



Norbrook[®]



Golden Rules of Worming

Noromectin[®]
1.87% Oral Paste for Horses

NoroPraz[®]
Ivermectin Praziquantel Oral Paste for Horses 

Golden Rules of Worming

Introduction

NOROMECTIN® is Norbook's ivermectin equine wormer, a trusted global product which launched in 2002.

NOROPRAZ® was the latest addition to Norbrook's equine anthelmintic range to reinforce Norbrook's commitment to reliable and responsible equine worming. **NOROPRAZ®** is an ivermectin/praziquantel combination used to combat tapeworms and all stages of adult worms* and insects.

NOROPRAZ® is safe to use throughout all stages of pregnancy and lactation. It is suitable for foals from two weeks of age, however, treatment is not considered necessary until two months of age.

*apart from small encysted redworms





The Golden Rules Of Worming

- Planning
- Testing
- Know your horses' worms
- Know your wormer

Noromectin®

1.87% Oral Paste for Horses



NOROMECTIN®

Ivermectin

Ivermectin has become a popular equine anthelmintic choice with a high efficacy, broad spectrum of action and a wide safety margin. It is part of the avermectin chemical family with its efficacy directed towards endoparasites in the horse.

Ivermectin interacts with chloride channels in the nervous system of parasites, leading to paralysis and death of nematode and arthropod species. It also stimulates the presynaptic release of a neurotransmitter gamma-aminobutyric acid which further increases the death rate.

PREGNANT AND LACTATING MARES

Both **NOROMECTIN®** and **NOROPRAZ®** are safe to use in mares throughout the whole gestation and lactation period. Although ivermectin passes readily into the milk, there have been no reported cases of an effect on new born foals.

FOAL WORMING

Foals can take years to build a natural immunity to worms and are more prone to worm infestations than adult horses. It is therefore important to worm correctly.

An effective ivermectin wormer regime using e.g. **NOROMECTIN®**, may be initiated from six weeks of age, with repeat administration every month. At six months of age a tapeworm treatment should also be considered e.g. **NOROPRAZ®**. Thereafter the foal should be slotted into the standard/yearling worming programme.

Faecal egg count reduction tests (FECRT) are recommended for foals to identify effective wormers; yearly tests are recommended. By having an effective foal worming programme, you can gain the benefits of preventing permanent damage which may affect performance in adult life, as well as ensuring that you can potentially gain the best price, if selling the foal.

NOROMECTIN® is used for the following internal parasites:

Adult Large Strongyles (Redworms), Adult Small Strongyles (Redworms), Adult Immature Lungworms, Pinworms, Ascarids, Hairworms, Intestinal Threadworms, Neck Threadworms, Oral and Gastric Larval Stages of Stomach Bots.

NoroPraz[®]

Ivermectin Praziquantel Oral Paste for Horses



NOROPRAZ[®]

Ivermectin and Praziquantel

Praziquantel

Praziquantel is a pyrazinoisoquinoline derivative which exerts its anthelmintic activity against many species of cestodes and trematodes. It primarily acts by impairing both motility and function of the suckers of cestodes. Its mode of action includes the impairing of neuromuscular co-ordination but also influencing the permeability of the integument of worms, which leads to excessive calcium and glucose loss. This induces spastic paralysis of the parasite musculature.

NOROPRAZ[®] is used for the following internal parasites:

Tapeworm, Adult and Larval Large Strongyles (Redworms), Adult Small Strongyles (Redworms), Adult and Immature Lungworms, Pinworms, Ascarids, Hairworms, Intestinal Threadworms, Neck Threadworms, Oral and Gastric Larval Stages of Stomach Bots.



Golden Rule 1 Planning

Good planning techniques are important and can be valuable in the long term.

Remember to encourage the horse owner to:

- Manage the fields - picking up droppings and rotation of pastures for rest periods.
- Test new horses arriving on the yard then dose appropriately.
- Worm pregnant and lactating mares.
- Dose foals correctly. Worming should be considered from six weeks of age.
- Treat each horse as an individual.
- Keep records.

