Bayer Environmental Science

Rodilon®

Technical Information

Leaves rats, mice and the competition for dead.



There's never been a rodenticide like Rodilon before.

Rodilon represents a combination of the most recently developed anti-coagulant active ingredient (difethialone) with arguably the most palatable rodent bait matrix available.

With unrivalled efficacy against both rats and mice this combination makes for a powerful product that can achieve rapid control of all rodent infestations.

Use it as the first line of attack to get fast results in your rodent control program.

Target pests

- Rats and mice

Areas of use

Industrial, commercial, public services, agricultural and domestic buildings



Key features:

- ☑ Contains difethialone – the most recently developed active ingredient for rodent control – in a 'soft-block' formulation.
- ☑ Highly palatable formulation providing highest level of bait acceptance (trials against both rats and mice show higher levels of consumption than other wax or mini-block formulations).
- ☑ 'Single-feed' rodenticide – provides rapid results.
- ☑ Equally effective against both rats and mice.
- ☑ Maximum potency – available only to Professional Pest Control operators.
- ☑ Bait matrix is enclosed in a paper sachet, reducing potential handling exposure to the bait, but not limiting efficacy (rodents chew through the sachet).
- ☑ Baits can easily be secured in stations (eg. with wire).
- ☑ Bait stays attractive and effective even under humid conditions.
- ☑ Soft blocks do not disintegrate into small fragments (producing spillage risk) even when gnawed by rodents.
- ☑ Contains Bitrex – a human taste deterrent
- ☑ Antidote is available.

Application rate and delivery

- ☑ 3–6 blocks per bait station – depending on the level of infestation present.

Comments on application

Difethialone is a powerful anti-coagulant active ingredient which is highly effective at very low doses (compare level of difethialone in Rodilon, 0.025 g/kg; against standard concentrations of brodifacoum in most currently used baits, 0.05 g/kg). However, coupled with its persistency, it can still present a risk of secondary poisoning in non-target animals if label directions are not followed.

Use Rodilon as part of an integrated rodent management programme utilising other non-chemical methods (eg. proofing, elimination of access to other food sources) to assist in achieving sustainable rodent management.

Ensure that any dead rodents are collected during course of treatment (to reduce risk of secondary poisoning).

Ensure baits are placed in areas inaccessible to children and domestic animals (due to its very high palatability the bait blocks may be attractive to other animals like dogs).

Through market leading Research and Development, Bayer Environmental Science is committed to providing quality, highly effective and safe-in-use pest management solutions for Pest Management Professionals.

Rodilon®

Active Ingredient

Difethialone is a late generation anti-coagulant rodenticide (sometimes referred to as a 'third generation' compound) which was researched and patented in 1989 by the French company Liphatech.

Difethialone is a single-feed anti-coagulant and a lethal dose is usually achieved in a day's feeding. It is more toxic and more persistent than the first generation anticoagulants, such as warfarin and coumatetralyl, and it is formulated at half the concentration (0.025 g/kg vs 0.05 g/kg) of other second generation compounds.

A snapshot of the history of rodenticide active ingredient discovery is listed in the table below:

Active ingredient	Year of discovery	Company
Warfarin	1944	Warf
Chlorphacinone	1961	Liphatech
Coumatetralyl	1962	Bayer
Difenacoum	1975	Sorex
Bromadialone	1976	Liphatech
Brodifacoum	1976	Syngenta
Flocoumafen	1984	BASF
Difethialone	1989	Liphatech

As can be seen from the table above, Rodilon comes from a combined base of almost 100 years of experience in rodenticide research and development (46 years for Liphatech and 45 years from Bayer). Both Liphatech and Bayer are global leaders in rodent bait technology and the Rodilon formulation represents a combination of best-in-class bait matrix with the newest rodenticide active ingredient available.

Formulation

- ☑ Appearance: Rodilon is formulated as a light blue/green soft-block (like putty in texture). The bait contains a blend of fat, sugar and cereal base that rodents can't resist. 10 gram portions are packed into a porous paper sachet (like a tea-bag). Rodents can smell the bait through the sachet.
- ☑ Convenience: Rodilon is easy to use as there is no mixing, dust or spillage problems which can be experienced with tracking powders or loose grain baits. Rodilon soft blocks each weigh 10 g, they are packed into a 5 kg square HDPE bucket. Each bucket therefore contains 500 bait blocks.

Product Safety

Difethialone is much more toxic and more persistent than the first generation anti-coagulants such as warfarin and coumatetralyl, but is formulated at a much lower concentration (0.0025% vs 0.0375%).

