

Solanum tuberosum

[Synonyms : *Lycopersicon tuberosum*, *Solanum andigenum*, *Solanum andigenum* subsp. *ayapapa*, *Solanum andigenum* subsp. *bolivianum*, *Solanum andigenum* subsp. *ecuatorianum*, *Solanum aquinas*, *Solanum aracatscha*, *Solanum chiloense*, *Solanum chilotanum*, *Solanum cultum*, *Solanum diemii*, *Solanum esculentum*, *Solanum fonckii*, *Solanum goniocalyx*, *Solanum kesselbrenneri*, *Solanum leptostigma*, *Solanum molinae*, *Solanum oceanicum*, *Solanum ochoanum*, *Solanum sanmartiniense*, *Solanum sinense*, *Solanum subandigena*, *Solanum tascalense*, *Solanum tuberosum* var. *guaytecarum*, *Solanum tuberosum* subsp. *tuberosum*, *Solanum zykinii*]

POTATO is a hybrid perennial (grown as an annual). From South America (particularly Chile, the northern Andes and Argentina) it has white blue, or pink flowers.

It is also known as *Aalu* (Bengali, Nepalese), *Aardappel* (German), *Aardappel* (Dutch), *Aloo* (Hindi), *Alu* (Hindi), *Ardappel* (Dutch), *Ärdäppel* (German), *Ardoffel* (French, Swiss), *Arthapel* (Sinhalese), *Batata* (Arabic, Portuguese), *Batata-da-terra-semelha* (Portuguese), *Batateira* (Portuguese), *Brambor* (Czech), *Bramboru* (Slovak), *Bramburi* (German), *Burgonya* (Hungarian), *Cây khoai tây* (Vietnamese), Common potato, *Dinich* (Ethiopian), English arrowroot, *Erdappel* (Austrian, German), *Erdbirne* (German), *Erpele* (German), *Frunderbirne* (German), *Gummel* (German, Swiss), *Grundbirn* (German), *Happere* (German, Swiss), *Hardopfel* (German, Swiss), *Harpfel* (German, Swiss), *Herdappel* (German), *Herdöpfel* (German), *Huwi kumeli* (Sundanese), *Inkatrüffel* (German), Irish potato, *Jaga imo* (Japanese), *Jordpäron* (Swedish), *Kartofel* (Polish), *Kartofel'* (Russian), *Kartoffel* (Danish, German, Spanish), *Kartoffeln* (German), *Kartofler* (Danish), *Kartoshka* (Russian), *Kautüffel* (German), *Kentang* (Javanese), *Ketüffel* (German), *Khoai tây* (Vietnamese), *Knolle* (German), *Krompira* (Serbian), *Krompirja* (Slovenian), *Krumbiir* (German), *Krumbirn* (German), *Krumpir* (Croatian), *Lilek brambor* (Czech), *Lul'ok* (Slovak), *Mailinterra* (French, Swiss), *Ma ling shu* (Chinese, Taiwanese), *Murphy*, *Papa* (Latin American, Spanish), *Papa común* (Peruvian, Spanish), *Papas* (Spanish), *Parmentière* (French), *Patata* (Italian, Latin American, Maltese, Spanish), *Patatas* (Spanish), *Patate* (French), *Patates* (Turkish), *Peruna* (Finnish), *Pom da terra* (Italian, Swiss), *Pomi de terra* (Italian), *Pomme de terre* (French), *Pomo di terra* (Italian), *Potaati* (Finnish), *Potät* (Swedish), *Potaten* (German), *Potatis* (Swedish), *Seebzameeni* (Persian), *Shue tsai* (Chinese), *Solano tubera* (Esperanto), *Tartuffel* (French, Spanish, Swiss), *Tartuffli* (German), *Tartufo* (Italian), *Tatws* (Welsh), *Tiffel* (French, Swiss), *Truffel* (French, Swiss), *Tu dou* (Chinese), *Ubi kentang* (Malay), *Urulaikkilangnku* (Tamil), *Urula-kelengu* (Tamil), *Waru* (Kikuyu), White potato, *Yang yu* (Chinese), *Zemiak* (Slovak), and *Ziemniak* (Polish); and in flower language is said to be a symbol of benevolence (blossom), poverty, and sustenance.

Warning – stems, leaves, flowers, fruit and unripe (green) sprouted or diseased tubers are extremely poisonous. (Green potatoes can be stored in the dark for 2-3 weeks until all traces of green have disappeared. Small green, unripe areas can be cut off.) It can cause constipation or diarrhoea, gastrointestinal irritation with pain, drowsiness, delirium, visual disturbance, breathing difficulties, loss of sensation, weakness, paralysis and death.

