Rubus Iconography: Antiquity to the Renaissance

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Abstract

***Rubus* images from late Antiquity to the Renaissance are described and assessed for botanical and horticultural information. The earliest surviving European blackberry (*R. fruticosus* L. sp. agg.) image is found on folio 83 in the *Juliana Anicia Codex* (*Codex Vindobonensis*) of 512 CE which contains copies of several older texts including an illuminated, illustrated, partial alphabetical recension of *De Materia Medica* (English: *On Medical Matters*) written in the first century by Pedanius Dioscorides. Comparisons are made with other blackberry images from later Dioscoridean recensions including the *Codex Neapolitanus* folio 32 (7th century CE), *Morgan* folio 25 (10th century CE), *Grecian 2179* folio 82b (8th century), and *Arab 2850* folio 19 (13th century CE). *Rubus* images from the Medieval Period include the recensions of *Apuleius Platonicus*: *Leyden Apuleius* (600 CE), *Leech Book of Bald* (920) and *Bodley 130* (1120 CE). Renaissance images from the 16th century include *Rubus* paintings from a prayer book, *Horae ad Usum Romanum* (*Grandes Heures d'Anne de Bretagne*) ca. 1503 to 1508, drawings by Leonardo da Vinci (1508 to 1510), and a woodcut from *De Historias Stirpium* of Leonhart Fuchs (1542). Images from the ancients represented nature, but deteriorated to crude diagrammatic representations in the Medieval Period. Images in the Renaissance eschewed imitative reproduction and returned realism to art.**

INTRODUCTION

Botany and Horticulture of *Rubus*

Rubus L., Rosaceae, known collectively as briars, brambles as well as small, bush, or berry fruits, includes blackberries, red raspberries, and their hybrids. Although many of the world inhabitants consider plants of this genus to be roadside, invasive, noxious weeds, domestication combined with breeding efforts have developed several species of *Rubus* into economically important cultivated fruit crops. In 2005, more than 154 thousand tonnes of blackberry (Strik et al., 2007) and 498 thousand tonnes of raspberry (FAO, 2006) were harvested worldwide with production expected to double in the next decade.

The European blackberry and red raspberry plants were mentioned by Ancient Greek and Roman rhyzomotists and were illustrated on lost scrolls of western antiquity (Collins, 2000). These plants were considered medicinal with a wide range of pharmacological uses. The objective of this paper is to highlight botanical and horticultural information from a progression of blackberry images from late antiquity to the Renaissance. Botanical descriptions of European blackberry and red raspberry plants are provided as a foundation to contrast with the morphology depicted in the images.

Botanical Descriptions

Blackberry plants are botanically classified in genus *Rubus* subgenus *Rubus* (formerly *Eubatus*). Although blackberry species are native on six continents, European blackberries (*Rubus fruticosus* L. agg.) have a center of origin in Armenia, are well

distributed throughout Europe, and have been introduced into Asia, Oceania, and North and South America.

The stems of European blackberries are semi-woody or biennial, with a perennial crown and root system. They grow as upright bushes or climbing lianes (Jennings, 1988). Stems can be 1 cm thick, with ridges and recurved prickles as long as 1 cm. Stems, or canes, grow to 2 m during the summer and can bend to the ground and tip layer (root) to propagate and spread vegetatively. Leaves tend to be ternate above, tending to five palmate leaflets, or sometimes seven towards the base. Adaxial sides of leaflets are plicate and glabrate, green in summer, darkening red-purple in the fall, and deciduous in winter. Abaxial sides are light green to white, with light pubescence. The terminal leaflet is acuminate, ovate, with a rounded base and compound serrate margin. Veination is percurrent, pinnate. The petiolules of the subtending leaflets are half the length of those of the terminal leaflet. The basal leaflets have short petiolules or are almost sessile. Recurved prickles or pricklets occur on stems, petioles, petiolules, and abaxial mid-veins.

Flowers of these blackberries have five petals, multiple stamens, and are usually white though sometimes pink. As the petals fall, the fruit develops an aggregate of drupelets that begins green, and ripens through red to black. The receptacle dehisces and remains inside of the ripe aggregate fruit. Flowers and fruit occur in a panicle-like, or racemose-cymb (Rehder, 1986), with the primary fruit ripening prior to secondary and quaternary ones. Flowers and fruits form on the end of floricanes (biennial stems), which branch from the previous year's primocane (Clark et al., 2007).

Red raspberries (*Rubus ideaus* L., subgenus *Idaeobatus*) are native to southern European Mountains (Tutin et al., 1980) named by Linnaeus for Mount Ida, Turkey. Canes tend to be biennial though some genotypes produce flowers and fruit on primocanes, i.e., 1-year old woody stems. Red raspberries have thinner stems than do blackberries and have smaller prickles. Rhizomes grow underground extending from the crown. Adventitious buds produce suckers that emerge from the underground rhizomes, and form new crowns for vegetative propagation. Upper leaves are ternate though lower leaves are subsessile with 5 to 7 pinnate leaflets. The terminal leaflet is serrate, ovate or oblong, sometimes lobed, cordate or shortly acuminate. The lateral leaflets are lanceolate, sessile. Leaves are plicate, green, glabrescent above, and white-tomentose below. Venation is percurrent, pinnate. Stipules are filiform. Prickles or pricklets occur on stems, petioles, and abaxial mid-veins.

