NOTES ON ECONOMIC PLANTS

Ethnobotany of *Clibadium* L. (Compositae, Heliantheae) in Latin America.—Reported applications as barbasco and medicines, common names, users, and distribution of species of *Clibadium* (Compositae) in Latin America are summarized based upon literature reports and label data obtained from examination of over 7000 herbarium specimens.

Clibadium L. (Compositae, Heliantheae) is a genus with interesting patterns of distribution and complex generic relationships. It comprises twenty-nine species (Arriagada in prep.) distributed from southern Mexico throughout Central America, Caribbean and Lesser Antilles, and northern South America, from sea level to 3400 m, with high concentrations of species in Colombia, Costa Rica, and Ecuador. The genus is woody with small, usually loosely aggregated heads, herbaceous phyllaries arranged in 1–5 series, receptacle usually paleaceous throughout, white to yellow 2–4-lobed ray corollas, white 4–5-lobed disc corollas, purple to black anthers, and chromosome numbers all $n = 16$ (*1, 2*).

Clibadium is an important element in the Neotropical flora. First, the included species are shrubby, and in some cases woody, which makes them conspicuous and encountered often in many regions; floristic workers, therefore, frequently must deal with taxa of this group. Second, the drupe-like fruits are also used as food by birds (*Feisinger et al. 2182* ECON) which indicates a significant role in wildlife resources and ecology. Third, species of *Clibadium* are used as a fish-poison by Indian tribes throughout Latin America, thus having an ethnobotanical role with medical potentials for the active compounds.

Some species of *Clibadium* have been reported to be used as fish-poisons and as medicines by Indians tribes throughout Latin America (*3, 4, 5, 6, 7, 8*). Local people and natives often refer to fish-poison plants as "barbasco," which is a generic term in spanish-speaking countries of South America for ichthyotoxic plants. Additional local names may also be used for these plants.

One of the first reports indicating the use of *Clibadium* species as fish-poisons comes from Ernst (*9*) who reported *C. sylvestre* (as *C. asperum*) and *C. surinamense* as the species broadly used from Panama and the Guyanas to the Upper Orinoco region. *Clibadium sylvestre* (as *C. asperum*) was also mentioned by Pulle (*10*) as a common fish-poison distributed in the West Indies, Surinam and French Guyana, Brazil, and Venezuela as used among Tusmani and Temi Indians in the Orinoco region. Other species of *Clibadium* also have been mentioned (*8, 9, 11*) as being used as barbascos and as medicines: *C. eggersii* (as *C. polygynum*) from Guatemala; *C. armanii* (as *C. rotundifolium* from north and south Brazil; and *C. peruvianum* (as *C. heterotrichum*) and *C. surinamense* (as *C. strigillosum*) from Peru.

Recent chemical analyses (*12, 13, 14*) have isolated ichthyothereol and its acetates from *C. arboreum* (as *C. erosum*) and *C. surinamense.* These active compounds previously were known only from *C. sylvestre* (*15, 16*). In spite of the chemical evidence, few field reports have mentioned the use of *C. arboreum* and *C. surinamense* as fish-poison (*Archer 2684,* US; *Leakey 181,* NY; *Oldeman 3220,* P). Probably, ichthyothereol is produced in minute amounts or, it is locally restricted to chemical races that are not recognized and used by natives. Despite the scarce evidence about their use as fish-poison, the isolated compounds strengthen the taxonomic relationships within these species and with the genus *Ichthyothere.* Some acetylenic compounds (tetrahydropyrans) suggest close relationship between *Ichthyothere* and *Clibadium* (*1*).

The available literature cites *Clibadium sylvestre* as the species within the genus being broadly used as fish-poison as compared with *C. surinamense.* Local natives identify *C. sylvestre* and *C. surinamense* and the naming system used reflects this distinction but at the same time the relationship between them based on their chemical properties. *Clibadium sylvestre* (as *Clibadium asperum*) is known as "ware koenamie" (true barbasco) and *C. surinamense as "oeman koenami" (false barbasco) (10).*

The following information, obtained from the labels of over 7000 herbarium specimens, illus-

Economic Botany 49(3) pp. 328–332. 1995

trates the use, users, and some of the common names for the broadly distributed fish-poison plant: *Clibadium sylvestre.*

Brazil. The Uaicá Indians use the fruiting heads "udishihimok," the leaves ("udihenuk") and, whole plant ("udishihi") as a fish-poison for small fish (*Prance et al. 10529,* ECON). The plant ("canabed" or "maku") is also cultivated by the Makú Indians (*Prance et al. 15555,* ECON). The Portuguese name for the species is "cunambí," or "cunanbi," meaning barbasco.

