

Timing of sugar maple leaf emergence over the last 18 years

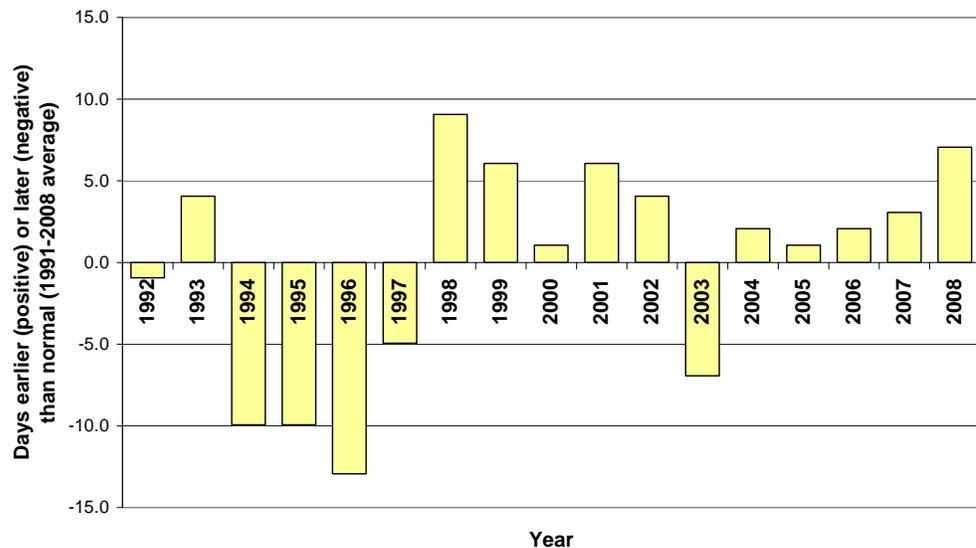
Many people are asking about changes in the timing of spring phenology (timing of biological events) in light of climate change. As a cooperator in the Vermont Monitoring Cooperative our Department has provided annual monitoring of tree phenology in the spring at the base of Mount Mansfield. While we have made weekly observations on various species at 2 elevations (1400 and 2200 feet) intermittently over the past 18 years, we have consistently monitored sugar maple tree bud development on tagged trees at 1400 feet at the Proctor Maple Research Center in Underhill, Vermont.

Our spring tree phenology monitoring has shown that sugar maple budbreak (green tip of leaf emerging from buds) and leaf out (full leaf development) have been earlier this decade compared to the 1990's. While there is much variability from year to year, we are seeing more years with earlier leaf development in this decade than in the previous decade. Eight of 9 years were earlier than normal this decade compared to 3 during the last decade (Figure 1). On average, budbreak is 3 days earlier this decade than last, and the timing of leaf out is 5 days earlier this decade than last (Figure 2). In 2008, our monitoring showed that budbreak was 12 days earlier and full leaf out was 9 days earlier than the baseline (1991-1999 averages) (Figure 3). We can't be sure this trend will hold, but sugar maple phenology has changed during this time period.



Timing of sugar maple leaf out
Monitoring by FPR at the Proctor Maple Research Center

Figure 1. The average date of sugar maple leaf out from 1991-2008 is compared to each year's first occurrence of leaf out from trees monitored at the Proctor Maple Research Center in Underhill, Vermont. Eight of the 9 years in this decade have been earlier than normal.



