

Shining some light on a poorly known species: *Haloragis luminosa* (Haloragaceae), a new Western Australian species from a Threatened Ecological Community

Juliet A. Wege¹ and Anthony E. Orchard²

¹Western Australian Herbarium, Biodiversity and Conservation Science,
Department of Biodiversity, Conservation and Attractions,
Locked Bag 104, Bentley Delivery Centre, Western Australia 6983
²c/o Australian Biological Resources Study,
GPO Box 787, Canberra, Australian Capital Territory 2601
³Corresponding author, email: Juliet.Wege@dbca.wa.gov.au

SHORT COMMUNICATION

The new species of *Haloragis* J.R.Forst. & G.Forst. (Haloragaceae) described below was first collected by Greg Keighery in 1989, but this collection was not available for study until many years after the publication of the *Flora of Australia* treatment of the family (Orchard 1990). It was eventually viewed by one of us [AO] in 2003 and immediately recognised to be of interest, but its taxonomic status could not be resolved due to the absence of fruits, which are highly diagnostic in *Haloragis*. Fruiting material was acquired in early 2018 thanks to the assistance of local conservation personnel and volunteers, enabling us to confirm that it is indeed a distinct species. Known from a single location within a Threatened Ecological Community on the Swan Coastal Plain (Figure 1A), this species may also merit a Threatened status.

Haloragis luminosa* Wege & Orchard, *sp. nov.

Type: near Yanchep, Western Australia [precise locality withheld for conservation reasons], 5 January 2018, J.A. Wege & A. Harris JAW 2058 (*holo:* PERTH 08984689; *iso:* CANB, MEL).

Haloragis sp. Parrot Ridge (G.J. Keighery 11563), Western Australian Herbarium, in *FloraBase*, <https://florabase.dpaw.wa.gov.au/> [accessed 14 August 2017].

Annual herb 10–40 cm tall, glabrous. *Stems* erect or ascending, faintly 4-ribbed, somewhat woody towards the base. *Leaves* opposite to subopposite at base, becoming alternate below the inflorescence, sessile, linear to narrowly lanceolate, 20–50 mm long, 1–2.5 mm wide (excluding coarse teeth), acute at tip, tapering gradually to base; margins with 3–5 widely spaced, forward-pointing, triangular teeth 0.5–2.5 mm long on each side; midrib channelled above, faintly visible below; lateral veins obscure. *Inflorescence* an indeterminate spike of 1–3-flowered dichasia in axils of alternate primary bracts; primary bracts green, leaf-like, 3–45 mm long; secondary bracts membranous, linear, 1.2–2 mm long, entire; tertiary bracts 0.3–0.5 mm long. *Flowers* 4-merous, shortly pedicellate. *Sepals* 4, erect, deltate, c. 1.2–1.4 mm long, c. 1.1–1.2 mm wide. *Petals* 4, yellowish green, sometimes with reddish markings externally, strongly hooded, c. 2.5–3 mm long. *Stamens* 8; filaments to c. 0.3 mm long; anthers yellow,

oblong, *c.* 1.8–2.1 mm long. *Styles* 4, *c.* 0.4–0.5 mm long; stigmas capitate. *Ovary* turbinate, ribbed opposite the petals, glabrous, 4-locular. *Fruit* 1 per axil on pedicels 1–1.8 mm long, pale brown to greenish brown, obovoid or depressed-globose, 4.5–7 mm long (excluding sepals), 4.5–8.5 mm wide, shortly and irregularly winged between the sepals in the upper part, with swollen protuberances below the sepals, irregularly rugose, glabrous; sepals erect, 1.5–1.8 mm long, 2.7–3 mm wide, eroding with age; endocarp and septa woody, exocarp swollen and spongy; seeds 4, 1 per locule. (Figure 1B, C)

Diagnostic features. *Haloragis luminosa* can be differentiated from other species in the genus by its large, obovoid or depressed-globose fruits that are irregularly winged between the sepals, swollen below the sepals and irregularly rugose, with a swollen and spongy exocarp. Other notable characters to aid identification are its glabrous vegetative and flowering parts, linear to narrowly lanceolate, coarsely toothed leaves, and 4-merous flowers and fruit.

Other specimens examined. WESTERN AUSTRALIA: [localities withheld for conservation reasons] 30 Sep. 1989, G.J. Keighery 11563 (PERTH); 7 Dec. 2016, C. Morey & D. Pike YNP vol/20161207 (CANB, PERTH); 6 Feb. 2017, D. Pike & C. McIlduff YNP vol/20170206.