Colombia. Used by natives to stop bleeding, to cure wounds, and as barbasco to kill fish (*García & Echavarría 232,* MO; *McDaniel 11799,* FSU). The Huitotos Indians cultivate this plant ("diare") in the Cara-Paraná region (*Ranghel-Galindo 40,* COL). It is also cultivated by the Chocó Indians together with manioc and plátanos and locally named "huaca" and "catalina" (*Gentry & Fallen 17253,* COL). It is considered toxic to cattle (*Romero Castaneda 6144,* NY). The barbasco is commonly prepared using the tops of plants crushed with soil and mixed with water to stupify fish (*Smith 5058,* US); also, the mascerated and pounded leaves are put into a basket which is dipped into standing water, which stupifies the fish (*Zarucchi 1304,* ECON, GH).

Ecuador. Commonly cultivated and used by the Lowland Quichua Indians to stupify small fish (*Marles & Palacios EE 39,* F). Quichua name: "Panga ambi" (*Mexia 7256,* US; *Prance et al. 10529,* US) and as pain killer (*Gentry 9811,* CAS). The Waorani Indians use it as fish-poison (*Davis & Yost 924,* ECON). *Clibadium sylvestre* is also cultivated by the Kofan Indians (*Martin 61,* ECON). It is broadly cultivated in house gardens by the Colorado Indians (*Cazalet & Pennington 5169,* NY), the Secoya, and Siona Indians (*Vickers 210,* F) and the product sold. Several kilograms of leaves are mashed by the Shuar Indians in water and the water agitated until foam appears (*Limback 120,* CAS). The Secoya Indians use *C. sylvestre* mixed with mashed-up fruits of *Bactris gasipaes* and shaped into balls, that later are thrown into streams as bait to poison fish. Natives identify *C. sylvestre* as "to'teo" or "to'te eo" (Secoya name for pounded poison). *Clibadium sylvestre* is sometimes mixed with finely chopped meat and thrown to the water where after a few minutes the effect is observed. Most accounts describe the fish as stunned and sometimes dying almost immediately, rising to the surface (*17*).

Panama. There are only few reports of *C. sylvestre* being used as fish-poison in Panama (*Allen 857,* F, MO, NY, US; *Allen 4582,* GH, MO). Probably this is true because natives use different plants and fishing techniques. One of the most common plants used is *Piper auritum,* which is found throughout lowlands of Panama and used to attract and trap fish without poisoning (*18*). *Clibadium sylvestre* is illegally used to intoxicate fish (*Hartman & Duke 3866,* OS). Its use has been banned by the Panamanian government because it kills small as well as large fish (*19*).

Peru. Clibadium sylvestre is commonly named "huaca" or "common barbasco," but also known locally as "wasu," "apach" (*Brown s.n.,* ECON), and "Chichka" (*Woytkowski 35187,* CAS). It is cultivated and the crushed leaves used for fish-poison (*Killip & Smith 26834,* F; *Seibert 2022,* US; *Woytkowski 35185,* F). Also, the whole plant is mascerated and used as fish-poison (*Mexia 6506a,* NY). *Clibadium sylvestre* is cultivated by the Culinas Indians, who may have brought the plant from their former home in Brazil (*Rutter & Barozo-Ferreyra s.n.,* OS).

Venezuela. Plants ("conambi" or "Kumá") are cultivated and used by Arekunas Indians to kill fishes (*Cardona Puig 2848,* NY). The cultivated plants are crushed and mixed with soil for use as a fish stupefactant (*Clark & Clark 7674,* MO).

Surinam. Clibadium sylvestre has been cited (*20*) as used mixed with *Piper* spp. and it is known as "Warakabakoro" or "toná" by natives.

It is probable that the current broad distribution of *C. sylvestre* could have been increased by migration (*21*) and domestication by native Indians who cultivated the taxon in house gardens in Amazonia, Panama and northern South America [e.g., probable introduction in Venezuela by the Culinas Indians who migrated from Brazil (*Rutter & Barozo-Ferreyra s.n.,* OS); the Chocó Indians probably migrated from Brazil to Panama (*5, 6*)].

Acknowledgments. This paper is based upon a doctoral dissertation submitted to the Graduate School of the Ohio State University. Financial support for this study was provided by The Garden Club of America, The Ohio State University Janice C. Beatley Herbarium Award, and the National Science Foundation (INT 9017695). I thank John Pruski for sharing with me information regarding ethnobotanical use of some species of *Clibadium,* and Tod F. Stuessy for

critical review of this manuscript. I also thank the curators of the following herbaria who loaned specimens for this study: A, B, BM, CAS, COL, CR, DS, ECON, F, FSU, G, GH, K, LL, LP, MEDEL, MO, NY, P, UC, US, WIS.

