Phytotaxa 159 (4): 298–300
www.mapress.com/phytotaxa/

Correspondence

ISSN 1179-3155 (print edition)
PHYTOTAXA
ISSN 1179-3163 (online edition)

http://dx.doi.org/10.11646/phytotaxa.159.4.8

Two new combinations in the genus *Bornmuellera* (Brassicaceae)

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The genus *Bornmuellera* Haussknecht (1897: 71) encompasses seven species distributed from the south-western Balkan Peninsula to Anatolia (Warwick *et al.* 2006). The original description of the genus encompassed only one species, *B. tymphaea* (Hausskn.) Haussknecht (1897: 72) which he previously described within *Vesicaria* Adanson (1763: 420). Haussknecht characterized the genus with non-saccate decidous sepals, white flowers with obtuse petals, filaments with appendages at the base, sessile subglobose glabrous fruits and two seeds in each loculi. The other taxa known at the time, *B. cappadocica* (Willdenow 1800: 452) Cullen & T.R. Dudley in Dudley & Cullen (1965: 228), *B. glabrescens* (Boiss. & Balansa in Boissier 1856: 32) Cullen & T.R. Dudley in Dudley & Cullen (1965: 228) and *B. baldaccii* (Degen 1896: 413) Heywood (1964: 61), were left classified in either *Ptilotrichum* Meyer (1831: 64, e.g., Degen 1896, Boissier 1867) or *Vesicaria* (Boissier 1856). Later, Heywood (1964) and subsequently Dudley & Cullen (1965) taxonomically re-defined the genus, whose new circumscription was followed by succeeding authors (Hartvig 2002, Warwick *et al.* 2006).

Recent molecular phylogenetic analyses of the tribe Alysseae (Rešetnik *et al.* 2013) revealed that the monotypic genera *Leptoplax* Schulz (1933: 92) and *Physocardamum* Hedge (1968: 293) phylogenetically nest within *Bornmuellera* and thus should be included in it. *Leptoplax emarginata* (Boissier 1842: 160) Schulz (1933: 92), endemic to Greece, was previously considered closely related to and even included in *Peltaria* Jacquin (1762: 260) of tribe Thlaspideae (Dudley & Cullen 1965, Ball 1993, Appel & Al-Shehbaz 2003, Warwick *et al.* 2008) because of shared compressed indehiscent silicules compared to terete, thin leathery fruits in *Bornmuellera.* As is often the case in Brassicaceae (Koch *et al.* 2003 and references therein, Alexander *et al.* 2010, Moazzeni *et al.* 2010), the similarity in fruit characters is superficial and the compressed siliculae in *Peltaria* and *Leptoplax* are of independent origin. Diagnostic morphological characters shared between *Leptoplax* and *Bornmuellera* include malpighiaceous hairs, non-saccate sepals, white flowers with obtuse petals and filaments with appendages. Both genera share a base chromosome number of x=8 (Constantinidis *et al.* 2002; compared to x=7 in *Peltaria*: Warwick & Al-Shehbaz 2006) and an ecological specialization to serpentine soils and the capability of nickel hyperaccumulation. Furthermore, *L. emarginata* hybridises easily and extensively with sympatric *Bornmuellera* species, *B. tymphaea* and *B. baldaccii* (Ball 1993, Hartvig 1986, 2002). A molecular phylogenetic study based on nuclear ITS data (Cecchi *et al.* 2010) inferred *Leptoplax* as sister to the European members of *Bornmuellera.* When considering Anatolian *Bornmuellera* taxa, *L. emarginata* is inferred by both nuclear and plastid sequence data as embedded within *Bornmuellera* (Rešetnik *et al.* 2013).

Previously, *Physocardamum* was tentatively placed in Lepidieae (Hedge 1968, Al-Shehbaz 1986) or not assigned to any tribe (Al-Shehbaz *et al.* 2006). The tribal placement of *Physocardamum* in Alysseae was only recently clarified by molecular data (Warwick *et al.* 2010, Rešetnik *et al.* 2013). This is supported by morphological data, because most features of *P. davisii* Hedge (1968: 293) are shared with *Bornmuellera*, including perennial life form, presence of malphighiaceous trichomes, non-saccate sepals, white petals, inflated and glabrous siliculae, and biovulate loculi; the only difference is that *Physocardamum* possesses edentate filaments (Hedge 1968). Molecular data identified *P. davisii* as sister to Anatolian *B. cappadocica* and resolved this Turkish clade as sister to a clade including the European species, i.e., including *Leptoplax* (Rešetnik *et al.* 2013).

Therefore, in the light of available molecular data (Rešetnik *et al.* 2013) and a re-evaluation of morphological characters, the monotypic genera *Leptoplax* and *Physocardamum* should be merged with *Bornmuellera*, requiring the following new combinations.

 Accepted by Karol Marhold: 18 Jan. 2014; published: 18 Feb. 2014

New combinations in *Bornmuellera* Hausskn.

Bornmuellera emarginata (Boiss.) Rešetnik, *comb. nov.*

basionym: *Ptilotrichum emarginatum* Boissier (1842: 160), synonyms: *Koniga emarginata* (Boiss.) Nyman (1855: 200); *Peltaria emarginata* (Boiss.) Haussknecht (1893: 111); *Leptoplax emarginata* (Boiss.) O.E. Schulz (1933: 92)

Type: [Greece, W Aegean] "Hab. in monte Delphi Euboea", ?1837, Aucher-Éloy no. 228 (G-BOISS photo!)

Bornmuellera davisii (Hedge) Rešetnik, *comb. nov.*

basionym: *Physocardamum davisii* Hedge (1968: 293)

Type: "Turkey, B9 Ağri: 2 km SW of Hamur (Murat valley). 1670 m. Sloping meadows; perennial; fruits inflated; pale green; flowers white." 2 June 1966, Davis 44017 (http://data.rbge.org.uk/herb/E00386088) (E photo!)

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