MADROÑO, Vol. 61, No. 3, pp. 299–307, 2014

CAREX XEROPHILA (CYPERACEAE), A NEW SEDGE FROM THE CHAPARRAL OF NORTHERN CALIFORNIA

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ABSTRACT

Carex xerophila Janeway & Zika is described from gabbro and serpentine soils on the west slope of the northern Sierra Nevada in California. It is documented from four populations in or on the margins of chaparral and open forest. The new species is assigned to *Carex* section *Acrocystis* Dumort., and a key is provided for all California representatives of the section. *Carex xerophila* differs from *C. globosa* Boott in its uniformly short, erect basal peduncles and Sierra foothills habitats. *Carex xerophila* differs from *C. brainerdii* Mack. by its green leaves that are not densely papillose below, its relatively shorter perigynium beaks, and its lower elevation montane habitats. *Carex xerophila* has more strongly nerved scales and perigynium faces than *C. rossii* Boott.

Key Words: California, *Carex* section *Acrocystis*, chaparral sedge, gabbro, Pine Hill, ultramafic.

There are 140 indigenous species of *Carex* known from California, which includes 13 endemics restricted to the state (Zika 2012; Zika et al. 2012, 2013). In California, there are seven representatives of *Carex* sect. *Acrocystis* Dumort., united by their short spikes, plump pubescent perigynia, and an arillate perigynium stipe that promotes dispersal by ants. These are *C. brainerdii* Mack., *C. brevicaulis* Mack., *C. deflexa* Hornem. var. *boottii* L. H. Bailey, *C. globosa* Boott, *C. inops* L. H. Bailey subsp. *inops*, *C. rossii* Boott, and *C. serpenticola* Zika. The subtle distinctions between species of *Carex* section *Acrocystis* are slow to be untangled, and continue to yield surprises and novelties in North America (Zika et al. 1998; Werier 2006; Sorrie et al. 2011). Among California specimens of *Carex* sect. *Acrocystis* are some puzzling populations from the northern Sierra Nevada (Janeway 1992; Oswald 2002). After studying these sedges in the field, we describe them here as a new species.

TAXONOMIC SECTION

Carex xerophila Janeway & Zika, sp. nov. (Figs. 1–3).—TYPE: USA, California, El Dorado Co., Bureau of Land Management Cameron Park Unit, Pine Hill Preserve, N of Route 50, 3.3 air km W of reservoir on Sawmill Creek, Shingle Springs, 450 m, 17 May 2012, *P. F. Zika 25874 and L. P. Janeway* (holotype: WTU; isotypes: CAS, CHSC, GH, JEPS, MICH, OSC, RSA, US).

Species propria, differt a *Carex rossii* glumis perigyniisque plus plurinervosis, a *C. brainerdii* foliis juvenilibus gramineo-viridibus epapillosis statim dignoscenda, ceterum pedunculis basalibus brevioribus rigentibus erectis a *C. globosa* recedens.

Plants densely to loosely cespitose, forming tufts up to one m in diam. Proximal sheaths scaly, bladeless, red to dark purple, smooth to scabrous on the prominent nerves, veins sometimes persisting and ladder-fibrillose. Distal sheaths with translucent faces, often red-streaked, apices concave; ligules obtuse, mostly longer than wide, margins scabrous; distal sheaths bearing blades. **Leaves** in numerous sterile rosettes, 4–10 on proximal 1/4 of stem, some blades taller than fertile stems, blades 6–42 mm long, 1.7–3.8 mm wide, V-shaped in cross-section, often folded, green not blue-green, 5–10 prominent veins, scabrous adaxially, blade margins scabrous, tips filiform-triangular, densely scabrous, apex blunt or truncate, bristly (20×). **Stems** (culms) 9.5–35 cm tall, triangular, scabrous. **Inflorescences** with 1–3 basal spikes 7–11 mm long, on erect filiform scabrous peduncles 1–7.5 cm long, 0.3–0.4 mm wide (Fig. 3A), the basal spikes with 2–5 perigynia, mostly pistillate, occasionally androgynous with 2–3 terminal staminate scales; non-basal portion of the inflorescences on elongate stems comprised of 1–4 spikes, the spikes 13–38 mm long, overtopped by foliage;

FIG. 1. *Carex xerophila* (A-F, H-M all from the type, *Zika 25874 and Janeway*. G from *Zika 25871 and Janeway*). A. Habit, with foliage overtopping fertile shoots. B. Detail of shoot base, showing basal scale, and ladder-fibrillose sheath, with detail of scabrous veins. C. Sharply triangular and scabrous leaf tip. D. Pistillate scale with scabrous mid-veins. E. Staminate scale, with scabrous mid-veins. F. Trigonous achene, with detail of papillose surface. G. (from *Zika 25871 and Janeway*) Fresh perigynium, side view, showing curved beak; base pale, plump, and arillate. H. Dried perigynium, front view, showing shallow teeth at tip of beak and dried base forming a stipe. I. Dried