The flowers have five white petals, multiple stamens, and are arranged in usually few-flowered axial or terminal cymbs with axillary racemes. Aggregate fruit form green and ripen orange or red, infrequently white to yellow, but upon ripening the aggregate of drupelets detach from the receptacle.

Ancient *Rubus* Uses

Rubus species were a food source and medicinal plant for native peoples soon after the Ice Age. In the New World, archeologists found evidence of *Rubus* as a food source in Newberry Crater near Bend, Oregon. Radiocarbon dating puts the artifacts and food remnants at about 8,000 BCE (Connolly, 1999). Brambles were documented in the writings of Aeschylus (Hendrickson, 1981) and Hippocrates, between 500 to 400 BCE. Hippocrates recommended blackberry (*batos*) stems and leaves soaked in white wine, as an astringent poultice on wounds and in difficulties of childbirth (Littre, 1979). Raspberries were harvested by the Ancient Greeks as early as 370 BCE (Handley and Pritts, 1989). Pompey introduced raspberries from southeast of Troy in what is now Turkey to Rome about 65 BCE (Trager, 1995). Ancient Egyptians knew of the blackberry but did not document uses for it. Egyptian words for blackberry were "*aimoios*" or "*ametros*" about the second century CE (Manniche, 1989).

Hebrew, Roman, and Greek Writings

The Hebrew Bible contains many references to spiny plants and the Hebrew words *sillon* or *silonim*, *sirpad*, *shamir*, *chedek* or *sěneh* have been attributed by some to *Rubus*

sanctus Schreb. or *R. ulmifolius* Schott. which are native to the Holy Land (Moldenke and Moldenke, 1952; Hackett and Abbot, 1888). The Hebrew word *sĕneh* occurs only in those passages (Exodus 3:1-5) which refer to Jehovah's appearance to Moses "*in the flame of fire in the bush*" (Hackett and Abbot, 1888).

The Roman statesman, soldier, and author, Marcus Porcius Cato (234-149 BCE), known as Cato the Elder, refers to brambles as weeds to be pulled [*spinas runcari*] in his work *De Re Rustica [De Agricultura]* (Hooper and Ash, 1935). This was probably the first surviving written documentation of *Rubus* (Jennings, 1988). The Roman poet, Publius Ovidius Naso, Ovid (43 BCE-17 CE) mentions blackberry plants, "*sentis*," in *Metamorphosis Book 1* (Miller, 1999):

> *Or to the Hare, that under bramble closely lying, spies*
> *The hostile mouthes of dogs.*

Krataeus, Greek physician to the King of Pontus, Mithridates VI Eupator and author of a lost herbal, *Agrimonia eupatorium* in the first century BCE mentions that red raspberries are found in Mount Ida of Frigia [Turkey] (Goodyer, 1655, in Gunter, 1934). Pliny the Elder (23-79 CE) in his *Naturalis Historiae*, first published in 77 CE (Jones, 1956), notes that the Greeks called them fruits from "Ida" (Jennings, 1988).

Pedanios Dioskurides, Latinized as Dioscorides, (20-70 CE), of Anarbazos, Cilicia (now southern Turkey), a physician in the Roman army specifically refers to both *batos* (blackberries) and *batos idaia* (raspberries) in the context of medicinal uses in *Peri Ylis Iatrikis*, Latinized as *De Materia Medica* (English: *On Medical Matters*). This epic work written between 50 and 68 CE has not survived, but many sections and forms of it have been reorganized, translated, and transcribed throughout the millennia (Singer, 1927; Gunther, 1934; Blunt and Rafael, 1994; Collins, 2000; Beck, 2005). In the letter of acknowledgement to his teacher, Areius, Dioscorides was critical of his predecessors for their organization, inaccurate procedures, and erroneous content. Dioscorides incorporated information not only from oral traditions and written texts, such as the 130 plants of the *Hippocratic Collection* (Blunt and Raphael, 1994), and more than 11 plants from Krataeus (Singer, 1927), but added details of personal experiences in uses of native plant materials from his broad travels as a soldier in South-Eastern Asia Minor (Gunther, 1934). His medical treatise, written on scrolls (which have not survived to the present day) in provincial Greek, included information on more than 600 plants, 35 animal products and 90 minerals. He scoffed at alphabetical arrangements and organized his text according to his interpretation of drug affinity (Collins, 2000). Dioscorides divided his original text into five books: (1) Aromatics Oils Ointments, Trees; (2) Living Creatures, Milk and Dairy Produce, Cereals and Sharp Herbs; (3) Roots, Juices Herbs; (4) Herbs and Roots; and (5) Vines and Wines, Metallic Ores.

The format of Dioscorides herbal descriptions, as with his predecessors, e.g., Hippocrates, included the name of the plant, followed by synonyms, a brief description of the plant, origin or habitat, medicinal (simple) preparation, extracted products, and finished with the medical uses, a format that has become standard for herbals throughout the centuries. He includes the comment that red raspberry plants have spiny and spineless forms.

