

YUCCA CERNUA (AGAVACEAE: SERIES RUPICOLAE),
A NEW SPECIES FROM NEWTON AND JASPER COUNTIES
IN EASTERN TEXAS

Eric L. Keith

Raven Environmental Services Inc.

P.O. Box 6482

Huntsville, TX 77342, U.S.A.

eric.keith@excite.com

ABSTRACT

A new species of *Yucca* from the series *Rupicolae* is described from Jasper and Newton counties in eastern Texas. Series *Rupicolae* is distinguished by its characteristically denticulate leaves and beaked fruits. This new species, *Yucca cernua*, sp. nov. is described, illustrated, and distinguished from other acaulescent species in ser. *Rupicolae*. The combined characteristics of a tall flowering scape; the tendency of the branches of the inflorescence to recurve and droop as they lengthen; the moderately to densely floccose inflorescence; large leaves typically growing erect; relatively short capsules, pistils, and stamens; unique habitat; and disjunct distribution distinguish this species from other acaulescent species in ser. *Rupicolae*. The rarity of this species warrants its consideration as a candidate for state and federal regulatory protection. Also included is a key of the entire or denticulate, non-filiferous leaved North American species of *Yucca*.

RESUMEN

Se describe una nueva especie de *Yucca* de la serie *Rupicolae* de los condados Jasper y Newton en el Este de Texas. La serie *Rupicolae* se distingue por las hojas denticuladas y frutos picudos. Esta nueva especie, *Yucca cernua* sp. nov., se describe, se ilustra y diferencia de las otras especies de la serie *Rupicolae*. Un conjunto de varias características distingue esta especie de las otras especies acaulescentes de la serie *Rupicolae*. Estas características son la presencia de un escapo alto con flores, la tendencia de las ramas de la inflorescencia a retorcerse y colgar cuando se alargan, la inflorescencia de mediana a densamente flocosa, cápsulas, pistilos y estambres relativamente cortos, las hojas grandes que típicamente se desarrollan de forma erecta, un hábitat único, y su distribución disyunta. La rareza de esta especie justifica su consideración como candidata para la regulación de protección estatal y federal. También se incluye una clave de todas las especies de *Yucca* norteamericanas con hojas denticuladas y filíferas.

In May of 2001, an unusual population of *Yucca* was discovered along U.S. Highway 190 in Newton County, Texas. It appeared distinctive because of its tall inflorescence (up to four meters) and the characteristic tendency of the inflorescence branches to recurve and droop as they lengthened. On closer investigation, these plants appeared most similar to *Y. pallida* McKelvey with mostly flat, glaucous, denticulate leaves. No plants were collected because the significance of the population was not recognized at the time. Plants were later collected in flower in June of 2002 and in fruit in November of 2002. It was unknown whether this population was escaped from cultivation, disjunct, or represented

an undescribed species. After examination of live plants and numerous herbarium specimens of its apparent closest relatives, it was determined to represent a new species. Acronyms of the herbaria cited follow Index Herbariorum (Holmgren et al. 1998).

Yucca cernua Keith, sp. nov. (**Figs. 1, 2**). TYPE: U.S.A. TEXAS. NEWTON CO.: brown, clayey roadside on US Hwy 190, 3/8 mi E of Newton-Jasper County line, plants ranging from 1.5–4 m tall, branches of inflorescence drooping with age, 11 Jun 2002, *Eric L. Keith* 183 (HOLOTYPE: TEX; ISOTYPES: BRIT, SHSU).

A *Yuccae pallidae* ac *Yuccae rupicolae* similis fructibus rostratis et marginibus serrulatis foliorum; ab utroque differt inflorescentia elatiore (usque ad 4 m) ramis moderate vel dense floccosis recurvantibus ac cernuentibus simul elongentibus, foliis majoribus (usque ad 80 cm longis ac 6.5 cm latis), pistillis brevioribus (2–2.7 cm), et staminibus brevioribus (1.2–1.7 cm).

