

CRATAEGUS SECRETA (ROSACEAE), A NEW SPECIES OF HAWTHORN FROM THE EDWARDS PLATEAU, TEXAS¹

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ABSTRACT

A new species of *Crataegus* L. (Rosaceae), *C. secreta* Phipps, is described from west-central Texas in the drier, northwestern parts of the Edwards Plateau. It is now known from at least a five-county area. The new species is compared with candidates in series *Virides* and *Molles* and easily excluded from these series. Its probable affiliation is series *Tenuifoliae*, but this awaits further study.

The Edwards Plateau area of Texas is an important phytogeographical area. Cooler than the Rio Grande Valley to the south and the Gulf Coast Plain to the southeast, considerably more mesic than most of Trans-Pecos Texas to the west and most of the Chihuahan Desert to the south and southwest, it forms a stepping stone between the Cross-Timbers region of eastern Texas and the higher, more mesic parts of the Sierra Madre Oriental in Mexico. Its vegetation is discussed in detail in Amos and Gehlbach (1988). The undulating uplands at around 1500 to 2500 ft. a.s.l. are covered by a mixture of grassland and scrubby dwarf oaks (*Quercus sinuata* var. *breviloba* - Bigelow Oak, *Q. fusiformis* - Texas Live Oak and *Q. texana* - Texas Red Oak) with junipers (especially *J. ashei* and *J. pinchotii*). The valleys, which are often ravine-like, are quite rich in taxa with northern affinities. They are often more mesic, with taller trees. The ranchland ecosystems, however, are not necessarily in anywhere near their ancestral state with the decreased fire regime imposed by modern pastoralism and the introduction of cattle and goats brought about by European settlement. Goats, in particular, may have mediated massive changes in the woody flora. Also to be taken into account are the elimination of the mobile bison and the presumptively large changes in deer population since large predator removal and control of screw-worm larvae.

This interesting area has been explored for hawthorns by the author in recent years with a view to helping to establish the southwesterly limits of American species of *Crataegus* and the northern limits of predominantly

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Mexican species. *Crataegus*, hitherto generally held to be rare in the Edwards Plateau, have recently been demonstrated to be locally common in this region. It is clear that hawthorns are a fairly general feature of the scrub oak woodland (but much less common among junipers) and are not by any means restricted to streams in the Edwards Plateau as formerly believed. Among the species encountered are *C. crus-galli* L., sens. lat. (locally common in the central Edwards Plateau), *C. reverchonii* Sarg. (primarily in the northeastern part of the Edwards Plateau), *C. mollis* (T.&G.) Scheele, sens. lat. (primarily on the eastern margins), *C. tracyi* Ashe ex Egglest. (scattered at higher elevations) and *C. greggiana* Egglest. (extremely rare and seemingly relict). Members of series *Virides* are also found around the southeastern, eastern and northeastern margins of this area.

In view of the generally good state of botanical knowledge of this region it was, therefore, a considerable surprise to encounter a distinctive and apparently unknown species of *Crataegus* in the Edwards Plateau. The new species has been carefully compared with the regional endemics *C. uvaldensis* Sarg. (series *Molles* - close to or conspecific with *C. greggiana*) and *C. desertorum* Sarg. (a xeromorphic form of series *Virides* also described originally from Uvalde) but these are quite different. *Crataegus sutherlandensis*, a Texas endemic from just outside the Edwards Plateau, east of San Antonio, was also considered, and also rejected as being a typical member of series *Virides*. Considering the somewhat isolated nature of the Edwards Plateau, attention was therefore given to regions further afield as possibly having disjunct conspecifics. However, to the immediate west (Trans-Pecos) only *C. tracyi* is known from the Davis Mountains (this species also occurs in the Edwards Plateau). To the south, no Mexican species is a match (Phipps, in preparation). To the north and northeast, therefore, it seemed prudent to consider species described from Oklahoma, southwest Arkansas, and eastern Texas.

