



FODDER RADISH AND OTHER FORAGE BRASSICAS

SIGRUN AMMANN, DERRYN NASH & DAVE GOODENOUGH

Fodder radish, (*Raphanus sativus* var. *oleiformis*) is commonly used as a winter feed mainly in the eastern parts of South Africa (KwaZulu-Natal and Eastern Cape). It is often known as Japanese, or Jap, radish. In other parts of the world it is mostly used as a cover crop. Forage brassicas include kale, also known as Chou-Moellier (*Brassica oleracea* var. *viridis*), forage rape (*Brassica napus*), swedes (*Brassica napus* var. *rapifera*) and turnips (*Brassica rapa* var. *rapa*).

All these differ in their characteristics and uses. In New Zealand there are also leaf turnips which produce no bulb and only have a swollen taproot with multiple growth points. Swedes and turnips both have a fleshy bulb with swedes having an obvious neck between the leaves and the bulb while turnips have no neck. Kale and forage rape both have no bulbs. Kale has a swollen stem with an inner soft marrow while forage rape has a fibrous stem.



FIGURE 1: Kale (*Brassica oleracea* var. *viridis*)



FIGURE 2: Forage Rape (*Brassica napus*)



FIGURE 3: Swede (*Brassica napus* var. *rapifera*)



FIGURE 4: Turnip (*Brassica rapa* var. *rapa*)

Uses

Generally fodder radish and forage brassicas are used as winter feed in South Africa but in other parts of the world like New Zealand, kale is also used in summer while forage rape and turnips are additionally used in late summer and early autumn. In the eastern areas of South Africa the summer planting of forage brassicas often suffer heavily under insect attack and have to be sprayed. The warmer temperatures also resulted in poor yield compared to summer production of grasses. Good weed control is necessary for summer production.

Fodder radish and bulb turnips are most commonly used in KwaZulu-Natal with the turnips used mainly in the colder southern parts of the province. The ARC has developed a new long-duration fodder radish called "Endurance" with soft leaves, which retains its quality longer and grows for almost seven months from planting while the other fodder radish varieties last for five, sometimes six months from planting with substantial leaf loss and bulb deterioration towards the end of the fifth month and into the sixth month. The forage brassica species have various days to maturity and, depending on the specific variety, vary from 90 to 180 days.

The main function of these forage crops is to provide feed during periods of feed shortage and to serve as a fodder bank especially for the bulb species which can be utilized over a three to four month period.

Fodder radish and brassicas should be limited to 70 to 80% of the diet for dry cows and only 30% for lactating cows. Brassicas are high in protein and energy but very low in fibre and thus animals should also be fed hay or pasture to slow the rate of passage and to allow for more effective digestion. Animals should not be given sudden unrestricted access to brassica crops but rather introduced slowly over a one- to two- week period. Grazing strips can be provided with electric fencing. Even though brassica and fodder radish are very high in moisture

content, it is important to provide the animals with sufficient water while grazing these forage crops.

Establishment

All the forage brassicas including fodder radish do not tolerate waterlogging and have relatively high nitrogen, potassium and phosphate requirements. Boron is also sometimes required. For forage brassicas sufficient molybdenum is important. A soil sample before planting is essential.

The seed can be drilled or broadcast. Drilled rows should be at 30 to 50 cm spacing for bulb types while others can be drilled at 15 to 20 cm rows. The wider the spacing within the row up to 50 cm, the bigger the resulting bulb.

TABLE 1 Recommended sowing rates

	Drilled (kg ha⁻¹)	Broadcast (kg ha⁻¹)
Fodder radish	2 - 3	3 - 4
Turnips	1 - 2	2 - 3
Swedes	1 - 2	-
Kale	3 - 5	5
Forage rape	2.5 - 3	-
Leaf turnips	3 - 4	5

Suitable sowing dates are from February to the latest mid-March to allow for good bulb development and utilize soil moisture from the summer rains for good establishment. In some areas it is necessary to spray for aphids, especially root sucking aphids which can be common on fodder radish.

Effect of intra-row spacing on fodder radish

A trial was done to determine the effect of intra-row spacing of 25 cm and 50 cm between plants in the row and rows spaced at 50 cm. The data shown in Figure 5 shows the narrow row-spacing to be preferential in harvests two and four. The data also shows that there is no adverse effect in terms of yield if the plants are spaced closer together.

