US Forest Service Eastern Region and Northern Research Station
Fall Colors Podcast
Title: "The Chemistry Behind Fall Color"

[Classical Music fades in and out]
Narrator: I'm Kelly vanFrankenhuyzen with the U.S. Forest Service Northern Research Station. Today I will be talking to experts about fall color and the science behind the seasonal change.

Colleen Mainville: My name is Colleen Mainville and I am a public affairs specialist on the White Mountain National Forest near Campton, New Hampshire. There is nothing as glorious as fall in New England where the excitement and anticipation is contagious as people watch and wait for the leaves to change from summer green to the dazzling shades of autumn! Fall color is spectacular throughout the Northeast and Midwest, but in New England, the landscape is transformed as billions of trees turn into a kaleidoscope of color changing into brilliant red, orange, gold, purple and yellow splashes across mountains and valleys. It is no wonder that visitors travel to New England from all over the world – often planning the trip years in advance in hopes of viewing peak fall foliage.

Narrator: As summer winds down and fall settles in, forest bloom into riots of yellows, reds and golds. Have you ever wondered why leaves turn colors in the fall? In this podcast, Forest Service scientists are going to describe the science behind the glory of fall color.

Paul Schaberg: I'm Paul Schaberg I'm a research plant physiologist at the Northern Research Station in Burlington, Vermont. My research focused on tree responses to a variety of stress agents, mostly ones that don't have to do with pathogens and disease, so things like pollutions, climate, nutrient problems, etc.

Kevin Smith: My name is Kevin Smith. I'm a supervisory plant physiologist at the Northern Research Station of the U.S Forest Service. I'm based in Durham, New Hampshire. I started with this project as a graduate student in 1977. My research focused on how trees respond to injury, infection and environmental change

Paul Schaberg: OK, The biology of fall leaf color: I think a good place to start is to think about the leaves during the summer, when they are green and growing. Everyone sees that green pigment, but also hidden in the leaves is a yellow pigment- carotenoids, that also helps the tree capture light but has a protective influence. In the fall, two things happen to trigger change in leave color. One is the shortening of day the length, so with sensing a shorter day, trees produce less of that green pigment and that green pigment doesn't last forever. Second cue happen on the landscape in the fall and that's the low temperatures. And what's interesting about the low temperatures is that number one, low temperatures speed up the process of the green fading away. But it can also trigger the production of a brand new pigment, a red anthacyanin, at least in certain tree species.

Kevin Smith: Based on temperature and day length, the tree knows fall is coming

Paul Schaberg: So as we pointed out, there are some tree species that can change colors and more dramatic in their display and other ones that are not. There are a bunch of tree species that happened to be concentrated in the Northern areas like sugar maple, red maple, white ash or understory plants like staghorn sumac or burning bush that are triggered to produce those red colors in the fall and primarily in response to low temperatures but it can be other stresses like nutrient deficiency or drought or other things. It's the fact that in New England and New

York, we have that mix of species that do not turn yellow and that mix of species that pretty commonly do that we get this vibrant mix of colors. I like to say the mosaic of colors you see on the landscape.

Kevin Smith: And that's the beauty of this biodiversity that we have that this manufacturer of pigment and this process for senescence -or aging- that is these sorts of factors which makes such a dramatic display that variation. So you can get the Persian carpet sort of effect of looking out over the rolling hills in northern New England.

Paul Schaberg: Whether a tree is exposed to low temperatures or when they are exposed to low temperatures and where they are exposed to, that varies from year to year. And that actually makes leaf peaking- going to look for these things really a great adventure because you have to explore your environments where are those triggers happening and create an adventures that's always different.

Kevin Smith: Fall foliage is a great entry way for the public to get caught up in the beauty, and wonder and excitement and indeed the science of our forests.

Narrator: The Eastern Region of the National Forest System includes some of the most specular color in the nation. You can find out about the current color condition by visiting the region website at www.fs.usda.gov/R9 where they post weekly updates throughout the season, located on the home page slider.

Narrator: For more information on the Forest Service's Northern Research Station, visit www.nrs.fs.fed.us.

Narrator: This podcast is produced by the U.S. Forest Service. The U.S. Forest Service is an Equal Opportunity Employer.

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