



Echinocereus reichenbachii
subsp. *baileyi*

For the past two years, I have been unable to get out of Ottawa and into the field. Taking on the role of president of our faculty union has made travel, especially long trips, nigh impossible. But it has meant spending more time in my garden and a chance to highlight some of its cactus gems.

Echinocereus reichenbachii subsp. *baileyi* has been a favourite of mine for two decades, one of the few cacti that thrives in cultivation in both Tempe, Arizona, where it gets to +50°C in summer (Fig 1), and North Kawartha, Ontario, where it gets to -30°C in winter (Fig 2). Admittedly *E. coccineus*, *E. triglochidiatus*, *E. fendleri*, and *E. viridiflorus* also survive unprotected in cultivation in both southern Arizona and southern Ontario (Gorelick et al. 2015), but seem to suffer more from Canadian winters, with more rotting and russetting than does *E. reichenbachii* subsp. *baileyi*. The winter of 2018/2019 was particularly trying in southern Ontario with no snow-cover from late November until late January, but ultra cold nights, of the -30°C variety in late January before snows started to fall for the season. Thermal insulation from a thick blanket of snow goes a long way to protect plants and animals. We then got almost 2.5 meters of snow in the

1. *Echinocereus reichenbachii* subsp. *baileyi* in cultivation in the author's garden in Tempe, Arizona (22 May 2005).



2. *Echinocereus reichenbachii* subsp. *baileyi* emerging from the snow (25 May 2019).

subsequent period between late January to mid March. But all my specimens of *E. reichenbachii* subsp. *baileyi*, as well as *E. reichenbachii* subsp. *perbellus* [*E. reichenbachii* var. *caespitosus*], seemed to weather this beautifully. In part, *Echinocereus reichenbachii* subsp. *baileyi* is probably better adapted to wet weather simply because it grows in wetter, i.e. farther east, native habitats than other members of the genus. I also grow it on metamorphic rock, much as it grows in habitat.

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3. View of cactus garden from frozen Loucks Lake (25 March 2019). The ice on the lake was still about $\frac{3}{4}$ of a meter thick. Snow has only melted from about 20% of the garden. Left-most arrow is *Echinocereus reichenbachii* subsp. *baileyi* that has been in cultivation the longest, shown later in Fig. 6. Right-most arrow is *E. reichenbachii* subsp. *baileyi* that was acquired the most recently which appears in Fig. 5. Middle arrow is *Pediocactus simpsonii*. *Echinocereus coccineus*, *E. triglochidiatus*, and *E. reichenbachii* subsp. *perbellus* are also visible.

Echinocereus reichenbachii subsp. *baileyi* was first described as a distinct taxon by Joseph N. Rose, as *Echinocereus baileyi*. *Echinocereus reichenbachii* subsp. *baileyi* is fairly common in the granitic hills of the Wichita Mountains of southwestern Oklahoma in Caddo County, Kiowa County, and primarily Comanche County. Benson (1969: 270) listed a voucher specimen of *E. reichenbachii* var. *albispinus* [his synonym for *E. reichenbachii* subsp. *baileyi*] from Childress County, Texas, in the far southeast part of the Texas panhandle, east of the town of Memphis, but then also claimed that this specimen is “transitional to var. *perbellus*.” This Texas locale would be about 120–140 km from the Wichita Mountains. I wonder whether this transitional specimen from Childress County, Texas is the reason many subsequent authors have listed *E. reichenbachii* subsp. *baileyi* as also being from Texas (e.g. Blum et al. 1998, Pilbeam 2011). In his documentation, Benson (1982) only listed voucher specimens for *E. reichenbachii* var. *albispinus* [= *E. reichenbachii* subsp. *baileyi*] from the Wichita Mountains, Wichita National Forest Preserve, and Medicine Park, which are all in Caddo, Kiowa, and Comanche Counties. His distribution map on page 667 shows

this taxon in Childress County, Texas and Comanche County, Oklahoma, for which he lists voucher specimens. But for some inexplicable reason, Benson’s distribution map also shows *E. reichenbachii* var. *albispinus* in the following more eastern counties in southern Oklahoma that are not accompanied by documentation of voucher specimens — Garvin, Pontotoc, and Coal Counties — as well as in Greer County in far southwestern Oklahoma. Pilbeam (2011) also lists specimens from the towns of Tishomingo and Troy, both of which are in Johnston County in southern Oklahoma, but again without any documentation. However, the herbarium at Southeastern Oklahoma State University contains a specimen labeled *Echinocereus baileyi* from a granitic hill in Greer County (J. Taylor 22529), while the herbarium at the University of Oklahoma contains a specimen labeled *Echinocereus baileyi* from flat granitic rocks in Johnston County (G.J. Goodman 7933). The only plants listed in the Oklahoma Vascular Plants Database (<http://www.oklahomaplantdatabase.org/>) are in Comanche, Kiowa, Greer, and Johnston Counties. Therefore, *E. reichenbachii* subsp. *baileyi* may not be endemic to the Wichita Mountains of southwestern Oklahoma, but is



4. Note the pectinately-arranged spines of the areole of *Echinocereus reichenbachii* subsp. *baileyi*.

probably restricted to granite in southern Oklahoma.

Echinocereus reichenbachii subsp. *baileyi* genuinely deserves to be classified as a subspecies, not a variety. Definitions of ‘subspecies’ and ‘variety’ are different for botanists in North America versus Europe (Gorelick 2015), but, given that this taxon is in North America, it should be obvious which definition I choose. To be more precise, here I borrow the following definition from Newton & Thiede (2015: 30), who take a decidedly North American tack, despite the gross irony that neither author is North American!

