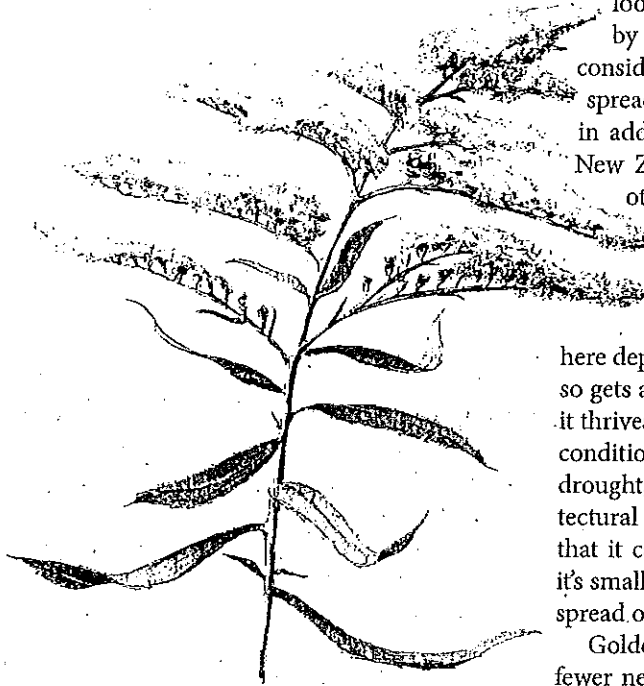


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Invasive Plant Species: When Our Plants are the Bad Guys

Some trade imbalances are way out of whack and tariffs won't help. Take the import and export of plants between North America and Europe, for instance. We've imported countless plants, and many of them cause severe and costly damage, but not all that many plants have gone from North America in an eastward direction.

However, there are some North American plants that have found foreign soil to their liking and are considered ugly Americans abroad. Three such species might surprise you: Canada goldenrod, black locust, and common milkweed. Another surprise: these species, which are running amok abroad, are not shrinking violets at home. They have aggressive tendencies even here.



Canada goldenrod, *Solidago canadensis*

Canada goldenrod is beautiful and appreciated throughout its native range in much of both the US and Canada. There are many goldenrods, but this is the most common large one. It grows to 5 feet high, and has large, plume-like flower heads, each head bearing an average of

roughly 1,400 flowers and, later, 10,000 seeds that are made for traveling far on the wind. Once a plant becomes established, it spreads rapidly via its root system, which includes rootlike underground stems called rhizomes, that spread to form dense colonies and that exclude other plants.

Canada goldenrod is allelopathic, and the chemicals it produces, particularly diterpenes, inhibit the germination of seeds of many other species, which may be why a field of goldenrod can persist for many decades. This is good news for honey bees, as they collect large amounts of nectar and pollen from goldenrod in late summer and fall to top off their winter stores. Sometimes the flower heads are heavy with bumblebees.

Canada goldenrod was welcomed in England at least by 1645 as an easy-to-grow addition to the garden. Its good looks got it to many other countries by the nineteenth century. Now it's considered to be one of the most widespread invasive species in Europe and, in addition, is unwelcome in Australia, New Zealand, Japan, China, and many other Asian countries. Its spread in China is especially rapid and alarming.

Goldenrod uses many of the same tricks that invasive species here deploy: it emerges early in the spring so gets an advantageous jump on growth, it thrives under a wide range of ecological conditions, it can physiologically adapt to drought, and it is said to have "high architectural plasticity," which I think means that it can produce seeds as easily when it's small as when it's large, and can either spread out or be spindly.

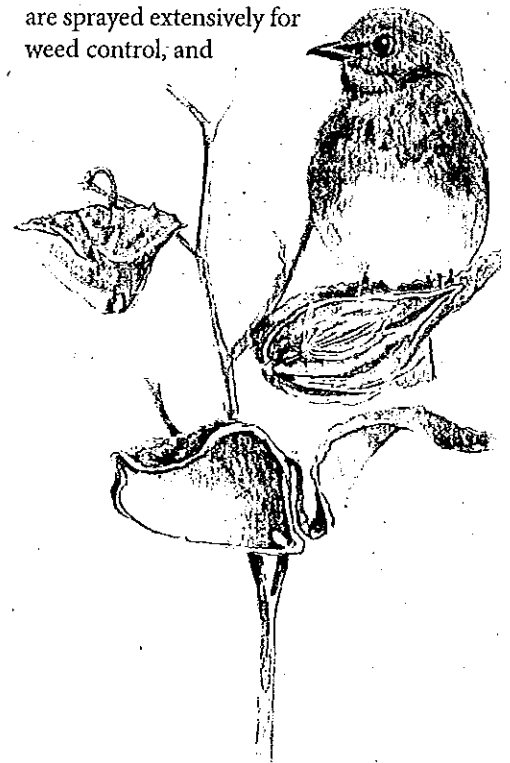
Goldenrod meadows in Poland have fewer nesting bird species than uninvaded meadows, and Canada goldenrod has been accused of causing the extinction of 30 native plants in Shanghai. There are fewer butterflies in goldenrod meadows in Europe as well. In Fukushima, it has colonized rice fields that were abandoned after the nuclear power plant catastrophe there in 2011. That particular goldenrod invasion might not be such a bad thing.

