

THE DISTRIBUTION OF *HABRANTHUS TUBISPATHUS* (L'Her.) TRAUB IN SOUTH AMERICA AND NORTH AMERICA—TEXAS AND LOUISIANA

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ABSTRACT

The plant known as *Habranthus texanus* (Herb.) Steud. is considered synonymous with *H. tubispathus* (L'Her.) Traub. Its distribution includes warm temperate South America and southeast Texas and northwest Louisiana. It is proposed that this species is native to South America and was introduced into the United States in the late seventeenth or early eighteenth centuries possibly by Spanish missionaries.

The plant known as *Habranthus texanus* (Herb.) Steud. is cited by Sealy (1937) as the only species of the genus to occur in the wild outside of South America. Despite being considered endemic to Texas by Correll and Johnston (1970), this plant has been reported in Louisiana as early as 1934 by Dormon. It has a long and confusing nomenclatural history. This appears to be caused, in part, by the plants of the United States never having received clear distinction from certain warm temperate South American expressions of the genus. This paper is intended to clarify the nomenclature and distribution of this interesting plant and provide information on its ecology and occurrence in the United States.

The plant, known locally as the "Copper Lily," is a scapose perennial arising from a brown ovoid bulb of about 1–2 cm in diameter. The apex of the bulb is abruptly narrowed into a tubular-like sheath composed of the remains of the leaves. The bulb bears 2–6 linear, deep green grass-like leaves that are 3–5 mm wide and up to 20–25 cm in length. Leaves normally wither prior to flowering. The scape is 10–20 cm tall and bears one flower. The bulb may flower more than once per year, occasionally possessing two scapes, each with a flower or fruit in various stages of development. Borne

slightly beneath the flower is a tubular scarious bract ending with a bifid, long attenuated tip. The pedicel is about twice the length of the bract. The flower is 2–3 cm long, slightly zygomorphic, and inclined. Tepals are obovate with rounded apices ending in an apiculate claw-like tip, this more pronounced on the outer whorl. The perianth is bright yellow, with the outer surfaces tinged with burgundy, the color deepening toward the base. The six stamens are slightly declinate and in fascicles of four different lengths and apparently attached to the base of the perianth. At the point of attachment are scarious, laciniate enations. The style is about two-thirds the length of the corolla (about the length of the longest stamen) and ends in a trifid stigma. The inferior ovary is somewhat tubular, three-loculate, and possesses very narrow, sub-herbaceous wings that extended onto the pedicel. At maturity the fruit is ovoid, three-lobed, and contains numerous black wafer-like seeds about 3–5 mm in diameter and 0.55 mm thick.

Field observations and data from herbarium specimens indicate the Copper Lily proliferates in dryer, well-drained, but disturbed areas, of low vegetation. Maximum flowering occurs from July through October following periods of heavy rainfall. At such times it may exhibit complete aspect dominance. Sporadic, but very light flowering may occur at other times during this period. Flory (1939), in reviewing Pace's (1913) embryological work on this plant, pointed out that this was apparently the first known incidence of diploid parthenogenesis, while at the same time having a sexually produced endosperm. Crane (1978) refers to this condition as semigamy. This appears to be the common condition in the Zephyrantheae tribe of the Amaryllidaceae ("rain lillies"). It gives a special advantage in allowing self pollination without genetic penalty in this group whose erratic and unpredictable flowering may lower the chance of insect pollination (Charles Crane, pers. comm.)

The synonymy of this species reflects not only its uncertain specific status but also the close affinities that exist between *Habranthus* and *Zephyranthes*. The plant of the United States was first designated *Zephyranthes texana* by Herbert. Upon proposing the genus *Habranthus*, Herbert himself gave it varietal status as *H. andersonianus* var. *texanus*. Steudel reinstated the plant to specific status as *H. texanus*. Later, Green created the combination, *Atamasco texana*. Direct comparison of the plants of the United States (known as *Habranthus texanus*) with those of South America (part of the *H. andersonii* complex) showed no differences that warrant retention of specific status for *H. texanus*. In fact, no differences could be detected and correlated with geography to give a definite geographical race or variety worth recognizing. Our opinion is that the name *H. texanus* rests solely on its disjunct distribution rather than an actual morphological distinction. This point of view is shared by Sealy (1937), Alexander (1939), and Ravenna (1970). Ravenna also showed that the type of *H. andersonii* (of which *H. texanus* is here considered synonymous) is identical to the type of *H. tubispathus* (L'Her.) Traub, the basionym being *Amaryllis tubispatha*.