The new species is nevertheless in many ways closest to *C. greggiana* in general facies. The fine straight thorns, scrubby plant habit and small, somewhat lobed leaves are all suggestive, as is the red fruit. But the slightly pubescent, or nearly glabrate, plant parts — foliage, young shoots, inflorescence, and fruit — of the new species, are all dissimilar from *C. greggiana* as is the stamen number. *Crataegus brachyphylla* Sarg., from southwest Arkansas, is also an obvious candidate species for comparison but it is also more typically *Molles* in its pubescence. Moreover, in spite of its name, it has substantially larger foliage than the new species. All other members of series *Molles* in the region mentioned may be excluded by their much larger foliage and dense indumentum. Species of series *Crus-galli* are too generally different to warrant even cursory attention. *Crataegus secreta*

may be differentiated from the most similar *Crataegus* species discussed by the characters given in Table 1. It will be seen that one of the most similar of those considered is *C. desertorum*. However, Sargent's (1922b) assignment of this taxon to series *Virides* is undoubtedly correct. The other species mentioned in the table are all unquestionably series *Molles*. One is, therefore, left with the conclusion that a distinctive new species of *Crataegus* (even though a statistically unlikely phenomenon, given the number of taxa described already in North America) has been discovered.

The first collection of *C. secreta* may have been Palmer's in 1917 from Menard, Menard Co.; however, this specimen is sterile. The species remained uncollected until 1933–35 when a number of specimens from Sutton and Val Verde counties were collected by Cory and by Parks and Cory. McVaugh then collected it in Menard Co. in 1947. The next collection appears to be by Marshall Enquist from Scalp Creek, Menard Co., in April 1986, a specimen of which was donated, along with a collection of other unidentified *Crataegus*, to the author. The recognition that the Scalp Creek hawthorn might be a new species has spurred a minor craze in *Crataegus* collecting in this *Crataegus*-poor region of Texas so that now at least 20 numbers of the new taxon exist in herbaria. Due to the ability of this species to resist scientific detection for so long, I am naming it *Crataegus secreta*. 1930's collections are also reported from Scalp Creek by R. O'Kennon from the University of Texas herbarium but these have not been located by the author.

CRATAEGUS secreta Phipps, sp. nov. Fig. 1.

Frutex vel arbor parva, 3–6 m alta, spinosa; spinae rectae, \pm tenues, \pm nigrae, usque ad 4 cm longis; cortex platata. Foliae brachyblastorum ovatae, parvae, brevipetiolatae, 2–3 cm longae, distincte lobatae, 3–4 paribus venarum secundarium, serratae, in apice acutae, \pm truncatae proximale, laeviter pubescentes (praecipue supra) ubi juvenes, glabrescentes, petiolis brevibus; foliae surculorum elongationum magniores, magis profunde lobatae, carentes venas in sinibus. Anthesis vernalis (in Aprilem); inflorescentia panicula subconvexa, ferens ca 4–10 flores albas, ramuloris pedicellisque sparsim pubescentibus; lobi calycis 2–3 mm longi, triangulati, pubescens adaxiale, marginibus \pm integris (glandulis stipitatis); petala orbiculares, ca 5 mm longa; stamina ca 15, antheribus purpureis; stigmata, styli et carpella (4-) 5; fructus pomum rubrum, parum oblatum, ca 1 cm diametro, carine farinosi, pyrenibus 5, dorsale sulcatibus.

Bush to small tree 3–6 m tall, thorny; thorns straight, \pm fine, blackish, to 4 cm long; bark plated. Leaves of short shoots ovate, small, short-petiolate, 2–3 cm long, distinctly lobed, with 3–4 lateral nerves, serrate, acute at the apex, \pm truncate below, slightly pubescent (especially above when young, glabrescent; leaves of shoots of elongation larger, more deeply lobed, lacking veins to the sinus. Flowering in spring (April), in-

TABLE 1. Comparison of *Crataegus secreta* Phipps with selected congeners.

