

“What is a Goldenrod?” She Asked

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She’s smart, a young teenager, a suburbanite. I said, it must be nice to have these hedgerows around your house, full of goldenrods.

“What is a goldenrod?” she asked.

I paled, not knowing where to begin, taken back by her lack of even the basic natural history of her homestead. She had studied biology in school, so knows DNA fundamentals, organ systems in mammals, the basics of cell structure, but not this, the name of the most common showy wildflowers in her community.

But what is a goldenrod, really? What first principles are the best to communicate to a questioning public, naïve to the basic elements of restoration ecology, the rationale and actions to establish even familiar members of the local biota?

Goldenrods are almost too common to be appreciated. About 80 species of *Solidago* are in North America, found in habitats from shaded forest to dry, rocky hillsides to salty breeze swept seashores. The genus is holarctic, with some species in Europe and China. A few of our North American species are now invasive in Asia, a biotic quid pro quo for the many Asian invasive plants they’ve given to us. Ranges keep growing and changing. One coastal species, *Solidago sempervirens* (seaside goldenrod) has migrated inland along roadsides, preadapted to the salt-laden fringes of roads that are treated with salt to melt the winter’s ice. They have responded to our use and modification of the landscape and have run away from the shore just as people love coming to the shore. A few *Solidago* plants are white-flowered, silverrods, not the buttery yellow of their congeners. Hard to tell apart in their morphological similarity, goldenrods are deliciously complex in their ecological personalities. What facets of these personalities should we start with, to introduce them to the curious novice?

Long-lived perennials with wind-dispersed seeds and generalist composite flowers that attract so many insect groups, many goldenrod species can quickly invade open land, pass through juvenile growth stages, and start dominating old fields, the bright yellow display for so many fall habitats. Many species are clonal and can produce dozens of ramets each year, quickly forming wide clusters

of connected stems, dominating the local landscape. Count the stems, a dozen, three dozen, but they are one plant genetically, not separate progeny of many seed germinations. We all learn, from childhood, that plants come from seeds; should we tell our curious teenager that most of the stems in her yard are asexually derived? Will we lose her with this first nerdy restoration comment before she is entrained to the wonderful natural history of this wildflower group?

Restorationists are well aware that this clonal growth dominates meadow development. Careful studies show that after six years most stems of *S. canadensis* are clonally derived. Adding seed to an establishing stand, even one or two years after the initial establishment period, doesn’t add many new stems at all. In a botanical version of the early bird gets the worm, the early wildflower gets the soil and sun resources. “Priority effects” we call it, the greedy and grabby behavior of many first arrivals in a restoration project.

These big populations of goldenrods can mask micro-evolutionary adaptations to small-scale stress gradients. Studies of the seaside goldenrod growing on dunes near the ocean show specific adaptations to the salty-wind environment. Populations of these primary dunes are much less damaged by salt deposition on their leaves than are plants from populations 0.5 km inland, near the more protected inland bays (Cartica and Quinn 1980). The species is in fact a rich mix of ecotypes and variants that bedevil the restorationist’s toolbox and are completely invisible to nature lovers who use a single drawing of a species in a field guide, as if all individuals come from one adaptive cookie cutter.

Wandering through a patch of goldenrods, our young student might see some stems with hard round swellings, the galls created by ovipositing flies. Other insects make different shaped stem galls. The gall growth affects different components of the goldenrod’s performance and reproduction, and the insects are central links in a wider food web story. The goldenrod, like many of us, will never be alone.

Thomas Huxley’s great essay of 1868, “On a Piece of Chalk” could be followed by a botanical sequel, “On a Stem of Goldenrod”. I could give you much more depth of coverage of this oh so common member of our flora, but you get the idea. Endless stories covering evolution, community and population ecology, habitat structure, and restoration potential. So where do we start?

We lead nature walks for the public in our landscapes. Anyone can and does come. We scan the crowd: earnest yuppies with their outdoorsy-company branded shirts, designer jeans, and collegiate baseball hats, building their environmental cred; yappy teens with their graphic T's and sweatshirts being pulled along by parents, cruisin' in the woods, not really listening to the mini-lecture on chemical defenses of plants against herbivory, booring; wizened seniors with walking sticks and TNC backpacks, nodding at ecological nuggets, newly remembered from their own youthful classroom days; amorous college kids, flirting, giggling during the cheap date that a nature walk in the woods can supply to them; botanical disciples, asking about Latin binomials, herbal remedies, wild food foraging, and seed dispersal fun-facts; environmental activists, earnest, angry, dedicated, with their Save The Something buttons and dangling metal water bottles. They're thrilled to be in an old field or forest, not the Ailanthus-strewn vacant lots of city roadsides and abandoned lots.

What should we tell them; what level of the science is right for their age group, interest, educational background, and personal concerns? We are aware of how thin the ecological background is for most people, how small a component of their formal education our science has been.

Can we grab their attention and snatch them into our world of restoration commitment? What will be the facts that will draw them in, open the door to begin their understanding of what is a goldenrod?

Recommended Reading

- Abrahamson, W.G. and A.E. Weis. 1997. *Evolutionary Ecology Across Three Trophic Levels: Goldenrods, Gallmakers, and Natural Enemies*. Princeton, NJ: Princeton University Press.
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- Dong, M., J. Lu, W. Zhang, J. Chen and B. Li. 2005. Canada goldenrod (*Solidago canadensis*): An invasive alien weed rapidly spreading in China. *Acta Phytotaxonomica Sinica* 44:72–85.
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- Louv, R. 2008. *Last Child in The Woods: Saving Our Children from Nature-Deficit Disorder*. Chapel Hill, NC: Algonquin Books.



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