

Wild Rice Research and Management

Proceedings of the Wild Rice Research
and Management Conference

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Great Lakes Indian Fish & Wildlife Commission

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Foreword

The first prophet said to the people, 'In the time of the First Fire, the Anishinabe nation will rise up and follow the Sacred Shell of the Midewiwin Lodge. . . . The Sacred Megis will lead the way to the chosen ground of the Anishinabe. . . . There will be seven stopping places along the way. You will know that the chosen ground has been reached when you come to a land where food grows on water (Edward Benton-Benai, *The Mishomis Book*).'

It was in Lake Superior that the Anishinabe fulfilled this prophecy and found *manoomin* (wild rice). The importance of this gift from the Creator cannot be overstated. As Benton-Benai states in *The Mishomis Book*, "Wild rice has always been regarded by the Ojibway as the sacred gift of their chosen ground."

Given the Ojibwe's traditional, high regard for manoomin, it is no wonder that the Great Lakes Indian Fish and Wildlife Commission's (GLIFWC's) member tribes were interested in sponsoring a conference to discuss the state of knowledge about this unique resource. The Sokaogon Chippewa tribe initially applied to the Environmental Protection Agency to fund this undertaking and is credited for the original vision. GLIFWC was invited to organize and oversee the conference and prepare these proceedings. In addition, the Fond du Lac Community College offered time, energy, and funds to assure that tribal elders, managers, and scientists could attend. Finally, GLIFWC's member tribes contributed a variety of resources that were necessary to ensure the project's overall success.

The conference took place July 7-8, 1999, in Carlton, Minnesota. Approximately 250 interested scientists, managers, and others attended two days of presentations on a wide variety of issues related to wild rice—from the archeological context of manoomin, to its genetic makeup, to current management techniques. Keynote speeches provided historic, cultural, and scientific overviews of manoomin.

GLIFWC is pleased to have been a part of this historic conference and to present these proceedings. We hope that they will provide a useful tool for anyone interested in this important resource, and that the discussions initiated through this conference will continue to stimulate new directions in research and management of the food that grows on water.

Megwitch,



James H. Schlender
Executive Administrator
Great Lakes Indian Fish and Wildlife Commission

Keynote Addresses

TRADITIONAL AND SOCIAL CONTEXT OF RICING

Thomas Vennum

INTRODUCTION

I am honored to address this symposium on wild rice as a long-time student specifically of Indian music and generally of Ojibway culture in the western Great Lakes area. Before we launch into discussions of genetics, taxonomies, plant mythology and the like, I hope to remind us all that the wild rice, like corn, soy beans, and other Indian gifts, was discovered by the original inhabitants of North America and its use as a staple and for barter predated by centuries the arrival of Europeans in the rice district. Further, in the cultural and spiritual life of the Ojibway, its principle harvesters, it occupied a central position.

OJIBWAY PATTERN OF RESOURCE USE

In 1919, a group of people living near Mille Lacs Lake sent a letter of complaint about their Ojibway neighbors to the Indian Service in Washington. Among other things, the letter charged that Indians "refuse to cultivate the land on which they live, take fish and game whenever they feel so inclined and think that they can get away with it, they do not establish permanent homes and try to cultivate the land or make substantial improvements there on, but live in bark or canvas wigwams, tents and rough board shanties. They scatter out over the country in the hunting season, the sugar making season, the rice season, and for berry picking and live practically in the same primitive state that their forefathers did years ago." The Ojibway pattern of using woodland resources developed over centuries, is deeply ingrained, and will probably never be completely abandoned for EuroAmerican lifestyles, food preferences, and subsistence strategies. Although the mechanics of harvesting have changed, the Ojibway continue to hunt and trap, pick berries, make maple sugar, and gather wild rice, and the timing of these activities follows the seasons, not necessarily the legal statutes of a dominant society.

However, today, the Ojibway people face a social and economic dilemma. Wild rice, one of their most important natural resources, is no longer as accessible to them as it once was. With the close of the fur trade, the surrender through treaties of large areas of the wild rice habitat and the confinement of Indian people on reservations, their aboriginal subsistence patterns have been severely curtailed. Previously, Indian people counted on modest sales of wild rice to supplement their incomes. Because of destitution however, the care and pride once taken in harvesting and processing wild rice in many places has given way to expedient shortcuts. Motive has led some individuals to ignore the ecological attention the Ojibway community traditionally accorded its rice. Yet, competitive efforts have been in vain, for EuroAmericans have learned to domesticate wild rice and mechanize its processing and the product has become a marketable commodity. Ironically, the rapidly developing industry is almost totally out of Indian hands. Wild rice has even been appropriated as a symbol by the state of Minnesota, which proudly proclaims wild rice its official grain.

Rice once played a central role in Ojibway tribal life. It was endowed of spiritual attributes and its discovery was recounted in legends. It was used ceremonially as well as for food and its harvest promoted social interaction in the late summer each year. Consequently, many Ojibway view the commercial exploitation of this resource by non-Indians as an ultimate desecration.

