Published online: 18 July 2024

Records of the Hawaii Biological Survey for 2024. Edited by Neal L. Evenhuis. *Bishop Museum Occasional Papers* 156: 179–189. (2024).

ISSN (online) 2376-3191

A synopsis of *Spermacoce* (Rubiaceae) and related genera naturalized in the Hawaiian Islands, with a key

David H. Lorence*, [1]
National Tropical Botanical Garden, 3530 Papalina Road, Kalaheo, Hawai'i 96741, USA; email: lorence@ntbg.org

Kevin Faccenda
School of Life Sciences, University of Hawai'i at Mānoa, 3190 Maile Way, St. John 101, Honolulu, Hawai'i 96822, USA; email: faccenda@hawaii.edu

*Corresponding author

Spermacoce L. (Rubiaceae) is a taxonomically complex genus of ca. 250 species of herbs and shrubs whose differentiating features are often found in minute but consistently reliable characters of calyx lobes and mature seeds, especially details of the dorsal seed face (Terrell & Wunderlin 2002; Adams & Taylor 2012). A good dissecting scope, preferably equipped with a micrometer, is essential to measure and differentiate these characters for accurate identification of the plants, as well as mature seeds. As noted by Oppenheimer (2003: 23), misidentifications are common. For example, a specimen from Hawai'i Island *(Wagner & Mill Arey 6390*, US, PTBG) initially identified as *S. ovalifolia* is actually *S. prostrata*. A number of *Spermacoce* species, especially *S. ocymifolia* and *S. remota,* are troublesome crop and garden weeds in the Hawaiian Islands, as well as potentially invasive species in native ecosystems. Furthermore, several other herbaceous genera belonging to the tribe Spermacoceae characterized by opposite leaves and small, axillary and/or terminal, sessile flowers and fruits, i.e., *Hexasepalum* Bartl. ex DC., *Mitracarpus* Zucc., and *Richardia* L. superficially resemble and may be confused with *Spermacoce*. These are also included in the key below for identification purposes. *Galianthe brasiliensis* (Spreng.) E.L. Cabral & Bacigalupo, also a member of tribe Spermacoceae, has been documented as naturalized on O'ahu and Hawai'i (Faccenda 2024). It can be separated from other members of the tribe by its low shrubby habit; narrowly winged stems; small, elliptic to obovate, pseudoverticillate leaves; and flowers arranged in thyrsoid spikes along branch ends.

For these reasons a revised key to the Spermacoceae genera and species naturalized in the Hawaiian Islands is provided below to replace and supplement the keys in Lorence & Flynn (2006), Wagner *et al.* (1990), and Wagner *et al.* (2023–). Note: in the key, seed surface refers to the abaxial (dorsal) surface, except where otherwise stated. See Figures 1–3 for fruit and seed images. In this article we report 3 new state records, 2 nomenclatural notes, 2 corrections with nomenclatural notes, and several notes.

1. Research Affiliate, Hawaii Biological Survey, Bishop Museum, 1525 Bernice Street, Honolulu, Hawai'i 96817-2704, USA.

KEY TO NATURALIZED SPERMACOCEAE IN THE HAWAIIAN ISLANDS

1. Inflorescences pedunculate, in axillary cymules of 2–4 flowers on peduncles (0)2–4 mm long, or flowers sometimes solitary on pedicels 2–7 mm long; fruits with ca. 20–40 seeds per locule ..... *Oldenlandia corymbosa*
1. Inflorescences sessile, in terminal and/or axillary clusters; fruits with 1 seed per locule (2).

2(1). Flowers in terminal, head-like clusters subtended by 2(4) involucral leaves; calyx and corolla 6-lobed; ovary 3-celled; fruit of (2)3(–6) mericarps (*Richardia* spp.) (3).
2. Flowers in both terminal and axillary clusters; calyx and corolla 4-lobed; ovary 2-celled; fruit a 2-valved capsule, or of 2 dimorphic mericarps (4).

3(2). Adaxial surface of mericarps broad with a median keel, the abaxial surface papillose and strigose ..... *Richardia brasiliensis*
3. Adaxial surface of mericarps closed to a narrow groove, the abaxial surface densely papillose and typically strigillose ..... *Richardia scabra*

4(2). Fruit a circumscissile capsule, the top separating like a lid at maturity; seeds with an x-shaped groove on the adaxial surface ..... *Mitracarpus hirtus*
4. Fruit either a 2-valved capsule opening via a longitudinal slit along the inner surface, or of 2 dimorphic mericarps separating at maturity, one dehiscent, the other indehiscent; seeds with a linear longitudinal groove on the adaxial surface (5).

