



MAJOR™
SLUG PELLETS



The Missing Link in Slug Control

Introducing TDS, a new chapter in bait technology...

Thirty years of know-how has given De Sangosse unparalleled expertise in the development of bait technology. Our market-leading baits now control slugs and snails throughout the world, with Europe, USA and Australia among our main markets.

A purpose-built Research and Development Centre in France helps us maintain bait technology as our core competence. The Centre's team received a simple but challenging brief – create a modern new solution for slug control, taking into account factors such as environmental issues, input costs and farmer attitudes.

That process has resulted in TDS, a new and unique production process producing baits with outstanding performance and physical characteristics, enabling the very best levels of control to be achieved whilst maintaining due regard for the environment.

TDS is the 'missing link' in the modern crop protection programme, allowing UK farmers to deliver a new level of precision in the fight against slugs.

Specific improvements

Improved resistance to mould

- Mouldy pellets are less attractive to slugs and break down faster in the field. TDS MAJOR contains a new improved anti-mould agent, reducing the incidence of mould. This means the pellet protects the crop for longer

More consistent pellet size and spreadability

- Our precise manufacturing method gives a pellet uniform in size and density. This allows more even application, bringing an end to 'hit and miss' dose rates across a field

Increased attractiveness to slugs

- Trials show that slugs show a preference for pellets produced with the TDS method over conventionally-produced pellets

Superior palatability

- Attracting the slug to the pellet is only half the story – to be effective, the slug must eat it too. TDS Major pellets have been specially formulated to ensure high palatability for the slug

Better persistence

- TDS MAJOR pellets will stand up to the rigours of the worst autumn weather, outlasting other pellets

Enhanced efficacy

- TDS Major offers growers the highest level of slug control

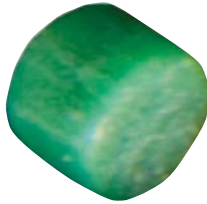
What makes a good bait?

Chef de Cuisine

TDS expertise and know-how allow us to tailor the formulation to match the need exactly to the target pest/crop situation.

Production Process

An entirely new production facility produces baits of unparalleled quality and uniform consistency.



Research and Development

Continual investment in new techniques and materials allows for continual improvement of products.

Quality ingredients

Rigid quality control of our raw materials ensures our products are of consistent quality and performance. Additives are used to prevent uptake by non-target animals, preserve pellets during storage and in the field, and to increase palatability and attractiveness. Carefully controlled water quality ensures even and regular production of bait.

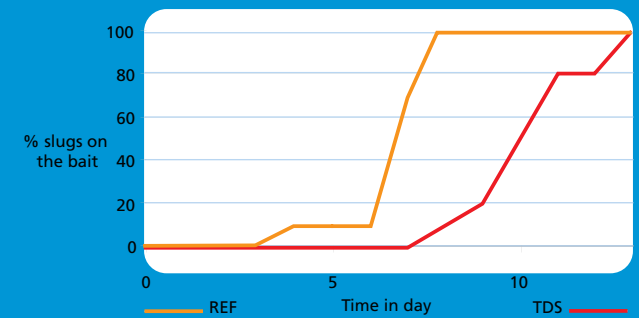
Quality control systems

Complete traceability of all ingredients all the way through to final product production. Essential in modern crop assurance schemes.

Physical Characteristics of TDS MAJOR

Diameter	2.70mm +/- 0.10mm
Length	2.47mm +/- 0.29mm
Density	0.8 (check units)
Colour	Green
Number per kg	60,000
Metaldehyde concentration	4%

Moulded pellets by time : lab study



TDS provides the most consistent pellet size available



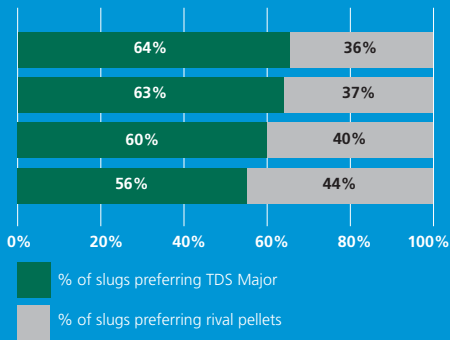
Performance Characteristics of TDS MAJOR

For effective control slug pellets must first be found by the slug. But that's only half the story – to be effective, the slug must eat enough of the pellet to ingest a lethal dose of the active ingredient, Meta-metaldehyde.