Nevertheless, the formulation offers some considerable safety advantages in that there is no dust so inhalation risk is minimal and there is no loose grain or pellets which can be spilled. The sachet packaging is easy to handle and simple rubber gloves are sufficient to avoid contact with the active ingredient.

Rodilon contains the bittering agent BITREX to further reduce the risk of accidental ingestion by children and, like other anti-coagulants, an antidote is available.

Recommendations to reduce the risk of secondary poisoning:

Like other ('second generation') anti-coagulants, difethialone is a rodenticide that is highly effective at very low doses and which can also be persistent in rodent carcasses after consumption of the bait. These two features can provide a high risk of secondary poisoning to predatory birds and mammals which hunt or scavenge for rodents (especially if use is extended in outdoor situations). In order to minimise the risk of secondary poisoning of non-target species this product is recommended primarily for indoor use. Where outdoor use is required this bait should not be used for more than 30 consecutive days.

If rodent baiting is required for periods longer than this in outdoor situations (eg. perimeter baiting) it is recommended that an alternative bait product with a lower risk of secondary poisoning is used (eg. a multiple-feed bait such as Racumin®).

Whilst baits are in use, search for dead and moribund rodents and remove and dispose of them safely by burning or burying in an approved landfill.

Field trials

The laboratory trials referred to previously are all well and good, but how does this translate to a field situation where the dynamics of rodent re-infestation, the presence of alternative food sources and feeding vagaries, or other such factors come into play?

Rattus norvegicus

The table below illustrates the results from five field trials carried out in Europe under what were considered 'tough' control conditions. Farm/Animal housing environments are locations where it is typically difficult to achieve control of rodent infestations due to reasonably large treatment areas, multiple sources of alternative food and a high potential for re-infestation.

In these trials the 'census baiting technique' was used; where a 'census bait' (eg. rolled oats) was put out prior to poison baiting, in order to obtain an estimate of infestation levels (the level of consumption of the census bait in grams per day indicates infestation levels prior to treatment).

		Rodilon consumption (g)			
	Census (g/d)	Maximum (on day N°)	Total	Duration (d)	Elimination (%)
'Dirty' Farm	1,736	2,033 (5)	11,045	22	96
Sheep and chicken farm	1,668	1,876 (4)	12,726	33	98
Animal home	732	880 (2)	2,504	7	100
Dairy farm	293	790 (4)	4,725	10	100
Chicken farm	852	*	2,164	< 16	100

*Not recorded

As can be seen, a very high level of treatment success was recorded in all five trials, with complete elimination of the infestation in all but two sites. The enhanced palatability of the bait matrix is illustrated by the fact that Rodilon bait consumption exceeded the pre-treatment census in all trials where this was recorded. The best result was in the animal home whereby the second day after bait placement the consumption of bait had exceeded the pre-treatment census levels.

Elimination was measured at the end of the duration period illustrated above.

In South Australia in 2005, two trials for the control of *Rattus norvegicus* were carried out (one a complex of fish-farm storage sheds, the other a warehouse situation) similar results were obtained, with >90% reduction in rodent activity within three weeks of commencement of treatment program and 100% elimination of activity by 32 days.

Mus musculus

The table below illustrates the results from three field trials carried out in Europe; again, under what were considered 'tough' control conditions (for the same reasons outlined previously).

		Rodilon Consumption (g)			
	Census (g/d)	Maximum (on day N°)	Total	Duration (d)	Elimination (%)
Rabbit Enclosure	318	346 (3)	1,385	< 14	100
Cereal + seed store	286	311 (3)	1,671	14	100
Pig Farm	71	52 (4)	251	8	100

Again a very high level of treatment success was recorded in field trials against mice, with complete elimination of the infestation in all sites. Once again the enhanced palatability of the bait matrix is illustrated by the fact that Rodilon bait consumption exceeded the pre-treatment census in most trials. This was the case within three days after bait placement.

Elimination of mouse activity was measured at the end of the duration period illustrated above.

In New South Wales in 2006, two trials for the control of *Mus musculus* were carried out; both in farm environments (one in some hay sheds, the other a work shed and feed shed). Similar results were obtained, with >90% reduction in rodent activity within 31 and 37 days of commencement of treatment programs (respectively) and 100% elimination of activity within 40 days. Considering the very challenging environment in which these trials were located (farm buildings) these are considered to be excellent results.

What do these results mean for you, the Professional Pest Manager?

