

Merremia dissecta (Convolvulaceae): Condiment, Medicine, Ornamental, and Weed—A Review¹

DANIEL F. AUSTIN

Arizona-Sonora Desert Museum, 2021 N. Kinney Road, Tucson, AZ 85743, USA; e-mail: daustin@desertmuseum.org

***Merremia dissecta* (Convolvulaceae): A Condiment, Medicine, Ornamental, and Weed—A Review.** *Merremia dissecta* was first discovered in the Caribbean, then Florida, Mexico, and later in the Old World, where it had been introduced. Historically and currently, the species has been used as a condiment, medicine, and ornamental by an array of cultures. Although the plant has escaped in several areas to become a weed, it continues being sold as an ornament in even those regions. In Argentina, roots of *M. dissecta* var. *edentata* are still used as food by a few indigenous groups. History, uses, and chemistry are discussed regarding these utilizations.

***Merremia dissecta* (Convolvulaceas): Un condimento, medicina, ornamental, y maleza—Una revista.** *Merremia dissecta* fue primeramente descubierta en el Caribe, luego en la Florida, México y más tarde fue introducida en el Viejo Mundo. Históricamente y aún actualmente se ha usado como condimento, medicina, y ornamentación por varias culturas. A pesar de que en varias áreas se ha transformado en una mala hierba, se continúa vendiendo como un ornamento aún en esas áreas. En Argentina, las raíces de *M. dissecta* var. *edentata* aún son usadas como alimento por unos cuantos grupos indígenas. La historia, los usos y la química de estas utilizaciones son aquí discutidas.

Key Words: *Noyau*, naturalized exotic, Ayurveda, Unani, edible roots, cyanogenic glycosides, alkaloids.

A fence is covered with *Merremia dissecta* (Jacquin) Hallier f. near where a main street ends at the base of the Tucson Mountains in the southwestern part of the city. Within towns elsewhere in Arizona, the species appears occasionally in other yards (Austin 1998). For a long time I thought that the people were growing the twiners solely for ornament. The white flowers with red centers are attractive, as are the finely lobed and toothed leaves (Fig. 1). Since the 1990s, more information has been gathered; the story of cultivation is not always simple. Plants are cultivated in many parts of the world, but most books on horticulture and useful plants do not list this species. *Merremia dissecta* is, however, important to people for several other reasons as it has been since at least the 1800s. The

purposes that people grow and move these plants are varied, because the vines are used in condiments, medicines, and as ornamentals. There is even one report of the roots being eaten in Argentina. This discussion brings together the scattered data on associations with humans to compare it with where the vines were introduced and the area of nativity of these American plants.

Discovery and Distribution

Nicolaus Joseph von Jacquin discovered the vines now known as *Merremia dissecta* in the Caribbean between 1755 and 1759. He called the plants *Convolvulus dissectus* in his book *Observationum Botanicarum* published in 1767. The next year, Philip Miller (1768) named the same plants *Convolvulus palmatus*, either not knowing Jacquin's book, or not realizing they were the same species. It was only in 1773 that William Bartram found the species in northern Florida

¹Received 27 November 2006; accepted 21 February 2007.

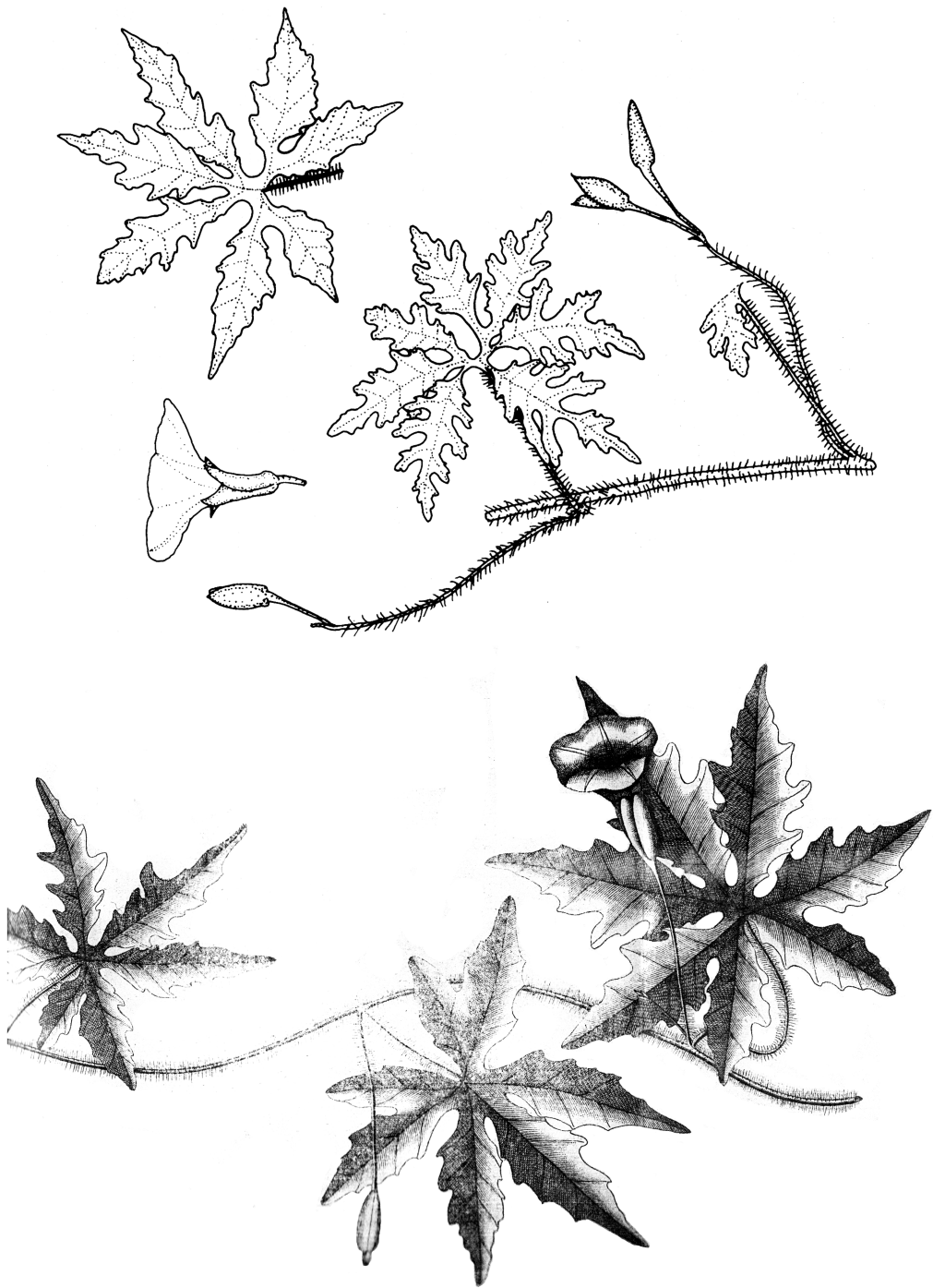


Fig. 1. *Merremia dissecta* Left, original drawing by Jacquin (1767). Right, by author (Austin 1979).

