



## Horticulture on the edge: the northernmost evidence for plant cultivation in pre-contact Northeastern North America

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### Palabras Clave:

Horticultura; Maíz;  
Iroqueses; Norte América;  
Quebec.

### Keywords:

Horticulture; Maize,  
Iroquoians; North America;  
Quebec.

### RESUMEN

El valle del río St. Lawrence fue el hogar del caso del cultivo de plantas más septentrional en el noreste de América del Norte antes de la llegada de los primeros europeos. Recientes análisis de fitolitos recuperados de antiguas vasijas de cerámica en esta área fueron datados en el siglo III antes de Cristo, posiblemente representando la evidencia más antigua de cultivo de maíz en esta área. Estos y otros datos similares de Ontario y el estado de Nueva York, junto con descripciones etnohistóricas de los siglos 15 y 16, permiten una mejor comprensión de los orígenes del cultivo de las plantas en el borde de la zona templada de América del Norte.

### ABSTRACT

The St. Lawrence River valley was home to the northernmost case of plant cultivation in Northeastern North America prior to the arrival of the first Europeans. Recent analyses of phytoliths recovered from ancient pottery vessels in this area were dated to the third century BC, possibly representing the oldest evidence for maize cultivation in this area. These and other similar data from Ontario and New York State, along with ethnohistorical descriptions from the 15th and 16th centuries, allow for a better understanding of the origins of plant cultivation on the edge of North America's temperate zone.



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## INTRODUCTION

This article offers a short review of the current data regarding the ancient cultivation of domesticated plants in the Quebec portion of the St. Lawrence river valley and some neighbouring regions, especially in regards to recent data that changed our perceptions of the beginnings of horticulture in this northern area. It must be stressed that the ancient plant cultivators of the St. Lawrence lowlands and elsewhere in Northeastern North America never adopted animal husbandry: strictly speaking, they were thus horticulturalists rather than agriculturalists, and the former concept is more appropriate than the latter in this case.

The overview of the past horticultural practices in the St. Lawrence lowlands will begin with a brief presentation of the natural and cultural environment of the area, followed by descriptions of the ethnohistorical and archaeological data, along with some general comments and interpretations. It is hoped that the northernmost evidence for horticulture in Eastern North America as summarized here will serve as a potentially inspiring point of comparison for the study of plant cultivation on the opposite side of the Americas.

## NATURAL ENVIRONMENT

The St. Lawrence river is a major waterway of the continent, being the primary conveyor that drains the

waters of the Great Lakes towards the Atlantic Ocean. The lowlands of the St. Lawrence river represent the northern limit of the Eastern Temperate Forests ecological region, characterized by dense, mixed deciduous and coniferous forests, and a temperate, humid climate with relatively hot summers and cold winters (figure 1). The forests are inhabited by cervids, especially white-tailed deer (*Odocoileus virginianus*), and various fur-bearing mammals such as black bear (*Ursus americanus*), beaver (*Castor canadensis*), woodchuck (*Marmota monax*), porcupine (*Erethizon dorsatum*), river otter (*Lontra canadensis*), snowshoe hare (*Lepus americanus*), red fox (*Vulpes vulpes*), and raccoon (*Procyon lotor*), among many other types of mammals, while the many rivers and lakes abound with numerous species of fishes and waterfowl.

In Quebec, much of the St. Lawrence lowlands are relatively flat with a slight inclination towards the river, and elevations ranging from 30 to 120 meters above sea level. These lowlands are underlain by flat-lying clay beds deposited by the post-glacial Champlain Sea between about 13 000 and 10 500 years ago. The clays are generally topped with brunisolic, freely drained soils with well-developed A (organic) and B (mineral) horizons, which makes them appropriate for plant cultivation. However, sand beaches, spits and bars representing former water levels are common in the valley, and these were the favoured locations for prehistoric horticulture because sandy soils naturally

drains more easily. This was an important criteria in this sub-humid region having between 105 and 130 days of rain during the warm season, and annually receiving about 1000 mm of precipitation (rain or snow) on average. The average annual temperature is about 5°C (18°C during the summer) and the number of frost-free days in the lowlands varies from over 165 days in the Montreal area to about 120 at Cap Tourmente, just east of Quebec City. Considering that 120 was the minimum number of frost-free days necessary to grow maize in prehistoric times (*i.e.* without the aid of modern techniques), the Quebec City area thus represent the northern limit where prehistoric horticulture was possible in Northeastern North America. It is certainly no coincidence that it also corresponds to the northeastern limit of the location of the permanent villages of the St. Lawrence Iroquoians.

