

Zea

Gramineae

[*Poaceae*]

Zea is derived from a Greek name for a related plant and means ‘cause of life’.

MAIZE was a major agricultural food crop for the Mayas, the Aztecs and the Inkas as well as many other American Indian tribes and cultures, and it was held in such respect that it featured in their rituals. The grain was only heard of in Europe in the 16th Century after the Genoese explorer, Christopher Columbus (1451-1506) found the New World (in November 1492 two of his men came across maize in Cuba) and Hernando Cortés (1485-1547) the Spanish conquistador, had conquered Mexico. (It is interesting to note that China where initial references to maize seem to date from 1555 must have first met maize very shortly after the Europeans did.)

This grain entered Europe (nobody seems to know how or why) from the eastern Mediterranean and gradually began to be cultivated on that Continent from about the 1540s – although it only began to gain any popularity there from about the 1920s. In Britain authorities have noted that one hundred years earlier the English writer, William Cobbett (1763-1835) who championed the poor (often to his own disadvantage), recommended maize cultivation after his brief self-imposed exile in North America. Today it plays a major role in many diverse areas of the Western economy and it is the second most plentiful cereal after rice. (Although wheat is grown over a far larger area maize grain yield is generally more than three times greater per acre.)

Archaeologists have shown that maize was growing wild in Middle America before the first human hunters had even crossed the Bering Strait between Russia and Alaska. They have discovered fossilized maize pollen in Mexican subsoil that dates back 80,000 years. Subsequent finds in the Peruvian Andes and discoveries that have also been made in southern Mexico (in a cave in the Tehuacan Valley) indicate that initial cultivation of maize probably began between 6000-5000 BC. In its earliest known cultivated forms the species grown for food had small cobs that were only about ¾ in. long and would have borne a greater resemblance to today’s ‘popcorn’ variety. The ears shattered at the slightest vibration once ripe in order to scatter their seeds rapidly (as wild rice, *Zizania aquatica*, still does today in the wild) and this would have meant that harvesting would have been extremely difficult. Detailed scientific research has now been able to suggest how these forms came to be transformed, unaided by man, over at least a two thousand year period into the more obvious predecessors of modern maize species. By about 2000 BC it is thought that mutation had already resulted in such improved species that it had a dramatic effect on living standards and that in turn would have meant for that period in the Continents’ history a population explosion as well.

From at least 1000 BC maize not only provided food but the source of oils that were required by then for lighting, cooking and medicine. American Indians as a whole appreciated the significance of maize in their lives. For all of them it was sacred and for most it meant a life cycle of planting and harvesting times accompanied by celebratory or religious ritual. When western Europeans arrived at the turn of the 15th Century the continuing importance of maize to the American Continents would have been well illustrated to the reckless foreigners in both Middle and South America. In the former for example the

Spaniards would have found maize growing along all paths and routes through the countryside so that it was easily available and nobody died of hunger. While in the latter in the Andean region (that was then home to the short-lived Inka culture) all citizens between 25 and 60 had to tend the maize crop that underpinned the Inkan Empire's incredible prosperity. (Their gold was of secondary importance to them.) Guano from offshore islands was spread on the maize fields and this fertilizer was so highly valued that anyone landing on these islands during the birds' nesting season was put to death. But all of this was lost on the conquistadores for whom gold became god – and over time cultivation of maize was discounted to the point where malnutrition actually reared its head. (Apparently in 1781 there was a rebellion during which, symbolically and horrifically, molten gold was poured down the throat of Don Antonio Arriaga. The American Indian rebels were put to death – but gold had at last lost a significant part of its grasp on the oppressive rulers.)

The American Indians learnt how to farm the crops in widely differing climates and terrain and authorities debate the possibility that the inhabitants of the New World were far advanced in their agricultural techniques compared with their peers in the Old World (certainly the Europeans). Even when the Europeans appeared in numbers in the 16th Century American Indian knowledge and understanding of hybridisation and artificial fertilization is believed to have been much in advance of that of the intruders. In addition the American Indians had already devised a three-crop rotation system that conserved the soil and had developed ventilated clamps for storing the harvest (similar to those which can still be found in Europe for root crops at the beginning of the 21st Century). They also practised companion planting that is being revived today in many parts of the industrialized Western World. One fascinating fact that has been pointed out is that when maize seeds were first introduced across the Atlantic to France and Hungary particularly, without any planting advice from American Indians the new seeds were automatically grown with complementary plants in the same way that the American Indians combined maize with low clustering gourds or climbing beans.