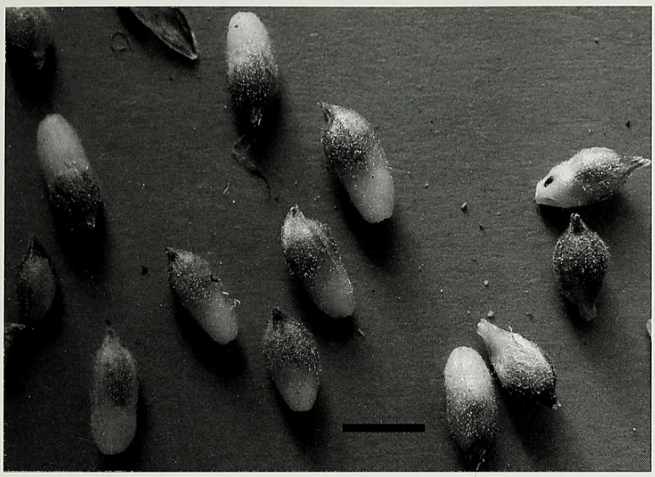

FIG. 2. *Carex xerophila* (*Zika 25871 and Janeway*) showing arillate base on fresh perigynia, presumably enhancing dispersal by ants. The perigynium nerves are difficult to see until the perigynia are dried, at this scale. Scale bar = 3 mm.

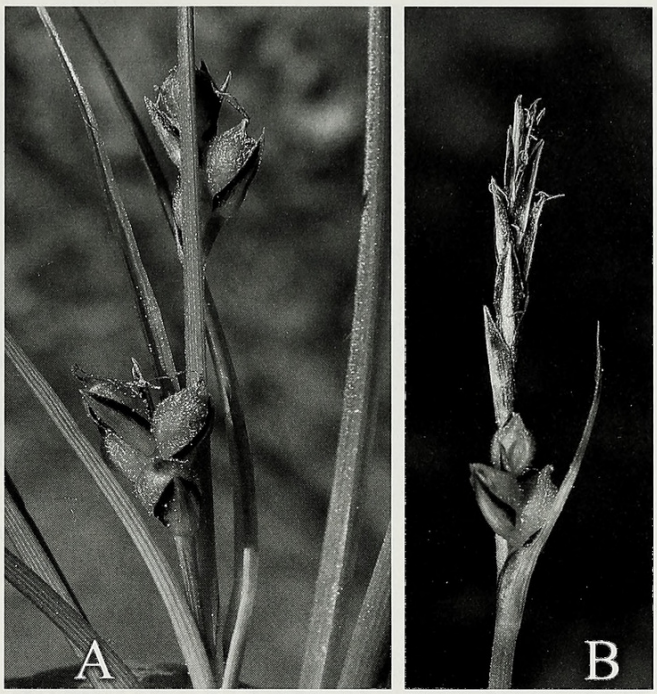

FIG. 3. *Carex xerophila* (*Zika 25872 and Janeway*). A. Erect basal pistillate spikes. B. Elongate stem and inflorescence, with lateral pistillate spike and terminal staminate spike.

lowest non-basal inflorescence bract often emarginate and purple at base, blade green, leafy, 8–45 mm long, often shorter than inflorescence; lowest non-basal lateral spikes pistillate, each with 1–5 perigynia (Fig. 3B), sessile or on peduncles to 5 mm long; distal spike staminate, 12–21 mm long, 2.0–3.0 mm wide, 8–17 flowered; stamens 3 per scale, filaments white, anthers yellow, linear, 2.7–4.2 mm long, apical appendage 0.1 mm long, bristly (20×). Staminate scales 4.8–7.1 mm long, dark purple, sometimes scabrous or sparsely pubescent, with prominent or keeled pale midveins, and 2–15 usually inconspicuous fine parallel lateral veins, apex acute, occasionally mucronate, mucro to 0.3 mm, often bristly (20×). **Pistillate scales** ovate to broadly ovate, clasping at base, 3.2–4.9 mm long, 2.8–4.0 mm wide, glabrous, scabrous, or sparsely pubescent, green central band with (1–)3 strong midveins, the midveins often keeled and scabrous, the broad dark purple lateral bands with 6–12 inconspicuous fine parallel veins, distal margins entire to sparsely ciliate, apex acute, or emarginate and mucronate, the mucro to 0.7 mm and scabrous or ciliate. **Perigynia** obovate, pubescent, 3.4–4.9 mm long, 1.4–2.1 mm wide; stipe fleshy, oily, turgid and pale when fresh (Fig. 2) then shriveling, 0.9–1.9 mm long; body plump, rounded-trigonous, usually with 10–16 prominent veins when mature; beak distinct, slightly flattened, erect or slightly incurved, scabrous and pubescent, measured from inflection point 0.5–0.9 mm long, including teeth 0.1–0.4 mm long. **Achenes** obovoid, rounded-trigonous, papillose (20×), brown, 2.0–2.5 mm long, 1.4–2.0 mm wide.