(Bartram 1943; Harper 1958). Both Jacquin (Fig. 1) and Bartram illustrated the species.

Jacquin did not record the island where he got the seeds that were subsequently planted in Vienna and that served as the basis of the illustration he published. He wrote “. . . *nec occurrit certus collectionis locus*” (“without occurring in any particular collection”). By contrast, Bartram found the plants in northern Florida in what now comprises Levy and Putnam Counties (Harper 1958). Miller’s specimen came from Veracruz, Mexico (McDonald 1993). Not long afterward, the same species was found in Cuba (Ortega 1798), Georgia (Michaux 1803; Pursh 1814), and a number of other places in the Americas. These vines have now been spread around the world (Fig. 2), and have become naturalized in many places.

Weeds

There is disagreement about whether or not this species is native to the southern United States. Some consider it a native, although others think it alien (e.g., Wunderlin and Hansen 2003; Weakley 2006).

Certainly, by comparison with others, it was found in the region early enough to be consid-

ered native, having been discovered by Bartram in 1773 (Bartram 1943; Harper 1958) and in 1774 by Michaux (1803; Taylor and Norman 2002). Pursh (1814) knew *M. dissecta* from both Florida and Georgia.

Moreover, the species has a distribution that encompasses the entire circum-Caribbean region (Fig. 2) and it appears to be part of the native U.S. flora. Still, there had been ample time for Europeans and others to have moved the plants farther north by the time it was seen by Bartram and Michaux, and it is clear that people did move it elsewhere in the world. These plants are more common in coastal areas. Frequency along the coasts may be associated with the statements by both Michaux (1803) and Pursh (1814) that *M. dissecta* grew in calcareous soils.

Within Florida, the species is now spread throughout the state. Wunderlin and Hansen’s (2004) map shows records from Escambia to Duval and south to Dade Counties.

Shinners (1970) did not mark this species as alien in Texas as he did others; he considered it native. Diggs et al. (1999) also thought the plants were native to Texas, at least as far north as Travis County.

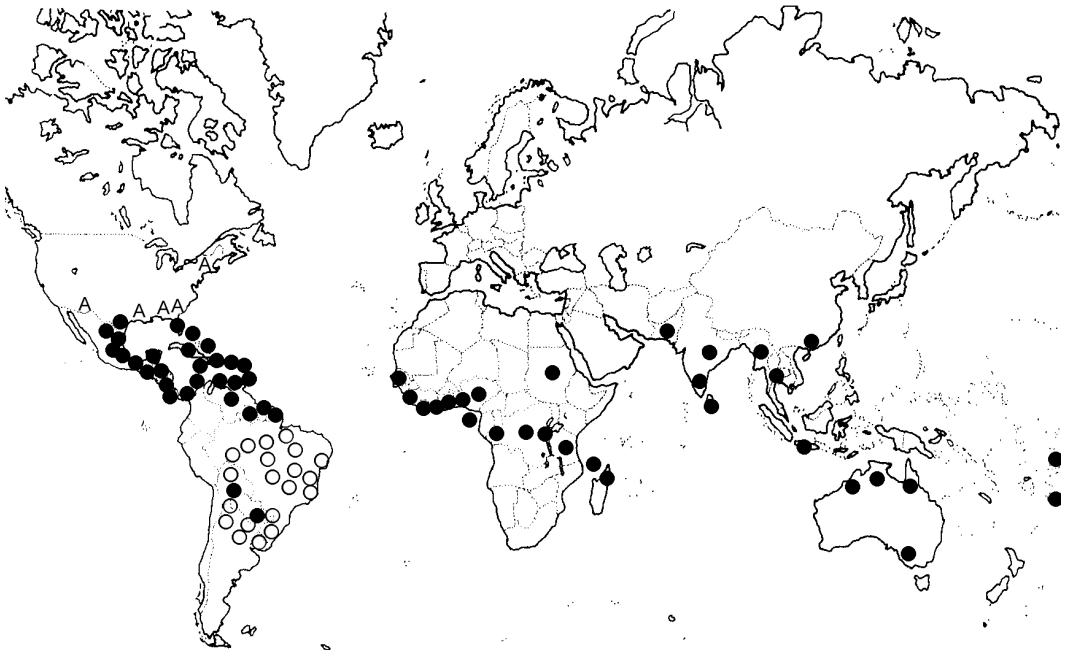


Fig. 2. World distribution of *M. dissecta*. Closed circles = herbarium specimen seen. Open circles = literature reports. “A” = Adventive.

By contrast, there are several places in the United States where the vine is not native. *Merremia dissecta* is adventive in Alabama, Arizona, Louisiana, Mississippi, and Pennsylvania. The Arizona report is based on plants growing outside a single subdivision in the Tucson Mountains (Rondeau et al. 1996), but she did not make a voucher of the plants (Jenkins pers. comm. 2006). The species is unknown in the wild elsewhere in the region (Austin 1998). The record for Pennsylvania is a single specimen taken from ballast ca. 1865 (Rhodes and Klein 1993). Similarly, single specimens are known from Alabama (Kral in 1971, MO), Louisiana (Thomas and Allen 1996), and Mississippi (in 1996, Lockley s.n. VSC). Plants in Georgia have been known since the late 1700s when they were found there by Michaux (1803), in Decatur, Glynn, and Wayne Counties (Jones and Coile 1988; Carter pers. comm. 2006). Nancy Coile (pers. comm. 2006) and Richard Carter, who know the living flora there, are undecided about its nativity. Occurrence of the species in five of these states is adventive. Although it may be native to southern Georgia, it is adventive farther north in that state.

These climbers are clearly alien in the Old World. By the 1900s or earlier the species was there and was included by some floras (e.g., Rendle 1905; Hutchinson and Dalziel 1931; Ooststroom 1939). Similarly, there is no doubt that *M. dissecta* is an exotic in Australia as has been noted numerous times (e.g., Barker et al. 2005; Groves et al. 2005). Humans have been moving this species around, probably both purposefully and accidentally, for many decades.