## CULTURAL ENVIRONMENT

The St. Lawrence Iroquoians were the native peoples inhabiting the St. Lawrence River valley at the time of contact with the first Europeans. They were the northernmost of all the groups speaking languages of the Iroquoian family. Their territory extended from the eastern end of lake Ontario to the Cap Tourmente area just east of present day Quebec City. The St. Lawrence Iroquoians were horticultural, semi-sedentary peoples living in large villages containing various numbers of longhouses (figure 2). St. Lawrence Iroquoians of the Quebec City area have been described as transhumant people, seasonally moving in large numbers (including women and children) to the estuary of the St. Lawrence river to capture marine resources, especially seals, but

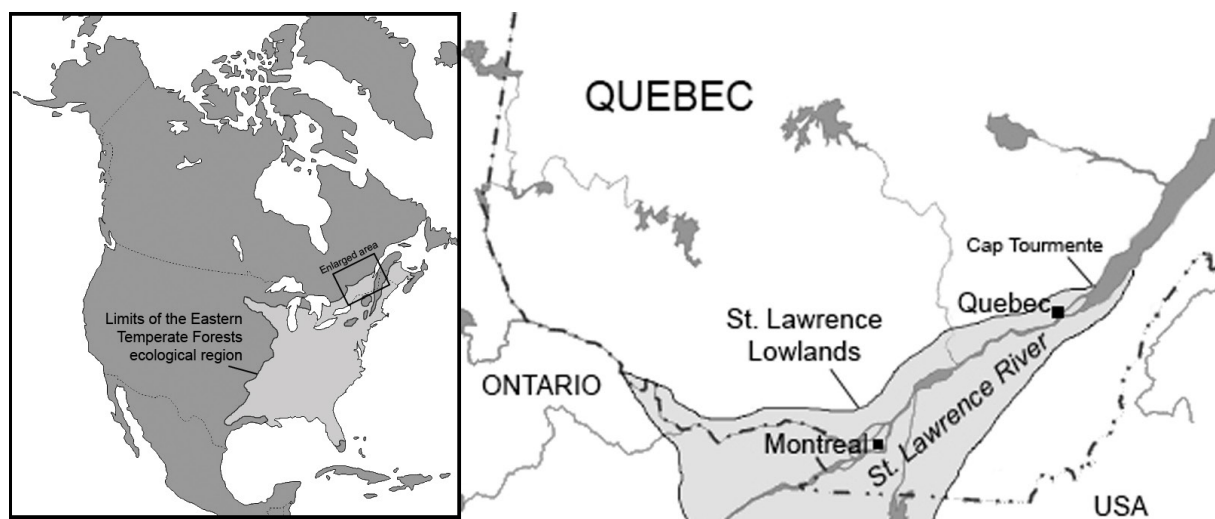


Figure 1. Location of the Eastern Temperate Forests ecological zone and the St. Lawrence lowlands.

also beluga (or «white whale», *Delphinapterus leucas*) as well as marine fish and shellfish (Chapdelaine 1993a, 1993b; Plourde 2012; Plourde & Gates St-Pierre 2003). In this matrilineal and matrilineal society, the husbands lived in their wife's house with the rest her family, members of which were sharing a common maternal descent. The Iroquoian villages were abandoned and relocated every 20 years or so, as a result of the depletion of the cultivated soils and a decrease in the local availability of essential resources such as deer and wood. White tailed deer (*Odocoileus virginianus*) was indeed an important source of food, but also a significant source of raw materials (hide, sinew, bone, antler, etc.) used in the making of clothes, instruments and tools of all sorts. Wood was also of prime importance for the construction of longhouses and palissades, as well as in the production of watercraft, snowshoes, sleds, containers, traps and weirs, weapons, and various tools and utensils. Like most of the peoples living in the Eastern Woodlands of North America, the St. Lawrence Iroquoians were part of what could be called a «Wooden civilisation».