Dioscorides' treatise written about 65 CE, although unmentioned by his contemporary Pliny the Elder in *Historia Naturalis* (Jones, 1956), was well received, as evidenced from Galen's extensive quotation written about a century later (Collins, 2000). Over the years, Dioscorides text was translated into Latin, Arabic, Hebrew, Persian, Anglo-Saxon, Provinçial, English, German, and each of the Latin derivative languages, and remained a fundamental medical handbook until the Italian Renaissance (Collins, 2000; Riddle, 1971; Blunt and Raphael, 1994). In Book 4, *Roots and Herbs*, two types of *Rubus* are described: IV:37 *batos* or blackberry (*Rubus fruticosus*, *sensu typo*) and IV:38 *batos idaia*, (*Rubus ideaus*) red raspberry. An English translation of the references to Rubus by Beck (2005) based on the critical revision of the Greek text made by Max Wellman (1905-1914) is presented in Table 1.

Table 1. English translation of reference to *Rubus* spp. in *De Materia Medica* of Dioscorides (Beck, 2005).

Book, section	Translation
IV, 37	[Βάτος (*batos*), *Rubus ulmifolius* Schott, Bramble] The bramble is a familiar plant. The decoction of its branches contracts, desiccates, dyes hair, and stops diarrhea when drunk, keeps in check leucorrhea, and is suitable for the bite of the *prester* [A kind of serpent whose bite is poisonous]. When chewed, the leaves strengthen the gums and heal the thrush; plastered on, they keep in check shingles, treat head scurf, prolapses of the eyes, callous lumps, and hemorrhoids, and they are suitable to apply ground up on those with stomach and heart ailments. But its juice, extracted from the stems and leaves and condensed in the sun, will accomplish everything better. The juice of its fully ripened fruit is suitable for mouth ailments, its half-ripe fruit stops diarrhea when eaten, and its flower checks diarrhea when drunk with wine.
IV, 38	[Βάτος Ιδαία (*batos idaia*), *Rubus ideaus* L., Idaian bramble, Raspberry] The raspberry (Idaian bramble): it was named so because a great deal of it grows on mount Ida [in Turkey]. It is much softer than the previous one, having small thorns. But it is also found without thorns. It can treat the same conditions as the one before it, but its flower helps far more for eye inflammations when triturated with oil and smeared over them; it also cools erysipelas and it is given in a drink with water to those with stomach problems.

Dioscorides' original treatise was not illustrated, unlike those of some other ancient herbalists. Pliny (Jones, 1956) questioned the usefulness and accuracy of illustrations: "*Krateuas, Dionysios and Metrodoros… painted likenesses of the plants and then wrote under them their properties. But not only is a picture misleading when the colors are so many, particularly as the aim is to copy nature, but besides this, much imperfection arises from the manifold hazards in the accuracy of copyists.*"

Dioscorides' preface states (trans. Beck, 2005): *Anyone who wishes to gain experience in these matters must be present when plants sprout newly from the ground as well as when they are in their prime and past their prime. For neither the person who has come across a plant only at its seedling stage can point it out when at its prime, nor can the person who has seen plants in their prime recognize them as seedlings. Because of changes in the leaves, in the size of stems, blossoms, and fruits, and because of certain other characteristics, people who have not made their observations in this manner were greatly mislead regarding some plants.*

The medical information of Dioscorides spread widely and illustrations were added to some subsequent transcriptions. Despite his efforts at developing a drug-use grouping, forms of his text were changed to an alphabetical sequence.

IMAGES

Dioscoridean Recensions

1. *Juliana Anicia Codex* (*JAC*). A magnificent illustrated manuscript based on the manuscript of Dioscorides was presented to the imperial Princess Juliana Anicia in Constantinople ca. 512 CE (Collins, 2000). This compilation has become known as the *Juliana Anicia Codex* since its purchase by the Emperor Maximillian for the Imperial

Library. This early book is also called the *Codex Vindobonensis*, the Latin term for Vienna, and is designated in the catalog as Vienna, Österreichische Nationalbibliothek, Cod. Med.gr.1. It does not include the complete text of *De Materia Medica* (Collins, 2000) but contains an alphabetical listing of 383 healing plants described in the original as well as two additional texts on fishing and bird catching. Collins (2000) suggests that the text may have been derived from an original collection of manuscripts made for Theodosius II, great-grandfather of Juliana. This hypothetical text of Theodosius no longer exists. The *JAC* was presented to Juliana by the citizens of Honorata in recognition of the two large churches constructed for them, to recognize the memory of her imperial ancestors, and to commemorate her religious orthodoxy, piety, magnanimity, and learning (Collins, 2000). The number and quality of the illustrations and the size (370 × 312 mm, containing 491 folios of fine parchment) indicates that it was originally a presentation manuscript, not a working medical text (Collins, 2000).

JAC was fully restored, foliated and rebound in 1406 by the notary John Chortasmenos in Constantinople, at the request of Nathaniel, a monk at the monastery of St. John the Baptist at Petra. John placed the cursive numberings on the plant paintings and the transcription of the plant titles in Greek minuscule. On the folia numerous translations in cursive Greek script along with the addition of Arabic and Hebrew plant names were possibly added by the owner Moseh ben Moseh, whose name appears on folio 1 and 2 (Collins, 2000).

Ogier Ghiselin de Busbecq (1522-1592), Ambassador from Emperor Ferdinand to the court of Suleiman the Magnificent brought back word of this manuscript to Vienna (Blunt and Rafael, 1994). The Codex was at that time owned by the son of Hamon, a Jewish physician of Suleiman. This work, one of many Greek manuscripts, was purchased at the price of more than 100 ducats by Maximilian II and brought to the Imperial Library in Vienna in the late 1500s. After the First World War, it was removed to Venice, but was returned to the Österreichische Nationalbibliothek, Vienna, where it now resides (Blunt and Rafael, 1994). Facsimile editions are now available (*Der Wiener Dioskurides*, 1998).