Paratypes: USA, CALIFORNIA, **Butte Co.:** Magalia Serpentine, E side of Coutolenc Road, 707 m, 14 May 2006, *L. P. Janeway 8595* (CHSC, JEPS, MICH, NY, OSC, TRT, WTU); Same site, over mature, 22 Nov 2009, *L. P. Janeway 9968* (CHSC); Same site, 29 Apr 1989, *B. Castro 307 and G. Kuenster* (CAS, CHSC, WS); Same site, 8 Jul 1996, *G. F. Hrusa 13106 and T. D. Wilfred* (HSC); Same site, 16 Apr 1984, *V. Oswald 1159* (CHSC); Same site, 6 May 1978, *M. S. Taylor 1578* (CHSC, MO); Same site, 16 May 2012, *P. F. Zika 25868 and L. P. Janeway* (BRY, CDA, CHSC, DAV, MO, OSC, RSA, WTU); Isolated block of serpentine between the E end of Hollywood Drive, Magalia, and the upper end of Magalia Reservoir, 29 May 2005, *L. P. Janeway 8397* (CAS, CHSC, GH, JEPS, MO, NY, OSC, TRT, US, WTU); Same site, 4 Jun 1989, *G. Kuenster s.n.* (CAS, CHSC, WS); Same site, 7 May 1997, *G. F. Hrusa 13726 and T. D. Wilfred* (CDA, DAV); Same site, 8 May 1997, *G. F. Hrusa 13761 and T. D. Wilfred* (CDA). **El Dorado Co.:** Cameron Park Unit, Pine Hill Preserve, 1.3 km W of junction of Hwy 50 and Mother Lode Drive, 457 m, 10 May 2006, *L. P. Janeway* 8589 (CHSC, HSC, OSC, SBBG, TRT,

←

perigynium, top view, rounded-trigonous. J. Basal spike and peduncle. K. Non-basal inflorescence, with two lateral pistillate spikes and terminal staminate spike. L. Notched sheath mouth on inflorescence bract (non-basal inflorescence). M. Sheath mouth and ligule, stem removed from view.

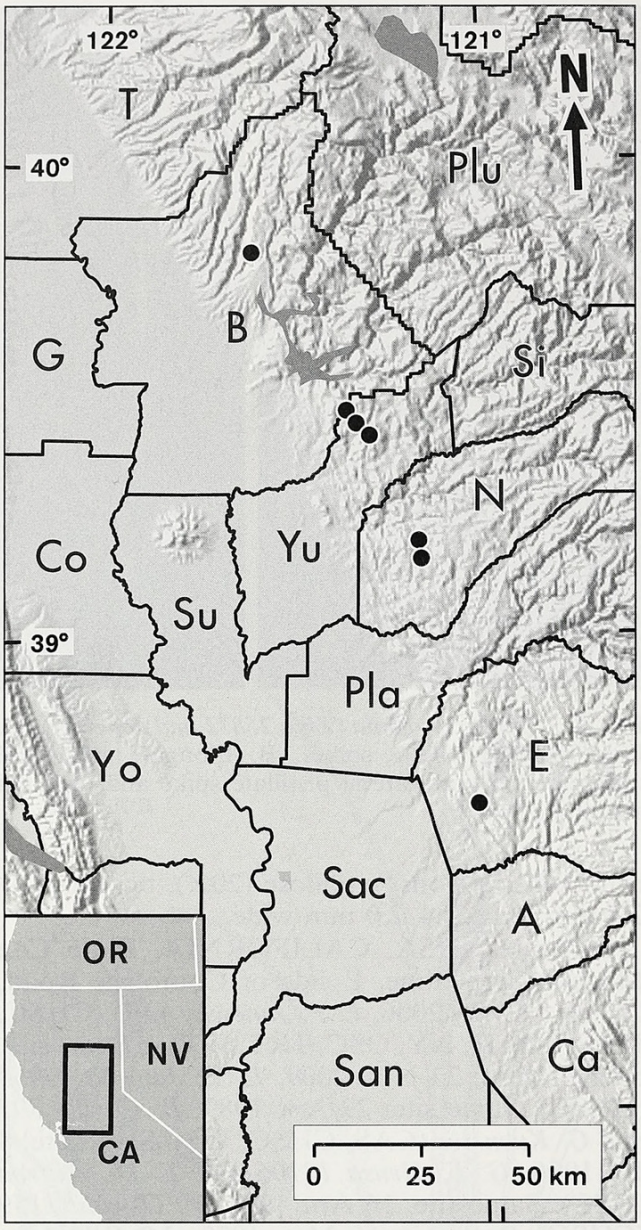

FIG. 4. *Carex xerophila* distribution map based on herbarium specimens. County abbreviations: A = Amador; B = Butte; Ca = Calaveras; Co = Colusa; E = El Dorado; G = Glenn; N = Nevada; Pla = Placer; Plu = Plumas; Sac = Sacramento; San = San Joaquin; Si = Sierra; Su = Sutter; T = Tehama; Yo = Yolo; Yu = Yuba.

