

Nature Trails

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Rough-skinned newt. Photo by Tom Titus

Toxic Tales from Oregon Amphibians: Newt and Toad Lickers Take Note!

Tom Titus

Ph.D. Biologist, Author

Friday, 20 November 2020, 7:30 p.m.

Here is how to join the audience for the November presentation. The Zoom meeting will open at 7:00 but our meeting will begin at 7:30. This is to make sure everyone has enough time to get properly connected.

August Jackson is inviting you to a scheduled Zoom meeting.

Topic: November ENHS Meeting

Time: 20 Nov. 2020 07:00 PM Pacific Time (US and Canada)

Join Zoom Meeting

<https://zoom.us/j/97499095971> We plan to use this Zoom link for the remainder of ENHS meetings. However, please double-check each time to make sure the link hasn't changed.



We are fortunate that, on short notice, Tom Titus is willing to become the ENHS November speaker. Members of ENHS know Tom. During the eight years he was President of our organization he was instrumental in getting our board to cast a wider net in our search for quality speakers.

Tom last spoke to us in September 2012. Besides being eight years older, several other aspects of his life have changed since then. He is now retired. He and his wife Kim Wollter, fellow ENHS board member, free-lance editor, and *Nature Trails* polisher, are now grandparents. Tom has authored another book and many more essays. Yet, much of Tom's introduction from 2012 remains relevant now, so those of you with long memories must deal with some repetition.

Tom was born in Renton, Washington, when his father worked for Boeing. His family moved to Oregon when he was three years old, to a twenty-five-acre place east of Springfield (his folks didn't want to raise their boys in a city). He and his three younger brothers had a huge natural playground on that hillside and the nearby McKenzie River. Tom has been venturing out into the natural world since shortly after he learned to walk. His earliest memories of family vacations involved foraging—fishing, hunting, and clamming trips.

After high school and a couple of collegiate false starts Tom enrolled at Western Oregon University. He took a course from Ken Walker in the natural history of Oregon. Students had to learn all of Oregon's amphibians, reptiles, birds, mammals, trees, and shrubs. There were several field trips to various parts of the state. Tom became fascinated with the obscurity of amphibians, surprised to learn that while he was playing on his hillside as a youngster they had been right under his nose without him knowing they were there. Walker's class was one of the formative experiences of Tom's life.

His intent when he began at WOU was to become a high school biology teacher. By the time he graduated with a B.S. in education with an emphasis in biology he knew that wasn't his calling. What his calling was took some time to determine. He travelled to New Zealand and spent several months touring and hiking before coming back to Oregon and taking a seasonal job at the Nature Center in Sunriver (also working there was a young woman named Kim Wollter). Tom's boss was Jay Bowerman (son of the famous coach), who had been a student of Jim Kezer, one of the early members of ENHS. Kezer, still directing research as a retired UO biology professor,

had organized a salamander expedition to Costa Rica to collect research material for one of his former graduate students. Through this set of connections Tom was invited to be a part of the expedition—his first serious salamander hunt.

His love of amphibians and reptiles led Tom to go to graduate school to study them further. He chose the University of Kansas, a premier institution for the study of herpetology. He said KU was really a “frog school,” but they put up with his strange infatuation with salamanders. Titus got both his M.A. and Ph.D. degrees there, in Systematics and Ecology. His M.A. research dealt with population genetics of the northwestern salamander (which necessitated frequent trips to Oregon). For his Ph.D. he worked on the molecular phylogenetics and life history evolution of a subfamily of lungless salamanders. He had to teach himself the required molecular genetics techniques and their use in evolutionary studies and set up the first molecular evolution laboratory in KU's Museum of Natural History.

