

But Why: A Podcast for Curious Kids

How Do Apples Grow?

October 7, 2021

Rupert 00:00

Belle de Boskoop, Ashmead's Kernel, Kandil Sinap, Blue Pearmain, Gray Pearmain, Bramley, Niedswetzkyana.

Bill 00:12

Niedswetzkyana, right.

Rupert 00:15

Crimson Topaz. Calville Blanc, Cox's Orange Pippin.

Bill 00:36

This is But Why: a Podcast for Curious Kids produced by Vermont Public Radio. I'm Jane Lindholm on this show. We take questions from you and find interesting people to help answer them. We love it when those interesting people are young, just like you. And today we're going to hear from a 10-year-old who has spent his whole life growing up on an apple orchard. So he knows a lot about apples. We're also going to discover some of the really interesting ways apples are grown. Like did you know that the Macintosh or Golden Delicious or Cortland or Niedswetzkyana that you buy at the grocery store can trace itself back to one single tree. So every Niedswetzkyana is an exact genetic copy a clone of one tree that might have grown 100 or 200 or more years ago. Okay, so you may not have ever heard of a Niedswetzkyana and you're probably not getting that kind of apple at a big grocery store where you live. Most of the apples that are shipped long distances and show up in big stores are just a handful of types of apples. But there are actually a couple thousand different known varieties of apples. Like the ones you heard, just as this episode was starting, you'll learn more about the Niedswetzkyana later in the episode. It is a really cool apple. Also, there are way, way, way more kinds of apples that don't even have official names. We'll get into all of that.

Jane 02:04

But first, let me tell you where we're going. Here in Vermont, right now it's apple season, and lots of us enjoy going out to a local orchard with our family or friends or school to pick a bushel or two of apples straight off the trees. And whether you like a crisp, tart apple where the sourness kind of makes you make a funny face, or a purely sweet apple where the juice practically runs down your chin when you bite into it, there's something for everyone at an apple orchard. So Melody and I paid a visit the other day to Champlain Orchards in Shoreham, Vermont. When we arrived and went into the tasting room, there were 20 or 30 apples spread out on a long wooden table. And each one looked different from the others in the pile in size, shape and color.

Zeke 02:51

Well, this a small collection of the fruit that is being grown at Champlain Orchards. So this table wouldn't fit all the varieties that they have here. But this was a collection of some interesting ones in terms of color and history and the shape of them and how they taste. They're all have different flavors, all have different stories too.

Jane 03:18

That is Ezekiel Goodband. He goes by Zeke, and he's been working with apples for almost his whole life. He's old enough now to have gray hair under his wool hat and a very, very long beard. So he has spent a lot of time with apples.

Zeke 03:32

I work here sometimes and right now I give advice. I know a lot about old varieties of apples and how to make new ones.

Bill 03:46

One of these apples I'm going to pick it up right here is tiny. It would be an apple that a doll might eat. And then one of these apples if anybody's ever had a grapefruit it's almost the size of a grapefruit. It feels so heavy. It's like heavier than a softball maybe or a baseball. So that's a lot of difference between two different kinds of the same kind of fruit. How different can apples be?

Zeke 04:09

They can be as different as people can be different. We can have all different textures of the skin. Some are smooth, some are rough, all different colors. And they ripen at all different times from late summer through late fall. There are thousands of varieties of apples.

Jane 04:36

How many do you think you've tried?

Zeke 04:40

I've tried maybe a couple hundred.

Jane 04:43

I'll pick this one up what is this one?

Zeke 04:44

That one is called Kandil Sinap and it's a Turkish apple from the 1700s and I've been growing it, growing the trees for a while, but this is the first time any of them have been bearing fruit. So we if we taste I can't wait to try it.

Bill 05:02

I picked it up too because it's such an interesting shape. It's almost egg shaped kind of oblong, whereas you usually think of an apple as a little bit more like a stout circle.

Zeke 05:13

Right, more rounded more like a tomato or something. But these are eye catching since they're so different.

Bill 05:20

Standing next to Zeke was another person who has been learning about how to grow and harvest this fruit for basically his whole life. But he's not old enough for a long beard, yet anyway. Rupert Suhr is 10 years old. His family owns this orchard. Champlain Orchards has more than 100 varieties of apples and also grows other tree fruits like peaches, pears and cherries. Rupert pointed to another apple on the table.

Rupert 05:47

The Hudson Golden Gem.

Jane 05:49

Hudson Golden Gem. How do you know, Rupert?

Rupert 05:54

It's long it's russetted.

