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## Native American foods: History, culture, and influence on modern diets

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## ABSTRACT

Approximately 12,000–15,000 years ago people from northeast Asia crossed the Bering Land Bridge to enter and inhabit North America beginning in Alaska but rapidly spreading throughout North and South American and the Caribbean islands. These people rapidly adapted to the available food sources and soon developed new foods. It is estimated that about 60% of the current world food supply originated in North America. When Europeans arrived, the Native Americans had already developed new varieties of corn, beans, and squashes and had an abundant supply of nutritious food. The foods of the Native Americans are widely consumed and their culinary skills still enrich the diets of nearly all people of the world today. This article provides only a small sampling of the rich and highly varied Native American food culture that has been passed down to modern civilization.

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## 1. Introduction

When Christopher Columbus first sailed into the Bahama archipelago he believed that he had reached Asia—thus the name Indian for the Native Americans. However, it soon became clear that he had entered a New World previously unknown to Europeans with unfamiliar new people, flora, and fauna. Probably the greatest impact on *Old World* culture was the rapid introduction of New World ornamental and food plants. Soon orchids from the tropical rainforests of Central and South America were highly sought after additions to the greenhouse collections of wealthy Europeans. Christopher Columbus had sailed to the Caribbean region in search of a route for obtaining spices [1]. However, what he found was not the cinnamon and cloves he sought, but Jamaican allspice [2,3], the dried unripe berries of *Pimenta dulce*, and chili and other peppers of the genus *Capsicum*. It was not long until the new foods from the Americas were introduced around the world and corn, potatoes, new varieties of beans and squashes, peppers and tomatoes, and many other foods were rapidly accepted into the cuisines of the entire world (Table 1) [2–16]. Now, approximately 60% of the food

consumed worldwide originated from the New World [17]. However, the introduction of food from Europe and Asia also changed the diets of the Native American people. Today, few if any of the descendants of the early Native American tribes eat diets that closely resemble those of their ancestors, although many indigenous foods are still eaten and Native American foods have been incorporated into the cuisines of almost the entire world. Here we describe the diets and dietary culture of the indigenous North American inhabitants, and discuss the nutritional quality of those diets and the contributions they make to the diets of all people.

## 2. The origins of Native Americans and their food

It is commonly believed that the first Native Americans crossed from the Old World into the New World across the Bering Land Bridge that joined Siberia to Alaska at least 15,000 years ago [18], but disappeared shortly thereafter. Although the passage of time renders it impossible to know for certain how, when, or why the Asian ancestors of the Native Americans first appeared in North America, it seems apparent that they either brought no animal or plant foods with them, or that none survived. By the time Christopher Columbus first entered the New World, the Native Americans were relying on foods that were indigenous to the region, although many had been improved by hybridization or selection.

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**Table 1**  
Common foods that Originated in the Americas.\*

