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RESEARCH ARTICLE/RECHERCHE

Factors Influencing Use of Traditional Foods Among the Nuxalk People¹

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Abstract/Résumé

Understanding the traditional food systems of native Canadians and factors influencing the use of traditional cultural foods is essential for planning effective nutrition promotion programs with them. This article describes patterns of food use and factors influencing the traditional food system of the Nuxalk People of Bella Coola, British Columbia. The most frequently used fresh and processed foods are identified, and declining use of most traditional foods since 1910 is shown. Differential use of seafoods among three generations of Nuxalk women is defined, and the effects of availability, taste appreciation and harvest time on traditional animal and plant food use, identified. Of 70 food species in the traditional food system, 23 are still used by 90% of families. Current food use frequency correlates most highly with availability for seafoods, and with taste for plant foods. Frequency of use, environmental availability and taste appreciation of traditional native food resources are factors to be considered in planning community nutrition promotion programs with native people. (*J. Can. Diet. Assoc.* 50:102-106, 1989).

La compréhension des systèmes d'alimentation traditionnelle des Canadiens autochtones et des facteurs qui influencent l'usage des aliments traditionnels est essentielle à la planification de programmes efficaces de promotion de la nutrition au sein de ces collectivités. Le présent article décrit les modèles d'alimentation et les facteurs qui entrent en jeu dans l'alimentation traditionnelle des Nuxalks de Bella Coola, Colombie-Britannique. L'auteure présente les aliments frais et transformés les plus fréquemment consommés et fait état de l'usage décroissant de la plupart des aliments depuis 1910. Les différences dans l'usage des fruits de mer chez trois générations de femmes nuxalks sont définies ainsi que les effets de la disponibilité, de la saveur et du temps de récolte sur l'usage traditionnel des aliments d'origine animale et végétale. Parmi les 70 types d'aliments du système traditionnel, 23 sont encore consommés par 90 % des familles. La fréquence de consommation actuelle est en forte corrélation avec la disponibilité des fruits de mer et avec la saveur des aliments d'origine végétale. La fréquence de consommation, la disponibilité dans l'environnement et la saveur des ressources alimentaires traditionnelles sont donc des facteurs à considérer dans la planification de programmes communautaires de promotion de la nutrition chez les autochtones. (*Rev. Assoc. can. diét.* 50:102-106, 1989).

Introduction

The study and understanding of traditional food

systems of indigenous peoples using techniques of the nutrition sciences, anthropology and ecology provide insights to community nutrition. Such research can give the community at large new knowledge of useful foods for rural people where these foods are prevalent, provides an information base for the development of new food products for modern food markets and contributes to educational programs in environment education and wilderness survival. For native people themselves, the scientific study and promotion of their foods — especially when high nutritive values are realized — can boost a lagging cultural morale and improve nutritional status. Historically, native people were known for their resourcefulness and their ability to develop a high standard of culture with local resources. Health promotion programs to improve health status among native groups are more likely to find success when they incorporate native cultural views on diet and nutrition. Most native groups are vocal in their defense of the benefits of a food system dependent in whole or in part on the local home environment and culture (1-3).

The Nuxalk Nation, comprised of approximately 800 people, is located in and around the community of Bella Coola, a rural area on the central west coast of British Columbia. The native community live primarily on the Indian reserve lands among the total valley population of 2500. For the native community, unemployment rates are high (over 30%) and the formal education of children rarely exceeds the ninth grade. Seasonal employment is mainly fishing and logging. The Nuxalk Food and Nutrition Program was initiated by the author as a health promotion effort in 1980, with the primary objective to enhance nutritional health status and lifestyle habits while emphasizing the cultural and nutrition benefits of the traditional Nuxalk food system (4-8).