Maranhão and Irgang (2005) considered the plants alien in the state of Santa Catarina, Brazil, however they do not record which variety. *Merremia dissecta* var. *edentata* is native there (O'Donnell 1941; Austin and Staples 1980; Austin and Cavalcante 1982; Bianchini pers. comm. 2006).

Ornamentals

Merremia dissecta is cultivated in the United States (Menninger 1964; Hortorium 1976; Rondeau et al. 1996; Austin 1998). Farther south in the Americas, the species is rarely grown, perhaps because plants are so abundant in wild places and in villages. In the Old World, however, they are widely cultivated.

Rendle (1905) recorded the species in Africa and considered *M. dissecta* "cosmopolitan." Hutchinson

and Dalziel (1931) were more exact and wrote that it was cultivated there and had escaped. In Asia, Hallier (1896), Ooststroom (1939), and Ooststroom and Hoogland (1953) noted the species in gardens of Malesia, particularly Java. Mansur (2001) also recorded the vines being cultivated in Southeast Asia. The plants do well in gardens in Australia, and are grown there in at least New South Wales, Northern Territory, Queensland, and Western Australia (Northern Territory Government 2006).

Seeds are offered for sale in the United States by many organizations (e.g., Isaacson 2000 and B & T World Seeds 2005). They are being sought for replacement in the New Orleans City Park since Hurricane Katrina (New Orleans City Park Improvement Association 2006).

There are several places in Germany where seeds are listed (e.g., Rare Plants 2006). Even in Australia, where *M. dissecta* is considered a terrible weed, seeds are for sale (e.g., Herbalistics 2006). Seeds are similarly sold in Taiwan (Plant Seeds 2006).

Flavoring and Medicines

Although flavoring and medicines may seem to be distinct, they are not to many people. Food, condiments, and medicines are not considered separate from each other in numerous cultures around the world (Etkin 2006). Several of the plant's common names refer to the smell or taste of almonds (Table 1). The almond taste (amygdalin and associated compounds) has a long history of involvement with humans, regardless of its source(s). Zohary and Hopf (2000) found that almonds (*Prunus dulcis* (Miller) D. A. Webb [=*Amygdalus communis* L.]) were domesticated in the Mediterranean not later than the third millennium BC. The many names for almond in southeastern European languages indicate a long history of human use in the region. These names include those based on Greek αμυγδάλη, such as Latin *amygdalus*, the Hebrew *shaked* and *luz*, Aramaic *luz*, as well as *lauz* [lōz] in Arabic, Kurdish, and other Semitic languages. Although neither the almond nor apricot (*Prunus armeniaca* L.) is native in the British Isles, the English were making a liqueur flavored with the kernels by 1785. The use of native British *Prunus* fruits and almond-flavored seeds for a variety of purposes is doubtlessly older in England as it was in Germany (cf. sloe gin in Fuchs 1542; Duke et al. 2002). Archaeological materials show that *Prunus* fruits

TABLE 1. SOME COMMON NAMES FOR *MERREMIA DISSECTA*.

Common Name	Language/Region	Source/Notes
<i>aguinaldo de almendra</i> (aguinaldo, gift, <i>de almendra</i> , of almonds)	Spanish/Cuba	Roig 1945, Leon and Alain 1957/ <i>Aguinaldo</i> historically was a gift at Christmas. This is the equivalent of “Christmas flower” in English.
alamo vine (<i>alamo</i> , cottonwood, <i>Populus</i> spp.)	Spanish-English/Texas	Shiners 1970/There are two versions of why the mission in San Antonio, Texas came to be “The Alamo.” One is that at one time there was a large cottonwood growing near it; the other says a Spanish cavalry unit stationed there in the early 1800s came from the town of Alamo de Parras, Coahuila, and named it after their home. Why and when this name was applied to these vines is undetermined, but it was probably after the famous battle of 1836.
<i>almendrillo</i> (little almond)	Spanish/Dominican Republic	Liogier 1974
<i>amarra-amarra</i> (tie-tie, reduplication of words based on <i>amarra</i> , to tie)	Portuguese/Brazil	Kissman and Groth 1992
<i>bejuco bochinche</i> (<i>bochinche</i> , rumpus, brawl, gossip [slang in Caribbean], bar or tavern, <i>bejuco</i> , climber, vine)	Spanish/Dominican Republic	Liogier 1974/Could this be applied because of the gossip that goes on over fences? Or perhaps because of the flavoring in drinks in taverns?
bind-weed (alluding to the wrapping around other plants; in use by 1548)	English/Florida	Bartram 1773 in Harper 1958, Bartram 1943
<i>bimibini</i> [<i>bini-bini</i>] (come-come)	Papiamento/Netherland Antilles	Hawthorne et al. 2004/This probably alludes to the use as a diuretic.
<i>campainha</i> (little bell)	Portuguese/Brazil	Kissman and Groth 1992
<i>campanilla</i> (little bell)	Spanish/Veracruz, Mexico	McDonald 1993
<i>cimarrón</i> (wild [one])	Spanish/Veracruz, Mexico	McDonald 1993
<i>corda-de-violã</i> (<i>de violã</i> , of the guitar <i>cordã</i> , string)	Portuguese/Brazil	Kissman and Groth 1992
<i>correhuela de las doce</i> (<i>correhuela</i> , morning glory, <i>de las doce</i> , of the 12)	Spanish/Texas	Shiners 1970/ In European Spanish the word is spelled <i>corregilda</i> ; it is generic for members of the Convolvulaceae.
<i>corriola</i> (morning glory)	Portuguese/Brazil	Kissman and Groth 1992
cutleaf morning glory	English/Florida	Perkins 2003
<i>dandab</i> (maybe from <i>dan</i> , tooth, <i>dabò</i> , first of all)	Kreole/Hispaniola	Liogier 1974

(Continued)

TABLE 1. (CONTINUED).