	C. SECRETA	C. GREGGIANA	C. BRACHYPHYLLA	C. UVALDENSIS	C. DESERTORUM
		Egglest. (1909)	Sarg. (1922a)	Sarg. (ex litt.) (1922b)	Sarg. (1922b)
Series	? Tenuifoliae	Molles	Molles	Molles	Virides
Distribution	Tx: Menard, Mason, Schleicher, Sutton, Val Verde cos.; ? Jeff Davis Co.	Tx: Edwards Plateau (rare); Mexico: Sierra Madre Oriental	Ark: Hempstead Co.	Tx: Uvalde Co.	Tx: Uvalde Co.
Leaf:					
length	2 cm	2 cm	5–7 cm	4–5 cm	cm 1.5–2 cm
shape	± ovate	ovate	broad-ovate	ovate	ovate to obovate
pubescence (young)	subglabrous	densely pubescent	densely pubescent	pubescent	pubescent
Hypanthial pubescence	glabrous	densely pubescent	densely pubescent	densely pubescent	glabrous
Calyx lobe margin	± entire, with stipi- tate glands to glandular- serrate	irregularly glandular- serrate	laciniately glandular- serrate	irregularly glandular- serrate	obscurely serrate
Stamen no.	ca 15	10	20	5–10	20
Anther colour	purple	pink	deep rose	?	pale yellow
Style no.	(4-) 5	5	3	3–5	4–5
Fruit:					
diameter	10 mm	10 mm	10–12 mm	10–14 mm	4–5 mm
colour	red	deep red	dull dark red	bright red	orange-red

florescence a flattish, convex panicle, bearing about 4–10 white flowers, branches and pedicels sparsely pubescent; calyx lobes 2–3 mm long, triangular, adaxially strigose-pubescent, margins ± entire to glandular-serrate, or entire with some stipitate glands; petals ± circular, about 5 mm long; stamens ca 15, anthers purple; stigmas, styles and carpels (4-) 5; fruit a red pome, slightly oblate, ca 1 cm diameter, flesh mealy; pyrenes 5, dorsally ribbed.

TYPE: TEXAS.: Menard Co.: creekside ca 5 mi E of Menard, 2000 ft, 15 Apr 1988, *J.B. Phipps*, *M. Enquist* and *R. O'Kennon* 6123 (HOLOTYPE: UWO; ISOTYPES: to be distributed); the same tree collected in fruit is *J.B. Phipps* and *R. O'Kennon* 6233, 13 Oct 1988 (UWO). Five other specimens have been collected at the above site. *M. Enquist s.n.*, Apr 1987 (UWO), and 9 Apr 1986 (TEX) represent earlier collections of this taxon from the same location.