UCR, WTU); Same site, 12 Jun 2010, *L. P. Janeway 9995 and B. Castro* (CHSC, OSC, WTU); Same site, 29 Mar 1972, *D. W. Taylor 1378* (DAV). **Nevada Co.:** South Ponderosa Road, W of Grass Valley, 670 m, 19 Apr 2008, *K. I. Callahan 8* (CHSC, JEPS, OSC, TRT, WTU); E slope of American Ranch Hill, ca. 5.6 km SW of Grass Valley, 685 m, 31 May 2010, *L. P. Janeway 9985 and C. Brinkhurst, B. Castro, K. Callahan, and Bill Wilson* (CHSC, MICH, OSC, WTU); Same site, 1 May 1969, *G. H. True 4900* (CAS); Same site, 11 May 1973, *G. H. True 7465 and J. T. Howell* (CAS); Highway 20 roadside, W of Grass Valley, 762 m, 20 Apr 2007, *D. G. Kelch 7.167* (CDA, CHSC); Osceola Ridge ca. 0.6 km N of Highway 20, along Pipeline Road, ca. 4.8 km W of Grass Valley, 720 m, 31 May 2010, *L. P. Janeway 9981 and K. Callahan, C. Brinkhurst, B. Castro, and Bill Wilson* (CHSC, MICH, OSC, WTU); Same site, 735 m, 16 May 2012, *P. F. Zika 25872 and L. P. Janeway* (CAS, CHSC, HSC, JEPS, OSC, SD, WTU). **Yuba Co.:** Forsythe Road, 2.7 road km S of New York House Road, above Prince Albert Creek, 604 m, 24 May 2006, *L. P. Janeway 8626* (CHSC, DAV, JEPS, MICH, OSC, TRT, US, WTU); Ponderosa Way, 1.3 km north of La Porte Road and Brownsville, 686 m, 16 May 2012, *P. F. Zika 25870 and L. P. Janeway* (CAS, CHSC, GH, OSC, WTU); Ponderosa Way 1.3 km SE of Robinson Mill Road and Forbestown Road, 771 m, 24 May 2006, *L. P. Janeway 8616* (CHSC, HSC, MICH, OSC, RSA, TRT, US, WTU); Chaparral adjacent to Brownsville dump, just E of junction of Jiggs Road and Ponderosa Way, 3 air km W of Ruff Hill, Brownsville, 715 m, 16 May 2012, *P. F. Zika 25871 and L. P. Janeway* (CHSC, JEPS, MO, OSC, RM, SBBG, UCR, WTU).

Distribution, Habitat, and Ecology

Carex xerophila is recorded from Butte, El Dorado, Nevada, and Yuba counties in California (Fig. 4). We know of four population centers, at elevations of 450–770 m, in the northern Sierra Nevada Mountains. Plants in Butte Co. are on peridotite (serpentine) bedrock and in mixed conifer forest of the High Sierra Nevada district (Baldwin et al. 2012). The other populations are essentially in the transition from Sierra Nevada Foothills to High Sierra Nevada district (Baldwin et al. 2012), and occur on gabbro-derived soils (Alexander 2011; Burge and Manos 2011; Alexander 2012). The plants grow in full sun to partial shade, on dry soils, in open forest, scrub, at the edge of thickets, and in chaparral (Figs. 5, 6), often with or near *Hesperocyparis macnabiana* (A. Murray) Bartel. In some dense stands of chaparral *C. xerophila* can dominate the understory (Fig. 6C). At the Pine Hill site, a wildfire in July 2007 removed the woody vegetation on a gentle northerly slope. *Carex xerophila* is sparingly present on the adjacent shrubby ridgeline, but absent in the recently burned ground.