Nuxalk foods show some remarkable properties in

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foods which are virtually unknown in North American markets. The roots of wild clover (*Trifolium wormskioldii*), cinquefoil (*Potentilla pacifica*), and riceroor (*Fritillaria camtschaticensis*) are rich in energy, fibre and minerals (9-11). Fat rendered from the oil-rich ooligan (*Thaleichthys pacificus*), which is ripened to develop flavour characteristics, is exceptionally rich in retinol and tocopherol (12). Berries and green vegetables, particularly the cow parsnip (*Heracleum lanatum*), shown to be highly appreciated foods in the community, are rich sources of minerals and vitamins (1, 13). The nutritional properties of fish processed by native techniques and other Nuxalk foods also have been studied.

Knowledge of culture within Indian groups is usually imparted from the elders of the group. This research report was generated from an intensive study of the local food system described by the elders of the Nuxalk Nation, a group selected to be representative in environment and general development of West Coast Indians in Canada. The intent of this report is to define in detail three important factors influencing the contribution of traditional native foods to native diets: taste, availability and harvest time. More general factors contributing to traditional food use also are mentioned.

Methods

An interview study to define factors influencing use of specific traditional food species used by the Nuxalk people was completed in 1982. Sixty-one women of Nuxalk parentage who were heads of households and who represented the 125 homes on the Nuxalk reserve were interviewed. These women represented three generations of adult Nuxalk women, and are referred to as "grandmothers" (birthdates 1904 to 1930), "mothers" (birthdates 1931 to 1950), and "daughters" (birthdates 1951 to 1963). There were 20 "grandmothers," 21 "mothers," and 20 "daughters" interviewed. The interviews, conducted by two Nuxalk women trained in consistent interviewing techniques, were carried out in the homes of the interviewees. Questions centered on 70 food species used in Nuxalk tradition (prior to European contact), which were defined in a series of eight taped interviews with a group of Nuxalk elders in 1980-1981. These 70 food species were categorized as: fish (13 species), shellfish (seven species), game (six species), berries (22 species), roots and greens (17 species), tea and tree foods (five species). Four-point frequency scales were used to identify the extent of family use of fresh or preserved foods. For each woman, this was asked for the present time and for two decades identified by each woman to represent her mid-childhood and early married life. Also, during the interviews, a five-point scale for composite hedonic taste appreciation was used to elicit a general score for each food species. These scales are described in detail in Kuhnlein (in press) (14).

All interviewing procedures were approved by the committee of human subject ethics at the University of British Columbia.

Scores of food use, taste appreciation, food availability and harvest time were treated with both parametric and

non-parametric statistics using SPSS-X. Multiple regression analysis was also conducted using interview data from the 61 women for scores on fresh and preserved food use and taste perception for each of the 70 food species. Food availability scores for each species and harvest times for 42 plant species were defined as previously reported (15).

Results and Discussion

The most commonly used foods in the Nuxalk traditional food system were defined as now being used by at least 55 of the 61 Nuxalk women (Table 1). Seafoods, game and berries predominate. The salmon species (*Onchorinchus*) and ooligans (*Thaleichthys pacificus*) are abundant in the Bella Coola river, which bisects that reserve, and berries in the local forests are favourite, though labour-intensive, summer foods. Complete scientific notation for each food has been reported (6).

Food use data were analyzed by food group by decade between 1920 and 1980 and are presented in Figure 1 and Figure 2. For both figures: 4 = \geq once/week; 3 = \leq once per week but \geq twice per month; 2 = \leq once/month; 1 = not used. Mean family use frequency of fresh river fish (salmon, trout, ooligans) has been maintained, whereas the use of preserved fish has fallen during recent years. The use of fresh and preserved seafoods in other categories and game has fallen off since about the 1950s. In contrast, plant foods represented in the categories and game has fallen off since about the 1950s. In contrast, plant foods represented in the categories of berries, greens and roots have fallen into much less frequent use. Greens and roots were not frequently preserved during any decade, although the eldest women remarked that their mothers previously used root cellars for storing boxes of roots and for drying certain greens. The only traditional Nuxalk green vegetable used often today is dried seaweed (*Porphyra perforata*), a food imported from the outer coastal regions.

