruit

... is long, cornered, rough, and set with certain bumpes or risings, greene at the first, and yellow when they be ripe; wherein is contained a firme and solide pulpe or substance, transparent or thorow shining; which



Fig. 6.2 (S–X). The cucurbit species illustrated in Gerard's 1597 *Herball*: (S) *Cucurbita pepo* subsp. *pepo* Pumpkin Group; (T) *Cucurbita pepo* subsp. *texana*, Scallop Group; (U) *Cucurbita pepo* subsp. *pepo* Round Smooth-Rinded Group; (V) *Cucurbita pepo* subsp. *texana*, Acorn Group; (W) *Cucurbita pepo* subsp. *texana*, Scallop Group; (X) *Cucurbita pepo* L. subsp. *pepo*, Vegetable Marrow Group.

together with the seede is eaten, a little before they be fully ripe. The seeds be white, long and flat.

The image labeled *Cucumis vulgaris* common cucumber (Fig. 6.2C), is entirely consistent with the description and shows *Cucumis sativus* L. American Pickling Group (Paris and Maynard 2008).

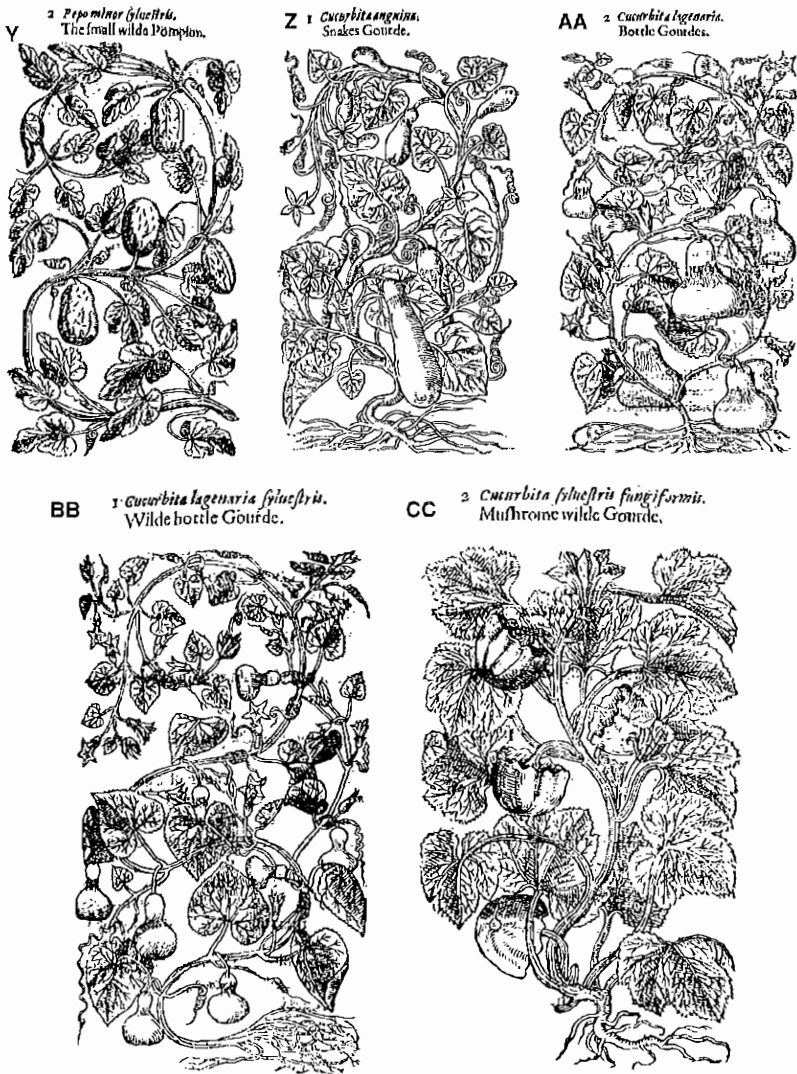


Fig. 6.2 (Y-CC). The cucurbit species illustrated in Gerard's 1597 *Herball*: (Y) *Cucurbita pepo* subsp. *pepo*; (Z) *Lagenaria siceraria* (Molina) Standley; (AA) *Lagenaria siceraria*; (BB) *Lagenaria siceraria*; (CC) *Cucurbita pepo* subsp. *texana*, Acorn Group.

The description of the second, "*The Turkie Cucumber*," is also of a branched, trailing, tendril-bearing, yellow-flowered plant with leaves that are

...very broad, deeply cut about the edges, not unlike to those of the Pompion on which after which commeth the fruit crested, chambered, or furrowed

*like the Pompion. The meate or pulpe is more firme and solide than that of the common Cucumber. The seede is long, very white, in shape like those of the common Cucumber, but greater.*

This passage is not derived from the *Pemptades* and apparently is Gerard's own observation. While the epithet *Turkie* was used by herbalists to indicate an exotic origin, the description is undoubtedly of a cultigen of *Cucurbita pepo*, which is a North American taxon. The illustration (Fig. 6.2D), labeled *Cucumis turcicus*, *Turkie Cucumber*, is entirely consistent with the description. Specifically, the description is of *C. pepo* L. subsp. *pepo* Pumpkin Group (Paris 1986, 2001).

The description of the third, "*this kinde certaine long Cucumbers*," is a translation from the *Pemptades*, but in beautiful prose:

*The seede of this kinde of Cucumbers being sowed, bringeth foorth not such as were before but such as art hath framed: which of their owne growth are found long, and oftentimes very crookedly turned; and thereupon they have beene called Anguini, or long Cucumbers, and crooked Cucumbers.*

The accompanying illustration, labeled *Cucumis Anguina Adders Cucumber* (Fig. 6.2E), depicts a trailing, tendril-bearing plant with bluntly cordate leaf laminae bearing very long, curved, striate fruits, undoubtedly *Cucumis melo* L. subsp. *melo* Flexuosus Group (Burger et al. 2010). These snake melons are often mistakenly referred to as cucumbers even to the present day.

The fourth, The Peare fashioned Cucumber, is not in the *Pemptades*. It too is described as a branched, tendril-bearing, trailing plant that is rough and prickly, with sharp-pointed leaves, starlike, yellow flowers, and pear-shaped fruits. The illustration (Fig. 6.2F), labeled *Cucumis pyriformis* Peare fashion Cucumber, matches the description, and even shows warts on the fruits, allowing positive identification as a cultigen of *C. sativus* having pyriform fruits.

The fifth and final item in this chapter is also described as a branched, rough, trailing plant, with sharp-pointed leaves and yellow flowers. The fruit is described as being "*of a foot in length, green on the side toward the ground, yellowe to the sun warde, straked with manie spots and lines of divers colors. The pulpe or meate is hard and fast like that of our Pompion.*" This item was not described in the *Pemptades*. It is accompanied by an illustration, *Cucumis ex Hispanico semine natus* Spanish Cucumber. The illustration (Fig. 6.2G), shows a small section of the plant, a stem with two entire leaves, two flowers, and one fruit which is twice the length of the leaf laminae and shows many warts and small cracks. Clearly, this is an illustration of a mature cucumber, *C. sativus*, quite large and similar to those grown today in Italy, the United States,

and elsewhere, that are used in salads. The description of the multi-colored exterior and hardness of the flesh like that of our Pumpkin suggests, however, *Cucurbita pepo*.

Chapter 327, is "*Of Wilde Cucumber.*" This too is described as a rough, branching plant with sharp-pointed, but grayish leaves. The flowers were described as small and light yellow, the small fruits

*...verie rough and hairie on the outside, and of the color and substance of the stalkes, wherein is contained verie much water and small hard blackish seeds also... which being come to maturitie or ripenes, it casteth or squirteth foorth his water with the seeds, either of it owne accord, or being touched with the most tender or delicate hande never so gently, and oftentimes striketh so harde against those that touch it (especially if it chaunce to hit against the face) that the place smarteth long after...*

The root was described as thick and white and the entire plant very bitter. The illustration (Fig. 6.2H), labeled *Cucumis asininus*, Wilde Cucumber matches the description, and is *Ecballium elaterium* (L.) A. Rich. In the *Pemptades*, this taxon does not appear in a chapter contiguous with the cultivated cucurbits. Apparently, Gerard was personally acquainted with this plant, even though he mistakenly described its seeds as "blackish," as his description is not a direct translation from the *Pemptades* and, moreover, he lists and describes various medical uses and preparations made from "*The juice called Elaterium.*"

In Chapter 328, "*Of Citrull Cucumbers,*" Gerard describes two kinds. The text of the first one is mostly a translation from the *Pemptades* but with some additions by Gerard. The plant is branched, tender, trailing, with deeply cut leaves and bears tendrils and yellow flowers and "*the fruite is somewhat rounde, . . . of a greene color above, and underneath on that side that lieth upon the grounde something white: the outwarde skin whereof is very smooth.*" The description of deeply cut leaf laminae and roundness of the fruit and its smooth, green rind fits the illustration (Fig. 6.2I) labeled *Citrulus officinarum* Citrull Cucumber and matches precisely the watermelon, *Citrullus lanatus* (Thunb.) Matsum. & Nakai. Also consistent with *C. lanatus* is the description of the seeds: *the seede is long, flat, and greater than those of the Cucumbers: the shell or outward barke is blackish, sometimes of an overworne reddish color;* likewise, that the fruit is not so prone to rot in the garden or field during wet weather: *The fruite of the Citrull doth not so easily rot or putrifie as doth the Melon, which being gathered in a faire dry day, may be kept a long time.* However, the English description also has "*streaked or ribbed*

*with certaine deepe furrowes alongst the same.*" Watermelon fruits can be striped or streaked, but not ribbed or deeply furrowed. This, undoubtedly, is an error of translation from the Latin *striati*, striated, used in the *Pemptades*; striate. Moreover the color of the fruit flesh is not mentioned which, as watermelon flesh can be red, orange, or bright yellow, surely would not have been overlooked if it was one of these colors; hence, the flesh was probably white or light green. Likewise, there is no indication that the fruit flesh was sweet, as was given for the melons. This could result from two causes, either the fruits did not ripen, as Gerard mentions, or that these were citrons, which have pale, bland fruit flesh. Tellingly, Gerard stated: "*the meate within is indifferent harde, more like to that of the Pompion then of the Cucumber or muske Melon: the pulpe wherein the seede lieth, is spungie and of a slimie substance.*" Moreover, "*The meate or pulpe of Cucumer Citrull which is next unto the barke is eaten rawe, but more commonly boiled . . .*" Evidently, Gerard was describing not the sweet watermelon familiar today but the citron watermelon, which has wet, bland, hard, usually white flesh that is cooked and used for preserves (Laggetti and Hammer 2007). Gerard described briefly a second kind of "Citrull" as differing from the first by being smaller and having leaves that were less deeply incised. However, the illustration labeled *Citrulus minor*, small sitrull (Fig. 6.2J), shows a plant of *Cucurbita pepo* subsp. *pepo* Pumpkin Group bearing fairly large, grooved, oblate fruits.

