

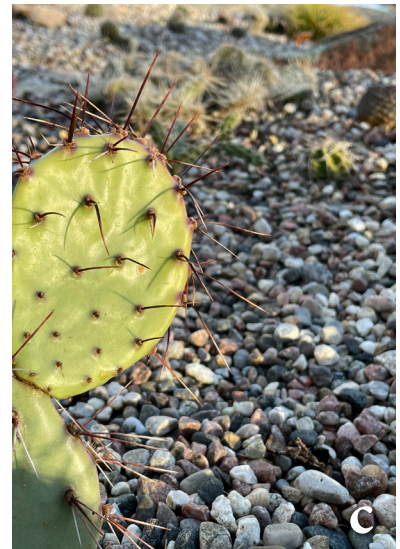
# Curved-spined *Opuntias*

There are curved spines in many cactus genera (e.g. *Cochemiea*, *Ferocactus*, *Melocactus*), in which the curve develops via differential growth of the upper (adaxial) and lower (abaxial) surfaces of the spine. But curved spines are rare in the subfamily Opuntioideae. Here I discuss a few curved-spined *Opuntias*.

I grow several clones of *Opuntia phaeacantha* (synonym *O. camanchica*), including one with strongly curved spines (Fig. 1). Its curved spines were not due to its unignified developing spines being pressed against another surface, such as a rock. Indeed, the figure shows downward curved spines on both sides of the upper pad. There is only one habitat that I have stumbled upon in which many specimens of *O. phaeacantha* have curved spines (Fig. 2). In *O. phaeacantha* specimens that have some curved spines, many spines are straight (Fig. 2). Most spines, if curved, curve downwards, as with *Cochemiea* and *Ferocactus*. But occasionally *O. phaeacantha* spines curve upwards (Fig. 3). Once a clone of *O. phaeacantha* produces curved



**1.** *Opuntia phaeacantha* in cultivation in central Ontario with downward curved spines. All three photos are of the same plant. **a.** Photo from the north on 15 October 2021. This edge-on view the pad makes it easy to see curvature of the spines. Note the actively growing talon-like spines, despite the fast-approaching Canadian winter. **b.** Photo from the east on 20 November 2021. This side of the pad has both strongly downcurved spines and straight spines. **c.** Photo from the west on 19 November 2021. Note the twisting of some spines, but all curved spines largely curve downwards. This western side of the pad has fewer spines than the other side, and largely with different curvature.



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**2.** *Opuntia phaeacantha* in southern New Mexico. Photo in habitat on 26 February 2020. With its purple pads in winter, distantly spaced areoles with 4–5 areoles per diagonal, and a few long brown spines per areole, this is clearly *O. phaeacantha*. Note the downward curved spines on the bottom left side of this trampled pad, but straight spines elsewhere.

spines, subsequent growth usually produces more curved spines. *Opuntia phaeacantha* is probably very closely related to *O. engelmannii* (Pinkava 2003) that also occasionally has some plants with curved spines (Fig. 4).

It's time for obvious etymology of *tortispina* and *curvispina*. *Opuntia tortispina* is named for twisted spines, but virtually all specimens only have straight spines. This species was named for an anomalous specimen. However, the illustrations that were supposed to go along with the original descriptions of both *O. tortispina* and *O. cymochila* — whose publication was unexpectedly preceded by Engelmann (1856) — only show straight spines (Engelmann & Bigelow 1856). At least both 1856 publications described twisted spines in both *O. tortispina* and *O. cymochila*. A small subset of specimens of *O. tortispina*, and what I consider to be the synonymous *O. cymochila*, consistently have twisted spines. The specimen of *O. tortispina* in Figure 5 has short, thin 'minor spines' that are mostly twisted and curved, whereas the long, stout 'major spines' are almost all straight, although a few of them are gently curved. By contrast, George Engelmann only referred to the 'major spines' as being twisted in these two taxa, which seems puzzling. I was pleasantly surprised by the twisted and curved spines in Figure 5 because my original cutting only had straight spines. Similarly, *Opuntia curvispina* (= *Opuntia curvo-spina*) was named for its curved spines, although usually all of its spines are straight. The original description reads, "the four yellow central [spines] 4–5 cm long, flattened, annular, twisted, bent, and curving in various directions" (Griffith 1916: 88). *Opuntia curvispina* seems to be synonymous with *O. chlorotica*, but



**3.** Another *Opuntia phaeacantha* approximately one-third of a kilometer from the plant shown in Fig. 2. On the lower right margin of the pad, there are a few downward curved spines. In the center of the pad and near the top of the pad, there are some upward curved spines.

is sometimes considered a natural hybrid between *O. chlorotica* and *O. phaeacantha* (Pinkava 1996), the latter of which sometimes has curved spines.

The South American *Opuntia sulphurea* usually only has straight spines (Lambert 1997), but a few specimens in habitat exist with curved spines, e.g. Anceschi and Magli's photo from Salta, Argentina (<http://cactusinhabitat.org/index.php?p=specie&id=217&l=en>). However, this is the one species of prickly pear in which clones are commercially propagated that have fantastically curved and twisted spines (Fig. 6). I am surprised that other curved-spined prickly pears, i.e. those from North America like Figures 1–5, have not also found their way into the horticultural trade.

## References

- Engelmann G (1856) Synopsis of the Cactaceae of the territory of the United States and adjacent regions. *Proceedings of the American Academy of Arts and Sciences* 3: 259–314.
- Engelmann G & Bigelow JM (1856) No. 3: Description of the Cactaceae. In: *Explorations and survey for a railroad route from the Mississippi to the Pacific Ocean. Volume IV: Route near the thirty-fifth parallel explored by Lieutenant A.W. Whipple, topographical engineers in 1853 and 1854. Report on the botany of the expedition.* Editor: Bigelow JM. Pages 27–58 (+ 26 plates).
- Griffiths D (1916) New species of *Opuntia*. *Bulletin of the Torrey Botanical Club* 43: 83–92.





4. *Opuntia engelmannii* in cultivation. There are some gently curved spines on the top two rows of areoles on the new pad to the right. These are not the most impressive examples of curved spines in this species, but simply reflect my lack of photos.



5. *Opuntia tortispina* (the form often known as *O. cymochila*) in cultivation from a pad originally from the Texas panhandle. On the top pad, all of the smaller ('minor') spines are twisted and curved, while most of the larger ('major') spines are straight, although a few are gently curved. Note how all of the spines — both 'major' and 'minor' — are straight on the lower pad.

Lambert JG (1997) *Cacti of Argentina* (2<sup>nd</sup> edition). Self-published.

Pinkava DJ (1996) Nomenclatural changes in *Opuntia* (Cactaceae).

*Haseltonia* 4: 103–104.

Pinkava DJ (2003) *Opuntia* Miller (Cactaceae). In: *Flora of North America - Volume 4*. Editor: Flora of North America Editorial Committee. Oxford University Press. Pages 123–148.



6. A commercially available clone of *Opuntia sulphurea* with twisted and curved spines in cultivation.