Notable associates of *Carex xerophila* include: *Adenostoma fasciculatum* Hook. & Arn., *Arbutus menziesii* Pursh, *Arctostaphylos viscida* Parry, *Calochortus monophyllus* (Lindl.) Lem., *Calystegia stebbinsii* Brummitt, *Ceanothus cuneatus* (Hook.) Nutt., *C. lemmonii* Parry, *C. roderickii* W. Knight, *Cercis occidentalis* Torr. ex A. Gray, *Danthonia unispicata* (Thurb.) Munro ex Macoun, *Eriodictyon californicum* (Hook. & Arn.) Torr., *Frangula californica* (Eschsch.) A. Gray subsp. *tomentella* (Benth.) Kartesz & Gandhi,

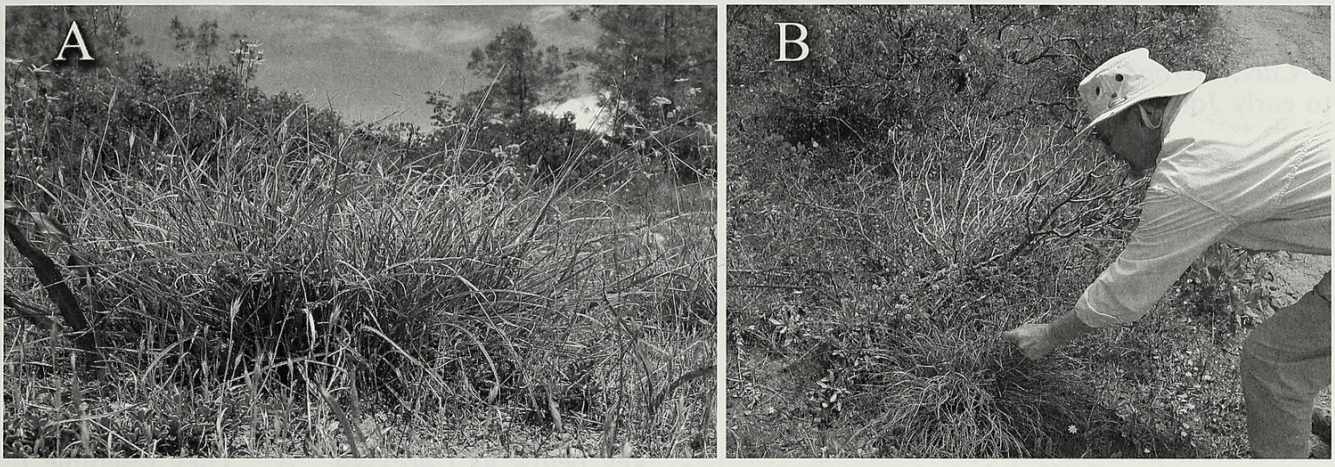

FIG. 5. *Carex xerophila* habit, both from El Dorado Co. (*Zika 25874 and Janeway*). A. A large tussock. B. Another large tussock in chaparral, with Lawrence Janeway.

Hesperocyparis macnabiana, Iris hartwegii Baker, *Lomatium marginatum* (Benth.) J. M. Coult. & Rose, *Melica torreyana* Scribn., *Packera layneae* (Greene) W. A. Weber & Á. Löve, *Perideridia bacigalupii* T. I. Chuang & Constance, *Pickeringia montana* Nutt., *Pinus ponderosa* Lawson & C. Lawson, *P. sabiniana* Douglas ex D. Don, *Quercus chrysolepis* Liebm., *Q. garryana* Douglas ex Hook. var. *semota* Jeps., *Q. kelloggii* Newb., *Q. wislizeni* A. DC., *Rhamnus ilicifolia* Kellogg, *Salvia sonomensis* Greene, *Sanicula bipinnatifida* Douglas, *Sisyrinchium bellum* S. Watson, *Triteleia hyacinthina* (Lindl.) Greene, and *Wyethia reticulata* Greene.