The origin of maize is culturally surrounded by myth. The Mayas of Middle America (basically 2000 BC-900 AD), particularly from southern Mexico, Guatemala and parts of Belize, in their sacred book *Popol Vuh*, held that

The first man was made in clay and was destroyed in a flood. The second man, made of wood, was carried away in a mighty rainstorm. The third man, made of maize, survived.

Today this legend still underlies the thinking of many in Guatemala. Another of the stories (this time from North America) probably owes its survival to Henry Schoolcraft (1793-1864) an American ethnologist and government agent for the United States. He married an Indian girl from the Chippewa tribe and was a contemporary of the American poet, Henry Wadsworth Longfellow (1807-1882). Schoolcraft's record of this Chippewa legend was translated into verse by Longfellow in the well-known poem, *Hiawatha*. It tells of the trials of Wunzh (an Indian youth who has reached initiation age) and how these lead to the birth of corn. Other legends from the Americas suggest that the seeds were stolen from heaven by a bird or fox, or that in the guise of a man the moon brought it to earth. [With the introduction of the seed to other lands that welcomed the new crop maize legends were no longer confined to the Americas. In particular they can also be found in Africa now.]

The Aztecs of northern and central Mexico revered their god and goddess of maize, Cinteotl and Chicomecoatl especially from the 14th to 16th Centuries. They also offered prayers to the rain god for water and performed a particularly gruesome annual ceremony that lasted over some days before harvesting the crop. It was recorded by a Spanish priest and is

related in the 12-volume study of magic and religion *The Golden Bough* by Sir James G. Frazer (1854-1941) the Scottish anthropologist and folklorist. It involved a beautiful young girl who was chosen to represent the corn goddess, Xclomen. Towards the height of the initial celebrations she was beheaded in sacrifice with a golden handled flint knife and the high priest wore her bloody skin during the succeeding rituals. Then on the last day he removed her skin and laid it in state with her head.

In the early 16th Century when the Spanish conquistadores reached the Americas 200-300 varieties of maize are believed to have already existed in those lands. There were variations in the way maize was cooked in the different civilizations and tribes. For example the Aztecs in Mexico were using it to make a porridge as well as producing tortillas from the dried kernels, while the Inkas of Peru tended to prepare a kind of porridge and flat cakes. The basic porridge used by American Indians would vary in consistency, could be unsweetened or sweetened with honey, could be spiced with different peppers (*Capsicum*) or cocoa (*Theobroma cacao*) if a wealthy Inka, and would usually be accompanied by meat, fish or vegetables. A beer known in Peru as *chicha* was also made from the fermented maize and at the time the Spanish invaded the Inkas this was being downed in some areas in very large quantities.

Maize had spread to south-western North America long before the Spaniards made landfall and had become a staple food for all the tribes in the area. One of these the Zuni for example developed many ways of preparing it for food (including a popcorn) and for drink. They also absorbed different parts of the plant into their ceremonial and the younger members of the tribe used beribboned husks as shuttlecocks in a kind of badminton. The Kiowas used husks in Peyote rituals, and also as cigarette 'papers'. While the Iroquois tribe (Like the Zuni) are believed to have prepared the maize as a kind of pre-runner of modern popcorn. But these only give a minute glimpse of the depth to which maize invaded the life of the North American tribes and it might be worth exploring this a little further before continuing to place the plant in a worldwide context.