TRADITIONAL WILD RICE HARVEST

Although the Ojibway have been the principle harvesters of wild rice for nearly three centuries, the food played a minimal role in their culture before contact with Europeans. The inland southwestern Ojibway, who counted most on wild rice, practiced a diversified economy, moving seasonally to the

locus of particular resources. Even after they settled on reservations, they remained semi-nomadic. In August, they moved to the rice camps for the harvest. While waiting for the rice to ripen, the Indians continued to fish and trap. If they ran out of meat in the rice camp, they trapped muskrat and used the skins for moccasins or leggings. They also hunted ducks and dried the meat. In late October, they moved South to begin the cycle anew. Writing in 1662, Jesuit Heirosme Lalemant summarized the Ottawa harvest, which is virtually identical to the Ojibway, Menominee, and other rice harvests, as follows: "There is in that country a certain plant, four feet or thereabout in height, which grows in marshy places. A little before it ears, the Natives go out in their canoes and bind the stalks of these plants in clusters which they separate from one another by as much space as is needed for the passage of a canoe when they return to gather the grain. Harvest time having come, they guide their canoes through the little alleys which they have opened across this grain field and bending down the clustered masses over their boats, strip them of their grain." Binding together bundles of wild rice stalks a few weeks before harvest when the fruit is in its milk state was a widespread practice now abandoned but reported in nearly all the old sources. Of the reasons for this activity, binding, the principle one was to declare ownership. The explorer Jonathan Carver observed in 1767 an entire rice field marked off in different styles of binding: "Each family having its allotment and being able to distinguish their own property by the manner of fastening the sheaths gathered in the portion that belongs to them."

When binding wild rice was fairly common practice, each woman harvester had her own way of doing it by some peculiarity of the twist, and community members easily recognized particular techniques of binding, so property was generally respected. This usufructuary practice paralleled marking maple trees in the sugar bush with distinctive ax slashes. As added insurance, some women dyed their bark, each a different color, or incorporated bits of colored yarn into the binding because one person working alone could tie and later harvest that rice. Older people

who lacked ricing partners also engaged in binding as their principle means of securing their own supply of rice. Two or three weeks before the harvest the women entered the rice fields, usually two to a boat, one poling, the other kneeling or sitting to gather the tops of the stalks in large shocks. Because, by this time, the rice had extended its growth some four feet above the water, they used a special stick bent over into a curve and tied to hold its sickle-shape to pull down the stalks which could then easily be grasped and tied with strips of bark. Several other advantages accrued from this practice. Rice that is bound and wrapped cannot easily be invaded and eaten by birds or lost to the elements. In collecting bound rice, the harvester catches the twine at the bottom, cuts it to remove the binding, then takes the bunch of stalks and knocks and strips it by hand. Releasing the fruit in this way, a much greater quantity of rice is diverted directly into the boat and binding creates convenient passageways through the rice fields facilitating boat traffic. Almost without exception among harvesters, August or September was designated the month of making wild rice. In the Ojibwa language, this time is called *manoominike-giizis*. When the rice moon arrived, the Ojibway prepared to move to the place of the harvest just as they set up camps among maple trees at spring when the sap begins to flow. They broke up their larger villages and moved in small groups to camp at the edge of the rice beds on the shores of rivers and lakes.

RICE CAMPS

Many still camp by the fields today. This may have some practical advantages but some say they do so to get a good night's sleep and to save on gas. Still, there is little denial that being one with nature in close proximity to the crop is also a determining factor, much as urban white game hunters enjoy an annual respite to rough it in the woods with their hunting companions.

The decline of rice camps has been relatively recent and can be attributed to several factors, improved transportation for one. When automobiles replaced teams of wagons, commuting to the rice lake on a

daily basis became possible, obviating the need to drag cooking gear and small children to the lakeside. Other factors have been the general break down of family activities, addiction to television, the fact that knocking rice is now almost exclusively a male activity, the abandonment of hand-finished wild rice in favor of immediate sale to commercial processors. Still, the vast majority of older Ojibway, many with considerable nostalgia, remember participating in wild rice camps as youths.

Although there is no mass exodus to the camps in the ricing area today, a spirit of excitement still develops as the community becomes aware that rice is ripening. One man claims that as the harvest approaches, his knocking sticks begin talking to him from his closet. Others check equipment, load boats and water jugs onto trucks, pack lunches, repair ricing poles and fashion sticks to replace those that are broken or missing. There may be a late summer community pow wow to enhance the generally festive air. In short, even without rice camps, early fall is a favorite time of year. Relatives come from the cities and Ojibway from other reservations attend the dances.