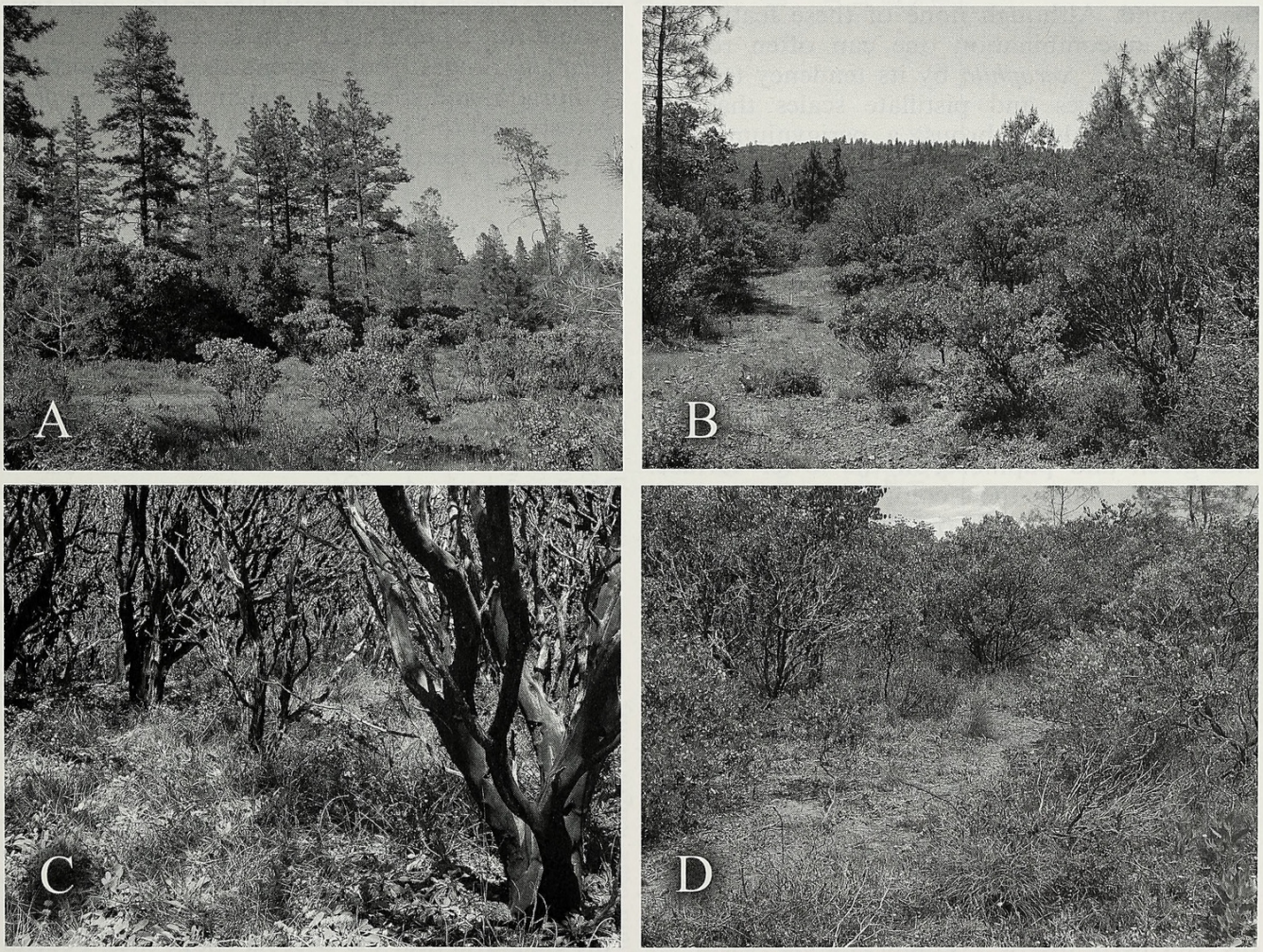

FIG. 6. *Carex xerophila* habitat. A. Nevada Co. (*Zika 25872 and Janeway*). B. Yuba Co. (*Zika 25871 and Janeway*). C. Chaparral sedge dominates under a canopy of *Arctostaphylos viscida* in Yuba Co. (*Zika 25871 and Janeway*). D. El Dorado Co. (*Zika 25874 and Janeway*).

Phenology

Carex xerophila fruits mature from late March to early June.

Etymology

Carex xerophila is named for the xeric sites it inhabits. We propose the common name chaparral sedge.

Discussion

Among the California representatives of *Carex* sect. *Acrocystis*, multi-nerved perigynia are found only in *C. xerophila, C. globosa* and *C. brainerdii*. In the field, basal spikes of *C. xerophila* are held on stiffly erect and short peduncles, always less than eight cm long. *Carex globosa* differs in its weak, and ultimately arching, elongate basal peduncles. Although some *C. globosa* basal peduncles may be short, some spikes are borne on peduncles that are more than 10 cm long and lax at maturity, presenting the arillate perigynia to dispersers on the ground. Although none of these features is unique, in combination one can often readily distinguish *C. xerophila* by its tendency to have narrower leaves and pistillate scales that are more commonly scabrous, a perigynium body that is never globose, and shorter perigynium beaks (Table 1), as well as a much denser growth form and a different habitat specialization. Where *C. globosa* forms loose tall clumps in mesic or damp forest and openings along the coast, *C. xerophila* creates denser shorter tufts in xeric situations in the foothills of the northern Sierra Nevada.

Carex brainerdii differs from all other *Acrocystis* in California with its young foliage that is blue-green and papillose on the lower surface. The blades retain their color with age, though the papillae may wear off the older leaves. In contrast, *Carex xerophila* foliage is green and scabrous, not blue-green or papillose. *Carex rossii* and *C. deflexa* var. *boottii* are similar in habit to *C. xerophila*. All three form rather dense tufts of numerous vegetative shoots. *Carex rossii* and *C. deflexa* var. *boottii* both have perigynia that lack veins on the faces, and their pistillate scales typically have a single vein, not three as usually seen in *C. xerophila*. In addition, both grow at higher elevations than *C. xerophila*, as discussed below.