Comparison of sugar maple leaf out dates

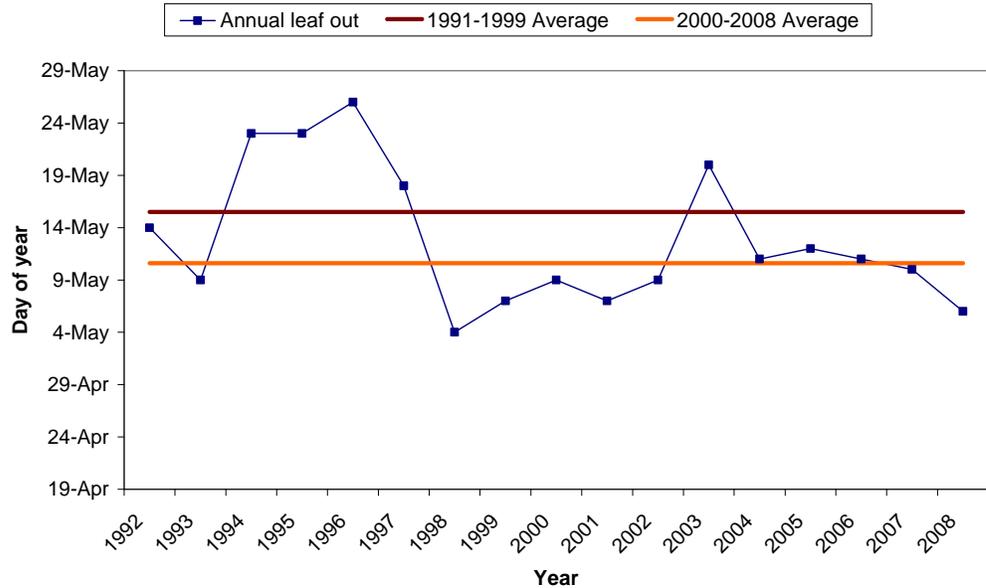


Figure 2. The timing of sugar maple leaf out fluctuation between years, compared with the average in 1991-1999 and the average in 2000-2008. Full leaf out was significantly earlier in 2000-2008 and in 1991-1999 by 5 days.

Date of Sugar Maple Budbreak and Leaf Development 2008 Compared to Average (1991-1999)

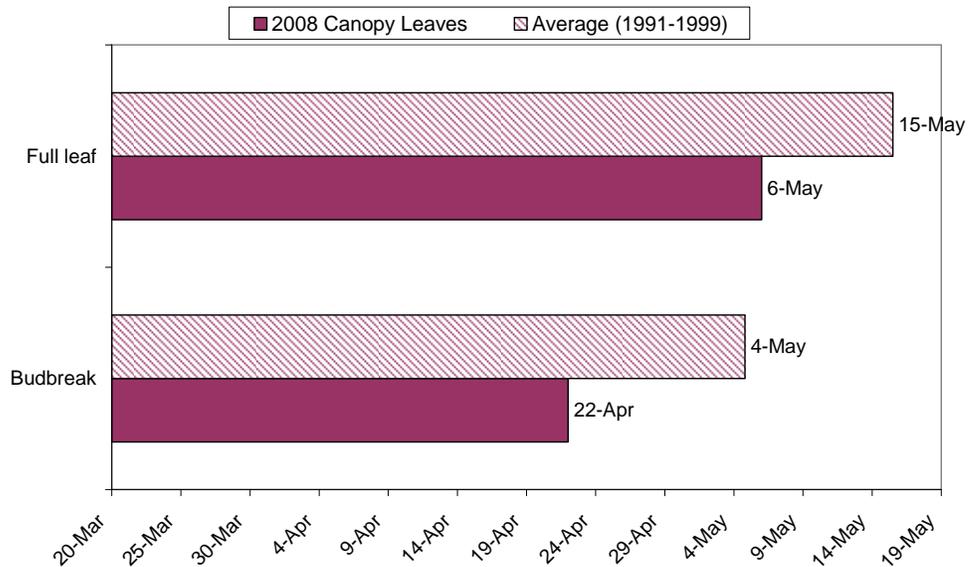


Figure 3. Date of first occurrences for sugar maple budbreak and full leaf out in 2008 compared to average (1991-1999) at the FPR monitoring site at the Proctor Maple Research Center, Underhill, Vermont. In 2008, budbreak was 12 days earlier and leaf out was 9 days earlier than the average timing.

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