

## **Bittersweet Episode transcript**

**Intro music:** 8-10 seconds

<b>Welcome and Introduction</b>	
E	Welcome to Bud Buds, the podcast that takes you along the <b>winding tendrils</b> of invasive plants and their seasonal changes, and what you might be witnessing out your window or in the woods in Vermont. I'm Elizabeth, a scientist for the Vermont Department of Forests, Parks & Recreation. I'm joined today, as usual, by my co-host and bud, Lina ...
L	Hi, I'm Lina, a natural resource steward for the Vermont Department of Forests, Parks, and Recreation. What's going on these days, Elizabeth?
E	Well, speaking of days, I'm excited for winter solstice, the shortest day of the year, and the start of winter!
L	That's right! But that means the days are short, the nights are dark, and there's not a lot of plant phenology going on out my window or in the woods of Vermont. So what's there to get excited about?
E	Mmmm, "not a lot" does not mean "nothing," Lina.
L	I mean, I guess that's true....
E	Think back to your last walk in the woods. Did you notice anything?
L	Well, I was mostly looking in the snow for animal tracks, and I saw a lot of evidence of hares and squirrels
E	Ooh, fun! Did you see anything plant related?
L	Hmm, I saw some garlic mustard basal rosettes
E	What about when you looked up in the branches and canopy?
L	Hmmm... I saw a few buckthorns hanging on to some shriveling green leaves
E	Mmmmm...
L	And – oh! I saw a vine
E	Bingo! Now I think we're on the same page
L	Yes! I saw a vine, climbing every tree it could, and making the most beautiful orange and red berries. Wow – against the white snow and the blue sky and the tan bark of the bare trees, those berries were certainly striking!
E	That sounds gorgeous!
L	It was. It was also a little sad
E	Sad? How come?
L	Well, that vine which is so pretty and looks so sweet is terrible for the forest.
E	You're right....
L	Yeah, it will eventually strangle the trees it's climbing on and kill them
E	Ooh, that's not sweet at all
L	No, it's not. It actually makes me kind of bitter
E	Well, that's fitting because today we're talking about
<b>Topic 1: Bittersweet</b>	
Together	Bittersweet!
L	The species of bittersweet we're talking about today is <i>Celastrus orbiculatus</i> , but we like to just refer to it as bittersweet.

E	This species evolved in Asia, but there is a species of bittersweet that evolved in this ecosystem --
L	... <i>Celastrus scandens</i>
E	...But more on that in a moment.
L	Invasive bittersweet is a climbing vine. It twines around anything it can reach with its tendrils, climbing up to get to the light.
E	Eventually, the invasive bittersweet will strangle and/or smother whatever its climbing up.
L	talk about biting the hand that feeds you
E	Hah yeah, or in this case, killing the trunk that supports you
<b>Topic 2: ID</b>	
L	Yikes. But Elizabeth, invasive bittersweet is not the only vine in the forest. How do we identify it?
E	Well, invasive bittersweet is a deciduous, woody vine that climbs saplings and trees and can grow over 60 feet in length. The bark is a grayish brown and as the vines get older it develops deep furrows.
L	When it isn't winter, it has alternate, elliptical to circular leaves that are light green and about 2-5 inches long.
E	From about May to early June, it has small and inconspicuous greenish-white flowers. Over the summer, the flowers develop into small round fruits. The fruits are green when young, and the outer casing turns yellow as the fruit inside ripens, then splits to reveal showy, ripe scarlet berries that persist into winter.
L	Oh! Those split open berries are what I saw on my walk in the woods, and we'll post pictures of them (and all the ID characteristics) in the show notes.
E	Lina, quick question. Where were those berries located on the vine?
L	Hmm I don't remember where exactly, but I do remember that it's helpful to know....
E	Haha, sure,.... WHERE flowers and fruit are located on the vine is <b>one</b> of the best ways to tell the difference between our locally evolved bittersweet and the invasive. The local species <i>Celastrus scandens</i> has flowers and fruits at the terminal ends of branches – the very tip; while the invasive <i>Celastrus orbiculatus</i> has flowers and fruit scattered along the entire stem.
<b>Topic 3: Hybridization</b>	
L	Wow, not quite a carbon copy, but that sounds really similar – They're closely related, right?
E	They are! In fact, they are so closely related that they have been hybridizing
L	Hybridize? Isn't that our
Together	Science word of the day!