It is generally held that the rank of subspecies should be used for populations of a species that have several morphological differences and are geographically and/or ecologically separated, whereas varieties, also with some morphological differences, overlap in their distribution.

Echinocereus reichenbachii subsp. *baileyi* unequivocally is morphologically differentiated from other conspecifics. While variety *baileyi* has areoles with pectinate spines (Fig 4) like all varieties and subspecies of *E. reichenbachii*, subspecies *baileyi* always looks more disheveled, with longer more bristly spines that are not as adpressed to the shoot. So the question of classification comes down to whether there are geographical or ecological differences between the subspecies or varieties. Blum et al. (1998) showed overlapping distributions for *E. reichenbachii* subsp. *baileyi* and subsp. *perbellus*, but this may be due to the coarse resolution of their map. Weniger (1969) reported *Echinocereus caespitosus* var. *purpureus* [= *E. reichenbachii* subsp.

perbellus] from Medicine Park, on the eastern edge of the Wichita Mountains, so subspecies *perbellus* may be peripatric with subspecies *baileyi*, the latter of which is supposedly ubiquitous throughout the Wichita Mountains, which would make this a variety. Plus, the type of *Echinocereus albispinus* [= *E. reichenbachii* subsp. *baileyi*] is from near Medicine Park in the Wichita National Forest Reserve (Lahman 1935), in which *E. reichenbachii* subsp. *perbellus* is also found. But the important distinction between these two taxa is ecological. The three subspecies of *Echinocereus reichenbachii* in Oklahoma — *reichenbachii*, *perbellus*, *baileyi* — each grow in very different edaphic conditions. The type subspecies grows on limestone; subspecies *perbellus* [= subsp. *caespitosus*] grows on clay and gypsum hills; subspecies *baileyi* grows on granite (Clark 1933). Because of these edaphic/ecological differences, these are bona fide subspecies.

Echinocereus reichenbachii subsp. *baileyi* tends to grow taller and offset much more frequently in cultivation in Arizona than in cultivation in Canada. In Canada, it almost never offsets. In cultivation in Canada, I find that this taxon hardly grows in height, sometimes getting shorter over the years, but continues to grow wider shoots, with plenty of new areoles each year, even though it does not appear to have anything like contractile roots nor any geophytic tendencies. The tallest specimen pictured from Canada here is that one I acquired most recently, in summer 2017 (Figs. 3, 5). The shortest and widest specimen is the one I have been growing unprotected outdoors



5. The most recently-acquired plant of *Echinocereus reichenbachii* subsp. *baileyi* is the tallest.



6. The longest-cultivated *Echinocereus reichenbachii* subsp. *baileyi* is the shortest (11 June 2018).

for twice as long, since summer 2015 (Figs. 3, 6 & 7). From a purely aesthetic point of view, I prefer the growth form of this taxon in cultivation unprotected in Canada more than I liked it in cultivation in either southern Arizona or southern New Mexico. But these plants in Canada seemingly will never form massive shoots or massive clumps. In terms of gross shoot morphology, when grown unprotected in

eastern Canada for several years, *Echinocereus reichenbachii* subsp. *baileyi* superficially resembles medium to large plants of *Pediocactus simpsonii*.

I grow all my cacti in several centimeters of pea gravel, with the only organic matter underneath the gravel being either a thin layer of charcoal (one part of the garden previously was a fire pit for disposal of lumber and other housing construction materials) or a mat of old dead juniper roots. In both instances, the thin layer of organic matter is on top of the gneiss and granite bedrock of the Canadian Shield (pre-Cambrian).

Despite its small native geographic range, *E. reichenbachii* subsp. *baileyi* shows a fair amount of variation in flower size and colour, as well as density and length of spines. And it seems to be able to survive in a huge range of habitats in cultivation.

Length of petals (more accurately, tepals) in each specimen is repeatable from year-to-year, but petal length differs between specimens by a factor of two. Petal colour is also repeatable from year-to-year and varies widely between specimens, from washed-out pink, to vibrant pink-purple, to a satiny purple that starts approaching the colour of *E. fendleri* petals (Figs. 1, 8–11). Even relatively small specimens flower reliably every summer, almost always with one flower per shoot. In southern Arizona, flowering was in mid



7. Proving it is no one-shot wonder, the longest-cultivated *Echinocereus reichenbachii* subsp. *baileyi* produced three flowers in June 2019.



8–11. Variation in petal colour and length of *Echinocereus reichenbachii* subsp. *baileyi* (11 June – 4 July 2018).

May; in southern Ontario flowering has been from mid June until early July.

Echinocereus reichenbachii subsp. *baileyi* is a spectacular and easy growing taxon for almost any environment. In southern Ontario, its only real requirement is for superb drainage and lots of sun. After that, it can handle pretty much any exigencies, such as ferociously hot summers, as well as cool and very wet summers; ultra cold winters with almost no snow, as well as being buried under metres of snow and ice for 4–5 months; being dug up by snapping turtles (Gorelick 2019); and even the likes of a lazy and inept gardener like me.

Unless otherwise specified, all photos are of *Echinocereus reichenbachii* subsp. *baileyi* in cultivation at the author's cottage at the northwest end of Loucks Lake in Kawartha Highlands Provincial Park, Peterborough County, Ontario, Canada

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