Chapter 329, "*Of the wild Citrull,*" called *Colocynthis*, follows immediately afterwards, as would be appropriate according to modern taxonomy as the description and illustration match a taxon closely related to but distinct from the watermelon. In the *Pemptades*, the true colocynth is discussed immediately following the squirting cucumber, *Ecballium elaterium*, a chapter that is not contiguous with the cultivated cucurbits. Gerard's description of this plant mostly follows that in the *Pemptades*, with some original notes interjected. The plant is described as creeping, branching, and tendril-bearing with deeply incised leaf laminae and small, pale yellow flowers. The fruit is round with a thin rind that turns yellow when the fruit is ripe, and which can be peeled off to reveal white, spongy pulpe full of brown seeds. The whole plant is said to be bitter and the dried, peeled fruit is used for medicine. The accompanying illustration (Fig. 6.2K), labeled *Colocynthis* The wilde Citrull or Coloquintida, is consistent with the description, allowing easy identification of *Citrullus colocynthis* (L.) Schrad. A second form was said to likewise have long branches and tendrils, but the leaves are not so much incised, flowers said to be small and yellow, the fruit shaped like a pear instead of round. The description is

consistent with the illustration labeled *Colocynthis pyriformis* Pear fashioned Coloquintida (Fig. 6.2L), but depicts the pear gourd, *Cucurbita pepo* subsp. *texana* (Scheele) Filov Ovipera Group. Pear gourds often are bitter and dry out at maturity, like the true colocynth, hence the association; these gourds arrived in Europe by 1508 (Paris et al. 2006). Gerard noted that “*Coloquintida is sowed and commeth to perfection in hot regions, but seldome, or never in these northerly and cold countries.*” Medical preparations and usage of the colocynth are described by Gerard at length.

A second Chapter 329 is entitled “*Of Muske Melon, or Million,*” and opens with an apparently original paragraph by Gerard himself, that gives a stunningly detailed and correct analysis:

*There be divers sorts of Melons found at this day, differing very notable in shape and proportion, as also in taste, according to the climate and countrie where they growe: but of the ancients there was onely one and no more, which is that Melopepo called of Galen Cucumis, or Galens Cucumber; notwithstanding some have comprehended the Muske Melons under the kinds of Citruls, wherein they have greatly erred: for doubtlesse the Muske Melon is a kinde of Cucumber, according to the best approved authors.*

Gerard describes four kinds of melons. He notes that melons grow well in hot regions but that he has seen melons of the first kind that he describes “*at the Queens house at Saint James*” and near to “*the Lord of Sussex house of Bermondsey by London,*” which indicates that he was familiar with these melons but did not grow them in his garden. Indeed, for the first kind listed, Gerard had some astonishingly botanically accurate observations:

*That which the later Herbarists do call Muske Melons, is like to the common Cucumber in stalkes, lying flat upon the ground, long, branched, and rough. The leaves be much a like, yet are they lesser, rounder, and not so cornered: the flower in like maner be yellowe: the fruite is bigger, at the first somewhat hairie, something long, now and then somewhat round; oftentimes greater, and many times lesser; the barke or rinde is of an overworne russet Greene color, ribbed and furrowed very deepe, having often chappes or chinkes, and a confused roughnes: the pulpe or inner substance which is to be eaten, is of a faint yellow color. The middle part whereof is full of a slimie moisture, among which is contained the seede, like unto those of the Cucumber, but lesser, and of a browner color.*

In the accompanying illustration, labeled “*Melo The Muske Melon*” (Fig. 6.2M), the fruits are depicted as fairly small by today’s standards, about as long and wide as the leaf laminae, but no “*chappes or chinkes*”



or “*confused roughnes*,” which may refer to warts, are evident. Otherwise, the illustration conforms exactly to the description and can be referred to, in present-day terminology, as a cantaloupe, *C. melo* subsp. *melo* Cantalupensis Group. The second kind that Gerard described refers to a very sweet one called “*sugar Melon*” that is “*rounde as the fruite of Coloquintida, and of the same bignesse, of a most pleasant taste like Sugar, whereof it tooke the surname Saccharatus*.” The accompanying image (Fig. 6.2N) labeled *Melo saccharinus* sugar melon, indeed shows a plant bearing many very small, spherical fruit. The description and illustration suggest *C. melo* subsp. *melo* Inodorous Group but we know of no modern cultivars of this Group having such small fruits. The third melon described by Gerard is “*The Peare fashioned Melon*,” said to be “*of the bignesse of a great Quince*.” The illustration labeled *Pyromelo* Peare fashion Melons (Fig. 6.2O), shows a plant having bluntly cordate, slightly indented leaf laminae and a number of pyriform fruits that appear to be smooth and small, not as long as the laminae. We know of no similar extant cultivar. The fourth melon described by Gerard is “*The Spanish Melon*,” said to have foliage similar to other melons but the fruit is “*very long, not crested or furrowed at all, but spotted with very many such markes as are on the backside of the Harts toong leafe. The pulpe or meate is not so pleasing in taste as the others*.” From the description alone, it would be hard to determine what melon Gerard was describing and, as we have seen above, Gerard did not appear to have grown melons in his own garden, so it is difficult to determine where Gerard obtained his description. The accompanying illustration (Fig. 6.2P), labeled *Melo hispanicus* Spanish Melons, does indeed depict a very large melon, approximately four times the length of the leaf laminae. The melon is long oval and reticulate, suggesting a muskmelon, *C. melo* subsp. *melo* Reticulatis Group.

Chapter 330, entitled “*Of Melons, or Pompions*,” describes forms of *Cucurbita pepo*, a taxon that originated in North America and was unknown in the Old World prior to the European contact with the Americas in 1492. Here, barely a century later, Gerard stated: “*There be found divers kindes of Pompions which differ either in bignes or forme: it shall be therefore sufficient to describe some one or two of them, and referre the rest unto the viewe of their figures, which most lively do expresse their differences; especially bicause this volume waxeth great, the description of no moment, and I hasten to an end*.” Gerard’s text contains descriptions of four of these “*Pompions*,” and all four descriptions are translations from Dodoens’ *Pemptades*. Gerard names them *Pepo maximus oblongus*. The great long Pompion (Fig. 6.2Q), *Pepo*

*maximus rotundus*: The great round Pompion (Fig. 6.2R), *Pepo maximus compressus*: The great flatbottom'd Pompion (Fig. 6.2S), and *Pepo maximus clypeatus*: The great buckler Pompion (Fig. 6.2T). The illustrations of the first, second, and fourth correspond, but that of the third, which is supposed to be "... full of little bunnies or hillie welts, as is the rind of the Citron which is in like manner yellow when it is ripe," is not shown as such. The four illustrations are of *Cucurbita pepo*, three of *C. pepo* subsp. *pepo* Pumpkin Group and one of *C. pepo* subsp. *texana* Scallop Group (Paris 2001). Except for the last named here, these were said by Gerard to be common in English gardens. Three additional *C. pepo* cultigens were illustrated in this chapter. *Pepo Indicus minor rotundus*: The small round Indian Pompion (Fig. 6.2U), depicts a viney plant bearing nearly spherical but small fruits, perhaps an orange gourd, *C. pepo* subsp. *pepo* Round, Smooth-Rinded Group. *Pepo Indicus angulosus*: The cornered Indian Pompion (Fig. 6.2V) is a viney plant bearing turbinate, ridged, and furrowed, rather small fruits like those of 'Table Queen', obviously *C. pepo* subsp. *texana* Acorn Group. *Pepo Indicus fungiformis*, Mushroom Pompion (Fig. 6.2W), is another viney plant bearing rather small, flattened, lobed fruits, another cultivar of *C. pepo* subsp. *texana* Scallop Group.

Chapter 331, entitled "Of wilde Pompions," closely follows the description in the Pemptades. "These bring foorth rough stalks set with sharp thorny prickles. The leaves likewise rough: the flowers yellow as be those of the garden Melon. The fruite is thicke, round, and sharpe pointed, having a hard greene rinde. The pulpe or meate whereof, and the middle pith, with the seede are like those of the garden Pompion, but very bitter in taste." Gerard added that there is a second kind similar to the first, but smaller. They are illustrated with the labels, respectively, *Pepo major sylvestris*: The great wilde Pompion (Fig. 6.2X) and *Pepo minor sylvestris*: The small wilde Pompion (Fig. 6.2Y). Both are definitely depictions of *Cucurbita pepo*. The former shows a bushy, compact plant, the latter a viney plant. Fruit size is not very small, about the same size as the leaf laminae and fruit shape is roundish to very short, tapered cylinder, resembling *C. pepo* subsp. *pepo* Vegetable Marrow Group.