The St. Lawrence Iroquoians cultivated three domesticated plants called the «Three Sisters»: maize (*Zea mays indurata*), beans (*Phaseolus vulgaris*) and

squash (*Cucurbita pepo*). Sunflower (*Helianthus annuus*) and tobacco (*Nicotiana rustica*) were also cultivated. While maize, beans and tobacco were of tropical origin, indigenous plants were domesticated and cultivated in precontact Eastern North America, such as goosefoot (*Chenopodium berlandieri*), little barley (*Hordeum pusillum*), erect knotweed (*Polygonum erectum*), maygrass (*Phalaris caroliniana*) or marsh elder (*Iva annua*), all part of the Eastern Agricultural Complex, along with squash and sunflower (see Smith 1987, 1989, 1992, 2006; Smith and Yarnell 2009). However, they appear to have been abandoned over time, as they were not grown anymore when the first Europeans explored the St. Lawrence river valley, with the exception of squash and sunflower.

Horticulture represented the main source of food, while the products of fishing, hunting, and gathering provided secondary complements. Women were in charge of most of the horticultural production: men were helping in the clearing of the fields and were in charge of growing tobacco plants in small patches, but it is the women who planted the maize, beans and squash, assumed the care of growing plants, harvested the seasons's yields, and prepared them for daily consumption, storage, or exchange with other groups. Such important charges



Figure 2. Two reconstructed Iroquoian longhouses from the Droulers-site in Saint-Anicet, Quebec (top), with an interior view of one of these (bottom). Photo credit: Christian Gates St-Pierre.

necessitated that women stayed at the villages with the children and the elderly, while men frequently departed to conduct warfare or undertake political or commercial voyages. This probably explains at least in part the prominent role of women in Iroquoian societies. The St. Lawrence Iroquoians had culturally similar neighbours of the large Iroquoian linguistic family to the West and South, such as the Wendat (or «Hurons») in Ontario and the Haudenosaunee (or «Iroquois») in New York State. To the North, East and Southeast, they were surrounded by various Algonquian peoples such as the Algonkins, the Attikameks, the Innus (or «Montagnais»), the Malecites or the Abenakis. Most Algonquians were nomadic, patrilocal and patrilineal peoples living on the products of hunting, fishing and gathering. However, there were some important exceptions to this general pattern. For example, many Algonquian tribes of New England were known for practicing horticulture at the time of contact with the first Europeans, albeit on a small scale. Compared with the St. Lawrence lowlands, New England has a warmer climate and more frost-free days. On the other hand, the soils are less fertile and the coastal areas often receive cold breezes and fog, which did not represent the best conditions for plant cultivation in precontact times. Moreover, the coasts of New England and their adjacent marshes are rich ecozones where food resources are abundant, varied and predictable; some wondered why take on the risk of embarking on an horticultural adventure, considering the foreseeable climatic obstacles, the efforts to acquire

the necessary knowledge and technology, and the potentially problematic yet unavoidable reorganisation of the daily economic activities, group mobility, and settlement pattern. And yet that's exactly what some coastal societies of New England chose to do, as well as some populations located in the interland, along the lower Connecticut river valley for example. Although the origins and development of horticulture in those regions are now well documented by archaeology, it remains difficult to identify the exact causes and rationale behind such a transformation in such conditions, a subject still being debated (see Bendremer & Dewar 1994; Bernstein 1992; Bridges 1994; Ceci 1979, 1990; Chilton 2002; Demeritt 1991; Dimmick 1994; Hasenstab 2000; Heckenberger *et al.* 1992; Lavin 1988; McBride & Dewar 1987; Medaglia *et al.* 1990; Mulholland 1988; Petersen & Cowie 2002; Russell 1980; Sanger 1988; Silver 1981; Snow 1980; and the various contributions in Hart 1999 and 2008, among many other references).