Still, according to those who remember, nothing today compares with the spirit prevailing when people harvested from camps. Traditionally, a wild rice camp consisted of extended families living in temporary wigwams. Since there was plenty to accomplish in knocking and processing rice, everyone in a household, including grandparents and an occasional aunt or uncle, took part. Each group returned yearly to the same site as long as the rice held out. A community typically selected its ricing area as close to the permanent villages as possible. To ensure sufficient harvest, many families had alternative campsites near the first. Not only were occupancy rights of campsites honored, but also sites were distributed to ensure access to good ricing for all. In some ways this attitude paralleled the traditional division of the sugar bush. Particularly bountiful lakes could sustain many family camps. When William Warren visited Prairie of the Rice Lake in 1820, its two square miles of water were filled with wild rice. By counting the wigwams, he

estimated 500 or more Ojibway camped there for the harvest. In times of want, particularly if the rice had failed, Ojibway with plentiful rice stands invited less fortunate residents of nearby reservations to take part in the harvest.

HARVEST MANAGEMENT AND CONTROL

The harvest was traditionally controlled by a designated rice chief who, together with his assistants or rice committee, maintained social order and regulated the number of outsiders permitted to share the harvest. Dispatching rice chiefs to inspect the crop before the arrival of campers was common. Further inspections were made if the ricers moved onto the campsite. The women covering wigwams might find a birch bark roll needing repair or lengthening, in which case they sewed additional strips of bark on its end. Kettles had to be washed out and scratched clean, damaged paddles repaired, old ones shined with a stone, lost ones replaced, knockers carved, boat leaks caulked, pails patched with pine pitch, the stamping pit dug and lined, and the firewood cut into blocks by women but split by men, and carried to a pile by children.

Tribes who harvested wild rice employed certain controls. The governing rule of the wild rice harvest is that what serves the rice is law; whatever harms the rice is illegal. The whole legal system of the rice camps was based on protecting the crop; its authority derived principally from public opinion. The entire band initially selected a rice chief and committee and through them expressed their common concerns, which ranked from contributions to a rice fund established to feed the poor and infirm, observance of proper thanksgiving rituals and attention to taboos, to serving out punishments such as confiscating the boats of trespassers. Traditionalists consider this system of harvest control as part of the "old," that is, correct way of doing things. Because a rice chief was chosen from among experienced elders, and was generally viewed as the best ricer, as evidenced by his family's capacity to harvest large amounts of wild rice and to finish it properly, he was rarely replaced. As the experienced "hunter," knowledgeable in all aspects

of wild rice plant habits, he knew best how to protect and divide the harvest fairly and to punish offenders of the public good. Such punishments were meted out impartially for the common good and were imposed regardless of the offender.

In 1946, a close relation of the medicine man John Nett Lake secretly harvested before the official wild rice season opening. As a result, his canoe and rice were confiscated and he was excluded from ricing for three weeks. At Mille Lacs Lake, the boats of such offenders were tipped over, dumping occupants, rice, and all into the water. Some canoes were even destroyed. Such controls were necessary because of the irregular ripening of the wild rice beds.

A rice chief's duties began in the late spring with the break up of ice on the lakes. He watched the crop in every stage, determining where the plant would come up and what areas could be harvested first. He observed all the signs of nature to predict the rate of maturation. One sign that the rice was ready was the changing color of leaves on young birch trees growing on ridges. Another was the ripening of chokecherries in the woods. Because the Ojibway associate wild rice harvesting with some aspects of traditional culture that are disappearing, its mention alone usually elicits pleasant memories of camp days.

Despite the hard work, the harvest was a period of social gatherings, joking and horseplay, storytelling, romance, exchange of news, and dancing. Camp activities also afforded children an opportunity to learn processing techniques, when a mother might make a tiny winnowing tray for her daughter to introduce her to the technology. Treading the rice also provided the opportunity for a girl to indicate her affection for a boy by bringing him beaded moccasins or asking him to hull rice for the family. Sometimes though, if a game were made of it, hullers using wooden tussles might get carried away with a dozen people pounding gleefully. Elders had to watch those young people because if they didn't, they might get nothing but powder. There was other entertainment, lacrosse games and canoe regattas in

which both boys and girls could compete. There was plenty of evening diversion as well once their families had retired for the night. Younger people usually went visiting other camps. Many camps would sponsor a *ikweniimiidiwin* or a women's dance, a traditional circle dance for couples that required reciprocal gift giving. At other times, the men would gamble, playing the box game.

Anything resembling the rice camp of the past is rare today. Some reasons for its decline have already been mentioned. As wild rice increasingly became a quick source of cash and more people took to the lakes to harvest what they could in a short time, stiff competition emerged. Most older Ojibway attribute the lack of rice camps today to this haste to earn profits. Despite these changes for practical reasons, the spirit of the harvest persists, and, on many reservations, people still rise with the sun, breakfast, gather in front of their houses to chat, load equipment into their cars, assign their small children to babysitters, and take part in a caravan and drive to the rice lake. Above all, people identify wild rice as a symbol of what it means to be Ojibway.

Although most Indian people are now settled in permanent frame houses, their communities sometimes resemble a rice camp at that time of year. There are always piles of green rice drying on a sheet or canvas in every yard, and, along side each house, some older women parching rice. Although the traditional camps have mostly disappeared, the Ojibway recognize ricing as a link to their past. Some Indians, especially urban dwellers who have spent little time on their home reservations, have taken up ricing later in life as a means of re-establishing their roots. One man ricing at Leech Lake in 1965 took his small son out on the lake just to show him how it was done. They spent all day harvesting only 20 pounds, all of which they kept.

