



Conscientious Collection of Wild Leeks

Wild Leek (*Allium tricoccum*) is a native member of the onion family that is found in rich, moist soils in eastern North America. This perennial plant has an interesting life history. In the early spring it sends up (usually) two or three broad, flat leaves whose growth is initiated by a subterranean bulb. In late spring and early summer, when the bulb is replenished, the leaves turn yellow and wither. At that point, the plant produces a leafless stalk that supports an array of white flowers. Each flower ultimately matures as a three-lobed capsule that houses black seeds (the capsules mature in late summer). The seeds are black due to a dark crust called phytomelanin.



Broad, flat leaves of wild leek, which expand in the spring of the year.

Wild leeks are a wonderful wild food and medicine. Their leaves, flowers, and bulbs taste somewhere between onion and garlic (to my palate). Cooking softens the flavors, so that an appropriate level of onion/garlic flavor can be found for anyone. Wild leeks offer substantial nutrition, including micronutrients and phytochemicals. They are rich in pro-vitamin A and vitamins C and B₉ (also called folate). In fact, the leaves contain 2.6 times the vitamin C as oranges for the same mass. They also contain choline (a B-complex vitamin) that is important in supporting cognitive function. The real treasure of wild leeks is the rich phytochemistry, including allicin and related sulfur compounds, which up-regulates apoptosis (programed cell death), an important process that guards human beings from cancer. They contain kaempferol, a flavonoid that protects blood vessels from reactive oxygen species (ROS). This phenolic compound also assists with nitric oxide (NO) production, which dilates blood vessels and helps lower systemic blood pressure. Wild leeks are also rich in antioxidants, offering further protection from ROS and cancer. And of course, wild leeks are simply a real treat on the plate, offering a rich flavor that pairs well with many foods.



Bulbs of wild leek after the leaves have withered (prior to this, the bulbs are very small).

The problem today is that wild leeks have been discovered by commercial collectors, people who harvest wild plants and sell them to supermarkets. While commercial collecting can be sustainable, the unfortunate fact is, when money is involved, collectors often prioritize economic gain over long-term sustainability. Wild leeks are also highly susceptible to harm from some methods of collection. A study performed by Rock et al. (2004) titled "Population recovery following differential harvesting of *Allium tricoccum* Ait. in the southern Appalachians" showed that harvesting ten percent of the bulbs in a given population could only be sustainable if that level of harvest occurred once every ten years. This means that wild leeks are highly susceptible to harm from over-collecting.

Wild leeks will be showing up in some supermarkets and on some restaurant menus shortly in the northeastern United States. I encourage you not to purchase a single one of these leeks, for several reasons. First, and foremost, is your safety. Wild leeks frequently grow along high terraces of middle-sized to large rivers that receive infrequent flooding. Many of these river systems are home to paper mills and other kinds of industry that release a number of chemicals, such as dioxins (PCDDs), polychlorinated biphenyls (PCBs), and furanes (PCDFs). The

important issue is that these industrial chemicals are lipophilic, meaning they are attracted to lipids (i.e., fats). They are deposited in the soil and enter plants through the roots or other underground organs. There, they tend to accumulate as they encounter cell membranes (which have a lipid bilayer). What is important to the forager is that these organic compounds are very poorly translocated to the aerial portions of the plants (such as the leaves and flowers) in most plant families (the cucumber family, Cucurbitaceae, is a noteworthy exception). Therefore, from the perspective of the aforementioned compounds, the above-ground portions can be safe to eat, but the below-ground portions are not. Therefore, consuming the bulbs of wild leeks may expose you to a host of organic compounds that have been shown to increase the risk of cancer, endocrine system dysfunction, impaired neurological function and development, respiratory issues, immune system suppression, and reproductive problems. If you don't know where the wild leeks originated, consuming the bulbs isn't wise.

The second reason not to consume the bulbs is to preserve the species. Over most of the Northeast, wild leeks are uncommon to rare (there are some locations where they are locally abundant). Most commercial collectors gather wild leeks in the spring when other wild plants are harvested for sale, such as ostrich fern fiddleheads (*Matteuccia struthiopteris*). During this time, the bulb is quite small because it has been largely depleted to grow the new leaves. Keeping in mind that collection of the bulb represents lethal activity to the plant, it certainly would be more prudent (and safer for the consumer) to avoid digging the bulb and merely take a single leaf from each plant. This form of collection does several things: (a) it does not harm the bulb and, therefore, does not kill the plant, because the plant has 1 or 2 additional leaves to photosynthesize with; (b) it protects the person consuming the wild leek because the most common class of environmental pollutants found where wild leeks frequently (but not always) grow are not found in the leaves (or are found at very small levels compared to the bulbs).