Common Name	Language/Region	Source/Notes
<i>duo lie yu huang cao</i> 多裂魚黃草 (<i>duo</i> , many, <i>lie</i> , split, <i>yu</i> , fish, <i>huang</i> , sulphur, <i>cao</i> , herb); 多裂魚黃草 (simplified characters)	Chinese/China Tongan?/Tonga	Fang and Staples 1995 Wolff 2006
<i>fue mea</i> (also used for <i>M. peltata</i>) <i>jitrirana</i> [jitrirana] (<i>rana</i> , false, <i>jeica</i> , sweet potato)	Portuguese from Tupi/Brazil	Kissman and Groth 1992
<i>kirehabirugao</i> キレハヒルガオ (<i>kire</i> , cut, <i>ha</i> , leaf, <i>hiru-gao</i> , mid-day face)	Japanese/Japan	Yoneda 1998-2004
know-you [noyó, no-yo] (corruption of French <i>noyau</i> , see below)	Creole English/Antigua, Jamaica, Barbados, Puerto Rico	Liogier and Martorell 1982, Nicholson 2005 Liogier 1974, Fournet 1978/In Europe the original phrase was apparently <i>eau crème de noyau</i> and was prepared from the “ <i>amandes de fruits a noyau</i> ” (kernels of stone fruits). This may have been shortened over time to <i>eau de noyau</i> and became “noyau water” in Caribbean English.
<i>liane</i> [ɔ] <i>noyau</i> (kernel vine)	French/Haiti, Guadalupe, Martinique	Fournet 1978 Fournet 1978
<i>liane zámánde</i> (kernel vine)	French/Guadalupe, Martinique	Fournet 1978
<i>liane-amande-amère</i> (bitter almond vine)	French/Guadalupe, Martinique	Fournet 1978/This is probably the same name as “meeny-weeny” used by Morton (1981).
<i>méné-vini</i> (<i>mene</i> , from <i>mener</i> , the trumpet call used to herd, lead, or drive livestock, so maybe an allusion to the corolla shape, <i>vini</i> , from <i>vigne</i> , vine)	French/Guadalupe, Martinique	
mile-a-minute-vine (alluding to the speed at which it grows)	English/Arizona	Rondeau et al. 1996
<i>na'que lá'ta#</i> [qai'k lá'ta#, na'qai'k lá'ta#] (?)	Toba-pilaga/Argentina	Arenas 2003
<i>netikwi'tax</i> (?)	W'ichi/Argentina	Arenas 2003
noon-flower (from the habit of flowering near mid-day)	English/Malesia, southeastern Asia	Ooststroom 1939, Ooststroom and Hoogland 1953, Mansur 2001
noyau vine (from French <i>noyau</i> , kernel, stone, pit)	English/Caribbean, Florida, Puerto Rico	Liogier and Martorell 1982, Wunderlin and Hansen 2003, USDA 2006/ See above <i>liane</i> [ɔ] <i>noyau</i> for more

TABLE I. (CONTINUED).

Common Name	Language/Region	Source/Notes
<i>ojo de tecolote</i> (owl eye; <i>tecolote</i> is from Náhuatl <i>tecolotl</i> , owl)	Spanish/Veracruz, Mexico	García-Argáez et al. 1999/ <i>Tecolote</i> is a word sometimes applied to the small owls such as the screech and the larger barn owl. Others apply it to the great horned owl, also called <i>bubo</i> . Barrtram 1773 in Harper 1958
palmated Convolvulus	English/at Long Pond, Levy Co.; Draton's Island, Lake George, Putnam Co., Florida	
<i>pasta de almendras</i> (<i>de almendras</i> , of almonds, <i>pasta</i> , dough)	Spanish/Venezuela	Pittier 1926
<i>pastica de almendras</i> (<i>pastica</i> , little paste, <i>de almendras</i> , of almonds,)	Spanish/ Dominican Republic	Liogier 1974
<i>pâte d'amande</i> (<i>pâte</i> , paste, <i>d'amande</i> , almond)	French/French Guiana, Guadalupe, Martinique	Fournet 1978, DeFilipps et al. 2006
<i>patico pudín</i> (<i>patico</i> , a nonsense word added as filler in French rhymes, <i>pudín</i> , pudding in Spanish; or maybe from French <i>boudin</i> , pudding, or from <i>putain</i> , prostitute; allusion obscure)	Creole?/Hispaniola	Liogier 1974/Which language this name may be is problematical. The word <i>pudín</i> is Spanish, but <i>patico</i> seems to appear in neither Creole nor Spanish, although it is in French. Probably the word is a corruption of <i>pastia</i> .
Queensland- <i>Holzrose</i> (Queensland wood-rose)	German/Germany	Röpke 2006/This is a name used by a commercial seed-company.
<i>rose de bois</i> (wood-rose)	French/Reunion	Bourgeois et al. 2006
<i>sandia</i> (watermelon, application obscure)	Spanish/Veracruz, Mexico	McDonald 1993
<i>sawu dubu</i> (1,000 footprints, because of the shape of the leaves)	Hausa/N. Nigeria	Dalziel 1937
sprain-bush	English/Carriacou, Grenada, Petit Martinique	Hawthorne et al. 2004
<i>swietie sopie wiewirje</i> (<i>swietie</i> , sweet, <i>sopie</i> , strong drink, <i>wiewirje</i> , hair)	Sranan [Creole Dutch]/Suriname	Oostroom 1932/Dutch equivalents of Sranan are <i>wiwirje</i> = <i>haar</i> ; <i>sopie</i> = <i>sterke drank</i> ; <i>swietie</i> = <i>zweet</i> .
white convolvulus creeper	English/northwestern Australia	CRC 2006
wood-rose (originally applied to plants growing in woodlands, in use by ca. 1000 as <i>wudu rosari</i>)	English/Florida, Louisiana	Hutchinson 2003

were eaten in Europe by A.D. 1000 and perhaps as early as 200 B.C. (Priest-Dorman 1999).

Noyau was in French by 1530 (Table 1), having been written *noiel* in the 13th century, in turn based on Latin *nucalis*, similar to a nut (*nux*), and came into English from French before the 1700s (OED Online 2003). By 1721 the phrase *eau de noyau* (almond liqueur) was in use in both languages (cf. Table 1 for more). *Noyau* in Caribbean French, but not in France, is a word clearly associated with almond odor and taste, although it specifically refers to kernel, pit, or stone. The seed within is *amande* for any species. Subsequently, *noyau* came to be associated with liquors flavored with almond or peach stones, e.g., *Noyau de Poissy*, one of the oldest liquors in France; established in 1698.

When the Europeans settled the New World they brought these ideas and practices to their new homeland. However, the indigenous people were inventive, imaginative, and inquisitive, and probably already had discovered the almond smell and flavor of *M. dissecta* on their own. Still, no records were found of any American use of this vine before Europeans arrived. Americans did use fruits and seeds of *Prunus* throughout its American range (cf. Austin 2004), so they were well acquainted with the almond smell and taste.

When and where *M. dissecta* began being used in the New World is unknown, but most records are from Caribbean and near-Caribbean people. Since the native range of *M. dissecta* var. *dissecta* includes that region, this pattern is not surprising. The year 1864, when Renato de Grosourdy published *El médico botánico criollo*, seems to be the earliest record of use by people in the Americas, although that publication surely was preceded by a long history.