Name of food [Ref.]	Region of origin	How prepared	Major nutrients provided
<b>Vegetables</b>			
Casava [1]	Brazil	Cooked vegetable or bread	Carbohydrate
Chili & bell peppers	Central America	Cooked, raw, or seasoning	Vitamin C, flavonoids
Jerusalem Artichoke	North America	Raw or cooked	Probiotic fiber, minerals, B vitamins
Lima Beans	South America	Cooked	Protein, B vitamins, minerals
Pole Beans: black turtle, pinto, navy, kidney, & cranberry beans	Probably originated in South America but possibly North & South America	Cooked & used in breads	Protein, minerals, B vitamins, fiber
Potatoes [6]	Peru	Cooked & baked	Carbohydrate, potassium
Pumpkin	North America	Cooked	Vitamins A & C
Squash varieties	North America	Cooked	Variable
Sweet Potatoes [7]	South & Central America	Cooked	Vitamin A, folate, minerals
Tomatoes	South & Central America	Raw & cooked	Vitamins A, C, K, potassium, lycopene
<b>Fruits</b>			
Avocado [8]	Mexico	Raw & sauces	Essential fats, B vitamins & A, E, K, & potassium
Black raspberry	North America	Raw, cooked, juice	Vitamin C, anthocyanins, ellagic acid, manganese
Blueberry	North America	Raw, cooked	Vitamins C & K, manganese, anthocyanins
Cacao, chocolate	Central America & Mexico	Prepared as chocolate	B vitamins, minerals, polyphenols
Cranberry	Northern North America	Cooked, medicinal herb	Vitamins A, E, & K
Guava	Mexico to Northern South America	Raw, cooked, juice	Very high in Vitamin C, & lycopene
Papaya	Mexico to South America	Raw, cooked	Vitamins A, E, & K, potassium, lycopene
Pineapple	South America	Raw, cooked	Vitamin C, folate
Strawberry [9]	Eastern North America	Raw	Vitamin C, fiber, minerals
<b>Grains</b>			
Amaranth [10]	Mexico	Baked breads & cooked	B vitamins, protein, minerals
Corn [11]	Mexico, Central America	Cooked as vegetable & grain, baked & fried grain breads	Protein, B vitamins, fiber, magnesium, potassium
Quinoa	South America, Andes	Cooked cereal	Protein, B vitamins, fiber, minerals
Wild Rice [12]	North America	Cooked cereal	Protein, B vitamins, minerals
<b>Nuts &amp; seeds</b>			
Black Walnut	Eastern North America	Raw, cooked, medicinal extracts	Protein, B vitamins, fiber, minerals, essential fatty acids [13]
Cashew	Brazil	Eaten semi-raw or cooked	Protein, minerals, B vitamins,
Peanut	Argentina	Raw, cooked, roasted	Protein, B vitamins, fatty acids, vitamin E, minerals
Pecan [14]	Southern USA, Mexico	Raw, cooked, baked	Protein, fatty acids, B & E vitamins, minerals
Sunflower	North (most species) & South America	Raw, cooked, roasted	Fatty acids, protein, B & E vitamins, minerals
<b>Meats</b>			
Bison (Buffalo)	North America	Cooked	Protein, B vitamins, iron
Turkey	North America	Cooked	Protein, B vitamins, minerals
<b>Sugar &amp; spices</b>			
Allspice	Caribbean, Mexico, Central America	Seasoning	
Maple Syrup	Northeastern USA	Sweetener	Sugar, minerals
Vanilla	Mexico, Central America	Flavoring	

\* Data in the table were obtained from numerous references [2–16]. This is not a comprehensive list of foods consumed by Native Americans, but a list the major foods that originated in the Americas and are still commonly consumed by people throughout the world.

Those foods became important to the entire world, as Samuel Beck said: “The American Indian's greatest contribution to our civilization is, in the eyes of many experts, the patient cultivation from their original wild state of the food plants which are now more than half of our agricultural wealth” [19].

There were numerous regional tribes with distinct diets, customs, and languages throughout the Americas (Fig. 1), but many of the foods spread among the regions due to well-organized trade routes that were facilitated in part by a common hand sign language used by many tribes [20]. Of the staple foods in North America known as the three sisters [21] only squash was of North American origin. Corn and beans probably originated in South America, but their use spread throughout North and South America. As is obvious from Table 1, the wealth of foods in North America made possible a balanced and highly palatable diet. Many of the berries that are popular today for their functional properties were also valuable additions to the Native American diet; they would include phytochemical-rich blueberries, elderberries, chokeberries, black raspberries, blackberries, serviceberries, buffalo berries, and cranberries [22,23]. Animal foods were also a major part of the Native American diet. When humans first arrived in North America they appear to have been predominantly hunter-gatherers and