The high respect in which maize was held is well illustrated by the fact that various parts of the plant played a significant role in the ceremonial rituals of the North American Delaware, Isleta, Navajo and Iroquois Indians, some of the Keresan and Tohono O'Odham tribes and the Cahuilla, Seminole, Tewa and Hopi tribes – apart from that already referred to in connection with the Zuni and Kiowa tribes. The plant entered into their games and sports. As well as the Zuni shuttlecocks, the Tewa stuffed 'foot balls' with cobs and also used them to make feathered darts while the Cherokee made the husks into dolls. Like the Kiowa Indians both the Tewa and Navajo tribes used the husks as cigarette papers – and Iroquois Indians used the husks for cooking tools. Stalks provided thatching material for the Navajo, and this tribe was known to use the cob pith as tinder. Seminole hunters made their arrow-heads from the plant.

Based on the versatility of maize as shown to this point it is understandable how some tribes such as the Tewa came to view it as a cash crop. (Records show that the Tewa bartered it with the Comanche for buffalo hides.) Maize also provided forage and fodder for Indian livestock. Tewa Indians let their animals graze the stalks, husks and leaves, while as fodder the plant was also eaten by the Kiowa tribe's livestock and some of the Navajo's horses.

Maize was eaten by many North American Indian tribes including the Kiowa, Kamia and Seminole. For a large number of them not least the Delaware, Navajo, Hopi, some of the Tohono O'Odham, the Dakota, some of the Keresan, the Zuni, Menominee, Pawnee, Omaha, Havasupai, Tewa, Isleta and Ponca it was a staple part of the diet. As a vegetable (prepared in different ways but especially as roasted ears) it seems to have been popular with quite a few including the Choctaw, Navajo (who ate the leaves as salad), the Hopi,

Cherokee, Havasupai, Delaware, some of the Keresan, the Menominee, Iroquois and Chippewa. Authorities note that the Havasupai, Iroquois, Chippewa, Delaware and Abnaki Indians all used the ground seeds to make soup, and (with the possible exception of the Abnaki) they and the Meskwaki, Zuni, some of the Tohono O’Odham, Cahuilla, Isleta and Navajo tribes made the seeds into a porridge-like mush as well. Iroquois Indian babies were fed a gruel made from the boiled seeds, and Iroquois adults enjoyed sauces and puddings also made with the seeds. Quite a few tribes including the Hopi, Delaware, some of the Tohono O’Odham, the Navajo, Havasupai, Isleta, Tewa, Iroquois and Zuni made various breads, and the latter two as already mentioned produced a kind of snack popcorn. Isleta Indians chewed the parched corn like confectionery, Iroquois Indians chewed stalks cut from between the joints to quench thirst and different parts of the plant were used by some North American Indian tribes as a sweetener. Isleta Indians used concentrated liquid obtained from crushed and steeped stalks. Hopi Indians preferred ears of corn baked, husked and sun-dried, and the Omaha, Pawnee, Dakota and Ponca tribes chose sun-dried corn silks for this purpose. Various parts of the plant were processed and stored for Winter use by the Isleta, Menominee, Potawatomi, some of the Chippewa, the Pawnee, some of the Keresan, the Meskwaki, Ponca, some of the Navajo, the Dakota, Omaha and Havasupai Indian tribes ranging from the roasted dried cobs to the sun-dried corn silks.

As intimated earlier however the plant was made into drinks as well as food. Isleta Indians used the ground seed to make a slightly alcoholic one – and non-alcoholic drinks were made with cornmeal by the Navajo and Tewa tribes and with popped corn by the Zuni. A few tribes also appear to have prepared a coffee substitute. Iroquois Indians used the boiled, roasted seeds – and the Menominee used scorched or parched corn.

The plant offered a source of medicines for one or two North American Indian tribes including some of the Keresan. Mohican Indians used it to treat poison ivy rash, while the Tewa tribe turned to it as a treatment for some heart problems and for period disorders, and the Cherokee used it for kidney ailments.

When the early 16th Century North American settlers arrived in Virginia (and those who followed after including the Pilgrim Fathers who landed further north in the Boston area in 1620) relations with North American Indian tribes were generally extremely friendly. The new people were taught how to cultivate and prepare maize by local tribesmen who in the areas hit by the severe famines of 1522 and 1623 even shared their reserves. (Records show that the immigrants in Virginia would have been wiped out without that help.) White settlers made various kinds of porridge, frumenty and flatbread which were to be the forerunners of today’s romantically recalled Hominy (that uses ripe maize), Succotash (made from fresh or dried kernels cooked with beans) and Cornpone (a maize pancake). But the new inhabitants (mainly English and French) eventually became hungry for land and power and the suppression of the American Indian nation began. They started to destroy American Indian crops and stores (both of which were valued more highly by their owners than the villages themselves) in order to force the American Indians out.

