BULLETIN

Optimise the control of Ramenas through key characteristics

General

Ramenas (*Raphanus raphanistrum)* is part of the Brassica family or mustard species and originally came from North West Europe and Asia. Raphanus in Greek means “fast appearance” which is an apt description of this problem weed.

Identification

The following photos reflect the different characteristics of Ramenas at different stages.

Photo 1: Ramenas seedling in cotyledon stage
Photo 2: Ramenas seedling with first two tru leaves
Photo 3: Ramenas seedling 3.5 leave stage
Photo 4: Ramenas seedling 6 leave stage
Photo 5: Ramenas flower
Photo 6: Ramenas pod

Properties
and Characteristics

The characteristic that makes Ramenas a successful weed is that the plant has a very adaptable life cycle with high genotypic variations. The plant produces many seeds. These seeds are persistent due to dormancy with an elongated germination. The plant is also a fast grower and is thus a strong contender where it appears (see Table 1). Seeds spread easily in hay, chaff and grain and are in certain instances toxic to animals.

Green pods in the presence of seed also can have allelopathic effects. Ramenas can serve as a host plant for insects and diseases.
Most of the Ramenas seed are dumped before harvest.
Resistance against certain herbicide groups like Group B (Sulfonylureas) is already known and recorded.

Ramenas is mainly a winter weed. Because soil disturbance will benefit germination, Ramenas is less likely to appear in undisturbed fields and pastures. Ramenas occurs in all types of soil, but is optimal in acidic soils with high nitrogen levels.

***TABLE 1:** Influence of Ramenas population density on % crop yield loss (Cheam 2005; Hashem, Wilkins & Piper 2001)*

Ramenas plant density (plants/m²)

	2 - 4	10	25	50	64	75
Wheat		7 %	20 %	37 %		56 %
Canola	11 %				91 %	
Lupiene	15 %	28 %	56 %	81 %		92 %

Biological characteristics of *Ramenas*

Seed dormancy

Up to 70 % of Ramenas seed will still be dormant at the start of the cereal planting season due to the pod surrounding the seed (see photo 6). Flower colour is also associated with dormancy. Plants with a yellow flower normally produce less dormant seeds than plants with rarer white or purple flowers. Early germinators produce more dormant seed than late germinators. Seed can stay viable in the soil for six years and even more in undisturbed deeper soil layers.

Germination and emergence

Approximately 6% of seed normally germinate in early autumn, while the majority (73%) germinate late autumn/ early winter. The remaining 21% germinate late winter/ early spring.

Germination can take place between 5°C - 35°C, with optimal temperatures between 20°C and 25°C.

Flowering period

Ramenas begins flowering from 4 - 12 weeks after emergence. Pollination takes place through bees and therefor gene transmission can take place over long distances.

Seed production and distribution

One plant can produce up to 292 seeds. Seed distribution can take place via agricultural products like grain and hay, as well as vehicles, livestock, wind and water. The seed pod breaks at the narrowings in the pod during the harvest process which could lead to dormancy.

Control
of Ramenas

The main goal should be to minimise the seedbank in the soil. If chemical options are used, make sure you alternate products with different modes of action or use a combination of products with different modes of action to combat possible resistance.

Use herbicide tolerant cultivars like triazine-tolerant canola and pre-planting sprays where feasible. Also make use of late post-emergence herbicides which is applied at the flowering of Ramenas to prevent the production of viable seed (Table 2).

TABLE 2:
Embrio stage and viability (Cheam et al 2005)

	Developmental stage	% Viability
1	Early flowering, pod development, thin pods	0
2	Mid-flowering, pod filling, well-formed but watery pods	4
3	Embrio formation on seed within watery pods, or embrio already present	65
4	Late flowering, woody pods, green developing embrios present	90

Shallow tillage (1- 2 cm) after first rains promotes germination, while the burial of seed deeper than 10 cm will decrease germination by 61% (Table 3).

This principal can be applied by for example doing shallow tillage every two years to promote weed germination and then to establish pastures (lucerne).

TABLE 3:
Influence of tillage on Ramenas plant density (Cheam & Code 1988)

Tillage	Ramenas density (Plants/m^2)
Plow	90
Direct planting	207
Disk tillage	323

How can the above characteristics be applied in possible strategies to

control/manage Ramenas?

Dormancy

// Dormancy can be broken by light tillage of 1 - 5 cm to stimulate germination, so that pre-plant sprays could be applied.
// After harvest grazing could be used to break the pods, and to dig the seeds into the soil, so that germination can take place after the first rain where after pre-plant sprays come into play again.
// Target early germinating Ramenas with chemical control, because these plants are more likely to produce dormant seeds.

Extended germination

// This characteristic can be addressed by making the correct crop choice. Plant lupines or TT canola where residual products can be used.

Viability

// Sprays during early flowering of Ramenas (Table 2) could negatively affect the viability of future seed. Before considering such an application, one needs to consult an expert as the potential products could also have a negative effect on the crop if sprayed at the wrong stage.

Other possible practices

// Gathering of seed or destruction behind the harvester like in Australia.
// Burning of chaff rows
// Tillage practices
// Silage crops where everything on the field is removed for silage. Spray possible regrowth or new germination with contact products.
// Green/brown manuring.

Chemical control

// **Resolve®** from Bayer is registered on cereal for the control of broad leaf weeds like Ramenas.
// The different herbicide group codes (F2, C3 and M) reduces the chance of resistance against the product.
// **Resolve®** has a fast knock down effect so as to quickly eliminate competition for the cereal crop.

Summary

Any control practice should be aimed at minimising the seedbank. By knowing more about the weed's characteristics, a combination of control measures could be applied to control Ramenas.

Bayer (Pty) Ltd. Reg. No. 1968/011192/07
27 Wrench Road, Isando, 1601
PO Box 143, Isando, 1600,
Tel: +27 11 921 5002

www.cropscience.bayer.co.za
www.bayer.co.za

Facebook: Bayer Crop Science Division Southern Africa ///// **Twitter:** @bayer4cropssa
08/2020