Petersen (1974) wrote that in the Virgin Islands "Extract from the leaves of this vine, which smells almost like almond essence, is used as a flavoring in cake and sweet breads and candy. Noyau water also has a taste of prussic acid and is used in preparation of a liquor called Noyau."

As medicine, Roig (1945) found that Cubans recommended crushed leaves as a sedative and for use in tisanes (infusions). Both forms were used for chest problems, applied against inflammation, and work as "*resolutivas y sedativas a la par*" (emollients and sedatives at the same time).

In Antigua and Barbuda, Grant (1995) noted that *M. dissecta* was used to treat colds. Hawthorne et al. (2004) infer by the common name "sprain-

bush" that the plant was used to treat sprains in the Spice Islands of Grenada, Carriacou, and Petit Martinique. Morton (1981) learned from indigenous people in Curaçao that a hot infusion of "*binibini*" was given to relieve urinary infections. Veeris (1999) recorded similar uses. DeFilipps et al. (2006) wrote that a decoction of the plant was considered an effective external remedy for scabies and itch in the Guianas. García-Argáez et al. (1999) listed similar use in Mexico.

Outside the Americas, the species is also used. Dalziel (1937) recorded that in Nigeria a cold infusion was a remedy for giddiness and that in the Gold Coast it is given as a treatment for chest complaints in children. Ved et al. (2002) noted that the plants were used in "folk" medicine in three agro-climatic regions (Andhra, Telangana, Rayalseema) of Andhra Pradesh, India. *Merremia dissecta* is not, however, employed in Ayurveda or Unani systems, indicating a recent introduction to medicine as would be expected for a comparatively new plant. Mansur (2001) found that *M. dissecta* was employed to treat snakebite and intoxication in Africa.

Akana et al. (1922) called two plants *kowali awa* (harbor morning glory) and *kowali pehu* (swollen morning glory). They said that these have leaves "that resemble the palm of the hand," white flowers, and that leaves of the latter kind are thicker and more round than the former. The two climbers were identified by H. F. Bergman, a professor of botany at the University of Hawai'i, as *Ipomoea insularis* (= *I. indica* (J. Burman) Merrill) and *I. dissecta* (= *Merremia dissecta*). No vouchers were made and the identity is spurious for the second species. This situation was corrected by Pukui and Elbert (1971) who listed *I. alba* for *koali pehu*. Pukui and Elbert were well versed in botany and their identification is probably correct, particularly since *M. dissecta* was not recorded in Hawaii until 1955 (Imada et al. 2005), and is not included among useful Hawaiian plants by Degener (1973) or Krauss (1974). Moerman (1998), using the misleading Akana et al. (1922), incorrectly thought that *M. dissecta* had been used as an analgesic, dermatological aid, laxative, orthopedic aid, pediatric aid, and strengthener in Hawai'i.

For Trinidad and Tobago, Williams and Williams (1969) simply indicate that *M. dissecta* is poisonous to cattle. Mansur (2001) found the same problem in India. Those problems must be caused by the prussic acid in foliage and seeds.

Indeed, Nahrstedt et al. (1989, 1990) found that leaves and seeds contain several cyanogenic glycosides, including amygdalin, its 6"--(4-hydroxy)benzoate, and its 6"--(4-hydroxy)-*E*-cinnamate, prunasin, and 6'-*O*-malonylprunasin.

Alemán-Frias et al. (1972) did not detect them, but Jenett-Siems et al. (2005) identified 32 alkaloids in the roots, among them 6 pyrrolidines and 26 tropanes. Some minor metabolites they called merresectines were a novel type of tropane alkaloid characterized by prenylated benzoyl moieties as acyl components. Another novel congener, merredissine, was characterized as 3- α ,6- β -di-(4-methoxybenzoyloxy)tropane. Moreover, calystegine B2, a polyhydroxynortropane, was detected in the flowers (Schimming et al. 2005).

García-Argáez et al. (1999) found other compounds. These authors discovered several caffeate esters in both *M. dissecta* and *M. tuberosa* (L.) Rendle. *Merremia dissecta* included a novel 6-methylheptadecanoyl caffeate, as well as lupeol, β -sitosterol, and stigmasterol.

Chemistry indicates that the early comparison with almond taste and notation that *M. dissecta* contains cyanogenic compounds were correct. Not surprisingly, Sena et al. (1997) found that extracts of the plants were antimicrobial.

Food

The only record found of the roots being eaten was recently published by Arenas (2003). Only *M. dissecta* var. *edentata* (Meisner) O'Donell is native in the Gran Chaco, Argentina, where Arenas worked with the Toba and Wichí people (Fig. 2), although there are scattered locations where *M. dissecta* var. *dissecta* has been introduced.

The second variety is restricted to South America and has not been dispersed outside that region (Fig. 2). Those plants were first discovered in Brazil, grown in the botanical garden in Bonn (*horto botanico Bonoiensis*), and called *Ipomoea fulva* by Giuseppe Bertolini in 1838. Then George Gardner found them in Rio de Janeiro and called them *I. nigricans* in 1842. Meisner, studying the family for Martius's *Flora Brasiliensis*, did not think that the climbers should be given specific rank and called them *I. dissecta* var. *edentata* in 1869. Meisner (1869) was obviously confused by this problem, because he also named them *I. maximiliani* in spite of their having two previous epithets at species rank. It was not until O'Donell (1941) examined the genus that the variety was moved to *M. dissecta* var. *edentata*.

While there are clear similarities between these two variations, corollas are completely white in *M. dissecta* var. *edentata* but white with a reddish-purplish center in *M. dissecta* var. *dissecta*. Moreover, the sepals average longer (20–35 mm.) in var. *edentata* than in var. *dissecta* (18–25 mm.). Leaf lobes in var. *dissecta* are toothed while those in var. *edentata* are mostly entire.

Arenas (2003) found only some of the Tobas using the plants, and although the Wichí formerly used them assiduously, only those in more remote villages still do. Roots are cut up if large, but left intact if small. The roots are put in a pot and boiled, or sometimes they are baked in ashes. Cooked roots are eaten with abundant oil as a dressing. Arenas thought that they tasted a little like the *batata* (*Ipomoea batatas*), although they tended to be insipid. Formerly they were taken entirely from wild places, but a few individuals now cultivate them in their home gardens. This is an important food only during the winter drought period.