Animals can also be poisoned by the same parts of the plant as humans and in addition by being fed excessive quantities of potato pulp.

Potato's flowers are similar to those of woody nightshade (*Solanum dulcamara*), black nightshade (*Solanum nigrum*) and deadly nightshade (*Atropa belladonna*) but the potato's flowers are larger and paler in colour. Small tuberous potato rootlets have also been confused with those of poisonous cowbane (*Cicuta virosa*).

Tuberosum means 'tuberous' with reference to the roots.

When the potato was first discovered by Europeans there was some confusion between it and the sweet potato. This helps to explain why both the English and Spanish names for 'potato' are derived from the North American Indian name *batata* for the sweet potato (*Ipomoea batatas*).

The potato has long been in cultivation. The first crops were being harvested by the Peruvians at least as early as 3000 BC and prior to that they were being collected from the wild.

The Spaniards came across the potato in the South American Andes Mountains in 1534. One of the men, Juan de Castellanos, on the 1537 expedition led by a conquistador, Gonzalo Jiménez de Quesada (c.1497-1579) described the vegetable which he called 'truffles' as of good flavour, a gift very acceptable to Indians and a dainty dish even for Spaniards.

The potatoes were found above 11,000 feet, were about the size of hazelnuts (*Corylus avellana*) and were known locally as *chunu*. By the time the Spaniards arrived the highlanders could already preserve them and remove most of their poisonous qualities. After harvesting over four to five days the potatoes were left on the ground each night to freeze and the water content was trodden out during the daytime (like treading grapes, *Vitis*). *Chunu* was the staple diet of the silver miners at Potosi and when the Spaniards realized this they exploited both the miners and the highlanders by buying up stocks and selling them on to the miners at an exorbitant price (as in centuries to come railway magnets for instance trapped the gangs of labourers who laid the railway lines or banana barons of today have abused employees cultivating acres upon acres of fruit).

When the potato was brought back to Spain in 1570 (a debatable date as some authorities have noted a possibility that the vegetable may have been cultivated there at least a quarter of a century earlier) it was believed to be a cure for impotence and briefly gloried in this reputation. Certainly it was quickly viewed as suitable food for soldiers and the poor (Although the following events took place their sequence varies for different authorities.)

By the end of the 16th Century the vegetable had spread from Spain to Italy (records indicate that Philip II of Spain, who ruled from 1556-1598, made a gift of potatoes to the then Pope) and was also beginning to make rapid inroads into the rest of continental Europe. It was introduced to Mons in Belgium (a Country that today is the home of the only potato museum) by one of the Pope's legates. From Mons the plant was sent to the French botanist, Charles de Lécluse (1525-1609) known as 'Carolus Clusius', when he was in Vienna in 1598. Then from there the potato's popularity marched quickly through Germany although not quickly enough in what was Prussia in the mid-18th Century. In Prussia the famine of 1774 saw Frederick (II) the Great (1712-1786) sending potatoes to peasants starving in Kolberg. Unfortunately his gift had to be supported subsequently with soldiers before the good folk of Kolberg could be persuaded to eat the tubers. In parts of Russia acceptance took even longer. Serious riots occurred in ten provinces when in 1840 the Government of the day decreed that potatoes must be planted on common land.

Separately during the 1580s one of the English seamen, Sir Francis Drake, Sir John Hawkins, or Sir Walter Raleigh (precisely which one is understood to be of much debate) discovered the potato independently as it was still unknown to their countrymen. When

the potato eventually arrived in Elizabethan England it experienced a brief novelty rating as a tropical luxury. [Authorities point out that it is barely conceivable that the plant could have been found in Virginia in southern North America as it is not native to that part of the Americas. Thus of the three men the discovery is most likely to have been made by Sir Francis Drake as he put ashore at Cartagena in northern Colombia in 1585 before continuing north to rescue Virginian settlers from local harassment. This also appears to be supported by the German, Baden town of Offenburg which still boasts a statue of the British explorer with the inscription

Sir Francis Drake, who spread the use of the potato in Europe, AD
1586.]