Three species of *Carex* sect. *Acrocystis* are found in dry habitats along the western slope of the northern Sierra Nevada: *Carex rossii*, *C. brainerdii*, and *C. xerophila*. *Carex rossii* is found at higher elevations, in mixed conifer forest and above, while *C. brainerdii* grows at middle elevations, overlapping some with *C. rossii*. *Carex xerophila* is usually found at lower elevations and further west than *C. brainerdii* and *C. rossii* (Janeway 1992). Of these three species, only *Carex xerophila* is found in the xeric chaparral habitat and the adjacent open forests, and is tolerant of the severe constraints created by gabbro and serpentine soils.

Some *Carex* sect. *Acrocystis* from southern California appear to be related to this small group of species with multi-nerved perigynia. A few populations from the San Bernardino and San Gabriel Mountains may represent an undescribed taxon, and are tentatively separated in the key below as *Carex* sp. "A." They resemble *C. xerophila*, but appear to differ in scale and perigynium characters. More study and better specimens are needed to confirm the consistency of these morphological differences.

Carex geophila Mack. and *C. pityophila* Mack. were reported from California (Crins and Rettig 2002; Taylor 2010), but these reports appear to be based on depauperate specimens of *C. rossii* and *C. deflexa* var. *boottii* (Zika et al. 2012). Both *C. geophila* and *C. pityophila* have essentially veinless perigynium faces (Crins and Rettig 2002), as well as single-nerved pistillate scales, and thus would not be confused with *C. xerophila*. *Carex geophila* ranges from Arizona to Texas, north to Colorado, and south to Guatemala; *C. pityophila* is restricted to Utah, Colorado, and New Mexico (Crins and Rettig 2002).

Conservation Implications

Much of the chaparral habitat on the lower slopes of the Sierra Nevada has been altered by fire suppression, development, agriculture, grazing, and off-road vehicles. This is true near all known localities for *Carex xerophila*. More field surveys are needed to search for additional populations, and to determine population sizes and trends. However, based on our preliminary investigations, it appears *C. xerophila* is an uncommon plant in a declining habitat, and in need of conservation attention. At the Pine Hill Preserve site, a number of rare plants are found in the remnants of the chaparral plant community (Wilson 1986; Hunter and Horenstein 1991; Hinshaw 2008; Wilson et al. 2009), including five federally threatened or endangered taxa: *Calystegia stebbinsii*, *Ceanothus roderickii*, *Fremontodendron decumbens* R. M. Lloyd, *Galium californicum* Hook. & Arn. subsp. *sierrae* Dempster & Stebbins, and *Packera layneae* (USFWS 1996). *Packera layneae* also occurs with *Carex xerophila* at some of the Brownsville sites, and *Calystegia stebbinsii* is in the chaparral near the Osceola Ridge sites. Federal listing of these chaparral taxa in the northern Sierra Nevada emphasizes that *Carex xerophila* habitat is sharply reduced and threatened.

TABLE 1. COMPARISON OF *CAREX BRAINERDII, C. GLOBOSA*, AND *C. XEROPHILA*, BASED ON A SAMPLE OF 20 SPECIMENS OF EACH. Perigynium stipe length is measured on dried material as the pale or discolored oily basal portion below the body. Perigynium beak length is measured from the inflection point of the margin, as it transitions into the curve of the upper body.

Character	*Carex* taxon		
	C. brainerdii	*C. globosa*	*C. xerophila*
Perigynium body shape	ellipsoid or barrel-shaped	obovoid to subglobose	obovoid
Perigynium length (mm)	3.5–5.6	3.4–5.7	3.3–4.5
Perigynium width (mm)	1.3–2.0	1.6–2.3	1.5–1.9
Perigynium stipe length (mm)	0.9–1.7	0.8–2.2	0.9–1.7
Perigynium beak length (mm)	(0.7–)1.0–2.3	0.5–1.6	0.4–0.9
Pistillate scales, strong veins	3	1–3	(1–)3
Pistillate scales, faint veins	up to 7	6–12	6–12
Staminate scale veins	(1–)3(–8 and faint)	1–3 (–11 and faint)	3–10 (often faint)
Proximal staminate scale length (mm)	4.3–7.1	4.0–8.5	5.0–7.1
Basal peduncle habit	all erect	always some are elongate and arching, erect if short	all erect
Basal peduncle length (mm)	1–75	10–290	10–75
Inflorescence bract sheath summit	tapered to truncate	tapered to truncate or notched	usually notched
Young leaf color	blue-green	green	green
Leaf abaxial surface	densely papillose, somewhat scabrous	somewhat scabrous	somewhat scabrous
Leaf width (mm)	0.9–4.4	1.0–5.0	1.4–3.8

KEY TO *CAREX* SECT. *ACROCYSTIS* OF CALIFORNIA, BASED ON ZIKA ET AL. (2012)

In the key below, mature specimens with ripe perigynia are needed for reliable identification.