Summary and Discussion

Merremia dissecta was discovered in the 1700s at nearly the same time in Florida, the Caribbean, and Mexico. Subsequently, the species was divided into two varieties, *M. dissecta* var. *dissecta* (Caribbean region) and *M. dissecta* var. *edentata* (South America, south of the Amazon River). Common names, ethnobotany, history, and distributions indicate that this species has been used by humans for multiple purposes. Variety *dissecta* was moved around the world by the 1800s, although the South American var. *edentata* has not been transported outside its native range. People moved var. *dissecta* because it is considered a condiment, medicine, and an ornamental climber. These various uses date from at least the 1800s. While the species has a venerable history of human association and use beyond being cultivated simply as an ornamental, it has not received wide acknowledgment for its various uses. Even in horticultural literature, the species has been slighted. *Merremia dissecta* deserves wider recognition and more study, particularly because of its association with an almond flavor, use to enhance food taste, and in medicines.

Acknowledgments

Specimens were examined at A, ARIZ, ASU, C, COL, DBG, DUKE, F, FTG-FAU, GH, IAN, INPA, K, L, MEXU, MG, MO, MSU, NY, P, PDA, RAW, S, U, UC, US, and VEN. Distribu-

tions are based on specimens and literature reports. I thank curators for access to specimens and loans. Pastor Arenas (Toba, Wichí) pointed out to me the roots being used as food, and Alejandro Velasco Levy (Spanish) and Richard Moyroud (French) graciously helped with translating names. Mary Stiffler (Missouri Botanical Garden Library) kindly provided old literature. Richard Carter (VSC), Nancy Coile (Florida Department of Agriculture, retired), Philip D. Jenkins (ARIZ), and Rosângela Simão-Bianchini (SP) provided data on the plants.

Literature cited

- Akana, A., D. M. Kaaiakamanu, and J. K. Akina. 1922. Hawaiian herbs of medicinal value. Pacific Book House, Honolulu. Facsimile reprint, 1976. Charles E. Tuttle Co., Rutland, VT.
- Alemán-Frias, E., O. Aurich, L. Escurra-Ferrer, M. Gutiérrez-Vásquez, C. Horstmann, J. López-Rendueles, E. Rodríguez-Graquitená, E. Roquel-Casabella, and K. Schreiber. 1972. Phytochemische Untersuchungen an Pflanzen der kubanischen Flora. *Genetic Resources and Crop Evolution* 19(1):359–425.
- Arenas, P. 2003. Etnografía y Alimentación entre los Toba-Nachilamole#ek y Wichí-Lhuku'tas del Chaco Central (Argentina). Published by the author, Buenos Aires, Argentina.
- Austin, D. F. 1979. Studies of the Florida Convolvulaceae-II. *Merremia*. *Florida Scientist* 42(4):216–222.
- . 1998. Convolvulaceae Morning Glory Family. Pages 61–83 in Editorial committee, eds., *Manual of the vascular plants of Arizona*. Arizona-Nevada Academy of Sciences Vol. 30(2).
- . 2004. *Florida Ethnobotany*. CRC Press LLC, Boca Raton, FL.
- and G. W. Staples. 1980. Neotropical Convolvulaceae Part I. Unpublished mss.
- and P. B. Cavalcante. 1982. Convolvuláceas da Amazônia. *Publicações Avulsas, Museu Paraense Emilio Goeldi* 36: 1–134.
- B & T World Seeds. 2005. <http://www.b-and-t-world-seeds.com>.
- Barker, W. R., R. M. Barker, J. P. Jessop, and H. P. Vonow, eds. 2005. *Census of South Australian Vascular Plants*, 5th Edition. *Journal of the Adelaide Botanic Gardens Supplement* 1. Botanic Gardens of Adelaide & State Herbarium Adelaide.
- Bartram, W. 1943. *Travels in Georgia and Florida, 1773–74*. A report to Dr. John Fothergill. (Francis Harper, ed.). *Transactions American Philosophical Society* 33, pt. 2.
- Bourgeois, T., G. Lebreton, P. Marnotte, L. Dijoux, J. J. Esther, and E. Jeuffrault. 2006. Enherbements et herbicides de la Canne à sucre à la Réunion. <http://www.prpv.org/index.php/fr/content/download/1583/12806/file/CIRAD%20depliant%20herbicide.pdf>.
- CRC. 2006. CRC weed management. Bushland-friendly gardens: Plants to avoid in your region. http://www.weedsrc.katalyst.com.au/bushlandfriendlygardens/bfg_home.html.
- Dalziel, J. M. 1937. *The useful plants of west tropical Africa*. Crown Agents for Oversea Governments and Administrations, London.
- DeFilipps, R. A., S. L. Maina, and J. Crepin. 2006. *Medicinal Plants of the Guianas*. <http://www.mnh.si.edu/biodiversity/bdg/medicinal/>.
- Degener, O. 1973. *Plants of Hawaii National Park Illustrative of Plants and Customs of the South Seas*. Braun-Brumfeld, Inc., Ann Arbor, MI.
- Diggs, G. M. J., B. L. Lipscomb, and R. J. O'Kennon. 1999. *Shinners & Mahler's Illustrated Flora of North Central Texas*. Center for Environmental Studies and Department of Biology, Austin College, Sherman, TX and Botanical Research Institute of Texas (BRIT), Fort Worth, TX.
- Duke, J. A., M. J. Bogenschutz-Godwin, J. duCellier, P.-A. K. Duke. 2002. *Handbook of medicinal herbs*. Second Edition. CRC Press LLC, Boca Raton, FL.
- Etkin, N. L. 2006. *Edible medicines: An ethnopharmacology of food*. The University of Arizona Press, Tucson, AZ.
- Fang, R.-Z. and G. W. Staples. 1995. Convolvulaceae. Pages 271–325 in C.-Y. Wu and P. Raven, eds., *Flora of China* (Vol. 16). Science Press and Missouri Botanical Garden Press, Beijing and St. Louis, MO.
- Fournet, J. 1978. *Flore illustree des phanerogames de Guadelupe et de Martinique*. Institut National de la Recherche Agronomique, Paris.
- Fuchs, L. 1542. *De Historia Stirpium Commentarii Insignes*. CD-ROM facsimile, Octavo Edition, Oakland, CA.
- García-Argáez, A. N., M. C. Pérez-Amador, E. Aguirre-Hernández, and M. Martínez-Vásquez. 1999. Two new caffeate esters from roots of *Merremia tuberosa* and *M. dissecta*. *Planta Medica* 65:678–679.
- Grant, L. C. 1995. *Antigua and Barbuda: Country report to the FAO International Technical Conference on Plant Genetic Resources*. Leipzig, Germany.
- Groves, R. H., R. Boden, and W. M. Lonsdale. 2005. *Jumping the garden fence: Invasive garden plants in Australia and their environmental and agricultural impacts*. CSIRO report prepared for WWF-Australia. WWF-Australia, Sydney.
- Hallier, H. 1896. *Systematisch-verzicht van de Convolvulaceen, gekweekt in 'S Lands Plantentuin. Verslag omtrent den staat van 'S Lands plantentuin te Buitenzorg over het jaar 1895*, Batavia.
- Harper, F., ed. 1958. *The travels of William Bartram*,