Chapter 332, entitled "Of Gourdes," opens with "There be divers sorts of Gourds, some wilde, and others tame or of the garden; some bringing foorth fruite like unto a bottle; others long, bigger at one end, keeping no certaine forme or fashion, some greater, others lesser." The subsequent text closely follows that of *De Cucurbita* in Dodoens' Pemptades, even perhaps an allusion to Pliny's Book 19 Chapter 5 of the *Historia Naturalis* (Janick et al. 2007). These gourds are described as having

very long, branched, tendril-bearing vines, with large but soft leaf laminae, foliage covered with a white down, bearing white flowers, fruits varying tremendously in shape, hard and woody when mature. The description admirably fits that of *Lagenaria siceraria* (Mol.) Standl., the bottle gourd. Both, long-fruited and bottle-fruited types of *L. siceraria* are mentioned and are illustrated as *Cucurbita anguina*: Snakes Gourde (Fig. 6.2Z) and *Cucurbita lagenaria*: Bottle Gourdes, respectively (Fig. 6.2AA). Gerard said that these gourds were exotics in the gardens of cooler regions, grown for pleasure rather than usage, and in the warmer regions are eaten, not with great delight, or used as vessels for liquids.

Finally, Chapter 333 "*Of the wilde Gourde*" contains a discussion of two cucurbits. The first described is a translation from the *Pemptades* of a small bottle gourd, *Lagenaria siceraria*, which is as bitter as the colocynth. The illustration labeled *Cucurbita lagenaria sylvestris*: Wilde bottle Gourde (Fig. 6.2BB) fits the description. The second is an original description by Gerard of a branched, trailing, tendril-bearing plant "*the leaves be broad, deeply cut into divers sections, like those of the Vine, soft and very downy, whereby it is especially known to be one of the Gourdes: the fruite succeedeth growing to a rounde forme, flatte on the top like the head of a Mushrome, whereof it tooke his surname.*" The description of deeply incised leaves is puzzling, otherwise the description is of another bottle gourd. However, the illustration (Fig. 6.2CC) labeled *Cucurbita Indicus fungiformis*, Mushroom pom-pion is of another *Cucurbita pepo*, this one with fruits similar to the extant 'Sweet Dumpling', *C. pepo* subsp. *texana* Acorn Group.

## B. Nightshade Chapters

Nightshades of five Old World genera (*Atropa*, *Hyoscyamus*, *Mandragora*, *Physalis*, and *Solanum*) and four New World genera (*Capsicum*, *Datura*, *Nicotiana*, and *Solanum*) are found in the *Herball* (Table 6.2). The species order is slightly different from the one used by Dodoens (1583), however, in both herbals most solanaceous species chapters are contiguous (51–52, 54–64, 66, 335 in Gerard), as those of the cucurbitaceous species, indicating that Dodoens as Gerard were aware of the relationships between the species and had an empirical notion of these two plant families. As Dodoens did, Gerard inserted in a unique sequence (one after the other) three edible species, eggplant, tomato, and an African eggplant, in the middle of a long list of plants only used for their medicinal properties. Interestingly, there is one exception in each of the two herbals that is treated differently from the others: the

Table 6.2. Nightshades of Gerard's *Herball* (1597).

Chapter	Chapter name	Taxon based on description	Latin name of illustration	Taxon based on drawing
51(1st)	Of nightshade	<i>Solanum nigrum</i>	<i>Solanum hortense</i> <i>Solanum pomiferum</i>	<i>Solanum nigrum</i> <i>Solanum aethiopicum</i>
51(2nd)	Of sleeping nightshade	<i>Atropa belladonna</i>	<i>Solanum lethale</i>	<i>Atropa belladonna</i>
52	Of winter cherries	<i>Physalis alkekengi</i>	<i>Solanum halicacabum</i> <i>Halicacabum peregrinum</i>	<i>Physalis alkekengi</i>
54	Of madde apples	<i>Solanum melongena</i>	<i>Mala insanae</i>	<i>Solanum melongena</i>
55	Of apples of love	<i>Solanum lycopersicum</i>	<i>Poma amoris</i>	<i>Solanum lycopersicum</i>
56	Of the Aethiopian apples	<i>Solanum aethiopicum</i>	<i>Mala aethiopica</i>	<i>Solanum aethiopicum</i>
57	Of thorne apples	<i>Datura metel</i> <i>Datura stramonium</i>	<i>Stramonium peregrinum</i> <i>Stramonium spinosum</i>	<i>Datura metel</i> Figure missing
58	Of bitter sweete, or woode nightshade	<i>Solanum dulcamara</i>	<i>Amara dulcis</i>	<i>Solanum dulcamara</i>
60	Of Mandrake	<i>Mandragora officinalis</i>	<i>Mandragoras mas &amp; foemina</i>	<i>Mandragora officinalis</i>
61	Of Henbane	<i>Hyoscyamus niger</i> <i>H. albus</i>	<i>Hyoscyamus niger</i> , <i>H. albus</i>	<i>Hyocyanus niger</i> <i>Hyocyanus albus</i>
62	Of yellow Henbane, or English tabaco	<i>Nicotiana rustica</i>	<i>Hyoscyamus luteus</i>	<i>Nicotiana rustica</i>
63	Of tabaco or Henbane of Peru	<i>Nicotiana tabacum</i>	<i>Hoscyamus Peruvianus</i> <i>Sana Sancta Indorum</i>	<i>Nicotiana tabacum</i> <i>Nicotiana tabacum</i>
64	Of tree nightshade	<i>Solanum pseudo-capsicum</i>	<i>Amomum Pliny</i>	<i>Solanum pseudo-capsicum</i>

Table 6.2. (Continued)

Chapter	Chapter name	Taxon based on description	Latin name of illustration	Taxon based on drawing
66	Of Ginnie or Indian Pepper	<i>Capsicum annuum</i>  <i>Capsicum</i> sp.	<i>Capsicum longioribus siliquis</i>  <i>Capsicum minimis siliquis</i>	<i>Capsicum annuum</i>  <i>Capsicum</i> sp.
335	Of potatoes of Virginia	<i>Solanum tuberosum</i>	<i>Battata virginiana sive virginianorum Pappus</i>	<i>Solanum tuberosum</i>

New World *Capsico* (and *Pseudocapsico*) in Dodoens and the New World *potatoes of Virginia* in Gerard. Each herbalist was clearly not familiar with these species that they classified apart from the other and better known Solanaceae. This is a clue that the American peppers (*Capsicum* spp.) were a recent introduction to Flanders when Dodoens published his *Stirpium Historiae Pemptades Sex*, in 1583, as was the American potato (*Solanum tuberosum*) in England when Gerard published its first description in 1597.

There are two Chapters named 51, dealing with several nightshades that gave a hard time to botanists in those days. In the first chapter "*Of Nightshades*" Gerard introduces the subject with more details than Dodoens: he mentions that there are diverse types, found in gardens or fields, some of which cause sleepiness or even death, whereas others are beneficial to health. Gerard describes and illustrates only two out of these many nightshades. The first is *Solanum hortense*, the Garden nightshade (Fig. 6.3A), the modern botanical name of which is *Solanum nigrum* L. with

... leaves of a blackish color, soft & full of juice, in shape like to the leaves of Basill, but much greater: among which do growe small white flowers with yellowe pointels in the middle; which being past, there do succceede rounde berries, greene at the first, and black when they be ripe like those of iuie: the roote is white and full of hairie strings.

Gerard correctly describes the black color of the mature fruits, whereas Dodoens also included green, red, and yellow berries within his matching "*de Solano Hortensi*" chapter, all mature fruit colors which correspond to closely related but distinct species of *Solanum*.

The second nightshade Gerard mentions is the Sleeping Nightshade. He personally observed the plant since he comments that his sample