Literature Cited. (*1*) Arriagada, J. 1993. Notas sobre las relaciones genéricas de *Clibadium* L. (Compositae, Heliantheae). Revista Academia Colombiana de Ciencias. 18:465–468; (*2*) Stuessy, T. F., and J. E. Arriagada. 1993. Chromosome counts in *Clibadium* (Compositae, Heliantheae) from Latin America. Brittonia 45:172–176; (*3*) Vellard, J. A. 1942. Poisons de pêcher et poisons de chasse en Amérique du Sud. Boletim Museo Nacional Rio de Janeiro du Sud. Boletim Museo Nacional Rio de Janeiro 18:345–362; (*4*) Prance, G. T. 1972. Ethnobotanical notes from Amazonian Brazil. Economic Botany 26:221–237; (*5*) Duke, J. A. 1970. Ethnobotanical observations on the Chocó Indians. Economic Botany 24:344–366; (*6*) Duke, J. A. 1972. Isthmian ethnobotanical dictionary. Publ. by author. Fulton, Maryland; (*7*) Duke, J. A. 1975. Ethnobotanical observations on the Cunha Indians. Economic Botany 29:278–293; (*8*) Acevedo-Rodríguez, P. 1990. The occurrence of piscicides and stupefactants in the plant kingdom. Advances Economic Botany 8:1–23; (*9*) Ernst, A. 1881. Memoria botánica sobre el embarbascar o sea la pesca por medio de plantas venenosas. Anales Real Academia Nacional Medicina 18:135–147; (*10*) Pulle, A. 1938. Flora of Suriname. Amsterdam: J. H. De Bussy; (*11*) Hoenhne, I. C. 1939. Plantas e substancias vegetais tóxicas e medicinais. São Paulo: Graphicars; (*12*) Czerson, H., F. Bohlmann, T. F. Stuessy, and N. H. Fischer. 1979. Sesquiterpenoid and acetylenic constituents of some *Clibadium* species. Phytochemistry 18:257–260; (*13*) Bohm, B. A., and T. F. Stuessy. 1981. Flavonol derivatives of the genus *Clibadium* (Compositae). Phytochemistry 20:1053–1055; (*14*) Christensen, L. P., and J. Lam. 1991. Acetylenes and related compounds in Heliantheae. Phytochemistry 30:11–49; (*15*) Quilliam, J. P., and R. Stables. 1968. The effect of cunianiol, a polyacetylenic alcohol isolated from the plant *Clibadium sylvestre,* on piscine behavior. British Journal Pharmacology 34:679; (*16*) Gorinsky, C., W. Templeton, and S. A. H. Zaidi. 1973. Isolation of ichthyotherol and its acetate from *Clibadium sylvestre.* Lloydia 36:352–353; (*17*) Kamen-Kaye, D. 1977. Ichthyotoxic plants and the term barbasco. Botanical Museum Leaflet 25:71–90; (*18*) Joly, L. G. 1985. El uso del *Piper auritum* para alimentar y atrapar pescado por los naturales del Río Indo, Panama. Pages 369–377 *in* W. G. D'Arcy and M. D. Correa, eds., The Botany and Natural History of Panama. Missouri Botanical Garden, Saint Louis. (*19*) Stuessy, T. F. 1984. Fish poisons in the sunflower family. National Geographic Society, Research Reports 17:839–841; (*20*) Archer, W. A. 1934. Fish poison plants of British Guiana (a preliminary list). Agronomical Journal British Guiana 5:205; (*21*) Vickers, W. T., and T. Plowman. 1984. Useful plants of the Siona and Secoya Indians of Eastern Ecuador. Fieldiana Botany 15:1–37.

—Jorge E. Arriagada, Herbarium, Museum of Biological Diversity, 1315 Kinnear Rd., Ohio State University, Columbus, OH 43212.

***Merremia discoidesperma* (Convolvulaceae) seeds as medicines in Mexico.**—During a visit to the Sunday market in Cuitzelan, Puebla, on 26 June 1994, one vendor was found offering a variety of plant products as remedies for human ailments. Among drawings of human internal anatomy, stacks of seeds and fruits, and mixtures in plastic bags, I noticed the largest collection of *Merremia discoidesperma* (Donn.-Sm.) O'Donell seeds I had ever seen. The vendor assured me that this was not a native Mexican plant [see, however, the map of its native range (Fig. 1) and Gunn 1977], but a miraculous imported seed called "tomate marino" or "castaña de la India." Used properly, he said it would cure a variety of illnesses plaguing humans. Because comparatively little about use of this species is recorded in the literature, I asked more questions.