Thus the ATTRACTIVENESS and the PALATABILITY are key factors if the bait is to be successful at controlling the slug populations.

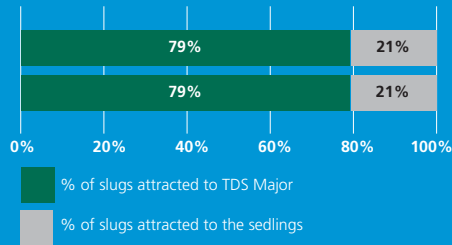
SUPERIOR ATTRACTIVENESS OF TDS MAJOR

Comparison of attractiveness of TDS MAJOR versus major rival pellets.

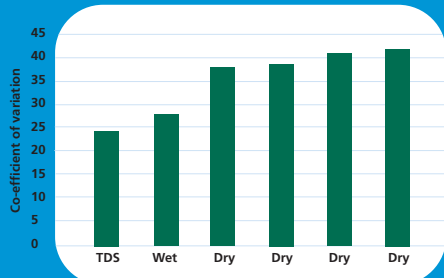


Not only is TDS MAJOR more attractive than other pellets, it's also more attractive than the crop itself – the first pellet where this has been proven in trials.

Attractiveness of TDS MAJOR compared with seedlings of wheat (upper bar) and oilseed rape (lower bar)



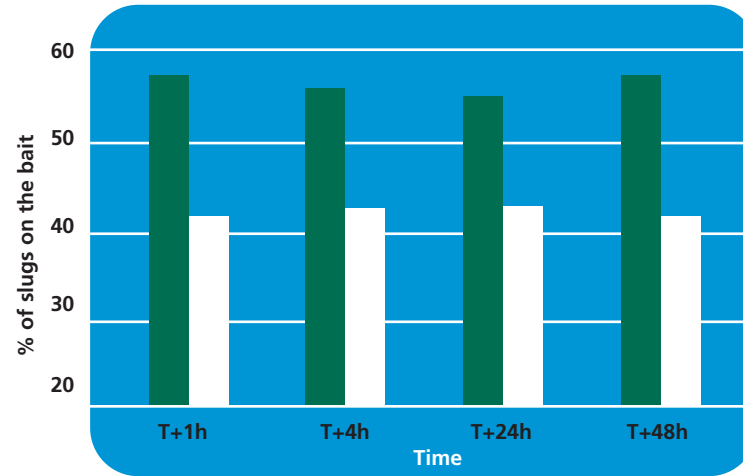
Spreadability tests (24m range)



The lower the co-efficient, the more even the spread of the pellets. TDS is the best performer.

