

Plant Lover's Almanac

Jim Chatfield

Ohio State University Extension

For June 27, 2015

Linden trees are flooding the sensory lives of both bees and beguiled plant lovers alike as we move into the sultrier days of summer. Bottlebush buckeyes are about to bloom forth – can golden raintrees be far behind? Appreciate the season as it unfolds. Now let us turn to appreciation of two new resources for plant lovers.

“Good Garden Bugs” by Mary Gardiner. Charles Darwin as a young man oft-eschewed his mathematics and theological studies, opting instead to look under rocks for beetles and to lead group expeditions to better understand nature. J. B. S. Haldane quipped that “God must have an inordinate fondness for beetles” with regard to their diversity, Douglas Brinkley, wrote in “Wilderness Warrior” about a young Teddy Roosevelt such that *“To the bafflement of his parents he gathered more than 100 different species of lichens and fungi under rocks and in dense undergrowths. He brought out from caves unusual samplings of moss to scrutinize back home under a magnifying glass...”* Insects must also have been in those samplings. They do indeed draw the active and curious mind, and that must at least partially explain the similar curiosity of Dr. Mary Gardiner, an associate professor in OSU's Entomology Department.

Her new book is “Good Garden Bugs”, a 176 page book of all the insects that are doing a major piece of our pest management for us in landscapes and gardens, as intimated by the book's subtitle: “Everything You Need To Know About Beneficial Predatory Insects.” Ground beetles. Big-eyed bugs, a host of different ladybug beetles, parasitic flies and wasps, doodle bugs, ambush bugs, green lacewings, fellow travelers such as a wide range of spiders, and on and on. Check out this book with its hundreds of photos (from the contributors to Iowa State University's BugGuide.net) and illustrations (by Michael Cooley).

These pictures help you identify the range of different beneficial insects and spiders in landscape settings, essential to any pest and plant health management program development. We are learning more and more about how important diverse plantings are as they produce habitat for a range of good bugs that help us do keep plants healthy. Low diversity and pieris lace bug = big problem. High plant diversity with a range of ecological services such as pollen and nectar sources for predators and the problem often resolves itself, without pesticides. Use the old practices of multiple cover sprays and cocktails to try to counter any possible problem and the damage to the good bugs results in bigger problems long-term.

According to Mary: “There are many great books in the marketplace focusing on insects in home gardens. However, I saw a need for an in-depth book focused solely on natural enemies that provided identification information below the order or family level. I can attest from the many photos I receive that when someone finds a beetle they don't only want to confirm that it's a lady beetle, they also want to know what species they have found and what type of prey it attacks. Gardeners are also interested in learning more about what natural enemies spend their time doing within the landscape. So, the reader will not only be able to identify their insect but will also learn about interesting courtship rituals, hunting strategies, and defensive behaviors employed by these species.”

Mary is focusing her current research in the urban vacant lots of Cleveland and their biological diversity, studying how we might redesign urban land to encourage native vegetation, provide ecosystem services, and

influence local food production. Check it out: I looked for it on Amazon; \$17.00. Well worth it as a reference and a good read.

Plant Galls. Galls are abnormal growths on plants that are caused by a living gall-maker. These gall-makers may be fungi, bacteria, mites, and most commonly - insects. The diversity and life histories of gall-makers and the galls they induce are quite fantastic. Case in point: the DNA of crown gall bacteria (*Agrobacterium tumefaciens*), even when separated from the bacterium itself, causes plant cells to produce too many cells and cells that are abnormally large, resulting in tumor-like galls that interfere with normal vascular function of the plant. Case in point: there are over 800 different insects that induce galls on oak species alone, each relationship highly specialized. Case in point: the incredibly broad host range of the cedar apple rust fungus (*Gymnosporangium juniper-virginianae*) that cycles back and forth between eastern red cedar, juniper, a plant in the Gymnosperms (seed plants with naked seeds) and plants in the rose family which are Angiosperms (true flowering plants with seeds enclosed within fruits). Yet, the host range of this fungus is also rather narrow, just certain species of junipers and certain genera in the rose family.

Research has revealed that some gall-making insects and mites produce chemical replicas of plant hormones, or “plant hormone analogs” meaning the molecules are nothing like plant hormones but the plant’s response is the same as with plant hormones. The gall-forming process is usually initiated by the female when she injects gall-inducing chemicals into the plant along with her eggs. The eggs themselves may ooze gall-inducing chemicals and once the eggs hatch, the interaction continues with the immature gall-makers continuing to exude chemicals to direct plant growth to suit their needs. The resulting galls provide both a protective home and nourishment for the next generation of gall-maker. The continual direction of gall growth by the gall-maker using chemicals to turn plant genes on and off speaks to why some find insect and mite plant galls so fascinating.

I could fill many a *Buckeye* article with the tales of plant galls, but instead, let us give you a handy reference and then turn you loose into the wonderful photogallic world of my OSU Extension colleague Joe Boggs, who provides the accompanying gall images for this article. For the rest of the story:

Check out a three part series on Plant Galls by Joe Boggs and Jim Chatfield, from gall myths and misconceptions to gall management in the May, June, and July issues of the “*American Nurseryman*” magazine. Joe’s gall image even made the May cover of “*Rolling Stone*”, er, I mean, *American Nurseryman*. To read the articles, go to (americannurseryman.com).

One more note: It is about Albert Kinsey, the erstwhile mid-20th century human sexual behavior researcher at the University of Indiana. While at Harvard and in his early IU career, Kinsey studied gall wasps. Studied them so passionately, that in the collection of 18 million insects at the New York Museum of Natural History, over 5 million are Kinsey’s gall wasps. As George Washington Corner, a scientific mentor of both Kinsey and the other 1950 human sex researcher William Masters of Masters & Johnson, said of Kinsey:

“...the most intense person I ever knew outside of an institution of psychiatry.” Gall-ee.