RICE CULTIVATION

When the Ojibway first moved into the rice district in the late 17th century, they adopted rice into their subsistence economy as an important new food source. Contact with Europeans was sporadic and

Ojibway harvested almost exclusively for their own needs. But as the fur trade increased, Indians were gradually induced to produce surplus amounts of wild rice for use in barter. A period of sustained surplus harvesting lasted until the fur trade began its decline after the merger of the Hudson Bay and Northwest companies in 1821, shortly after which the reservation era began. With little market for wild rice and restrictions on access to former rice camps, the Ojibway entered occupations such as lumberjacking and guiding, and wild rice harvesting reverted more closely to its subsistence role. Although the product brought a modest amount of income in a new cash economy, the Ojibway never regained the market control they had during the fur trade. This period lasted roughly until whites began to perceive a new demand for wild rice by non-Indians.

Spurred by rapid development in mechanization and scientific research, they entered the market, first as brokers but ultimately as farmers, cultivating wild rice like any other crop. During the last three decades, like tobacco, soy beans, corn, and other Indian gifts, wild rice has become almost exclusively a non-Indian product with minimal involvement of the Ojibway or financial rewards for them. This development has rendered the traditional rice technology nearly obsolete. In this most recent period, wild rice, once the staple of Indian diets, entered modern American agronomy.

The Ojibway have always been aware that wild rice was an annual and that what they did not harvest would seed the rice fields for the following season. Their traditional belief, that if they were in harmony with the spirits, the crop always returned, helps to explain their fairly limited practice of transplanting rice. Most evidence suggests that rice is deliberately sown only to ensure some family an annual yield for its own needs. Like usufructuary privilege in the sugar bush, a sown field was recognized as a certain family's, where the exclusive right to harvest it was recognized. Traditionally, there was no selling for economic gain. For this reason, the non-Indian farming of wild rice and paddies has been viewed as a desecration, contrary to the laws of nature and

wishes of the supernaturals. Early white frustration at propagating wild rice was coupled with the general consternation about Indian "under-production" of this bounteous food. Non-Indians have continually pointed out how little rice the Ojibway harvested. This view was one facet of the land use argument of the European arrivals to the North American continent. Because the Indians were not using the land to its whole capacity, the Europeans wanted them to relinquish their rights to those who would make it more productive.

By continuing to harvest rice by hand, the Ojibway had at least retained a slender connection with the crop. Once the wild rice was successfully moved inland for farming on paddies, mechanical combines replaced Indian people as harvesters and the wild rice industry fell almost totally into white hands. To quote my friend George McGeshick, "now they're growing in Chinese style."

RICE ECONOMICS

Wild rice played its strongest role in a healthy Ojibway economy during the fur trade, when its supply, except for years of failure, was inexhaustible, its requirements by Europeans for subsistence ensured, and its harvesting, processing, and marketing exclusively in Indian hands.

Since the middle of the 19th century, the role of rice in the Indian economy has diminished drastically. Despite attempts to involve themselves in the new white-monopolized wild rice market, Indian people have generally been unable to compete. Where once they counted on their own surplus production as a source of income, they now view from the sidelines a white industry that, through overproduction, has glutted the market and depressed the general value of wild rice. In short, for most Ojibway, wild rice has reverted to its initial economic role as a subsistence item with small surplus amounts traded or sold to nearby non-Indians.

Despite the distractions of communal social life in the rice camps, each individual had been free to harvest as much or as little as desired. Thus, the

underproduction of wild rice by Indian people was a source of consternation to Europeans from the time they arrived in the rice district. Unable to appreciate the deeper meaning of manoomin in Ojibway life, they paid little attention to its ceremonial use and were oblivious to the role of wild rice in legends and regarded the rice camps as mere social diversions interfering with the harvest. They generally considered the lack of concentrated effort to gather every grain possible an indication of Indian indolence or stupidity. The situation was clearly ripe for Europeans to apply their rationale of land use justification to acquire an aquatic crop that many saw as having potential economic benefits, which were being wasted by the Indians. The Minnesota Department of Natural Resources once even criticized Indian harvest methods as inefficient because some of the rice was inadvertently knocked into the water and lost. The Ojibway, of course, saw this as good conservation needed for reseeding the lake.

THE FUTURE ROLE OF WILD RICE

What role can Ojibway expect wild rice to play in their future? In the 1960s, when paddy production became a reality and wild rice became big business, the small size and informality of Indian sales became so disadvantageous that many people stopped selling rice altogether. When public opinion was sampled about the possible introduction of paddy rice at Net Lake, one resident replied, "It will knock out the husband and wife who go out ricing." I take that statement to reflect as much a cultural as an economic concern. Government and industry control of water levels has, in nearly every instance, proven disastrous to the wild rice crop. Interference by the government with the Mississippi headwaters, traditionally a rich ricing area for the Piliger Band, shows just how vulnerable precious Indian land and subsistence resources are. Under the aegis of stream management, the U. S. Army Corp of Engineers undertook water control projects on confiscated Indian land for agricultural commercial development. Among their activities, beginning in the 1880s, were drainage efforts that destroyed rice beds to make room for farms or building sites and

widening and channeling the slowly moving currents in the streams and lakes feeding into the Mississippi. The dams meant to facilitate navigation when the Mississippi was low in the summer never really accomplished that goal but created reservoirs out of lakes and drowned the wild rice.