One of the most frequently reproduced paintings of the *JAC* is that of fol. 83r, *batos* (Fig. 1), which appears to be the oldest surviving image of a *Rubus*. This image labeled "83" in Arabic numbers in the upper right of the folio and annotated on the left, is a Dioscoridean text translated into Byzantine cursive Greek. The text was transcribed after the image was painted and specifies the medical uses of *batos*, blackberries, and *batos idaia*, raspberries (Hortamentos trans. 2005, Tzanetakis, pers. commun.). Only medicinal uses are mentioned. The manuscript has other foreign text notations, including the Arabic word "*illick*," the ancient Turkish word "*watush*," and the Hebrew "*batot*," translated to English as "prickly" or "brambles." These foreign text annotations were added many years later than 512. This image, despite some technical inaccuracies, portrays native European blackberries, *R. fruticosus* agg.

Five substantial stems are painted with thick recurved prickles. Pricklets appear on petioles, petiolules, and pedicels. A tip layer is depicted, as is a broken stem. Fruiting occurs on this stem, which could have been biennial (two-year old) cane, although the original painter probably did not realize this, judging from the seemingly primocane-fruiting stem on the left may be a result of the painter showing plant changes from multiple seasons rather than the intent to convey a true primocane fruiting branch. The leaves were drawn with painstaking detail despite some botanical errors. The leaves appear pubescent, glaucous on the abaxial, darker green on the adaxial side. The pinnate leaf venation was drawn for most leaves. Serrate leaf margins are apparent. The leaflet numbers 5 (as many as 7) per leaf. The inflorescence is drawn with flowers and fruit. The corolla is white with petals dropping from some mature flowers. Surprisingly, the petals number 6 and 7 per flower rather than the natural 5. On the fruiting stems, the image portrays an apparently racemose panicle (indeterminate) inflorescence with the least mature flowers at the apex. Two non-fruiting stems are shown. The size of the leaves, flowers, berries, and stems are drawn in correct proportions.

Fig. 1. *Batos* image *Juliana Anicia Codex* Vienna, Őesterreichische Nationalbibliothek, Cod. Med.gr.1. fol. 83r. 512 CE. Vienna.

Despite the elegance and sophistication of the image, particularly for the Byzantine Era, the multitude of botanical inaccuracies are perplexing: (1) the foliage has predominantly pinnately, rather than palmately compound leaves, and the pediolules of the basal leaflets are long rather than almost sessile. (2) 6 and 7 petals per flower were drawn instead of 5; (3) apparent primocane rather than floricane fruiting; (4) flowers in a raceme instead of a panicle-like-cyme; the angle of the single palmately compound leaf on the left side of the image shows the abaxial side; and (5) the recurved prickles of the main mid-vein of leaves are absent.

2. *Codex Neapolitanus* (*CN*). The *Codex Neapolitanus*, *Naples Biblioteca Nazionale, Cod.* Gr 1, gr. or *Naples Codex* (Dioscorides, ca. 675 but date and origin imprecise) is physically smaller than the *JAC*; with folia that are reduced. The images are compressed to fit the page, and are placed in doubles or triples on each of the folios. The *CN* includes only herbal illustrations (Blunt and Raphael, 1994). The codex consists of 172 parchments arranged predominantly in quaternions (four plants to a page) and measures about 290 × 255 mm. Between the 11th and 15th centuries, the original order was disrupted and the manuscript was bound in its present state. A recent 20th century restoration retained the new order (Collins, 2000). A facsimile was recently published (Orofino et al., 1992) by the Bibliotèca Nazionale, Napoli.

The *CN* image of blackberry, fol. 32 (Fig. 2), appears at the top right of the page and is obviously related in form to the *JAC*. Significant similarities include the layout and direction of the main stems, the broken stem, and the tip layer. The plant name, printed in Greek in red ink, is under the images, and the descriptions and uses of *batos* are subordinate. This *CN* text is the same as that of *JAC* fol. 82.

The many similarities between the images of *JAC* fol. 83r and *CN* fol. 32 suggest that the younger *CN* was either copied from *JAC* (Singer, 1927) or descended from the same or similar archetype, i.e., are sister images. Collins (2000) and Orofino (1992) state that differences between the two manuscripts preclude one having been copied from the other (Collins, 2000; Orofino, 1992). Botanical differences in the *batos* images of the two codices may provide some further clues on its relation to *JAC*.

The *CN batos* image is cruder and less naturalistic that the elegant painting in the *JAC*, but in some ways, it is more botanically accurate. The smaller, compressed *CN* image has leaves disproportionately large relative to the stems, with fewer stems (four instead of five) and about half of the number of leaves as found in the *JAC*. The leaves appear to be palmately lobed rather than palmately compound – but have proportional leaf shape more like blackberries of nature than the pinnately compound leaves with long petiolules of *JAC* fol. 83r. Details of the leaflet margins and venation in the *CN* are less pronounced than in the *JAC*. The *CN* artist seemed to have used dots to give the impression of leaf serrations, rather than detailed painting as in the *JAC*. No abaxial leaf surfaces were visible in the *CN* fol. 32. However, flowers are displayed with 5 petals, the correct number, unlike the *JAC* 6 and 7. The inflorescence branches of the *CN* show stipules at the nodes, another correct detail missing in the *JAC*. The *CN* inflorescences appear more cymose than do those of the *JAC*.

