Purslane Use: A Cultural Practice by Ontario Iroquoians near Crawford Lake A.D. 1000-1650, Evidence from Pollen and Macrofossil Studies of Lake Sediments in Southern Ontario, Canada*

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INTRODUCTION

The Crawford Lake Archaeological Research Program has documented over 80 Iroquoian sites from south of Lake Medad to Georgetown, in Halton County, Ontario (Finlayson et al. 1990) (Figure 1.2.11). The archaeological program was initiated because of the identification of corn pollen in Crawford Lake which suggested that Iroquoian horticulture was practised from ca. A.D. 1300-1650 (Byrne & Finlayson 1976). This discovery of corn pollen from Iroquoian horticulture is unusual in eastern North America (Crawford et al. 1997) raising a number of intriguing questions:

1. Since corn pollen is dispersed by wind only to a maximum of 50 m from corn fields, how do we account for the deposition of corn pollen in Crawford Lake when the Crawford Lake satellite was probably occupied only for about 60 years while the remainder of known villages are over two km from the lake?

2. Why are corn pollen counts in Crawford Lake sediments higher during the occupation by Ontario Iroquoians than for modern-day corn agriculture? Was corn being grown close to the lake on clay soils, which are considered unsuitable for Native corn horticulture, or were trees cleared around the lake, allowing corn pollen to blow in? Why is there substantial pollen from such trees as maple and hemlock, and why is the occurrence of weed and grass pollen sporadic?

3. Why is evidence of Native horticulture in the form of preserved corn pollen all-but-unheard-of in eastern North America, when it is so prevalent in lakes on the Niagara Escarpment in Halton County?

Since there are no satisfactory answers to these questions in the published literature, and none based on experimental testing, Turton set out to investigate the problem and to find an explanation compatible with both the history of Iroquoian occupation of the area between about A.D. 1000 and 1650 and the fossil pollen evidence found in the lake sediments. This paper presents the results of this research.

METHODS AND FIELD WORK

Three hypotheses were formulated to account for the abundance of corn pollen in Crawford Lake compared with its apparent scarcity in other lakes in adjacent parts of Ontario and eastern North America:

1. Crawford Lake has laminated sediments, which help to concentrate the corn pollen;

2. Corn pollen is indeed present in most lakes in eastern North America where Native corn agriculture was practised nearby, but sampling techniques (removing sediment in 5-10 cm intervals and identifying only 500 pollen grains) have been too coarse to detect it;

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Burlington Locality
1. Tara East & West
2. Ireland
3. Five Acre Field

Crawford Lake Locality
4. Zumple
5. Kraus
6. Centre Track
7. South Bend
8. Mike
9. George
10. Agro
11. Coverdale
12. Gunby
13. South Track
14. Bennett
15. Lindley
16. Wilderhagen
17. Wright
18. Laurenssen
19. Scout
20. H&R
21. Unick
22. Rife
23. Van Eden
24. Crawford Lake
25. JC
26. Unick Metate
27. Stump
28. Rife Metate
29. Crawford Lake II
30. Cedar Acres
31. Plunge Pool
32. Strawberry Patch
33. Not Much
34. Crawford Lake Metate

▲ Crawford Lake
▲ Miller (Lost) Lake
▲ Lake Medad
**** Niagara Escarpment

Figure 1.2.11: Burlington and Crawford Lake localities: Location of sites, lakes and movement of people.
(3) Crawford Lake is a relatively small lake and had corn fields nearby. If one looked at other lakes with similar conditions one would find corn pollen in their sediments.

To test these hypotheses, samples from the first metre of sediment (which represents the last 1200 years) were taken with a plastic tube piston corer from four small un laminated lakes. Each of these had known prehistoric sites within one km of the lake. Two of these lakes are found on the Niagara Escarpment in Halton County (Miller Lake and Lake Medad) (Figure 1.2.12); Lake St. George is located in York County, north of Toronto; and Pond Mills Pond is in London, Ontario. Samples were taken in 1 cm intervals instead of in 5 or 10 cm intervals, and large numbers of slides were examined under low-power scanning microscope to identify the large corn pollen grains. Pollen extraction involved standard techniques (Faegri and Inversen 1972).

RESULTS

Large quantities of corn pollen were recovered from Miller Lake in levels 27, 28 and 29 (Figure 1.2.13). By comparing the Miller Lake and Crawford Lake pollen diagrams (Figures 1.2.13 & 1.2.14), levels 27, 28 and 29 from Miller Lake can be tentatively dated to the mid to late 14th century (McAndrews and Boyko-Diakonow 1989). Two Iroquois sites have been identified near Miller Lake (Scout and H&R) and have been dated to A.D. 1360-1390 and 1390-1420 respectively. Again, we are

Figure 1.2.13: Miller Lake pollen diagram.
using the proposed chronology of Finlayson from Chapter 7, not the varve dates of Byrne earlier in this chapter (page 106). Other levels between 23 to 33 contain only minute quantities of purslane and corn pollen (Figure I.2.13), which may have originated in levels 28 and 29, and have been intermixed with these other levels by the natural mechanical mixing of bottom sediments that occurs in un laminated lakes (Allison et al. 1986). Accordingly these minute amounts of pollen do not indicate any additional Iroquois horticulture.