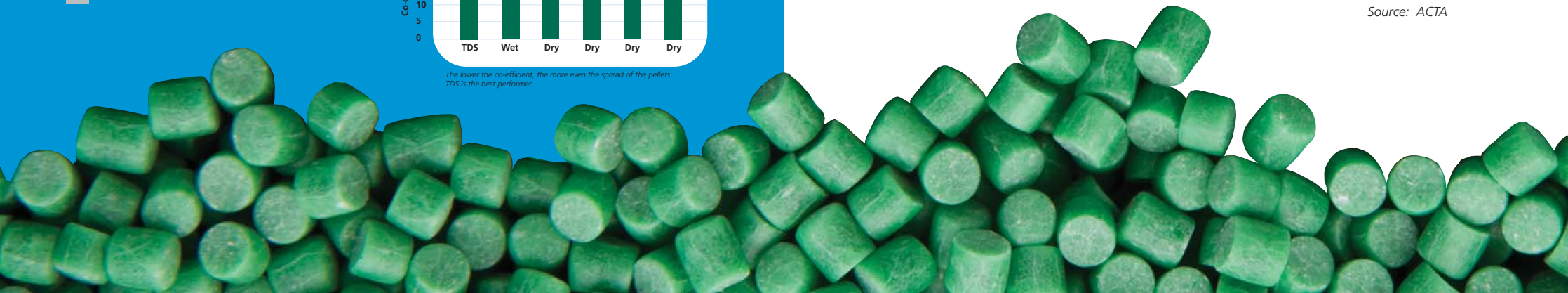
SUPERIOR PALATABILITY OF TDS MAJOR

By assessing slug behaviour in front of two products, conclusions can be drawn about which is more palatable to the slug. Here, TDS MAJOR was compared to a major rival over a two day period. The results are clear: slugs consistently prefer to eat the TDS MAJOR pellet.



Legend: TDS (dark green bar), wet process (white bar)

Source: ACTA



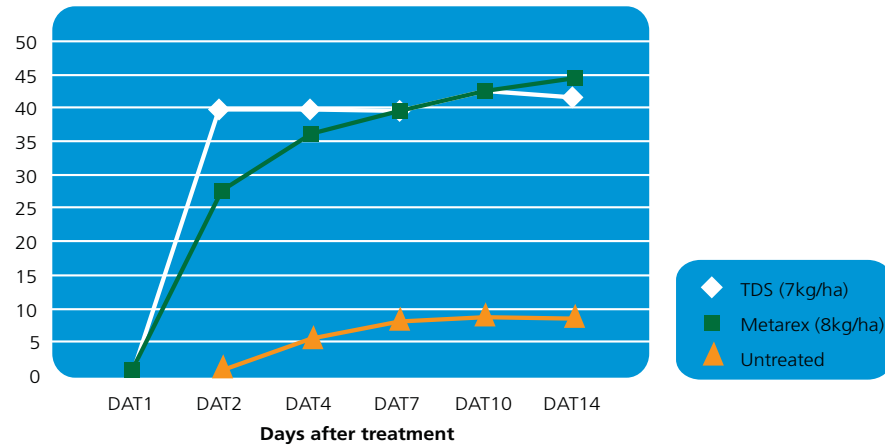
Exceptional Efficacy

1. Controlling Slugs

- a. When used correctly TDS MAJOR offers the highest level of slug control
- b. TDS MAJOR will control ALL species of slugs, giving consistent, reliable and high levels of control whatever the conditions at, or after, application. Both juveniles and adults are controlled. Be vigilant; crop

damage can be dramatically reduced if applications are made soon after slug hatchlings are spotted.

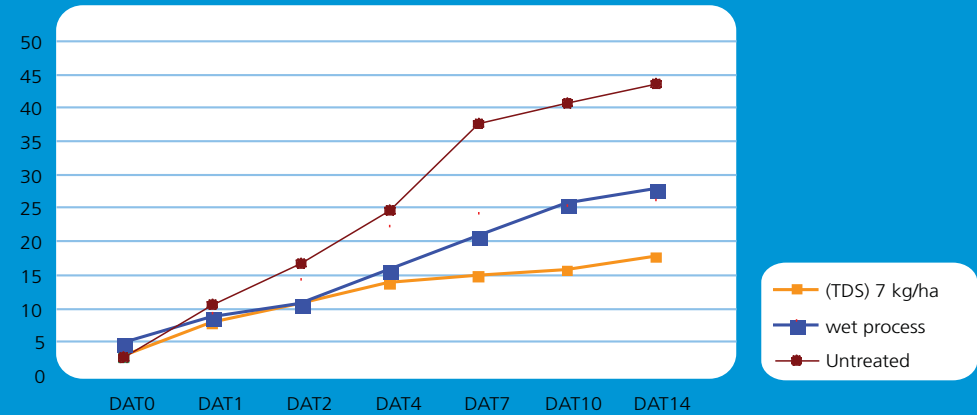
% of dead or severely affected slugs



2. Crop Protection

Any control programme should aim to protect the crop during the vulnerable period of establishment. This makes good application timing absolutely crucial, followed by careful crop monitoring to ensure subsequent generations are controlled.