Therefore, the correct name for the only *Habranthus* outside of cultivation in the United States is *H. tubispathus*. Complete synonymy is as follows:

- Habranthus tubispathus* (L'Her.) Traub, Plant Life 7: 42. 1951.
Amaryllis tubispatha L'Her., Sert. Angl. 9. 1769.
Zephyranthes texana Herb., Curtis Bot. Mag. London, 3482. 1836.
Habranthus andersonianus Herb., Amary. 167. 1837.
Habranthus andersonianus var. *texanus*, l.c.
Zephyranthes commersoniana Herb., l.c., tabl 29, f. 3.
Habranthus texanus (Herb.) Steud., Norm. ed. 2 (1): 717. 1838.
Zephyranthes andersonii (Herb.) Steud., Nom. Bot. ed. II. 1. 70. 1840.
Amaryllis andersonii (Herb.) Griseb., Goett. Abhandl. 24: 320. 1879.
Zephyranthes andersonii (Herb.) Benth. & Hooker f., Gen. Pl. 3(2): 724. 1883.
Zephyranthes andersonii (Herb.) Baker, Handbook Amaryll. 37. 1888.
Atamasco texana Green, Pittonia 3: 187. 1897.
Atamasco tubispatha G. M., Rev. Fac. Let. & Cienc. 19: 227. 1914.

The distribution of the species includes southern Brasil, Uruguay, Argentina, central and southern Chile, and the United States (east Texas and northwest Louisiana). The species has, under various of the synonyms cited above, been reported in much of the Antilles and northern South America (see Pulle, 1966; Grisebach, 1864; Adams, 1972; Moscoso, 1943; and Urban, 1903). However, the plant of those areas has a white flower and is referable to *Zephyranthes puertoricensis* Traub.

Herbaria abbreviations follow that of Index Herbariorum (ed. 6). except for Institute for Botanical Exploration (IBE), Mississippi State, Mississippi.

Specimens examined: NORTH AMERICA: United States: Texas. Anderson Co.: Wilcox, near Palestine 1 Aug 1943, *Barkley s.n.* (TEX); Bastrop Co.: Texas Hwy. 71 on the first knoll E of Garfield, 5 Oct 1966, *Mears 1017* (TEX); Bexar Co.: San Antonio, Oct 1850, *Thurber s.n.* (F); Brazos Co.: College Station, 7 Sep 1969, *Frywell 1108* (SMU); Caldwell Co.: 4.65 mi N of Lockhart on Texas Hwy. 183, 6 Aug 1966, *Mears 680* (TEX); Calhoun Co.: Port Lavaca, *Gentry 46* (F); Colorado Co.: Eagle Lake, Oct 1930, *Biology Class s.n.* (TEX); Comal Co.: New Braunfels, Oct 1850, *Lindheimer 1207* (F, SMU); DeWitt Co.: without further location, 18 Jul 1942, *Riedel s.n.* (TEX); Fayette Co.: Muldoon, 20 Jul 1950, *Ripple 51-713A* (TEX); Jim Wells Co.: 15.2 mi S of Alice, 13 Sep 1955, *Johnston 2781A* (SMU); Gonzales Co.: 4.5 mi S of Belmont, 27 Sep 1958, *Correll 20466* (LL); Karnes Co.: Karnes City, 29 Aug 1953, *Johnson 1302* (SMU); McLennan Co.: M-K-T RR N of Gapshead, Jul 1946, *Smith 56* (TEX); Milam Co.: U.S. Hwy. 190, ca 10 mi NE of Cameron, 26 Oct 1963, *Henderson 63-1833* (SMU, TEX); Nacogdoches Co.: E. Austin St., Nacogdoches, 7 Jul 1955, *Lacey 32* (SMU); San Patricio Co.: ca 4 mi NW of Sinton, 24 Oct 1948, *Rogers 6643* (TEX); Travis Co.: 19 mi S of Victoria, *Cory 45965* (TEX); Waller Co.: Hempstead, 10 Jun 1872, *Hall 654* (F); Williamson Co.: 2 mi SW of Georgetown, 2 Oct 1944, *Wolcott 217* (TEX); Walker Co.: Near Huntsville, Jun 1914, *Young s.n.* (TEX); Louisiana. Caddo Parish: Columbia Park, Shreveport, 31 Jul 1977, *MacRoberts 262* (LSUS); Natchitoches Parish: Los Adaes, 1 mi E of Robeline, 18 Sep 1978, *Holmes 3346* (IBE, NATC); Sabine Parish: ca 3/4 mi W of Natchitoches-Sabine Parish line on La. Hwy 6, 18 Sep 1978, *Holmes 3344* (IBE, NATC). SOUTH AMERICA. Argentina. Buenos Aires. La Casada, *Troucose 1296* (F); Brasil: Minas Gerais. Serra de Piedade, Caete, 11 Nov 1938, *Barreto 8809* (F); Chile: Cordillera de Chile, 1(90,

Hanenke 2122 (F); Paraguay: Cordillera de Altor, Mar 1903, *Fiebrig* 1017 (F); Uruguay. Montevideo. Sayago, 5 Jan 1930, *Herter* 85498 (F) and 85494 (F); Atahualpa, Dec 1925, *Herter* 79892 (F) and 79891 (F).