Golden Rule 2

Testing

Maintaining an *in refugia* population to help minimise the risk of the development of anthelmintic resistance means you need to know the worm burden of an individual horse, the type of worms present and the risk they pose. This can be achieved with the help of appropriate testing.

Faecal Egg Counting (FEC)

A sample of dung is viewed under a microscope and the number of worm eggs are counted. The lower the number, potentially the better.³

Benefits to the horse owner

- ✓ Targeted program for new horses on the yard.
- ✓ Improves overall health of your horse.
- ✓ Reduce the risk of the development of resistance with ineffective worming programs.
- ✓ Worm horses appropriately.
- ✓ Can be more cost effective over time.

Limitations of faecal egg sampling

- ✗ Worm counting does not identify bots, pinworms, small encysted redworms and tapeworm.
- ✗ Clear worm count does not mean worms are not present.

Worm egg count chart

Result	FEC	Risk	Comments
LOW	Less than 200 epg	Negligible	No need to worm your horse as this is an acceptable egg count
MODERATE	200-500 epg	Small risk	Your horse has a burden of worms, treatment should be considered
HIGH	More than 500 epg	High risk	Treatment is required to reduce worm burden

Blood Testing

ELISA tapeworm test is performed by the vet and is done to determine if the horse has been exposed to tapeworms. The ELISA test measures the level of antibodies to tapeworm antigens. High levels of antibodies indicates recent exposure to tapeworms.⁴

Saliva Testing

Tapeworm saliva testing is performed by the horse owner using a specialist sampling kit. It looks for antibodies to tapeworms present within the horses saliva.

Uses

- ✓ Identify tapeworms, if veterinary surgeon has concerns.
- ✓ Produce targeted worming programmes for the horse owner.

Limitations of blood and saliva testing

- ✗ The results only determine tapeworm exposure, not potential current burden since antibodies can remain present within the system for up to 12 months despite treatment of a tapeworm infection.

Golden

Know your h

Bots

Diagnosis: Bot larvae over-winter attached to the lining of the stomach

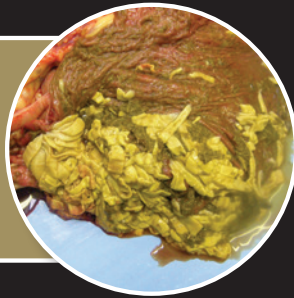
Treatment: Macrocytic lactones such as ivermectin or moxidectin



Tapeworms

Diagnosis: Blood or saliva test for tapeworm antibodies

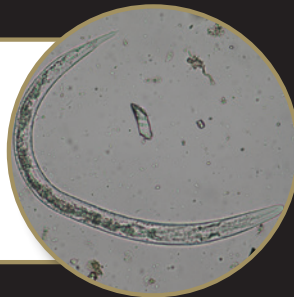
Treatment: Praziquantel or double dose pyrantel



