

Twelve Plants in Twelve Weeks

Many farmers involved in the Climate Resilient Farms project will be experimenting with seed mixes for multi-species paddocks. Jade Killoran, the project's agronomist and Kirsty Hawkes, communications assistant, have dug deep to bring you the history, benefits and sometimes surprising cultural associations of twelve of these plants. We kick off with the tillage radish - both thrilling and ravishing for any soil.

Tillage Radish – Queen of Cover Crops

What do I know of man's destiny? I could tell you more about radishes. (Samuel Beckett)

When Irish playwright, Samuel Beckett, made this comment, he could not have known that one day the improvement of soil health would depend heavily on a radish. Acting as biological driller, killer, fodder and prodder, the tillage radish is the queen of cover crops.

Forage and oilseed radishes were bred to break up compacted soil in America in the early 2000s. The development of what today we call tillage radish was led by Pennsylvanian farmer Steve Groff. Tillage radish is a trade name and a variety of the species *Raphanus sativus* which includes all cultivated as opposed to wild radishes which are *Raphanus raphanistrum*. In 2015 Steve brought the first tillage radishes to Australia, touring Victoria to promote them. AGF Seeds were the first to distribute the seeds which are now grown in Australia too.

Every part of the tillage radish is beneficial to the soil and grazing livestock, but it is best known for its long, strong tap root which drills through heavily compacted and degraded soils. In Australia, where soil salinity is a major problem, these robust radish roots have even been found to penetrate the sodic layer which can be as hard as concrete. The main tillage radish taproot usually reaches 20-60 cm in length with the thin lower part of the root sometimes growing nearly 2 metres underground. The root opens up the soil, improving water infiltration and aeration.

The finer roots branching off from the main tuber act as a giant sponge, absorbing nitrogen and nutrients from deeper in the sub-soil, and releasing them from the main tuber once the radish begins to decompose. The tuber also provides a haven and food source for soil biota, particularly worms, as it decomposes. As the main tuber is closer to the surface, this nutrient release is very beneficial for topsoil fertility and plants with shallower root systems which cannot readily access the subsoil.

Like other brassicas, the tillage radish contains compounds called glucosinolates which are toxic to soil-borne pests and pathogens such as harmful nematodes, and as such is gaining popularity as a break crop in the horticulture sector. This process is known as biofumigation.

From a livestock perspective, tillage radish establishes rapidly (twice as fast as fodder rape) and provides high quality fodder with plenty of energy and protein. The plant tends to smother weeds due to its competitiveness and provides fodder in 6-9 weeks. Tillage radish is very versatile as it can be sown almost year round. It tolerates both low and high temperatures, being more drought tolerant than other brassicas due to the energy resources available in its large tuber and its ability to access subsoil moisture and nutrients.

Sowing tips: Tillage radish can be planted at any time of year but sowing after the longest day will prolong maturity and encourage tap root growth. Sowing from December to May in Australia will provide the best results. Sow at a depth of 0.75-2.5cm at 3-5 kg per hectare.

Rad Radish Facts:

The Record Radish – The biggest radish ever grown weighed 31.1kg and had a circumference of 119cm. The radish, *Raphanus sativus var longipinnatus*, was cultivated by Japanese gardener Manabu Oono in 2003. Known as a Daikon (Japanese for “big root”), radishes were introduced to Japan over 1300 years ago and there are now 120 varieties. The Sakurajima Daikon is the largest of these varieties and has been cultivated in the volcanic soils of Sakurajima since 1804. Sakurajima was an island, but since an eruption in 1914 has been joined to the mainland. Before this event 500 acres were devoted to its growing.

The Original Radish - The wild ancestors of all radishes probably come from Southeast Asia where they were first domesticated. No amount of googling revealed how many varieties of radish now exist, but they would certainly number hundreds, with more no doubt being developed.

The Commercial Radish - Most radishes are produced in China, Korea and Japan, with a global figure of 7 million tonnes reported in 2004.

The Oily Radish - The seeds of radishes can be pressed to extract radish seed oil. Wild radish seeds contain up to 48% oil, and while not suitable for human consumption, this oil is a potential source of biofuel. It was used in some places to light lamps and in China ink was once made from the soot of the flame of radish oil.

The Cultural Radish - In Japan and Korea, radish dolls are sometimes made as children's toys. Daikon is also one of the plants that make up the Japanese Festival of Seven Herbs (*Nanakusa no sekku*) which takes place on the seventh day after the new year.

The Christmas Radish - Citizens of Oaxaca in Mexico, celebrate the Night of the Radishes (*Noche de los rábanos*) on December 23 as a part of Christmas celebrations. Religious and popular figures, buildings, and other objects are cleverly carved from large radishes and displayed in the town square.

The Ravenous Radish – Radishes feature in recipes all over the world. Their peppery taste makes them an Asian favourite. "Radi", a spiral-cut radish sprinkled with salt and occasionally chives, is traditionally served with beer at the Bavarian Oktoberfest. Tillage radish can be eaten. Jade recommends it thinly sliced in salad.

The Healing Radish – According to ethnobotanist and herbalist, Wolf D Stor, the radish has a range of healing properties. It is said to inhibit fungi and bacteria; activate gallbladder and liver; help prevent gallstones, kidney stones, and bladder stones; improve intestinal flora; prevent scurvy (antiscorbutic); promote urination. The glucosinolates in radishes which are so helpful for soil are said to have an antibacterial and antifungal effect on humans, which help prevent colds. Radishes feature in several traditional remedies. - The juice can be rubbed into the scalp to encourage hair growth; Radish seeds can be cooked into a brew to counteract mushroom poisoning; Dairy farmers used the crushed leaves to heal cows' udders; Radish slices can be placed on corns to soften them.

The Religious Radish – Because the Roman war god, Mars, rules over the radish, it became a symbol for quarrel and strife in the Middle Ages. Radish flowers in the courtly Language of Flowers reflect this meaning. So that the radish did not cause too much strife, precautions were taken to consecrate it. Radish consecration was traditionally done on the day of the Feast of the Chair of St. Peter (February 22) to whom the radish was sacred. In Japan the radish means affluence and in the Near East it denotes spring and the renewal of life. Radishes were often an attribute of wind and weather gods such as Donar the ancient German god of thunder, equivalent to the Norse Thor.



Manabu Oono in 2003 with his record-breaking Japanese radish.



An impressive display of carved radishes at the Mexican festival, Night of the Radishes (*Noche de los rábanos*). Why not try this at home? Forget the pumpkins this Halloween and get whittling those radishes!