Does Sap Flow Better During Holy Week?

by

Stephen G. Saupe, PhD
Biology Department
College of St. Benedict/St. John's University
Collegeville, MN 56321
ssaupe@csbsju.edu; 320-3363-2782

Introduction

The Catholic, Benedictine monks of St. John's Abbey and University (Collegeville, MN) have been making maple syrup for more than 60 years. Approximately every other year since 1942 the Benedictines and their friends have installed an average of 1400 taps, collected about 10,000 gallons of sap and cooked it down to make an average of 257 gallons of pure maple syrup. Maple-syruping has been an important part of the Benedictine tradition at St. John's that involves community, worship, and work. Each season, as many as 40 members of the monastic community gather to participate in this springtime ritual.

In recent years, lay members of the St. John's community have been recruited to serve as syrup-makers. In 2000 I was introduced to syrup-making "St John's Style." During this season I served as an apprentice and am now one of the chief sugar "bosses." Since becoming involved with sugaring at St. John's, I have heard on several occasions that the sap flows best during Holy Week. This idea may have originated as early as May 1943. At the end of only the second season of syrup-making, an anonymous entry in the St. John's *Scriptorium,* an internal publication written during the 1940's through 1960's by monks training to be priests, stated that "On the better days, during Holy Week, over twenty-five gallons of maple syrup were finished."

Holy Week, which runs from Palm Sunday to Easter Sunday, is one of the most important periods in the Christian calendar. Considering the religious background of the St. John's community, the notion that sap flows best during Holy Week is certainly appealing. It makes sense to think that a community that has dedicated its life to God might receive a little divine help with syruping. But, do the data support this idea? In this article I test the hypothesis that sap flows best during Holy Week.

Study Site

St. John's Abbey and University are located in Collegeville, Minnesota (Stearns County). We are approximately 80 miles northwest of Minneapolis/St. Paul and slightly south of the geographic heart of Minnesota. On average, our sap collection season runs from 19 March to 11 April and lasts 22 days. The earliest that we've ever collected sap is 26 February and the latest is 22 April.

Methods

Since syruping began at St. John's, the monks and their helpers meticulously recorded every date on which sap was collected and the amount of sap that was gathered. I obtained 16 seasons of sap collection data from 1972 to 2005. Unfortunately the St. John's records prior to 1972 were destroyed in a suspicious fire that burned down the original sugar house in 1970. It is possible that there may have been sap flow before the date recorded but it was not significant enough to collect. Similarly, some sap flow may have occurred after the date listed but the

syrup-makers had judged the bulk of the flow had ended for that season and were no longer collecting sap. Using these data I calculated for Holy Week and for the remainder of the maple season the average sap flow (gallons per day) and the percentage of days on which sap was collected. The dates of Holy Week were obtained from the web sites of the US Naval Observatory (2005) or the Astronomical Society of South Australia (2005). The data were statistically analyzed with a Student's t-test.

Results:

Ecclesiastical rules that date back to about 325 AD set Easter as the first Sunday after the first full moon that falls on or after the vernal equinox (US Naval Observatory, 2004). As a result, the date for Easter varies but can never occur before March 22 or after April 25. Depending on the year, Holy Week may or may not occur during the prime time for making syrup. In half (50%) of the syruping seasons analyzed in this study, Holy Week occurred completely within the sap flow season (Table 1). In 3 of 16 seasons (1992, 2000, 2003) Holy Week didn't begin until after the syruping season had ended. In 5 seasons, Holy Week partially overlapped the sap flow season. In these cases Holy Week either started just a few days before sap flow began or Holy Week ended a few days after sap flow stopped. In no season did Holy Week occur completely before the sap flow season. This is not surprising since Easter can never occur before March 22 and our average first day of sap collection is March 19.

In three years (1985, 1988, 1994) the sap flow (gal/day) was greater during Holy Week than any other time (Table 2). However, during the vast majority (13 of 16 or 81.3%) of seasons that we made syrup at St. John's the sap flow was lower during Holy Week than it was during non-Holy Week periods (Table 2). In fact, the sap flow during Holy Week for all seasons averaged 331.8 gal/day compared to 541.0 gal/day for non-Holy week periods (Table 2). Although there is a distinct trend toward greater sap flow during non-Holy Week days, this difference was not statistically significant ($p=0.08$).

Similarly, the syrup makers at St. John's collected sap more often during non-Holy Week periods than during Holy Week. On average, sap was collected on 38.3% of the days during Holy Week as compared to 57.7% of the days during the remainder of the season (Table 2). This difference was statistically significant ($p=0.02$).