Lungworms

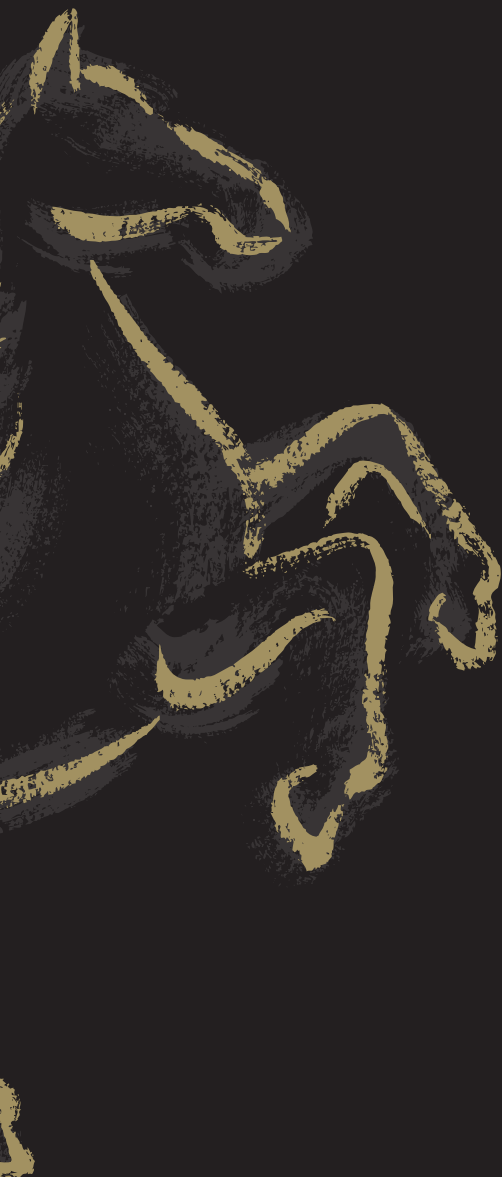
Diagnosis: Uncommon in horses

Treatment: Macrocytic lactones such as ivermectin or moxidectin



Rule 3

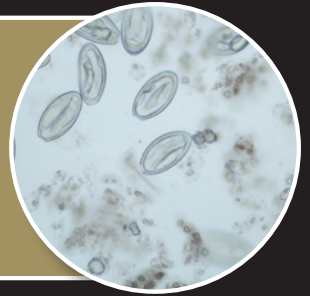
Horses' worms



Pinworms

Diagnosis: Tail base irritation with white eggs possibly visible around the peri-anal region

Treatment: Adults – benzimidazoles, pyrantel or macrocyclic lactones such as ivermectin or moxidectin



Ascarids

Diagnosis: Faecal egg count

Treatment: Adults and larvae – pyrantel or macrocyclic lactones such as ivermectin or moxidectin

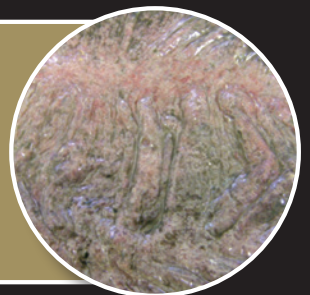


Small redworms

Diagnosis: Faecal egg count to show presence of adult worms

Treatment: Adults – benzimidazoles, pyrantel or macrocyclic lactones such as ivermectin or moxidectin

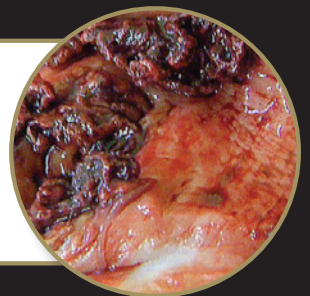
(Encysted small redworm larvae: moxidectin or 5 day course of benzimidazoles)



Large redworms

Diagnosis: Faecal egg count

Treatment: Adults and larvae – benzimidazoles or macrocyclic lactones such as ivermectin or moxidectin