While the engineers became a destructive force in the wild rice habitat, other federal agencies sought to repair the environment. In the general spirit of cooperation during the depression era of the 1930s, some construction projects were initiated to improve the harvest in other ways, specifically through the creation of brand new rice camp sites on the White Earth reservation. There had been concern that the lack of sanitary facilities in the old rice camps caused sickness among many White Earth residents immediately following the ricing season. Consequently, sanitation was uppermost in the minds of the planners. The work on six projects provided Ojibway with Indian emergency conservation jobs. The forest supervisor radiantly proclaimed that the new camps "had the appearance of parkways." Each site was chosen in a heavy stand of timber, necessitating forest stand improvement, which resulted in the removal of all dead trees/bushes and other forest debris and 50 percent of the standing timber. One has to wonder where the campers were suppose to find firewood. A fire lane was made around each camp, streets 20 feet wide were installed every 100 feet across the ground, and, on one side of the street, lots were cleared off and numbered. At one end of each street two latrines were constructed in accordance with state regulations. Before and after photos were published showing the improvements. Their caption read: "A typical rice pickers camp of the old style without conveniences or provisions for health. Today the Indians can set up their teepees by the lake and still have pure water and health facilities thanks to IECW." Despite the federal government's best paternalistic intentions, one has to wonder about the social and cultural ramifications of such scientifically created Indian rice camps.

CONCLUSION

Because ricing is such a deeply rooted activity, most Ojibway build harvest time into their annual schedules as a matter of course. Many urban Indians return to their reservations for ricing, others leave regular jobs in nearby towns for the harvest, even though it can mean financial loss. It is not unusual during harvest to request time off from work or call in sick to get enough rice for the family table. Most who rice are culturally motivated. While 10 of 14 Leech Lakers interviewed in 1965 sold all their rice, 11 said that they would go ricing even if no money were to be made, and, in 1986, 21 of 22 Mole Lakers said the same. For cultural reasons alone, the Ojibway people will probably never give up ricing willingly. Norma Smith of Mole Lake, a community that continues to be threatened by Exxon, summed up her feelings as follows: "I often wonder what my children will do when the rice is gone forever. What will take its place when this last tradition is gone."

Thank you.

AUTHOR

Thomas Vennum
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MANOOMIN—A GIFT FROM THE CREATOR

Fred Ackley

The following is a summary of the remarks of Fred Ackley, using his own words whenever possible. Direct quotations are so indicated.

INTRODUCTION

Before I talk I want to offer tobacco (*asemaa*) to the Great Spirit for bringing us together to talk about the wild rice (*manoomin*) that is so important to me, and that the Creator put here for us to use. The Creator gave us food and nourishment in the form of the wild rice, it is God's food to the Indian people. I asked the Great Spirit to come into our hearts and minds this afternoon, and I talk to you today from my heart.

This week, when I was getting ready to give this presentation, I asked the older people to talk about the rice. They told me many, many stories of how rice used to grow on Bishop Lake, Pickerel Lake, in Pickerel Creek. The rice is gone there now. We have to protect what is left and the environment that sustains the rice. When manoomin and birch are gone and the water is polluted what do we have?

WILD RICE: ECOLOGICAL REQUIREMENTS AND THREATS

The environment is the most important part of sustaining the rice. I'm fortunate that Rice Lake, on my reservation, is still in good shape. It takes clean, clear water to make rice. There is a prophesy that soon people will come to us in this area and beg for water to drink. Clean water will become scarce. Indian people are not the only ones who need rice, the snails and the blackbirds and the ducks do too.

The biggest threat to my rice bed on Mole Lake comes from a proposed mine, one and a quarter miles upstream of the reservation. The mining companies have been trying to get this mine for a long time, first Exxon and now Rio Algom, a

Canadian company. The company is trying to say that it's an environmentally safe mine, but I fear what the mine would do to the rice.

The ore that the companies want to mine is made mostly of copper and zinc. Copper plus zinc makes brass, which is used to make shell casings. We don't need to make the armaments and instruments of war. There is also gold and silver in the ore. What good is that? You can't get nourishment from eating gold and silver. I tell you that what happens to the wild rice is happening to you and me. We're using up resources to further conflicts and destruction; that is wrong.

Rice is sensitive and it can be easily killed. In 1995, the rice crop on my reservation was lost. Many snails also died that year, and the blackbirds sang a different song that year in the fall. I remember the smell of decaying rice in July and it is a terrible smell. No one came to help us when we lost our national crop. No one offered us wild rice to eat in the winter, for our ceremonies. That was a bad winter for my family.