5(4). Fruits schizocarps, both mericarps indehiscent or tardily dehiscent, seeds usually enclosed and not visible (*Hexasepalum* spp.) (6).
5. Fruits capsular, 2-valved, both cocci dehiscent or one indehiscent, 1 or both seeds usually released at maturity (*Spermacoce* spp.) (7).

6(5). Stems scandent; leaf blade 1–2.5 cm wide, apex acute, tip not apiculate; corolla tube 1.5–3 mm long; calyx lobes (2–)4 ..... *Hexasepalum sarmentosum*
6. Stems erect to prostrate; leaf blade 0.1–0.5 cm wide, apex apiculate with long, slender tip; corolla tube 6–14 mm long; calyx lobes 4 ..... *Hexasepalum apiculatum*

7(5). Mature seed surface transversely sulcate with 7–12 conspicuous dorsal grooves that completely encircle the seed, the surface between the grooves pitted (8).
7. Mature seed surface variously sculptured but not transversely grooved (10).

8(7). Leafy stems with only lateral inflorescences; seeds occasionally with several shallow transverse depressions on dorsal surface ..... *Spermacoce ocymifolia*
8. Leafy stems with terminal and lateral inflorescences; seeds with 7–12 conspicuous dorsal grooves that completely encircle it (9).

9(8). Terminal inflorescences 1–2.5 cm in diameter; calyx lobes 1–1.3 mm long, bicolorous with green midrib and broad pale margins; leaves often appearing clustered at the nodes due to short shoots in axils of leaf pairs, the internodes hirsutulous with trichomes to 1 mm long ..... *Spermacoce brownii*
9. Terminal inflorescences 0.3–0.8 cm in diameter; calyx lobes 0.5–1 mm long, uniformly green or purple-tinged green in color; leaf pairs well separated by internodes, the internodes glabrous or hirtellous with trichomes to 0.2 mm long ..... *Spermacoce remota*

10(7). Calyx lobes consistently 2 ..... *Spermacoce exilis*
10. Calyx lobes 4 (occasionally 2–3 in some flowers of *S. alata* and *S. prostrata*) (11).

11(10). Seed surface papillose with raised protuberances ..... *Spermacoce* sp. A (Moloka‘i)
11. Seed surface nearly smooth, shallowly or deeply pitted (12).

12(11). Leaves sessile or the lower ones with petioles 1–3(–5) mm long; corolla tube ca. 0.5 mm long; seeds 0.7–0.9 mm long with deep pits organized into less than 8 vertical rows. ..... *Spermacoce prostrata*
12. Leaves, at least the lower ones, distinctly petiolate with petioles 5–10 mm long; corolla tube 2.5–5 mm long; seeds 1.7–3 mm long with numerous minute pits not organized into rows (13).

13(12). Calyx lobes (2)4; corolla tube ca. 4–5 mm long; seeds light brown, 1.7–2.6 × 1.2–1.5 mm, surface finely pitted; annual herbs to ca. 50 cm tall; apices of leafy stems determinate, usually with terminal inflorescences ..... *Spermacoce alata*
13. Calyx lobes 4, often unequal; corolla tube 2.5–4 mm long; seeds dark reddish- or purplish-brown, 2–3 × 0.8–0.9 mm, surface finely pitted and also with several very shallow transverse dorsal depressions; perennial herbs or shrubs to ca. 70 cm tall; apices of leafy stems indeterminate, usually without terminal inflorescences ..... *Spermacoce ocymifolia*

Hexasepalum apiculatum (Willd.) Delprete & J.H. Kirkbr. **Nomenclatural note**

(Fig. 1A)

[Syn. *Spermacoce apiculata* Willd.; *Diodella apiculata* (Willd.) Delprete; *Diodia apiculata* (Willd.) K. Schum.; *Diodia rigida* (Willd. ex Roem. & J.A. Schultes) Cham. & Schltdl.]

The record for *Hexasepalum apiculatum* (as *Diodia apiculata*) in Hawai‘i was first published by Imada *et al.* (2000), and this species and is now found on O‘ahu (Imada 2019). Native to Mexico, Central and South America, West Indies, naturalized in Java, Angola (POWO 2024). Imada *et al.* (2000) recorded this as weedy at a single locality on O‘ahu [Ko‘olau Mts, Pūpūkea-Paumalu, Ko‘olauloa, 400 ft [120 m], 6 Dec 1987, *Nagata & Takeuchi 3748* (BISH)], but unknown if it is truly naturalized or occurs elsewhere.

