Placement of *Arabidopsis parvula* in *Thellungiella* (Brassicaceae)

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ABSTRACT. The genus *Thellungiella* is recognized, and the characters separating its two species from *Arabidopsis* are given. *Arabidopsis parvula* (Schrenk) O. E. Schulz is recognized in *Thellungiella.*

The limits of *Arabidopsis* have been the subject of considerable controversy, and as many as 50 species were previously placed in the genus (Al-Shehbaz, 1988; Price et al., 1994). Detailed morphological and molecular studies by the authors reveal that *Arabidopsis* includes less than ten species, most of which were previously assigned to other genera, and that the remaining species are more appropriately placed in five or six genera. The results of these on-going studies will be published elsewhere.

The present paper deals with two species here recognized as members of *Thellungiella* O. E. Schulz. *Thellungiella parvula* has generally been accepted in *Arabidopsis* in all recent floras (e.g., Ball, 1964; Busch, 1939; Hedge, 1965, 1968; Pavlov, 1961) that cover the areas of its range. The generic placement of *T. salsuginea* (Pallas) O. E. Schulz has been more controversial; although several authors followed Schulz (1924) in treating it in *Thellungiella*, Al-Shehbaz (1988) and Rollins (1993) retained the species in *Arabidopsis*. Schulz (1924, 1936) placed *Arabidopsis* and *Thellungieila* in different subtribes separated solely on the basis of presence versus absence of seed-coat mucilage. As shown by Vaughan and Whitehouse (1971), the presence or absence of mucilage in wetted seeds can be observed in various species of the same genus and, therefore, is not a reliable taxonomic character. Although the seeds of *T. parvula* produce mucilage upon wetting and those of *T. salsuginea* do not, it is abundantly clear that this and other differences given in the key below do not justify the placement of the two species in different genera.

In addition to *Thellungiella salsuginea*, Schulz (1924), Busch (1939), and Pavlov (1961) recognized another species, *T. halophila* (C. A. Meyer) O. E. Schulz, which they separated from *T. salsuginea* primarily by having coarsely dentate to divided instead of entire to repand basal leaves. It is highly unlikely that these differences alone justify the recognition of *T. halophila* as distinct from *T. salsuginea*. Because the types of these two species were not available for this study, we refrain from formally reducing *T. halophila* to the synonymy of *T. salsuginea*.

As here delimited, *Thellungiella* consists of two (or perhaps three) species that are centered primarily in Kazakhstan and neighboring Russia. *Thellungiella parvula* is distributed in Kazakhstan, southern Russia, Turkmenistan, and Turkey, whereas *T. salsuginea* is widespread in Kazakhstan, southern Russia, Mongolia, northern China, Canada, and the United States. Both species are restricted to strongly saline soils, and such edaphic adaptation to salinity, which is rare elsewhere in the Brassicaceae, is not exhibited by any species of *Arabidopsis*. In addition, both species are glabrous throughout, are glaucous on stems and leaves, and do not produce well-defined basal rosettes. All species of *Arabidopsis* produce basal rosettes that often persist well after fruit maturity, and none has glaucous stems and leaves. The characteristic indumentum of mixed simple and stalked furcate trichomes should readily distinguish species of *Arabidopsis* from members of *Thellungiella*. The two species of *Thellungiella* are easily separated as follows:

1a. Cauline leaves oblong to ovate or cordate, not fleshy, auriculate to rarely amplexicaul at base; infructescence axis straight; petals much longer than sepals; seeds not mucilaginous when wetted . . . . . *T. salsuginea*

1b. Cauline leaves linear to linear-oblong, fleshy, not auriculate at base; infructescence axis flexuous; petals subequaling sepals or absent; seeds mucilaginous when wetted . . . . . *T. parvula*

Thellungiella parvula (Schrenk) Al-Shehbaz & O'Kane, comb. nov. Basionym: *Diplotaxis? parvula* Schrenk in Fischer & C. A. Meyer, Bull. Cl. Phys.-Math. Acad. Imp. Sci. Saint Pétersbourg ser. 2, 2: 199. 1844. TYPE: [Kazakhstan]. "In desertis salsuginosus ad Tersakkan," *A. Schrenk s.n.* (holotype, LE; isotype?, G).

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