Bulbs in the spring of the year, when they are usually harvested by commercial collections. Note how small they are compared with the first picture of wild leek bulbs. Given that they offer so little food, why gather them at all (i.e., why kill the plant for little additional food)?

Do I ever dig the bulbs of wild leeks? The answer is yes, but only under a few specific conditions. First, the wild leeks must be growing in a location that is not influenced by industry, such as a rich, forested hillside or an upstream tributary to a major river. Second, there must be an abundance of plants—harvesting should remove a very small proportion of the plants (less than $1/50$ of the population). Third, I often gather late in the growing season when the capsules are mature. This way, I can plant the black seeds (visible as the capsule opens) in the holes from which I have dug the bulbs. Waiting until later in the season has the advantage of producing more food for the forager because the bulbs are significantly larger than they are in the spring. Planting the ripe seeds in the freshly tilled soil where bulbs have been dug is an effective strategy for maintaining plant populations in perpetuity. It is a practice developed by indigenous populations and has a history of promoting sustainable use of a resource.

Please keep in mind when foraging a concept known as “Tragedy of the Commons”. This is a theory that states that individuals acting in their self-interest can threaten a public resource, even if those individuals follow rational guidelines. For example, if someone were to come along and gather a proportion of wild leeks from a population (let’s say $1/10$, as this is commonly believed to be an acceptable level of harvest). To make the math easy, let’s say a wild leek population has 100 individuals. The first forager comes along and digs up ten plants and moves on, satisfied they have not negatively impacted the population (though that would only be true if no one harvests from this population for a ten-

year period, based on research mentioned earlier in this article). The next day, another forager comes along and finds 90 plants and takes nine of them. The day after, another forager comes along and observes 81 plants and takes 8 of them. At this point, you get the picture. Each forager was following a guideline to limit harm to the plants, but what they failed to do was observe the scene and see if others had already foraged in that location (i.e., they were not using tracking to become aware of the recent history of that sight). This means that populations of plants, especially small ones, are capable of being eradicated even when foragers attempt to limit harvests. Therefore, small populations (i.e., fewer than 100 individuals) should not experience lethal harvesting. This is a perfect situation for gathering a single leaf from a plant and leaving the bulbs in the ground.

While I am a major proponent of “conservation through use”, harvesting can threaten plant populations, especially when it fails to take into account the life history (i.e., biology) of the target organism. Wild leeks are certainly one of our standout wild foods, yet they are also a plant under increasing pressure from commercial collectors. Boycotting the purchase of wild leeks from stores and restaurants if they perform lethal collection of the plant is a good way to remind those who fund the harvesting of wild leeks that the end consumers care about the resources being exploited. In fact, mention to those businesses that you would be more inclined to participate in this wild food if collectors limited their impact by gathering only a leaf from each plant—it is much faster than digging the plants, provides almost as much food (because the bulbs are very small in the early spring), is safer to the person eating the plant, and limits our impact on a public resource. If we want our children and their children to enjoy wild leeks, we need to take action now. We need to act less selfishly and more collectively. *Ktankeyasultiniya* (take care of yourselves).

The Delta Institute of Natural History has some important items in the works. First, a digital version (i.e., ebook) will soon be available for *Ancestral Plants* volume 1. I

will announce it on my website when ready
here: <http://www.arthurhaines.com/books/>. Ancestral Plants volume 2 is nearly completed! Only a little bit of editing remains before it goes to the printer, meaning it will be ready in approximately early July of this year. This book complements the first volume but has different introductory chapters and describes the uses of just over 100 different plants. It will be announced at the aforementioned link. Please check back when you can to determine the availability of these foraging resources. Feel free to share this email with whomever you think might be interested in or benefit from its content. Also, connect with the Delta Institute of Natural History on facebook for more articles and information on wild plants, rewilding, and human ecology. Thank you for being part of the movement and best wishes.

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