Level of feeding damage on lettuce



Getting the best from TDS Major

To make the most of the powerful abilities of TDS MAJOR it should be used within an integrated control programme. As a guide, the following should be considered:

1. Trapping

- a. Trapping for slugs in the preceding crop or prior to sowing the new crop can give valuable information on current population levels and therefore the degree of potential risk the new crop faces.
- b. Place traps in suitable weather conditions using chicken layers' mash or equivalent as bait. (Do not use pellets as bait beneath traps)
- c. For further information on trapping see the HGCA website (www.hgca.com). DeSangosse co-funded Project Report 393, examining best practice slug control in arable crops.

2. Cultivations

- a. Well prepared seedbeds, with a fine tilth, reduce the risk of slug damage. Ploughing can help

achieve this. Sowing deeper also reduces the risk. Conversely, minimal tillage cultivations potentially increase the risk.

3. Application Machinery

- a. Accuracy of application is just as important with TDS MAJOR as for any other crop protection product. Use a well maintained applicator and ensure it is correctly calibrated before use. De Sangosse recommends the STOCKS FAN JET series of applicators as being particularly suited to accurate application of pellets.
- b. Refer to table on opposite page for calibration.

Key Points

- Assess the risk
- Apply at the right time
- Apply the right dose
- Apply accurately using a good applicator
- Monitor the results and reapply as necessary

Calibration setting guide for Stocks Mk5 Fanjet: standard pellet size

SPEED		FEED OPENING SETTINGS and KILOGRAMS PER HECTARE								
KPH.	1.Kg/Ha	2.Kg/Ha	3.Kg/Ha	4.Kg/Ha	5.Kg/Ha	6.Kg/Ha	7.Kg/Ha	8.Kg/Ha	9.Kg/Ha	10.Kg/Ha
4		8.31	13.4	19.94	25.51	31.73	37.68	43.10	49.34	52.08
5		6.65	10.79	15.95	20.40	25.42	30.15	34.48	39.47	41.66
6		5.54	8.99	13.29	17.0	21.18	25.12	28.73	32.89	34.72
7		4.74	7.69	11.38	14.55	18.13	21.50	24.59	28.15	29.72
8		4.14	6.72	9.94	12.72	15.84	18.79	21.49	24.6	25.97
9		4.68	5.97	8.82	11.29	14.06	16.68	19.08	21.84	23.05
10		3.32	5.39	7.97	10.20	12.71	15.07	17.24	19.73	20.83
11		3.01	4.89	7.23	9.25	11.52	13.66	15.63	17.89	18.88
12		2.77	4.49	6.64	8.5	10.59	12.56	14.36	16.44	17.36
13		2.54	4.13	6.11	7.83	9.74	11.55	13.21	15.13	15.97
14		2.37	3.84	5.69	7.27	9.06	10.75	12.29	14.07	14.86
15		2.22	3.59	5.31	6.80	8.47	10.05	11.49	13.15	13.88
16		2.08	3.38	5	6.39	7.96	9.44	10.80	12.36	13.05
17		1.97	3.20	4.73	6.05	7.54	8.94	10.22	11.71	12.36
18		1.86	3.02	4.46	5.71	7.11	8.44	9.65	11.05	11.66
19		1.75	2.84	4.20	5.37	6.69	7.93	9.08	10.39	10.97
20		1.66	2.69	3.98	5.10	6.35	7.53	8.62	9.85	10.41
21		1.57	2.55	3.77	4.82	6.01	7.13	8.16	9.34	9.86
22		1.5	2.44	3.61	4.62	5.76	6.83	7.81	8.94	9.44
23		1.44	2.33	3.45	4.42	5.5	6.53	7.47	8.53	9.02
24		1.37	2.23	3.29	4.21	5.25	6.23	7.12	8.15	8.61
25		1.3	2.12	3.13	4.01	5	5.92	6.78	7.76	8.19
26		1.26	2.05	3.03	3.87	4.83	5.72	6.55	7.5	7.91
27		1.21	1.97	2.92	3.74	4.66	5.52	6.32	7.23	7.63
28		1.17	1.9	2.81	3.6	4.49	5.32	6.09	6.97	7.36
29		1.13	1.83	2.71	3.46	4.32	5.12	5.86	6.71	7.08
30		1.08	1.76	2.6	3.33	4.15	4.92	5.63	6.44	6.8