We signed treaties with the U. S. government, and the Supreme Court has reaffirmed our right to gather fish and rice and to work to protect these resources in the ceded territory. "I'm hoping that you will use your curiosity to seek more knowledge of what the Anishinabe people know about the resources and the manoomin; that's just one part of the whole circle we have as Indian people."

FAMILY AND SPIRITUAL SIGNIFICANCE OF WILD RICE

Rice comes from the Great Spirit. There are generations of Anishinabe here today because of manoomin. "We have to protect the rice and the resources we have left so that our people can . . . freely practice our religion, our way of life." Our

migration story focuses on wild rice—finding the place where food grows on water. Runners were sent from Madeline Island to find the rice beds. The runners came back and said that people are needed down near the border, near Sokaogon. This was in the 1700s. So we've been watching over the rice beds in that area for all those years.

In my life, wild rice sustained us when I was a boy and we had no money in my grandmother's house. Later in my life I spent many years in the city and my diet changed. Without the rice my body began deteriorating. Just as rice is good for young people, my mother told me that I should tell you how important rice is for the old people. It is good nourishment for old people who can't chew so well.

My grandfather taught me to make the things needed for the rice harvest, the push poles, the sticks, fanning baskets. One has to go to the woods to get the materials that you need to harvest the rice. That way it's all tied together. It takes everything in the forest and in that water to make the rice and the nourishment that it provides.

My other grandfather was a farmer in Antigo. He prayed for a good harvest when he planted his crops. He taught me to love the natural resources, to make a living, and have a good life here even though he was a non-Indian. My grandmother taught me the Indian ways; she prayed for the crops every day.

I'm teaching my grandchildren how to gather the rice. I hope that this will go on in my grandchildren and for the next seven generations. We're not rich in terms of money, in spite of the treaties we made with the white people. Where I am rich is in my heart and spirit and in my body because I know how to live on the land, and I eat the rice. That's why it's important to Indian people. "I want to thank all those who knocked rice when I was a little child."

We don't pray enough anymore. We need to teach young people to pray and use tobacco in the right way. Maybe the world will change and the resources will come back if we go back to prayer.

I can remember when some people would get greedy and harvest the rice before the rice chiefs said that it was time. They would come to the rice buyers first with big sacks of rice. They would say it was from a secret lake, but we knew differently. Bad things would happen to those people later in the year because they forgot that the rice comes from the Great Spirit.

"I watched those peoples' lives as I grew up—the ones that were greedy. And always something happened to them in their family, or during the year. Some kind of tragedy or bad luck. Because when they were doing that [taking the rice early] they always forgot that the rice is from the Great Spirit and there's laws put here for man on earth to obey and when they say it's time, that's the time. You break that time, you're breaking a covenant or an agreement you have with the Great Spirit."

HARVEST METHODS AND TECHNIQUES

Harvesting and processing wild rice is part of surviving on the land; my whole life I was taught how to survive on the land. I was taught how to harvest wild rice from an early age as a young boy. I was taught every step of the process. For example, never use elm in the parching fire, use birch, maple, oak, or cherry to roast rice. This was handed down from generation to generation and will be handed down to my grandchildren. I remember that when I was young we would go out to the rice camp. We would clean up, gather fire wood, and sleep under an old Army canvas. There were no conveniences, no "Off," no toilets.

As I mentioned, my grandfather taught me to make everything I need: push poles, sticks, fanning baskets. I still harvest and process the rice in the traditional way. It tastes the way it's supposed to that way. Waynaboozhoo taught us how to do it the right way.

"There's a song for everything in the 'rice business,' as I call it. When you dance it, there's a rhythm; when you fan it, there's a rhythm; when you roast it, there's a rhythm. All those things you have to learn.

and if you`ve got a song for every one, it makes the work go easy When you sing a song in the Indian way, you`re imitating the birds After it rains the birds eat and they sing and what our people believe and what I was taught is that the birds are singing to the Creator and thanking him. For they keep the faith to the Creator that he will provide for them. And that`s what it`s all about, this wild rice and Indian people—we pray to the Creator that he will provide for us. And when we get provided for and the food comes to us, we`re supposed to pay him back by praising and prayer and the songs. That`s the way it is.”

Manoomin is our gift from the Creator. Even after this speech, I will go on talking to people about the rice and how precious it is to me and my people.

Megwitch.

AUTHOR

Fred Ackley
Sokaogon Chippewa Community
Mole Lake Band

RESEARCH AND THE CONSERVATION OF WILD RICE

P. F. Lee

INTRODUCTION

It is certainly an honor to be a part of this conference. However, when I was first asked to make this address, I had some reservations. Researchers are trained to be objective and not emotionally involved in their research topic. Therein lies the problem. It has been 25 years since I first worked on wild rice and when I look back over that time period and remember the people and events involved, I realize that my work had as much to do with the industry I served as the science I practiced. On reflection, however, I do not regret this fact. I believed then, and believe today, that wild rice, the only cereal native to North America, long an integral part of the history and culture of the First Nations of North America, has the greatest physiological potential and ecological tolerance of any grain in existence. One day it will take its rightful place as one of the world's most important food crops.