Tom continued this research at Washington University in St. Louis, where he did postdoctoral work for over two years, obtaining a federal grant to fund his own research. When he and Kim decided in 1994 it was time to get back home, he was able to transfer this grant to the University of Oregon. He was a postdoctoral researcher for five years, during which time he continued the molecular phylogenetics research while taking on a heavy teaching load. In 1999 he took a position in John Postelthwait's lab. He dropped all of his teaching duties except the one summer class “Amphibians and Reptiles of Oregon,” which he continued to teach until he retired in 2020. He has authored and coauthored over 30 papers on evolutionary genetics and gene expression of amphibians, reptiles, and fishes.

Once home again in Oregon, his familiar space, Tom fell back into his foraging ways, and he has chronicled many of these adventures in his books and other writings. He cultivated his love of writing by joining a writer's group. He has honed his writing technique to the point that we all look forward to his *Nature Trails* essays. He has authored two books: *Blackberries in July: A Forager's Field Guide to Inner Peace* and *Palindrome: Grateful Reflections from the Home Ground*. The chapters in both are compelling; the adventures are intriguing with funny bits and profound insights. But the fundamental message Tom gives us is that we become whole beings to the extent we connect with our physical place. His books and blog can be found at www.tomtitus.com.

So there you have it: the fascination with amphibians born in an undergraduate class leading to self-taught expertise in molecular genetics approaches to phylogenetics; the requirement to learn all the Oregon fauna and flora leading to the class that he taught for twenty-four years; the molecular expertise leading to the position in Postelthwait's lab as a fish molecular geneticist; his foraging and writing talents married in books with his name on the cover as the author. After all these years, Tom still thinks salamanders are the coolest animals walking (and swimming) the planet.



Dr. Tom Titus's ENHS presentation is entitled **Toxic Tales from Oregon Amphibians: Newt and**

Toad Lickers Take Note! Here is his summary of what he will tell us: "Amphibian skin is far more interesting and perilous than our own, with a host of glands that produce a fascinating array of toxins. If you were tempted to take that dare and swallow a newt or seek out new hallucinogenic horizons by running your tongue over a toad's skin, think twice. Some Willamette Valley newts contain enough nerve toxin to kill ten adult humans, and although the skin of the western toad won't give you warts, it contains a cocktail of cardiotoxins that can send your heart permanently off to the races. Discover why rough-skinned newts really *should* be afraid of snakes, and why the snakes that eat them have little to fear of being eaten by anything." Please join the Zoom meeting at 7:00 pm on Friday, 20 November.

John Carter

Invasive Species by Whitey Lueck

One day, a student in a class I teach called "The Nature of Eugene" told me about a beautiful bird he'd seen on his way to campus that morning that he was unfamiliar with. Sadly, most of my students are unable to identify even five different species of birds at the beginning of the term, so I make every effort to help them improve their bird identification skills during the ten weeks we're together. So I asked Trevor to describe the bird for me, which he did. He said it had incredibly shiny black feathers with white spots, pink legs, and a relatively long, sharp, bright yellow beak. Hmm. I then asked him if he'd by chance taken a photo, as almost all of my students carry with them a device that can take photos. Indeed, he had a photo—and a very good one, at that.

I recognized the bird immediately as a starling and told Trevor that, but said no more, other than to praise him for his new-found interest in birds and to agree with him about the male starling's attractive breeding-season plumage.

Almost anyone else who would have been able to identify a starling for someone would have immediately had something *negative* to say about the bird. And the single phrase most likely to be used with regard to the starling is that it's an "invasive species."

I didn't, however, wish to annotate my comments with anything negative that might affect Trevor's excitement at having discovered a bird that was new to him. Moreover, I didn't want him to associate the term "invasive" with the starling. The starling didn't invade North America any more than dandelions invade your lawn. Both organisms were originally

native to Europe and were relatively recently introduced by humans to North America, where they spread across the continent simply because they *could*—not because they are innately "bad" in any way.

Where they're native, the populations of both starlings and dandelions are naturally kept in check by a variety of factors. But after being introduced to North America, where they are largely free of those controls that had evolved over many millennia in their homelands, their populations increased dramatically.