Family food use of each food group can be estimated by multiplying the frequency times the number of species under consideration. At the current time, seven species of river fish are each consumed fresh one to three times per month (us to 21 family servings per month). Twenty-two different species of berries are each consumed less than once per month, but in the summer season, this amounts to a considerable quantity of fruit. Although the

Table 1 23 most commonly used Nuxalk foods¹

Seafoods	Game	Plant foods
Chum salmon	Moose	Wild strawberries
Coho salmon	Deer	Wild raspberries
Sockeye salmon	Duck	Blackcaps
Spring salmon		Thimbleberries
Steelhead trout		Salmonberries
Snapper		Soapberries
Ooligans		Grey blueberries
Crab		Red huckleberries
Clams		Thimbleberry shoots
Herring roe		

¹Foods reported by at least 55 of 61 women in 1983 from a list of 70 Nuxalk traditional food species.

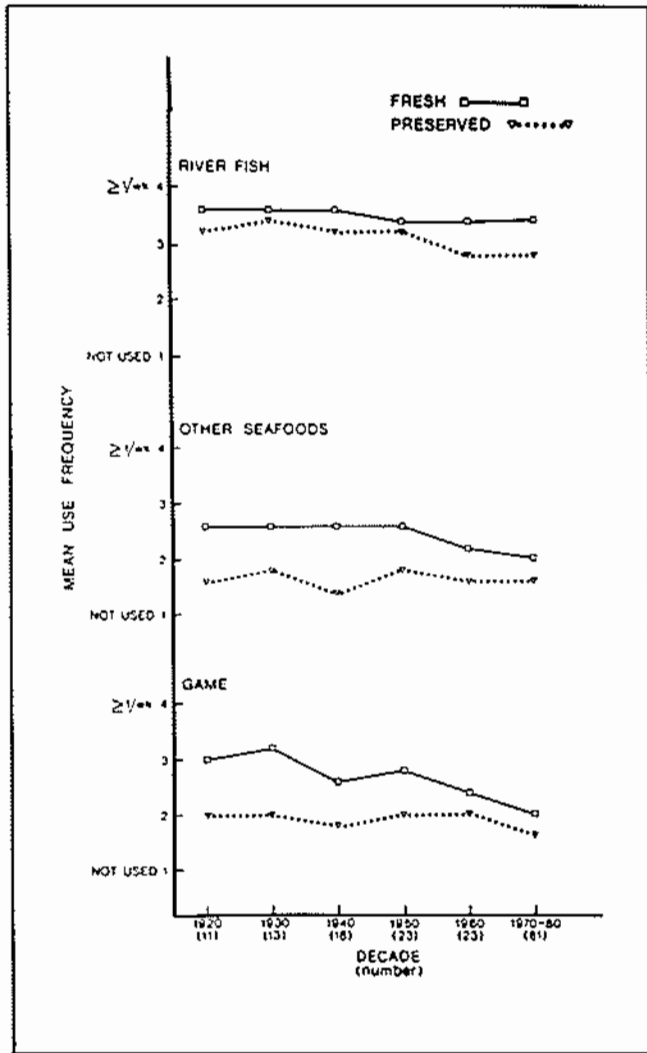


Figure 1. Mean frequency of family use of fresh and preserved river fish, other seafoods and game from the 1920s to the present. Numbers beneath the decade represent the number of women who recalled food use in this period. Means were computed for eight river fish, 12 other seafoods and six game foods.

consumption of traditional foods has declined during this century, the total consumption of Nuxalk traditional food is still considerable for Nuxalk families. The average daily consumption in grams of total fish, meat and fruit reported in two 24-hour recalls for each woman during September and October is given in Table 2, along with the percentage of energy for carbohydrate, protein and fat. Marketed meats and fruits formed part of the total meat and fruit consumed; but, all fish was harvested on the reserve.