Jane 05:57

Can you explain what russetted means? Because that's something that I didn't learn until I was older because I might have looked at a russetted apple when I was younger and thought I don't think that one is good. It's not very shiny and it's kind of brown.

Rupert 06:07

Yeah, it's kind of yellow and the texture is kind of coarse.

Jane 06:12

Does that mean that you shouldn't eat it?

Rupert 06:15

No, it's awesome. But yeah, it's just funny looking kind of. My dad loves them.

Jane 06:23

And what's going on with this apple? Why did you choose this?

Zeke 06:26

This is called Knobbed Russett. And it's old English apple. And oftentimes, it's even lumpier than this. When I go to the orchard and look at trees that have Knobbed Russett, it looks like a tree full of toads.

Bill 06:45

Despite that description, I just couldn't wait any longer. I had to taste a few of these apples. The first one Zeke cut up was tiny. You could eat it in one bite. If you don't mind swallowing the seeds. It was

called a Wickson. And it had been brought to the table by Rosa, Rupert's younger sister. She didn't want to talk on the microphone, but I was really glad Rosa brought such a delicious apple for us to try.

Zeke 07:11

You know, when we're harvesting apples, sometimes we cut up the apple and look the seeds. And if the seeds are brown, and we know it's pretty close to being ripe, but if they're white, we know that apple needs more time on the tree before we pick it. That is good, isn't it?

Bill 07:33

Some of the apples on the table were really shiny, but a few of them looked kind of dull, like they were covered with dust or something. Have you ever had an adult suggest you rub an apple on your shirt to get it all shiny before you eat it? Zeke says most of what you're rubbing off is actually a natural coating that all apples have to different degrees.

Zeke 07:52

That cloudy surface that you want to rub. It's a combination of waxes and yeast on the outside of all apples, it's covered with yeast and waxes. So when you do rub it on your shirt the wax polishes it up.

Jane 08:10

Oh yeah, look at that. That's beautiful.

Zeke 08:12

We call it the bloom on an apple.

Bill 08:15

As you can tell, I could have stayed there all day asking Zeke and Rupert and Rupert's dad, Bill Suhr questions about apples. But this is supposed to be a show where you get to ask the questions, right? So let's get to them.

Anni 08:28

Hi, my name is Anni. I live to North Carolina. And I'm three. Why do apples have stems?

Bill 08:39

Why do apples have stems? For this one Bill Suhr chimed in to answer. Bill is Rupert and Rosa's father, he and their mom, Andrea, own the orchard.

Bill 08:49

I would say that it would be challenging to grow a fruit that isn't communicating with the tree itself. And when I say communicating to receive nutrients from the roots, the stem is the conduit or the, you know, the pathway between the tree and the fruit. So and luckily that's what holds the fruit on the tree until it's ready to pick and if the stem as the fruit ripens that that connection with the tree begins to weaken and the ripe fruit will actually fall to the ground. But the stem is like the umbilical cord for a baby and the mom. So it's how the apple is fed.

Grayson 09:30

Hi, my name is Grayson. I'm eight years old, and I live in San Jose, California. And my question is, why are some fruits a flower before they're the actual fruit?

Bill 09:48

Grayson asked why some fruits are flowers before they become fruit. Actually, all fruits start as flowers, but not all flowers become fruits. Fruits are a way that some plant reproduce. Fruit is the nice ripe container that holds the seeds which humans or animals will eat and then spread around allowing new plants to grow from the seeds inside. But that process begins with a flower. The outer part of the flower often has beautiful colors and shapes or smells. All that is part of the way the plant tries to attract a bee or another pollinator.

Zeke 10:22

So the flower has an ovary at the base of the petals, and so the petals are enticing, you know, a bee to come with pollen from another blossom that it's visited and there's some nectar that the bee can collect. And while the bees doing that, it's shedding some pollen on that. And so that sort of completes the information that the apple needs to start growing. The flower is to attract the bees so the apple can start growing.

Bill 10:54

If you look at the bottom of an apple, the opposite end to where it's attached to the tree where the stem comes out, you can actually see where the flower used to be, it even kind of looks a little bit like a tiny flower.

Danika 11:05

Hi, my name is Danika and I live in Atlanta, and I'm six years old. And my question is, how did the first apple come when no one was there to plant it's seed? Bye bye.