Phenology. Buds and young flowers have been recorded in late September; mature fruits have been collected in January and February.

Distribution and habitat. *Haloragis luminosa* is known from a single locality near Yanchep where it grows in orange-brown sand on the slopes and crest of a limestone ridge in a tall shrubland of *Acacia rostellifera* with *Banksia sessilis*, *Melaleuca systema* and *M. huegelii* over *Xanthorrhoea preissii* and *Hibbertia hypericoides*.

Conservation status. Listed by Smith and Jones (2018) as Priority One under Conservation Codes for Western Australian Flora, under the name *H. sp.* Parrot Ridge (G.J. Keighery 11563). This species is known only from a single population that occurs within Threatened Ecological Community 26a (*Melaleuca huegelii* – *Melaleuca systema* shrublands on limestone ridges), which is highly restricted in distribution and threatened by quarrying for limestone and inappropriate fire regimes (Gibson *et al.* 1994; English 2009). *Haloragis luminosa* is likely to warrant listing as Threatened.

Etymology. The epithet is from the Latin (*L. luminosus*, full of light) and refers to the swollen fruit, which resemble Chinese or Japanese paper lanterns.

Vernacular name. Lantern Sea-berry.

Affinities. We are uncertain as to the precise affinities of *H. luminosa*. It is perhaps best compared with *H. maierae* Orchard, a species that also has a mostly glabrous, annual habit, coarsely toothed (or entire) leaves, and tetramerous flowers and fruit. However, unlike *H. luminosa*, the fruit of *H. maierae* have four, well-developed papery wings that are prominently veined, with the veins forming distinct ‘shelves’ between the wings (see Orchard *et al.* 2005: Figure 2B), and sepals that are incurved over the apex of the fruit (*cf.* fruit shortly winged and irregularly rugose with erect sepals). *Haloragis maierae* differs further from *H. luminosa* by the presence of minute hairs on young plant parts and up to three forward-pointing teeth on each side of the leaves (*cf.* 3–5 teeth). It has a distribution centred on the Pilbara bioregion, with outlying records near Wolfe Creek and Kalgoorlie in Western Australia, and Hamilton Downs Station in the Northern Territory (Western Australian Herbarium 1998–; Orchard *et al.* 2005; AVH 2018).

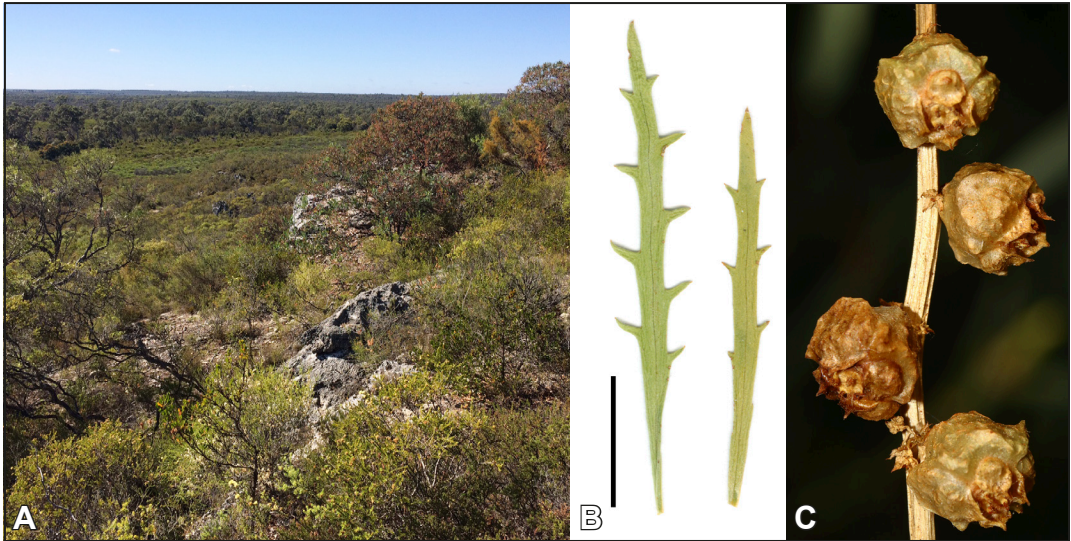


Figure 1. *Haloragis luminosa*. A – rocky limestone habitat; B – coarsely toothed leaves (scale bar = 1 cm); C – swollen fruit with erect sepals and irregular protuberances. Images © J. Wege (A, B) and R. Davis (C) from *J.A. Wege & A. Harris* JAW 2058 (A, C) and *C. Morey & D. Pike* YNP vol/20161207 (B).