Hexasepalum sarmentosum (Sw.) Delprete & J.H. Kirkbr. **New state record**

(Fig. 1B)

[Syn. *Diodia sarmentosa* Sw.; *Diodella sarmentosa* (Sw.) Bacigalupo & E.L. Cabral ex Borhidi]

Native from southern Mexico through Central and South America, also in tropical East Africa (POWO 2024). This species is recorded from a single collection on Moloka‘i, but unknown if truly naturalized. The *Herbst 9823* collection (Fig. 1B) has puberulent fruits with stiff white hairs and 4 calyx lobes, matching the pubescence of some collections of this species from Mexico (e.g., Puebla and Veracruz) housed at PTBG. The following description is from Verdcourt (1976: 336, as *Diodia sarmentosa* Sw.):

> “Straggling, scrambling or procumbent herb 1–3.6 m. long, often with many lateral branches from the main stem; stems 4-angular, pubescent on the angles but at length glabrous. Leaf-blades often rather yellowish green, elliptic, 1.8–6.3 cm. long, 0.7–2.8 cm. wide, acute at the apex, narrowed to the base, scabrid above with dense very short to longer tubercle-based hairs, pubescent beneath; petiole 1–5 mm. long; stipule-bases 1–2 mm. long with lines of hairs, bearing 5–7 setae 1–7 mm. long. Flowers usually few in axillary clusters at most nodes, the inflorescences up to 1.2 cm. in diameter in fruiting stage. Calyx-tube glabrous, obconic, 1.5–2 mm. long; lobes 4, often unequal, oblong-lanceolate

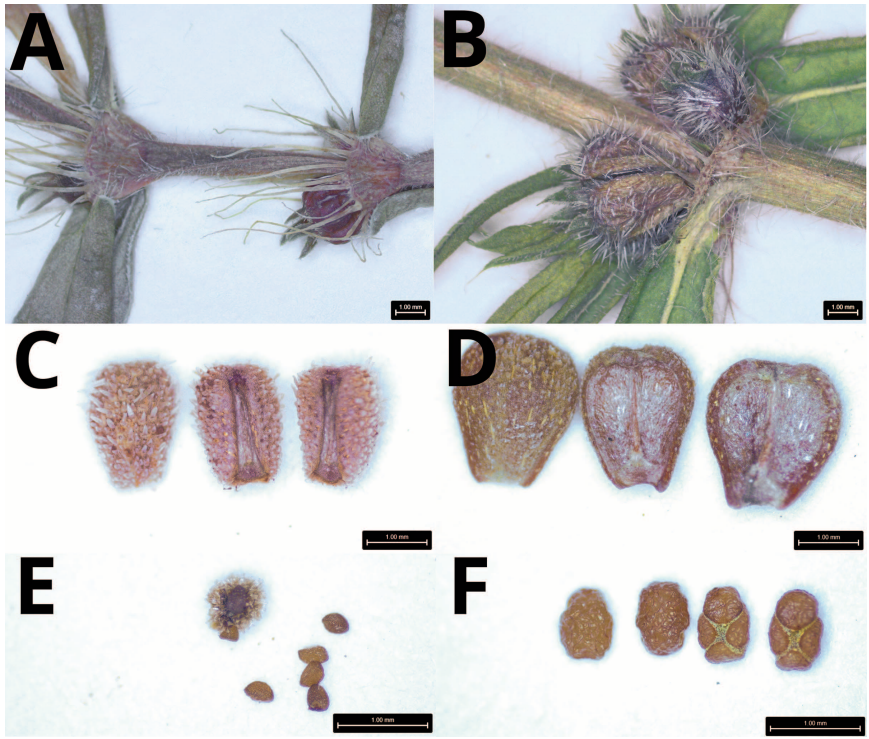

Figure 1. Fruits and seeds of Spermacoceae, all photographs taken of specimens housed at BISH. Note the various magnifications between genera. **A,** Nodes showing stipules and glabrate fruits of *Hexasepalum apiculatum* (*Nagata & Takeuchi 3748*); **B,** Node showing stipules and pubescent fruits of *Hexasepalum sarmentosum* (*Herbst 9823*); **C,** Mericarp fruits of *Richardia scabra* showing narrow median groove (*K. Faccenda & C. Daehler 2908*); **D,** Mericarp fruits of *Richardia brasiliensis* showing broad median keel (*D. Lorence & T. Flynn 5539*); **E,** Seeds of *Oldenlandia corymbosa* (*D. Lorence 6611*) with placenta (upper left); **F,** Seeds of *Mitracarpus hirtus* showing x-shaped adaxial groove (*K. Faccenda 3265*).