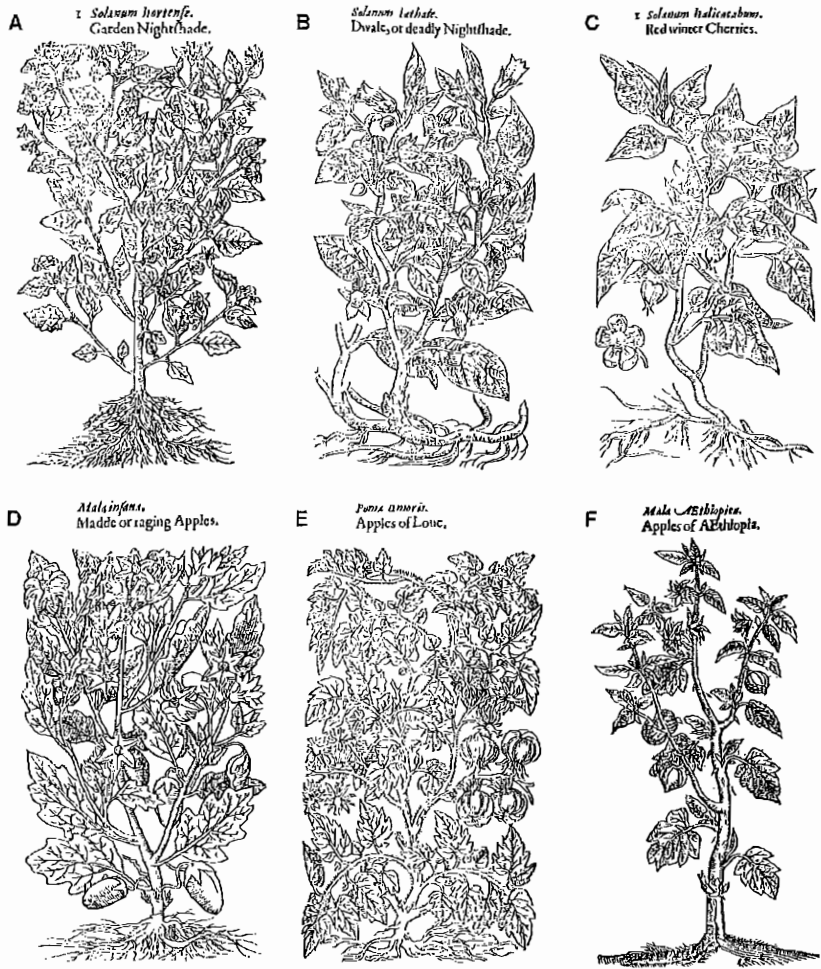


Fig. 6.3 (A-F). Nightshade species illustrated in Gerard's 1597 *Herball*: (A) *Solanum nigrum* L.; (B) *Atropa belladonna* L.; (C) *Physalis atkekengi* L.; (D) *Solanum melongena* L.; (E) *Solanum lycopersicum* L. = *Lycopersicon esculentum* Mill.; (F) *Solanum aethiopicum* L.

"perisheth at the first approach of winter" and, although his rather vague description matches Dodoens' for the yellowish fruit color, it does not for the flowers, which Gerard wrote were white and Dodoens wrote were reddish. Furthermore, the illustration, labeled *Solanum pomiferum* Sleepy Nightshade, depicts an African edible scarlet eggplant and not the Sleeping Nightshade. This illustration is found in other

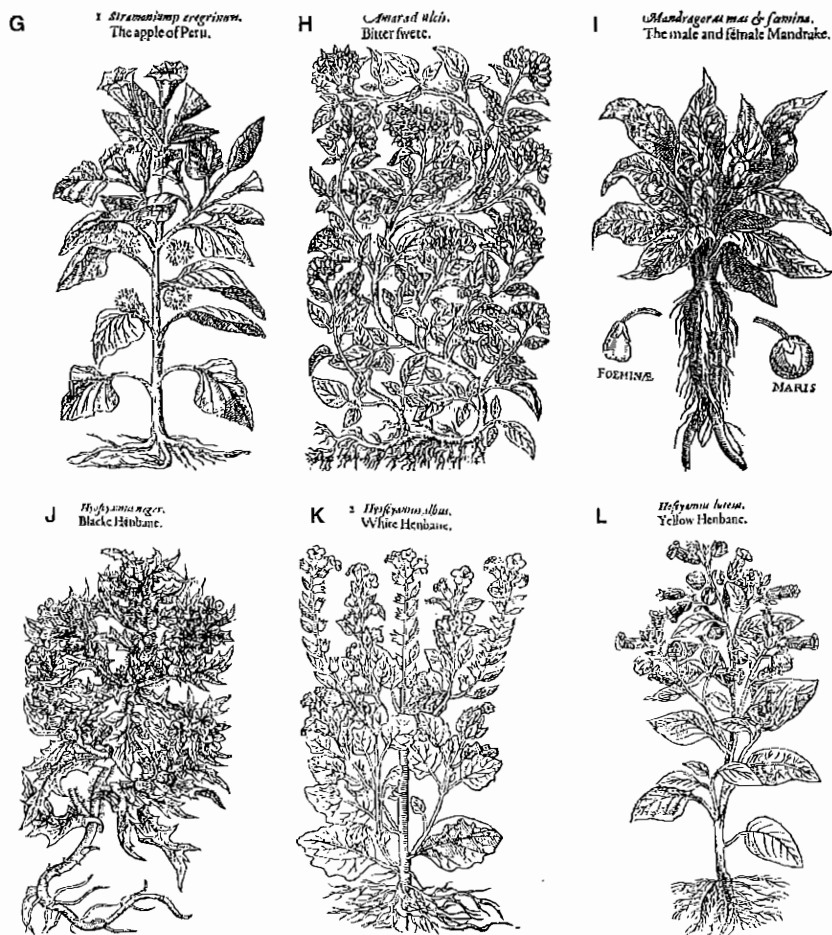


Fig. 6.3 (G–L). Nightshade species illustrated in Gerard's 1597 *Herball*: (G) *Datura metel* L. or *Datura stramonium* L.; (H) *Solanum dulcamara* L.; (I) *Mandrake officinalis* L. (b) (J) *Hyoscyamus niger* L.; (K) *Hyoscyamus albus* L.; (L) *Nicotiana rustica* L.

herbals of this period, wherein it is labeled *Solanum pomiferum* or *Mala aethiopia* (Daunay et al. 2008); it was more precisely identified as *S. aethiopicum* Shum Group by Lester and Niakan (1986). Hence, clearly Gerard confused a specimen of the African eggplant—that he however described separately in Chapter 56—with the authentic sleeping nightshade, that is, Dodoens' "*Solano somnifero*," possibly *Withania somnifera* L. (Dunal), that induces strong psychotropic effects. Gerard's 1597 mistakes were corrected in the second edition (Gerarde and

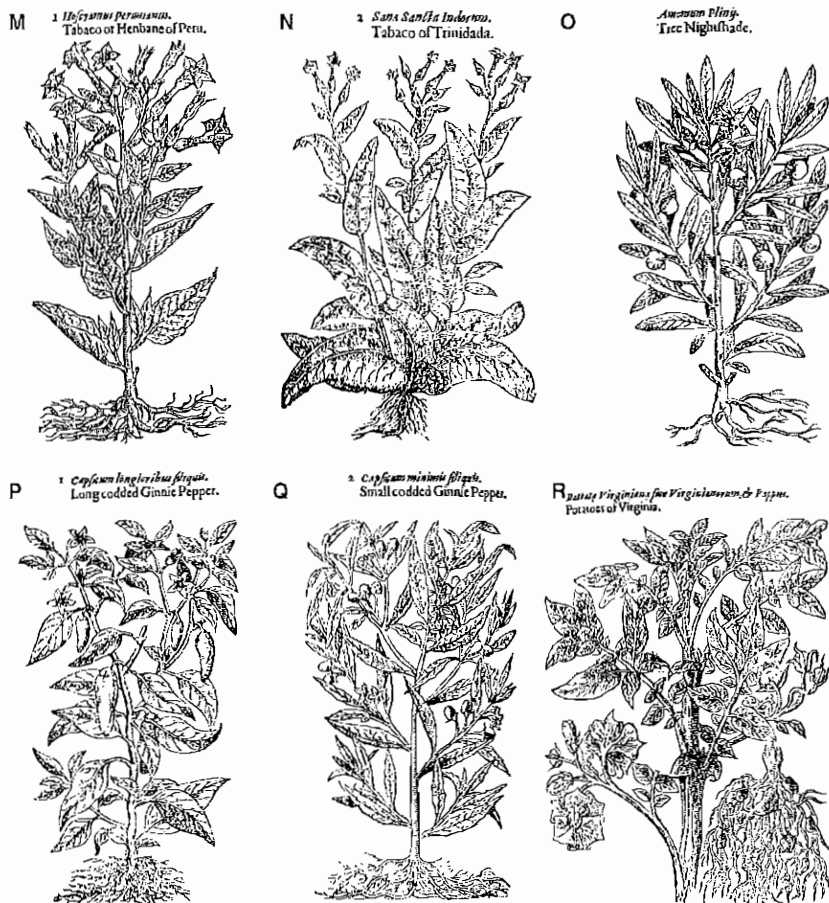


Fig. 6.3 (M-R). Nightshade species illustrated in Gerard's 1597 *Herball*: (M, N) *Nicotiana tabacum* L.; (O) *Solanum pseudocapsicum* L.; (P) *Capsicum annuum* L. (Q) *Capsicum* L. spp.; (R) *Solanum tuberosum*.

Johnson 1633) with the correct illustration of a *Withania* sp. and an appropriate caption "*Solanum somniferum* Sleepie nightshade."

The second Chapter 51, "Of Sleeping Nightshade," describes a dangerous species that "*causeth sleepe, troubleth the minde, bringeth madness if a few of the berries be inwardly taken, but if mo be given they also kill and bring present death.*" The illustration of *Solanum lethale*, Dwale, or deadly Nightshade (Fig. 6.3B) together with the description, close to that of Dodoens, depicts *Atropa belladonna* L.,



a beautiful but poisonous species. Gerard discussed at length the dangers of consuming the berries of this plant. He indicated that the plants flourished during the spring and summer in sea marshes, and around fences and roads, in Holland and England.