Acaulescent, forming large solitary clumps and spreading from thick rhizomes, 1–2 cm diameter. **Leaves** (30–)40–70(–80) cm long, (3–)3.5–6.5 cm wide at widest point, greatly narrowed (0.7–1.2 cm) to just above union with base, young leaves glaucous, the lowermost leaves usually undulate and twisting, older leaves becoming yellowish-green to olive green and flat or slightly concave, turning purplish or brown on drying, acute or slightly acuminate, becoming concave and inrolled 0.7–2.5 cm below tip; leaf margins corneous, yellowish and minutely denticulate; spines, 0.3–1 cm long, pungent, yellowish at base and reddish-brown at tip. Inflorescence long-exserted, (1.5–) 2–4 m tall, scape (1.2–)1.5–3.2 m in length; inflorescence paniced, moderately to densely floccose, branched from base to racemose tip; inflorescence branches characteristically recurved and drooping as they lengthen, longest branches to 35 cm long. **Flowers** mostly white or slightly greenish white, campanulate, pendant; tepals free, glabrous, outer whorl narrowly elliptic or lanceolate, 3.4–5(–5.8) cm long, 0.75–1.7 cm wide, inner whorl elliptic 3.5–5(–5.8) cm long and 1–1.8 cm wide; stamens 1.2–1.9(–2.2) cm long; filaments reflexed or even slightly twisted or contorted especially on drying, echinate; anthers to 0.7 mm long, sagittate; pistil 2–3(–3.3) cm long as measured from base of ovary to tip of stigmas; ovary slender, oblong-cylindric, 0.4–0.8 cm diameter; styles 3, 0.8–1.5(–1.7) cm long, erect to slightly spreading, branches usually papillose. **Fruit** dry, dehiscent, pendant, 3.2–4.5 cm long, 2–2.5 cm in diameter, symmetrical, oblong-cylindric, at dehiscence splitting for entire length on primary fissures and usually $\frac{1}{4}$ to $\frac{1}{2}$ of the length of capsule on secondary fissures; beaks 0.5–1 cm in length, usually turned inward at 45° angles where split on secondary fissures (Fig. 1). **Seeds** polymorphic, obovate to D-shaped 5–7 mm long and 4–6 mm wide, thicker toward edges, 0.5–1 mm thick.

Etymology.—The epithet refers to the characteristic tendency of the inflorescence branches to recurve and droop as they lengthen, an apparently distinctive feature separating it from all other *Yucca* species.