Discussion

The purpose of this study was to evaluate the timing of maple sap flow in relation to Holy Week. Our data disprove the hypothesis that sap flows best during Holy Week but support the alternative hypothesis that sap flow is greater during non-Holy Week periods.

There is no doubt that during some years the sap did flow best during Holy Week. For example, during Holy Week in 1988 and 1994 we collected 68.0% and 46.5%, respectively, of the total sap that was produced during those seasons. In these years the syrup-makers clearly would have been very busy trying to balance their maple-syrup duties with their religious obligations. Consequently these seasons would certainly have been memorable ones and would serve to perpetuate the idea that sap flows best during Holy Week.

This situation is analogous to the contention that the moon affects human behavior. Many doctors and nurses continue to believe that admissions to the emergency room, especially psychological cases, are much greater during the full moon even though study after study has conclusively disproved this idea (Carroll, 2005).

When many individuals in a group believe in a myth it reinforces or strengthens the idea (Carroll, 2005). It then becomes more difficult for an individual to reject the claim because to do so would mean weakening his/her bond with the other members of the group. In addition, individuals tend to selectively remember incidents which support a myth, such as overcrowded waiting rooms on the night of a full moon or Holy Weeks with overflowing sap, but ignore any contradictory evidence. This type of unconscious bias can plague any scientific investigation.

It is appealing to believe that the moon affects our health and that sap flows best during Holy Week. Unfortunately, the data don't support these ideas. Despite this, Holy Week will always be a significant and special time of the year for me and the other syrup-makers at St. John's, whether the sap flows better or not.

References

Anonymous. 1943. *Scriptorium*. page 22, May.

Anonymous. 2004. The Date of Easter. U.S. Naval Observatory, Astronomical Applications Department website (http://aa.usno.navy.mil/faq/docs/easter.html). Date accessed: December 27, 2005.

Carroll, Robert Todd (2005) Full Moon and Lunar Effects. The Skeptic's Dictionary website: http://skepdic.com/fullmoon.html. Date accessed: December 27, 2005.

Mallen, Ronald. 2002. Easter dating method. Astronomical Society of South Australia web site: http://www.assa.org.au/edm.html. Date accessed: December 27, 2005.

Table 1. Dates of Holy Week and the sap flow season at St. John's, Collegeville, Stearns County, Minnesota.

Year	Holy Week (Palm Sunday to Easter Sunday)	Sap Flow Dates (first – last day of collecting)
1972	26 Mar -2 Apr	23 Mar – 20 Apr
1974	7 Apr – 14 Apr	3 Apr – 19 Apr
1978	19 Mar – 26 Mar	22 Mar – 15 Apr
1982	4 Apr – 11 Apr	2 Apr – 22 Apr
1985	31 Mar – 7 Apr	16 Mar – 11 Apr
1988	27 Mar – 3 Apr	23 Mar – 6 Apr
1990	8 Apr – 15 Apr	22 Mar – 10 Apr
1992	12 Apr – 19 Apr	19 Mar – 4 Apr
1994	27 Mar – 3 Apr	16 Mar – 4 Apr
1996	31 Mar – 7 Apr	21 Mar – 22 Apr
1999	28 Mar – 4 Apr	26 Feb – 8 Apr
2000	16 Apr – 23 Apr	6 Mar – 30 Mar
2002	24 Mar – 31 Mar	28 Mar – 13 Apr
2003	13 Apr – 20 Apr	17 Mar – 9 Apr
2004	4 Apr – 11 Apr	18 Mar – 5 Apr
2005	20 Mar – 27 Mar	24 Mar – 10 Apr

Table 2. Maple sap flow and percent of days on which sap was collected during Holy Week and the remainder of the sugaring season at St. John's, Collegeville, Stearns County, Minnesota.

Year	Sap flow (gal/day)		% days during period on which sap was collected	
	Holy Week	Other	Holy Week	Other
1972	148	763.3	37.5	57.1
1974	695	1228	50.0	88.9
1978	328	634.2	37.5	50.0
1982	164	703.9	25.0	84.6
1985	1041	713.8	75.0	57.9
1988	1092	685.5	87.5	71.4
1990	328	547.5	37.5	47.1
1992	0	905.1	0	88.2
1994	733	612.5	75.0	66.7
1996	317	337.3	62.5	48.0
1999	113	190.1	50.0	44.1
2000	0	420.5	0	40.0
2002	131	181.8	37.5	30.8
2003	0	283.4	0	45.8
2004	131	289.8	12.5	52.9
2005	87.5	159.3	25.0	50.0
Mean	331.8	541.0	38.3	57.7