It was always thought that the wider spacing allows for bigger bulbs and thus higher yield but this is apparently not necessarily the case.

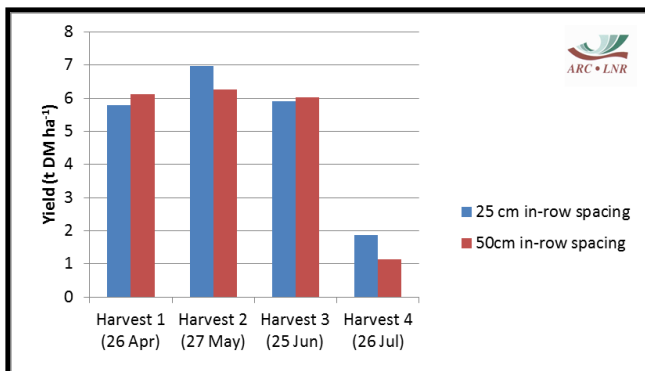


FIGURE 5: Dry matter yield (t DM ha⁻¹) in response to intra-row spacing of 25 cm and 50 cm with inter-row (between rows) spacing at 50 cm.

Effects of controlling root aphids in fodder radish

Root or bulb sucking aphids can be a major problem in fodder radish. Spraying a systemic insecticide such as imidacloprid early on when the crop is young can make a substantial difference to the yield, especially if the fodder radish is kept for later harvesting. The results are shown in Figure 6 below.

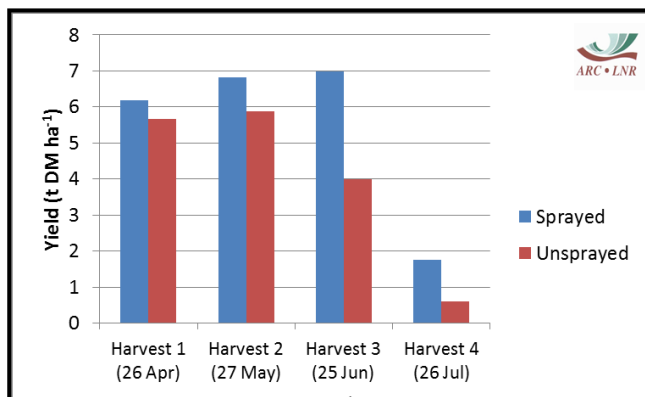


FIGURE 6: Dry matter yield (t DM ha⁻¹) in response to spraying to control root aphids.

Production of fodder radish (*Rapahnus sativus var. oleiformis*)

Harvesting can be done from three to five/six months after planting and for the long duration types up to 6½ months or from three to nine weeks after the first frost if planted in February to mid-March. In the data shown in Figure 7, the bulb yield increased until July for the soft-leaved and standard

varieties, while the long-duration varieties still had a significant increase in bulb yield during August with the peak reached at the end of August/early September. Only the long-duration varieties had a bulb yield in late September.

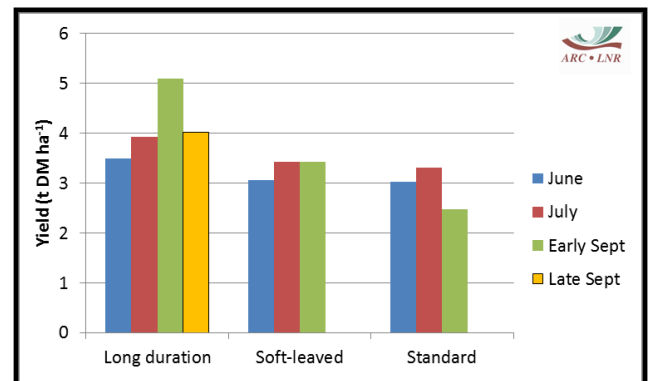


FIGURE 7: Root/bulb DM yield (t DM ha⁻¹) at ARC Cedara planted 11 March 2010 with four harvest dates.

Figure 8 shows the leaf yield which for all three types of fodder radish peaked in July. The standard varieties suffered substantial leaf deterioration after July and to a large extent the soft-leaved varieties as well although they retained more leaf than the standard varieties. The long-duration varieties retained their leaves the best and there was some leaf-retention to late September.

