

Fodder/Forage Rape

Methane Mitigation and Mighty Mixer

Fodder rape (*Brassica napus* and interspecific crosses of other *Brassica* species including *Brassica rapa* – mainly turnips - and *Brassica campestris*- largely leafy turnips & forage brassica hybrids) are used for pasture, silage and green manure. Fodder rape improves the soil, decreases the risk of N leaching and soil erosion and fights against parasites (has allelopathic properties). It has also been shown to reduce methane emissions in sheep.



Fodder rape thriving in May, sown as a summer mix. (Photo – Jade Killoran)

Our Resilient Farms Agronomist, Jade Killoran, says:

“Fodder rape is a tough, versatile brassica species which can be sown in autumn, spring and summer if moisture allows. As part of a multispecies mix, it provides long lasting, high quality forage over multiple grazings. From an autumn sowing, first grazing occurs at 8-12 weeks, and plants will last through into late spring. From a spring or summer sowing, the fodder rape can be grazed over summer and will persist on into the autumn and winter with good grazing management, helping create a valuable feed wedge for the farm.

Another advantage of this strategy is that plants are large and well established when RLEM appear in the autumn and are less susceptible to attack as a result. Red legged earth mite, cabbage moth and diamond back moth are partial to forage brassicas, but this risk can be mitigated a bit by sowing date, and by sowing a diverse multispecies mix, which will attract lower numbers of pests than a monoculture. Over time, as soil and plant health improves, these insect pests become less of a concern.

Fodder rape is highly palatable and a mainstay of most multispecies mixes. It is a small seed, and sown at 1-2 kg/ha in a mix, it provides excellent value for the seed cost/ha.”



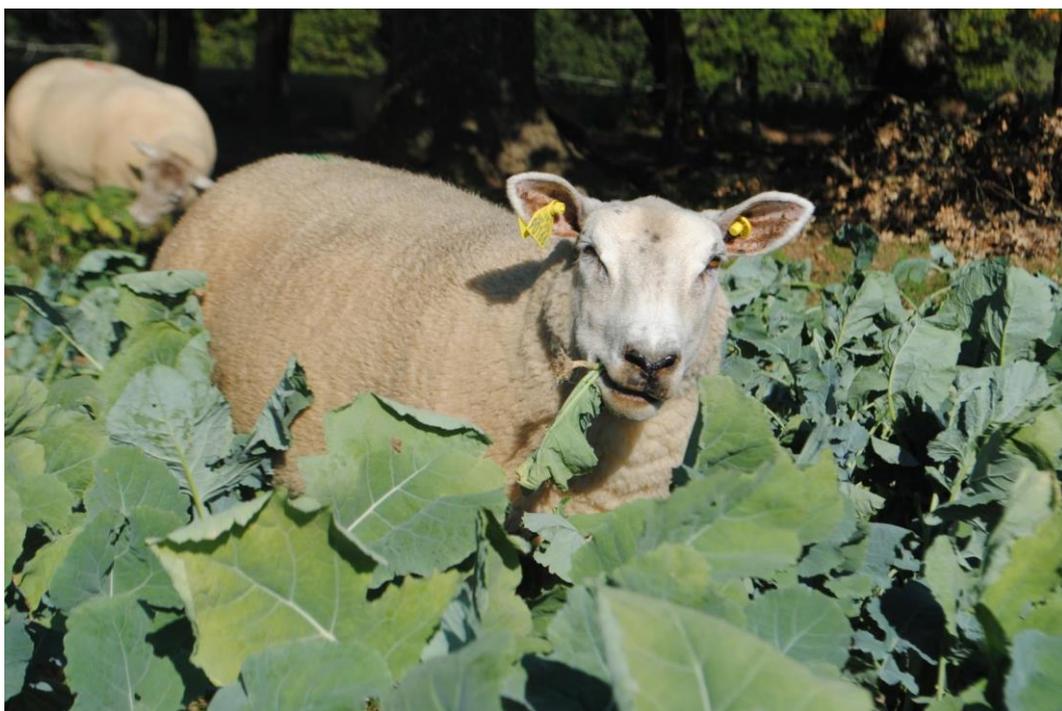
Methane emissions

Work has been done on sheep which shows methane is mitigated by the ingestion of brassica forage crops so why not cattle too?

According to Feedipedia:

“In an experiment in New Zealand, lambs fed fresh winter forage rape yielded 22–30% less CH₄ than those fed perennial ryegrass and the difference persisted for 15 weeks. The lower CH₄ yields from forage rape were associated with a different microbial community, a faster fermentation and a lower ruminal pH. Forage rape could be a viable CH₄ mitigation tool for pastoral-based sheep production systems. (Sun et al., 2015).”