The European starling was first introduced to the New World in 1890 in New York City, as part of an effort by the American Acclimatization Society to introduce European birds and animals here that were familiar to immigrants from Europe. The dandelion, however, probably arrived on this continent on its own. That is, its seeds came here in the pant cuffs of European immigrants, or attached to the hair of livestock being imported, or in bales of hay that accompanied animals being brought to the New World. Then again, because some Western European cultures found dandelions useful—the greens as salad, the entire plant for medicinal purposes, the flowers for wine—maybe it was also purposely introduced as well.

The organisms here in North America that now carry the label "invasive" have come from every continent except Antarctica. Nutrias and pampas grass—which now create a variety of ecological problems in different parts of the U.S.—are both from South America. The nutria was brought here to be raised for its fur, and pampas grass was introduced as a garden plant, but both of them eventually

escaped their confines. Japanese honeysuckle—common now especially on the East Coast—is obviously from eastern Asia, as is the kudzu vine, the scourge of the South.

Regardless of the provenance of these species, the one thread that links them all is that human beings carried them from their ancestral homelands to the new territories where the organisms have now created problems. It is bipedal hominids that, relatively recently and over a very short time period, fueled the phenomenal spread of plants and animals around the world. The plants and animals themselves “mean no ill,” I often say. So I personally don’t care to have words like “invasive” associated with these otherwise innocent species, none of which had the ability to come here on its own.

Besides introducing species—especially plants—that can eventually become monocultures and destroy the natural diversity of native plants and other organisms that once existed on “natural” sites, humans have proven to be invasive in another way that, in the end, may prove to be even more calamitous. For as long as life on Earth has existed, the ranges of different species have expanded and contracted over time as climates and other circumstances changed. And most of the species that ever existed on the planet are long extinct. That’s life, so to speak. But until humans evolved, no single species had ever before come to occupy virtually every available terrestrial habitat—from the humid tropics to Arctic deserts—thus displacing or eliminating in the process those habitats’ former occupants.

Although our cities and highways themselves now consume a considerable portion of the Earth’s land mass, our agricultural lands occupy an even

greater area. And all agricultural lands—which now are almost exclusively devoted to crop monocultures—once supported vibrant and diverse biotic communities, whether it was the prairies of the Great Plains, the savannas and grasslands of California’s Central Valley, or the remarkable Sonoran desert of southern Arizona. In converting these areas to farmland, the biologically rich habitats that once thrived there were largely eliminated.

Because the word *species* can be either singular or plural, the title of this essay likely suggested to most readers that I would be discussing and wagging my finger at European starlings, Japanese honeysuckle, and South American nutrias, when in fact, the only organism that deserves any blame in all of this is ourselves. At one time confined to Africa, our ancestors eventually migrated to Europe, Asia, and Australia—and much more recently to the Americas. That’s just how our species has evolved. And because we’ve had both the desire and the ability to move plants and animals from one part of the world to another, we’ve done so—and *continue* to do so (especially with plants) even though we should know better by now.

To use the adjective “invasive” for any species other than our own is absurd. It’s time we humans stop blaming other species for being “out of control” and simply look in the mirror. The only species that is truly out of control on this planet is our own, *Homo sapiens*. One might think that an organism with a species name (*sapiens*), that means “intelligent” in Latin would be able to figure out a way to rein in its own excesses—out of simple consideration for the countless other species that call this planet “home.” But so far, there’s very little evidence of such empathy.

Bigleaf Maple Tar Spot by David Wagner

Every fall bigleaf maple leaves develop large, green-bordered spots with speckled centers. It is a common sight in our area although not every tree has them. As bigleaf maple leaves start turning yellow, the colonies of the fungus *Rhytisma punctatum* (tar spot fungus) grow quickly and become conspicuous.