megafauna including mastodons and giant ground sloths were an important part of the diet [15,24]. However, their extinction an estimated 10,000–12,000 years ago is believed to have resulted in major changes to the flora and fauna of North America. This may have resulted in the transition of many Native American tribes to at least a partial reliance on agriculture as a means of obtaining a stable food supply. Whether the disappearance of the approximately 60 species of megafauna at that time was the result of human activity or rapid climate change that occurred during that period is still unknown [17,24,25]. Although the early food sources are difficult to identify with certainty, it is almost certain that virtually all possible plants and animals were used as foods. One of the best early records of Native American customs and culture was published by James Adair, who spent much time from 1735 until around 1770 working and living with the natives of the area that is now the southeastern USA [26]. In his book, James Adair describes the hunting of deer and bear, and the methods of fishing. The main staple food he mentioned was corn, which was often mixed with beans and chestnuts and baked to make a corn bread (Fig. 2). We know from other sources that small game, turtles, turkeys, and grouse were also commonly eaten by the Eastern Native Americans [27]. Of course, the exact makeup of the Native American diet



**Fig. 1.** Map of USA depicting the location of major Native American tribes. Asians first entered North America by crossing from Siberia into Alaska using the Bering land bridge, but soon spread throughout the Americas. This map shows some of the larger and better known tribes of the USA.



**Fig. 2.** Varieties of Native American corn and beans. The Native Americans developed a wide variety of foods by selective breeding and probably hybridization. Corn was available as white, yellow, red, and blue varieties. Corn, beans, and squash provided a stable food supply that was augmented by hunting, fishing, and gathering of wild foods. *Note.* Photo by Zachary Young, photo rights purchased from [dreamstime.com](https://www.dreamstime.com) (Fig. 2 © Zachary Young 2007).

depended to a large extent on the indigenous plants and animals in the area where they lived. For instance, saw palmetto berries were a unique common food of the Florida tribes, desert tribes used the fruit and leaves of the prickly pear cactus, and bison was an

important food of the Native American tribes of the western Great Plains, and is one of the few large mammals used for food by the early Clovis people that avoided extinction [28].

### 3. Food collection: hunting, gathering, agriculture

The early Native Americans were all hunter/gatherers, living off the abundance of plants and animals they found nearby. Because they remained a largely stone age culture until Europeans arrived with metal tools, very little remains of most of the early cultures other than stone tools, pottery shards, and occasional bone fragments from butchered animals. Most of their tools and dwellings were made of perishable materials such as reeds for baskets, wood, animal skins, and vines. Almost all had decomposed before becoming available to archeologists. Much of what we know about the Native Americans we have learned from the Europeans who first arrived and passed down records of their encounters with various tribes. Of course, at that time the culture was already thousands of years old, and had undoubtedly undergone many changes. What we do know is that they had adapted very well to their environment and were thriving as was described by an eyewitness, James Adair: "They (the native Americans) are acquainted with a great many herbs and roots, of which the general part of the English has not the least knowledge. If an Indian were driven out into the extensive woods, with only a knife and a tomahawk, or small hatchet, it is not to be doubted but he would fatten, even if a wolf would starve. He could

soon start a fire, by rubbing two dry pieces of wood together, make a bark hut, make earthen vessels, and a bow and arrow; then kill wild game, fish, fresh water turtles, gather a plentiful variety of vegetables and live in affluence” [26].

### 3.1. Agriculture

The *three sisters* (corn, beans, and squash) were the major staples of Native American agriculture, and were always grown together. Corn was the most important staple food grown by Native Americans, but corn stalks also provided a pole for beans to climb and the shade from the corn benefited squash that grew under the leaves. The beans, as with all legumes, provided nitrogen for the corn and squash. Finally, the shade from large squash and pumpkin leaves held moisture in the ground for all three plants. Although other plants such as potatoes, tomatoes, and peppers were cultivated, the *three sisters* gardens were the backbone of North American Indian agriculture and provided the primary dietary staples of many tribes, and horticulture remains an important part of modern Native American life (Fig. 3). Early Native Americans did not divide

their gardens into sections of just one plant as is typical on today's farms, but used companion planting in rows of mounds about 30 cm high in which they would plant the corn, beans, and squash or other garden plants together [29,30]. Between the mounds were troughs that were made by digging the soil to make the mounds, these troughs served as reservoirs to collect water for the garden. The system of agriculture developed by the Native Americans would not be practical for use with modern tractors and harvesting equipment, but was highly efficient for use in gardens prepared and harvested by hand.