In a 2020 academic paper entitled “Glucosinolates Might Result in Low Methane Emissions From Ruminants Fed Brassica Forages” led by Xuezhao Sun again and resulting from studies in China, the author: “proposes a new mechanism underlying the lower methane emissions from sheep fed brassica forages. It is reported that feeding brassica forages to sheep can increase the concentration of free triiodothyronine (FT₃) in serum, while the intramuscular injection of FT₃ into sheep can reduce the mean retention time of digesta in the rumen. The short retention time of digesta is associated with low methane production. Glucosinolates (GSLs) are chemical components widely present in plants of the genus *Brassica*. After ruminants consume brassica forages, GSLs are broken down in the rumen. We hypothesize that GSLs or their breakdown products are absorbed into the blood and then may stimulate the secretion of thyroid hormone FT₃ in ruminants, and the altered thyroid hormone concentration may change rumen physiology. As a consequence, the mean retention time of digesta in the rumen would be altered, resulting in a decrease in methane emissions.”



Pest and pathogen control

In a 2020 study conducted in China by Yu-Lian Gao et al: “results indicated that the allelopathic inhibitory effect of rape water extract was the strongest on sunflower, followed by corn and oat.”

According to NSW Agriculture, Agfact P2.1.13, first edition 2002:

“Brassica crops can also reduce the incidence of soil-borne plant diseases. Brassica crops contain naturally occurring chemicals called glucosinolates. These chemicals break down in the soil to produce compounds that inhibit the growth of disease producing organisms such as the take-all fungus, which is regarded as one of the most serious root diseases of wheat. They also reduce the incidence of nematodes. While the level of these biofumigants varies between brassica types, all brassicas will deliver some benefit.”

Fuel for Mammals and Motors

The most famous member of the Brassica napus family is rapeseed also known as rape or oilseed rape. **Canola** are a group of rapeseed cultivars which were bred to have very low levels of erucic acid (harmful to mammals) and are especially prized for use as human and animal food. Rapeseed is grown for the production of animal feed, edible vegetable oils, and biodiesel. Rapeseed was the third-leading source of vegetable oil in the world in 2000, after soybean and palm oil. It is the world's second-leading source of protein meal after soybean. Owing to the costs of growing, crushing, and refining rapeseed biodiesel, rapeseed-derived biodiesel from new oil costs more to produce than standard diesel fuel, so diesel fuels are commonly made from the used oil.

What’s the Dry Matter?

All forage brassica crops have a high dry matter yield. Typically:

- 3–10 t/ha for forage rape
- 2–8 t/ha for leafy turnip
- 2–12 t/ha for turnips
- 5–20 t/ha for kale
- 5–20 t/ha for swedes

The Hindu Kush where the wild ancestor of *Brassica rapa* is believed to have come from.



From the Himalayas to Heat Resilience

According to an article on atlasobscura.com by Gemma Tarlach (11 June, 2021):

“The single species (*Brassica rapa*), which humans have turned into turnips, bok choy, broccoli rabe (also known as rapini), and other residents of the produce aisle, began up to 6,000 years ago in Central Asia, most likely in the shadow of the Western Himalayas’ sky-piercing peaks.”

Now members of this remarkable family “grow from Alaska to Tierra del Fuego. They grow in Oceania, they grow from Spain to Japan.”

According to Makenzie Mabry, who co-authored an academic study entitled “*Brassica rapa* Domestication: Untangling Wild and Feral Forms and Convergence of Crop Morphotypes” first published in April 2021:

“One reason we think these species have this incredible diversity is that their ancestor had not only a duplication of their genome, but a triplication. Even in the wildly diverse plant world people recognize Brassica as being a little ‘extra.’”

More genes mean more raw material and thus greater adaptability. So, if one species can be so many different things perhaps it has the ability to adapt to the demands of a changing climate before it’s too late!

Illustrations of *Brassica rapa* in the “Seikei Zusetsu”, a Japanese agricultural encyclopedia compiled between 1793 to 1804.



Who's to Blame for the Name? – Kirsty's Quest for the Root

When I was a lass in the 1980s, the fields of yellow flowers which started to appear in Scotland, were referred to as rape. When I came to Australia, I was delighted to find that what looked to me like the same crop was called canola. So where does "rape" come from?

According to Wikipedia:

"Brassica napus is a digenomic amphidiploid that occurred due to the interspecific hybridization between Brassica oleracea and Brassica rapa."

Brassica rapa is the species which has spawned, among other vegetables, turnips. So, the term "rape" comes from the Latin name for turnip which in turn comes from the Greek *rhapys*. After a google search, I found that *rapa/rapus* might mean "rod" (Byzantine Greek *ῥαπίς* is rod according to Lexico.com) Then again, another likely root is from the Latin word *rapere* which means "to hurry away" as in "rapid", or "to seize" which brings us back to the other meaning of the word "rape".

So, in answer to last week's question - What is another common name for fodder rape (*Brassica rapa*)?

Well for starters, I now realise fodder rape is more properly called *Brassica napus*. Field mustard is a common name used for a variety of these related plants. And I thought the binomial system was meant to make things clearer!

The important thing of course is that cows don't care what it's called or why. It's just delicious and nutritious!

