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## Japanese Radish – *Raphanus sativus*

Japanese Radish is an annual temperate root crop. It is cultivated for forage and it has a thickened taproot that makes out the bulk of the production. It is conventionally utilised as grazing (sheep, goats or cattle), or alternatively fed to animals after uprooting it. It makes good silage if mixed with other roughage with a low water content like wheat straw. It can also be preserved by chopping and drying it. It can be utilized in winter and early spring (depending on planting date) under dry land conditions or irrigation. It requires at least 350 mm rainfall per annum if it is cultivated under dry land conditions. It is also produced under irrigation.



### Strengths

- 4 – 12 t DM/ha/season  
**Depending on environmental conditions and management**
- High production of good quality forage
- Drought tolerant once established
- Cost effective crop
- Bio-fumigation crop for nematodes
- Successful to aerate soils due to the large root.

### Limitations

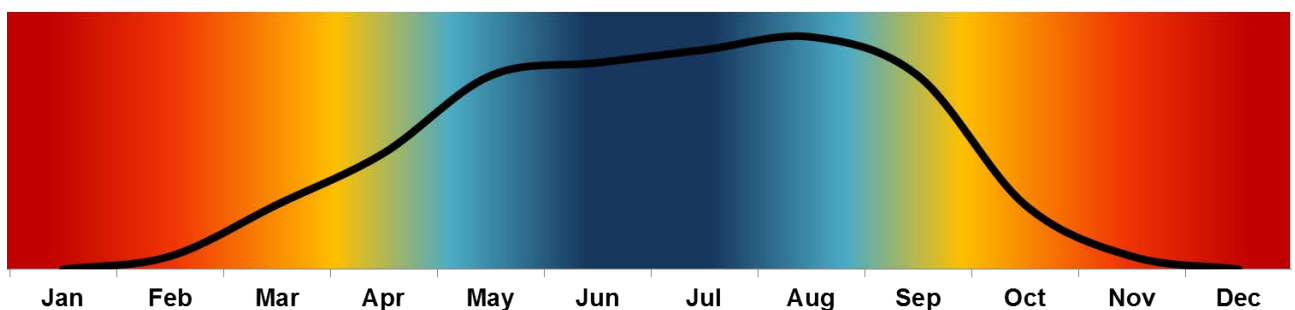
- Limited utilisation window
- May cause a taint in milk if fed to dairy cows or milk goats
- Animals take time to get used to taste



## What can it be used for?

- Grazing:** Sheep and goats graze radish with much success and little wastage. Tubers are eaten deep into the ground by these animals. Cattle will waste a lot more of the tuber.
- Cut and Carry:** In many cases farmers uproot the radish with an implement and either allow cattle to eat it on the land, or they can be fed elsewhere.
- Silage:** Radish can be ensiled with something like wheat straw, just to correct the moisture levels.
- Hay:** Chopping and drying the plants can be done to preserve it, but is labour intensive.
- Cover Crop:** This root crop is very good at breaking compaction and water infiltration rate, which contributes to its ability to protect against soil erosion. The root also deposits organic material as it decomposes. Radish is very good at scavenging Nitrogen from the soil.

**Production potential:** Planting date and moisture is often the determining factor. Four tons (dry land) to 12 t DM/ha/season under full irrigation can be reached. Yields are dependent on soil fertility, climatic conditions and utilisation management. Radish only contains 10 – 15 % DM but it is very digestible and high in crude protein and water soluble sugars <sup>(1, 2)</sup>.



Relative growth curve of a Japanese Radish stand - one year cycle



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## Metabolic disturbances in animals on cultivated pastures:

**Nitrate poisoning:** Nitrate build up in plants under periods of poor growth, especially after high N fertilisation.

## Establishment

**Climate:** Radish is planted in the subtropical areas of South Africa. In frost free areas, insect pressure may become a problem.

**Moisture:** Under dryland conditions it requires at least 350 mm from January to April/ May for good production. Lower rainfall will result in lower production but moisture conservation, by means of weed control can improve this. Production can be greatly increased under irrigation.

**Soil:** Soil with a good moisture retention capability will be beneficial under dry land conditions, since most of the growth takes place towards the end of winter. It grows best on lightly textured soils and does not tolerate waterlogging. Heavy clay soils limit tuber development and can make feeding tubers challenging. It is very acid tolerant and can grow in soils with pH (KCl) levels of > 4. The ideal pH (KCl) is however > 5 <sup>(2)</sup>.

**Fertilization:** Japanese radish responds well to fertilization if moisture availability is not limiting. A soil analysis before establishment is essential <sup>(1, 3)</sup>.

	N (kg/ha)	P (mg/kg soil)	K (mg/kg soil)
Requirement for establishment***	20-40*	20	100-140
Seasonal application (kg/ha)	40-150**	Use removal rates	
<b>Production - Removal rates (kg/ton):</b>			
Good quality fodder	37	3.8	28.8
Average quality fodder	24	2.5	23
Poor quality fodder	14	1.2	18.5

\*Fertilizer just after establishment (kg/ha)

\*\*Selected rate should maximise profit

\*\*\*Determined by production potential

Phosphorus (P) and potassium (K) can be recycled back to pastures when grazed by animals. This is dependent on the grazing system and the type of animals used. Up to 40% of P and 90% of K can be recycled <sup>(5)</sup>. It is however necessary to do annual soil



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analysis to determine the level to which recycling occurred. The difference should be fertilized.

**Methods:** Seed into a firm, fine, weed free seed bed. Consolidating (rolling) the seedbed after planting will ensure good seed-soil contact and subsequently better germination and establishment. Plant seed no deeper than 2.5 cm.

Our prescribed seeding rate:	Rows (90cm) <sup>(1)</sup>			Broadcast <sup>(1)</sup>
	Low Potential	Medium Potential	High Potential & Irrigation	Irrigation
	2 kg/ha	2.5 kg/ha	3.5 kg/ha	4 kg/ha

Seeds/kg = ±35000  
After emergence, seedlings can be thinned out if stand is too dense.

**Planting time:** Plant from mid-January until May (depending on soil moisture, dry land/irrigation). Cool eastern parts of SA: plant as early as mid-December. Be careful of seedlings scorching in hot January/February months.

## Management

**Utilisation:** Grazing only the leaves at any stage without damaging the growth points, and regrowth. This however is not recommended due to the strict management required. Do not chop the Radish before feeding it; animals can choke on it. After a January planting date, radish can be utilized as early as the end of April, however, yield will be low due to poor tuber development at this early stage. Japanese radish starts making flowers from the end of July/early August. From this stage onwards, quality keeps declining. By end of September (in most places) Japanese radish cannot be utilized anymore.

## Cultivars

### **Nooitgedacht**

The most common cultivar planted in South Africa.



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## Resources

1. Pasture Handbook, Kejafa Knowledge Works, ISBN 0-620-31994-1
2. Gids tot die volhoubare produksie van weiding. Alles oor natuurlike veld en aangeplante weiding vir kleinvee, grootvee en wildboere. Prof Hennie Snyman, 2012.
3. Nutrient Requirements of Beef Cattle, 1984
4. Truter, WF. Dannhauser, CS, Smith, H. and Trytsman, G. 2014. *Raphanus sativus (Japanese radish)*. Integrated Crop and Pasture-based livestock production systems. Conservation Agriculture – Part 15. SA Grain. ISSN 1814-1676. Page 57-58.
5. Dannhauser CS. 1991. Die bestuur van aangeplante weiding in die somerreëval-dele, vol. 1. Warmbad



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