

Sinosenecio newcombei (Asteraceae: Senecioneae): A New Combination for a North American Plant in an Asiatic Genus

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ABSTRACT. The plant long called *Senecio newcombei* Greene is a distinctive endemic of the Queen Charlotte Islands, B.C., Canada. Microcharacters, cytology, and gross morphology indicate its affinities with the tussilaginoide group of the Senecioneae and with the East Asian genus *Sinosenecio*. The new nomenclatural combination is made: *Sinosenecio newcombei* (Greene) J. P. Janovec & T. M. Barkley.

Work on generic treatments for the Flora of North America North of Mexico project has drawn our attention to the problematic *Senecio newcombei* Greene. The entity was described from a collection made by C. F. Newcombe in 1897 at the site of a Norwegian fishing camp just north of Kaisun on the west coast of Moresby Island, Queen Charlotte Islands, B.C., Canada, and was named in honor of the collector (Greene, 1897). Subsequent studies have agreed that the entity is restricted to the Queen Charlotte Islands, where it occurs on open, rocky, and boggy sites throughout the western coastlands and on the heathy rock-talus slopes of the Takakia Lake alpine region (Barkley, 1962, 1978, 1988; Calder & Taylor, 1968; Douglas, 1982). Greene (1897) treated the entity as a *Senecio* because of its evident gross morphology, and Barkley (1962) included it within the *Aurei* species-group as a matter of convenience. Calder and Taylor (1968) recognized that *S. newcombei* did not fit comfortably among the *Aurei* but suggested that it might be related to the aureoid *S. porteri* Greene, a distinctive monocephalous alpine species of the Colorado Rocky Mountains and apparently the Wallowa Mountains of northeastern Oregon. In 1988, Barkley excluded *S. newcombei* from the aureoid complex and suggested that it might have Asiatic affinities.

Since then, generic concepts within the Senecioneae have undergone revision. As recently as 1985, Barkley could argue for maintaining *Senecio* as a single, diverse genus, and this notion reflected American floristic traditions (Barkley, 1985a, b). Detailed studies, however, have made a compelling case for treating the various segregates as genera;

many of them have been long-recognized as sections or other infrageneric groups within *Senecio* s.l. New data derived from morphological analyses and from biochemical/genetic investigations, plus the rigor of modern phylogenetic theory, combine to favor narrower generic concepts. Recognition of smaller, segregate genera was promoted in the 1970s by Robinson, often in collaboration with Brettell, in a series of papers centered upon the plants of southern North America and eastern Asia (see Barkley, 1985b, and Bremer, 1994, for citations). Nordenstam (1977, 1978) accepted a series of segregate genera in a world-wide catalog presented in connection with the symposium on the Biology and Chemistry of the Compositae, at the University of Reading, U.K., in the summer of 1975. Jeffrey treated the traditional *Senecio*, s.l., as a series of segregate genera in several papers, culminating in his generic catalog of *Senecioneae* (Jeffrey, 1992). Bremer also treated *Senecio*, s.l., as numerous segregates in his monumental review of the Asteraceae of the world (Bremer, 1994). He provided cladograms, based on morphological characters, of the evolutionary lineages within the Senecioneae, as he saw them, and he stressed the morphological distinctions between the subtribes Senecioninae and Tussilaginatae, i.e., the senecionoid and tussilaginoide lineages. (The tussilaginoide were called "cacalioids" and "tephroseroids" in the older literature.) Barkley et al. (in press) summarized the distinctions among the segregates in these two lineages in Mexico and Central America and offered a justification for regarding them as genera.

The senecionoid lineage is characterized by having style branches with separate stigmatic lines, upper stamen filaments with swollen collars ("balusterform"), anthers often with thickenings in the lateral walls of the endothelial cells, and chromosome numbers based on $x = 10$ or 20 or numbers derived therefrom. In the tussilaginoide lineage, the stigmatic surface is entire or nearly so across the inner face of the style branch, the upper stamen filaments are cylindrical, the anthers often have thickenings in the transverse walls of the endothelial cells, and the chromosome numbers are

based mostly on $x = 30$ or numbers derived therefrom, including numbers down to $x = 24$, presumably via aneuploid reduction (Bremer, 1994). The nature of the microcharacters in the Senecioneae is illustrated by photographs in Nordenstam (1978), Jeffrey & Chen (1984), and Wetter (1983).