The procedure for using the seeds that were in his mounded display was straight forward. Two seeds are chosen from those available and placed in a glass of water. When one seed is found that floats and one that sinks, the selection is made. This, the vendor assured me, was a vital step. The floating seed was called the "macho"; the sinking seed the "hembra." The two seeds were then to be placed in a glass of water and left to soak overnight. The following morning the seeds were to be removed and the water where they had floated was to be drunk. A critical final step was that the seeds were to then be carried in the small bag by the person seeking the cure. This sequence of events was said to cure hemorrhoids, circulation problems, varicose veins and high blood pressure.

The same basic procedure, with the omission of drinking the water, was recorded by Gunn (*1*) for the Veracruz area of Mexico [see also (*5*)]. At the time Gunn wrote the paper, however, it was

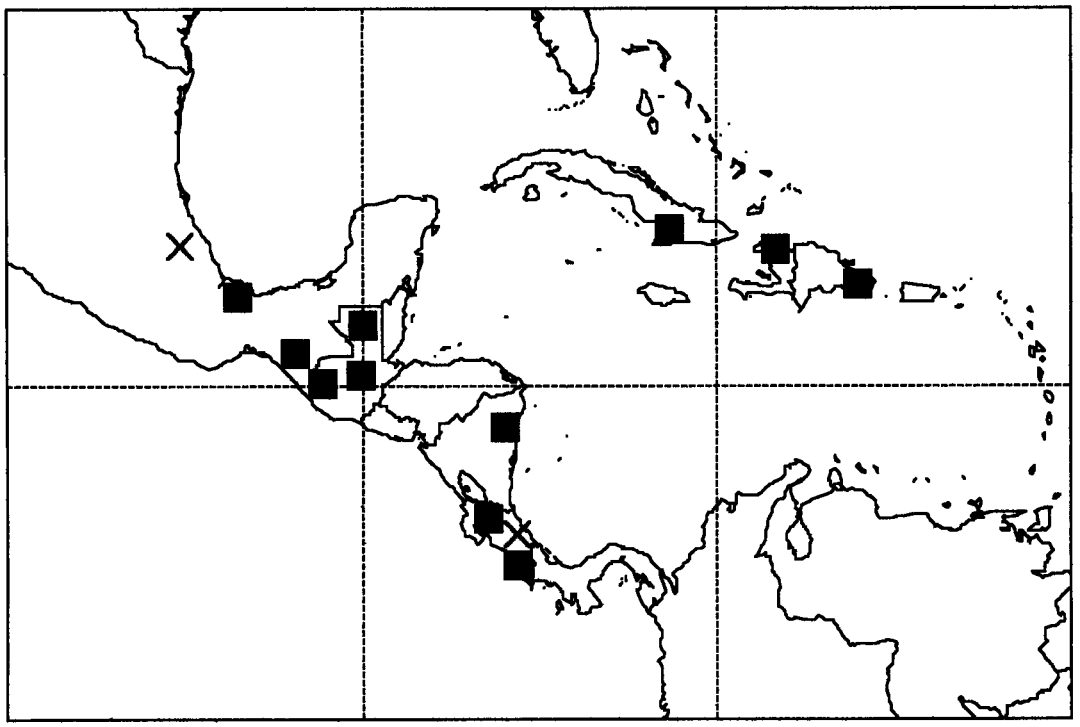

Fig. 1. Known distribution of *Merremia discoidesperma* (boxes) and locations where plants have recently been found in markets (X).

not recorded which seed was properly to be called the "macho" and which the "hembra." Also, Gunn (*1*) and McDonald (*5*) knew of only that hemorrhoids were treated by the seeds. In addition, Williams (*7*) recorded the use of the seeds as a remedy against snakebites in Nicaragua. The common name (see below) in Costa Rica perhaps suggests a snakebite usage there.

Neither Miguel Angel Martínez nor Christina Mapes of the Jardin Botanico of the Universidad Nacional Autónomo de México, who have been studying the markets in this town for some years, had ever seen or heard of this member of the Convolvulaceae there. When I returned to the same market place the following Sunday hoping to get more information, the vendor was not present. Thus, we have no direct data on the origin of the seeds and how long this product has been sold as a remedy in Puebla. Still, the existence of these remedies and uses in the Gulf region of Mexico over the past 20-odd years indicates that they have been in use there for some time. Perhaps some or all the uses predate European arrival.