or narrowly triangular, 1.5–3 mm. long, 0.8 mm. wide, ciliate. Corolla mauve or white; tube glabrous, funnel-shaped, 1.8 mm. long; lobes triangular, 1 mm. long, 1 mm. wide, with a few hairs outside. Filaments exserted 0.5 mm. Style exserted 1.5 mm., minutely papillate. Cocci 1/2-oblong-ellipsoid, 3.5–5 mm. long, 2.5 mm. wide, 1.2 mm. thick or sometimes more globose, quite definitely not readily dehiscent. Seeds dark blackish red, compressed ellipsoid, 2–4 mm. long, 1.5 mm. wide, 0.8 mm. thick, with a broad ventral groove, finely rugulose."

Material examined: **MOLOKA'I**: Kaluako'i Distr, along Hwy 46 at Mahana, 750 ft [230 m], 17 Apr 1997, *D. R. Herbst 9823* (BISH).

Mitracarpus hirtus (L.) DC. **Note**
(Fig. 1F)
[Syn. *Spermacoce hirta* L.; *Mitracarpus villosus* (Sw.) DC.; *Spermacoce villosa* Sw.]
Mitracarpus hirtus was first published in Hawai‘i by Wagner *et al.* (1990), and this species is now found on East Maui (Kaupō, Ke‘anae) and Hawai‘i (Ka‘ū, Puna, North Kona, and South Hilo Districts) (Imada 2019). Native to the Neotropics and becoming widespread at an early date (POWO 2024). Easily recognized by its circumscissile capsules and seeds with an x-shaped groove on the adaxial surface.

Oldenlandia corymbosa L. **Note**
(Fig. 1E)
[Syn. *Hedyotis corymbosa* (L.) Lam.]
Oldenlandia corymbosa was first published in Hawai‘i by Wagner *et al.* (1990), and this species is now found on Kaua‘i, O‘ahu, Maui, Kaho‘olawe, and Hawai‘i (Imada 2019). Native to Africa and tropical and subtropical Asia, but widely naturalized in tropical and subtropical America, Australia, and on many Pacific islands (POWO 2024). Easily recognized by its creeping habit with prostrate stems, lanceolate leaves, and capsules with numerous very small seeds 0.2–0.3 mm long.

Richardia brasiliensis Gomes **Note**
(Fig. 1D)
Richardia brasiliensis was first published in Hawai‘i by Wagner *et al.* (1990), and this species and is now found on Kaua‘i, O‘ahu, Lāna‘i, West Maui, and Hawai‘i (Imada 2019). Native to central South America, now widely naturalized in the southern United States, Mexico, Jamaica, Africa, Mauritius, India, Sri Lanka, Southeast Asia, China, Australia, New Guinea, and the Hawaiian Islands (POWO 2024).

Richardia scabra L. **Note**
(Fig. 1C)
Richardia scabra was first published in Hawai‘i by Lorence *et al.* (1995), and this species is now found on Kaua‘i, O‘ahu, Moloka‘i, Maui, and Hawai‘i (Imada 2019). Native in South and Central America, Mexico, the southern United States, the West Indies, and now widely naturalized in Africa, India, Sri Lanka, Southeast Asia, China, the Philippines, and the Hawaiian Islands (POWO 2024).

Spermacoce alata Aubl. **Correction; nomenclatural note**
(Fig. 2B)
[Syn. *Borreria alata* (Aubl.) DC.; *B. latifolia* (Aubl.) K. Schum.; *Spermacoce latifolia* Aubl.]
Spermacoce alata was first published as naturalized in Hawai‘i under the name *S. latifolia* by Lorence *et al.* (1995), and this species is now found on Kaua‘i and O‘ahu (Imada 2019). Native from southern Mexico to Paraguay and naturalized in Florida, tropical Africa, tropical Asia, Malaysia, Indonesia, Polynesia (Hawaiian Islands), Micronesia (FSM and Palau), and Australia (POWO 2024). The stems and leaves usually dry with a distinctive yellowish green color. The specimens from East Maui cited by Oppenheimer (2004) were misidentified and are actually *S. remota*. Consequently, the distribution record for *S. alata* in Maui should be removed, as well as the record for Moloka‘i, which is *Spermacoce* sp. (see below).