Specimens of *Sinosenecio newcombei* were borrowed for study (cited below), and slides were made to observe microcharacters. The techniques for microcharacter analyses were learned by the first author from H. Robinson at the Smithsonian Institution, and they are similar to those of Wetter (1983).

Sinosenecio newcombei uniformly has the entire stigmatic areas and the cylindrical stamen filaments of the tussilaginoide lineage and also has thickenings in the transverse walls of the endothelial cells, i.e., the thickenings are "polarized." In aspect and in these microcharacters, it clearly resembles the Asiatic tussilaginoide segregate genus *Sinosenecio* B. Nordenstam. The chromosome number for this species is $n = 24$, which is known from several counts (Taylor & Mulligan, 1968). This number occurs in some other tussilaginoide species but is apparently not known among senecionoid species.

The aureoid assemblage of *Senecio* is senecionoid in microcharacters, but it has a distinctive chromosome number of $n = 22$ or 23 or polyploid derivatives thereof. Moreover, it is distinguished by having pollen walls of a helianthoid rather than a senecioid structure (Bain & Walker, 1995). The aureoid assemblage is now recognized as the segregate genus *Packera* Löve & Löve, and it definitely does not include *Sinosenecio newcombei*.

Specimens referable to *Sinosenecio* were surveyed by the first author in the herbarium of The New York Botanical Garden (NY) and by both authors in the herbarium of the Missouri Botanical Garden (MO), and we conclude that *Sinosenecio newcombei* is comfortably similar to the Asiatic species of *Sinosenecio*. *Sinosenecio newcombei* resembles *S. homogynophyllus* (Cumm.) B. Nordenstam, which was illustrated in Nordenstam (1978), and several of the species illustrated by Jeffrey and Chen (1984) in their account of the *Sinosenecio* in Eastern Asia. *Sinosenecio newcombei* appears to fall among the species referable to their subsection *Madarogyne*.

The recognition that a distinctive and highly restricted North American plant belongs to an otherwise Asiatic group raises biogeographic questions that are beyond the scope of this paper. It is remotely possible that the American plants derive from a relatively recent introduction, but *S. newcombei* is distinctive and is not known in Asia.

More likely, *S. newcombei* is a locally adapted relict of some past distributional event.

The following new combination is made here:

Sinosenecio newcombei (Greene) J. P. Janovec & T. M. Barkley, comb. nov. Basionym: *Senecio newcombei* Greene, Pittonia 3: 249. 1897. Type: Canada. British Columbia: Queen Charlotte Islands, June 1897, *Newcombe s.n.* (US).

Specimens examined. CANADA. **British Columbia:** McClinton Bay, Graham Island, 18 June 1957, *Calder, Savile & Taylor 21605* (NY); Kootenay Inlet, Moresby Island, 21 July 1964, *Calder & Taylor 36195* (NY); Kaitgoro, 1903, *Newcombe s.n.* (MO-photo); Canoe Passage, 26 July 1910, *Spreadborough 91260* ex Herb. Geol. Survey of Canada (MO).

Acknowledgments. We thank C. Jeffrey, R. R. Kowal, B. Nordenstam, and H. Robinson for sharing their knowledge and enthusiasm for the Senecioneae. The administration of the Smithsonian Institution provided the fellowship that permitted the first author to study for the summer of 1995 in the U.S. National Herbarium, under the guidance of H. Robinson and V. Funk. We also thank the curators of the above noted herbaria for lending specimens and otherwise permitting us to study their collections. This is contribution No. 96-294-J from the Kansas Agricultural Experiment Station, Manhattan.

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