3. ***Morgan 652 Codex* (*MC*).** The *Morgan 652 Codex* (Dioscorides, 950), a large, heavy, and expensively produced manuscript now located in the Pierpont Morgan Library in New York, contains 385 folios of illustrations 395 × 290 mm, with unframed in-text paintings (Collins, 2000). The manuscript was made in Constantinople in the mid-10th century CE and some images are close to those of *JAC* (Blunt and Raphael, 1979). Folios containing about 50 plant paintings are missing at the beginning along with any introductory material (Collins, 2000). The abbreviated Dioscoridean text around the images is in Greek minuscule associated with court circles in Constantinople between 927 and 985 CE.

Fig. 2. Codex Neapolitanus, Naples Biblioteca Nazionale, Cod. Gr 1, gr. fol. 32. ca. 675 CE. Naples, Italy.

The *batos* image (Fig. 3) is present in Morgan 652 fol. 25. The image seems to be condensed or truncated to fit into a space assigned, but the text seems to be an abbreviated portion of that found on *JAC* fol. 83r, added after the painting. The painting is centrally located on the page and resembles both the *JAC* and the *CN* in different ways, but with less detail than either. The Morgan fol. 25 has 5 main stems and the signature broken stems as does *JAC*. The stems are armed with recurved prickles, and pricklets appear on the petioles and pedicels. The tip-layered, rooted stem is to the right; two main stems have inflorescences; a primocane is shown with no inflorescence. At least one leaf appears palmately compound, but others appear in a multitude of fanciful leaflets arrangements or as awkward lobed leaves not found in nature. The careful details of serration, venation, and abaxial surfaces found in the *JAC* were omitted. Abaxial sides of the leaflets are not shown. The type inflorescences are indistinct, arising nodeless from the main stems. Flowers seem to have either five or three petals, but these are indistinct and diagrammatical.

4. *Grecian 2179*, fol. 82v. The Paris *Grec 2179* is a secondary alphabetic group recension (Dioscorides, 1000) dating to about the 9th century from Egypt, Sinai, or Palestine. It now consists of 171 parchment folios, and is an incomplete version of *Περὶ ὕλης ἰατρικης* (Collins, 2000).

The *Rubus* fol. 82v. (Fig. 4) contains translations of IV:37 *batos* and IV:38 *batos idaia* in Greek ogival uncial script in brown ink. The Arabic word "*illick*," and other marginal notations have been added. The *batos* image is quite subordinate to the Greek cursive text, being squeezed into the lower right corner. Both the blackberry and raspberry uses are described in the text. The *batos* image is diagrammatical and is rotated clockwise 90° from vertical. The layout of the drawing is dissimilar to that of the *JAC*, *CN*, or *MC*. The lack of detail of this drawing makes it difficult to determine the archetype from which it was copied. The main stem, crown and roots are drawn in red ink and additional stems and leaves are drawn in green ink. Prickles are only drawn on part of the main stem. Palmately compound leaves or leaflets are depicted as green lines originating from one point. Flower buds are shown as white circles. Circular berries are drawn in red and dark green-almost black ink. They do suggest, however, a paniculate-cymose ripening pattern.

5. *Arab 2850* (13th Century). *Arab 2850* fol. 19 (Fig. 5) consists of an Arabic translation of the Dioscoridean text (Dioscorides, ca. 1290) found in IV:37 and IV:38 and a diagrammatical image of *batos*. The Arabic text translates the uses of *batos*, and similar statements are made to the 1655 English translations of John Goodyer (Gunther, 1934), and Beck (2005), and the Greek translation of Hortamentos (Bassil, per. comm.). In fol. 19, the *batos* image is subordinate and was prepared subsequently to the text but the artist drew on top of the text in some places. The layout of the drawing is dissimilar to the *JAC*, *CN*, or *MC*. This image uses curved green inked lines to depict the viney stems. The recurved prickles are shown as lines perpendicular to the main stem. The star shape of the leaves could imply palmately compound leaves with five leaflets. No flowers or fruit are depicted so inflorescence types are not defined.

***Apuleius Platonicus* Recensions**

Latin manuscripts of Dioscorides, some illustrated, combined with a Latin text by Apuleius (referred to as Apuleius Platonicus to distinguish him from the author of *Metamorphoses* or the *Golden Ass*, a first century Latin novel) are the source of Italian, German, and Anglo-Norman herbals. The images of *Apuleius Platonicus* herbals are dissimilar and much inferior to the *JAC*, *CN*, and *MC*.

1. *Leyden Apuleius*. The *Rubus* image (Singer, 1958; Fig. 80) of the *Leyden Apuleius* dates to about 600 CE (Fig. 6). This image shows one floricane, with branching inflorescences. Prickles are represented by "knobs" on the main stem, petioles, and pedicels. The leaves are compound with four or five sessile, lanceolate, serrate leaflets. Flowers are not shown. The fruit seems to be arranged in a paniculate-cymb.

