
Welpan[®]

Nematocide for puppies and young dogs

Product information

International Edition

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Important note

This product information on Welpan is based on the available results of controlled international studies. User information may be found in the instructions for use contained in the Welpan package inserts which have been approved by the regulatory authority.

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The roundworm (nematode) problem in dogs

Morphology

Nematodes (Greek: nema = thread) are thread-shaped worms. Their body is tapered at both ends. The length of the adult worm ranges from 1 millimetre to 18 centimetres, depending on the species. All nematodes have a stable, elastic cuticle and a complete digestive system. The mouth of the worm is the buccal capsule which serves both for feeding and in some species also for attachment to the intestinal wall. Nematodes feed on chyme or intestinal contents and on epithelial cells, mucosa or blood. The sexes are separate. The males are usually distinguishable from the females by their smaller size. The accessory organs (such as the copulatory bursa) of the reproductive system, and especially the buccal capsule, and the form of the oesophagus are important features in species identification. The various worm species are also distinguishable by the appearance of their eggs.



Fig. 2: *Ancylostoma caninum*

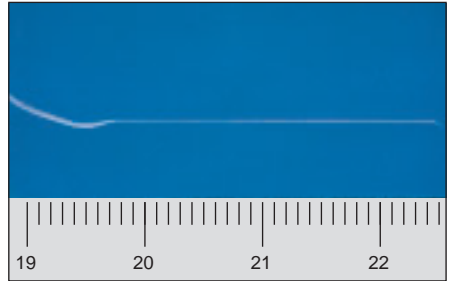


Fig. 3: *Trichuris vulpis*

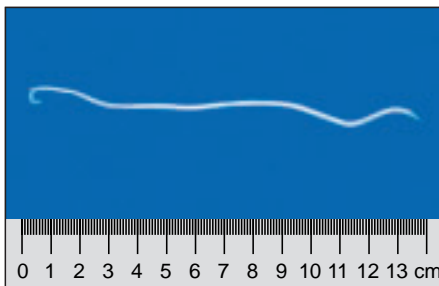


Fig. 1: *Toxocara canis*

Biology

The number of eggs passed from each female worm can be very high. One female ascarid can produce 700 eggs per gram faeces daily. In puppies, 15000 eggs per gram faeces are not uncommon. The duration of the pre-patent period (period from infection of the dog to the appearance of the parasite's eggs in the faeces) also varies considerably from two weeks (*Uncinaria stenocephala*) up to three months (*Trichuris vulpis*). This period is an important factor in the establishment of worming programmes.

The eggs pass to the exterior in the faeces of the host. Since **the resistance and the longevity of the eggs** can be very high, there is a constant risk of infection from the environment. Whipworm eggs can survive for three or four years as a reservoir of infection in kennels. Likewise, *T. canis* eggs are highly resistant to climatic extremes, and can survive for years in the ground.

Most of the nematode parasites of dogs develop into infective larvae either in the external environment or in the body of an intermediate host (e.g. *T. leonina*). There the larvae hatch and become infective after several moults. In some species larval development takes place inside the egg, i.e. embryonated eggs constitute the invasive stage. Paratenic hosts can also be infected (e.g. rodents can harbour larvae of *T. canis*) but in this case the larvae do not undergo any further development .

After infection of the definitive host and further moults, the adult worm stage is reached. During final development the larvae often migrate through various tissues and organs of the host, causing severe damage.

The **gastrointestinal tract** of dogs and puppies may be infected by a number of different nematode species: ascarids (*Toxocara canis*, *Toxascaris leonina*) and hookworms (*Ancylostoma caninum*, *Uncinaria stenocephala*) may occur in the small intestine, and whipworms (*Trichuris vulpis*) in the large intestine, particularly the caecum.

Adult ascarids do not attach to the gut wall; they feed on intestinal contents and not on the blood or tissues of the host. Hookworms (e.g. *Ancylostoma*) suck in a plug of intestinal mucosa and feed upon detached epithelial cells and blood. Blood is rapidly pumped into the intestine and haemorrhaging may



Fig. 4: *Trichuris vulpis* in the intestine

occur at the site of attachment of the nematode. *Trichuris vulpis* bury their oesophageal region into the mucosa, where they continually move around in order to search for blood and fluid.