#### ETHNOHISTORICAL DATA

*«Here likewise grows Indian corn like peas, the same as in Brazil, which they eat in place of bread, and of this they had large quantity with them. They call it in their language, Kagaige» (Biggar 1924: 62-63, original translation from French).*

This is one of the earliest known mentions of maize cultivation by the St. Lawrence Iroquoians, in the words of French explorer Jacques Cartier written in July 1534. The year after Cartier encountered St. Lawrence Iroquoians near their village of Stadacona, located somewhere in the modern day Quebec City area, were they were offered maize and other food items such as «large melons» (*ibid.*: 120-121) and where he sees «[...] ridges of cultivated land, and is as good soil as it is possible to find» (*ibid.*: 195). When he visited the village of Hochelaga, in the present location of the city of Montreal, the French captain narrated that at some distance from the shores, he and his men

*«[...] found that the land began to be cultivated. It was fine land with large fields covered with the corn of the country, which resembles Brazil millet, and is about as large or larger than a pea. They live on this as we do on wheat. And in the middle of these fields is situated and stands the village of Hochelaga, near and adjacent to a mountain, the slopes of which are fertile and are cultivated.» (ibid.: 153-154).*

During that same visit, «[...] fish, soups, beans, bread and other dishes [...]» were brought to them (*ibid.*: 167). Back to Stadacona, he mentions that Iroquoians «[...] work the soil with short bits of wood about half a sword in length. With these they hoe their corn which they call Ozisy, in size as large as a pea» (*ibid.*: 183). These and other short glimpses at the subsistence of St. Lawrence Iroquoians suffice to indicate that the products of horticulture constituted an important component of their regular diet.



Cartier is the sole European to have seen and described the horticultural practices of the St. Lawrence Iroquoians. When the French explorer Samuel de Champlain visited the same area in 1603, the St. Lawrence Iroquoians were no more. Their disappearance remains a mystery to this day (see Chapdelaine 2004; Jamieson 1990; Pendergast 1993; Petersen 1990; Ramsden 1990; Snow & Lanphear 1988; Tremblay 1997, 2006). Warfare with the neighbouring Wendat and Haudenosaunee tribes is the most probable cause of their demise, as the latter aimed at controlling the emergent yet already lucrative fur trade in the St. Lawrence – Great Lakes axis. However, epidemics triggered by the introduction of deadly infectious diseases by the first Europeans is another possible contributing factor. It is also conceivable that a long period (from 1450 to 1850 AD) of colder temperatures, known as the Little Ice Age, seriously compromised the growth and harvest of cultigens, especially at the northern limit of where plant cultivation was possible under normal conditions, thus fatally affecting the survival of the St. Lawrence Iroquoians.

Because the St. Lawrence Iroquoians disappeared early, the ethnohistorical record about the Wendat nation is more telling, mostly owing to the chronicles of Champlain, Gabriel Sagard (a Recollect friar) and various Jesuit missionaries who traveled to Huronia during the first half of the XVII<sup>th</sup> century (see Tooker 1964). Because the Wendat and St. Lawrence Iroquoian nations were culturally very similar, it is reasonable to believe that they shared similar food habits. Accordingly, the St. Lawrence Iroquoians probably cleared the land to be planted by falling down the trees and burning the stumps and underbrush, just like the Wendat used to do according those ethnohistorical accounts. Maize seeds were sowed by women in little mounds of organic soil, regularly spaced one meter apart from each other (figure 3), and each containing five to ten kernels that were previously soaked in herbal concoctions for a few days to accelerate germination and prevent the birds from eating the seeds. The mounds provided a slightly warmer temperature for the seeds compared to the surrounding flat soil, but even such a slight gain in temperature could make the whole difference in the

less permissible latitudes of the St. Lawrence lowlands. Bean and squash seeds were planted a few weeks later. It is no surprise if these crops were being cultivated together: maize plants served as stakes for bean plants, which in return fixed the nitrogen in the soil for the profit of maize and squash. The latter, with its large leaves, covered the soils around the base of the plants, thus preventing its moisture from evaporating and keeping weeds at bay. That was definitely a successful trio.