Taste appreciation scores of 20 seafoods in three groups of frequency, and used by the three generations of Nuxalk women are shown in Figure 3. Taste scores by "mothers" were significantly higher than taste scores by "grandmothers" for seafoods in group A, the foods used most often. However, of the three groups of seafoods, "daughters" also appreciated these foods most highly. The "grandmothers" were most moderate in their taste appreciation across all three seafood groups, whereas the "mothers" and "daughters" had polarized taste preferences for these seafoods. The seafoods in group B were liked equally well by all three groups of women. The foods used least often (group C) were scored significantly

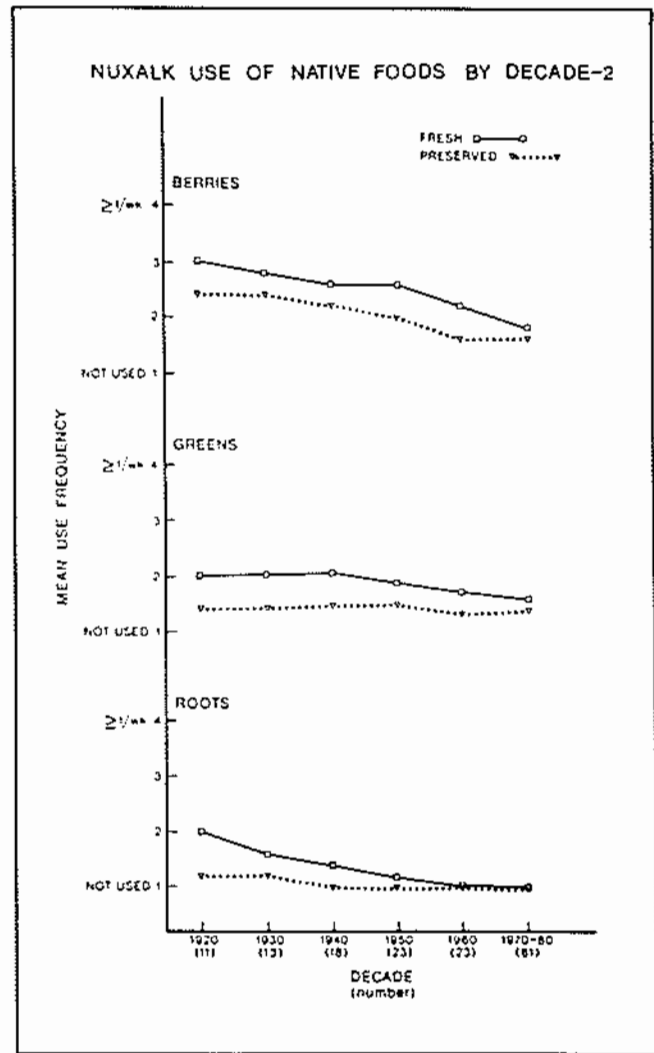


Figure 2. Mean frequency of family use of fresh and preserved berries, greens and roots from the 1920s to the present. Numbers beneath the decade represent the number of women who recalled food use in this period. Means were computed for 22 berries, nine greens and six roots.

lower by "daughters" than by "grandmothers" or "mothers." The seafoods in group C would probably not be popular candidates for enhanced traditional food use by younger families. Such information is important when decisions are being made about which seafood items to promote in educational activities.

The significance of the factors of taste appreciation, availability and the harvest time in determining the extent of use of the Nuxalk foods was further explored with correlations and multiple regression analysis (Tables 3 and 4). In Table 3, use and taste from specific food groups were correlated. Taste and use for seafoods ($n = 20$ species) and berries ($n = 22$ species) were correlated highly and significantly for both fresh and preserved products. In contrast, use and taste appreciation was not significantly correlated for greens ($n = 12$ species) (not shown). Also shown is that for the collective data set of all fish and game ($n = 26$ species), both parametric and non-parametric statistical treatments demonstrated that availability is a stronger correlate of use than taste. When all plants were considered together ($n = 42$ species), taste appreciation and harvest time correlated significantly, but availability did not.