People in temperate zones have been fascinated by these seeds since at least the time of Clusius in the 1600's and perhaps thousands of years because the seeds are carried north by sea currents. Still, only two recent articles deal with the species outside a floristic context, those published by Gunn (*1*) and Williams (*7*). Gun (*1, 2*) also mentions the seed as precious among drift seeds due to their rarity and says it is known in Europe as "Mary's bean" or "crucifixion-bean." Both common names are allusions to the cross on the surface. The seed apparently floats as far north as Ireland, the Hebrides, the Orkneys and Shetland Islands where it is regarded as a gift from God. Thus, two distinct parts of the World use the seeds against ailments for what appear to be different reasons.

To the scientific community the species has been known from Central America since it was originally described as *Ipomoea discoidesperma* by J. Donnell-Smith in 1889. Knowledge among the natives of MesoAmerica is markedly older. In Guatemala the seeds are called "quiebra-cajete" (*6*). From several places along the Caribbean shores (*3*) the seeds are known as "almorrana" or "tomate de mar" (note the similarity

to "tomate marino" of Cuitzelan). Costa Ricans call the seeds "contraveneno." The type collection for the species was made in Bayamó (also spelled Bayamon), Cuba. Although no recent specimens have been seen Hispaniola, it was collected in Haiti by Ekman and in the Dominican Republic by Abbott and Ekman (*3*). Liogier (*4*) records the common name "cacorne noir" and says that it is "rara en maniguas costeras." When Gunn (*1, 2*) reported the drift seeds on the Wotho atoll in the Marshall Islands, he assumed that they originated in Chiapas, Mexico, where they had been reported (*6*). The species has also been collected near Golfito on the Pacific coast of Costa Rica as well as in Monte Verde.

Known distribution: Mexico (Veracruz, *Beaman 5172* XAL; Chiapas. *Martínez S. 15281* XAL), Guatemala (Alta Verapaz, Huehuetenango, both (*3*), Peten. *Contreras 8944* XAL), Nicaragua (Zelaya. *Stevens 12722* MO), Costa Rica (Alajuela. *Haber & Bello 1879* MO; Puntarenas. *Burger and Matta 4766* F, MO). Cuba (Oriente, *Wright* isotype MO), Haiti (du Nord) and Dominican Republic (Samaná) (*3*).

Acknowledgments. This study was partly supported by grant No. 4478-91 from the National Geographic Society. The first trip to the Sunday market was made during a Society for Economic Botany field trip led by Miguel Angel Martínez and Christina Mapes (both of Jardin Botanico, Universidad Nacional Autónomo de México). Thanks are extended to these two colleagues as well as to Robert Bye of the same institution.

Literature Cited. (*1*) Gunn, C. R. 1977. *Merremia discoidesperma.* Its taxonomy and capacity of its seeds in ocean drifting. Economic Botany 31:237–252. (*2*) Gunn, C. R., and J. V. Dennis. 1976. World guide to tropical drift seeds and fruits. Quadrangle/New York Times Book Co., New York; (*3*) Leon, H., and H. Alain. 1974. Flora de Cuba, Vol. 2. Otto Koeltz Science Publishers, Koenigstein; (*4*) Liogier, A. H. 1974. Diccionario botanico de nombres vulgares de la Española. Impresora Univ. Nacional Pedro Henriquez Ureña, Santo Domingo; (*5*) McDonald, A. 1993. Convolvulaceae I. Pages 1–99 *in* Flora de Veracruz fasciculo 73; (*6*) Standley, P. C., and L. O. Williams. 1970. Convolvulaceae in flora of Guatemala. Fieldiana: Bot. 24(Part IX):4–85; (*7*) Williams, L. O. 1973. An antivenin, a pacifier and a bit of botanical sleuthing. Economic Botany 27:147–150.

—Daniel F. Austin, Department of Biological Sciences, Florida Atlantic University, Boca Raton, FL 33431.

ANNOUNCEMENT

Lupin scientists to convene at Asilomar Conference Center in California

Scientists from throughout the world will be gathering May 11–16, 1996 for the 8th International Lupin Conference in the scenic Asilomar Conference Center near Monterey.

For further information or registration materials, write to Conference & Event Services (lupin), University of California, Davis, CA 95616-8766, USA or contact by phone at (916) 757-3331, FAX at (916) 757-7943 or by e-mail at jcbarnes@ucdavis.edu. Please provide full name and address with appropriate postal codes, phone numbers, country and city codes and e-mail addresses.