In Chapter 52, “*Of winter Cherries,*” Gerard describes two species, the red and the black winter cherry, which correspond to two species that Dodoens examined in two successive chapters. For the first, the text is close to that of Dodoens, and describes *Physalis alkekengi* L., the illustration of which is labeled by Gerard *Solanum halicacabum*, Red winter Cherries (Fig. 6.3C). This species, the medicinal use of which was already mentioned in the oldest surviving copy of the Dioscorides herbal (Daunay et al. 2008), was considered efficacious against urination troubles and bladder stones. The other plant, *Halicacabum peregrinum*, Black winter Cherries, is not a *Physalis* species despite its inflated calyces, but the balloon vine, *Cardiospermum halicacabum* L., Sapindaceae is. The association within the same chapter of these two species is also found in several other herbals contemporary to that of Gerard (Daunay et al. 2008), but why Gerard kept the two species in a single chapter is unclear since he knew that the black winter cherries were “*in truth not any of the Nightshades.*”

The next chapter, 54, “*Of madde Apple,*” presents eggplant/aubergine, *Solanum melongena* L. Gerard’s description is consistent with that of Dodoens, including the white or purple color of the flowers and fruits, but he added some details, such as yellow or brown fruit color, which corresponds to fruit physiological maturity, and comparisons of his own, such as the fruits “*of the bignesse of a swans egge and sometimes much greater*” that are indicative of a personal knowledge. He observed that the plant was to be sown in April and flowered in August, and that the fruits rarely reached their full size, except in exceptionally mild years, and never reached maturity, which would be expected for eggplants growing in the outdoor climatic conditions of England. The woodcut, labeled *Mala insana*, Madde or raging apple (Fig. 6.3D), depicts small oblong fruits and is close to the one used by Dodoens. Gerard explains the way the fruits were eaten in some Mediterranean countries but remains suspicious about this use:

*The people of Tolledo do eate them with great devotion being boiled with fat flesh, putting thereto some scraped cheese, which they do keepe in vinegar, honie, or salt pickell, all winter to procure lust. . . . in Egypt and Barbarie, they use to eate the fruite of Mala insana boiled or rosted under ashes with oile, vinegar, and pepper, as people use to eate Mushrooms. But I rather wishe English men to content themselves with the meate and sauce of our*

*owne cuntry, then with fruite and sauce eaten with such perill: for doubtless these apples have as mischeevous qualitie, the use whereof is utterly to be forsaken.*

Chapter 55, “*Of apples of Love*,” describes tomato (*Solanum lycopersicum* L. = *Lycopersicon esculentum* Mill.). Again, Gerard followed Dodoens’ general plant description, starting with the branches, the leaves, the flowers, the fruits, and the roots, but he removed some of Dodoens’s text and added details of his own such as the flowers and fruits set in bunches, and explanations such as “*The Apple of Love bringeth foorth verie long round stalkes or braunches, fat and full of juice, trailing upon the grounde, not able to sustaine himselfe upright by reason of the tendernesse of the stalkes, and also the great waight of the leaves and fruite wherewith it is surcharged.*” Except for the color, red or yellow, the fruits he described do not display the characteristics given by Dodoens as round, scalloped with deep creases, and the size of an ordinary apple, Gerard’s observation states that they “*do come in place faire and goodly apples, chamfered, uneeven and bunched out in manie places, . . . and the bignes of a goose egg or a large pepin.*” Similar to Dodoens, he noted the unpleasant plant odor, “*the whole plant [of which] is of a ranke and stinking savour.*” The illustration, the same as the one used by Dodoens, is labeled *Poma amoris*, apples of love (Fig. 6.3E) and displays deeply creased fruits though Gerard’s text does not mention this trait. Gerard does not mention that the species comes from the New World, but notes it is grown in Spain, Italy, and other warm areas. He mentions the alternative name of “golden apples” and spells *Lycopersicon* (for wolf peach) as “*lycopertium*,” a name used by the second-century Greek physician Galen to designate a malodorous plant from Egypt. He reports a persisting distrust towards tomato by writing that though the fruits are eaten in hot countries such as Spain, “. . . they yeelde very little nourishment to the bodie, and the same naught and corrupt.”

The following chapter, 56, “*Of the AETHiopian apple.*” Gerard’s plant description differs from that of Dodoens (1583) for some aspects such as the roots described in Gerard but not in Dodoens. However, both texts have much in common; both include the description of the few but sharp prickles on the leaf midribs, white corollas, yellow stamens, and round, striate fruits. Gerard’s description “*The fruite is rounde, and bunched with uneven lobes or bankes lesser then the golden apple, of color red, and of a firme and solid substaunce, wherein are contained small flat seedes,*” together with the illustration, matches the traits of some types of the African Scarlet eggplant (*Solanum aethiopicum* L.). Although the plant originates from Africa, Gerard mentions its

presence in France and Flanders, and specifies that he got his sample from Andalucia. The climate was too cool for it to be grown successfully in England: “*But mine perished at the first approach of winter.*” Gerard mentions that, to his knowledge, Aethiopian apples are not used as medicine, but “*they are used for a sauce and service unto rich men tables to be eaten, being first being boiled in broth or fat flesh with pepper and salt, and have a lesse hurtfull juice then either madde apples [eggplant] or golden apples [tomato],*” suggesting that the fruits he sampled were sweet, and not bitter as is the case for some cultivars of this eggplant species. The illustration is labeled *Mala AETHiopica*, Apples of AETHiopia (Fig. 6.3F).

Chapter 57, “*Of Thorne apples,*” focuses on two *Datura* species, the heady scent of the flowers of which is mentioned. The first description is similar to that of Dodoens: “*leaves smooth and even, little or nothing indented about the edges*” and “*round fruite full of short and blunt prickles,*” and it fits the illustration labeled *Stramonium peregrinum*, the apple of Peru, that we identify as *Datura metel* L. (Fig. 6.3G). The second species, absent from Dodoens, is probably the Jimson weed, *D. stramonium* L. given its description as “*great leaves cut and indented deeply about the edges, with many uneven sharpe corners*” and “*the fruit followeth rounde, sometimes or of the fashion of an egge, set about on every part with most sharpe prickles.*” The space allocated to the illustration is blank but the caption indicates *Stramonium spinosum*, Thornie Apples of Peru (in the second edition of 1633, the plant is illustrated). The use of “Peru” in the English common name of both species indicates their New World origin, and the absence of *D. stramonium* in Dodoens (1583) suggests that *D. stramonium* was introduced to Europe after *D. metel*. In any case, both were rare in England at the time of the publication of the *Herball* (1597). Gerard grew the plants from seeds he obtained from the herbalist John Rogin of Paris for the first, and for the second from Lord Edward Zouch (1526–1625) who brought them back from Constantinople. Gerard claims credit for distributing seeds of the second type throughout England. He describes thorn apples as being efficient unguents against any kind of inflammation.

Chapter 58, “*Of Bitter Sweete, or woode Nightshade,*” describes bitter-sweet (*Solanum dulcamara* L.) as very common in humid places. Although Gerard’s description follows closely to the one of Dodoens, some details, including of the berries as “*of a sweete taste at the first, but after very unpleasant, of a strong savour; growing together in clusters like burnished corall*” indicate that Gerard knew this species. He describes the common blue-flowered type as well as a white-flowered type found growing in a ditch near a house in London, the botanical identity of

which might be *S. dulcamara* forma *albiflora* (<http://www.nhm.ac.uk/research-curation/research/projects/solanaceaesource/taxonomy/list.jsp>). The faithful illustration [Fig. 6.3H], labeled *Amara dulcis*, Bitter swete, depicts clearly and accurately the plant characteristics, whereas the one used by Dodoens was confusing and poorly informative. Gerard indicated several curative effects of the plant.

Another chapter, 59, "*Of Bindweede Nightshade*," deals with a species that is not a *Solanaceae*, but *Circaea luteciana* (Onagraceae), the woodcut of which is labeled "*Circaea lutetiana* Inchaunters Nightshade," the English part of the label still being used as an epithet for this plant. The enchanter in question is Circe the witch, whose spells turned the shipmates of Ulysses into pigs. The literary connection of this plant with sorcery is probably at the origin of its placement among the nightshades by Gerard, who specified that this plant had no use in medicine and was confused with Mandrake and mistakenly allocated its properties.

In Chapter 60, "*Of Mandrake*," Gerard describes two Mandrakes, the "male" and "female." Such sexual connotation was common in the past, for distinguishing superior from inferior types, on the basis of various criteria. Gerard distinguished the "male" and "female" by fruit shape (respectively round and pear shaped) and leaf color (darker for the female form). Both types are now considered as *Mandragora officinalis* L. Gerard's description is longer and less technical than that of Dodoens, and he interjected into his text various comments. He describes the ridiculous "old wives" tales about the plant emitting a shriek when harvested, pointing out that he and his servants had frequently dug out, planted, and replanted Mandrake without experiencing any trouble. The legends and deceptions surrounding the Mandrake were fertile ground for Gerard's literary talent:

*But the idle drones that have little or nothing to do but eate and drinke, have bestowed some of their time in carving the rootes of Brionie, forming them to the shape of men & women; which falsifying practice hath confirmed the error amongst the simple and unlearned people, who have taken them upon their report to be the true Mandrakes.*

Gerard allocated almost a full page to the medicines that could be prepared from various parts of the Mandrake plant, to its numerous medicinal properties, including drowsiness and sleepiness as well as induction of fertility in sterile women. However, for this special "virtue" he commented, quoting Psalm 127:3, that "*Children and the fruite of the womb are the inheritaunce, that commeth from the Lord.*" The illustration is a natural portrayal (Fig. 6.3I) labeled as *Mandragoras mas & foemina*, the male and female Mandrake.

Chapter 61, “*Of Henbane*,” alludes to three types: white, black, and yellow but describes only two, the black and the white henbane, the illustrations of which are labeled *Hyoscyamus niger* (Fig. 6.3J) and *Hyoscyamus albus* (Fig. 6.3K), which are their still accepted names, now authored L. Hence, Gerard corrected partially the mistake made 13 years before by Dodoens who included erroneously the so-called *Hyoscyamus luteus* within his *de Hyoscyamo* chapter with the accompanying illustration displaying the New World taxon *Nicotiana rustica*. Although they follow those of Dodoens, Gerard’s short descriptions of black and white henbanes seem to be from his own observations, the white henbane differing from the black one mostly by its much smaller, whiter and more hairy leaves, by its whiter flowers, and its prickleless calyx. Furthermore, the white henbane was said to be found only in gardens of simples, whereas the black henbane “*groweth almost everywhere*.” The illustration of black henbane, identical to the one used by Dodoens, displays clearly a characteristic that the text barely mentions, the deeply dentate, almost laciniate leaves. The illustration of white henbane is different from the one of Dodoens. Gerard noted that external use of henbane cured various pains but that leaves, seeds, and juice taken inwardly caused restless sleep and even death.