- ☑ In the choice trials, where consumption of bait is close to or greater than 50% of total consumption, this indicates that rats and mice are more likely to consume Rodilon than another alternative food source.
- ☑ When rats and mice consume Rodilon preferentially, and at the consumption rates observed in these trials a lethal dose is going to be consumed much faster than would be the case with the other products referred to in these trials.
- ☑ If consumption is faster and also greater (in terms of volume), then more rapid control is going to be achieved.
- ☑ If this enhanced palatability to rats and mice means feeding on the bait within one or two days after placement, then this provides a huge advantage in terms of head-start in achieving control.

Best Practice Guidelines:

Rodilon is intended to be used by professional pest managers as the initial 'clean-out' bait treatment for rodent infestations in indoor areas and other situations in close proximity to buildings. Due to its high palatability and quick-kill, extended use of the bait should not be necessary if other integrated rodent control measures are also adopted. An integrated rodent management programme should include the following steps:

- ☑ Conduct a thorough inspection of premises.
- ☑ As far as is practical remove or limit access to potential rodent alternative food sources.
- ☑ Implement rodent proofing measures to limit or restrict rodent access to indoor areas (or areas where infestation is identified as a problem). These must be discussed with client.
- ☑ Manage weeds and other vegetation around buildings to minimise the number of available or potential rodent harbourages.
- ☑ Remove any rodent droppings (if relevant) prior to treatment – the presence or absence of droppings after treatment will provide an additional measure of treatment success.
- ☑ Bait infested areas using the amounts referred to on the product label (read and follow directions on the label closely).
- ☑ Record the number and location of bait stations to facilitate replenishment during (and removal after the cessation of) the baiting program.
- ☑ Ensure that bait stations are placed in areas where domestic animals and children cannot gain access. Secured, tamper-proof bait stations are preferred.
- ☑ Inspect baits at least every few days and replace eaten baits.
- ☑ If baits are eaten quickly, increase both the number of bait stations as well as the quantity of bait used per station.
- ☑ Actively search for, remove and destroy dead and moribund rodents whilst baits are being used (refer to section on secondary poisoning on pages 2–3).
- ☑ Baiting for at least two weeks is necessary to reduce mouse or rat numbers but continue observation and bait replenishment until no more bait is taken.

The soft blocks should be secured in bait stations (for example on a wire) to prevent rats from removing whole sachets from the station. The use of clean gloves is recommended to avoid contamination of bait with human and other deterrent scents.

If necessary, cover baits so that only rats and mice have access to them. All bait stations must retain bait so that it does not spill onto the ground, and the bait stations must prevent access by birds.

In locations where native mammals may be active, baits should be placed in secure bait stations that only allow the bait to be accessed by the target rodents.

Bait must not come into contact with the ground or water.



Product Performance

A total of 27 laboratory and field trials were submitted as part of the Rodilon biological dossier for the registration in Australia. This cross-section of trials included a range of laboratory 'one day no-choice' (carried out as standard to determine the average lethal time to mortality for bait products), three or four day choice trials (carried out to establish the relative palatability of the bait matrix) and an extensive array of field trials across a range of geographical areas.

To say that Rodilon has undergone rigorous testing would be an understatement.

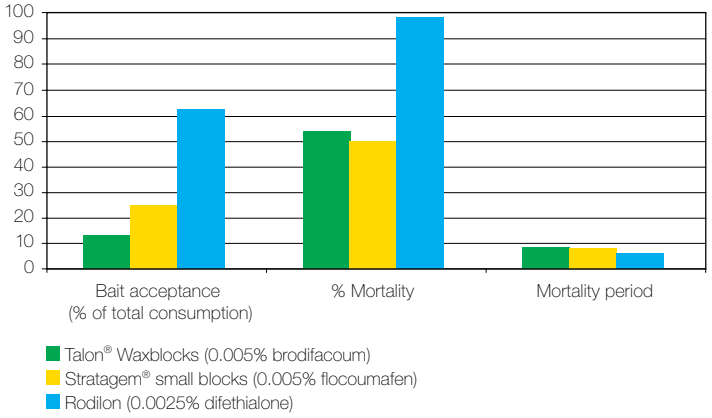
Palatability of bait matrix

The graphs below represent the results of standard choice trial with groups of wild rats (*Rattus norvegicus*) (first two graphs) and wild caught mice (third graph). The summary table at the end shows the overall results for these kinds of trials against main rodent species.