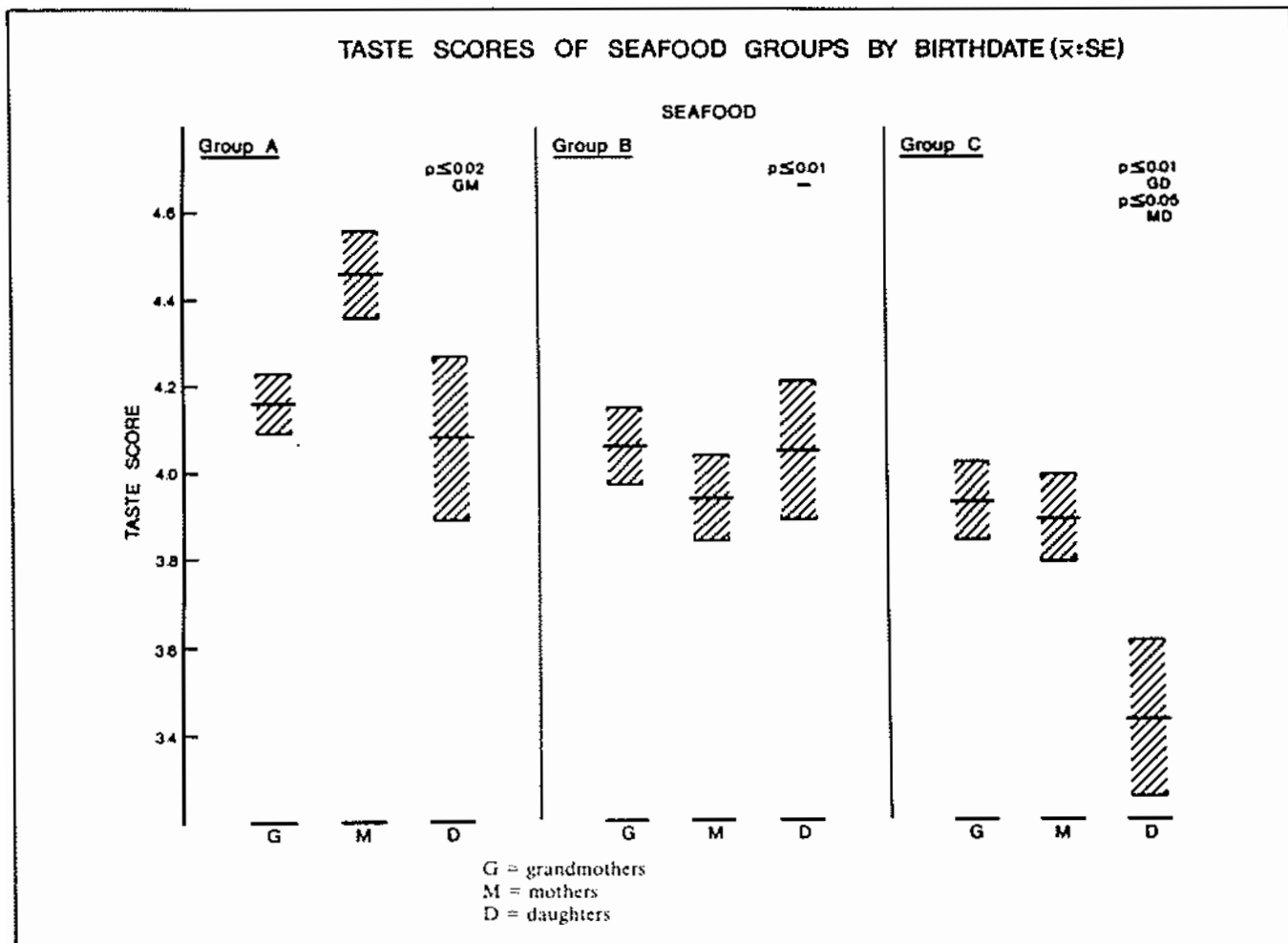


Figure 3. 20 seafoods grouped according to use in the following categories:

- A. Sockeye, Spring, Coho, Ooligans, Clams. More than 90% of all women used the food both fresh and preserved.
- B. Steelhead, Chum, Trout, Crab. More than 80% of all women used the food fresh. 80% used them preserved. Use by mothers and daughters was less than that of grandmothers.
- C. Pink, Rock Cod, Red Cod, Ling Cod, Herring, Flounder, Mussels, Seal, Abalone, Sea Cucumber, Sea Urchin. Less than 80% of all women used the food either fresh or preserved. Use by mothers and daughters was less than that of grandmothers.

