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Strawberry, not a strawberry: distinguishing between wild strawberry and Indian strawberry

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This is a strawberry:

***Fragaria virginiana*, Rosaceae, (Rose Family), wild strawberry**

Wild strawberry is a relative of the cultivated variety we find at grocery stores or grow in gardens. It is quite common and occupies a wide range of habitats, including prairies, sedge meadows, marshes, fens, woodlands, and old fields (Wilhelm and Rericha 2017). It is a low growing herbaceous perennial with **trifoliate** leaves and toothed **leaflet** margins, and creeps along the ground on red **stolons**. Flowers are **perfect** with five white to pinkish-white petals, and yellow anthers.

Not only are the fruits of *Fragaria* species nutritious and flavorful, the leaves and rhizomes have many medicinal uses (van Wyk and Wink 2017). The cultivated variety consumed in the US is *Fragaria* × *ananassa*, a hybrid of *F. virginica* and *F. chiloensis* (beach strawberry). In our region (the central Midwest), we have two species of *Fragaria*, *F. virginiana* and *F. vesca* (woodland strawberry), each with a recognized subspecies.

When in flower, *F. vesca* can be distinguished from *F. virginiana* by its erect flower stalks, which stand above the vegetation, as opposed to the leaf-level flowers of *F. virginiana*. Additionally, the terminal tooth of **leaflets** of *F. vesca* is longer and wider than the

neighboring distal marginal teeth, whereas it is shorter than to subequal and narrower in *F. virginiana* (Wilhelm and Rericha 2017).

Fragaria vesca subsp. *americana* (hillside strawberry) can be distinguished from *F. vesca* by its **appressed pubescence** (hairs) of the stem versus the spreading stem **pubescence** of *Fragaria vesca*. This species occurs in gravel hill prairies, dolomite prairies, and on outwash along streams and rivers (Wilhelm and Rericha 2017) and is far less common than both wild and woodland strawberry.

Fragaria virginiana subsp. *grayana* (Illinois strawberry) occurs in the same habitat as *F. virginiana* and can be distinguished by its spreading stem **pubescence** versus **appressed** (Wilhelm and Rericha 2017).

This is not a strawberry:

Photos by Molly Hacker

***Duchesnea indica,* Rosaceae (Rose Family), Indian strawberry, mock strawberry**

This species is ubiquitous in our modern human landscape in lawns, old fields, and degraded woodlands, and is often confused with wild strawberry (*Fragaria* species). They are very similar – both are **stoloniferous** perennials with **trifoliate** leaves and large fleshy red aggregate fruits. When in flower, these species are easily distinguished by flower color – *Duchesnea indica* is yellow and *Fragaria* spp. are white to pinkish-white. Vegetatively, *Duchesnea indica* and *Fragaria* spp. can be distinguished by leaf texture and **pubescence**. *Duchesnea indica* has a deeper venation, giving the **leaflets** a crinkled look and rougher texture than *Fragaria* spp. Both have a **pubescence** of the underside of the **leaflet** (mostly

along the veins) and stems, however, *Duchesnea indica*'s hairs are **appressed** versus the longer and generally more spreading hairs of *Fragaria*.

Duchesnea indica is native to Asia and was introduced for its ornamental and medicinal value. Traditional folk uses include treating diarrhea and stomach ulcers (Shan et al. 2019) and more recent studies have suggested this plant efficacy in treatment and prevention of some cancers, including growth inhibitory activity against several cancer cell lines (Shoemaker et al. 2005), and that the fruit of this species have an exceptional capacity to scavenge free radicals (Shan et al. 2019) – the agents responsible for cell damage associated with the development of cancers and other diseases.

Why does knowing the distinction between these species matter??! Well, this discussion comes up all the time, for myself and my botany cohorts, on Facebook, etc. several times a year. Most people just want to know what *Duchesnea indica* is and if they can eat it. Technically, you can eat it - *Duchesnea indica* lacks flavor, but it is non-toxic (FDA 2019). Should you eat it? It seems like it'd be really good for you...but, let's consider another layer of complexity...environmental toxicology.

Some desirable wild harvested plants have a capacity to accumulate contaminants harmful to human health (including heavy metals) from contaminated soils in their harvestable parts, and it can be difficult to know contaminant levels in your foraging area. Although my review was a bit cursory, there seemed to be a paucity in the literature regarding *Duchesnea indica*'s uptake of environmental contaminants toxic to human health. I found that *Duchesnea indica* has been tested for feasibility for use in phytoremediation (a way to clean up contaminants from soils using plants), and it showed promise for use in phytostabilization (stabilization of metals in the soil-root interface vs. phytoextraction, accumulation of metals in harvestable parts of the plant, thereby extraction from the system) (Sajad et al. 2018). Although it was not the best accumulator or stabilizer of lead, lead was detected, nonetheless.

Another study looked at cadmium (Cd) levels in three commonly used Chinese medicinal plants grown in contaminated soils and assessed risks on human health. Of the three plants, Cd levels were lowest in *Duchesnea indica*, at levels below internationally recommended standards, including the Acceptable Daily Intake of World Health Organization (Jiang et al.2018). Mind you, this was merely cursory review, yielding more questions than answers.

So, is it safe to eat?? Aside from environmental toxicological concerns and allergic reactions – yes, it appears so. I would recommend a cautionary approach to this and all wild foraged plants. Grow it in your verifiably uncontaminated gardens to reap the apparent health benefits. Know your sites and your plants.

The distinction between *Fragaria virginiana* and *Duchesnea indica* may be important in shaping the composition of your lawn or a managed natural area. One wouldn't want to accidentally let *Duchesnea indica* take over their garden/woodlot thinking it was *Fragaria virginiana* (a fine ground cover for native landscaping), or control for actual wild strawberry thinking it was the non-native Indian strawberry. The distinction between these species could also be important if one were planning to spend time foraging their lawn for delicious berries to eat. To me, the distinction mainly matters for the intrinsic value of understanding our world and its plants.

Glossary of botanical terms

Appressed: Pressed close to or flat against another organ.

Stolon: An elongate, horizontal stem creeping along the ground and rooting at the nodes or at the tip and giving rise to a new plant.

Trifoliate: with three leaves or three leaflets

Leaflet: A division of a compound leaf.

Perfect: having both male and female reproductive structures

Pubescence: Hairiness; short, soft hairs.

Anthers: The expanded, apical, pollen bearing portion of the stamen.

Distal: Toward the tip, or the end of the organ opposite the end of attachment (compare proximal).

Proximal: Toward the base, or the end of the organ by which it is attached (compare distal).

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