Chapter 62, “*Of yellow Henbane, or English Tabaco*,” describes *N. rustica* L., with an illustration identical to the one found in Dodoens, labeled *Hoscyamus luteus*, Yellow Henbane (Fig. 6.3L). Dodoens did not realize that this new species was distinct from henbane but Gerard did and he allocated it a separate chapter. Gerard was perhaps helped by the clearsightedness of L’Obel (1576), who named this species *dubius hyoscyamus* (dubious henbane). However, he kept the inappropriate name of *Hyoscyamus luteus* in his text and as caption of the woodcut. His description of this plant, of its “*smooth and even leaves, thicke, and full of juice*,” and pale yellow flowers at the top of the branches blooming mostly during summer, is more complete than that of Dodoens. Gerard’s observation that this plant has an invasive tendency due to spontaneous sowing in British conditions indicates that this species was already quite common there, only about 50 years after its introduction in Europe (Daunay et al. 2008). He mentioned that it is called “*Petum*”/“*petun*” or also “*Nicot*” after the name of a Frenchman who brought the seeds from the [West] Indies, as also the seeds of the “*true Tabaco*” [*Nicotiana tabacum* L.]. In fact, tobacco was introduced in Europe not only by Mr. Nicot, but also by other characters, and the exact date of its first introduction is still debated (Daunay et al. 2008). Gerard noted that it was smoked by some instead of true tobacco but caused a similar kind of drunkenness.

Another chapter, 63, “*Of Tabaco or Henbane of Peru*,” refers to two types of *N. tabacum* L., the “greater,” with shortly stalked leaves, originating from “*the provinces of America, which we call the West Indies*,” and the “lesser,” with unstalked leaves, originating from the island of Trinidad, with “light carnation” or “light purple” flowers, respectively. Gerard mentions that other authors considered these to be two additional types, including the yellow henbane, but he did not agree with this opinion. Gerard’s description of the “Tabaco of Peru” roughly follows that of Dodoens, however with several personal interjections. The illustration, labeled Tabaco or henbane of Peru, *Hoscycamus peruvianus* (Fig. 6.3M) is different from the one used by Dodoens, and displays a plant with longer leaves and compacter vegetation. Gerard adds a description of the “Trinidad Tabaco” that is absent from Dodoens and that comes from his own observations “*The whole plant perisheth at the first approach of winter*.” But Dodoens was aware of this second type since he provided a woodcut of it that is identical to the one illustrated and labeled by Gerard *Sana Sancta Indorum*, Tabaco of Trinidad (Fig. 6.3N). Although Gerard stated that these plants “*bringeth drowsinesse, troubleth the senses, and maketh a man as it were drunke by taking on the fume onely*,” he devoted two full pages to the numerous medicinal virtues of their juice, leaves, or smoke.

Chapter 64, “*Of tree Nightshade*,” is devoted to “*This rare and pleasaunt plant, called tree Nightshade, is taken of some to be a kinde of Ginnie [Guinea] pepper, but not rightly*.” Gerard’s description of this plant is based on his own observations and is more complete and accompanied with more commentary than that of Dodoens. Gerard specified that although the fruit shares some morphological similarity with ginnie pepper (*Capsicum* sp.), it “*hath no taste of biting at all*,” and thus the two species should not be confused with each other. The accompanying illustration (Fig. 6.3O), slightly different from the one used by Dodoens, represents the American species *Solanum pseudo-capsicum* L. (Jerusalem cherry, Madeira cherry, winter cherry). However, the label Tree nightshade, *Amomum pliny*, reveals some confusion with *Amomum melegueta*, Zingiberaceae (melegueta pepper, grains of paradise, or alligator pepper), which is native to Africa. In Brazil, some species of *Capsicum* were also called melegueta and incorrectly assumed to have originated in Africa, as *A. melegueta* (Andrews 1993; Reifschneider et al. 2009). Dodoens did not make this confusion either in the text or in the woodcut label, the plant being named “Pseudocapsicum.” Gerard mentioned that “*It groweth not wild in these colde regions, but we have them in our gardens, rather for pleasure then profite, or any good qualitie as yet knowne*.”

Chapter 66, “*Of Ginnie or Indian Pepper*,” describes two plants, both having square stems and white flowers. Some parts of the descriptions include what appear to be translations of Dodoens’ text whilst other parts are Gerard’s own observations. Moreover, Dodoens’ work had four illustrations displaying a variety of fruit and plant shapes. Gerard’s work contains only two, which are labeled *Capsicum longioribus siliquis* Long codded Ginnie Pepper (Fig. 6.3P) and *Capsicum minimis siliquis* Small codded Ginnie Pepper (Fig. 6.3Q). The first illustration shows a plant of *Capsicum annum* L. bearing finger-size, elongate fruits that are “*greene at the first, and when they be ripe of a brave color glittering like red corall.*” The second illustration appears to be of a plant of a wild *Capsicum* sp., with small, clustered, erect, oval, and red berries. The fruits of both plants were described by Gerard as “*verie sharpe and bitin.*” Gerard mentioned that these plants were of foreign origin and that he obtained seeds from Spain and Italy. He reports that they had some useful medicinal properties, but as far as food use is concerned he cautioned: “*Ginnie pepper hath the taste of pepper [Piper nigrum], but not the power or vertue, notwithstanding in Spaine and sundrie parts of the Indies they do use to dresse their meate therewith, as we do with Calecute pepper: but (faith my author) it hath in it a malicious qualitie, whereby it is an enimie to the liver & other of the entrails; Avicen writeth that it killed dogs.*” As *Capsicum* is a New World genus that could not have been known to Avicenna, Gerard misinterpreted the translation he read.

Finally, in a wide further Chapter 335 “*Of Potatoes of Virginia*,” Gerard describes the potato, *Solanum tuberosum* L., a plant that is absent from the herbal of Dodoens. Gerard was the first to publish a description of this New World species which characterizes the variation in the shape of the tubers, as “*some of them round as a ball, some ovall or egge fashion, some longer and others shorter.*” The accompanying illustration, labeled *Battata virginiana sive virginianorum, & Pappus*, Potatoes of Virginia, depicts a potato plant with flowers and fruits, as well as its root system and very small tubers (Fig. 6.3R). Gerard is responsible for the confusion between potato (Indian name *papas*) and sweetpotato, *Ipomoea batatas* (Indian name *batatas*), the topic of Chapter 334. He mentioned that the plant grew naturally in America and that the plants cultivated in his garden were obtained from Virginia. In fact, potatoes are a South American crop introduced to Virginia at the end of the 16th century by Spaniards (Quellier 1971). Gerard describes the color of the tubers as the same as of the “*common potatoes*” [sweetpotato]. *S. tuberosum* was introduced independently into southern Europe by 1589 (Daunay et al. 2008). Gerard mentions the

alimentary and culinary interest of potato, without any hint of distrust towards this plant: "*a meate for pleasure . . . being either rosted in the embers, or boiled and eaten with oile, vineger and pepper, or dressed any other way by the hand of some cunning in cookerie.*" Distrust for this new crop persisted a long time, at least in some countries such as France (Daunay et al. 2008). Gerard's pride in describing the potato is evident in his portrait (Fig. 6.1), part of the frontispiece of the second edition of the *Herball*, which shows him holding a flowering and fruiting shoot. In the 1596 garden catalogue (*Catalogus arborum*), Gerard included *Papus orbicularus* (round potato), the first printed mention of *S. tuberosum*, next to *Papus hyspanorum* (Hispanic potato = *I. batatas*, sweetpotato).

### III. WILLIAM SHAKESPEARE

Shakespeare is considered the greatest writer in English based on his poetry and plays. Born in Stratford-on-Avon, his early life is not well known. He was not university educated. He moved to London as a young man and entered the world of the theatre as a minor actor and then playwright. Shakespeare wrote about the human condition in a way that still, despite changes in the language, come across as fresh and pungent. A disconnection between his life and his experience with his literary efforts has led to the belief by some that the Shakespeare of Stratford is not the author of the plays, and various claimants have been suggested including Francis Bacon and Edward de Vere, Lord of Oxford, the latter a known playwright (Meres 1598). Edward de Vere was the ward and later son-in-law of Lord Burghley, suggesting a connection between Oxford and Gerard.

The bulk of Shakespeare's imagery is drawn from everyday things, seen and unseen (Spurgeon 1935). There are many references to medical, military, and legal matters as well as sports, hunting, and fishing, but the main body derives from the real world of everyday life emphasizing nature. And of all nature's images, the greatest number is devoted to horticulture including plant growth, propagation, grafting, pruning, manuring, weeding, ripeness, and decay. Almost 200 plants are cited in the famous work *The Plant Lore and Garden Craft of Shakespeare* by Ellacombe (1884) who has meticulously traced all the plant references in Shakespeare including herbs, flowers, fruits, and vegetables. Here we review the references to the *Cucurbitaceae* and *Solanaceae*. The quotations from the plays are from the authoritative *The Riverside Shakespeare* (Blakemore Evans 1996).