Bill 11:23

Danika, this is such a great question. And we get this kind of question from kids like you a lot. Everyone wants to know how the first human or first animal or first apple tree came into existence if you need a parent to create the seed, but you need to seed to create the parent in the first place. It's actually kind of a tricky thing to explain quickly. But it all has to do with evolution. The idea that things change over time into the plants and animals and human beings we recognize now. So apples evolved over time from other types of plants and over thousands and thousands of years they changed into the tree and the fruit we see today. So there wasn't really a first apple or first apple seed we can point to know exactly when the first apple came into existence. But Zeke points out, you don't actually need a person around to place a seed in the ground and plant an apple tree. Apple trees basically created the fruit we love to eat now as part of a strategy for reproducing, for making more apple trees.

Zeke 12:26

Well, in Central Asia, where they think apples developed, or came into existence. And apple trees are pretty smart trees and I think they decided a long time ago that the way they were going to disperse their seeds or send their seeds out into the world to make new apple trees was to grow them inside

something that an animal or a person would like to eat. And so if a bear or deer came along, they eat the whole thing. And the seeds would come out in the poop and so probably some of the apples you're finding in your fields started life that way. They probably thought about you know having their seeds be fluffy and the wind carry them away, or have burrs so they'd stick on fur but they decided we'll put something that will taste good to whoever's passing by and we'll get them to eat this and then have the seeds taken away and hopefully end up in someplace where they'll grow, have a nice home.

Seth 13:34

Hello, my name is Seth. I'm eight years old. I live in Imperial Beach. And my question is, how come we can make a seedless grape but not a seedless apple?

Bill 13:45

Hey Seth, there actually have been seedless apples developed by growers over the years but they're not very popular for a few reasons. Seedless apples tend to produce small poor quality fruit unless they are hand pollinated. That means a person would have to do what is normally done by bees and butterflies. The seedless varieties just don't attract insects the same way regular apples do. But while we're talking about seeds, we should talk about how the apples you eat are actually grown on apple orchards. They are not grown from seeds. All the apples you're eating, unless you find them wild, are actually clones. Do you know what a clone is? It means it is exactly the same as the parent tree it came from. Let me put it in human terms. You are a mix of your biological parents the genetic material of your two biological parents mixed together and created a totally new person, you. But an apple tree grown from the seed which would be the same a genetic mix of its parents could be delicious or it might not be very tasty at all because it would be different from its parents, it would be a mix. So it could be downright gross, an apple that you want to spit out rather than eat more of. So people who are growing apples on purpose don't tend to grow them from seed because they don't know what they'll be getting. So the orchardist takes a little cutting a little bit of the wood of the tree they want to grow more trees to be like, and then they do something called grafting to attach that little part of the tree to the root stock of another apple tree. The tree that then grows full of apples a few years later will be identical to the tree it came from in flavor. It's a clone, it's the same tree as the one you took the cutting from. It is not a mix of two parents. So every Cortland apple you've ever eaten can trace its history back to one single tree.

Zeke 15:45

So when someone comes across that first tree, and decided to call it Cortland, they took a cutting off the tree that contains the exact DNA or the code for making another Cortland tree and they splice it onto another apple tree.

Jane 16:05

Like you just take a branch of that original Cortland and you attach it to a little tree?

Zeke 16:09

A piece even then you splice it into the tree so it starts growing from that. And that's how you keep it going. It's a clone.

Bill 16:19

So when you see rows and rows and rows of one kind of tree, one kind of apple, let's say a Cortland, those are all grafted trees. And all of those grafts originally if you trace them back came from one tree.

Zeke 16:34

One tree, right. So they're all they're the same tree. So that long row of Cortland's it's really the same tree that grew back in New York state in the early 1900s.

Jane 16:49

That's wild. And Rupert, you're doing some of that work, right? You're actually doing some of the grafting here. What is it? How do you do it?

Rupert 16:57

Yeah, Zeke taught me, there's many ways to do it, so there's one bench grafting where you'll cut off the top. And then there's a tool that Zeke uses. Is there an actual name for it? Or is it just? Yeah, yeah, so you kind of peel back the bark a little bit on the side. Is that fair, and then you will stick two sticks on you do both sides, normally, if it's a pretty big tree, and then we have...

Jane 17:26

Two sticks of the tree that you want to have apples of?

Rupert 17:30

Yep. And then you'll get some grafting wax, and you'll just put it around and put a little on top. And that's basically it. And then the other one is called chip budding. And so if say, we have a nursery, and if a tree doesn't take the graft, and it's still a root stock, we can go back in the summer, and do the chip bud, again. It's how would you describe it? It's just a little chip and you put a little bud in. And you wrap it up and that's basically it.

Jane 18:08

How long does that tree have to grow before you can harvest apples from it?

