

## Linseed – From Fungi and Phosphorus to Flooring and Physics

Linseed, also known as flax or flaxseed, is officially, *Linum usitatissimum*, a flowering plant in the family Linaceae. The plant has multiple uses for mankind (*usitatissimum*, means "most useful"). For instance, linen is made from its fibres and linoleum from the oil extracted from its seeds, but it is also cultivated as a food and fibre crop in temperate regions. Linseed meal, the by-product of producing linseed oil from seeds, is used as livestock fodder and increasingly for us. Gluten free, an excellent source of fibre and a good source of protein, it can be used in baking, salads and smoothies, among other things.

Our Resilient Farms Agronomist, Jade Killoran, says:

“Linseed is an annual broadleaf which is used in mixes because it is a host to mycorrhizal fungi, can release soil phosphorus and attracts pollinators. It is highly recommended by Christine Jones, and a few top-level US cover croppers. Buckwheat also makes soil phosphorus available to plants but is usually sown in spring mixes while linseed is best sown in autumn mixes.

There is no real livestock feed value in linseed, but it establishes readily and doesn't take up much space in the paddock, as it is a slim, upright plant. I sow linseed in a mix at .5kg/ha as it re-seeds quite easily. It is fairly resistant to pests such as RLEM, and also tolerates hot dry periods due to its taproot. While it doesn't have a large taproot like tillage radish, the taproot is sufficient to access subsoil moisture and reduce heat and drought stress on the plant.”



Linseed flowers (Google commons)



## Fungi and phosphorus

Australian soil ecologist, Dr Christine Jones, has lectured all over the world on the subject of soil and in particular the importance of mycorrhizal fungi. Here's what she has to say:

“Much of the initial research into mycorrhizal fungi was related to the uptake of phosphorus. Phosphorus is a highly reactive element. As soon as there's any free phosphorus floating around in the soil, including whatever we may add as fertilizer, it becomes fixed. In other words, it forms a chemical bond with another element like iron or aluminium or calcium, making it unavailable to plants. But certain bacteria produce an enzyme called phosphatase that can break that bond and release the phosphorus. Once released, the phosphorus still has to be transported back to the plant, which is where mycorrhizal fungi come in. As our analytical techniques have become more sophisticated, we've realized that mycorrhizal fungi also transport a wide variety of other nutrients, including nitrogen, sulphur, potassium, calcium, magnesium, iron, and essential trace elements such as zinc, boron, manganese, and copper. In dry times they supply water. Mycorrhizal fungi can extend quite a distance from plant roots. They form networks between plants and colonies of soil bacteria. Plants can communicate with each other via messages sent through these networks. Mycorrhizal fungi are both the highway and the Internet of the soil.” Regenfarming.news (published 2015, updated 2021)



*Linum usitatissimum* from Köhler's "Medizinal Pflanzen," 1897 (Google commons)



## Linen Lingerie

Linseed provided humans with their first plant-based textiles. The earliest underwear would have been made of linen – hence the word lingerie.

The earliest evidence of humans using wild flax as a textile comes from the present-day Republic of Georgia, where spun, dyed, and knotted wild flax fibres found in Dzudzuana Cave date to the Upper Paleolithic, 30,000 years ago.

Flax was cultivated extensively in ancient Egypt, where the temple walls had paintings of flowering flax, and mummies were embalmed using linen. Egyptian priests wore only linen, as flax was considered a symbol of purity. Phoenicians traded Egyptian linen throughout the Mediterranean and the Romans used it for their sails. As the Roman Empire declined, so did flax production. But with laws designed to publicize the hygiene of linen textiles and the health of linseed oil, Charlemagne revived the crop in the eighth century AD. Eventually, Flanders became the major centre of the European linen industry in the Middle Ages. In North America, colonists introduced flax, and it flourished there, but by the early 20th century, cheap cotton and rising farm wages had caused production of flax to become concentrated in northern Russia, which came to provide 90% of the world's output. Since then, flax has lost its importance as a commercial crop, due to the easy availability of more durable fibres.

Flax fibres taken from the stem of the plant are two to three times as strong as cotton fibres. Additionally, flax fibres are naturally smooth and straight. Europe and North America both depended on flax for plant-based cloth until the 19th century, when cotton overtook flax.

Flax / linen exhibit: flax stem, fiber, yarn and woven and knitted linen textiles. Tray and samples of the textile cabinet in the Textielmuseum in Tilburg. (Google Commons)



## Flax on the Flag

The flax flower is an emblem for Northern Ireland and more typically common flax is the national flower of Belarus. Ukraine's national flower is the sunflower.



## Flax Fax –Flowers, flour, floors and more

The linseed plant plays a part in a truly remarkable range of products from non-stick frying pan to putty and printing ink. In this millennium it has even been used in nuclear physics to detect radiation! Here is the ever-expanding list of the plant's uses:

- Wood – drying, preserving oil and varnishing
- Gilding – adheres sheets of gold leaf
- Oil paints - pigment binder
- Putty – plasticiser and hardener
- Printing inks
- Food supplements and cooking
- Industrial lubricant
- Leather treatment
- Tablecloths - waterproofing
- Textiles – linen and more
- Radiation detector
- Frying pan coatings
- Floors – earthen and linoleum
- Bicycle maintenance as a thread fixative, rust inhibitor and lubricant
- Composition ornament for moulded decoration
- Ornamental garden plants
- Animal care products
- Animal feed

What next...?