### 3.2. Hunting

Most people think of American Indians as relying on the bow and arrow for hunting and warfare. Indeed, that was the weapon of choice when the Europeans first arrived. However, the bow and arrow had only been in use for about 1,000 years at that time [31]. Spears were the first tools we are aware of, and their exact methods of construction are not known since the stone points are all that remain since the shafts and other organic parts of them



**Fig. 3.** Native American gardens. Farming and gardening remains an important part of many Native American cultures, and corn and beans are still important foods to the modern descendants of early Native Americans. These pictures depict Native American farmers still cultivating the same foods as grown for thousands of years by their ancestors. (A) Dora Mariano's field of beans and corn. (B) Dora Mariano picking green pinto beans. (C) Lola Lopez picking corn. All were taken at Meneger's Dam Village, Tohono O'odham Reservation, November 1977. Note. Photo by Helga Teiwes (Arizona State Museum, University of Arizona, Tucson, AZ, USA). Pictures are published with the kind permission of Arizona State Museum, University of Arizona. (Fig. 3 © Helga Teiwes 1977).

decomposed over time. The atlatl was also developed early in Native American history, or may have been brought with them when they first arrived from Asia. The atlatl is a sling-like device to assist in throwing a spear to give it more power and distance [32]. Finally, the bow and arrow were developed in the Americas, apparently independent of outside influence, although the bow and arrow were first developed in Alaska, suggesting some possibility that there was contact with Asians at that time, and the knowledge of crafting bows and arrows may have been learned from other cultures. By the time Europeans arrived bows and arrows were the weapons of choice, although spears and atlatls were still in use. The atlatl was a more powerful weapon, but less accurate, and may have been more effective for hunting the early megafauna such as mastodons. The bow and arrow were well suited for hunting deer, antelope, turkey, and most of the other animals used for food.

### 3.3. Fishing

Fishing appears to have been a major source of food for the majority of Native Americans. Most Indian villages were located close to rivers or large streams where there was a dependable water supply, fish, and water fowl. James Adair described the importance of water to most of the tribes: "Except the Choctaw, all of our Indians, both male and female, above the late infancy, are in the watery element nearly equal to amphibious animals, by practice..." [26]. He also described some of the fishing methods that impressed him the most, such as wrapping one's hand with a cloth and putting it into underwater holes where catfish waited and would swallow their hand, allowing the Indian fisherman to pull the catfish onto the bank of the river or stream. Probably the most common fishing method employed by most native Americans was using a spear to gig the fish, but also nets fashioned from vines, traps, and fish hooks made from bone were used. A novel fishing method was using ground black walnut hull to spread into pools, which would temporarily stun the fish and cause them to float to the surface where they could easily be captured [33]. Although it is not a part of the popular lore of Indian culture as is hunting, fish appear to have been an important part of the early Native American diet.

