

***Arabis hirshbergiae* and *Arabis johnstonii* kept as California Rare Plant Rank 1B.2 species, and their genus changed to *Boechera* on January 18, 2012**

**Rare Plant Status Review: *Arabis hirshbergiae* and *Arabis johnstonii***

**Proposed Deletion of *Arabis hirshbergiae* from 1B.2**

**Proposed Name Change of *Arabis johnstonii* to *Boechera johnstonii***

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Changes made to the original document appear in blue text.

**Background**

*Arabis hirshbergiae* and *Arabis johnstonii* are perennial herbs in the Brassicaceae family that are known only from near Cuyamaca Lake and the San Jacinto Mountains in southern California. After extensive molecular, cytological, and morphological studies, most of the North American species of *Arabis* were transferred to *Boechera*, including *A. hirshbergiae* and *A. johnstonii* (Al-Shehbaz 2003), and therefore will be synonymized with *Boechera* for the remainder of this review. *Boechera hirshbergiae* was added to Rank 1B of the CNPS Inventory, 6<sup>th</sup> Edition (2001). It was first described by Steve Boyd in 1998, and was not included in *The Jepson Manual* (1993). *Boechera hirshbergiae* is treated as a synonym of *Boechera johnstonii* in *The Jepson Manual, Second Edition* (TJM 2), and *Flora of North America, Vol. 7 (FNA)*. Steve Boyd (1998) notes that *B. hirshbergiae* is most closely related to *B. johnstonii* and *B. parishii*, and that it is similar to *B. johnstonii* in general habit, basal leaf shape and size, and fruit morphology. Boyd (1998) differentiated *B. hirshbergiae* from *B. johnstonii* “in having longer and broader petals (12.8-14 mm long vs. 8-10 mm; 3.5-4 mm wide vs. 2-3 mm), a consistently shorter style ( $\pm$  1 mm vs. 1-2 mm), shorter and broader gynophore, and broader siliqua valves (3-4 mm vs. 2-3 mm).” However, after a critical re-examination of the type collections of *B. johnstonii* and *B. hirshbergiae*, and the review of numerous herbarium specimens for both the *FNA* and *TJM 2* treatments, Windham and Al-Shehbaz (2006) noted considerable overlap in both petal and fruit size between *B. johnstonii* and *B. hirshbergiae*, and found the styles of the former to be only slightly longer than the latter. Subsequent genetic analyses were carried out on a small number of *B. hirshbergiae* (n=2) and *B. johnstonii* (n=11) specimens. Although a larger sample size would produce more reliable results, this preliminary study showed that *B. hirshbergiae* and *B. johnstonii* were very similar, with *B. hirshbergiae* being fixed for an allele not found in *B. johnstonii* at only a single locus. In fact, they are more similar than any pair of *Boechera* taxa treated by Windham and Al-Shehbaz as distinct species (M. Windham pers. comm. 2011).

CNPS and CNDDDB recommend deleting *A. hirshbergiae* from the Inventory and changing *Arabis johnstonii* to *Boechera johnstonii* to reflect the new treatments. After inclusion of the two *B. hirshbergiae* occurrences within *B. johnstonii*, the latter will have a total of eleven occurrences throughout its range. We do not recommend a change in California Rare Plant Rank for *Boechera johnstonii*, as the additional occurrences do not significantly extend its distribution and range.

*A. hirshbergiae* Element Code: PDBRA064D0

*A. johnstonii* Element Code: PDBRA060Y0

### Recommended Actions

**CNPS:** ~~Delete~~ **Keep** *Arabis hirshbergiae* from as CNPS Rank 1B.2 and include occurrences in keep *Boechera johnstonii* as Rank 1B.2; change genus of *Arabis johnstonii* to **and** *Arabis hirshbergiae* to *Boechera johnstonii*.

**CNDDB:** ~~Delete~~ **Keep** *Arabis hirshbergiae* from as G1 / S1.2 and include occurrences in *Boechera johnstonii*; change keep *Arabis johnstonii* to as G1 / S1.2; change genus of *Arabis johnstonii* and *Arabis hirshbergiae* to *Boechera johnstonii*.

### Revised CNPS Inventory Records

*Boechera johnstonii* (Munz) Al-Shehbaz

Brassicaceae

Johnston's rock cress

Synonyms: *Arabis johnstonii* Munz, ~~*Arabis hirshbergiae* S.D. Boyd~~

Rank 1B.2

Riverside, San Diego

Palm View Peak (066A) 33116F5, Idyllwild (066B) 33116F6, Anza (066C) 33116E6, Butterfly Peak (066D) 33116E5, San Jacinto Peak (083C) 33116G6, Cuyamaca Peak (020A) 32116H5, Julian (033D) 33116A5

Chaparral, lower montane coniferous forest, ~~pebble (pavement) plain/~~ often on eroded clay.

Perennial herb. Blooms Feb-Jun.

Known only from ~~near Cuyamaca Lake and the southern San Jacinto Mtns. Plants from near Cuyamaca Lake were previously treated as *Arabis hirshbergiae*.~~ Threatened by recreational and residential development in Garner Valley and fuel break maintenance on Desert Divide. Also threatened by grazing and trampling, and possibly threatened by vegetation/fuels management projects. *Boechera hirshbergiae* is treated as a synonym of this plant in *TJM 2*; see *Harvard Papers in Botany* 11(1):61-88 (2006) for relative taxonomic treatment. See *Bulletin of the Southern California Academy of Sciences* 31:62-63 (1932) for original description; ~~and~~, *Rhodora* 43(511):467-468 (1941) for taxonomic treatment, and *Novon* 13(4):381-391 (2003) for revised nomenclature. ~~and~~ *Harvard Papers in Botany* 11(1):61-88 (2006) for taxonomic treatments.

*Boechera hirshbergiae* (S. Boyd) Al-Shehbaz

Brassicaceae

Hirshberg's rock cress

Synonyms: *Arabis hirshbergiae* S.D. Boyd

Rank 1B.2

San Diego

Cuyamaca Peak (020A) 32116H5, Julian (033D) 33116A5

Pebble (Pavement) plain; elevation 1400 – 1415 meters

Perennial herb. Blooms Mar-May

Known only from near Cuyamaca Lake. Threatened by grazing. Not in *The Jepson Manual* (1993); a synonym of *B. johnstonii* in *TJM 2*; see *Harvard Papers in Botany* 11(1):61-88 (2006) for relative taxonomic treatment. See *Aliso* 17:203 (1998) for original description, and *Novon* 13(4):381-391 (2003) for revised nomenclature.

*A. hirshbergiae* Element Code: PDBRA064D0

*A. johnstonii* Element Code: PDBRA060Y0

### Literature Cited

Al-Shehbaz, I. 2003. Transfer of most North American species of *Arabis* to *Boechera* (Brassicaceae). *Novon* 13(4):381-391.

Boyd, S. 1998. *Arabis hirshbergiae* (Brassicaceae), a narrow endemic from the Cuyamaca Mountains, San Diego County, California. *Aliso* 17:203-205.

Windham, M.D. & I. Al-Shehbaz. 2006. New and noteworthy species of *Boechera* (Brassicaceae) I: sexual diploids. *Harvard Papers in Botany* 11(1):61-88.