Habitat and Distribution.—*Yucca cernua* occurs in open or slightly shaded

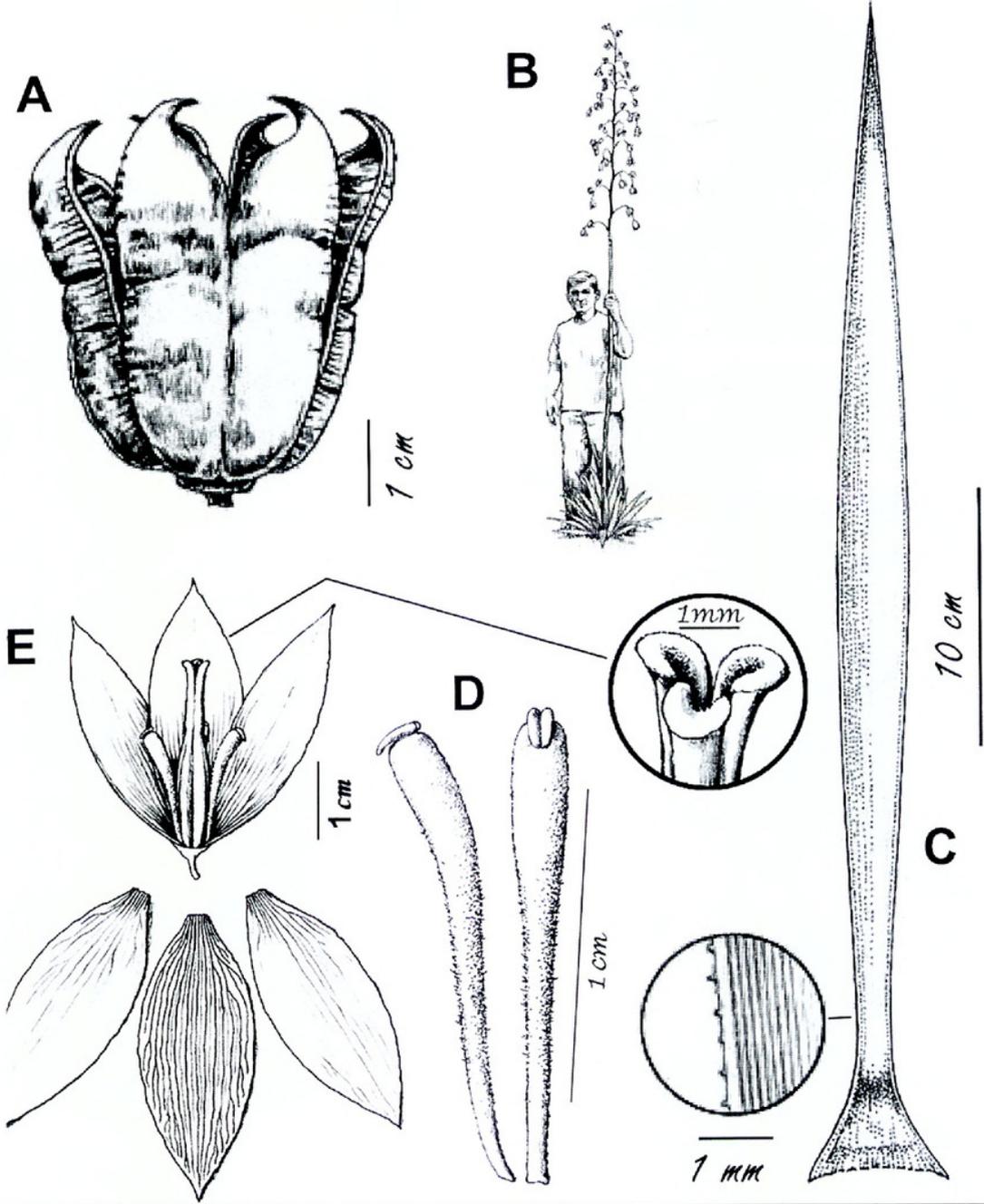


FIG. 1. *Yucca cernua*. A. Capsule. B. Habit. C. Representative leaf, abaxial surface, with leaf margin magnified 11 \times . D. Stamen, front view and side view, slightly enlarged. E. Flower; inset detail of stigma lobes.

areas apparently restricted to brownish, acidic clayey soils of the Redco Soil Series in Jasper and Newton counties in eastern Texas (Neitsch 1982). The Redco Soil Series occurs in southeastern Texas from Newton County westward to Walker County (McClintock 1979; Neitsch 1982; USDA 2002). This species is currently known only from an area approximately 6-km² centered in west-central Newton County and just into the far eastern portion of Jasper County. One large population of approximately 1000 plants and six small populations