- Naturalist's Edition. Yale University Press, New Haven.
- Hawthorne, W. D., D. Jules, G. Marcelle. 2004. Caribbean spice island plants. Trees, shrubs and climbers of Grenada, Carriacou and the Petit Martinique: A picture gallery with notes on identification, history and other trivia. NHBS Environment Bookstore, Totnes, Devon, UK.
- Herbalistics. 2006. <http://www.herbalistics.com.au>.
- Hortorium, Liberty Hyde Bailey. 1976. Hortus Third. Macmillan Publications, New York.
- Hutchinson, J. and J. M. Dalziel. 1931. Flora of West Tropical Africa. Crown Agents for the Colonies, London.
- Hutchinson, J. T. 2003. Wood-Rose (*Merremia dissecta*). Land Management Program at Archbold Biological Station, Florida. <http://www.archbold-station.org/abs/landmanage/ExoticsGrant03/ExoticsMain/wood%20rose.htm>.
- Imada, C. T., G. W. Staples, and D. R. Herbst. 2005. Annotated Checklist of Cultivated Plants of Hawai'i. National Biological Information Infrastructure, <http://www2.bishopmuseum.org/HBS/botany/cultivatedplants>.
- Isaacson, R. T. 2000. Andersen Horticultural Library's Source List of Plants and Seeds. University of Minnesota Libraries, Minnesota Landscape Arboretum, University of Minnesota, Chanhassen, MN.
- Jacquín, N. J. 1767. Observationum Botanicarum 2: 4, pl. 28.
- Jenett-Siems, K. R. Weigl, A. Böhm, P. Mann, B. Tofern-Reblin, C. Ott Sonja, A. Ghomian, M. Kaloga, K. Siems, L. Witte, M. Hilker, F. Müller, and E. Eich. 2005. Chemotaxonomy of the pantropical genus *Merremia* (Convolvulaceae) based on the distribution of tropane alkaloids. *Phytochemistry* 66(12):1448–1464.
- Jones, S. B. J. and N. C. Coile. 1988. The distribution of the vascular flora of Georgia. University of Georgia, Athens, Georgia.
- Kissman, K. G. and D. Groth. 1992. Plantas infestantes e nocivas. Tomo II. Brazil, BASF Brasileira S.A., São Paulo.
- Krauss, B. H. 1974. Ethnobotany of the Hawaiians. Harold L. Lyon Arboretum, University of Hawai'i, Honolulu.
- Leon, H. and H. Alain. 1957–1963. Flora de Cuba, Vol. 2. Otto Koeltz Science Publishers, Koenigstein, Germany, 1974.
- Liogier, A. H. 1974. Diccionario Botanico de Nombres Vulgares de la Espaniola. Impresora Universidad Nacional Pedro Henriquez Ureña, Santo Domingo.
- Liogier, H. A. and L. F. Martorell. 1982. Flora of Puerto Rico and adjacent islands: A systematic synopsis. Editorial de la Universidad, Rio Piedras.
- Maranhão Carneiro, A. and B. E. Irgang. 2005. Origem e distribuição geográfica das espécies ruderais da Vila de Santo Amaro, General Câmara, Rio Grande do Sul. *Iheringia, Serie Botânica* 60(2):175–188.
- Mansur, M. 2001. *Merremia*. Pages 366–373 in Van Valkenburg, J. L. C. H. and N. Bunyapraphatsara, eds., Plant Resources in South-East Asia. No. 12(2). Medicinal and Poisonous Plants 2. Prosea Foundation, Backhuys Publishers, Leiden, The Netherlands.
- McDonald, A. 1993. Convolvulaceae I. Pages 1–99 in V. Sosa, ed., Flora de Veracruz (Vol. 73). Xalapa, Veracruz, Instituto de Ecología, A. C. and University of California, Riverside.
- Meisner, C. D. F. 1869. Convolvulaceae. Pages 200–370 in C. F. P. von Martius, A. G. Eichler, and I. Urban, eds., Flora Brasiliensis (Vol. 7). J. Cramer, Weinheim, 1840–1906. Reprinted by Stechert-Hafner Service Agency, Inc., New York, NY.
- Menninger, E. A. 1964. Seaside plants of the world. Hearthside Press, New York.
- Michaux, A. 1803. Flora boreali-americana. Apud fratres Levrault, Parisiis et Argentorati. Reprint 1974 *Classica botanica Americana* Vol. 3, introduction by Joseph Ewan, Hafner Press, New York.
- Miller, P. 1768. Gardener's dictionary, ed. 8. Printed for the author and sold by John and Francis Rivington . . . [and 23 others], London.
- Moerman, D. E. 1998. Native American Ethnobotany. Timber Press Inc., Portland, OR.
- Morton, J. F. 1981. Atlas of Medicinal Plants of Middle America, Bahamas to Yucatan. Charles C. Thomas, Springfield, Ill.
- Nahrstedt, A., E. A. Sattar, and S. H. H. El-Zalabani. 1990. Amygdalin acyl derivatives, cyanogenic glycosides from the seeds of *Merremia dissecta*. *Phytochemistry* 29(4):1179–1181.
- , P. Skjottgaard Jensen, and V. Wray. 1989. Prunasin-6'-malonate, a cyanogenic glucoside from *Merremia dissecta*. *Phytochemistry* 28(2):623–624.
- New Orleans City Park Improvement Association. 2006. Hurricane Katrina Updates. New Orleans Botanical Garden Plant Collection Replacement Wishlist. <http://www.neworleanscitypark.com>.
- Nicholson, D. V. 2005. Cultural Heritage. Some Aspects of the Antigua and Barbudan Way of Life Past and Present. <http://www.antiguamuseums.org/cultural.htm>.
- Northern Territory Government 2006. Darwin Waterfront and Convention Center Environmental Accessment Report. <http://www.waterfront.nt.gov.au/waterfront/environment/>.
- O'Donnell, C. A. 1941. Revision de las especies americanas de *Merremia*. *Lilloa* 6: 467–554.
- OED Online. 2003. Oxford University Press. 10 Dec. 2004. <http://dictionary.oed.com/cgi/entry/00299371>.
- Ooststroom, S. J. van and R. D. Hoogland. 1953. Convolvulaceae 4. Pages 388–512 in C. G. J. van Steenis, ed., Flora Malesiana, Series 1 (Vol. 4). Noordhoof-Kolff n.v., Djakarta.