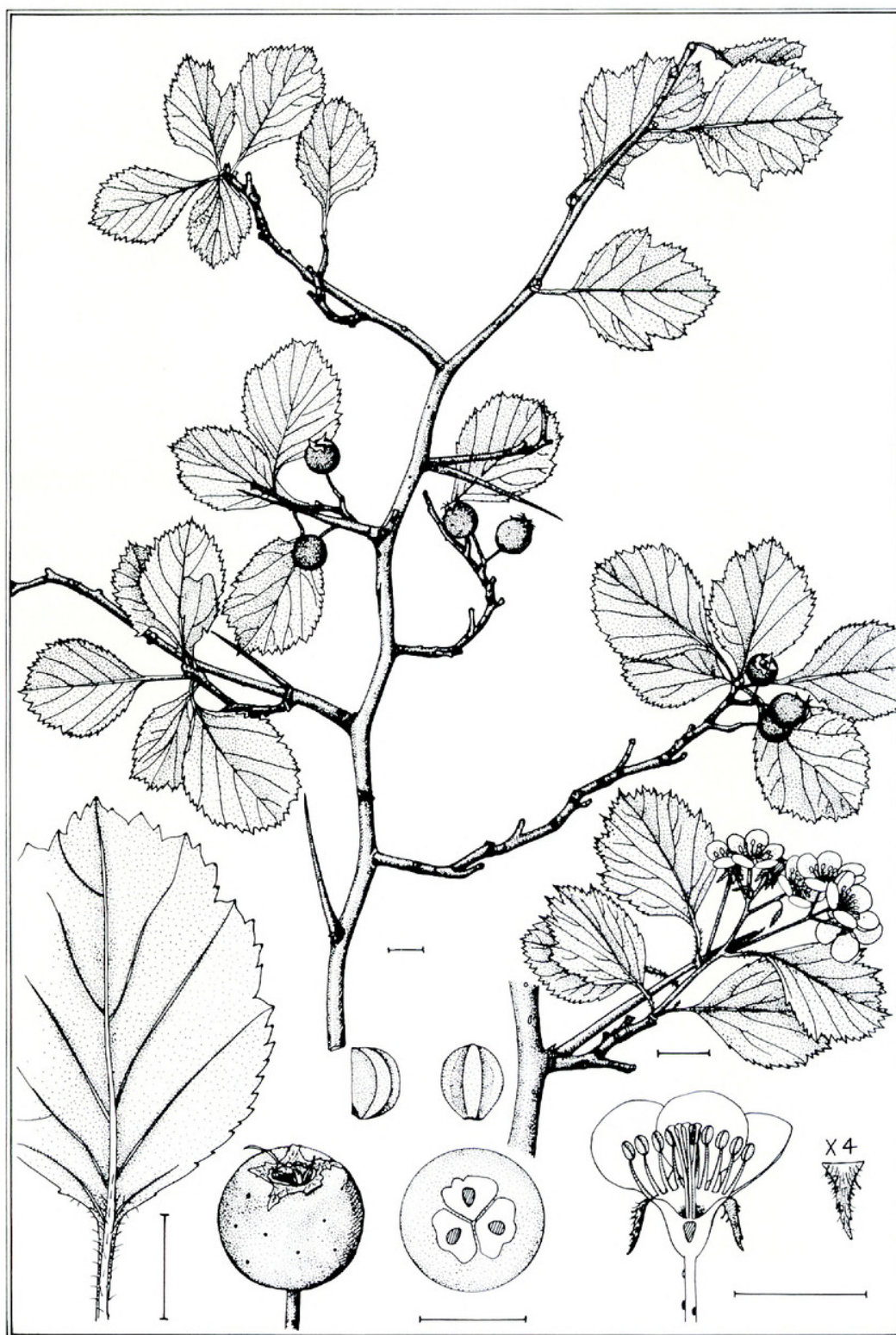


FIG. 1. Line drawing of *Crataegus secreta* Phipps, sp. nov. Fruiting branch, fruit and pyrenes from J.B. Phipps 6233; flowering shoot and flower parts from J.B. Phipps 6121; leaf from J.B. Phipps 6121. Scale bars 1 cm. Susan Laurie-Bourque del.

Other specimens examined: TEXAS: **Mason Co.**: 1 km N of Katemcy, 1880 ft, scrub along creek bed, 15 Apr 1988, *Phipps and O'Kennon* 6127 (UWO); 14 Oct 1988, *Phipps and O'Kennon* 6243 (same location) (UWO); 1.6 mi S of jct. 1851 and 1222, west side of road, along Sandy Creek, A. W. Edmiston property, 27 Apr 1989, *Enquist* 1076 (TEX-LL, UWO). **Menard Co.**: Route 83, 1 mi S of jct. with Tx 29, 2000 ft, *Phipps, Enquist and O'Kennon* 6121, 15 Apr 1988 (UWO); *Phipps and O'Kennon* 6239 represents the same plant in fruit, 1 Oct 1988 (UWO); on bluffs of San Saba River near Ft. McKavett, 4 Apr 1989, collected in bud and forced, *Phipps, Enquist and O'Kennon* 6318 (UWO); wooded bottom of San Saba R., near crossing of Ft. McKavett Rd., 17 mi S of west of Menard, scarce, 12 May 1947 *R. McVaugh* 8787 (SMU). **Schleicher Co.**: W of Fort McKavett, 3.2 mi W of jct. with hwy. 864, first crossing of Middle Valley Prong of San Saba River, 19 Apr 1989, *Enquist* 996 (TEX-LL, UWO). **Sutton Co.**: 30 mi SW of Sonora, 4 Apr 1933, *V. L. Cory* 5505 (TAES); Aldwell Bros. (? ranch), 21 Apr 1934, *H.B. Parks and V.L. Cory* 8433 and 8434 (TAES); south-west quadrant ... near Dry Devil's River, 19 Apr 1989, *Enquist* 717,732 (TEX-LL, UWO); SW quadrant, by Granger Draw Road near crossing of Dry Devil's River, 19 Apr 1989, *Enquist* 720 (TEX-LL, UWO). **Val Verde Co.**: NE quadrant, on the floodplain of the Devil's River, 19 Apr 1989, *Enquist* 710 (TEX-LL, UWO); 11 mi NE of Juno, 4 Jun 1939, *H.B. Parks and V.L. Cory* 31678 (TAES) -doubtful ID, specimen badly damaged by herbarium beetle. It appears that *E. J. Palmer* 11889 (A) from "low woods on the San Saba River, Menard, Menard Co., May 12, 1917" may also be *C. secreta*. Since this specimen is sterile, it is not easily rejected from *C. uvaldensis*. However, it is within the area of distribution for *C. secreta*. *Enquist* 1144 (UWO) from Musquiz Canyon, Jeff Davis County may represent the same species but confirmatory material is required.