Worming Yearly Rota



Spring



Summer



Autumn



Winter



Bots

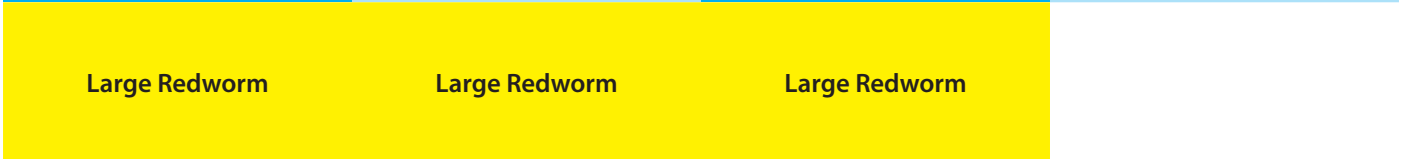


Tapeworm

Tapeworm

Tapeworm

Tapeworm



Large Redworm

Large Redworm

Large Redworm

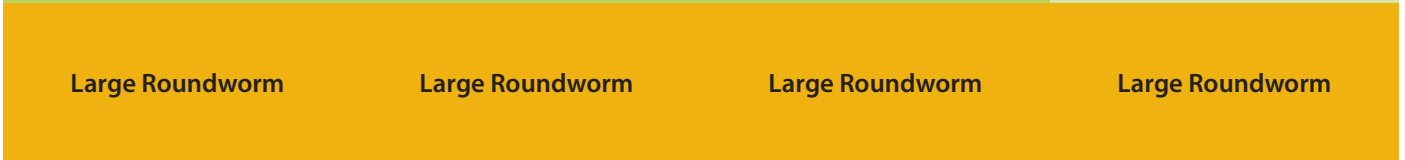


Small Redworm

Small Redworm

Small Redworm

Small Redworm



Large Roundworm

Large Roundworm

Large Roundworm

Large Roundworm

Lighter coloured areas are in general less risk.

Ingredients used in Horse Wormers and what they kill

	Group one Macrocyclic Lactones		Group two Benzimidazoles	Group three Pyrantel Ebonate	Group four Praziquantel
	Ivermectin	Moxidectin			
CESTODES (tapeworm)					
<i>A.perfoliata</i>				x (Double Dose)	x
<i>A.magna</i>					x
<i>P.mamillana</i>					x
NEMATODES (roundworms)					
Large strongyle					
Adults	x	x	x	x	
Larvae	x	x	x		
Small strongyles					
Adults	x	x	x	x	
Non mucosal larvae	x	x	x		
Encysted cyathostomes		x	x (5 day course)		
Benzimidazole resistant strains	x	x		x	
Lungworm	x	x			
Pinworm					
Adult	x	x	x	x	
Larvae	x	x	x		
Ascarids					
Adult	x	x	x	x	
Larvae	x	x	x		
Hairworms	x	x			
Intestinal threadworms	x	x			
Neck threadworms	x	x			
INSECTA					
Bots	x	x			

Golden Rule 4

Worming for the individual horse not the yard

Knowing the types of worms that you need to treat can have a positive impact on resistance, and means a more targeted and cost effective worming programme can be designed for the horse owner.

ADVISING ON RESISTANCE PREVENTION...

Resistance to anthelmintic can occur in many different ways as outlined below:

- Unnecessary worming
- Low worming dose
- Excessive worming
- Not changing the class of product, just the brand name
- Not seeking advice from SQP or vets
- Not understanding the seasonal/climatic effects on worm populations

REFUGIA

Refugium is a term applied to worms that have remained sensitive to wormers as they have had no significant exposure to anthelmintic products. Keeping a refugia population in the horse, ensures a gene pool of treatment sensitive worms. To ensure refugia is maintained faecal egg counting and blood testing can be employed.

Appropriate wormer for the appropriate worm type should be employed so as to not allow resistant worms to establish.

References:

- ¹ Westgate laboratories, 2008. Westgate laboratories postal worm egg counts [online]. Available from: <http://www.westgatelabs.co.uk/> [Accessed 26th September 2012].
- ² Intelligent worming, 2012. Intelligent worming the future of equine parasite control [online]. Available from: <http://www.intelligentworming.co.uk/doyouknow-aboutworms-gettingthemeasureoftap.asp> [accessed 26th September 2012].
- ³ Bell, R.J., & Holste, J.E., 1990. Efficacy of ivermectin oral liquid for horses. Canadian Veterinary Journal. 519-521.
- ⁴ Rock, A.H., 2007. Veterinary pharmacology: a practical guide for the veterinary nurse. London: Butterworth Heinemann.



Noromectin® 1.87% Oral Paste for Horses

Presentation

Ivermectin 1.87% w/w

Uses

Noromectin® 1.87% Oral Paste for Horses kills the adult and some larval stages of the important internal parasites of horses. Noromectin 1.87% Oral Paste for Horses at the recommended dose rate of 200 µg ivermectin per kg bodyweight is indicated for the treatment of the following internal parasites of horses:

Large strongyles (redworms): adults and 4th larval (arterial) stages of *Strongylus vulgaris*, adults and tissue larval stages of *S. edentatus* and adults of *S. equinus*.