Since the plant formerly known as *Habranthus texanus* is considered synonymous with *H. tubispathus*, it is doubtful it is native to both southern South America and Texas and Louisiana. Several points make it probable that the plant is native to southern South America and its disjunct distribution of well over 10,000 kilometers is better explained in another way. These include the following:

1. Most other species of *Habranthus* (ca 23, Ravenna, 1970) are native to South America, which undoubtedly is the center of distribution for the genus. Two species have, since 1937, been described from Mexico.

2. Although plants morphologically identical to the plants of the United States exist, considerably more variation is present in the South American populations of this species. The variation is well documented by Ravenna (1970) who proposed several infraspecific names based on flower size and minor color differences. If introduced into the United States, it would almost certainly have come from one population and not exhibit the total range of variation present in the species (Founders Principle). This coupled with its parthenogenic habit would explain and insure a great amount of morphological uniformity. Examination of herbarium specimens, field observations, and cultivation support this argument.

3. The plants of the United States inhabit disturbed places of low, usually grassy vegetation (lawns, roadsides, railroads, etc.).

4. The plant is very abundant in west-central Louisiana only in the areas settled or developed at the same time Texas was being settled by the Spanish. These include the City of Natchitoches, founded in 1714, and the El Camino Real (now roughly following Louisiana Highway 6) a trail marked in the early 1700's connecting Natchitoches with Spanish Texas, and thence to Mexico. It was also extremely abundant at Los Adaes, the easternmost Spanish mission founded in 1717, which is 15 miles west of Natchitoches on the El Camino Real, 30 miles from the Texas state line. It is also abundant on Highway 6, westward from Los Adaes for about five miles. The plant has not been reported from any other place in Louisiana, other than Shreveport (Caddo Parish) where it is believed a recent introduction that is still quite rare, even though the habitat appears favorable. The occurrence of this plant in these, the oldest inhabited areas of Louisiana, and with the close ties that existed with Spanish Texas, (also being settled at the same time) apparently indicates that it may have been introduced into Louisiana in the same manner and at the same time as it appears it was introduced in Texas.

In considering the possible ways in which *Habranthus tubispathus* could be introduced into the United States, natural methods can probably be discounted because the plant does not appear to possess either long or moderate range dispersal mechanisms, either by seed or other vegetative structure. The plant does not appear to possess a vegetative means of reproduction, other than bulbs, which appear unlikely to be transported by natural means. Transport by a "dirty bird" also seems unlikely considering the dry habitat of the plant and sporadic flowering and fruiting. Even if the seeds were to be utilized for food by birds, the nature of the seed is such that survival through the digestive tract seems doubtful.

The introduction of *Habranthus tubispathus* appears best explained by human activity. This was first proposed by Sealy (1937) at the suggestion of H. H. Hume of the University of Florida. He proposed that Spanish missionaries transported the plant between 1690 and 1703 during the establishment of the various missions in Texas. It should be noted, as pointed out by Flory (1938), that the only records available concerning the establishment of Spanish missions in Texas cite that they were founded by Spaniards coming out of Mexico and *H. texanus* (*H. tubispathus*) has not been reported in that country. This would certainly preclude chance introduction from Mexico, but not intentional introduction if the plant were cultivated there and could not become naturalized due to unfavorable conditions. The plant's slow rate of spread favors intentional human transport. Documented in Natchitoches some 50 years ago, and probably being present there for a much greater period of time, the plant has failed to spread outside of the city, as cited above. When its distribution area in the United States of well over 125,000 square miles is considered, it is obvious that either the plant arrived here much earlier than the Europeans (which we feel the evidence does not support), or was a direct, intentional introduction as an ornamental or possibly for some other use not known today. In no other way could the plant have spread to occupy its present distribution area. We suggest it was brought into Texas from South America, possibly via Mexico. Once established at one site, it was carried to other settlements. Under favorable conditions it escaped, became established, which further hastened its spread. These we feel are the only conditions that explain the plants' present distribution in the United States. It appears to be only a matter of time before the plant spreads to other favorable habitats in Louisiana and possibly the southeast United States.

ACKNOWLEDGEMENTS

We wish to thank the curators of the herbaria for their loan of specimens and Sidney McDaniel of the Institute for Botanical Exploration for his review and comments on the manuscript. Appreciation is also extended to W. S. Flory of Wake Forest University and Charles Crane of the University of Missouri, Columbia, for their suggestions and comments.

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Holmes, Walter C. and Wells, Christopher J . 1980. "THE DISTRIBUTION OF HABRANTHUS TUBISPETHUS (L'Her.) TRAUB IN SOUTH AMERICA AND NORTH AMERICA—TEXAS AND LOUISIANA." *SIDA, contributions to botany* 8, 328–333.

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