

Kept as California Rare Plant Rank 1B.2 on March 28, 2013

**Rare Plant Status Review: *Lepidium latipes* var. *heckardii*
Proposed Deletion from Retention as Rank 1B.2, G4T2 / S2**

Danny Slakey (CNPS), Aaron Sims (CNPS) and Roxanne Bittman (CNDDDB)

February 12, 2013

Changes made to the original document appear in blue text.

Background

Lepidium latipes var. *heckardii* is an annual herb in the Brassicaceae that was first added to the CNPS Inventory in 1994 (5th Edition), and is currently included on California Rare Plant Rank (CRPR) 1B.2. It was first described by Rollins (1993) and was included in *The Jepson Manual* (1993). However, it was treated as a synonym of typical *L. latipes* in *The Jepson Manual, Second Edition* (*TJM 2*; available online at http://ucjeps.berkeley.edu/cgi-bin/get_IJM.pl?tid=30545) and the *Flora of North America* (*FNA*; available online at http://www.efloras.org/florataxon.aspx?flora_id=1&taxon_id=250094897). The treatment for *L. latipes* in *FNA* provides a justification for the synonymization with the following statement:

“Variety *heckardii*, which is said to differ from var. *latipes* mainly by having elongated stems simple at base (instead of short and branched basally), grows mixed with var. *latipes* in single populations. It appears that the difference is trivial and may well be controlled by a few-gene difference. In our opinion, formal distinction is unwarranted; similar conditions exist in other species (e.g., 27. *Lepidium nitidum*).”

As noted in *FNA*, *Lepidium nitidum* var. *howellii* serves as a good example of the type of morphological variation seen in this genus. Variety *howellii* was recognized as a valid taxon in *TJM* (1993) and was previously included on Rank 4 of the CNPS Inventory. It was separated from the typical variety by its hairier stems, inflorescences, and fruits (*TJM* 1993). A later review of herbarium specimens by S. Boyd (pers. comm. 1999), however, showed that the hair characteristics were variable throughout much of the range of the species, and even varied within populations, so it was deleted from the CNPS Inventory, 6th Edition (2001) and not included in *TJM 2*. Although *L. latipes* var. *heckardii* was not included in *TJM 2* and *FNA* for the above reasons, genomic studies of *Arabidopsis* strongly suggest that even a few-gene differences can be profound with respect to crucifer adaptive features, including: vernalization, rosette formation; flower development and phenology, breeding system, fruit morphology and others (D. Taylor pers. comm. 2013).

When Rollins (1993) first described *Lepidium latipes* var. *heckardii*, he addressed the problem of the co-occurrence of the two varieties with a common garden experiment. Heckard and Hickman collected seeds of both varieties from the

same population, and the offspring of those seeds produced plants similar to the seed source in every case (Rollins 1993, L. Heckard pers. comm. 1982). Heckard suggested that the two forms are able to maintain themselves through autogamy (Rollins 1993), a method of reproduction that is common in other members of this genus (Lee et al. 2002).

Although further detailed studies on *L. latipes* var. *heckardii* have not been conducted, some field observations suggest that the two varieties do not merit recognition. Several botanists (E. Dean pers. comm. 2013; C. Witham pers. comm. 2011) observed *L. latipes* var. *heckardii* consistently growing with var. *latipes*, and noted that there is a morphological continuum between the two varieties where they occur. Many plants in the Woodland area (Yolo County) were intermediates that could not be assigned to either variety, but in other instances it is distinctive, and overall is much rarer than some of the other taxa with a 1B rank (E. Dean pers. comm. 2013). Plants from the Woodland area “need protection so that the pattern of variation can be established by genomic analysis” (D. Taylor pers. comm. 2013).

Based on the available information, CNPS and CNDDDB recommend ~~deleting~~ **maintaining** *Lepidium latipes* var. *heckardii* ~~from~~ **in** the CNPS Inventory **as a California Rare Plant Rank 1B.2 taxon**. If future research suggests that it does **not** merit taxonomic recognition, CNPS and CNDDDB will re-evaluate its status at that time.

Recommended Actions

CNPS: ~~Delete from~~ **Keep as** 1B.2

CNDDDB: ~~Delete from~~ **Keep as** G4T2 / S2

Current CNPS Inventory Record

Lepidium latipes Hook. var. *heckardii* Roll.

Heckard's pepper-grass

Brassicaceae

Rank 1B.2

Glenn, Merced, Sacramento, Solano, Yolo

Arena (422C) 37120C6, Clarksburg (497A) 38121D5, Saxon (497B) 38121D6, Liberty Island (497C) 38121C6, Dozier (498D) 38121C7, Grays Bend (513B) 38121F6, Davis (513C) 38121E6, Zamora (530C) 38121G8, Logandale (562B) 39122D2

Valley and foothill grassland (alkaline flats); elevation 2-200 meters.

Annual herb. Blooms March to May.

Many plants from the Woodland area (YOL Co.) are intermediate with *L. latipes* var. *latipes*; needs further study. A synonym of *L. latipes* in *TJM 2*. See *Harvard Papers in Botany* 4:47 (1993) for original description.

(available online at <http://www.rareplants.cnps.org/detail/1712.html>)

Literature Cited

Baldwin, B.G., S. Boyd, B.J. Ertter, R.W. Patterson, T.J. Rosatti, D.H. Wilken, and M.E. Wetherwax (eds.) 2002. *The Jepson Desert Manual: Vascular Plants of Southeastern California*. University of California Press, Berkeley and Los Angeles. 624 pp.

Flora of North America Editorial Committee, eds. 1993+. *Flora of North America North of Mexico*. 16+ vols. New York and Oxford.

Hickman, J.C. (ed.). 1993. *The Jepson Manual: Higher Plants of California*. University of California Press, Berkeley. 1400 pp.

Lee, J., K. Mummenhoff, and J.L. Bowman. 2002. Allopolyploidization and evolution of species with reduced floral structures in *Lepidium* L. (Brassicaceae). *Proceedings of the National Academy of Sciences of the United States of America* 99(26): 16845-16840.

Rollins, R.C. 1993. *The Cruciferae of Continental North America: Systematics of the Mustard Family from the Arctic to Panama*. Stanford University Press, Stanford, CA (original description).