The fruit of *H. luminosa* are perhaps more akin to those of another arid zone species with tetramerous flowers, *H. uncatipila* Orchard. Its fruit are similarly swollen and rugose; however, they are scabrous (*cf.* glabrous), lack protuberances, and tend to be smaller ($3.5\text{--}4.5 \times 4\text{--}5.5$ mm *cf.* $4.5\text{--}7 \times 4\text{--}8.5$ mm in *H. luminosa*). Sterile material of the two species can be readily differentiated since the stems and leaves of *H. uncatipila* are scabrous (*cf.* glabrous) and its leaves are dentate (*cf.* coarsely toothed).

Haloragis luminosa is also somewhat similar to *H. platycarpa* Benth., another species with coarsely toothed leaves, tetramerous flowers and swollen, rugose fruit; however, its fruit are smaller than those of *H. luminosa* ($1.7\text{--}2.5 \times 2.2\text{--}4$ mm *cf.* $4.5\text{--}7 \times 4\text{--}8.5$ mm) and densely papillose (*cf.* glabrous), and its stems have scattered papillae (*cf.* glabrous). *Haloragis platycarpa* is a Threatened species from the northern Avon Wheatbelt, occurring near Moora and Dalwallinu (Western Australian Herbarium 1998–).

Other possibly closely related species are *H. foliosa* Benth., *H. scoparia* Fenzl and *H. aculeolata* Benth., all of which are similar in habit and appearance to *H. luminosa* and have distributions that include records from the Swan Coastal Plain. *Haloragis foliosa* can be readily differentiated by its sparsely scabrous vegetative and floral parts, lanceolate bracts, and small (*c.* $1.7\text{--}2 \times 1.7\text{--}2$ mm), 4-winged fruit that are transversely rugose between the wings and borne on pedicels *c.* $0.2\text{--}0.5$ mm long. *Haloragis scoparia* and *H. aculeolata* also differ from *H. luminosa* in their scabrous vegetative and floral parts and smaller fruit (*c.* $1.8\text{--}2.5 \times 1.5\text{--}2.5$ mm) that are weakly rugose or unornamented.

Acknowledgements

We are indebted to Anne Harris (Flora Conservation Officer, Swan Region, Department of Biodiversity, Conservation and Attractions) and regional volunteers David Pike, Chanelle Morey and Ciara McIlduff for their survey efforts and assistance in obtaining material to facilitate this research. We also thank staff at the Western Australian Herbarium for curatorial and editorial assistance, including Kelly Shepherd for her editorial remarks, and an anonymous reviewer for their comments on the manuscript. This research was supported by a Science Project Support Grant from Biodiversity and Conservation Science (DBCAs).

References

- AVH (2018). *The Australasian Virtual Herbarium*. Council of Heads of Australasian Herbaria. <https://avh.chah.org.au> [accessed 27 April 2018].
- English, V. (2009). Rare plant community on massive limestone ridges. *Landscape* 25(1): 45.
- Gibson, N., Keighery, B.J., Keighery, G.J., Burbidge, A.H. & Lyons, M.N. (1994). *A floristic survey of the southern Swan Coastal Plain*. Unpublished report prepared for the Australian Heritage Commission. 228 pp. (Department of Conservation and Land Management and Conservation Council of Western Australia (Inc.): Western Australia.)
- Orchard, A.E. (1990). Haloragaceae. In: George, A.S. (ed.) *Flora of Australia*. Vol. 18. pp. 5–85. (Australian Biological Resources Study: Canberra.)
- Orchard, A.E., Lepschi, B.J. & Hislop, M. (2005). New taxa, a new record and a rediscovery in Western Australian *Haloragis* (Haloragaceae). *Nyctisia* 15: 431–443.
- Smith, M.G. & Jones, A. (2018). *Threatened and Priority Flora list 5 December 2018*. Department of Biodiversity, Conservation and Attractions. <https://www.dpaw.wa.gov.au/plants-and-animals/threatened-species-and-communities/threatened-plants> [accessed 18 September 2019].
- Western Australian Herbarium (1998–). *FloraBase—the Western Australian Flora*. Department of Biodiversity, Conservation and Attractions. <https://florabase.dpaw.wa.gov.au/> [accessed 20 April 2018].