- . 1932. Convolvulaceae. Pages 66–102 in A. Pulle, ed., *Flora of Suriname* (Vol. 4). Koninklijke Vereeniging Indisch Instituut (voorheen Koloniaal Instituut), Amsterdam.
- . 1939. The Convolvulaceae of Malaysia, II. The genera *Jacquemontia*, *Aniseia*, *Convolvulus*, *Calystegia*, *Shuterea*, *Merremia*, *Operculina* and *Decalobanthus*. *Blumea* 3(2):267–371.
- Ortega, C. G. 1798. *Novarum, aut Rariorum Plantarum Horti Reg[um] Botani[cum] Matrit[?] Descriptionum Decades, cum Nonnullarum Iconibus*. 7:84. Typographia Ibarriana, Madrid.
- Perkins, K. D. 2003. Local Flora. Vascular plants of north central Florida. VINES. <http://www.flmnh.ufl.edu/natsci/herbarium/locfl/locfvine.htm>.
- Petersen, A. 1974. *Herbs and proverbs of the Virgin Islands*. St. Thomas Graphics, St. Thomas.
- Pittier, H. 1926. *Manual de las Plantas Usuales de Venezuela*. Lithografía del Comercio, Caracas.
- Plant Seeds. 2006. <http://www.forums.plant-seeds.idv.tw>.
- Priest-Dorman, C. 1999. Archaeological finds of ninth- and tenth-century viking foodstuffs. <http://www.cs.vassar.edu/~capriest/vikfood.html>
- Pukui, M. K. and S. H. Elbert. 1971. *Hawaiian Dictionary*. University Press of Hawai'i, Honolulu.
- Pursh, F. 1814. *Flora Americae Septentrionalis*. Vol. 1. White, Cochrane & Co., London.
- Rare Plants. 2006. <http://www.rareplants.de>.
- Rendle, A. B. 1905. Convolvulaceae. Pages 62–206 in W. T. Thiselton-Dyer, ed., *Flora of Tropical Africa* 4(2). L. Reeve & Co., Kent, England; reprint by Beadley Brothers Ltd., Kent, 1959.
- Rhodes, A. F. and W. M. Klein Jr. 1993. *The Vascular Flora of Pennsylvania, Annotated Checklist and Atlas*. American Philosophical Society, Philadelphia.
- Roig y Mesa, J. T. 1945. *Plantas Medicinales Aromáticas o Venenosas de Cuba*. Ministerio de Agricultura, Habana.
- Rondeau, R., T. R. Van Devender, C. D. Bertelsen, P. Jenkins, R. K. Wilson, and M. A. Dimmitt. 1996. *Annotated Flora and Vegetation of the Tucson Mountains, Pima County, Arizona*. *Desert Plants* 12(2):3–46.
- Röpke, H.-G. 2006. *Pflanzen-Versand Röpke. mediterrane und tropische Pflanzen in großer Auswahl*. www.topshare.de/c107.html.
- Schimming, T., K. Jenett-Siems, P. Mann, B. Tofern-Reblin, J. Milson, R. W. Johnson, T. Derooin, D. F. Austin, and E. Eich. 2005. *Calystegines as chemotaxonomic markers in the Convolvulaceae*. *Phytochemistry*. Feb. 2005; 66(4):469–80.
- Sena, K. X. F. R., H. Xavier, M. C. Fontes, C. S. Rocha. 1997. *Atividade Antimicrobiana e perfil cromatografico de Merremia dissecta Hallier* (Convolvulaceae) in XX Encontro Nacional dos Estudantes de Farmácia e I Encontro dos Estudantes de Farmácia da América Latina, 1997, Recife. *Anais Do IV Congresso Científico dos Estudantes De Farmácia*, [kxfrs@bol.com.br].
- Shinners, L. H. 1970. Convolvulaceae. Pages 1241–1261 in D. S. Correll and M. C. Johnston. *Manual of the Vascular Plants of Texas*. Texas Research Foundation, Renner.
- Taylor, W. K. and E. M. Norman. 2002. *André Michaux in Florida. An Eighteenth-Century Botanical Journey*. University Press of Florida, Gainesville, FL.
- Thomas, R. D. and C. M. Allen. 1996. *Atlas of the Vascular Flora of Louisiana. Volume II: Dicotyledons, Acanthaceae – Euphorbiaceae*. Louisiana Department of Wildlife and Fisheries, Natural Heritage Program, Baton Rouge.
- USDA. 2006. *PLANTS Database*. <http://plants.usda.gov/>.
- Ved, D. K., P. S. Udayan, K. Ravikumar, N. Begum, and R. Karthikeyan. 2002. *Medicinal plant species of Andhra Pradesh community forestry project area*. Foundation for Revitalisation of Local Health Traditions, Bangalore.
- Veeris, D. 1999. *Green remedies and golden customs of our ancestors. The introduction of more than a hundred herbal plants from the islands of Aruba, Bonaire and Curacao*. Triangel Publicaties, The Hague.
- Weakley, A. S. 2006. *Flora of the Carolinas, Virginia, and Georgia, and surrounding areas*. University of North Carolina, Chapel Hill. <http://www.herbarium.unc.edu/flora.htm>.
- Williams, R. O. and R. O. J. Williams. 1969. *The useful and ornamental plants in Trinidad and Tobago*. Port of Spain, Government Printery.
- Wolff, D. 2006. *Underlying causes of deforestation: Tonga*. World Rainforest Movement, Montevideo, Uruguay. <http://www.wrm.org.uy/>.
- Wunderlin, R. P. and B. F. Hansen. 2003. *Guide to the Vascular Plants of Florida, Second Edition*. University Press of Florida, Gainesville, FL.
- and B. F. Hansen. 2004. *Atlas of Florida Vascular Plants* (<http://www.plantatlas.usf.edu/>). [S. M. Landry and K. N. Campbell (application development), Florida Center for Community Design and Research.] Institute for Systematic Botany, University of South Florida, Tampa.
- Yoneda, Y. 1998–2004. *Family Convolvulaceae*. http://www.protist.i.hosei.ac.jp/Asagao/Yoneda_DB/E/taxonomy/1-family.html.
- Zohary, D. and M. Hopf. 2000. *Domestication of Plants in the Old World*, third edition. Oxford University Press, Oxford, UK.