Rupert 18:14

Well, normally we have we've had in the nursery for two years. Then we plant it out in the planting. The actual trellis where we'll harvested it from, it's about three years. So say about five ish, but it may be a little longer for that chip bud, so say six or seven.

Jane 18:34

And have you ever yet tried to make a new variety of apple?

Rupert 18:40

Not here? No.

Jane 18:42

Somewhere else?

Rupert 18:46

No not yet.

Jane 18:47

Zeke, what about you?

Zeke 18:48

Well, you know, I used to bring windfall apples to home to my pigs to eat. And I did that for a number of years. And then I don't have pigs anymore, but where they lived is growing up in apple trees now. So just a few more years when I might find, you know, my dream apple.

Jane 19:09

So you can retire rich?

Zeke 19:11

Yes, I hope so.

Jane 19:12

So if you have an apple and try to grow your own tree from it, that apple will actually be a totally new variety that no one has ever tasted. Maybe it'll be delicious, and you can name it after yourself and have an apple that becomes famous and is all yours. More of your apple questions still to come.

Bill 19:31

This is But Why: a Podcast for Curious Kids. I'm Jane Lindholm. Today we're learning some cool facts about apples. We visited Champlain Orchards here in Vermont, where we are based to taste some apples and learn more about how they're grown with orchardists Zeke Goodband, Bill Suhr, and 10-year-old Rupert Suhr. While we were there, Zeke took out his pocket knife and cut into one apple to show us something surprising.

Bill 20:02

That's the Niederswetzkyana.

Jane 20:02

Can you describe it?

Zeke 20:03

This is a red fleshed apple. So you're used to biting into an apple and inside will be white. If you bit into this apple, you'd be worried that your mouth was bleeding, you lost a tooth or something because the flesh is red. And it's a little bit on the tart side. So you might put this in a pie or a crisp, not a great lunchbox apple, but for surprising your friends, this is a great apple.

Jane 20:22

It's almost the kind of color and the pattern inside reminds me of a pomegranate, for kids who live in places where there are a lot of pomegranates. It doesn't have little seeds, but it has the same kind of coloration and pattern as a pomegranate.

Zeke 20:49

Yeah, it does.

Bill 20:51

We have a picture of that apple on our page for this episode at ButWhyKids.org if you want to see that red flesh for yourself. Here's another apple question from one of you.

Theo 21:02

Hi, my name's Theo, and I'm seven years old, from Stevens Point, Wisconsin. And I want to know why when you eat apples, they get so juicy?

Bill 21:14

Inside of an apple, the cells are full of water and sugar and acids and other things. When you bite into the apple, you're bursting the cells and that delicious juice kind of explodes inside your mouth. Some varieties of apple will hold more water and sugar than others. Apple growers grow some kinds specifically because they're so juicy and flavorful and people enjoy eating them. But they might grow less juicy varieties to that are better for cooking, or apples that don't really taste great eaten raw, but are delicious in cider or juice. Speaking of which, here's a question from Shalom in Vancouver, Canada.

Shalom 21:51

My question how do people make apple juice?

Jane 21:57

To make apple juice, or apple cider, you're basically just squeezing all the liquid out of the apples. It's actually not much more complicated than that!! To make the process easier, apples are often kind of cut and mashed up until they look kind of like apple sauce. And then that apple mash is wrapped in rough fabric and squeezed really really really hard in a machine that pushes all the juice through the fabric and into a container. And...voila, you've got a drink! Now, if you're buying at a farm stand or apple orchard, or making it yourself, that's usually called cider, and it turns a kind of brownish color and isn't see through. If you're buying it from a grocery store, and it's clear, and isn't kept in the fridge until after you open it, that's usually called apple juice. And it's gone through at least one other step--it's been filtered to get any tiny little bits out of it. And it's been pasteurized--heated up really fast and then cooled back down. That allows it to keep longer on the shelf. Some apple juice produced by big companies also has other things added to it--like other kinds of fruit juice, sometimes added sugar, and maybe preservatives to make it last even longer. Cider, on the other hand, usually only lasts a week or so, and needs to stay in the fridge. And, depending on what's gone into it, cider can taste pretty different from orchard to orchard!

Zeke 22:05

I think a combination of apple varieties makes the best juice so you can combine you know maybe some tart apples with some real sweet juicy ones and maybe combine something that has a little bit of pineapple flavor or some apples have a little more pectin in the juice and so it will give it a creamy mouthfeel that just feels good in your mouth.

