

Syrup Is as Canadian as a Maple Leaf. That Could Change With the Climate.

By Kendra Pierre-Louis New York Times

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PAKENHAM, Ontario – By 9:30 a.m. the line for Fulton's Pancake House and Sugarbush had snaked out the door and down the driveway toward the parking lot, like the day a new iPhone goes on sale.

But the restaurant, roughly 40 miles southwest of Ottawa, isn't brand-new. It's in its 50th year, and its star attraction, maple syrup, is much older. It was invented by Native Americans long before Europeans arrived in the Americas.

"Maple is a social crop," said Shirley Fulton-Deugo, the owner. "It's the first crop of the year and a sign that spring is here."

Fulton's sits on 400 wooded acres in Eastern Ontario, and Mrs. Fulton-Deugo is a fourth-generation maple syrup producer. Her children help her run the business, and three of her grandchildren are already making their own syrup and selling it under the label Triple Trouble. But should the Triple Trouble generation have grandchildren one day, it's not clear they'll be able to take over the family business. A growing body of research suggests that warming temperatures and loss of snowpack linked to climate change may significantly shrink the range where it's possible to make maple syrup.

In fact, climate change is already making things more volatile for syrup producers. In 2012, maple production fell by 54 percent in Ontario and by 12.5 percent in Canada over all, according to data from the Canadian government, because of an unusually warm spring.

Canada produces roughly 70 percent of the world's maple syrup. That was worth about \$370 million in 2017.

Warm weather can hurt syrup production because the process depends on specific temperature conditions: daytime highs above freezing with nighttime lows below freezing. This specific variation – which tends to happen as winter turns to spring, and fall into winter – causes pressure differences in the trees that allow the sap to flow. And it's the sap that the farmers boil to create maple syrup. To release the sap, maple producers make a small hole in the tree and insert a tap that allows it to spill out. But there's only a small window of time when conditions are right.

"You're really only talking six to eight weeks," said Mark Isselhardt, a sugar maple expert at the University of Vermont. "Every day that you don't get sap flow has the potential to really impact the total yield for that operation."

But because of climate change, some years those key temperatures are more elusive.

Instead of six or eight weeks to produce syrup in 2012, the Fultons

had just 13 days. "We started the 8th of March and finished the 21st of March," Mrs. Fulton-Deugo said.

"That type of condition will happen more often and it can have an impact like the impact it had in 2012," said Daniel Houle, a biologist at the Quebec Ministry of Forests, Wildlife and Parks.

In addition to the shorter tapping window, spring is also arriving earlier. The phenomenon is called season creep and it means that fall ends later as well.

That creates more headaches for producers, and not only in Canada, because the timing of putting in taps is crucial. "I'm in my 60s," said Helen Thomas, executive director of the New York Maple Producers Association and a syrup producer. "When I was a kid, my dad had the rule that you tapped around March 15." This year, they were tapping in late January.

At first glance, the scene at Fulton's sugarbush corresponds perfectly with the bucolic picture typically associated with maple syrup. There are sleigh rides and children, their faces stained with maple taffy, squirming with energy across from the sugar camp where the alchemy that transformed maple sap into syrup was performed.

While many imagine sap collecting into metal buckets attached to trees, the Fultons and most other syrup producers now use plastic taps connected to long lines of food-grade plastic tubing. The tubes zigzag through acres of forest from tree to tree before pouring out into a collection tank. Because the system is cleaner than older methods, it allows producers to tap earlier without fear that the trees will plug the holes, the way a scab covers a cut, before the sap begins to flow. On the Fulton's sugarbush, the taps were in the trees weeks before the sap ran.

To help coax the sap out of the trees, producers use vacuum pumps. "We've seen that you get basically double the amount of sap when you use vacuum," Mr. Isselhardt said.

But the weather conditions still need to be right. And, of course, you still need trees.

Maples need to be about 40 years old before they can be tapped, though they don't come into their prime, according to Ms. Thomas, until they're about 90 years old. "If I planted maple trees today, it would be my grandchildren that would be harvesting the sap from them," she said.

But a recent study suggests that the changing climate is a threat to that process of growth and renewal. Andrew B. Reinmann, an ecologist at the City University of New York, along with colleagues at Boston University and the United States Department of Agriculture, looked at what happens to trees when snowpack declines.

Snowpack is important because, when temperatures dip, it acts as a blanket over the ground that prevents the soil, and the tree roots that reside in it, from freezing. By scraping off snow from some of the forest plots at the Hubbard Brook Experimental Forest in New

Hampshire during the first four to six weeks of winter, Dr. Reinmann and his colleagues were able to mimic the delayed snowfall that is predicted by century's end in the National Climate Assessment.

"After the first year of snow removal, growth rates of the sugar maple trees declined by 40 percent or so, and growth rates remained suppressed between 40 and 55 percent below their growth rates prior to the start of the experiments," Dr. Reinmann said.

Dr. Reinmann has also been running a separate experiment where he heats up the soils to see if the increase in warmer temperatures linked to an earlier spring would offset losses from frost damage. So far, his results suggest that it doesn't.

Diane M. Kuehn, a professor at the State University of New York College of Environmental Science and Forestry, has researched the perceptions of climate change by maple syrup producers. "What I heard frequently from people was that they're not concerned about themselves during their lifetime," she said, "but they are concerned about future generations and their families."

That appeared to be on the mind of Mrs. Fulton-Deugo. "Most sugar makers are family farms and those family farms hold this land and hold this space for the next generation," she said.