We learned about this fungus on a fall outing of the Eugene Natural History Society led by Bill Dennison, late mycologist and lichen specialist at Oregon State University. He had recently spoken to us about his adventures teaching scientists in Bhutan how to cultivate shiitake mushrooms on hardwood. This was a follow-up field trip to focus on lichens, mushrooms and other fungi. Bill discussed how air-quality monitoring is being done by regular surveys



Photo by David Wagner

of lichens with precisely known sensitivity to atmospheric pollutants.

The co-leader of this field trip was Martha Sherwood, a mycologist who worked at the

University of Oregon. She is a specialist in tiny fungi that parasitize wood and woody plants and was the person who identified the tar spot fungus for us and talked about its ecology. Its life cycle is fascinating. The fungus lives inside the leaves, unnoticed, all year. At season's end, the fungus preserves the last of the green leaf cells to produce spores for the next season. The green ring around each colony does that job. The tiny black spots building a low dome in the center of origin are the spore cases for next year's cohabitation.

The green border is known as the Green Island

effect. At the end of the growing season deciduous trees start withdrawing energy out of their leaves before the leaves are dropped. Part of the process involves the

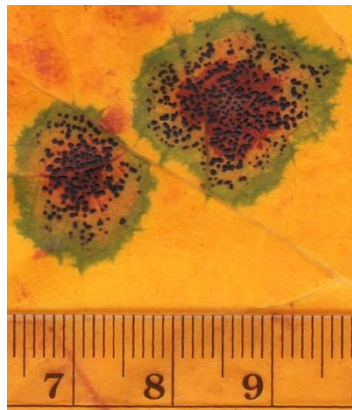


Photo by David Wagner

breakdown of chloroplasts, the part of leaf cells that makes leaves green. The trees save the magnesium ions needed for every chlorophyll molecule. This is a trigger for the tar spot fungus to begin its reproductive process. The colony exudes a plant hormone analog that prevents the chloroplasts from breaking down in the region where the fungus grows. A green island is defined by the extent of each fungus colony. In this area, the fungus takes advantage of the last energy generated by photosynthesis no longer needed by the tree. The rest of the leaf turns yellow, showing the yellow or reddish pigments that had been masked by the green chloroplasts.

The date of our field trip must have been soon after 1976, because Martha discussed a paper about *Rhytisma acerinum* in Great Britain that was published that year in *Environmental Pollution*. *R. acerinum* is a close relative of our regional species. The authors of that paper discussed their study of distribution of the tar spot fungus in urban areas of Liverpool compared with the countryside. They showed that high sulfur dioxide levels were correlated with absence of *R. acerinum*. The conclusion was that the tar spot fungus was an indicator of atmospheric pollution in Liverpool.

We decided to do a study of the distribution of our tar spot fungus in the Eugene area. It was one of the first group activities of the Eugene Natural History Society. Our members were asked to send in notes on the occurrence of tar spot fungus on bigleaf

maples around where they lived. We heard from people in many places out in the countryside: tar spot in Veneta; tar spot in Dexter; tar spot in Creswell. It seemed to be almost everywhere outside the city limits of Eugene.

I decided to conduct an observation transect through the center of Eugene. There are lots of bigleaf maples in Eugene as street trees. I took the bicycle route that went down 12th Avenue, from the university campus to west Eugene. It was evident right away that there was very little tar spot to be seen along the bike route. I got close to Willamette Street when I snapped my notebook shut and went back to my office. Why? I realized the absence of tar spot along 12th Avenue probably had nothing to do with air pollution. Surely it had to do with breaking the life cycle of the tar spot fungus. Infected leaves need to stay on the ground all winter, so that when new leaves start appearing on the trees in spring, the air would have ascospores of *R. punctatum* blowing around from the decomposed leaves. The city of Eugene, like most towns, sweeps up all the leaves along streets, including leaves raked off yards into the street. Street cleaners work year round. We discussed this idea of life cycle interruption and concluded it was the best explanation for absence of tar spot fungus in downtown Eugene.