Its general acceptance in Britain was partly impeded according to some authorities by the fact that Puritans had been unable to find any reference to the plant in the *Bible* and because of this were opposed to its cultivation. Household records of 1619 for James VI of Scotland and I of England (1566-1625) include reference to the potato as costing 2 shillings for one pound and it is known that by 1633 the Royal Society became aware of the tuber's advantages as a source of food in times of famine. But it was not until the middle of the 18th Century that cultivation there became more generalised after its successful introduction to Scotland in 1725. Even then it still had its opponents. Despite being recognized as a champion of the poor the English writer, William Cobbett (1763-1835) is claimed to have referred to the potato as 'Ireland's lazy root', and then observed

In whatever proportion the cultivation of potatoes prevails in
that same proportion the working peoples are wretched.

The one country where the potato scored immediately was Ireland. It had been introduced there in the 1580s (as it had in England) and by the 17th Century its consumption exceeded every other food. However some curious beliefs emerged at various times such as your neighbour's potatoes could be prevented from growing if you left a kettle of boiled potatoes in his field. Despite this by the late 1830s the potato as a staple food almost unsupported by any other was virtually entrenched. This was a significant factor in the ferocity of the effects for the Irish (and on a smaller scale the Scots) during the period of the potato blight that hit crops in both North America and Europe to varying degrees in 1845 and 1846. It led to the death of 1 million Irishmen from disease and starvation. For the Irish who had 'put all their potatoes in one basket' it was not just lack of food but also the absence of seed stock for the following year and lack of fodder for their animals. (And to make matters even worse these horrifying problems were only exacerbated by political issues.)

The widespread potato blight that had affected many countries (although to a lesser degree than Ireland) had many other ramifications. (Some authorities note that the disease made its debut in Europe in the Belgian potato fields in 1836 and from there fanned out through and from Europe ravaging communities in its path until at least 1872, carried by wind, rain and the cultivation of infected tubers.) The British government abolished punitive duty on grain imports but the blight also contributed to a general food shortage all over Europe which combined with economic and political unrest led to a massive increase in emigration to North America. The size of this is illustrated by the fact that although the number of Irish immigrants had jumped from an annual 60,000 to 200,000 by 1847 (and eventually 250,000), this was to remain at a constant 44% of all Europeans who made their way to North America during those years. The descendants of some of those immigrants are familiar in North American public life today not least the Kennedy family.

The blight was only identified later as a fungus and despite work by botanists since then it has not been completely abolished. The disease is now under greater control and blight-

resistant varieties of potato have been developed. There are parts of the world however where serious losses are still experienced and botanists actively monitor the movement of more aggressive strains of the fungus, as well as continuing their research to find non-susceptible varieties of the plant.

The one European country where the potato took longest to be accepted was France – despite the fact that the vegetable was probably being cultivated there widely from the first half of the 15th Century. From around 1620 the Abbey at Remiremont is believed to have accepted potatoes as payment. Tithes were also being paid on potatoes in the Lorraine region and in 1693 the priest at Saint-Dié won an order by which local farmers (who had been freely cultivating potatoes there since 1675) also had to pay a potato tithe. Despite this historians have declared that French acceptance was grudging to say the least. Even in 1749 it was being called the worst of all vegetables by a French expert in Burgundy where it was reported (as also in other areas around the Rhine) to have been believed that too much consumption of the potato could lead to leprosy. Its cultivation had been forbidden in that region since 1619 and in 1771 a Parisian medical faculty were required by the Government to assess whether the vegetable was safe to eat. During this period the Seven Years' War (1756-1763) had taken place and the army's apothecary, Parmentier (1737-1813) spent one year as a prisoner of war in Prussia. The Prussians had decided that potatoes were only suitable for pigs and prisoners of war. Thus as one of the latter Parmentier found that his diet was primarily potatoes. He returned to France with a new goal the promotion of the potato in his homeland – and a future which would lead historians to refer to him as an agricultural economist. Although he himself was living proof of the fallacy of the fairly widely held leprosy argument and some scientists were also beginning to support his own enthusiasm his first efforts met severe opposition. He was even to be sacked from his job as pharmacist at the Hôtel des Invalides when the pensioners there claimed that their food was 'pig fodder'. But in 1769 the city of Besançon held a competition to find the best plant substitute for grain cereals in the event of famine. Parmentier entered the potato which won first prize. But this was not enough partly because the symbol of food for the poor i.e., bread, could not be made satisfactorily from potatoes. So he still had to campaign as the problems of famine increased. He held a dinner party at which the guests included Benjamin Franklin (1706-1790) the famous American statesman and scientist who happened to be visiting Europe, and the menu embraced twenty different ways of preparing the potato in dishes varying from soups and entrées to cake and a kind of bread. A climax to his activities came however on 25th August 1775 when he presented bouquets of potato flowers to Louis XVI (1754-1793) and Marie Antoinette. To his gratification it is said that the King was heard to proclaim that famine, an ever-growing concern, would be at an end with the advent of the potato. But Parmentier appears not to have stopped here. To ensure the effect of the royal patronage he is said to have persuaded the King to order armed guards to stand duty round a 50 acre field of potatoes at Les Sablons in Neuilly. It was a very clever move as the parading soldiers were only likely to heighten the value and desirability of the crop both in fashionable circles and among the poor. Predictably the ploy worked as it not only led to burgeoning fashionability in Courtiers' eyes (they wore potato plant buttonholes) but because when the guard was relaxed intentionally at night many potatoes were stolen and this advertised them further. (Through all these efforts some authorities are said to have contended that Parmentier was not as interested in the potato's overall acceptability as he was in attempting to convince bakers that potato flour could be a satisfactory alternative to wheat flour – a practicable impossibility as potatoes do not contain gluten). Despite the heightened interest, substantial universal acceptance of the potato in France was still not destined to materialize until the French Revolution (1792-1804) and the