Figure 2. Seeds of genus *Spermacoce*, all photographs taken of specimens housed at BISH at 20×. **A,** *S. remota* (*J. Lau 1475*); **B,** *S. alata* (*Tschannen US ARMY 455*); **C,** *S. ocymifolia*. (*K.R. Wood 15257*); **D,** *S. brownii* (*P.M. Bunch L104*).

The names *Spermacoce alata* and *S. latifolia* (or *Borreria alata* and *B. latifolia*) have been treated as distinct species by many authors but synonymized by others, variously under each of these names. There now appears to be only one species here, which takes the name *S. alata* (Adams & Taylor 2012). Aublet's names were published simultaneously. Although the names *B. latifolia* and *S. latifolia* have been more often used, these species were apparently first synonymized by Hara and Gould (1979) under the name *B. alata*.

Spermacoce brownii Rusby **New state record**
(Fig. 2D)
[Syn. *Borreria tonalensis* Brandegee; *B. vegeta* Standl. & Steyerm.; *Spermacoce tonalensis* (Brandegee) Govaerts]
Annual herb or subshrub native from southern Mexico to Argentina (POWO 2024). This species resembles *Spermacoce remota* but differs by the characters noted in the key. It is known from three collections on Hawai‘i Island. Apparently naturalized, but additional collections should be made to assess its current status and distribution. The following description is from Burger & Taylor (1993: 320, as *Borreria vegata*):

> "Annual herbs, erect, 10-30 cm tall, leafy stems 1–5 mm diam., longitudinal ribs obscure in early growth, sparsely to densely puberulent with crooked whitish hairs 0.2–0.5 mm long; stipule sheath 3–8 mm long, 6–23 mm broad, often marked with reddish spots, with

7–13 subequal awns to 9 mm long. Leaves opposite or more often pseudoverticillate with smaller axillary leaves, petioles 3–10 mm long, with broad lateral margins; leaf blades 25–90 mm long, 6–40 mm broad, elliptic-lanceolate to ovate-elliptic or lanceolate, apex tapering gradually and attenuate-acuminate, base abruptly narrowed and obtuse or cuneate, decurrent on the winged petiole, drying chartaceous, grayish green or yellowish green above (paler grayish beneath), glabrous or with short scabrous hairs above, sparsely to densely puberulent with thin whitish hairs 0.2–0.5 mm long beneath, 2° veins 4–7/side. Inflorescences terminal or axillary, hemispheric or verticillate, to 15 mm high and 25 mm broad, subtended by the leaves and enlarged stipular sheath, flowers densely congested. Flowers with 4 calyx lobes, 0.5–1.3 mm long, ca. 1 mm broad at base, ovate or suborbicular to broadly triangular, rounded to obtuse at the apex, ciliolate; corolla white, ca. 2.5 mm long, anthers ca. 0.4 mm long. Fruits ca. 3 mm long, villose to glabrous; seeds 2–2.2 mm long, 0.8–0.9 mm broad, narrowly oblong, with prominent transverse sulci, dark reddish brown."

Material examined: **HAWAI'I**: North Kohala Distr, Parker Ranch, stock ponds in vicinity of Kehena Reservoir, emergent vegetation along the shore and standing water, growing in upland, dry, grassy area, 2400 ft [730 m], 20°10′N, 155°48′W, 08 Jun 1992, *A. Engilis Jr. & F.A. Reid 92-04* (BISH); North Kohala Distr, Surety Ranch LLC Stock Ponds, growing on sloping wet banks of stock pond, stiffly upright herb 1.5–2 ft [0.5–0.6 m] tall, 20°11.481′N, 155°47.276′W, 1755 ft [535 m], 20 Mar 2005, *Crago 2005-118 & C. Imada* (BISH, PTBG); North Kohala Distr, Ka'ala'ala ahupua'a, Lāhikiola cinder cone, growing on shallow soil pockets on southwest facing exposed rock, uncommon, 3000–3300 ft [915–1005 m], 13 Mar 1989, *P.M. Bunch L104* (BISH).