Corn pollen was found in two distinct places in the Lake Medad core. The first occurred with purslane pollen and seed coat fragments in the dark brown gyattia, where beech pollen is high (25%). This level dates to a time before the 14th century (McAndrews and Boyko-Diakonow 1989; Bennet 1987; Burden et al. 1986). The corn pollen here was found in small but significant quantities (0.25%). Two Iroquoian sites dating to the 12th century have been located within two kilometres of this lake.

The second place where corn pollen was found in the Lake Medad core sample was in the yellow brown marl gyattia where beech pollen is low (12%); this stratum postdates the beech decline in the 14th century. The corn pollen found in minute quantities and without the accompanying evidence of purslane is believed to have originated from the 17th century Neutral site identified on the east bank of Lake Medad.

Close examination of the sediments of all the lakes showed that corn pollen is present in large quantities only when pollen and seed coat fragments of purslane (Portulaca oleracea) are also present. Pollen and seed of purslane were found in the Crawford Lake varved sediments by Byrne and McAndrews. They concluded that: "Purslane was present in the corn fields of Natives who lived near Crawford Lake in the 15th century,... the fossil seeds and pollen could not have entered the lake by natural means... (and) Natives probably washed the plants in the lake before they ate them" (Byrne and McAndrews 1975).
Since the presence of purslane in the lakes in Halton County appeared to be important to the problems being studied, Turton collected 100 purslane plants from a local corn field near Crawford Lake and washed them in a tub of water. He then analysed the water for pollen traces and found large quantities of purslane, corn, grass, and other pollen from plants growing in the corn field. Thus, these different types of pollen had obviously collected on the purslane plants. These are the same pollen types that are found during the period of Iroquoian occupation in the sediments of Miller and Crawford Lake and Lake Medad.

**DISCUSSIONS AND CONCLUSIONS**

The discovery of large quantities of corn pollen in Miller Lake, an unvarved lake, disproved the hypothesis that the lamination of sediments had any effect on the quantity of pollen.

More intensive sampling techniques did help locate corn pollen which would ordinarily have been missed using standard sampling techniques, but this does not explain the large quantities of corn pollen in the three lakes on the Niagara Escarpment in Halton County.

Although some corn pollen was blown into lakes from Native corn fields, as demonstrated by the presence of small quantities in Lake St. George, Pond Mills Pond and Second Lake (Burden et al. 1986), it is difficult to accept that corn pollen in the lakes on the Niagara Escarpment was deposited by the wind. We cannot accept that these lakes received large quantities of wind-blown pollen, while other lakes in southern Ontario and eastern North America with similar conditions, did not. How do we explain that windblown corn pollen is present in Lake Medad in the 12th century from a site two kilometres away, while almost absent in the 17th century from a site nearby?

**Conclusion 1** - Large quantities of corn pollen in lake sediments during the Iroquoian period on the Niagara Escarpment in Halton County was not caused by wind dispersal.

Ninety-five percent of corn pollen does not blow any farther than 50 m from its source (Raynor 1980). Consequently, most corn pollen has to fall within the corn field or near its perimeter. Turton’s research has shown that this pollen, along with other weed pollen, can be washed from purslane plants growing in corn fields. Historic records describe purslane growing in Native corn fields, while the collection and washing of these plants in Crawford Lake has been inferred (Byrne & McAndrews 1972). We suggest that when the Iroquoian washed the plants in these three lakes, Crawford, Miller and Medad, they also washed off the pollen, which under normal circumstances would not reach the lakes. It is interesting to note that the only other lake in Eastern North America with high counts of corn pollen from Native horticulture (one to two per cent) is Tuskegee Pond, Tennessee. This corn pollen was found associated with seeds and pollen of herbs, including purslane (Delcourt et al. 1986).

**Conclusion 2** - Corn pollen found in the three lakes on the Niagara Escarpment in Halton County is mostly due to the washing of purslane plants in the lakes by the indigenous peoples.

This conclusion offers a reasonable explanation of the questions raised by the high counts of corn pollen in the lakes on the Niagara Escarpment in Halton County. Corn pollen counts are higher in these lakes because the corn pollen had a different means of transport. It is higher in the Iroquoian period because the Iroquoians were, by the nature of their subsistence practices, bringing the corn field to the edge of the lake. Corn pollen was more prevalent in Lake Medad in the 12th century because people were washing the purslane plants in the lake at this time, while not doing so in the 17th century. The distance of an Iroquoian site from the lake—within or beyond the 50 m perimeter—is not an important factor in explaining the presence of corn pollen: it could have been both wind borne from fields near the lake and
deposited by washing large quantities of purslane plants from fields further inland (Note that comparable corn pollen counts were found in the modern period [Figure 1.2.14], probably resulting from wind dispersal, but these came from corn fields of 100-200 acres with over six million plants under cultivation.)

Conclusion 3 - The washing of purslane plants in the lakes was a local cultural practice.

We know that purslane was available in other parts of Ontario during the time period of A.D. 1400-1650 (Fecteau 1985; Moncton 1992). However, present research shows that purslane seeds and pollen occur only in the Halton lakes. If this situation were caused by natural forces, similar conditions should produce similar findings. These unusual findings have been connected to the Iroquoians who lived near these lakes: Medad, Miller and Crawford. Comparing the results of sampling from these different lakes in conjunction with their different features shows that the corn pollen deposits result, not from natural forces, but from the cultural practices of one community of Iroquoians who relocated their villages over a period of more than five centuries in that limited area of Halton County adjacent to Lake Medad, Miller Lake and Crawford Lake.

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