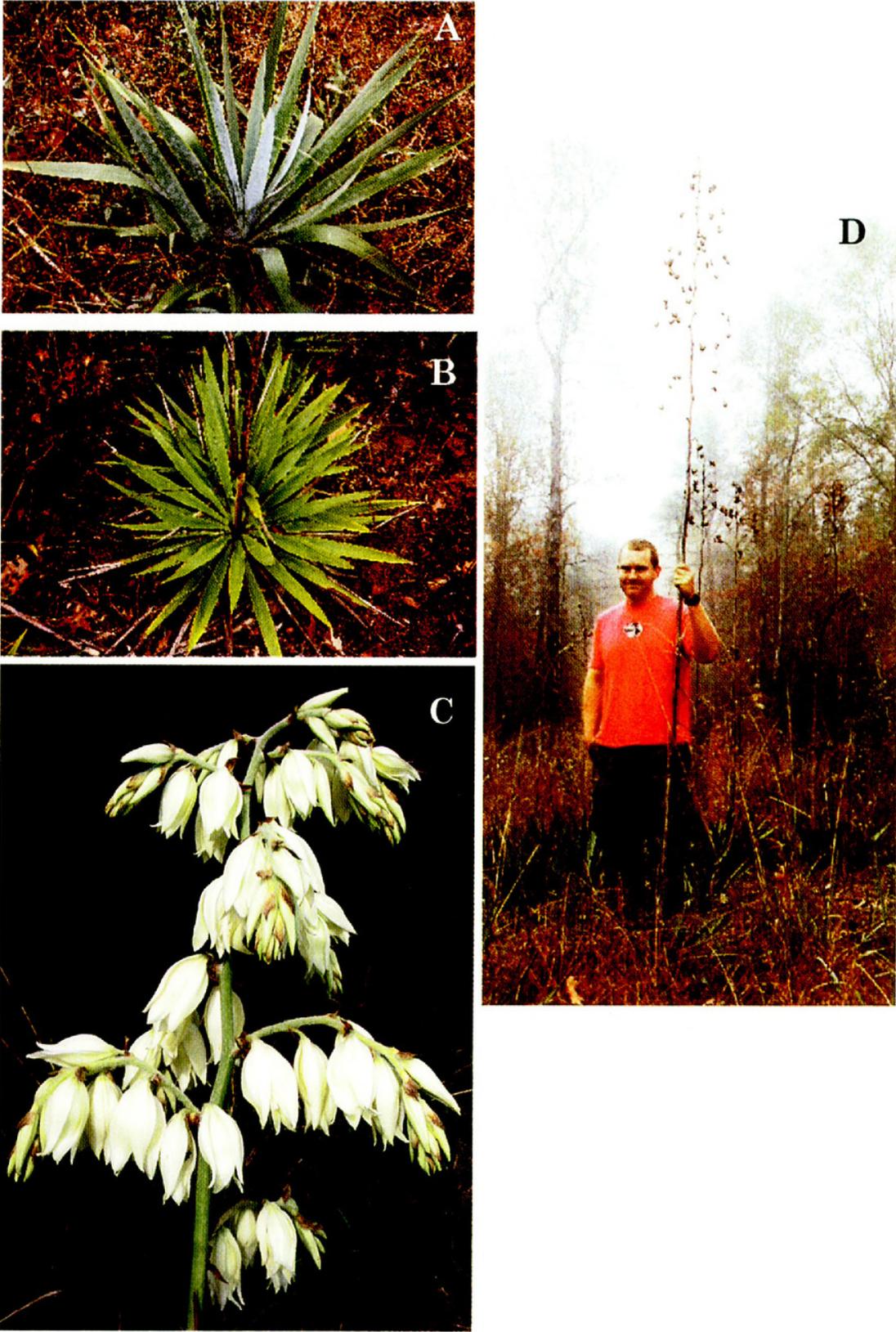


FIG. 2. *Yucca cernua* Keith. **A.** Young leaves glaucous. Note lower leaves slightly undulate and twisting. **B.** Older leaves yellowish-green or olive and flat. **C.** Inflorescence recurved and drooping. **D.** Habit.

of less than a 100 plants each are known. In 1987, Thomas and Allen collected this species (labeled as *Yucca* sp.) at the type locality. A 1951 collection of *Y. cernua* (labeled as *Yucca*) at the Botanical Research Institute of Texas (BRIT) from Jasper County indicates that it was collected in the town of Jasper. This population, if still extant, is at least five miles west of any known location. No other collections of this species are known. This species is apparently tolerant of soil disturbance. All of the plants are found along roadsides and other disturbed areas, and it rapidly colonizes areas with bare soil. It is hoped that more populations will be found throughout southeastern Texas in similar habitats.

Associated species.—*Eurybia hemisphaerica* (Alexander) Nesom, *Helianthus angustifolius* L., *Panicum anceps* Michx., *Solidago canadensis* L., *Tridens strictus* (Nutt.) Nash, *Smilax bona-nox* L., *Pinustaeda* L., *Symphyotrichum lateriflorum* (L.) A.&D. Löve, *Symphyotrichum dumosum* (L.) Nesom, *Carex flaccosperma* Dewey, *Liquidambar styraciflua* L., *Ilex vomitoria* Ait., and *Coreopsis* sp.

Additional collections examined: U.S.A. **TEXAS. Jasper Co.:** Jasper, leaves up to 69 cm long and 4 cm broad; terminal spine 5–7 mm long, 20 Jul 1951, *H.R. Reed* 1238 (BRIT). **Newton Co.:** on S side of U.S. 190, 8.8 mi E of Texas 63 intersection near Jasper and 4.3 mi W of Newton, Texas, top of dry, sandy hill on S side of U.S. 190, 07 Sep 1987, *R. Dale Thomas & Charles M. Allen* 101823 (NLU).

Yucca cernua is a very distinctive species adapted to a unique soil type. It appears to be closely related to *Y. pallida* and *Y. rupicola* Scheele in the series *Rupicolae* and which it most closely resembles by its acaulescent habit, denticulate leaves, and beaked capsules (Hess & Robbins 2002; McKelvey 1947; Trelease 1902). The closest known populations of either species are over 300 km to the west and northwest of *Y. cernua* (Correll & Johnston 1970; Diggs et al. 1999; Hochstaetter 2000; McKelvey 1947).

Table 1 provides a list of the major differences between these three species. To date, our understanding of the species indicates that it is endemic to this region and is extremely rare. Adverse impacts to this population described above could pose serious threats to the continued existence of the species. All known populations of *Yucca cernua* are found on private land and public highway rights-of-way and are not currently protected. Fortunately, a preliminary agreement with a private landowner will set aside a preserve along both sides of Highway 190 where the largest population occurs. Since this species appears to have a very restricted distribution based on unique soil requirements, it should be considered as a candidate for federal and state protected species status.