Slug Biology



Slugs are among the best adapted molluscs to life on land. Tolerant of dry conditions and able to survive compression, they are less dependent on calcium salts than their shelled cousins. More than 125 species are recognised in Europe.

The familiar mucus trail is secreted by cells called mucocytes – the mucus completely covers the slug, keeping it hydrated and acting as a lubricant for movement. Meta-metaldehyde, the active ingredient in all TDS pellets, acts by irreversibly disrupting the slug's mucus production.

Important species:

Broadacre crops (cereals, potatoes, OSR, etc) are at risk from two species in particular:



Grey Slug

Deroceras reticulatum

The slug is the biggest pest of crops in Europe

Size: 3.5 to 5 cm

Colour: Beige or brown with small dark patches

Foot: Same colour as the rest of the body

Movement: up to 4 to 5 metres during the night. The grey slug is a pioneer species, colonising new areas. Active from 0.80°C to 20°C

Nutrition: 30 to 50 mg per day

Young: Pink of reddish/brown
1 to 5 mm long

Black Slug

Arion hortensis, Arion distinctus

Found less frequently in fields.

Size: 3 to 4 cm

Colour: Black

Foot: Orange

Movement: 2 to 3 metres at night, on the surface and in the soil. Rarely active below 5°C

Nutrition: ?

Young: Grey bluish 4 to 5 mm long

Slugs' diet is varied, including many plant species, dead invertebrates and decomposing vegetation.

- Attractivity – the slug's ability to sense food - plays a role only in a 10cm zone around the slug.
- Appetance plays a role in determining the choice of food. In nature the 'resistance' of some plants to slug attack can be due to the presence of silica, hairiness, cyanogens or glucosinolates.
- Black slugs have a preference for underground food such as tubers and bulbs

Slugs are found wherever there is food – as long as conditions are humid, temperatures are moderate, and there is somewhere to hide. Most of all, they like constant conditions, and proliferate in thick vegetation, with little soil movement.

Slugs can reproduce at any time throughout the year, if conditions are right, but there are two key periods – spring, and summer/autumn. Optimum soil saturation is 75%; slugs won't lay eggs at all if the soil moisture falls below 10%.

Eggs are deposited in small packets in soil shelters:

- 300 to 400 eggs per grey slug
- 150 to 300 eggs per black slug
- Usually in top 5cm of soil

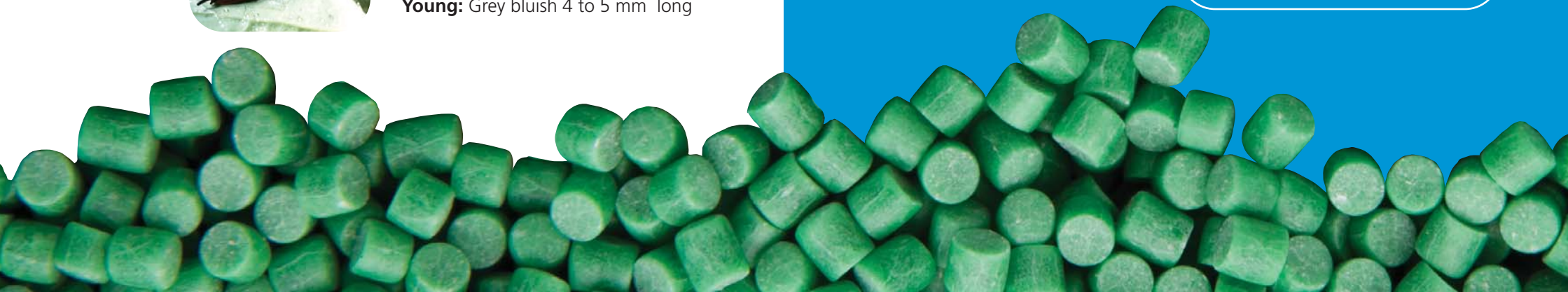
Favourable conditions for egg incubation:

- Soil humidity between 40 and 80%
- Air temperature between 5 and 20°C

Duration of incubation varies:

- from 15 to 20 days at 20°C
- more than 3 months at 5°C

Eggs are resistant of cold temperatures including those below zero, but will desiccate rapidly if not maintained in a humid environment.



Environmental Profile of Metaldehyde

Meta®-metaldehyde:
The active ingredient in TDS MAJOR. Proven efficacy and safe to the environment when used as directed.

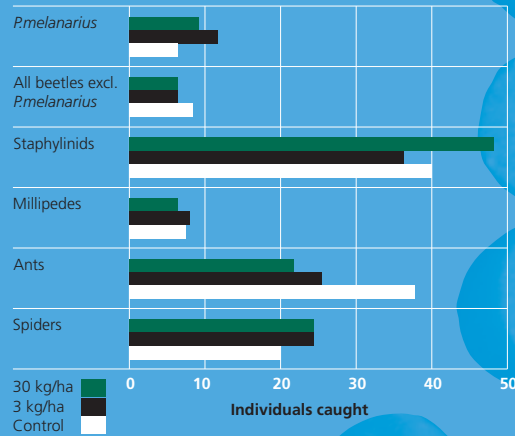
Meta-metaldehyde works by attacking and destroying a slug's mucus producing cells. The damage is irreversible and, once a lethal dose has been consumed, it is impossible for a slug to recover, even in wet conditions.

Meta-metaldehyde is highly effective in wet conditions, which has been proven in field trials. Moreover, further trials have shown it is as effective at temperatures as low as 3°C.

Meta Metaldehyde has:

- Minimal effect on earthworms
- Minimal effect on important carabid beetle populations
- No lasting soil residues, breaking down to carbon dioxide and water

Effect of Meta® slug pellets on a variety of invertebrates



Bieri M. et al. 1989 Slugs and snails in world agriculture
BCPC Monograph 41:391-392

Guidelines for use Summary of recommendations

TDS MAJOR®

For the control of slugs in field crops, vegetables, fruit crops, ornamentals and glasshouse crops. Bait containing 4% w/w metaldehyde.

TDS MAJOR contains Bitrex™.

The Control of Substances Hazardous to Health Regulations (COSHH) may apply to the use of this product at work.

IMPORTANT INFORMATION

FOR USE ONLY AS AN AGRICULTURAL/HORTICULTURAL MOLLUSCICIDE

Situations for use: On natural surfaces not intended to bear vegetation and on all edible and non edible crops.

Maximum individual dose: 7 kg/ha

READ THE LABEL BEFORE USE. USING THIS PRODUCT IN A MANNER THAT IS INCONSISTENT WITH THE LABEL MAY BE AN OFFENCE. FOLLOW THE CODE OF PRACTICE FOR USING PLANT PROTECTION PRODUCTS

MAPP NO: 13462

Safety

Keep away from animals and children

Do not store near animal feeding stuffs

Clear up all spillages immediately

Only take to the field the required quantity

TDS MAJOR

Superb attractiveness
Superb palatability
= Superb efficacy
= Superb crop protection



www.desangosse.co.uk

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Bitrex is a trademark of Macfarlan Smith Limited.
Meta is a registered trademark of Lonza Limited.
DeSangosse gratefully acknowledges the research involvement of
ACTA, I2L and Charles Rivers.