Today I have decided to talk to you not only about research on various topics of wild rice but also about the underlying purpose for this research and how ultimately we must use these skills to ensure that none of the natural secrets of this plant and its relationship to the environment will ever be lost.

EXPANSION OF LAKE PRODUCTION

Prior to 1970, the wild rice industry was based on the harvest of natural stands of wild rice. At this time, the market was shared by Minnesota, Ontario, and Manitoba, each with approximately a 50%, 20%, and 20% share, respectively, of the market. The main problem of the industry was its fluctuating supply, which was directly related to water levels. For example, in Ontario, under low water level conditions, harvests of 1,500,000 lbs could be followed the next year by harvests of less than 10,000 lbs if the water levels on the major producing lakes increased. In this situation, the

industry was highly competitive (and highly secretive) with the wonderful problem of having the demand for wild rice exceed the supply. It was soon recognized that if the industry was to expand, a more stable supply of wild rice was required. Two very different approaches were taken.

In Minnesota, paddy culture of wild rice was introduced. Wild rice was grown on flooded fields that could be drained and harvested with modified white rice combines. Development of non-shattering varieties and cultivation practices to increase yields soon established paddies as the leading method of production.

In northwestern Ontario, and later in the rest of Canada, it was investigated whether or not stands could be established in lakes not presently containing wild rice. The reason for this approach versus the American paddy strategy was simple—Canada has millions of lakes located in regions that are sparsely populated. Suitable lakes could be developed exclusively for wild rice because there were few resource conflicts typical of more populated regions in the United States. This was my initial job—to determine if there really were suitable lakes for the commercial expansion of wild rice. Results were very encouraging and it soon became apparent that there was a huge potential throughout much of Canada to establish new wild rice stands. Entrepreneurs soon realized the economic opportunity and leased suitable lakes from the Crown for seeding and harvesting purposes.

Initial management of wild rice lakes was somewhat limited. The major advancement was the development of mechanical harvesters. Most are airboats and use what are known as "speed heads," large tray-like devices mounted on the front of the boat, to harvest the grain. The front of the speed head strikes the wild rice plant just below its panicle and the ripe grains fall into the tray. Since the grains

ripen unevenly on the panicles, several passes are needed each year to gather the crop. The second mainstay of lake management was water level control. Blasting of beaver dams, channelization of outlets, and the addition of various water level control structures were common strategies to try and eliminate fluctuations in yields caused by increases in water depths.

LAKE RESEARCH PRIORITIES

It was soon recognized that management techniques had to be developed to further improve yields for lake wild rice. Basic research was directed at three main avenues: 1) site identification and enhancement, 2) water depth effects, and 3) seed selection. The procedure was similar for all research topics. Initial hypotheses were tested under controlled greenhouse or "cultivation raft" conditions and then further tested under field conditions. For many of the research topics, results were encouraging.

We had particularly good success at improving the accuracy of selecting potential wild rice lakes. We developed specialized protocols for analyzing lake sediments while they were still wet, implemented a sediment classification system, and isolated the parameters most important in sediments in limiting wild rice production. Generally, best production occurred in sediments with 30 to 50% organic content and high phosphorus and nitrogen concentrations. Production was limited in mineral soils and even further reduced in highly flocculent soils that were characterized by extremely low bulk densities.

Enhancement of potential wild rice areas was directed at the feasibility of adapting the common agronomy strategies of using fertilizers to increase yields and herbicides to limit plant competition. Slow release fertilizers were particularly effective, increasing yields by up to a factor of 20. Weed control of many emergent perennials was readily achieved using a "brush on" applicator that added high concentrations to the target species but overall low amounts to the environment. However,

enhancement techniques such as these, although effective, were later abandoned as lake wild rice became further identified as an "organic" product.

Our water depth research was concerned with how much of an increase could be tolerated at each phenological stage of development. Surprising results occurred in this regard because it was found that depth toleration was dependent on the fertility of the growing medium—that is, the more fertile the sediment, the greater the tolerance for depth increases.

Our most promising findings were involved with seed selections for wild rice that improved yields, decreased the time to maturity, and increased depth tolerance. These results were particularly significant because they provided us with a management technique that was non-intrusive; that is, we could fit the wild rice plant to the environment, not modify the environment for wild rice. We conducted exploratory surveys of wild rice populations across North America. Noted findings included depth tolerant populations from Manitoba, early maturity populations from the extreme northern regions of northwestern Ontario, isolated populations of *Zizania aquatica* L. (versus the common *Zizania palustris*) in southern Ontario, and a perennial variety of wild rice in north central and western Florida.