Adult small strongyles (redworms including benzimidazole resistant strains): *Cyathostomum catinatum*, *Cyathostomum pateratum*, *Cylicocycylus ashworthi*, *Cylicocycylus elongatus*, *Cylicocycylus insigne*, *Cylicocycylus leptostomum*, *Cylicocycylus nassatus*, *Cylicocycylus radiatus*, *Cylicostephanus asymmetricus*, *Cylicostephanus bidentatus*, *Cylicostephanus calicatus*, *Cylicostephanus goldi*, *Cylicostephanus longibursatus*, *Cylicostephanus minutus*, *Cylicodontophorus bicornatus* and *Gyaloccephalus capitatus*.

Adult and immature lungworms: *Dictyocaulus arnfieldi*.

Pinworms: Adult and immature *Oxyuris equi*.

Ascarids: Adult and 3rd and 4th stage *Parascaris equorum*.

Hairworms: Adult *Trichostrongylus axei*.

Intestinal threadworms: Adult *Strongyloides westeri*.

Neck threadworms: Microfilariae of *Onchocerca* spp.

Oral and gastric larval stages of stomach bots: *Gasterophilus* spp.
Ivermectin is not effective against encysted larval stages of the small strongyles.

Dosage and Administration

Noromectin 1.87% Oral Paste for Horses is administered orally at a single dose rate of 200 µg/kg of bodyweight. One syringe division of paste should be administered per 100kg bodyweight (based on the recommended dosage of 200 µg/kg). Each syringe delivers 140mg ivermectin, sufficient to treat 700kg of bodyweight. The tip of the syringe barrel should be inserted at the interdental space (the gap between the front and back teeth). The horse's head should be raised for a few seconds after dosing.

Horses' weight should be accurately determined for the correct use of the paste. The animal's mouth should be free of food to ensure swallowing. For best results all horses in a yard or grazing together should be included in a regular parasite control programme and treated at the same time. All horses should be included in a regular parasite control programme, with particular attention being paid to mares, foals and yearlings. Foals should be treated initially at 6-8 weeks of age and routine treatment repeated as appropriate. Retreatment should be carried out according to the epidemiological situation, but not less than at a 30 day interval. Do not use the same syringe to treat more than one animal unless horses are running together or in direct contact with each other on the same premises. As with all anthelmintics, a veterinary surgeon should establish appropriate dosing programmes and stock management to achieve adequate parasite control and reduce the likelihood of anthelmintic resistance developing.

Withdrawal Period

Animals must not be slaughtered for human consumption during treatment. Horses must not be treated within 34 days of slaughter for human consumption. Do not use in mares producing milk for human consumption

Contraindications, Warnings, etc

Noromectin 1.87% Oral Paste for Horses has been formulated for use in horses only. Dogs and cats may be adversely affected by the concentration of ivermectin in the veterinary medicinal product if they are allowed to ingest spilled paste or have access to used syringes. Avermectins may not be well tolerated in all non-target species (cases of intolerance with fatal outcome are reported in dogs, especially Collies, Old English Sheepdogs and related breeds or crosses, and also in turtles/tortoises). Do not use in dogs or cats as severe adverse reactions may occur. This is a unidose product which should be disposed of after use. Frequent and repeated use may lead to the development of resistance.

Some horses have experienced reactions involving cutaneous swelling and itching shortly after treatment. In most of these cases, the horses have been diagnosed as carrying heavy infections of *Onchocerca microfilariae*, and it is assumed the reactions are a result of the microfilariae dying in large numbers. Although the signs will resolve spontaneously in a few days, symptomatic treatment may be advisable. Consult your veterinary surgeon should these signs persist.