When bad weather conditions occurred, the Hurons sometimes had to sow again once or twice during the same season, according to the Jesuits. The cultigens were normally harvested in September by the women. Maize husks were pulled down and the cobs were tied in bunches and hung for drying inside the longhouses. Once dried, the cobs were shelled and the grains were stored in large pots or bark containers. Often the kernels were ground into flour using wooden instruments (figure 4), a flour that was used in making unleavened bread, among other uses. According to Champlain maize was sometimes harvested unripe and then laid in mud for some months before being grilled with meat or fish. Maize could also be eaten in whole, roasted or grilled. A more common meal was the *sagamité*, a corn stew usually mixed with fish or meat, squash or wild berries. As a matter of fact, the Jesuits recorded about twenty different ways of preparing maize among the Hurons, and it is reasonable to believe that the St. Lawrence Iroquoians knew of just as many.

The Hurons, once accurately qualified as Farmers of the North (Trigger 1969), traded maize with neighbouring populations, especially with the many Algonquian tribes to the north, in exchange for furs or fish, for example. According to the Jesuits, Huronia was literally «the granary of most of the Algonkians» (Thwaites 1896-1901, vol. 8: 115). The St. Lawrence Iroquoians certainly occupied a similar position, exchanging maize and other crops with their Algonquian neighbours as well.

#### ARCHAEOLOGICAL DATA

For a long time maize was believed to have been introduced at around 1000 A.D. in Northeastern North

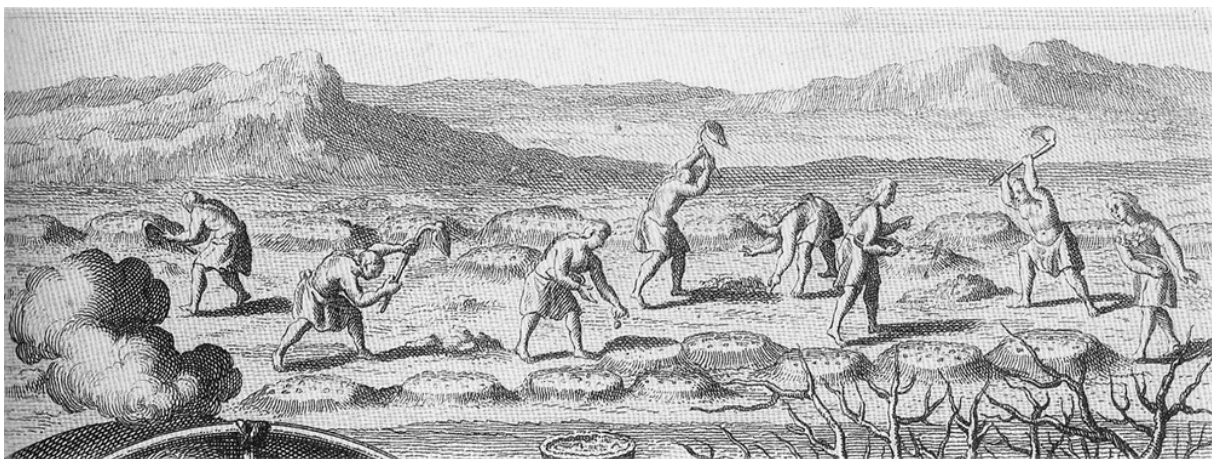


Figure 3. Native Americans sowing maize in little mounds. From Joseph François Lafitau, *Mœurs des sauvages américains: comparées aux mœurs des premiers temps*. Saugrain L'aîné et Ch. E. Hachereau, Paris, 1724.



Figure 4. A Huron (Wendat) woman grinding maize. From Samuel de Champlain, *Voyages et découvertures faites en la Nouvelle France, depuis l'année 1615 jusques à la fin de l'année 1618*. Claude Collet, Paris, 1619.