subsequent famine of 1816. Then the potato was embraced – but Parmentier who had expended so much energy in trying to promote it in the first place nearly lost his head to Madame la Guillotine because he had involved the King in these efforts. After reading thus far it is then disconcerting to be reminded that according to some historians the potato was being cultivated and eaten throughout France, particularly among the poor, long before Parmentier ever began his promotion of it. Regardless there is no doubt that there were still many dissenting voices. One such was Anthelme Brillat-Savarin (1755-1826), the celebrated lawyer and gastronome, who was said to declare on being offered potatoes

None for me. I appreciate the potato only as a protection against famine; except for that, I know of nothing eminently more tasteless.

Today in France those who are considered to have helped promote the potato are awarded membership of an association of gourmets, chefs and restaurateurs, the Académie Parmentier, Grand Ordre du Noble Tubercule.

As the potato gradually gained acceptance in Europe in many regions it not only sustained populations during famine but could also have been said to have increased them. As much as European rulers eventually welcomed the potato as a counter to starvation (which would have bred unrest) there are commentators today who have blamed the potato for contributing to the outbreak of World War I, at the beginning of the 20th Century, as it is often claimed that increased population was one of the factors leading to the conflict. On the other hand it has also been suggested by some authorities that without the potato Germany's survival of both 20th Century World Wars would have been less assured.

On the other side of the North Atlantic potatoes are believed to have been introduced to the United States in 1719 with the arrival of emigrating Irishmen who settled in New Hampshire. Quite a few North American Indian tribes including the Haisla, Iroquois, Cherokee, Abnaki, Meskwaki, Hanaksiala, Menominee, some of the Keresan, the Oweekeno, Kitasoo and the Seminole came to eat the tubers cooked. Apart from cooking them in more traditional ways some of the Chippewa used them to make soup, Makah Indians dunked them in oil to accompany fish, and in Winter (for which they stored them in root cellars) some of the Navajo boiled them into a pudding. The potato also served some tribes in a medicinal capacity. Bruised potatoes were applied to warts by Rappahannock Indians, the Cherokee used it to cause vomiting, and the Iroquois tribe treated eye inflammation with it.

Certainly potato's importance was well appreciated as Okanagan-Colville Indians treated it as a cash crop.

It is thought that potatoes were grown for the first time in North America on a commercial scale at Salem in Massachusetts in 1762. But they were only viewed as suitable for animals then – or for use by the estates in the South as a cheap slave food. Even in the mid-19th Century potatoes were still a lowly crop – but greater interest must have existed by then as the Massachusetts Horticultural Society was able to exhibit close to one hundred varieties in 1848. The Gold Rush was at about this time and the Mormons profited from selling potatoes to gold-eyed prospectors passing through their area. Although the vegetable eventually gained some general acceptance there some authorities observe that it has never reached the level of popularity achieved in Europe. In the 1960s 90% of the world's potato harvest could be found in Europe.