## 4. Food preparation

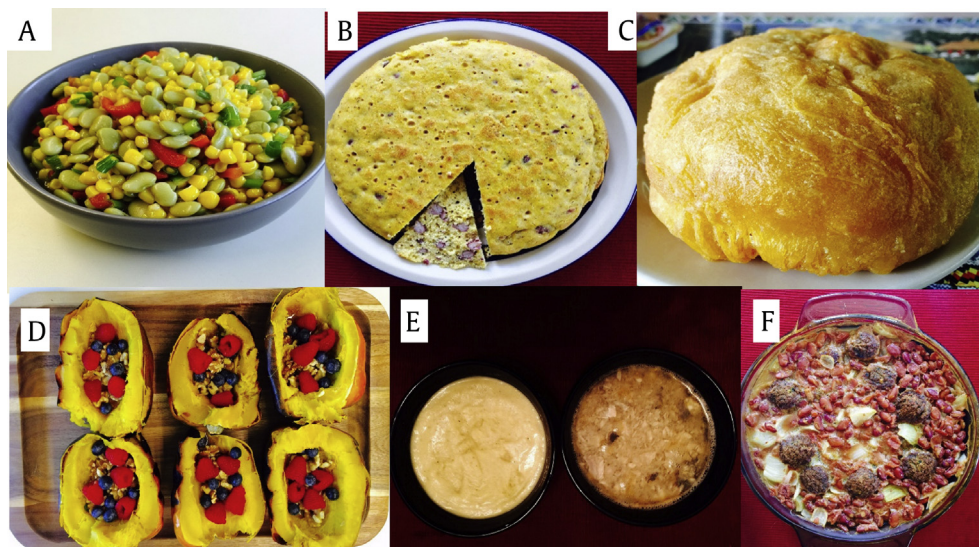
It is important to keep in mind that many Native Americans were largely hunter/gatherers until the Europeans arrived. Although many Native American tribes had well-developed agriculture, they did not have domesticated animals, and they still depended heavily on the wild plants and animals for food. Also, James Adair mentioned that the Indians did not use any kind of milk, he also stated that "None of the Indians however eat any kind of raw salads, they reckon such food is only fit for brutes" [26]. Berries and fruits were eaten raw, but most other foods were cooked. James Adair was impressed with the culinary skills of the Native American women and said: "It is surprising to see the great variety of dishes they can make out of wild flesh, corn beans, peas potatoes, pumpkins, dried fruits, herbs and roots. They can diversify their courses, as much as the English, or perhaps French cooks: and either of the ways they dress their food, it is grateful to a wholesome stomach" [26].

Cooking methods included baking, frying, deep frying, boiling, and roasting over an open fire. Corn was used in a variety of ways; *succotash* was a simple corn and beans dish with almost unlimited variations [21]. A simple recipe is shown in Recipe 1 in Table 2 (Fig. 4A) with a picture of the dish. This was a wonderful food that could provide a balanced meal alone, with the corn and beans providing a complete protein. Corn was also cooked as a porridge [34] known as *sofkee* by the Seminole tribes in Florida. It was