I would like to propose the vernacular name 'Plateau Hawthorn' for *Crataegus secreta*.

Crataegus secreta has now been found at several sites in Menard, Mason, Schleicher, Sutton and Val Verde counties. It occurs near creek beds and in the shade of oak trees, always, so far as is understood, in rangeland. *Crataegus secreta*, although hardly common, is not believed to be under threat, due to a compatible type of land-use in its natural habitat. It should be searched for in adjacent counties.

The serial affiliation of *C. secreta* is not clear. On *prima facie* grounds assignment to series *Tenuifoliae* seems obvious. These are very 'median' American hawthorns with \pm ovate, relatively small, shallowly lobed leaves, a modest amount of pubescence, quite thorny, with thorns of median length, flowering early-midseason, with smallish flowers, fruit red of medium size, spherical, with unpitted pyrenes. These characteristics all apply to *C. secreta*. However, if *C. secreta* were to be assigned to *Tenuifoliae* then its somewhat xeromorphic characteristics, particularly short-petiolate leaf, and fine, straight thorns, as well as the precise leaf shape with its unusual lobing would make it the most distinctive members of the series. Furthermore, *Tenuifoliae* are not primarily either a southern or a xeromorphic series. Affiliation with series *Virides* is however, easily rejected where the central tendencies of *Virides* are concerned: the leaves (though usually small) are usually evenly lobed (or sometimes unlobed) and the plants are

± glabrate, not usually very thorny, calyx lobes ± entire, with twenty stamens and ivory anthers, and small, ± shiny, orange-red fruit. However, Texas *Virides* can be found with blood-red fruit (a deeper color than *C. secreta*) but these are more succulent and shiny than *C. secreta*. Also the sometimes lobed leaf shape in forms assigned to *C. desertorum* and *C. sutherlandensis* together with a greater thorniness than typical *Virides*, may resemble *C. secreta*, but then the fruit and calyx are quite wrong. The aforementioned taxa in the series *Virides* (together with other members of series *Virides*) occur around the southern and eastern margins of the plateau. *Crataegus secreta* also has some striking resemblances to the small-leaved *Molles* species *C. greggiana* Egglest. particularly in leaf size, thorniness (a very close match) and fruit characteristics (bright red when ripe, though slightly smaller than in *C. greggiana*), with mealy, not succulent flesh. But then the leaf shape is different and also *C. secreta* lacks the dense pubescence of all parts that (especially while young) so thoroughly characterize the *Molles* series. *C. greggiana*, of course, occupies the most generally xeric habitats of all North American *Crataegus* and occurs, although scarcely, on the Edwards Plateau. The stamen number (15) of *C. secreta* is midway between that of *C. greggiana* (10) and series *Virides* (20). It is not unreasonable, therefore, to suppose that *C. secreta* is of *Molles* × *Virides* hybrid origin for its characters fall midway between these two series, but this hypothesis must await detailed biosystematic and morphometric analysis. If this hybrid hypothesis is true, then resemblances to series *Tenuifoliae* are coincidental. However, even if of hybrid origin, *C. secreta* has the marks of a good species, being rather uniform over a five (or six, if Jeff Davis be included) county area of distribution and not merging into any other Texan species. Therefore, for the time being, it seems wise to leave *C. secreta* unassigned.

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