The potato was not short of its share of superstition in Britain. Not only did some people confuse the potato with the 'forbidden fruit' from the Garden of Eden but they also bestowed upon it various powers. As a charm against rheumatism a stolen potato carried either as a necklace or in the pocket was believed to be helpful, and warts rubbed with a

potato would melt away in concert with the potato's independent deterioration as it rotted. It was also believed that the best crop was obtained if the potatoes were sown on a stormy night. In the south of England potatoes were not planted on Good Friday, while in the Midlands they held the reverse view and the day was called 'Spud Day'. Even as recently as the beginning of the 20th Century some people were convinced that the best crop would be ensured from a Good Friday planting. In parts of Cheshire the arrival of the yellow wagtail (known in those areas as the 'potato dropper') from the European Continent in mid-Spring heralded potato sowing time. While in Devon

When you hear the cuckoo shout,
'Tis time to plant your tatties out.

Today at least one custom is still practised based on the old belief that any newly emerged natural thing is well placed to enable one's desires to be granted.

When eating the season's first new potatoes you make a wish.

In relatively recent times the Russians have used potatoes primarily to make vodka. It has long been distilled in that Country (Russia vies with Poland for the credit of having been first to make the drink). It had previously been made from other vegetable matter such as rye (*Secale cereale*).

Authorities believe that the Dutch probably introduced the potato to Java (now part of Indonesia) where it was still being assimilated when the Swedish botanical explorer, Carl Thunberg (1743-1828) travelled there. At roughly the same time the (British) East India Company was also spreading the tuber in other parts of south-eastern Asia including Malaysia and Sumatra (also now part of Indonesia). Potatoes were first introduced to New Zealand in the 1770s by the English navigator and explorer, Captain James Cook (1728-1779) and then by the French explorer Marion du Fresne (c. 1724-1772). They made an immediate and significant impact on Maori life. Not only did the plant thrive in both the North and South Islands but the Maoris also absorbed potatoes rapidly into their culinary practices and with the surpluses produced began their initial participation (unforeseen only a decade earlier) in a burgeoning world market being developed by the Europeans.

Potato flour is sometimes called Poor man's salep as a comparison between it and *salep* (a starch extracted from the tubers of some species of orchid which is sometimes used especially in the Middle East).

As a source of starch the potato appears to have been attracting the attention of the packaging industry during the last decade of the 20th Century. It was revealed in Britain in 2001 that a material (which would decompose within anything from 7-21 days) had been developed from the dried baked starch combined with cellulose fibres and water. It was expected to be able to replace, for instance, non-degradable polystyrene trays used by supermarkets for packaging fruit and vegetables and it was hoped that a mesh could also be developed for similar uses. Ultimately researchers anticipated that these innovations alone could dispense with 200 of the 4 million tonnes of household packaging waste sent to landfill sites in that Country – a not insignificant breakthrough as part of a larger drive to reduce household rubbish there.

The potato provides a source of starch or edible tubers on a commercial scale today for a wide range of applications apart from any already referred to. For example the textile industry uses it for sizing cotton and synthetic fibres for weaving and for thickening textile dyes, and it is used for thickening commercial printing inks and water-colour paints. The tubers are used extensively by the food and drinks industries, the latter for producing alcohol, particularly Akavit (or Aquavit).

Today the potato is the fourth most important crop in the World – and is the most important non-cereal food plant. Half an adult's daily Vitamin C requirement can be obtained from

one potato which is also 99.9% fat free and according to nutritionists has higher protein value than the World's principal protein crop the soyabean (*Glycine max*).

There are 8 species of potato, this one *Solanum tuberosum* being the only one (in its many, many varieties) eaten in the Western industrialized world. Apart from this the farmers in the Andes know up to 5,000 different varieties springing from the other species. All these varieties have been bred in their native lands over at least 7000 years and very many of them have ended up in a worldwide network of agricultural gene banks. Until early 2005 this would effectively have denied the South American Indian tribes that bred them over those centuries the right to a return from any future exploitation of the genes involved. In other words yet another instance of genetic piracy was looming if multinational seed companies (who had already patented plants in other examples and made people pay for using seeds which they had bred in the first place eg. Pride of China, *Azadirachta indica*) turned their attentions to the potato. In February 2005 it was reported that Quechua Indians in the Peruvian Andes had designated an area as a kind of 'potato park' to secure the future of potato plants and had reached an initial agreement with the Potato Centre in Lima (part of the agricultural gene network) for the commercial rights covering 206 varieties.

The potato was chosen as the vegetable emblem for the state of Idaho in the United States in 2002.

Medicinally, herbalists used to recommend the potato in the treatment of rheumatism and peeled and pounded uncooked potatoes used to be applied to scalds and burns.

The blossom is the birthday flower for 13th June.