

MENTERRA LINSEED AND CAMELINA OMEGA 3 OIL CROP TRIALS

Omega 3

Both Linseed and Camelina contain significant levels of linolenic acid, a short chain omega 3 fatty acid. Short chain omega 3 is converted in the human body into long chain omega 3, which has been associated with good cardiovascular and mental health, although the efficiency of the conversion process and the extent of omega 3's benefits are still subject to debate. Long chain omega 3 is obtained from oily fish but there are concerns about levels of pollutants such as heavy metals and PCBs, especially as many caught species, e.g. mackerel, are at the top of the food chain where pollutants may accumulate over time. As over-fishing and Climate Change threaten the long-term sustainability of fish stocks, plant sources of omega 3 will become increasingly important.

Linseed

Linseed is the seed product of *Linum usitatissimum* L. also commonly known as flax. The plant has been cultivated for thousands of years, being one of the 'Near East package' of six crops that founded agriculture in the Fertile Crescent; the others being einkorn wheat, emmer wheat, barley, lentils and peas. Plant breeders have developed two main types of specialised cultivars, seed flax (linseed) for oil production and fibre flax for the bast fibres in the stem.

The linseed plant is an annual with a thin, erect and wiry stem. Linseed varieties tend to be shorter with more branches than fibre flax plants. The flowers are usually self-pollinated and produce a rounded fruit capsule that retains the seed until threshed. The seeds are oval and flattened about 4-5mm long, are usually brown but golden varieties have also been developed.

Linseed cultivation was encouraged in the 1990s by a favourable subsidy regime, but since the 'Agenda 2000' reforms the popularity of this crop has fluctuated. At the time of writing, the short-term prospects for linseed are on a downward trend due to a poor UK harvest in 2006 (resulting from a cold spring and summer drought), poor prices (a good harvest in Canada) and good prices for oilseed rape (a rival break crop).

Camelina

Camelina (*Camelina sativa*), a member of the mustard family, is a summer annual oilseed plant. Camelina, like oats and rye, is considered a secondary crop because it appeared first as a weed of flax and cereals, before being domesticated as agriculture spread into Eastern Europe where its tough qualities were appreciated.

The plant grows between 30-90 cm tall, has branched stems that become woody at maturity, and produces abundant small pale yellow flowers. The seeds are yellow to yellow-brown with a very low thousand-grain weight of about one gram. False flax and Gold of Pleasure are the popular names for *Camelina sativa*.

The crop was probably never widely grown in the British Isles but was popular in Eastern Europe and Russia until the 1940's and 1950's. Camelina was replaced with the introduction

and widespread use of oilseed rape, probably due to difficulties associated with hydrogenating the highly unsaturated oil for margarine.

THE MENTERRA TRIALS

Linseed was the first of the omega-3 crops to be trialled on-farm. Two varieties, a brown and a golden linseed were grown in this trial, while a wider selection of varieties was grown in plots at Henfaes.

As *Camelina* is a novel crop in Gwynedd, it was first trialled at Henfaes to make sure it could grow well in our climate, before being scaled up onto a field scale in 2005 and 2006.

Seed was cold-pressed using a small oil press at Henfaes demonstrating that it could be viable to press and bottle the oil on-farm to add value.

The key findings were:

- Linseed (and flax) grows very well in the Gwynedd climate and yields compare favourably with any other region of the UK.
- The late maturity of linseed can cause harvesting difficulties; both because the fibrous straw is difficult to cut if damp, and seed will quickly spoil post-harvest unless dried.
- Linseed competes very poorly with weeds, and herbicides must be applied at the correct time, otherwise weed infestation will result in crop failure.
- *Camelina* grows well in Gwynedd, and could fit well into the local farming system.
- *Camelina* is easier to harvest than linseed, as it has a shorter growing season, hence earlier maturity, and no fibre in the stem.
- Following the withdrawal of triflurin, there are no herbicides registered for use on *Camelina*. Fortunately *Camelina* competes well with weeds by producing its own herbicide (known as allelopathy).
- *Camelina* straw is useful animal bedding.
- *Camelina* seed must be dried immediately after harvest to prevent spoilage. Oil from damp seed will be tainted by mouldy off-flavours, and of no value.