Spermacoce exilis (L.O. Williams) C.D. Adams ex W.C. Burger & C.M. Taylor **Note**

(Fig. 3A)

[Syn. *Borreria exilis* L.O. Williams; *Spermacoce mauritiana* Gideon]

Spermacoce exilis was first published in Hawai'i by Wagner *et al.* (1990) as *Spermacoce mauritiana* and is now found on Maui and Hawai'i (Imada 2019). Native from southern Mexico and the Antilles to Brazil and Bolivia, now widely naturalized in tropical Africa, Madagascar, tropical Asia, Malaysia, Indonesia, New Guinea, the Indian Ocean islands, Polynesia (Hawaiian Islands and Samoa), and Micronesia (FSM and Palau) (POWO 2024).

Spermacoce ocymifolia Willd. **New state record**

(Fig. 2C)

[Syn. *Borreria ocymifolia* (Willd.) Bacigalupo & E.L. Cabral; *Diodia ocymifolia* (Willd.) Bremek.; *Hemidiodia ocymifolia* (Willd.) K. Schum.]

A perennial herb or subshrub native from southern Mexico through much of Tropical America. Introduced in Sri Lanka, Southeast Asia, Indonesia, Malaysia, and New Guinea (POWO 2024). In the Hawaiian Islands naturalized in areas of windward Kaua'i, where it forms extensive and dense stands in formerly cultivated areas, secondary vegetation, and also in native wet forest vegetation up to ca. 780 m elevation. Some specimens were initially misidentified as *S. latifolia* and distributed by PTBG under that name. The following description is from Burger & Taylor (1993: 317):

"Herbs or subshrubs, 30-90(–150) cm tall, branches erect or spreading and decumbent, distal branches simple or less often branched, leafy stems 0.5–3 mm thick, with 4 obscure longitudinal ribs and becoming terete, usually sparsely pubescent with thin whitish hairs 0.1–0.3 mm long; stipular sheath 2–6 mm long, 2–6 mm broad, conical (often difficult to

see beneath the inflorescences), pubescent, with (3–)5–11 unequal erect or spreading awns on each side, 2–8 mm long. Leaves opposite, petioles 0–12 mm long, 0.4–2 mm wide, sometimes with winged margins continuous with the leaf margins; leaf blades 2–8(–11) mm long, 0.6–2(–3) cm broad, narrowly elliptic, narrowly elliptic-oblong or elliptic-lanceolate, apex tapering gradually and acute or acuminate, base, attenuate, and decurrent on petiole, the margins becoming revolute, leaves drying stiffly chartaceous, slightly scabrous above and glabrous or sparsely puberulent, glabrous or scabrous beneath with short (0.1–0.2 mm) stiff hairs, 2° veins 3–6/side, strongly ascending. Inflorescences axillary and verticillate, 6–14 mm broad and 4–8 mm high, subtended by the petiolar sheath and its linear awns, the flowers densely crowded and sessile or subsessile. Flowers with hypanthium 1–2 mm long, narrowly oblongoid, with short stiff hairs, calyx lobes 0.3–0.5 mm long and ca. 0.4 mm broad; corolla white, funnelform, tube 1.3–2.5 mm long, ca. 0.6 mm diam. at the base and 1 mm at the mouth, glabrous externally, with short hairs at the mouth within, lobes 3–4, 1–2 mm long and ca. 0.5 mm broad, oblong-lanceolate; stamens 3–4, filaments 0.6–2 mm long, anthers 0.6–0.9 mm long, oblong; style ca. 2.5 mm long. Fruits 2.5–4 mm long, 1.5–2 mm broad, oblong-turbinate to obovoid-oblong, glabrous near the base and with thin erect hairs 0.2–0.3 mm long distally, persisting calyx 0.3 mm long, splitting into 2 mericarps; seeds 2–3 mm long, 0.6–1.3 mm thick, narrowly oblong, smooth or with obscure transverse depressions abaxially (×10) and minutely pitted surface (×40), dark reddish brown."

Material examined: **KAUA'I**. Līhu'e Distr, former Līhu'e Plantation land due N of Kilohana Crater along S fork of Wailua River, 22.033333, -159.416667, 11 Jan 2004, *D.H. Lorence et al. 9182* (BISH, PTBG, US); Kōloa Distr, Līhu'e-Kōloa Forest Reserve, N of water tank for Kāhili Mountain Park, 21.964333, -159.484417, 23 Jun 2005, *W.L. Wagner et al. 7043* (PTBG, US); Kōloa Distr, Hā'upu summit region, 14 Jul 2006, *K.R. Wood & M. Wood 11987* (BISH, PTBG, US); Līhu'e Distr, 'Iole Ridge, 22 Sep 2012, *K.R. Wood & M. Query 15257* (BISH, PTBG); Līhu'e Distr, 'Ili'ili'ula Valley, along drainage below northern falls, 22.0487350, -159.487350, 27 Jun 2013*, K.R. Wood et al. 15548* (PTBG); Līhu'e Distr, Kamo'oloa, northern branch, 22.003482, -159.491856, 11 Jul 2018, *K.R. Wood et al. 17881* (BISH, PTBG, US).