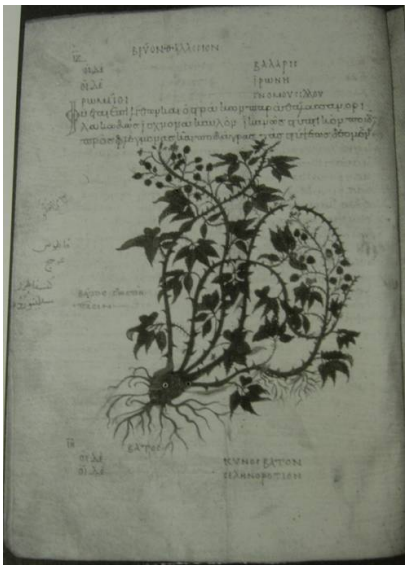

Fig. 3. The *Morgan 652 Codex*, fol. 25, ca. mid-10th century CE. Pierpont Morgan Library, New York.

Fig. 4. *Grecian 2179*, fol. 82v. ca. 9th century CE. Paris

Fig. 5. Arab 2850 fol. 19. ca. 13th century CE. Paris.

Fig. 6. Leyden Apuleius ca. 600 CE.

2. *Leech Book of Bald.* The *Leech book of Bald* is an Anglo-Saxon herbal from Winchester prepared in 920 CE. "*Læce*" in Old English means healer; a leech book was a physician's desk reference. Leech books were consulted to determine what kind of bloodletting was necessary, if any, whether the patient should rest more or exercise more,

if a change of diet were in order, or what medication or herbal remedies were needed. This book was scribed by a monk named Cild under the direction of a monk named Cyril Bald, who most probably was a personal friend of King Alfred (Rohde, 1922).

The Leech Book of Bald contained 109 leaves and was written in a large bold hand with one or two of the initial letters faintly illuminated. This book was written in the vernacular by men who were not Latin scholars. The medical knowledge originally based on pagan superstition combined with herb lore was absorbed into Christian tradition:

> *"Against dysentery, a bramble of which both ends are in the earth [tip layer!] take the newer root, delve it up, cut up nine chips with the left hand and sing three times the Miserere mei Deus and nine times the Mater Noster, then take mugwort and everlasting, boil these three worts and the chips in milk till they get red, then let the man sip at night fasting a pound dish full… let him rest himself soft and wrap himself up warm; if more need be let him do so again, if thou still need do it a third time thou wilt not need oftener." Leech Book* II 65. (Rohde, 1922).

The extremely crude *Rubus* image in this Anglo-Saxon herbal is diagrammatical (Fig. 7). It grossly depicts roots with a viney stem, perhaps placed on a trellis, which could indicate that it was cultivated. Pointed protrusions extend from the main stem indicating recurved prickles. Leaves are depicted as entire, acuminate, ovate, with a rounded base and pinnate venation. They appear on single petioles attached directly to the main stem. No flowers are depicted. Berries are shown as aggregate drupelets on single pedicels also attached directly to the main stem. This image does not clearly represent either blackberries or raspberries, though it suggests *Rubus*.

Fig. 7. *Leech Book of Bald*. fol. ca. 920 CE.

Fig. 8. *Bodley 130 Apuleius Platonicus Codex*, fol. 26r. Abbey of Bury St. Edmonds. ca. 1120 CE. The Bodleian library, Oxford, England.

3. *Bodley 130 Apuleius Platonicus*. The *Bodley 130 Apuleius Platonicus* is a codex written at the Abbey of Bury St. Edmonds about 1120 CE. The figures are painted in an archaic style (Blunt and Stearn, 1994). Elements of the images may reflect an Anglo-Saxon Model. The layout of the text of the *Rubus* fol. 26r is similar to that of standard illustrated herbals, including plant name, synonyms, habitat, and uses (Fig. 8). The text consists of Latin translation of the Greek Dioscorides IV: 82.

The *Rubus* image in fol. 26r (Fig. 8) is diagrammatical, but improved over that of the *Leech Book of Bald*. The image was drawn first and the text was penned around the image. Only a single viney main stem is shown, attached to a representative tri-part root. Recurved prickles are present on the main stem but not on petioles, petiolules, or pedicels. Leaves seem to be "compound-like" with five leaflets, but the attachment of leaflets and petiolules is imaginative and differs with each leaf. Perhaps the artist was working from a flattened specimen and didn't correctly trace petiolules attachment. One leaf appears to be somewhat palmately compound, but the petiolules are of incorrect lengths relative to those of natural blackberry leaflets. The leaflet shape is acuminate, ovate, with a rounded base with a slight indication of serration though not of venation. No flowers are depicted. The fruits occur in clusters reminiscent of umbels with implied ripening from red to black. Drupelets are shown within a fruit but fruit definition is not distinct.

For the next several centuries, scribes continued to repaint, reproduce and embellish previous archetypes, rather than observing and representing the existing native plant, a dogmatic type of scholastism that stifled original investigation (Emboden, 1987).

Renaissance Images

The Renaissance brought a new spirit into botany and plant iconography characterized by a return to nature combined with unrivaled artistry. Four *Rubus* images will be presented here, two paintings by Jean Bourdichon, illustrating *Horae ad isum Romanum* (*Grandes Heures d'Anne de Bretagne*) a prayer book of Anne of Bretagne (1503-1508), a drawing of Leonardo da Vinci made between 1510-1512, and a woodcut from *De Historia Stirpium*, a printed herbal written in Latin by Leonhart Fuchs made in 1544.