**Table 2**  
Recipes of Native American foods.

Components	Substitutes
<b>Recipe 1. Succotash</b>	
2 cups fresh corn	2 cans of corn
2 cups fresh beans	2 cans of lima beans
1 tablespoon Fat	1 tablespoon of butter
Optional	
Chopped wild or green onions, tomatoes, garlic cloves, peppers, juniper berries, fish, or meat.	
Mix all ingredients in a pot & bring to a boil over a campfire or on a stove.	
<b>Recipe 2. Bean bread</b>	
2 cups yellow corn meal	White or blue corn
1 cup cooked pinto beans	Any beans or peas
1 teaspoon baking powder	
1 teaspoon of salt	
6 beaten quail eggs	2 chicken eggs
Mix all dry ingredients in a bowl. Add beans with broth & beaten eggs & stir until well mixed. If more liquid is needed to make a soft dough, a little clean spring water can be added if needed. Heat a flat rock by the campfire or skillet on a stove at home & cover with bear grease or a vegetable oil at home & press down the dough to make a flat bread. Allow to cook well without burning. It should be able to stick a knife into the bread & remove it & not see any uncooked batter on the knife.	
<b>Recipe 3. Fry bread</b>	
3 cups white flour	
2 teaspoons of baking powder	
1 teaspoon of salt	
1 tablespoon of animal fat or shortening	
1½ cups of warm water	
Mix dry ingredients then add fat & cut in & finally add water gradually & mix to form a soft dough. Divide into balls of dough & allow to rise for about 20 min. Deep fry in bear fat or other oil. Carefully remove the fry bread when it is a golden brown color.	
<b>Recipe 4. Acorn squash</b>	
1 acorn squash	
2 tablespoon maple syrup	Honey
2 tablespoons walnuts	Pecans
Raspberries & blueberries	Dried fruit
Cut acorn squash in half, bake face down or covered in a hot oven until soft (about 1 h). Divide the maple syrup, nuts, & berries between the 2 halves & serve.	
<b>Recipe 5. Fish &amp; corn mush</b>	
2 mediums sized fish cooked on a stick	
1 cup corn meal	
Pinch of lye or soda	
Pinch of salt	
Place finely chopped fish in a pot, cover with water, & boil until a thick soup is formed. In another pot place corn meal with 3 times as much water, add lye & salt & cook until a thick liquid. Serve together as a meal.	
<b>Recipe 6. Baked beans</b>	
2 cups dried beans	2 cans of beans
¼ cup maple syrup	honey, sugar
1 chopped onion	
1 cup cubed venison	Bacon, ham, beef
1 teaspoon salt	
Optional ingredients: peppers, root vegetables, & fish.	
Cook beans until well done, add other ingredients & place in a covered dish to bake by a campfire or in a stove at medium heat for at least 1 h.	

usually just corn flour boiled in water. It could be eaten as a soup or drunk as a hot beverage. Cornbread was also a very common food among all Native Americans [35] and could be thin flat breads such as tortillas or thick breads more like modern cornbread or pancakes made from corn. Interestingly, all major varieties of corn (red, blue, white, yellow) that are available today were already available to the Native Americans when the Europeans first arrived in the New World. Another way corn and beans were frequently combined was to make bean bread [36] which is a corn bread with beans (Recipe 2 in Table 2, Fig. 4B). Bean bread is easy to make and, like most Native American recipes, the ingredients and cooking methods can be varied according to what is available as long as the basic cornmeal and some kinds of beans are available. Cooking methods could also



**Fig. 4.** Native American Foods prepared according to the recipes included in this article. (A) *Succotash* is based on boiled sweet corn and beans, and is still a popular food in the Southern USA. (B) Bean bread is corn bread with beans and can be quickly prepared to make a highly nutritious meal or side dish. (C) Fry bread is a signature food of many contemporary Native Americans. It was developed out of hardship when tribes were forcibly relocated and provided little food other than flour and lard. (D) Baked acorn squash. Squashes could be prepared many ways, and baking was one of the more popular. Other local foods could be combined to make highly palatable and nutritious main dish as show here. (E) The Cherokee tradition of eating fish and corn mush, especially when sick, was a simple yet nourishing way to have a simple and easily digested meal. (F) Baked beans, are a commonly eaten food by many people today, and can include many other ingredients, just as was common among the early Native Americans.