A number of years later a group of mycologists revisited the pollution sensitivity of *R. acerinum* in Great Britain. In the original study, the airborne sulfur dioxide level was measured directly at many sites around Liverpool and the surrounding countryside. The presumed pollution effect also was correlated with known sensitivity from lichen studies, well established over the previous century. That seemed to verify the original conclusion. This time, however, the scientists put infected leaves into a controlled atmosphere cabinet and subjected them to varying levels of sulfur dioxide. Much to their surprise, they found no significant effect of sulfur dioxide on the *Rhytisma* colonies. They concluded as we had here in Eugene: the lack of tar spot fungus on maples in Liverpool was due to the streets being cleared of leaves in the fall.

There is one more part of this story. The person who brought this more recent notion to our attention was George Carroll, Professor Emeritus at the University of Oregon and a recognized expert on endophytes of tree needles. He mentioned an intriguing concept: that the tar spot fungus might not be a typical parasite but actually a beneficial endophyte (endophytes are microbes that live within plants). He said that *R. punctatum* could be acting as an internal antibiotic, protecting against viral or bacterial parasites. Remember that the antibiotic era

in humans began when penicillin extracted from the fungus *Penicillium* was found to kill bacteria.

Even though we have no evidence of a harmful parasite of bigleaf maple that is being held in check

by tar spot, it is an intriguing hypothesis and worth further study.

Events of Interest in the Community

McKenzie River Trust <https://mckenzieriver.org/events/#event-listings>

Saturday, 14 November, 11 a.m. to 3 p.m. Green Island Exploration Days. Take a walk near the place where the Willamette and McKenzie Rivers meet. Observe fifteen years of tree planting work on Green Island, a habitat for beaver, river otter, and over 150 species of birds. If you're looking for a special place to connect to nature this year, Green Island will be open for self-guided tours on 14 November and 27 November from 11 to 3. **Please observe COVID-19 safety guidelines for this visit. Bring your mask and maintain a safe social distance from visitors outside of your group.** This event is free and does not require registration. We will have a guestbook available on site, and we'd love to know who comes to visit! Look at the website before you go to learn about the other requirements and see a map.

Lane County Audubon Society lanecountyaudubon.org

Saturday, 21 November. Third Saturday Bird Walk. Although the regular walks are on a COVID hiatus, we continue to lead small walks with some restrictions in place to adhere to local safety guidelines. Attendance is capped at 10 birders, but I enjoy doing it for as few as one. Beginners welcome! Folks wishing to join a walk can email Bex at rebecca.waterman@gmail.com. All participants must wear a mask for the entirety of the walk and maintain the recommended 6-foot distance from each other.

Tuesday, 24 November, 7 p.m. Ultimate Africa. Ram Papich will guide the audience on a tour of what he terms "the greatest wildlife spectacle in the world." He will show herds of wildebeest, zebra, and antelope stretching endlessly in every direction and provide an opportunity to witness the eternal struggle between predator and prey on the expansive plains of Tanzania. Looking beyond the megafauna, he'll share photos of the wonderful and abundant bird life of the African savannahs, wetlands, and rainforests. And, as a bonus, his presentation will offer a window into the mysteries of mountain gorillas in Uganda. Check the LCAS webpage for instructions on how to access the meeting.

Mt. Pisgah Arboretum

For MPA activities go to <https://mountpisgaharboretum.com/festivals-events/>

University of Oregon's Museum of Natural and Cultural History <https://mnch.uoregon.edu/museum-home>

MNCH is now open to the public with new limited hours: Wednesday through Sunday 11 a.m. to 12 noon for seniors and COVID-vulnerable visitors. 12 noon to 3 p.m. for everyone. Current exhibits: **Explore Oregon** and **Oregon—Where Past Is Present**. [Learn more](#).