MARKET DIFFERENTIATION OF LAKE WILD RICE

Although research showed that wild rice yields could be increased in lakes, the lag period to full commercialization could not compete with the increases in wild rice yields in paddies or their expansion into new cultivation areas. Notably, in the early 1980s, wild rice was introduced into California on paddies formerly used for white rice production. By 1990, the world market share of lake-produced wild rice had fallen to less than 10%. Minnesota paddies produced 40% and California had become the world leader with 50%. Price per pound had also fallen from an average of \$1.00 to \$1.25 in the early 1970s to only \$0.50. In order to survive in the

marketplace, lake producers adopted strategies designed to distinguish their product from paddy-produced wild rice. These strategies included labeling practices that identify rice as lake-produced, organic certification, and grading. In North America, the effectiveness of these options relies on the awareness (and concern) of the consumer. In Europe, such practices perhaps have more impact where both labeling and organic certification is often a requirement for many distributors and lake wild rice seems to have found a niche in that venue.

Grading of wild rice has never been adopted but was proposed by a variety of groups for many years. In Canada, a lake grading system was seriously considered in the early 1990s. The proposed grades were based on uniformity of color, size, moisture, and percent broken kernels. Paddy-produced wild rice would always receive a lower grade under this system. I developed a grading apparatus using image analysis that could automatically and accurately measure length, width, and color, and these measurements were used for the division into grades. Unfortunately, a lack of consensus among industry stakeholders could not be reached on the definition of grades, and the process was abandoned.

Quality control and quality assurance have more recently become an issue in the lake wild rice industry. Increasingly, large buyers wish to have a guaranty of a uniform product. In this regard, we conducted research on parching and curing. Relatively simple findings had a pronounced effect. For example, parching of the grain (essentially the glutinization of the grain) was an art that relied solely on the experience of the operator as to when the green rice was cooked. Utilizing a series of probes, we correlated moisture content in the rice during parching to the parcher temperature and were able to define a very precise temperature when the desired moisture level was reached. Utilization of infra red temperature "guns" are now routinely used to ensure the rice is not overcooked. The curing process (darkening of the grain prior to parching) is also largely dependent on the experience of the

operator. We have been involved in various techniques that quantify the loss of chlorophyll from the seed as it ripens, but commercialization of the process has not occurred.

FUTURE DIRECTIONS

The future direction of the lake wild rice industry seems unclear. Essentially, it has the choice of continuing its present direction of creating a sophisticated market for a superior product (in the same fashion as the wine industry), trying to retain or increase its market share by implementing production improvements, or a combination of both. Clearly, the lake industry is in a difficult situation. Market forces may make its production contribution increasingly insignificant, and production research to increase lake wild rice yields is all but negligible. At the same time, paddy production research continues at an increasing rate. This is a critical time for the industry and for wild rice in general. Although curiosity-driven research still continues on natural wild rice stands, the level of research funding for such projects is limited and the virtual treasure chest of ecological relationships found in these stands may never be uncovered.

NEED FOR CONSERVATION

Regardless of the direction of the lake (and the paddy) industry, there exists an immense opportunity for the advancement of the wild rice industry from the study of the natural stands of wild rice. It is critical that these stands be protected from development pressures and human interference. No other grain in the world has the luxury of virtually an infinite data base of genetic and environmental information that can be used for future crop enhancements. The point here is that entire stands must be preserved, not just the seed from the stands. Time and again I have been surprised and humbled by the unseen order that exists in these wild rice stands. I will cite a few examples.

While examining wild rice in Florida, it became strikingly obvious that both an annual and a perennial variety existed. When I brought some of

the seed back to my laboratory, I was further startled to learn that they did not exhibit a normal afterripening period of three months of cold treatment and instead could germinate immediately. I was further impressed by the ability of both these varieties to survive in mineral soils.

Wild rice is known not to compete well with perennial aquatic plants. However, when examining an isolated wild rice stand, I noted that one species, *Potamogeton robbinsii*, dramatically enhanced the production of wild rice, causing dry weight increases up to 40 times more than from areas not colonized with this associated plant.

Saskatchewan is one area that has successfully introduced wild rice as a commercial crop even though it was never found there naturally. A major problem in these newly created stands is that large floating mats of wild rice straw are formed that disrupt the growth of wild rice seedlings the next spring. In natural wild rice stands in Ontario and Manitoba, these mats are not a problem. It might be that decomposers such as snails normally resident in the natural stands of Ontario and Manitoba are not present in Saskatchewan. In this case, the seed was moved, but the overall ecological relationships were not.

Even overlooked and seemingly insignificant relationships could be important to the overall well-being of a wild rice ecosystem. We recently developed a wild rice bioassay that is used to assess the toxicity of various added substances to wild rice. In one such experiment, we added acetate as the associated anion of our target substance. Fungi immediately appeared in our culture solution using the acetate as an organic source. The wild rice seedlings died from this fungal growth, and the fungi further multiplied on the exposed endosperm of the wild rice seed. The lesson in this case is that the fungi is apparently always present and any additions of organic contaminants to the water body in which wild rice is growing could have severe implications.

WILD RICE FOREVER!

In closing, I would like to again emphasize the absolute critical need to conserve and preserve the natural wild rice stands of North America. These stands have evolved over millenniums and likely millenniums more will be required to fully understand their ecological relationships. We will not know the final story, but let us at least ensure that this story will one day be told. Thank you.

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