be varied, it could be baked, pan fried, or even deep fried. Fry bread is a very popular food of most modern North American Indians, partly because it is a symbol of their ability to survive under adverse conditions of being forcibly removed from their homes to live in new areas where they were unfamiliar with the local foods. The fry bread was what they survived on by using rations provided by their white oppressors who forced them to relocate to new areas and live on reservations. Fry bread is easily prepared from simple, but not very nutritious, ingredients [37]. A recipe for fry bread is shown in recipe 3 in Table 2 (Fig. 4C). Squash is the third of the three sisters and was also a major food, although not as ubiquitous in the diet as corn. Many varieties of squash and pumpkins were available to Native Americans including summer squashes such as the yellow crookneck squash and hard squashes such as pumpkins, acorn, and butternut squashes. The hard, fall squashes could be stored and used as fresh vegetables in the winter. Squashes could be prepared by cutting into chunks and baking, adding to soups and stews, or baked whole as in the recipe for baked acorn squash (Recipe 4 in Table 2, Fig. 4D). There were also many ways to prepare meat and fish. The most common and simple method was to cook them skewered over a fire. A simple way to cook fish was to clean fish, salt fillets, and let them stand overnight. The next day they would be strung on a stick and roasted over a fire with frequent turning until evenly cooked. Fish could also be fried in a pan, but would not taste as good without the smoke flavor from the fire [19]. Fish, birds, and meats could be cooked as soups, stews, and stir-fry with vegetables. The stir fry would be much like *fajitas*, a popular Mexican food, which consists of vegetables such as peppers and onions, cooked with strips of meat and served on a flat corn bread. Fish was popularly prepared as a soup and served with corn mush (Recipe 5 in Table 2, Fig 4E) and was especially fed to sick people as a nutritious and easily digestible meal [19]. A simple menu for Cherokee fish and corn mush is shown in Recipe 5. Baked beans are a Native American food that has withstood the test of time to be a popular food in many parts of the world [38]. Baked beans like most Indian recipes have many variations, but a basic recipe using ingredients that would have been available to Native Americans is

shown in Recipe 6 in Table 2 (Fig 4F). Of course, what we have provided here is a small sampling of foods that would have been eaten by Native Americans. Acorns were also used to make bread and dumplings. For some Native Americans, acorns were an important part of the diet [39] although they required extensive washing with hot water to remove the tannins. There is no single Native American diet. The diets of different tribes varied considerably, according to the foods available in their region. There are currently 567 officially recognized Indian tribes in the USA. Each had their own language and food preferences, making it impossible provide details about every tribe. However, each tribe appears to have adapted well to the region in which they lived and were able to obtain a wide variety of nutritious foods.

## 5. Native American dishes that are still eaten today

Holiday foods in the USA (Thanksgiving and Christmas especially) traditionally include turkey, cranberry sauce, pumpkin pie, baked beans, and mashed potatoes, all of which originate from Native Americans. The original Thanksgiving feast in the year 1621 was a gathering of English colonists and local Indians. The records reveal that the feast which lasted several days included deer, water fowl, turkeys, shellfish, eels, squash, corn, and beans [40]. Other foods were probably eaten as well; chestnuts would have been available as would some berries. However, what is known for sure is that most of the traditional Thanksgiving foods of today were available at that time even if they were not a part of that first Thanksgiving meal almost 400 years ago.

Foods of the American South are greatly influenced by Native Americans: grits, cornmeal mush, cornbread, *succotash*, and fried green tomatoes are all uniquely southern but with Native American origins. Some people in the South still hunt raccoons, opossums, and squirrels, as did the Native Americans. Of course venison, deer meat, was and still is eaten throughout North America [28]. It is hard to imagine American breakfast foods without pancakes and maple syrup. James Adair [26] described the local Indians tapping maple trees to obtain the sap, which would be concentrated by

boiling to make a syrup. Southwestern and Mexican foods are also heavily influenced by Native Americans. *Nopal* (prickly pear cactus) leaves are frequently included in Mexican cooked vegetables, but were first consumed by the Indians. Corn tortillas are a thin fried corn bread used to make tacos and *enchiladas*, which are commonly filled with beans and meat. In what is widely known as the Columbia Exchange [41], the foods of the Native Americans spread throughout the world, and the foods of the rest of the World were introduced to the Native Americans.

This account of North American aboriginal foods is limited in its ability to convey the full scope of foods and food cultures that were developed by Native Americans. There are well over 500 recognized Indian tribes in the USA and some of the original tribes no longer exist. Each tribe had its own language and foods. Fig. 1 depicts just a few of those tribes. Therefore, we have provided only a small sampling of the rich and highly varied Native American food culture that has been passed down to modern civilization and enriches the diets of people around the world. However, the reader can find much additional information in the references we have provided.

### Conflicts of interest

All authors have no conflicts of interest to declare.

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