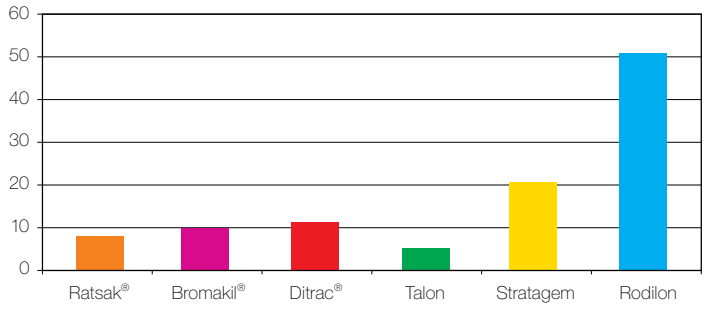
Over four days, rats and mice were given a free choice of both the bait product and a standard challenge diet (broken wheat, wheat flour and corn oil mixture). Bait acceptance is indicated by the percentage of bait take out of total consumption (ie. bait + challenge diet) (the higher the figure the more palatable the bait; generally speaking levels of acceptance >30% are considered good).

Percentage mortality speaks for itself. The excellent efficacy of difethialone, coupled with the better palatability of the Rodilon bait matrix, combined to give superior performance. This includes total mortality and the average time required to achieve mortality. Under the conditions of the first trial the mean mortality period for Talon waxblocks was 7.8 days, for Stratagem was 7.2 days and for Rodilon was 5.5 days.

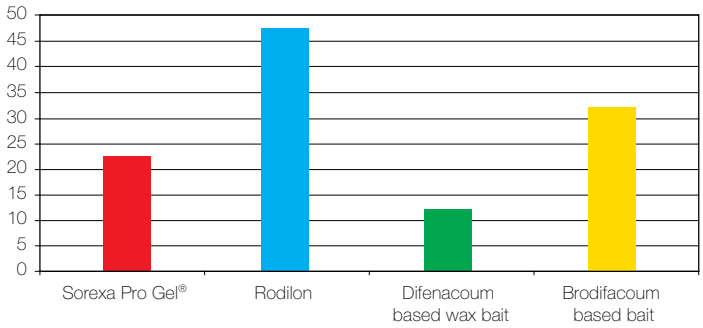
Comparison of bait acceptance, % mortality and mortality period against *Rattus norvegicus* for three different rodenticides.



Comparison of % bait acceptance for six different rodenticide bait matrices (four day laboratory choice trials with *Rattus norvegicus*; mean acceptance is expressed)



Comparison of % bait acceptance between four different baits in standard choice trails with *Mus musculus*.



An overall summary of choice trials with Rodilon against other leading 2nd generation rodenticide baits

Test rodents			Bait consumption	Mortality
Species	Number	Test bait	(% of total consumption)	(%)
House mouse	24	Rodilon	48	100
House mouse	53	Rodilon	41	100
House mouse	24	Rodilon	54	100
Roof rat	6	Rodilon	54	100
Norway rat	5	Rodilon	52	100
Norway rat	5	Rodilon	70	100
Norway rat	16	Block 'Brodifacoum'	20	88
Norway rat	16	Block 'Flocoumafen'	12	38

Rodilon®

Technical Information



Product profile

Active ingredient information:
0.025 g/kg difethialone

Chemical Group:
Anti-coagulant

Formulation type:
Ready to use bait

Pack size available:
5 kg bucket

Product safety

Personal protective equipment required:
Rubber gloves

No products produced by Bayer Environmental Science have been shown to be carcinogenic, teratogenic or mutagenic.

Regulatory information

APVMA Approval number: 61167
AQIS IOA Status: Category 15 Type C
Poisons Schedule: Schedule 6 – Poison

Other regulatory information:
Use of this product according to the registered label is consistent with the requirements of HACCP Procedures used within food processing establishments.

Impact on the environment
All pesticides are regulated under the Agricultural and Veterinary Chemicals Act to ensure that they do not pose an unacceptable risk to human health and the environment.

For more information regarding pesticide regulatory process please visit the Australian Pesticides and Veterinary Medicines Authority website at: www.apvma.gov.au

Bayer Environmental Science

ALWAYS READ AND FOLLOW THE REGISTERED PRODUCT LABEL PRIOR TO USE.

Rodilon® and Racumin® are Registered Trademarks of Bayer

Talon is a registered Trademark of Syngenta Group Company; Stratagem is a Registered Trademark of BASF; Sorexa is a Registered Trademark of Sorex Ltd; Bromakil is a Registered Trademark of Rentokil Initial Pty Ltd; Ditrac is a Registered Trademark of Bell Laboratories Inc.; Ratsak is a Registered Trademark of Orica group of companies.

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