Horses of all ages, including young foals, pregnant mares and breeding stallions have been treated with no adverse effects on their health and fertility. Ivermectin passes readily into milk. When administering to lactating females, residues of ivermectin could be present in the maternal milk. No studies have been reported on the effect of ingestion of milk on the development of newborn foals, therefore it would be prudent not to feed very young animals with milk obtained from the mother.

Mild transitory signs (slowed pupillary light response and depression) have been seen at a higher dose of 1.8mg/kg (9 times the recommended dose level). Other signs seen at higher doses include mydriasis, ataxia, tremors, stupor, coma and death. The less severe signs have been transitory. Although no antidote has been identified, symptomatic therapy may be beneficial.

Pharmaceutical Precautions

Do not smoke or eat while handling the product. Wash hands after use.

Avoid eye contact.

Do not store above 25°C. Keep the container in the outer carton in order to protect from light.

EXTREMELY DANGEROUS TO FISH AND AQUATIC LIFE.

Do not contaminate surface water or ditches with product or used containers. Dispose of any unused product and empty containers in accordance with guidance from your local waste regulation authority.

Legal Category

POM-VPS

Package Quantities

Syringes containing 7.49g of product in cartons of: 1,2, and 10 syringes.

VM No: 02000/4208

For Animal Treatment Only

Keep out of reach and sight of children

Noropraz® 18.7 mg/g + 140.3 mg/g Oral Paste for Horses

Presentation

A white to off white homogenous oral paste.

Each gram of Ivermectin Praziquantel Paste for Horse contains:

Active substance:

Ivermectin	18.7 mg
Praziquantel	140.3 mg

Uses

Target Species: horses

For the treatment of mixed cestode and nematode or arthropod infestations, due to adult and immature roundworms, lungworms, bots and tapeworms in horses:

Nematodes:

Large strongyle: *Strongylus vulgaris* (adult and arterial larvae), *Strongylus edentatus* (adult and L4 tissue larval stages), *Strongylus equinus* (adult), *Tridontophorus* spp. (adult)

Small strongyle: *Cyathostomum: Cylicocyclus* spp., *Cylicostephanus* spp., *Cylicodontophorus* spp., *Gyalocephalus* spp. (adult and non-inhibited mucosal larvae)

Parascaris: *Parascaris equorum* (adult and larvae)

Oxyuris: *Oxyuris equi* (larvae)

Trichostrongylus: *Trichostrongylus axei* (adult)

Strongyloides: *Strongyloides westeri* (adult)

Habronema: *Habronema* spp. (adult)

Onchocerca: *Onchocerca* spp. *microfilariae* i.e. cutaneous onchocerciasis

Lungworm: *Dictyocaulus arnfieldi* (adult and larvae)

Cestodes (Tapeworm): *Anoplocephala perfoliata*, *Anoplocephala magna*, *Paranoplocephala mamillana* (adult)

Dipteran insects: *Gasterophilus* spp. (larvae)

As tapeworm infestation is unlikely to occur in horses before two months of age, treatment of foals below this age is not considered necessary.

Dosage and Administration

Single administration

200 µg of Ivermectin and 1.5 mg of Praziquantel per kg of bodyweight corresponding to 1.07 g of paste per 100 kg bodyweight

To ensure administration of a correct dose, bodyweight should be determined as accurately as possible; accuracy of the dosing device should be checked as underdosing might lead to an increased risk of development of resistance to anthelmintic drugs.

The first division delivers enough paste to treat 50 kgs.

Each subsequent syringe division delivers enough paste to treat 50 kgs of bodyweight. The syringe should be adjusted to the calculated dosage by setting the ring on the appropriate place on the plunger. The syringe containing 7.49 g of paste delivers sufficient paste to treat 700 kg of bodyweight at the recommended dose rate.

Directions for Use

Before administration, adjust the syringe to the calculated dosage by setting the ring on the plunger. The paste is administered orally by inserting the nozzle of the syringe through the interdental space and depositing the required amount of the paste on the back of the tongue. The animal's mouth should be free of any food. Immediately after administration, elevate the head of the horse for a few seconds to ensure the dose is swallowed.