Multiple regression analysis (Table 4) demonstrated that for all fish and game ($n = 26$) and for the subset of seafoods ($n = 20$), availability of the foods was the greater significant predictor of use, followed by taste. For all plants ($n = 42$) and for the subset berries ($n = 22$), taste appreciation was predictive at a low but significant level. Harvest time was also significantly predictive for the group of 42 plants. Thus, general availability, harvest time and taste are interacting forces that contribute to

traditional food choice and use, and vary in importance with food items.

Table 2 Weights in food categories and % of total dietary energy as carbohydrate, protein and fat in autumn diet records of Nuxalk women

Age yrs.	n	Fish ¹	Meat	Fruit	Carbo- hydrate	Protein	Fat
		g	g	g	%	%	%
20-40	31	62	70	157	41.2	17.3	42.4
40-60	21	64	79	96	36.6	19.2	45.1
> 60	12	94	84	125	37.2	21.6	41.3
Total	64	69	76	131	38.5	18.3	43.4

¹Total daily means for traditional and marketed foods. All fish was harvested on the reserve but meat is combined game and marketed meats and fruit is combined traditional berries and marketed fruits.

Table 3 Correlations on food use

Food groups Variable	Pearson's		Kendall's	
	r	p	tau	p
A. Correlations: use frequency vs taste				
Seafoods (n=20)				
Fresh	.51	.008	.38	.007
Preserved	.51	.008	.38	.016
Berries (n=22)				
Fresh	.72	.000	.51	.000
Preserved	.65	.000	.49	.001
Greens (n=12)				
Fresh	.17	.293	.27	.116
B. Correlations: use frequency vs availability, taste and harvest time				
Fish, Game (fresh) (n=26)				
Availability	.32	.000	.31	.000
Taste	.19	.000	.17	.000
All plants (fresh) (n=42)				
Taste	.20	.000	.18	.004
Harvest time	.10	.008	.09	.004
Availability	-.06	.005	-.06	.016

During the interviews with Nuxalk women, several factors that contributed to change in the use of the Nuxalk traditional food system were revealed:

- legislation restricting traditional food resources use
- demographic changes
- availability of new foods: gardening, marketed foods
- interacting acceptability of native and new foods - as guided by education, social contact, media
- employment - concerns for time, money, and personal energy
- interruption of knowledge transfer to younger generations.

As well as contributing appreciably to the variables of availability, taste appreciation and harvest time, these factors are significant change determinants in themselves, but are difficult to quantitate. They are mentioned here, but are discussed more fully elsewhere (15-17).

Summary

Many factors have contributed to the patterns of use of foods in the Nuxalk traditional food systems. Use of seafoods, particularly the fish available in the Bella Coola River on the Nuxalk reserve, has been retained to a greater extent than that of game, other seafoods or plant foods. Availability and taste appreciation have been significant variables influencing use of traditional animal and seafoods. Taste appreciation is the most significant variable tested that influenced the use of traditional berries and other plant foods. The older generations of women have significantly greater taste appreciation scores for seafoods than do the youngest generation, indicative of other foods becoming more important to the younger group.

In considering programs for nutrition education and health promotion with native Canadians, traditional cultural values and traditional food choices must be realized as significant influences on dietary choices. However, generational differences in taste appreciation and availability in the local environment are important influences on use of these foods, and such factors also must be considered.

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Table 4 Multiple regression: Determination of frequency of food use by variables: taste, availability, harvest time scores

Food set variable (Fresh foods)	R ²	Predictive value	
		Beta	t
All fish, game (n=26)	.123		
Availability		.297	.000 ¹
Taste		.178	.000 ¹
Seafoods (n=20)	.192		
Availability		.395	.000 ¹
Taste		.185	.000 ¹
All plants (n=42)	.045		
Taste		.205	.000 ¹
Harvest time		.129	.002 ¹
Availability		-.045	.278
Berries (n=22)	.092		
Taste		.309	.000 ¹
Availability		-.031	.648
Harvest time		.051	.461

¹Highly significant, *p* < .005

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