E	Hybridization is the process of crossing two genetically different individuals, resulting in offspring with a different set of traits from the parents. Even though these two bittersweets are different species, they belong to the same genus, and so cross easily and produce fertile progeny.
L	I mean, that doesn't sound all that bad at first, but it must lead to a loss of genetic identity of the locally evolved species, right?
E	Yeah, so while the invasive bittersweet vines are visibly killing the trees, the bittersweet genetics are killing the locally evolved species in a much less obvious way.
L	Elizabeth, I guess I don't really understand, if this invasive plant is so similar to one that's here already – so similar, in fact, that it can hybridize with that plant and eventually erase the genetic differences between them – why would the invasive bittersweet have been introduced?
<b>Topic 4: How it got here/ in decor</b>	
E	Good question. Best estimates think that the invasive bittersweet was introduced to North America in the late 1800s as a specimen plant for the Arnold Arboretum in Boston, then from there sold widely at the turn of the century, and nowadays is prohibited many places, but not all. I imagine that people were drawn to the way the invasive bittersweet has flowers and berries all along the length of the vine, rather than just at the ends.
L	it really is quite pretty. – so pretty, in fact, that people use it a lot for decoration – especially in the areas where it evolved. Here, too, I've seen tons of bittersweet show up in wreaths this time of year. For better or worse, most of what I've been seeing around the city is plastic and silk, or wreathes made of winterberry (a locally evolved plant), but I know that people use invasive bittersweet too
E	Which can be problematic
L	(laughs) that's an understatement if I've ever heard it
E	(laughs) True – It's important to give weight to the gravity of the situation, especially when it seems so harmless an act – repurposing a wild vine for festive decoration – giving different life to a plant deemed invasive. But without care and understanding of the biology of the plant, people may actually be helping it spread.....in this case, think about what we Vermonter's might do with that wreath or bough later on?
L	.....usually just chucking the whole kit and caboodle into the woods or compost – Which is generally a fine idea – but with an invasive plant the fruit can sprout or even spread by hungry wildlife – and wildlife dispersal is one of the other major modes of spread beyond human activity.
E	And that's all the opposite of what we want
L	It sure is. We want to spread the word, and NOT the plant
E	That's right! but in cases where the plant has already been spread, Lina, let's talk about what people can do to help!
<b>Topic 5: Spread, treatment, and disposal</b>	
L	Well, it's tough. Invasive bittersweet can be really hard to get rid of, in part because of all the different ways it spreads
E	Let's recap – so we already know it spreads by seed. A single vine typically produces more than 350 fruits, each fruit contains between 3-6 seeds, and the seeds have a high germination rate of around 90%....
L	So invasive bittersweet can spread by seed, which botanists call sexual reproduction. It can also spread asexually -- runners, roots, root fragments, and root crown can all sprout
E	Wow, now that's a lot of reproduction methods

L	Anyway (giggle), given that invasive bittersweet can spread from seed, or from runner, or from roots or root fragments or the root crown, you might imagine removal and disposal to be kind of delicate work
E	That's a great way to put it. One way to get rid of a small number of invasive bittersweet vines like you might find in a backyard, is to very VERY carefully dig it up, being sure to get ALL of the root fragments
L	And then?
E	Right, so as with all our invasive removals, once you've removed the plants, your best bet is to leave them to rot on-site – to denature any reproductive ability before returning the decomposed material to the ecosystem, and if it's after seed-set, doing this also reduces the risk of spreading seed.
L	...but make sure to return in the spring to check for seed or root sprouts, this is definitely a process NOT an event.
E	And if you have cut material that can't be left on site, you can contact your local composting facility about bringing them that material.
<b>Call to action and sign off</b>	
L	If you find a bittersweet vine in the woods
E	Or in a holiday wreath!
Together	We want to know about it!
E	We'll include in the show notes links to where and how to report what you're seeing....
L	...and if you see any other invasive plants, or have a topic you'd like us to address, please let us know about that too. Our email address is on the podcast homepage
E	Also on the podcast page are links to our iNaturalist mapping project and other volunteer efforts we coordinate to track invasive plants and their phenology in our state. We'd love to have you involved! Check out our projects and sign up, or be in touch with any questions.
L	Until then, we'd like to acknowledge the financial and technical support provided by the USDA Forest Service, Northeastern Area State and Private Forestry that enables us to run projects and provide outreach such as this,
E	and our major project partner, the National Phenology Network, bringing together community members, scientists, managers, and educators, to advance the science of phenology.
L	And most importantly, thanks to you, our listeners, for being interested in the science of phenology and being willing to
Together	"Learn. Get Involved. And Make a Difference."

**Outro music: 8-10 seconds**