1. *Grandes Heures d'Anne de Bretagne.* The prayer book made between 1503-1508 by Jean Bordichon, official court painter to four kings of France, for Anne de Bretagne (1477-1513), twice Queen of France by marrying Charles the VIII in 1491, and his successor, Louis XII in 1499, is a collection of over 300 paintings of plants including a myriad of animals of which most are insects. The paintings tend to be vertically oriented 165 × 45 mm rectangles placed on the outside margins of the prayer pages. Each is labeled with a Latin name in Gothic letters at the top, and with its French vernacular at the bottom.

Fol. 206 depicts a bramble with "*Arbustum Rubra*" (= woody or tree *Rubus*) in Gothic Latin at the top and "*Ronce*" (= blackberry) in French at the bottom (Fig. 9A.) The image contains one main stem with multiple, axillary, racemose inflorescences. Prickles are drawn around the main stem, petioles, and pedicles. These dense prickles are small, more like the size and proportion of raspberry than blackberry. The upper leaves are ternate and the lower pinnate, with five leaflets. The lateral leaflets are subsessile, another trait common to *R. ideaus*. The flowers contain five white petals. The fruits are an aggregate of drupelets. The perplexing note is that the artist suggests that this fruit ripens black, and the Latin and French nomenclature indicates that the image is of *R. fruticosus* agg. The morphological characteristics of this plant, of the stem, leaves and flowers, however, seem to imply that the shoot was drawn from a red raspberry. The detail of a few drupelets colored black must have been an artistic emphasis rather than an observation. The artist probably did not observe a blackberry, but knew that "ronce" was "like" a woody bramble and modified the painting by adding darkened fruit.

Fig. 9. (Left) *Promenade dans des Jardins les Plantes au Moyen age d'apres les Grandes Heures d'Anne de Bretagne*, fol. 206. Arbustus Rubra. Ronce. (= blackberry) ca. 1503-1508 CE. (Right) *Promenade dans des Jardins les Plantes au Moyen age d'apres les Grandes Heures d'Anne de Bretagne*, fol. 20. Fraxibatot. Framboise (= raspberry) ca. 1503-1508 CE.

The bramble of fol. 20 (Fig. 9B) is labeled "Fraxibatot" (= "ash-leafed" bramble) in Gothic Latin at the top and "*frambois*" (= raspberry) in French at the bottom. The name "ash-leafed" refers to the 5 to 7 pinnate leaflets found in raspberry.

The plant is depicted as a single main stem with prickles and pricklets. Upper leaves are ternate with acuminate, ovate to obovate, serrate leaflets with a rounded base, prominent mid-vein, and pinnate venation. The flower has five white petals. The inflorescences consist of an axillary cymb with nodding, axillary flowers or fruits composed of drupelets. The fruits ripen from green through orange to red. The sepals reflex. The painting seems to be a true representation of red raspberry, what we term *R. idaeus*.

2. Drawings of Leonardo da Vinci. Leonardo da Vinci, whose motive in drawing was to explore new ideas and insights, was preoccupied with *R. fruticosus* as evidenced in a series of drawings composed of sanguine chalk on pink-buff surface. Emboden (1987) considered the *Rubus* image R.L. 12419 c. 1508-1510 CE (Fig. 10) to be the most finished and among the most accomplished of Leonardo's botanical studies. The clarity of da Vinci's work, and that of some of his contemporaries, is comparable with illustrated flora of the present day. The da Vinci image shows a blackberry floricane. The main stem has recurved prickles and long arching branches. The leaves are palmately compound with five leaflets of which the basal ones are smaller and subsessile. The terminal leaflets are acuminate, ovate, and serrate to compound serrate, with prominent mid-vein and pinnate venation. Prickles are present on the petioles and pedicels. The flowers have five petals. The inflorescence is a panicle-like cymb. These botanical details demonstrate his artistry combined with keen observations of the blackberry plant included in the preparation of this drawing.

3. *De Historia Stirpium* of Leonhart Fuchs. Leonhart Fuchs, born at Wemding, Bavaria, in 1501, finished Erfurt University at the age of 12, and later earned a Master of Arts and Doctor of Medicine at the University of Ingolstadt. His great work *De Historia Stirpium* was published in 1542 in Latin and the German edition, entitled *New Kreüterbůch* was prepared in Basel and published 1543. The texts were based on Dioscorides but the images reached a new level of excellence both botanically and artistically. The woodcuts based on drawings from two illustrators, Heinrich Fullmauer and Albrecht Meyer, combined with the engraving skill of Veit Rudolf Speckle, vividly express the individual character and habit of each species. Plants are represented holistically and do not emphasize the reproductive over the vegetative organs (Blunt and Stearn, 1994).

De Historia Stirpium plate 83 contains an image of red raspberry (Fig. 11). This image depicts a single branched main stem, floricane, with attached root system. Suckers, which form new plants, emerge from the crown and further out on the roots. Prickles are set perpendicular to the main stem, and are also found on petioles, and pedicles. The leaves are ternate to pinnately compound and leaflets are acuminate, ovate, and serrate, with pinnate venation. Adaxial and abaxial surfaces are shown. The flowers have five petals, multiple stamen, and pistil, and are depicted from multiple angles. Terminal inflorescences are cymose and others are axillary, paniculate racemes. Aggregate fruits of multiple drupelets are shown. A conic receptacle remains attached on the stem of a terminal inflorescence, the fruit having fallen or been removed. These botanical details must have been observed from living red raspberry plants.