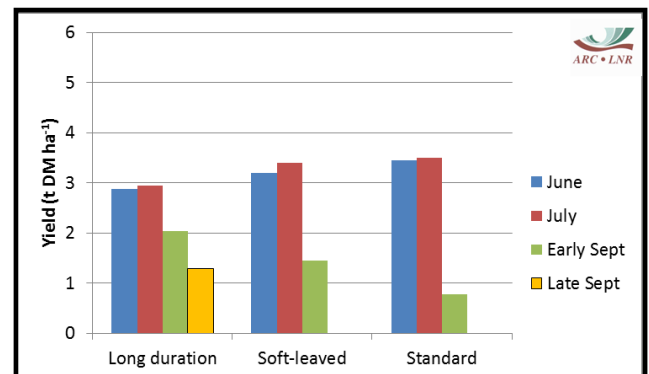


FIGURE 8: Leaf DM yield (t DM ha⁻¹) at ARC Cedara planted 11 March 2010 with four harvest dates.

The exact month, or months after planting when peak yield is achieved for leaves and bulbs depends on the planting date. For an early February planting the peak yield can already be reached four months after planting due to the faster growth rates in the warmer temperatures. For the 2010 planting at ARC Cedara, which was at the latter end of suitable planting dates,

the total yield amounted to approximately 7 t DM ha⁻¹ (Figure 9). The long-duration varieties were able to increase in biomass until early September while the other varieties peaked in July, deteriorating significantly thereafter.

A similar trial run in 2005 yielded a maximum dry matter production of 5 t DM ha⁻¹ at the second harvest, which was six weeks after the first frost on 5 July. The trial was planted on 24 February. Yield will vary with rainfall and temperature.

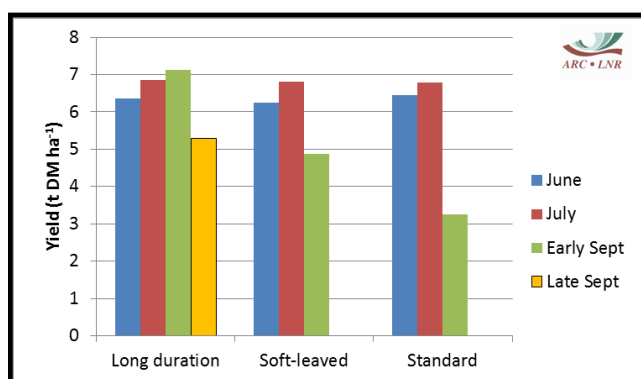


FIGURE 9: Total Yield (leaf + bulb) (t DM ha⁻¹) at ARC Cedara planted 11 March 2010 with four harvest dates.

Animal health risks

As mentioned above animals should always be introduced slowly to brassicas to allow them to adapt and should not be hungry when they feed on brassicas. Brassicas can be highly metabolisable and hungry animals can bloat very quickly.

Due to the high sugar content and low fibre content

there can be a risk of acidosis if the brassicas make up a substantial component of the diet. At high nitrogen applications there is a risk of nitrate poisoning. Brassicas also contain glucosinates which can interfere with thyroid functioning and SMCO (S-methyl cysteine sulphoxide) which can depress intake and can cause haemolytic anaemia. It is thus important to feed hay or pasture together with brassicas in the diet.

Contact

Derryn Nash

Professional Scientist

Tele: (033) 355 9256

derryn.nash@kzndard.gov.za

KZN Department of Agriculture & Rural Development
Livestock Production: Grass & Forage Science,
Cedara

Or

Sigrun Ammann

Professional Scientist

Tele: (044) 803 3726

sigruna@elsenburg.com

Western Cape Department of Agriculture, Plant
Science, Outeniqua

Published March 2016

TABLE 2 Varieties listed in the South African Variety List in November 2015

Fodder radish	Kale	Forage rape	Swedes	Turnip
Anaconda, Doublet	Chou Moellier/ Marrow stem	Giant English	American Purple Top	Australian Purple Top
Geisha (soft-leaf), Groundhog	Sovereign	Giant Essex	Champion Purple Top	Early Purple Top Globe
Lomo (soft-leaf), Melotop		Hobson		Green Globe
Nooigedacht, Samurai				Mammoth Purple Top
STAR 1650, STAR 1651				Marco
Sterling (soft-leaf), Terranova or				
Endurance (long, soft leaved)*				

*this variety is not yet listed but will be in 2016.