Native Plant Society of Oregon, Emerald Chapter <https://emerald.npsoregon.org/>

Sunday, 15 November, 1 to 3 p.m. Field Trip: Fall Fruits and Their Dispersal Ecology with Gail Baker and Steven Yeager. Fall fruits are a joy to explore at Mt. Pisgah Arboretum because they occur in such variety and beauty. Learn how fruit colors, textures, sizes, ripening times, and chemistry influence how their cargos, the seeds, are dispersed. Due to public health concerns, we ask that attendees preregister by e-mailing your name and contact number to em_president@npsoregon.org.

Monday, 16 November, 7 p.m. Online Program: 40 Years of Plant Walks in Alton Baker Park with Bitty Roy, David Wagner, and Sarah Ward. For the last 40 years, David Wagner and Bitty Roy have led plant walks in Alton Baker Park during 15 weeks each spring. Join a virtual tour of Alton Baker Park, hear stories about the plants and people on the walks, and learn how their long-term observations of new and invasive species at the park are useful for assessing climate. The link for the online presentation will be posted on the NPSO website and will be emailed to NPSO members in advance.

Nearby Nature <https://www.nearbynature.org/>

Tuesday, 8 December, 10 to 11:30 a.m. Green Start Play Day: Furry Friends. Enjoy outdoor nature play in our Learnscape plus toddler and preschool activities and stories. This month we'll learn all about our furry friends in the forest. We'll check out real pelts and skulls and make our own paw-printed stories. Kids 5 and under only, with an adult. Rain or shine. Members free, nonmembers \$7/family. Preregister online or call 541-687-9699.

Friends of Buford Park and Mt. Pisgah <https://www.bufordpark.org/>

Because people and nature need each other, the Park is OPEN during the Coronavirus/COVID-19 pandemic. Please refer to [Lane County](#) for instructions about the park and updates.

WREN (Willamette Resources and Educational Network)

For WREN's upcoming events go to <http://wewetlands.org/community-programs/> or info@wewetlands.org

ENHS welcomes new members! To join, fill out the form below. Membership payments allow us to give modest honoraria to our speakers and pay for the publication and mailing of *Nature Trails*. Our web address:

<http://biology.uoregon.edu/enhs>

MEMBERSHIP FORM

Name _____

Address _____

City _____ State & Zip _____ Phone _____

E-mail (if you want to receive announcements) _____

I (we) prefer electronic copies of *NT* rather than paper copies. ___ Yes ___ No

If yes, email address (if different from the one above): _____

ANNUAL DUES:	Family	\$25.00
	Individual	15.00
	Life Membership	300.00
	Contribution	_____

Annual dues for renewing members are payable in September. Memberships run from September to September. Generosity is encouraged and appreciated.

Make checks payable to:
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Ensatina (lungless salamander). Photo by Tom Titus

Note: If you have yet to pay your dues, this will be your last issue of *Nature Trails*.

ENHS. Officers and Board Members 2020–2021

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Nature Trails: Editor: John Carter jvernoncarter@comcast.net; Support Staff: Ruth BreMiller, Reida Kimmel, Kim Wollter.

2020–2021 Speakers and Topics

20 Nov.	Tom Titus	Toxic Tales from Oregon Amphibians: Newt and Toad Lickers Take Note!
11 Dec.	John Marzluff	Of Ravens, Wolves, and People
15 Jan.	TBD	
19 Feb.	TBD	
19 Mar.	Pepper Trail	Fighting Crime with Feathers: The Casebook of a Forensic Ornithologist
16 Apr.	Daphne Stone	Lichens: How They Tell Us About Their Environment
21 May	Lauren Hallet	The Ultramafic Plant Communities of the Siskiyous

The Eugene Natural History Society website has moved to a new host at: <http://eugenenaturalhistorysociety.org/> This is a new site under old management. Changes and improvements to the site will be ongoing. If you have any questions or concerns, please let Tim Godsil know at tgodsil@gmail.com