DISCUSSION AND CONCLUSIONS

This selected review of *Rubus* images is a microcosm of the history of botanical and horticultural illustration and science from Antiquity to the Renaissance. The ancient Greeks were capable observers who conveyed information concerning medicinal plant uses, and drew idealized portraits of plants, although detailed botanical images are lost. The first image of *Rubus* that survived antiquity from the *JAC* fol. 83 (Fig. 1) reflects a cultural interaction between the idealism of Greek portraiture and the Roman interest in

Fig. 10. Leonardo da Vinci. *Rubus* image R.L. 12419 ca. 1508-1510 CE.

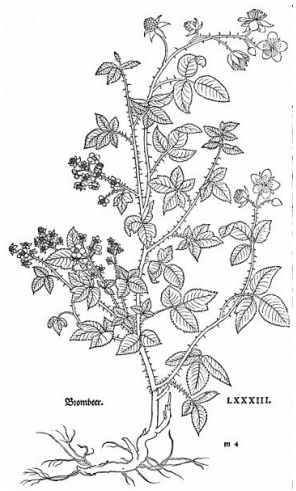

Fig. 11. Leonhart Fuchs, *De Historia Stirpium* plate 83 woodcut image of "brombeer," red raspberry, 1542 CE.

copying nature. This tradition deteriorated coincidentally with social disturbances brought about by the fall of the Roman Empire, and the establishment of a new religion that discouraged independent thought and science. This is evidenced in the deterioration in the accuracy and content of plant illustration, specifically of *batos* or *Rubus* images from the 6th century to the Middle Ages. The comparison of the *Rubus* illustration in *JAC* (Fig. 1) with the *Book of Bald* (Fig. 7) demonstrates this decline. During the Middle Ages, botanical illustration and content became unscientific, relied on progressive recopying, and was based on the philosophy that all truth had been discovered and only needed repeating.

The new spirit of the Renaissance starting in the 14th century typified by the flourishing of artistic and scientific activities brought about by the new translations of Classical philosophers, the rise of humanism including new methods of inquiry involving science, the explosion of knowledge brought about by the emerging universities, the invention of printing, and the extraordinary discoveries associated with the Age of Exploration. In the botanical sciences, this led to a return to nature with inspiration from the real world rather than mere scholastism, based on endless copying from the past. As in many fields this new spirit of inquiry is crystallized in the detailed and magnificent drawings of Leonardo da Vinci, and the woodcuts of Leonhart Fuchs.

Our study of *Rubus* images demonstrates that botanical analysis can be applied to historical images to explore the history of art. For example, a careful analysis of three Dioscoridean images of blackberry in *JAC*, *CN*, and *MC* (Figs. 1 to 3), indicates that images as well as text may be analyzed to reconstruct the origins of ancient manuscripts. Based on botanical evidence we conclude that although the *JAC* fol. 83r is the earliest surviving *Rubus* image, it was not the direct source of either the *CN* fol. 32 or the *MC* fol. 25, that were at least a century younger. We assume that the original source of these three images is now lost, though it may have been included in the manuscripts belonging to Theodosius II, which would have been available to the other scribes one century later. We conclude from the differing botanically correct parts of each of the three images that the original must have been more botanically correct than any of the copies and should be capable of being reconstructed. We have prepared a reconstruction of the hypothetical archetype of the *batos* image from the hypothetical manuscript of Theodosius II (Fig. 12). on the assumption that this image was more botanically correct than any of the three sister images.

Because of the magnificent detail, the botanical errors of the *JAC* fol. 83r are difficult to explain. Maybe the talented artist did not have the original close at hand and painted from a flawed memory relative to the compound leaves and the incorrect number of petals; or perhaps these errors were simply a result of botanical misunderstanding. Despite these lapses, the available resources, time, care, and the artistic ability demonstrated by the *JAC* fol. 83r copyist, clearly exceeded that of those who produced the corresponding images in *CN* fol 32 or *MC* fol. 25. Because each of the three artists drew the same branch layout, including the rooted tip layer, and broken stem each of the three images are related. We surmise that each artist may have felt compelled, or was assigned, to replicate an original image under the watchful eye of a chief overseer, rather than create an idealized image of original design. One possibility is that small changes reflected a personal effort of the artists to express individuality within defined parameters. Another is that of human fallibility in the details of transference. The passage of time and lack of an enduring archetype leaves us with conjecture.

During the next millennium, plant artists turned away from observation and copied previous images without reference to living plants. This was a sad period in the history of science until the rebirth of intellectual thought we label the Renaissance. We continue to find great inspiration in the vigor of the Renaissance artists who returned to a resurgence of realism, and provided the foundation for instruction in the newly emerging sciences of botany and horticulture; no less so for the Ancients who began this study of our road to knowledge.

Fig. 12. Reconstructed image of hypothetical archetype depicting a *Rubus* plant from a manuscript in the possession of Theodosis II in ca. 400 CE. *JAC* fol. 83v (Fig. 1) altered by: (1) text removal, (2) flowers redrawn pentamerous, (3) leaves redrawn palmately compound, (4) primary fruit of cymous inflorescence emphasized by darkening and enlarging.

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Leyden

Herbal of Apuleius Platonicus. ca. 600 CE.