## A. Cucurbit References

### 1. Coloquintida

Iago. *The food to him now is a luscious as locusts, shall be to him shortly as acerb as the coloquintida.* *Othello*, I.iii.347.

Iago's intent to transform Othello's food of love (Desdmona), which is as luscious as a carob seed (known as locust beans), into coloquintida, the extremely bitter colocynth, *C. colocynthis* (L.) Schrad., is a metaphor for the infamy he is planning against the noble Moor.

### 2. Gourd

Pistol. *Let vultures grip thy guts! For gourd and fullam holds, and high and low beguiles the rich and poor.* *Merry Wives of Windsor*, I.iii.85.

"Gourd," from the Latin *cucurbita*, refers to the hard-shelled, dried, hollow fruits of *Lagenaria siceraria*. The word "gourd" in this obscure phrase is an allusion to hollow dice while "fullam" refers to false dice loaded with lead on one side to come up with low numbers.

### 3. Marrow

Timon. *Dry up thy marrows, Vines, and plough-torn leas.* *Timon of Athens*, IV.iii.193.

Although some members of *Cucurbita pepo* are referred to as vegetable marrow, the word "marrow" here is ambiguous and has been assumed to refer to vital strength. The word "marrow" does not appear in Gerard's *Herball*.

### 4. Squash

Malvolio. *Not yet old enough for a man, nor young enough for a boy; as a squash is before 'tis a peascod, or a codling when 'tis almost an apple.* *Twelfth Night*, I.v.156.

The use of the word "squash" here, as explained in the text, refers to the young pea pod before the seeds appear. "Squash" is also used in the same sense for one of the fairies in *Midsummer Nights' Dream*. The word "squash" for cucurbit has been assumed to be derived from a native American word (Paris 2001).

### 5. Pumpkin

Mrs. Ford. *We'll use this unwholesome humidity, this gross wat'ry pumpkin. We'll teach him to know turtles from jays.* *Merry Wives of Windsor*, III.iii.40.

Lincoln. *They bring in strange roots, which is merely to the undoing of poor prentices, for what's a sorry parsnip to a good heart?*

Williamson. *Trash, trash; they breed sore eyes and tis enough to infect the city with the palsy*

Lincoln. *Nay, it has infected it with the palsy, for these bastards of dung—as you know they grow in dung have infected us, and it is our infection will make the city shake, which partly comes through the eating of parsnips.*

Clown: *True, and pumpions together. Sir Thomas Moore, Addition. II,16.*

Mrs. Ford disparagingly refers to Falstaff as a fat watery pumpkin. The reference to turtles (turtledoves) and jays (blue jays) refers to faithful and loose women. The epithet “pumpion” was transformed into pumpkin, and the term “bumpkin” for a country oaf seems to be related; it is derived through the French *pompon* from the Greek word *pepon* for a sun-ripened fruit, the watermelon, *Citrullus lanatus*, and Pliny referred to a mature melon, *C. melo* L., as a *melopepo* (Janick et al. 2007). Shakespeare's *wat'ry pumpion* is reminiscent of Gerard's Citrull Cucumber, the citron watermelon: *the pulpe wherein the seede lieth, is spungie and of a slimie substance.*

*Sir Thomas Moore*, a play known in a handwritten manuscript, is generally accepted to be the work of a number of authors including Anthony Munday, Henry Chettle, Thomas Heywood—a professional theatrical scribe, Thomas Dekker, and William Shakespeare (Hand D). In the rebellion scene penned by Hand D, the mob complains of the economy and the plants brought in including the well-known parsnip (*Pastinaca sativa* L.) and the strange pumpions. There is no way to determine for certain if pumpions in both plays refer to *Cucurbita* species from the New World or watermelon or melon. In any case, the large, round cucurbits of the New World were soon to take on the name *pumpion* which was later transformed to pumpkin.

## B. Nightshade References

### 1. Henbane

Banquo. *Were such things here as we do speak about? Or have we eaten on the insane root that takes the reason prisoner? Macbeth, I.iii.93.*

Ghost. *Upon my secure hour thy uncle stole,  
With juice of cursed hebona in a vial,  
And in the porches of my ears did pour  
The leprous distillment, whose effect  
Holds such an enmity with blood of man*

*That swift as quicksilver it courses through  
The natural gates and alleys of the body,  
And with a sudden vigor it doth posset  
And curd, like eager droppings into milk,  
The thin and wholesome blood. Hamlet, I.v.61.*

“Insane root” and “hebona,” have been inferred to be henbane (*Hyoscyamus* spp.) but there are other claimants including belladonna (*Atropa belladonna* L.) and yew (*Taxus baccata* L.). Gerard mentions that Pythagoras, Zoroastes, and Apuleius used the name *insana* for henbane. The sleeping potent given for Juliet by Friar Lawrence (*Romeo and Juliet*, II, iii) has been assumed to be belladonna but is not specifically named by Shakespeare.

Henbane, presently also called stinking nightshade, is distributed in the Mediterranean area and in Asia, but spread to England in the Middle Ages. Since antiquity it has been considered a useful medicinal plant, however dangerous because of its psychoactive properties that have been shown to be due to the presence of hyoscyine and hyoscyamine-type alkaloids.

## 2. Mandrake

Juliet. *And shrieks like mandrakes torn out of the earth, that living mortals, hearing them, run mad. Romeo and Juliet, IV.iii.47.*

Suffolk. *Would curses kill, as doth the mandrake's groan, 2 Henry VI, III.ii.310.*

Cleopatra. *Give me to drink mandragora. . . .  
That I might sleep out this great gap of time  
My Antony is away. Antony and Cleopatra, I.ii.4.*  
Iago. *Not poppy, nor mandragora,  
Nor all the drowsy syrups of the world  
Shall ever medicine thee to that sweet sleep  
Which thou ow'dst yesterday. Othello, III.iii.330.*

Falstaff. *Thou whoreson mandrake, thou art fitter to be worn in my cap than to wait at my heels. 2 Henry IV, I.ii.14.*

'A *was the very genius of famine, yet lecherous as a monkey, and the whores called him mandrake. 2 Henry IV, III.ii.313.*

Five references to Mandrake (*Mandragora* spp.) in Shakespeare allude to medicinal and occult properties that date to antiquity (Daunay et al. 2008). Various tropane alkaloids are responsible for the various pharmaceutical and psychotropic effects that transformed Mandrake to a magical plant that still reverberate in the modern tales of Harry Potter. Juliet's and Suffolk's comment refers to the ancient belief that the plant

emitted a fatal shriek when ripped from the soil. In Shakespeare's play, Cleopatra and Iago refer to the sleep-inducing properties of Mandrake, while Falstaff refers to the lechery induced by the anthropomorphized hairy root that resemble a man's thighs. Gerard clearly points out by personal experience that these ancient superstitions regarding Mandrake are ridiculous, old wives tales but still encouraged by "*rennagate Surgeons or physick-mongers*." He also debunks the so-called fertility effects of Mandrake found in the story of Rachel and Leah in the Hebrew bible.

### 3. Potato

Thersites. *How the devil Luxury, with his fat rump and potato finger, tickles these together? Fry lechery, fry! Troilus and Cressida*, V.ii.55.

Falstaff. *My doe with the black scut? Let the sky rain potatoes; let it thunder to the tune of "Green-sleeves," hail kissing-confits, and snow eringoos; let there come a tempest of provocation, I will shelter me here. Merry Wives of Windsor*, V.v.20.

These two references to potato show Shakespeare at his bawdiest and the Reverend Henry L. Ellacombe in his collection *The Plant Lore* and scholarly *Garden Craft of Shakespeare* prudently eliminated some of the offending associated lines. He mentions that potato (*S. tuberosum*) was introduced from the New World into Ireland in 1584 by Sir Walter Raleigh from whence they came to England. However, Clusius is the pivotal figure in the diffusion of the potato to the gardens of various European herbalists, and he is the one who received in 1589 the earliest image of potato, a watercolor (Daunay et al. 2008). The first mention in European planting of potato is in the plant list, *Catalogus arborum* (1596) of Gerard, under the name of *Papus orbiculatus*. However, because of the confusing nomenclature he used for designating potato and sweetpotato (*I. batatas*) in his 1597 *Herball*, Gerard is responsible for a lasting confusion between these two unrelated species. Sweetpotato was known to Europeans before potato since reference to it exists in earlier herbals such as the one of Clusius (1576). Based on the erotic overtones, Shakespeare's potato refers most likely to the elongated tuberous root of sweetpotato rather than the round tuber of *S. tuberosum*,

In his chapter on potato, Gerard specifies that its roots resemble those of "*common potatoes* (i.e., what we now call sweetpotato)," but "*are not so great nor long, some of them tound as a ball . . .*" Further in the chapter on sweetpotato, Gerard included a statement that the roots "*comfort, nourish and strengthen the body, procuring bodily lust, and that with greedinesse*." The basis of this assertion was obviously related to the phallic shape of the root alluded to by Theristes in *Troilus and*

*Cressida* which is unambiguous in the remarks of Falstaff in the *Merry Wives of Windsor*. Gerard (Chapter 334) also points the culinary qualities of sweetpotato that are baked (rolled in the ashes), and sometimes infused (sopped) in wine, and he points out others to give them the greater grace in eating, "*doe boyle them with prunes, and so eate them.*" Prunes and sweet potato in a dish called *tsimmis* still remain a favorite holiday dish of the Jewish community.