The veterinary surgeon should give advice regarding appropriate dosing programmes and stock management to achieve adequate parasite control for both tapeworm and roundworm infestations.

Withdrawal Period

Horses: Meat & Offal: 35 days

Not permitted for use in horses producing milk for human consumption.

Contraindications, Warnings, etc

Do not use in foals under 2 weeks of age.

Do not use in mares from which milk is taken for human consumption.

Do not use in horses known to be hypersensitive to active ingredients or to any other ingredients.

Care should be taken to avoid the following practices because they increase the risk of development of resistance and could ultimately result in ineffective therapy:

- Too frequent and repeated use of anthelmintics from the same class, over an extended period of time.

- Underdosing, which may be due to underestimation of body weight, misadministration of the product, or lack of calibration of the dosing device
Suspected clinical cases of resistance to anthelmintics should be further investigated using appropriate tests (e.g. Faecal Egg Count Reduction Test).
Where the results of the test(s) strongly suggest resistance to a particular anthelmintic, an anthelmintic belonging to another pharmacological class and having a different mode of action should be used.

Resistance to ivermectin (an avermectin) has been reported in *Parascaris equorum* in horses in a number of countries including the EU. Therefore the use of this product should be based on local (regional farm) epidemiological information about susceptibility of nematodes and recommendations on how to limit further selection for resistance to anthelmintics.

Adverse Reactions

Horses carrying heavy infection of *Onchocerca microfilariae* have experienced such reactions as swelling and itching after treatment. It is assumed that these reactions are the result of the destruction of large animals of microfilariae.

In case of very high levels of infestation, destruction of the parasites may cause a mild transient colic and loose faeces in the treated horse.

Colic, diarrhea and anorexia have been reported in very rare occasions post treatment, in particular when there is heavy worm burden.

In very rare occasions, allergic reactions such as hypersalivation, lingual oedema and urticaria, tachycardia, congested mucus membranes, and subcutaneous oedema have been reported following treatment with the product. A veterinarian should be consulted if these signs persist.

Pharmaceutical Precautions

Do not store above 30°C

Store open syringes below 23°C

Special Warnings

Special precautions for use in animals

Avermectins may not be well tolerated in all non target animals. Cases of intolerance are reported in dogs, especially Collies, Old English Sheepdogs and related breeds or crosses, and also in turtle and tortoises.

Dogs and cats should not be allowed to ingest spilled paste or access to used syringes due to the potential for adverse effects related to ivermectin toxicity.

Parasite resistance to a particular class of anthelmintic may develop following frequent, repeated use of an anthelmintic of that class.

Special precautions to be taken by the person administering the veterinary medicinal product to animals

Wash hands after use (to be sure that eye contamination can not occur).

Avoid contact with the eyes. In the case of accidental contact, rinse with abundant quantities of water. In case of eye irritation, seek medical attention.

Do not eat, drink or smoke while handling this product.

In the event of accidental ingestion, seek medical advice and show the doctor the leaflet so that he knows what you have taken.

Disposal

EXTREMELY DANGEROUS TO FISH AND AQUATIC LIFE. Do not contaminate surface waters or ditches with the product or used container. Any unused veterinary medicinal product or waste materials derived from such veterinary medicinal products should be disposed of in accordance with local requirements.

Legal Category

POM-VPS

Package Quantities

An adjustable multidose syringe composed of polyethylene barrel, plunger and end cap, with polypropylene dosing rings. The syringe contains 7.49g of product and is fitted with variable dose capacity.

The oral paste is available in the following pack sizes:

- 1 carton box containing 1 x 7.49g syringe
- 1 carton box containing 2 x 7.49g syringes
- 1 carton box containing 12 x 7.49g syringes
- 1 carton box containing 40 x 7.49g syringes
- 1 carton box containing 48 x 7.49g syringes
- 1 carton box containing 50 x 7.49g syringes

Not all pack sizes may be marketed.

VM No: 02000/4365

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Keep out of reach and sight of children



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