Common milkweed, *Asclepias syriaca*

In North America, there's more concern about the decline of common milkweed than its over-abundance. But the opposite is true in Europe, where monarch butterflies are not native, and its poisonous cardenolides are toxic to sheep, cattle, and poultry.

On our side of the Atlantic, milkweed populations have decreased dramatically over the past 20 or 30 years and so have monarch butterflies. This is not thought to be a coincidence. Monarchs feed on the other 11 *Asclepias* species, but common milkweed is much more common than the others and it occurs over a large range: the eastern two-thirds of the US and Canada. Leaves of plants in the genus *Asclepias* are the only food on which monarch larvae can thrive. They do eat the leaves of other milkweed family members, such as the invasive swallow-wort – but when they do, they die. Monarchs have adapted to milkweed's toxins and are able to sequester them as a defense against predators.

Roadside mowing and diminished habitat because of development may be partly to blame, but it seems that the increased use of herbicides is the biggest reason for milkweed's decline. Genetically modified corn and soybeans have been developed to tolerate herbicides that are sprayed extensively for weed control, and



their heavily treated fields are now free of milkweeds, as well as of other weeds.

The intensely fragrant pinkish flowers are often buzzing with honeybees and many other foragers gathering nectar and pollen in June and July. Despite the fact that milkweed leaves are full of toxic latex, they are eaten by several insects. Both the larvae and adults of the milkweed leaf beetle sever the veins of a milkweed leaf before feeding, which reduces the amount of sticky latex that reaches the leaf tips they munch on.

It's no surprise that those on other continents are wary of milkweed. Anyone who has engaged in hand-to-hoe combat with milkweed in the garden is likely to have been alarmed by its root system; the rootstocks, the diameter of a finger, can travel under the broccoli to send a fat green shoot up in the lettuce bed. Astonishingly, a single plant may give rise to a clonal group that consists of several thousand stems. There seems to be more to this plant underground than aboveground.

And the four to six seed pods on a milkweed stem can produce over 400 seeds, and each one flies off – sometimes a long distance – on a plume of silky hairs. This milkweed fluff has been used to stuff life jackets, and long ago the species was cultivated in Europe to make twine from the fibers in its stem, but nowadays it's an unwelcome invasive and is being considered for use as a biofuel.

Black locust, *Robinia pseudoacacia*

Black locust is a lovely tree. When its large white flowers open in June along roads and around villages, it lights up the landscape, the air is filled with its fragrance, and bees go to work early and go to bed late. It is an important honey plant in the Northeast, even though it flowers for only 10 days or so.

It has handsome, small, bluish green leaflets and zigzagging – some might say contorted – upper branches that are unlike those of any other trees around here. The irregular outline reminds me of the trees in some Japanese woodcuts.

Because it is tough, grows fast, puts up

with poor soil, and, like other legumes, fixes nitrogen, black locust is an excellent choice for erosion control.

Ecologically, the story is more mixed. It is believed to have a small native range, in two separated populations: an eastern population from southern Pennsylvania to

northern Georgia, and a western one that is centered on the Ozark Plateau. But colonists began moving this tree around as soon as they encountered it, and it is now found throughout the continent. Its wood is heavy, hard, strong, and among the most durable in North America. It is unmatched as fence post material, so in some ways its habit of producing new stems from its roots is desirable, as it spontaneously produces new crops of fence posts.

But this staying power is not so appreciated when people are trying to get rid of it. The suckers form dense thickets that exclude other plants, and its toughness and ability to withstand adversity have gotten it in trouble in some places. Even on its home continent, black locust is sometimes considered to be a weedy invasive. Several compounds in the leaves inhibit the growth of many other plants. Though it is planted as a street tree in

Europe because it withstands pollution, it's mostly unwelcome there, as it is in Pakistan, Australia, Canada, China, Europe, India, South Africa, New Zealand, and parts of Australia and South America.