Spermacoce prostrata Aubl. **Note**

(Fig. 3C)

[Syn. *Borreria prostrata* (Aubl.) Miq.; *Spermacoce ovalifolia* misapplied, non (M. Martens & Galeotti) Hemsl.]

Spermacoce prostrata was first published in Hawai'i by Wagner *et al.* (1990), and this species is now found on O'ahu, Maui, and Hawai'i (Imada 2019). Native from southern Mexico to Argentina, Florida, and the Antilles, naturalized in the Cape Verde Islands, Sri Lanka, Southeast Asia, Indonesia, and Polynesia (Hawaiian Islands) (POWO 2024). Formerly misidentified as *S. ovalifolia* (M. Martens & Galeotti) Hemsl., which does not occur in the Hawaiian Islands (Oppenheimer 2003; Imada 2019).

Spermacoce remota Lam. **Nomenclatural note**

(Fig. 2A)

[Syn. *Borreria remota* (Lam.) Bacigalupo & E.L. Cabral; *Borreria assurgens* (Ruiz & Pav.) Griseb.; *Spermacoce assurgens* Ruiz & Pav.; *Borreria laevis* sensu auctt., non (Lam.) Griseb.]

This is the most common and weedy member of the genus in Hawai'i. *Spermacoce remota* was first published in Hawai'i by Wagner *et al.* (1990) as *S. assurgens,* and this species is now found on Kaua'i, O'ahu, Moloka'i, Lāna'i, Maui, and Hawai'i (Imada 2019). Native from the southeastern USA and the West Indies and Mexico south to Brazil and Paraguay,

Figure 3. Seeds of genus *Spermacoce*, all photographs taken of specimens housed at BISH at 20×. **A,** *S. exilis* (*R. Hobdy 2561*); **B,** *Spermacoce* sp. A showing papillose surface (*H. Oppenheimer H110715*); **C,** *S. prostrata* (*D. Herbst 9583*).

naturalized in tropical East Africa, tropical Asia, Malesia, Indonesia, Australia, New Guinea, and many Pacific islands, including Polynesia (Hawai‘i and Samoa) and Micronesia (FSM, Palau) (POWO 2024).

Spermacoce sp. A **Correction; nomenclatural note**
(Fig. 3B)

Known from a single collection from Moloka‘i, where it was noted to be naturalized "… in pastures, waste areas, and open disturbed sites…." (Oppenheimer 2008). The collection was identified as *S. latifolia* (a synonym of *S. alata*) but doesn't correspond with *S. alata,* and consequently the occurrence of that species on Moloka‘i should be removed.

Seeds of *H. Oppenheimer H110715* are dark brown or mottled, narrowly ellipsoid, and have a distinctive papillose surface with raised protuberances (Fig. 3B), although the layer covering the testa appears to disintegrate with age, revealing pitting underneath (Fig. 3B, second seed from left). In contrast, seeds of *S. alata* (Fig. 2B) are light brown or tan, broadly ellipsoid, and the surface is finely pitted, not papillose. No other *Spermacoce* species currently known from the Hawaiian Islands has comparable papillose seeds, nor does *H. Oppenheimer H110715* correspond with any neotropical *Spermacoce* species seen by the first author. Additional collections should be made to assess its identity, current status, and distribution. A description of this unknown species follows:

Herb of unknown life span, stems erect to sprawling, indeterminate with most inflorescences axillary, stems square with low ridges, pilose on the margins, stipular sheath truncate, puberulent, ca. 1 mm long with 3–4 setae 1–4 mm long, these sparsely ciliate; stems and leaves drying yellowish green; leaves sessile, the blade coriaceous, elliptic, 2–3 × 0.7–1 cm, adaxial surface scabrid, abaxial surface pilose, lateral veins 3–5 on each side, deeply sunken adaxially, prominulous and pilose abaxially. Inflorescences mostly axillary, 0.8–1.2 cm wide; flowers with hypanthium puberulent, calyx lobes 4, subequal, narrowly deltoid-lanceolate, 0.7–1.5 mm long, ciliate, corolla white, tube 1.5 mm long, lobes 0.5 mm long, apex puberulent. Capsules ca. 2 mm long and wide, both cocci dehiscent; seeds dull dark brown, sometimes mottled with paler brown dorsally, narrowly ellipsoid, 1.6–2 × 0.7–0.9 mm, abaxial surface papillose with raised protuberances.

