



Ferramol® Slug and Snail Bait – a novel molluscicide for the control of slugs and snails

Introduction

Ferramol® is a new registered molluscicide for the control of slugs and snails on vegetables, strawberries and ornamentals in the greenhouse and outdoors. The active ingredient of **Ferramol®** is iron phosphate which is a naturally occurring soil component. The bait contains only 1 % active ingredient.

Application rate: 1 Tsp/yd² and 1 lb/1000 ft²

Toxicology

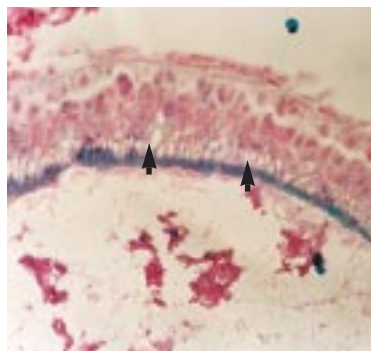
Ferramol® distinguishes itself by extremely low mammalian toxicity and no undesirable ecological side-effects. Because of the extremely low mammalian toxicity (LD50 rats, oral > 5000 mg/kg) it is virtually harmless for higher animals (dog, cat). Also earthworms, bees and other beneficials are not affected. No aquatic toxicity could be observed.

Toxicity studies of Ferramol®

Study	Results
Acute oral toxicity	LD 50>5000 mg/kg
Acute dermal toxicity	LD 50>5000 mg/kg
Acute eye irritation	minimally irritating
Skin irritation	non irritating (index of 0.0)
Acute oral toxicity Bobwhite quail	LD 50 and NOEL >2000 mg/kg
Acute toxicity earthworms	LC 50 >1000 mg/kg
Acute toxicity to the ground beetle Poecilus cupreus	No effect on Poecilus at max. application rate
Acute toxicity to the beetle Aleochara bilineata	No effect on Aleochara at max. application rate
Acute oral toxicity of pure active	LD 50>5000 mg/kg

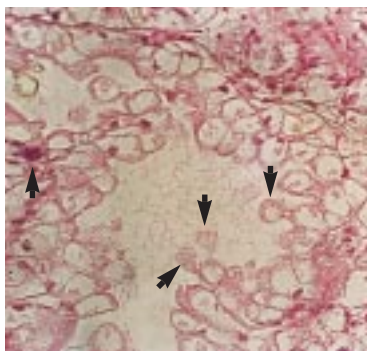
Mode of Action

The bait attracts slugs and snails and lures them from hiding places. Once ingested the slugs and snails will stop feeding. The active ingredient causes pathological changes on a cellular basis in the slug's and snail's crop and hepatopancreas.



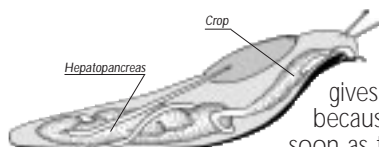
Light Microscopy Crop x 400

Iron proof at cell apices/microvilli; vacuoles are formed below the iron layer as well as the base of the cells (see arrows).



Light Microscopy hepatopancreas x 400

Strong vacuolization and disintegration of epithelium cells, parts of the resorptive digestive cells are stretched out into the lumen (see arrows).



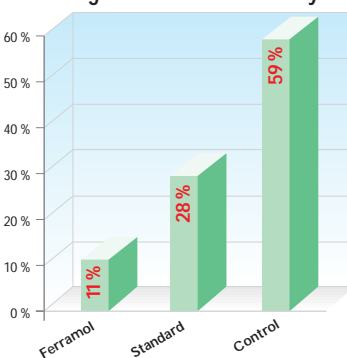
The physiological effect of the bait gives immediate protection to the plants because slug and snails stop feeding as soon as they ingest the bait. The slugs and snails then become less mobile and begin to die within 3-6 days. The poisoned slugs and snails do not secrete ugly slime since the mode of action is not based on water loss. In addition, because poisoned slugs and snails often crawl away to die, dead slugs and snails and ugly slime are not seen.

Efficacy

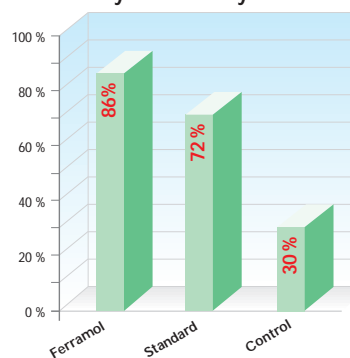
The slugs and snails controlled by this product include (but are not limited to): *Deroceras reticulatum* (Field slug), *Deroceras laeve* (Smooth slug), *Arion subfuscus* (Dusky slug), *Arion circumscriptus* (Gray garden slug), *Arion hortensis* (Black field slug), *Arion rufus* (Large red slug), *Arion ater* (Large black slug), *Limax flavus* (Spotted garden slug), *Limax tenellus* (Slender slug), *Ariolimax columbianus* (Banana slug), *Helix* spp., *Helicella* spp., and *Cepaea* spp.

Results of Ferramol® against a mixed population of Arion and Deroceras slugs on vegetables (mean of 8 independent trials)

% feeding on leaves after 21 days

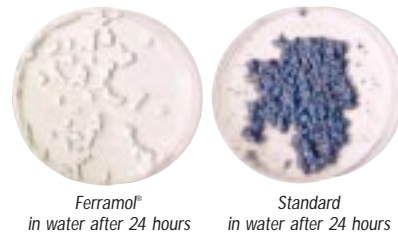


% mortality after 21 days



Rain Fastness

Ferramol® is a granular (pellet) formulation. The pellets have a diameter of approx. 1/16 of an inch and a length of approx. 1/8-1/4 of an inch. The pellet represents a new bait technology that guarantees extremely rain-fast baits. The baits remain



Ferramol® in water after 24 hours

Standard in water after 24 hours

effective even after heavy rain or sprinkling. On wet ground the pellet takes up water and swells. Under dry conditions the water is given off again. Even after repeated water uptake/loss the pellets keep their shape.

Conclusion

Ferramol® is a novel molluscicidal control agent containing the active ingredient iron phosphate. Its new mode of action and its outstanding rain fastness ensures effective control on a broad spectrum of slugs and snails. **Ferramol®** presents a new molluscicide that fulfills all criteria for an innovative plant protecting agent with regard to efficacy, eco-toxicology and user-safety.