Bill 22:33

So the other thing is regionally where you grew up. I grew up in the Mid Atlantic in Maryland and the cider there is very different than the cider here. So that would have been based on Red Delicious and Golden Delicious and, and Zeke would probably drink that cider and spit it out. And because he grew up on a New England cider, and it wasn't just Macintosh, it would have Macoun and Northern Spy. So his idea of what sweet cider should taste like and look like. We'd like a cider that's oxidized like the surface of the apple going brown. We think the darker the cider potentially the richer and the better the flavor. But that is just a matter of oxidation. So you're making it just with under ripe apples and certain varieties like a granny smith you'll end up with a very pale looking cider and potentially pale flavored cider from a New England consumers standpoint.

Leo 24:43

Why apples are hard and pears are soft? My name is Leo. I'm two.

Jane 24:51

Why are apples hard and pears are soft?

Zeke 24:54

Leo, I guess both pears and apple start out hard. When pears ripen, they get soft. And so when you buy some in the store, oftentimes they're still hard. And you should just leave them out on the counter for a couple of days before you try them. And they'll soften up and be sweet and buttery. But apples, you know, some apples are really hard and they stay that way. And others are pretty soft. Especially the early season apples tend to be soft, and we call them tender apples, because you don't need teeth to eat them. But some like, this is Golden Russet. These are pretty hard. You know, if you want it to throw, you know something at someone you're upset with? That would be a good one to throw. Yes, or if you didn't have a baseball, and that would be a good one.

Jane 25:52

If you wanted to play ball with it that might work. So pears and apples can both be kind of hard or kind of soft. And they're actually related. You know, some pears even taste really crisp, just like an apple. Before we left the orchard, I asked Rupert if there was anything else he thought we should know.

Rupert 26:11

I don't know I I just like to follow, like what my dad does. And I mean, if he lived in this city, I would have a whole different interest.

Jane 26:23

Do you think you're ever going to get tired of apples? Like when you're a teenager or an adult? Like I will never eat another apple in my whole life?

Rupert 26:29

I don't think so.

Jane 26:32

And you haven't ever said that, Zeke?

Zeke 26:33

No, no. When I was growing up when I was Rupert's age, my father just had one variety of apple trees and we had to because we were thrifty New Englanders we had to just eat those apples until they ran out or someone threw them into the woods in July. And so when I grew up, I wanted to have as many different apples as I could find.

Jane 26:58

So this is all rebellion, your whole career is rebelling against your dad.

Zeke 27:03

Yeah. In rebellion against Red Delicious apples.

Jane 27:08

And Bill Suhr wanted us to keep in mind that when we get our food at the grocery store, it's easy to forget that there were a lot of people doing a lot of hard work to make sure we get fed.

Bill 27:19

Yeah, so I think it's shocking to people they don't really comprehend. And it's certainly as a young person growing up, you go to the supermarket, and there's this excess abundance of food and you don't see what doesn't sell and what goes out the door. And you don't understand the hands that have touched that food and grown that food. And it's not a day that goes by that I don't recognize the fact that our food is primarily being grown by migrant help that is coming from Jamaica, in this case. These are lovely men. And the program could also have women involved. But at this point, it's primarily men that pick apples, and they're here with us 18 months of the year, and they graft the trees with Rupert and Zeke. And then they help harvest the fruit and they also help pack the fruit and make the cider. So you might see our face on Champlain Orchards products. But it's really these men from Jamaica that are primarily responsible for the millions of pounds of fruit that make it out into the Vermont community and down to New York City.

Jane 28:26

I think Rupert's laughing at you because you have now made a year have a lot of months in it. So how many months? Are they here?

Bill 28:33

Did, I say 18 months? Yes, that's right. Thank you, Rupert. They're here 10 months of the 12 month year. Wow. We're in the middle of harvest, and I'm a tired young man.

Jane 28:42

Well, I really appreciate all of you talking to us, especially during harvest season when there is so much going on. And thank you very much for helping us learn about apples and orchards and how this all works. We have so much more to learn. But this has been fascinating. Thank you.

Jane 28:57

You're welcome.

Jane 28:59

That's it for this episode. Thanks to the Suhr family and to Ezekiel Goodband, and to all of the farmworkers who make sure we eat well. Now if you have a question about anything you can have an adult recorded, then email the file to questions@ButWhykids.org. We can't answer every question we get. But we love hearing what's on your mind and it helps us shape our future episodes. I'm Jane Lindholm. Melody Bodette and I make But Why at Vermont Public Radio. We are distributed by PRX. Our theme music is by Luke Reynolds. We'll be back in two weeks with an all new episode. Until then, stay curious.