Material examined: **MOLOKA‘I**: Moakea, south of Pāpio Gulch, in pastures and waste areas, naturalized, erect to sprawling, locally common, 968 ft (295 m), 21.141407°N, 156.743386°W, 7 Nov 2007, *H. Oppenheimer H110715* (PTBG, BISH).

ACKNOWLEDGMENTS

We extend our thanks to Clyde Imada for helpful review of the manuscript, to Barbara Kennedy and Clyde for providing information, images and loan of specimens housed at the Bishop Museum (BISH), and Tim Flynn for assistance with collections at Herbarium PTBG.

REFERENCES

Adams, **C**.**D**. **& Taylor**, **C**.**M**. 2012. *Spermacoce*, pp. 275–282. *In*: Davidse, G., Sousa S., M., Knapp, S. & Chiang, F. (eds.), *Flora Mesoamericana.* Volumen 4, parte 2, Rubiaceae a Verbenaceae. St. Louis.

Burger, **W**.**C**. **& Taylor**, **C**.**M**. 1993. Flora Costaricensis, Family # 202 Rubiaceae. *Fieldiana: Botany* (*n.s.*) **33**: 1–333.

Faccenda, **K**. 2024. Report of 24 new naturalized weeds across the islands of Hawai‘i. *Bishop Museum Occasional Papers* **156**: 71–110.

Hara, **H**. **& Gould**, **S**. 1979. Rubiaceae, pp. 199–209. *In*: Hara, H. & Williams, L. H. J., *An enumeration of the elowering plants of Nepal.* Vol. 2. British Museum (Natural History), London.

Imada, **C**. (ed.). 2019. Hawaiian naturalized vascular plants checklist (February 2019 update). *Bishop Museum Technical Report* **69**, 203 pp.

Imada, **C**., **Staples**, **G**.**W**. **& Herbst**, **D**.**R**. 2000. New Hawaiian plant records from 1999. *Bishop Museum Occasional Papers* **63**: 9–16.

Lorence, **D**.**H**. **& Flynn**, **T**. 2006. New naturalized plant records for Kaua‘i and Hawai‘i. *Bishop Museum Occasional Papers* **88**: 1–5.

Lorence, **D**.**H**., **Flynn**, **T**.**W**. **& Wagner**, **W**.**L**. 1995. Contributions to the flora of Hawai‘i. III. New additions, range extensions, and rediscoveries of flowering plants. *Bishop Museum Occasional Papers* **41**: 19–58.

Oppenheimer, **H**.**L**. 2003. New plant records from Maui and Hawai‘i counties. *Bishop Museum Occasional Papers* **73**: 3–30.

Oppenheimer, **H**.**L**. 2004. New Hawaiian plant records for 2003. *Bishop Museum Occasional Papers* **79**: 8–20.

Oppenheimer, **H**.**L**. 2008. New plant records from Maui County for 2008. *Bishop Museum Occasional Papers* **107**: 33–40.

POWO (Plants of the World Online). 2024. https://powo.science.kew.org/ (accessed June 2024).

Terrell, **E**.**E**. **& Wunderlin**, **R**.**P**. 2002. Seed and fruit characters in selected Spermacoceae and comparison with Hedyotideae (Rubiaceae). *Sida* **20**: 549–557.

Verdcourt, **B**. 1976. *Flora of Tropical East Africa*. Rubiaceae (1): 1–414.

Wagner, **W**.**L**., **Herbst**, **D**.**R**. **& Sohmer**, **S**.**H**. 1990. *Manual of the flowering plants of Hawai'i*. 2 vols. University of Hawaii Press & Bishop Museum Press, Honolulu. 1,853 pp.

Wagner, **W**.**L**., **Khan**, **N**.**R**. **& Lorence**, **D**.**H**. 2023–. Flora of the Hawaiian Islands website. https://naturalhistory2.si.edu/botany/hawaiianflora/ (Accessed May 2024).