#### IV. THE CONNECTION BETWEEN GERARD AND SHAKESPEARE

The lives and careers of Gerard and Shakespeare overlap. Rohde (1922) has thought it unlikely that two such prominent figures could have been unaware of the other given that the plays and poems of Shakespeare are so rich in botanical and horticultural imagery (Spurgeon 1935). There is indirect evidence that the two men very likely interacted. Based on court evidence of a dowry dispute (Belott vs. Mountjoy), the witness Shakespeare was shown to be a tenant in the house of Christopher Montjoy in 1604, located at the corner of Mugwell (now Monkswell) Street and Silver Street opposite Barber-Surgeons' Hall. Gerard was elected a member of the court of Assistants in the Barber Surgeons' Company in 1595, appointed Junior warden in 1597, and Master in 1608 (Woodward 1928).

There is conjecture that Gerard's work was known to Shakespeare (Lever 1952) based on reference to the silver color of the normally pale lilac lady smocks (*Cardamine pratensis*), in The Cuckoo Song in Shakespeare's *Love's Labour's Lost* and a references of milk white Ladie smockes in Gerard's *Herball*. The extensive references to Mandrakes in Shakespeare duplicate many of the comments made by or alluded to by Gerard including their deadly shriek when ripped from the earth, their soporific effects, and their lecherous connotations, that Gerard finds too scurrilous to repeat. Whether Shakespeare was influenced by Gerard's comments or merely in tune with these common opinions cannot be ascertained. The fact that Gerard was gardener to Lord Burghley, guardian and father-in-law of Edward de Vere has been seized upon by those who believe that Lord Oxford wrote the plays attributed to the Stratford Shakespeare.

Of particular interest to us is the general knowledge of several New World crop or wild plants in 16th century England. The English were attracted to the New World but their interest was at first centered on harassing and looting the Spanish ships, land possession, and later in finding a northern route to Asia. It would seem that the antagonism of

England to their Spanish adversaries in Europe made them unwilling to embellish their botanical discoveries in the New World. This may explain the fact that the word America is never mentioned in Shakespeare although he refers to New World plants in two cases: pumpkin and potato. His reference to the enchanted island Bermoothes in *The Tempest* has been thought to refer to Bermuda. Despite the use of tobacco in England as early as 1573, Shakespeare makes no reference to it. In contrast, Shakespeare's contemporary Ben Jonson satirized tobacco and smoking in his 1598 play, *Every man in his Humour*, and makes reference to its New World origin (Gately 2001). Intriguingly Shakespeare is included as an actor in a performance of this play. Although Gerard referred numerous times to *Cucurbita pepo*, its New World origin is not mentioned. However, in the case of the Solanaceae, Gerard makes it obvious that tobacco and potato come from the New World and the illustration of *Datura* is labeled "The apple of Peru." The word "America" is specifically mentioned by Gerard in reference to tobacco in Chapter 63 and in reference to potato in Chapter 335. However, there is no evidence that he was aware that capsicum pepper or tomato originated in the New World. Surprisingly, while New World plants were widely grown in Europe more than a century after Columbus' encounter with America, there was still confusion about the geographical origin of many New World crops.

## V. CONCLUSION

The cucurbits and nightshades described and illustrated in Gerard's *Herball* reflect the domestic genetic diversity of these two plant families in Europe and specifically in late 16th-century England. This diversity was known to botanists and horticulturists such as Gerard and perhaps to many gardeners as well. However, only a fraction of it may have been known or appreciated by the general public, as reflected by the few representatives of these plant families that happen to be mentioned in Shakespeare's plays. Moreover, in a famous contemporary cookbook, the only cucurbit or nightshade that appears in a recipe is cucumber, *C. sativus*, and this in a recipe for pickling (Murrell 1615, reprinted 1988).

Although the bulk of Gerard's *Herball* is comprised of woodcuts that had appeared several years earlier in the *Eicones* of Theodorus (1590) and much of the literary material was strongly inspired from the *Stirpium Historiae Pemptades Sex* of Dodoens (1583), a significant literary portion is Gerard's own observations and interpretations written in picturesque prose. Some errors are apparent, part of which can be

attributed to mistranslation and part are based on Gerard's own misinterpretations, mistaken notes, or wrong information passed on to him. There are cases for which it is difficult to determine which plants were known to him personally, how familiar he was with them, and how closely he observed them. While the occasional errors in the text spawn some confusion, on the whole the descriptions are accurate and highly detailed, allowing in nearly all cases the precise identification of the plant taxonomically, even without the help of the drawings, or in spite of the use of the wrong drawings for illustration.

The Cucurbitaceae and Solanaceae contain a number of taxa that have had importance for food and medicine since antiquity (Janick et al. 2007). Their polymorphism, especially of the Cucurbitaceae, also led to much confusion in ancient times down through the present day. The arrival of highly polymorphic New World cucurbits and nightshades in Europe during the 16th century greatly exacerbated the state of confusion among those concerned with these plants, botanists, horticulturists, physicians, and apothecaries alike.

The cucurbit genera *Bryonia*, *Citrullus*, *Cucumis*, *Ecballium*, *Lagenaria*, and *Momordica* are from the Old World while *Cucurbita* is a New World genus. The nightshades *Hyoscyamus*, *Mandragora*, *Physalis*, and *Withania* are Old World genera while the New World genera include *Capsicum*, *Lycopersicon* (now integrated into *Solanum*), *Datura*, and *Nicotiana*. The genus *Solanum* includes some species that are native to the Old World such as eggplant, and others that are native to the New World (e.g., tomato). Many cucurbits and nightshades are ill-adapted to the cooler regions such as England, failing to complete their development and ripen their fruits. Some descriptions of these plants seem to reflect this situation; observations on ripe fruits seem to have been obtained indirectly, for example, from descriptions of herbalists working in warmer regions. More significantly, most of the valuable food plants of these two families, the watermelon, melon, some species of squash and pumpkin, eggplant, tomato, and capsicum pepper, ripen with difficulty in England. Two notable exceptions were the cucumber, *C. sativus*, and one of the species of squash and pumpkins, *Cucurbita pepo*. Indeed, the latter species was represented by a large number of cultigens in England, and this scarcely 100 years after its introduction to the Old World.

Of all the species of cucurbits and nightshades, *Cucurbita pepo* is represented by far the most in Gerard's *Herball*. While most of the forms of this species were recognized by Gerard as *pompions*, its tremendous polymorphy resulted in some of its forms to be variously grouped together with the cucumbers, with the watermelons, with the

colocynths, and with the bottle gourds. The polymorphism of *C. pepo* was to bedevil botanists for two more centuries, until the great French amateur botanist and horticulturist Antoine Nicolas Duchesne set the record straight (Duchesne 1786).

Based on the illustrations and the descriptions of the plants as having been spiculate and the leaf laminae deeply incised, it is apparent that the only species of squash and pumpkins recorded by Gerard was *Cucurbita pepo*. *Cucurbita maxima* Duchesne has stiffly hairy, but not spiculate foliage and rounded nonincised leaf laminae and *Cucurbita moschata* Duchesne has softly hairy foliage and cornered but not incised laminae; no such plant is described or illustrated in the *Herball*. Nonetheless, these *Pompions*, all *C. pepo*, had to have been common given that so many forms were recognized.

*Pompions* are also one of the few New World plants that are mentioned by Shakespeare, but given the adjective "watery" would seem less appropriate for pumpkin than for watermelon, the Greek *pepon*, but it is possible that the epithet *pompion* was used for both. Whatever the case, the *pompions* by this time were common enough in England to have metaphoric implications. Cucurbits are sometimes considered as ridiculous because of their often extravagant sizes and shapes, and so is Falstaff, who is fat, like a pumpkin or watermelon, and imbibes to excess, therefore becoming "watery." Cucurbits also have strong sexual connotations and hence Falstaff, the *pompion*, at this part of the *Merry Wives of Windsor*, is trying to seduce a woman. Presently, pumpkins are still considered schizophrenically as both funny and plump, and dear and lovable—symbolic of fertility, sexuality, warm summer days, and Thanksgiving treats (Norrman and Haarberg 1980). Shakespeare's hollow dice, that is gourds, are dried-up, empty, and ridiculous, a thought that survives to the present, as a person who has become crazy is said to be "*out of his gourd*."

The pumpkins and squash of *Cucurbita pepo* and the cucumbers probably provoked much attention in gardens of Gerard's and Shakespeare's time. Today, the pumpkins and squash of all three major species, as well as melons, watermelons, cucumbers, eggplants, tomatoes, and peppers are commonly grown in gardens of England and other cool-climate regions. New horticultural technologies and the development of early cultivars have allowed for individual, local, and mass production of these fruit vegetables in regions that would otherwise be unsuitable. Today, they are in the spotlight of many English gardens and of gardens the world over.

The many powerful physiological and psychoactive properties of Old World nightshades such as Mandrake, henbane, belladonna, and deadly



nightshades as well as New World tobacco and datura had a deep impression on traditional folk medicine, folklore, and the occult. It is the deadly effects of many of these plants, perhaps together with their soporific and psychotropic properties that gave rise to magical uses, that gave rise to the name nightshades as a collective for this family. The name is appropriate. The physiological effects on humans are now known to be due to the presence of alkaloids such as hyoscamine, hyoscyne, and atropine in this family. Both Gerard and Shakespeare allude to these effects in their references to several Solanaceae species. The discovery of novel nightshade species in the New World induced many expressions of concern by herbalists of the edible solanums including tomato and potato and this fear contributed to delay their acceptance in some European countries. Two New World species escaped the disapproval on the nightshades: capsicum peppers and tobacco. In the case of capsicum pepper, the fiery nature resembled the valuable Indian spice black pepper (*Piper nigrum*), and adoption was rapid, especially in Asia where it encountered a great success. The universal acceptance of tobacco and smoking is an amazing paradox, since this species, considered a panacea in Renaissance Europe, is now considered as a tremendous health problem.

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