How a native plant ended up on reality TV, and why it's at risk

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Rangers mark ginseng plants in Cumberland Gap National Historical Park, Kentucky, to make them harder to steal. Credit: National Park Service

In one of television's more bizarre recent offerings, the History Channel show "Appalachian Outlaws" follows a band of West Virginians as they

hunt rugged forests for American ginseng, a medicinal root worth hundreds of dollars per pound. The show has high stakes: These men poach on federal lands, risking fines and jail time, and guard private patches with shotguns and homemade land mines. Most of them are out of work, out of savings and worried about paying for food and heat. Ginseng gives them a way to get by.

The drama may be made for TV, but illegal harvesting is a serious problem in many protected areas, and violence can result. "Appalachian Outlaws" reveals ginseng's current niche in American cultural life – a bit part, in which it provides a little cash and excitement to a few struggling families in Appalachia.

This harvesting and other ecological pressures now threaten to push the species toward extinction. But during most of the past 300 years, ginseng was easier to find, and played a much larger role in American culture. In concrete ways, ginseng embodied the American dream.

Since my students and I study people's impacts on plant distributions and ecological responses to human disturbances, we're interested in how the biology of a plant like ginseng can shape our culture, and how our culture is changing its biology in turn.

Wealth from 'useless produce'

The plant itself is unassuming. A mature American ginseng plant stands about 20 inches tall, with three or four leaves. Its tuber-like root sends up a single stem each year. The flowers are very small, greenish-white, and what wildflower guides call "inconspicuous."

American ginseng's closest relatives are Asian species used in traditional medicine for centuries. Few clinical trials have been conducted, but some laboratory studies suggest the root may help in treating cancer,

diabetes or cardiovascular disease.

These uses have fueled demand in Asia for American ginseng since the mid-1700s. In colonial America, Indians and trappers started bartering ginseng at the fur trading posts of Montreal and Albany. It soon became a major export to Asia.

After the Revolutionary War, the first American ship to trade directly with China arrived in Canton loaded with 30 tons of ginseng. It returned to New York with tea, silk and porcelain, earning a 30 percent profit for the ship's backers. Samuel Shaw, the American ambassador to China, bragged,

"While the nations of Europe are, for the most part, obliged to purchase this commodity [tea] with ready money, it must be pleasing to an American to know that his country can have it upon easier terms; and that the otherwise useless produce of her mountains and forests will in a considerable degree supply her with this elegant luxury."

The American landscape supplied this "useless produce" in abundance. In September 1787, Ohio surveyor John Mathews' party camped and dug ginseng for four days, during which each man harvested 40 to 60 pounds of root per day. According to first-hand accounts from sources including George Washington, roads between Pittsburgh and Philadelphia were clogged with wagons, pack-trains and horses loaded with barrels of ginseng. Each barrel was a jackpot. The ginseng trade made fortunes for Daniel Boone and John Jacob Astor, America's first multimillionaire.

To early Americans, ginseng represented an opportunity for their new nation to assert its independence, and for self-made individuals to succeed on sheer grit and resourcefulness. But ginseng's meanings shifted as its biology changed. By 1975, American ginseng was listed on Appendix II of the Convention on International Trade in Endangered

Species (CITES). Under this treaty, the U.S. Fish and Wildlife Service must regulate trade to ensure that each year's harvest "will not be detrimental to the survival of the species."

From common to contraband

American ginseng's biology makes it vulnerable to overharvesting. It has a large geographic range and grows in many habitats, but most populations are small. The plants grow slowly and live for a long time. A mature plant may produce only four or five seeds a year, and these seeds have low chances of making new plants. By following individuals over time, ecologists Danielle Charron and Daniel Gagnon estimated in a 1991 study that only 1 to 15 percent of seeds became seedlings, and only 8 to 31 percent of seedlings survived.

Once established, ginseng plants can live as many as 50 years. Populations thus tend to remain stable in size rather than growing or declining. This is an excellent strategy for undisturbed habitats, but when populations are harvested, they cannot rebound by growing quickly.

Many states have restricted harvest seasons, size limits and protected areas, but these regulations are difficult to enforce. Jim McGraw and his students at West Virginia University tracked 30 ginseng populations in seven states for five to 11 years and found that only 6 percent of harvests complied with all relevant laws.

Outlaws and "sangers," as some diggers call themselves, are not the only threats to American ginseng. Invasive species may compete with or crowd out native plants. In the same 30 populations mentioned above, Kerry Wixted and McGraw found that one-third of ginseng plants were growing within a few meters of an invasive plant. In seven West Virginia populations, deer ate 10 to 63 percent of ginseng plants. Mary Ann Furedi and McGraw estimated that deer browsing reduced the odds that

ginseng populations would survive for another century from 95 percent to zero.

How much impact have these depredations had? In collaboration with Martha Case and others, I quantified ginseng's decline in abundance by examining rates of herbarium specimen collection over time. Botanists make these specimens of pressed plants to document species occurrences, so a more abundant plant should be represented by more specimens.

Compared to four closely related species that are not harvested, ginseng collections declined between 1850 and 2000 in Vermont, New York, Pennsylvania, Michigan, Wisconsin and Minnesota. Other stresses such as deer, invasive species and habitat destruction affect ginseng and related species in similar ways, so these declines probably resulted from ginseng harvesting.

Using the same herbarium specimens, McGraw documented a subtler effect: from 1900 to 2000, ginseng plants also declined in size. Each year's bud leaves a scar on the rhizome, the short horizontal stem above the root, so the number of bud scars reveals a plant's age. McGraw counted these scars to determine that more recent specimens were not younger. This evidence showed that plants of the same age are now smaller – evidently an evolutionary response to both deer and diggers selecting larger plants.

Asian ginseng is effectively extinct in the wild, and American ginseng seems to be heading in that direction. Ginseng's further decline would mean an important loss to all Americans, not just a few hillbillies. As in all extinctions, we would lose genetic and biological diversity and a web of ecological interactions. We could lose a potential drug before we fully understand its effects. But in losing American ginseng, we would also give up part of our cultural heritage. If for no other reason, American

ginseng is worth protecting as a relic of our past and a repository of our hopes.

Provided by Baldwin Wallace University

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