America, but research from the last two decades has demonstrated that it appeared much earlier. For example, the direct dating of charred maize kernels and cupules from Princess Point sites located in southern Ontario yielded radiocarbon dates between *ca.* 500 and 1000 A.D. (Crawford and Smith 1996, 2003; Crawford *et al.* 1997, 2006; Smith 1997). Similar dates were obtained from stable isotope analyses of human bone and charred residues collected on prehistoric sites in Ontario (Harrison and Katzenberg 2003; Katzenberg 2006; Katzenberg *et al.* 1995; Morton and Schwarcz 2004). In New York State, John P. Hart and his colleagues have radiocarbon dated numerous samples of maize phytoliths from various sites, situating the introduction of maize in that state as early as *ca.* 300 B.C. at the Vinette site (Hart and Brumbach 2005; Hart *et al.* 2007), although most of their dates fall into the first millennium of our era (Hart and Brumbach 2005; Hart and Lovis 2013; Hart and Matson 2009; Hart *et al.* 2003, 2007, 2011; Thompson *et al.* 2004). More recently, maize microfossils (phytoliths and starch granules) were associated with charcoal samples radiocarbon dated to *ca.* 500 A.D. in the northerly region of central Manitoba (Boyd and Surette 2010; see also Boyd *et al.* 2006, 2008).

In Quebec, until recently the oldest macrofossil evidence for horticulture was a maize kernel found at the Place-Royale site in Quebec City, and radiocarbon dated to

1000 A.D. (Clermont *et al.* 1992). However, a pollen analysis recently conducted at the Hector-Trudel site, near Montreal, revealed the presence of maize pollen dating between 500 and 1000 A.D. (Landry 2012).

A more recent study confirmed an earlier presence for maize in southern Quebec (Gates St-Pierre & Thompson 2015; see also Gates St-Pierre & Chapdelaine 2013). This study was based on an analysis of the phytoliths retrieved from carbonized encrustations on a sample of 30 pottery vessels from three different Middle Woodland period (400 BC to 1000 AD) sites: Hector-Trudel and Station-4, both located at Pointe-du-Buisson, near Montreal, and Place-Royale in Old Quebec City. Nine of the samples submitted for analysis contained maize phytoliths, all from the Hector-Trudel site, except one from Place-Royale (figure 5). Most of the phytoliths are similar to the Mandan Clay Red, Mandan White Flour, Mandan Black Flour or Mandan Yellow Flour varieties from the Midwest, all part of the Northern Flint Corn Complex. Two samples contained phytoliths that are definitely maize but from an unknown variety: they do not match with the representative samples of the Northern Flint Complex. This variation may indicate an *in situ* development of a new lineage in the area during the Middle Woodland period, as seen later. Moreover, a few samples are also similar to some archaeological specimens of maize phytoliths found at the Femco Mound site (21WL1) in Minnesota and at the Hunter's Home site in New York State; these locations may represent the possible origin(s) of the first maize products introduced in the St. Lawrence river valley.

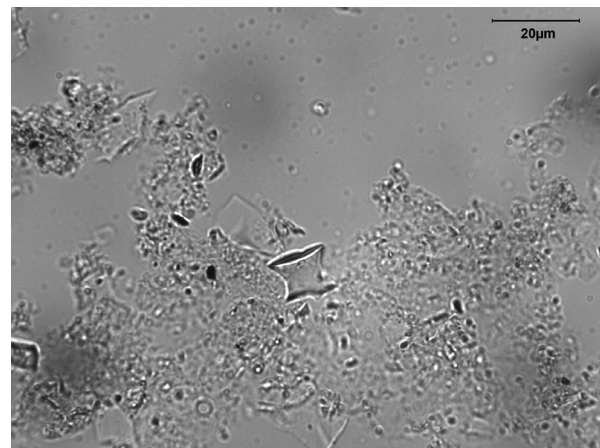


Figure 5. Example of a maize phytolith (at center of the image) from the carbonised encrustation on a Middle Woodland pottery vessel from Pointe-du-Buisson. Photo credit: Robert G. Thompson, Archaeobiology Laboratory, University of Minnesota.