1. Stems unisexual . . . . . *C. serpenticola* (2)
1′ Stems with both pistillate and staminate flowers
  2. Basal spikes absent
    3. Pistillate scales and proximal staminate scales green, red, or purple with hyaline margin 0.4–0.8 mm wide; terminal spike staminate; stems always monoecious, never on serpentine. . . . . *C. inops* subsp. *inops*
    3′ Pistillate scales and proximal staminate scales dark purple with hyaline margin 0.1–0.2 mm wide; terminal spike variable, staminate, pistillate, or gynecandrous; stems monoecious or dioecious; always on serpentine . . . . . *C. serpenticola* (2)
  2′ Basal spikes present
    4. Perigynia veinless or nearly so except for two strong marginal ribs; pistillate scales with 1(–3) prominent veins, lacking fine veins
      5. Inflorescence bracts inconspicuous and shorter than the inflorescence on elongate, non-basal stems (occasionally shoots produced in a second flush of growth will have elongate inflorescence bracts); proximal sheaths disintegrating into stiff fibers; perigynia 1.5–2.1 mm wide; habitat coastal dunes and headlands . . . . . *C. brevicaulis*
      5′ Inflorescence bracts conspicuous and usually longer than the inflorescence on elongate, non-basal stems; proximal sheaths not disintegrating into stiff fibers; perigynia 1–1.7 mm wide; habitat widespread, coastal and montane
        6. Perigynia 3.1–4.5 mm long, beaks 0.7–1.7 mm long, beak teeth 0.2–0.5 mm long; stems usually ascending, scabrous; habit loosely to densely cespitose; rhizomes often stout, 1.1–3 mm diam . . . . . *C. rossii*
        6′ Perigynia 2.3–3.1 mm long, beaks 0.4–0.8 mm long, beak teeth 0.1–0.2 mm long; stems usually spreading or arching, smooth to scabrous; habit loosely cespitose; rhizomes often slender, 0.8–2.0 mm diam. . . . . *C. deflexa* var. *boottii*
    4′ Perigynia with 10–20 strong veins across the faces, usually extending to mid-body or beyond, in addition to the two marginal ribs; pistillate scales with 3–5 prominent veins, plus up to 14 less conspicuous veins
      7. Foliage blue-green when fresh, strongly papillose abaxially when dry, at least on new growth (40×); perigynium body elliptic or barrel-shaped . . . . . *C. brainerdii*
      7′ Foliage green when fresh, smooth to scabrous abaxially when dry, never papillose; perigynium body obovoid to subglobose
        8. Some basal pistillate spikes on long weak arching peduncles more than 10 cm long; perigynia up to 2.3 mm wide; perigynium stipes up to 2.2 mm long; habitat coastal mesic forest and openings . . . . . *C. globosa*
        8′ All basal pistillate spikes on stiffly erect peduncles less than 8 cm long; perigynia up to 1.9 mm wide; perigynium stipes up to 1.6 mm long; habitat inland, dry forest, savanna and chaparral
          9. Perigynium stipe longer than beak; pistillate scales usually with 6–12 fine inconspicuous nerves; perigynium beak 0.5–0.9 mm long; fruiting from late March to early June; 450–735 m elev., northern Sierra Nevada . . . . . *C. xerophila*
          9′ Perigynium stipe equaling or shorter than beak; pistillate scales usually with 3–6 fine inconspicuous nerves; perigynium beak 1.0–1.3 mm long; fruiting in June, 1900–2400 m elev., San Gabriel and San Bernardino Mountains . . . . . *C.* sp. "A"

ACKNOWLEDGMENTS

We thank the curators and staff from the following herbaria for assistance and loans of specimens: CAS, CDA, CHSC, DAV, DS, GH, HSC, JEPS, NEBC, ORE, OSC, POM, RSA, UCR, WILLU, and WTU. Cindy Brinkhurst, Karen Callahan, Samantha Hillaire, and Bill Wilson helped guide Janeway to populations of chaparral sedge. Access and collecting permits were granted by Graciela Hinshaw of the Mother Lode Field Office, Bureau of Land Management. Jan Kirschner kindly translated the diagnosis into Latin. Tom Ruehli created the range map. Krista Anandakuttan drew the plate and assisted with the other graphics. Nick Otting and Dick Brainerd of the Carex Working Group provided invaluable feedback with the research and manuscript. Julie Nelson, as always, was generous with encouragement and logistical support.

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