Included herein is a key of the entire or denticulate, non-filiferous leaved North American species of *Yucca*. Key is derived from Hess and Robbins (2002) and personal observations.

1. Mature plants caulescent; rosettes each with more than 100 leaves; distribution in western Texas.
2. Mature plants 2.5–3.6 m, not including inflorescence; leaf blade 25–60 × 1.2–1.7 cm, widest considerably above middle, smooth _____ ***Yucca rostrata***

TABLE 1. A comparison of *Yucca cernua*, *Yucca pallida*, and *Yucca rupicola*. Characters are taken from personal observations, Diggs et al (1999), Hess and Robbins (2002), and McKelvey (1947).

Feature	<i>Yucca cernua</i>	<i>Yucca pallida</i>	<i>Yucca rupicola</i>
Distribution	Jasper and Newton counties in eastern Texas	Central Texas northward to North Central Texas	Edwards Plateau
Habitat	Acidic clays of the Redco Soil Series	Open areas on limestone outcrops	On limestone ledges and plains
Leaf dimensions	(30-)40-70(-80) cm long, (3-)3.5-6.5 cm wide at widest point	18-35(-56) cm long, (1.0-) 2.5-3.2(-4.5) cm wide at widest point	25-60(-82) cm long, (1.7-) 2.3-5(-6) cm wide at widest point
Leaf characteristics	Most leaves flat except green lowermost leaves which are usually undulate and twisted, young leaves glaucous becoming olive or yellowish with age	Most leaves flat and persistently blue-green glaucous	Most leaves olive-green and undulate and twisted
Spine characteristics	Yellow at base, reddish brown at tip	Mostly all yellow, occasionally slightly reddish near base	Orange, yellowish-brown, or reddish-brown
Inflorescence height	(1.5-)2-4 m tall	1.3-2.5 m tall	1.5-3.6 m tall
Inflorescence characteristics	Moderately to densely and floccose, branches recurved and drooping	Glabrous and glaucous, branches wide-spreading	Glabrous or slightly pubescent, branches erect-ascending
Tepal dimensions	3.4-5(-5.8) cm long, 0.75-1.8 cm wide	(3.6-)5-6.5 cm long, (1.5-) 2-3.2 cm wide	(4-)5.5-8.2 cm long, (1.4-) 2-3.2 cm wide
Pistils	2-3(-3.3) cm long	2.4-4 cm long	2.7-4 cm long
Stamens	1.2-1.9(-2.2) cm long	2.1-3.2 cm long	1.8-2.8 cm long
Capsules	3.2-4.5 cm long	3.8-5 cm long	4.8-7.5 cm long
Capsule beaks	0.5-1 cm long, usually turned inward at 45° angles where split on secondary fissures	0.8-1.2 cm long, usually erect	0.9-1.2 cm long, erect or slightly reflexed

2. Mature plants 0.7–2.5 m, not including inflorescence, leaf blade 20–30(–45) × 0.7–1.2 cm, widest at or above middle, ± scabrous _____ **Yucca thompsoniana**
1. Mature plants acaulescent, usually forming colonies; rosettes each with fewer than 100 leaves.
3. Mature leaf blade undulate and twisted, strongly concave, margins orange or yellowish-brown to reddish-brown; endemic to eastern Edwards Plateau _____ **Yucca rupicola**
3. Mature leaf blade straight (lowermost leaves usually twisted in *Y. cernua*), flat or slightly concave, margins yellow or reddish brown.
4. Mature leaf blades 1–2(–2.5) cm at greatest width, inflorescence densely floccose with branchlets spreading or ascending; endemic to western Edwards Plateau _____ **Yucca reverchonii**
4. Mature leaf blades (1–)2.5–6.5 cm at greatest width, inflorescence either moderately to densely floccose with recurved and drooping branchlets or glabrous with wide-spreading branchlets.
5. Plants in colonies of 10–30 rosettes each, leaves (1–)2.5–3.2(–4.5) cm at greatest width, persistently blue-green glaucous, inflorescence glabrous with wide-spreading branchlets; endemic to central and north-central Texas _____ **Yucca pallida**
5. Plants usually solitary, leaves (3–)3.5–6.5 cm at greatest width, young leaves glaucous becoming olive or yellowish-green with age, inflorescence floccose with recurved and drooping branchlets; apparently endemic to eastern Texas _____ **Yucca cernua**

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