Another result is the possible identification of wild rice phytoliths (*Zizania palustris*, or more probably *Z. aquatica*) in two samples: should this identification be confirmed by future analyses, these phytoliths would represent the northernmost known archaeological evidence of wild rice consumption in precontact Northeastern North America. It has been suggested that wild rice might have been of equal importance to maize in the diet of the Princess Point people of southern Ontario (Ferris 1999). It should also be noted that wild rice and maize phytoliths were found together



in the charred residues on a single vessel dating from the Middle Woodland period on the Wickham, Kipp Island, and Hunter's Home sites in central New York State, clearly indicating that they were cooked together (Hart *et al.* 2003; see also Raviele 2010 for an example from the Schultz site in Michigan). This led some archaeologists to suggest that the Middle Woodland habit of cooking maize with wild rice could have been ancestral to the well documented tradition of cooking maize with beans among Iroquoian populations of the Contact period, with beans gradually replacing wild rice over time (Hart and Lovis 2013; Hart *et al.* 2003). Perhaps this is also what can be deduced from our samples from the St. Lawrence River valley.

Our samples of charred residues containing maize phytoliths were sent for radiocarbon dating using the AMS method. The results indicate that maize was introduced in southern Quebec as early as the beginning of the early Middle Woodland period, at both the Hector-Trudel and Place-Royale sites, two sites located in two different areas and two different latitudes (Gates St-Pierre & Chapdelaine 2013; Gates St-Pierre & Thompson 2015). The fourth to third centuries B.C. one of the calibrated radiocarbon date obtained from one of our samples could possibly make it the oldest evidence of maize consumption in Northeastern North America, along with the sample from the Vinette site mentioned earlier (Hart and Brumbach 2005; Hart *et al.* 2007). However, most of the dated samples are more recent, from the seventh or eighth centuries A.D.

The results of this study clearly indicates that maize was introduced much earlier than previously thought in southern Quebec, 14 to 12 hundred years earlier than the traditionally accepted date of 1000 A.D. They also allow us to develop an hypothetical and preliminary reconstruction of the developmental history of maize horticulture in the St. Lawrence river valley. It begins with the assumption that a continued demographic increase necessitated the development of new subsistence strategies during the Middle Woodland period. The main archaeological evidence in support of this assumption is a clear rise in the number and size of the archaeological sites during the transition from the Early Woodland (1000 to 400 BC) to the early Middle Woodland (400 BC to 500 AD) periods in the St. Lawrence lowlands. Early Woodland sites or components are rather rare in that area and they often contain a limited quantity of artifacts (see Clermont 1990a; Chrétien 1995a, 1995b; Taché 2011a, 2011b). Conversely, early Middle Woodland components are ubiquitous throughout the same area, often yielding large amounts of artifacts (Gates St-Pierre 2009; Gates St-Pierre and Chapdelaine 2013). It is not clear whether this apparent demographic surge caused real demographic pressure and was being perceived as a problem or not, but what is more certain is that early Middle Woodland people extended their territory and adapted to a wider range of environments, possibly as a response to that potentially problematic situation.

Another response to a demography on the rise was a more intensive exploitation of fishes and the inclusion of new edibles such as maize, thus reducing the predatory stress on highly valued terrestrial game such as deer. This intensification is largely documented

in southern Quebec for the Middle Woodland period (Brodeur 2006; Clermont 1990b, 1996a; Clermont *et al.* 1992; Clermont and Cossette 1991; Cossette 1996, 1997, 2000; Courtemanche 2003, 2008; Laliberté 1999). Similarly, the present research now provides the first archaeological evidence regarding the inclusion of maize among the list of products consumed by those same groups.

During this first phase of maize adoption, occurring during the early Middle Woodland period, maize was most certainly obtained from exchanges with long-time growers in the Midwest, perhaps via the Hopewell exchange network that was in operation at that time, or maybe from more recent growers located in New York State. This is indicated by the similarities previously underlined between the phytoliths from those regions and the ones from our samples in the St. Lawrence lowlands. It is difficult to determine the precise importance of maize in the food habits of those early Middle Woodland populations; it certainly was not already a staple food at that time, but it is clear that maize was known and that it was cooked and consumed at least occasionally.

After many decades or perhaps centuries of maize consumption as a trade product, the second phase of maize adoption was one of experimentation with the local cultivation of this crop in the St. Lawrence river valley. It can be hypothesized that maize cultivation gradually became a more reliable and more important source of food, and that it might have resulted in the appearance of at least one possible local variety of maize. This would constitute the appearance of a mixed economy combining the products of fishing, hunting, gathering, and incipient plant cultivation, a subsistence strategy similar to Smith's concept of «low-level food production» (Smith 1998, 2001).

