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## New records and corrections of *Chenopodium* sensu lato in the Hawaiian Islands

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*Chenopodium* sensu lato is a genus of ca. 150 species of mostly annual herbs found primarily in arid to semi-arid regions nearly worldwide (Fuentes-Bazan *et al.* 2012a). Recent phylogenetic analyses of *Chenopodium* s.l. have split off several segregate genera (Fuentes-Bazan *et al.* 2012b), including *Chenopodiastrum* and *Dysphania*. Some updates to the Hawaiian naturalized *Chenopodium* s.l. are reviewed here in light of these taxonomic changes. One nomenclatural note, one new island record, and two corrections are reported. Considering the many changes since the last time the genus was treated in Hawai'i (Wagner *et al.* 1999), as well as a newly described subspecies of *Chenopodium oahuense* from Moloka'i (Cantley *et al.* 2020), an updated key for all Hawaiian *Chenopodium* s.l. (*Chenopodiastrum*, *Chenopodium* sensu stricto, and *Dysphania*) is provided. All identifications were made by the authors unless otherwise stated. All voucher specimens cited for this paper have been deposited at the Herbarium Pacificum (BISH).

### Amaranthaceae

#### *Chenopodiastrum murale* (L.)

S. Fuentes, Uotila & Borsch

#### Nomenclatural note

Formerly known as *Chenopodium murale*, this taxon was transferred to a new genus, *Chenopodiastrum*, largely based on molecular phylogenetic analyses (Fuentes-Bazan *et al.* 2012b). Morphological differences between *Chenopodiastrum* and *Chenopodium* s.s. are discussed below.

#### *Chenopodium album* L.

#### New island record

Previously only known from Maui and Hawai'i, *Chenopodium album* is reported for the first time as naturalized on O'ahu following several recent collections. The plants from O'ahu show some odd variation that initially keyed out to *Chenopodium strictum* Roth in the Flora of North America (Clemants & Mosyakin 2003a). The leaf apices are more obtuse than typical *C. album* and the perianth segments are also reflexed at maturity, exposing the fruit. However, Mosyakin (2017) has shown that there are major problems with the name *C. strictum* and its taxonomic history. The name is no longer considered valid, but rather a synonym of *C. album* var. *album* (POWO 2023). Given that *C. album*

is a well known birdseed contaminant (Oseland *et al.* 2020), it is likely that this species is being spread in part by birdseed since at least one collection site is near an area where birdseed is frequently cast.

*Material examined.* **O‘AHU:** Honolulu, Kahuna Ln, near intersection with Kuilei St, growing from dirt near parked cars, partial shade, only one plant observed, 4 m, 21.172578, -157.491993, 29 Dec 2022, *M.C. Ross 1863*; Honolulu, Kapi‘olani Community College, near NW corner of Koa Building, growing with *Alternanthera pungens* in a disturbed area, regularly weed whacked, feral chickens present, 4 plants seen, 66 m, 21.161996, -157.485837, 19 May 2023, *M.C. Ross 1944*; *loc. cit.*, one additional plant seen, 7 June 2023, *M.C. Ross 1948*.

***Chenopodium berlandieri* Moq. Correction**

*Chenopodium berlandieri* was noted by Wagner *et al.* (1999:536), who wrote: “*Chenopodium berlandieri* Moq. was collected once in 1914 in a vegetable garden in Kaimukī, Honolulu, O‘ahu (*Forbes 1938.O*); it does not appear to have ever become established.” This species was then listed as questionably naturalized by Imada (2019). Given that *Chenopodium berlandieri* has not been seen or collected again in more than 100 years it is now almost certain that it did not become naturalized. It should therefore be entirely removed from the checklist.

***Chenopodium hircinum* Schrad. Correction**

*Chenopodium hircinum* was previously considered to be naturalized on Maui and Hawai‘i Wagner *et al.* (1999:538). However, the species is no longer known from Maui, as the single specimen (*Faurie 1059*, collected in 1909) has been redetermined as *C. oahuense* subsp. *oahuense*. *Chenopodium hircinum* is therefore only known from a single collection in 1982 from Hawai‘i Island in the area near Parker Ranch. A recent [iNaturalist observation](#) by kphilley confirms that the species is still naturalized in the area.

COMBINED KEY FOR CHENOPODIASTRUM, CHENOPODIUM S.S., & DYSPHANIA IN HAWAI‘I

Several keys for *Chenopodium* s.l. were consulted in the development of this combined key (Aellen & Just 1943; Wagner *et al.* 1999; Clemants & Mosyakin 2003a, 2003b; Fuentes-Bazan *et al.* 2012b; Cantley *et al.* 2020). The genera *Chenopodiastrum* and *Dysphania* were formerly included in *Chenopodium* s.l. but have been separated from *Chenopodium* s.s., based on molecular and morphological evidence (Fuentes-Bazan *et al.* 2012b; Clemants & Mosyakin 2003a, 2003b). Given the similarity between the three genera, they are included together in this combined key. *Dysphania* are typically aromatic herbs with glandular hairs on the leaves and perianth segments, whereas *Chenopodium* s.s. and *Chenopodiastrum* are usually non-aromatic herbs with vesicular (farinose) hairs, at least when young. These hairs are effectively spherical and usually whitish in color. The hairs in *Chenopodium* s.s. become cup-shaped when dry and are mostly persistent at maturity (Fuentes-Bazan *et al.* 2012b). In *Chenopodiastrum* the hairs totally collapse when dry and rarely persist at maturity (Fuentes-Bazan *et al.* 2012b). Furthermore, the perianth segments in *Chenopodiastrum* have a prominent midvein visible inside, while in *Chenopodium* s.s. the midvein is not especially prominent (Uotila 2017).

1. Plants with glandular hairs; not farinose
  2. Seeds vertical; leaf blade glandular-hairy on veins; rarely surpassing 40 cm tall ....  
..... *Dysphania carinata*
  - 2'. Seeds mostly horizontal; leaf blade copiously gland-dotted on lower surface;  
reaching up to 100 cm tall ..... *Dysphania ambrosioides*
- 1'. Plants lacking glandular hairs; farinose, at least when young
  3. Leaves generally glabrescent, irregularly toothed; perianth segments with prom-  
inent midrib visible on inner surface ..... *Chenopodiastrum murale*
  - 3'. Leaves farinose, variously lobed or toothed; perianth segments with midrib barely  
visible or absent (*Chenopodium* s.s.)
  4. Annual or short-lived perennial herbs; leaves usually thin, not especially fleshy  
or succulent
    5. Plants fetid; leaves usually lobed, median lobe linear; seeds alveolate .....  
..... *Chenopodium hircinum*
    - 5'. Plants nonaromatic; if leaves lobed, median lobe not linear; seeds smooth or  
nearly so ..... *Chenopodium album*
  - 4'. Shrubs; leaves thick and somewhat fleshy or succulent [endemic]
    6. Prostrate or scandent shrubs; leaves succulent, marginal lobes few and  
generally not prominent [Moloka'i] ... *Chenopodium oahuense* subsp. *ilioense*
    - 6'. Erect shrubs; leaves somewhat fleshy, marginal lobes sinuate-dentate to  
weakly prominent [all main islands, NWHI] .....  
..... *Chenopodium oahuense* subsp. *oahuense*

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