Initially in the Old World the grain was known as ‘turkey corn’ to the British, Dutch and French, ‘Syrian corn’ to the Egyptians, and ‘Egyptian corn’ or ‘Roums corn’ (foreign corn) to the Turks. Today in the United States where half the world’s maize is grown (90% of which is used as animal feed) it is referred to as ‘corn’, and the crushed grains as ‘hominy’. Maize is known as ‘mealies’ in south and central Africa. While in Britain although it is called maize there it can be referred to also as ‘Indian corn’. Just to add to the confusion ‘corn’ in Scotland usually means Oats (*Avena*) and in England Wheat (*Triticum*) or Sweetcorn (*Zea mays saccharata*).

Maize was never eaten alone in the Americas whereas it was in poorer parts of Europe and Africa (introduced there by the Portuguese who used it on slave ships). Compared with wheat (*Triticum*) or rice (*Oryza*) maize is lower in protein, is approximately the same in calories but is deficient in an amino acid (lysine) and a nicotinic acid (niacin). It is this deficiency in the latter that can cause the disease known as pellagra – an outbreak of which swept through Spain and other parts of Europe from the end of the 18th Century and hit some of the northern areas of Italy dramatically in the early 19th Century. In that part of Italy and some other poor areas in Europe polenta (a cornmeal porridge) was and still is today a traditional dish eaten at that time in quantity. Even then polenta was blamed for the illness but it was only in the 20th Century that the real cause was identified – the nutritional deficiency in the maize flour used to make the ‘porridge’.

Maize has also been used as a coffee substitute but apart from being much cheaper it is considered to be a very poor alternative.

In the past the flower sheaths have been used to make matting, paper and cigarette wrappers.

Maize oil has been made into a lard substitute and it has also been used to make a soft soap.

In more recent years the use of maize has not been limited by any means to food for man and beast. Apart from the many different applications already summarized it has served many other purposes. For instance at one time the leaves were once recommended as mattress fillings to support children suffering from back complaints. Between 1942 and 1945 in the 2nd World War when General Douglas MacArthur (1880-1964) the famous American military leader, was involved in battles in the Far East tobacco pipes made with maize stems became a familiar sight. In the world of architecture the cob has provided the inspiration for tower blocks in both Chicago in the United States and Créteil south-east of Paris in France. Then back in the United States in South Dakota one of the major maize growing areas there boasts a casino called the Corn Palace which is built like a mosque and is thatched with maize. Like other cereals maize has also been used for making corn dollies particularly in Africa, China and Mexico. Now the recognition of the need to find practical, economic energy sources has led to the use of maize as a fuel crop as well in the ‘biomass’ conversion programmes’ encouraged by the United Nations.

Although the United States grows nearly 50% of the world’s maize crop, parts of Europe, China and South America produce a large amount of maize (primarily for local consumption). The latter’s maize only accounts for 10% of that internationally traded. In Africa (like South and Middle America) maize is a staple food, bread dough being made from maize flour.

Maize and many of the other cereal grains are not themselves poisonous if not consumed to excess, but intensive animal husbandry encourages their use in large quantities as food for livestock. This has led to an increase in many digestive and other ailments in a wide range of farm animals and poultry.

So far no mention has been made of maize in heraldry. A corn cob is depicted at the foot of the Zambian coat of arms, two corn cobs encircle the central motto of the coat of arms of the Cape Verde Islands (off the west African coast) and a corn cob appears on the heraldic shield of the Transkei region of South Africa.

Medicinally, herbalists have recommended the seeds in poultices for healing swellings and ulcers, and for easing rheumatic pain – as well as the use of cornmeal gruel as part of a convalescent’s diet. The silk is still used today for treating cystitis and bladder ailments.