Interestingly, this seems to have happened somewhat simultaneously in both the Montreal and Quebec City areas, despite the distance and slightly harsher climate of the latter, which apparently did not represent a serious obstacle to the cultivation of maize in this region. In fact, some of the maize phytoliths from the Quebec City samples represent the northernmost and possibly the earliest evidence of maize in Northeastern North America to this day. It might indicate that maize cultivation was being developed in relative synchronicity with other populations experimenting with farming in neighbouring areas such as New York State and southern Ontario, where maize was also present before the Late Woodland period, with no significant interval due to distance or latitude.

Another important aspect in the process of maize adoption is the inception of a settlement pattern that became increasingly sedentary. This phenomena is again well documented in southern Quebec where late Middle Woodland groups aggregated every year on large fishing stations, such as Pointe-du-Buisson and Place-Royale, for half of the year, from early spring until the end of the fall season, a settlement pattern repeated annually during 500 years (Clermont 1996b; Clermont and Chapdelaine 1980; Cossette 1996, 1997, 2000; see also Chapdelaine 1993c; Gates St-Pierre 2004, 2006; Gates St-Pierre and Chapdelaine 2013). The clearings created on these large seasonal base camps probably

engendered favorable conditions for the cultivation of domesticated plants. Based on current evidence, the introduction of maize now seems to predate the development of a sedentary settlement pattern in the St. Lawrence lowlands, although the two phenomena might have become entangled later on.

It has also been suggested that matrilocality and matrilinearity, two central characteristics of all Iroquoian populations, appeared in the context of these late Middle Woodland earliest experiments with horticulture (Clermont 1990b, 1996a; Hart 2001). For example, some believe that:

«[Women] may have created maternal families during summer in late Middle Woodland times when men often were hunting and trading. Women had created close and more formal links between themselves. The Late Woodland horticultural villages were simply places where these families had built multifamily longhouses as social equivalents of the older inhabited clearings. They were social spaces where women would share close relationships and would develop a new network of maternal families and clans». (Clermont 1990b: 79).

The third and last phase in the process of maize adoption occurred during the Late Woodland period (1000 to 1550 AD); this is when maize was totally integrated into the daily diet and became one of the main staples of the Iroquoian populations of the St. Lawrence river valley (see Trottier 2014). This occurred after centuries of experimentation during which maize certainly became more adapted to its new environment, more productive, and less costly to cultivate, a process sometimes interpreted as a developing coevolutionary relationship between domesticated plants and humans (see Hart 1999; Hart and Lovis 2013; Rindos 1984). Considering the climatic conditions of the St. Lawrence lowlands, it is easy to understand that many centuries of experiments and adaptation were necessary before horticulture could become truly productive and reliable.

## CONCLUSION

The St. Lawrence Iroquoians lived at the extreme northern limits of precontact New World agriculture, and yet their horticultural practice was in no way a marginal activity: to the contrary, it was a major source of food, even the most important one indeed. It provided large quantities of food, parts of which could be stored for winter days or exchanged with neighbouring hunter-gatherer populations. The St. Lawrence Iroquoians, like the nearby Wendat, were truly farmers of the North. Using ethnohistorical and archaeological evidence, the preceding pages have demonstrated how that was possible. The data then served as building blocks for a proposed scenario explaining the development of horticulture in that area. That interpretative scenario is very fragile, to say the least, but in the present state of knowledge it is the best one we can offer to explain how Native American populations from the past could adopt and adapt horticulture at the northern edge of temperate North America.

## ACKNOWLEDGMENTS

Part of the author's research presented in this article was financed through a postdoctoral research grant from the ministère de la Culture et des Communications du Québec. The Groupe de recherches en archéométrie de l'Université Laval in Quebec City provided some additional funding. I would like to thank Réginald Auger, Pierre Desrosiers and Allison Bain for their support. Robert G. Thompson conducted the phytolith analysis from my samples at the Archaeobiology Laboratory of the University of Minnesota: thanks are also due to him. Finally, I would like to thank Daniel Loponte for his invitation to publish in this journal.

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