A special phenomenon in some nematodes (e.g. *T. canis*, *A. caninum*) is **hypobiosis**, which is a state of arrested development of the final larval stage. It is initiated by external stimuli acting upon the infective larvae (e.g. low temperatures, low humidity) or by immunological and hormonal processes in the body of the host, although the nature of

this (multifactorial) phenomenon is not yet completely understood. These arrested larvae play a major role in the **vertical transmission of nematode infections from the bitch to her pups**, and are particularly difficult to combat. As dormant larvae in the tissues of bitches, they are immune to anthelmintics because they are metabolically inactive. Experimental studies have shown that, when reactivated, these larvae are only moderately susceptible to a few anthelmintics administered frequently and in high dosage.



Fig. 5: Close-up of the head of an ascarid showing the mouth and the three lips

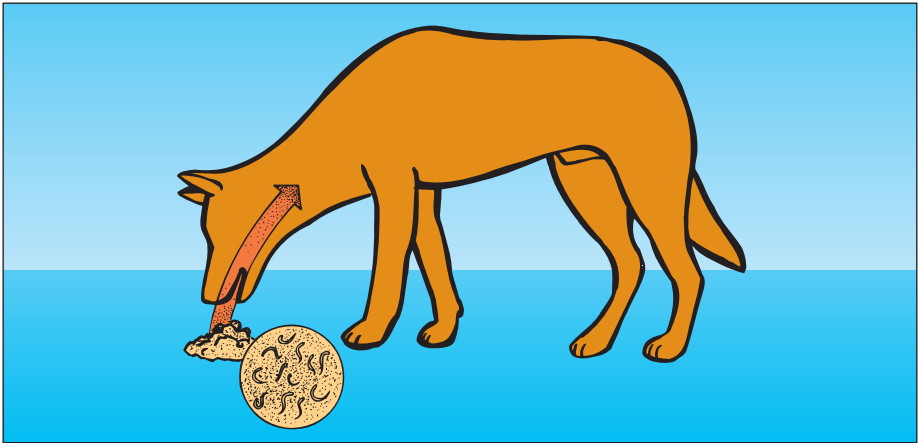


*Fig. 6: Scanning electron micrograph of the head of an adult hookworm (*Ancylostoma*), showing the buccal capsule with the marginal teeth*

Routes of infection in the dog

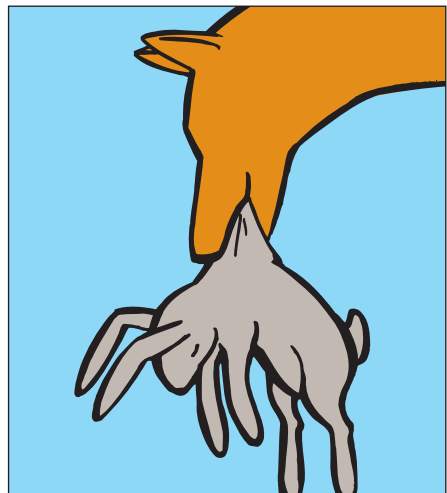
Oral infection

1. By direct ingestion of the infectious eggs (e. g. eggs containing the L2 of ascarids, or the L1 of whipworms) or infective larvae (the L3 of hookworms).



2. By eating infested hosts.

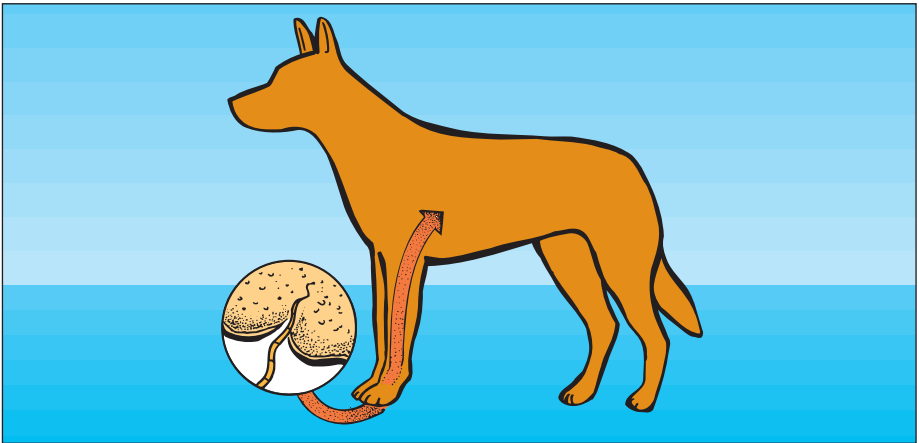
Ingestion of infested paratenic or intermediate hosts (mice, birds) is an important route of infection in dogs with nematodes (ascarids, hookworms).



Percutaneous infection

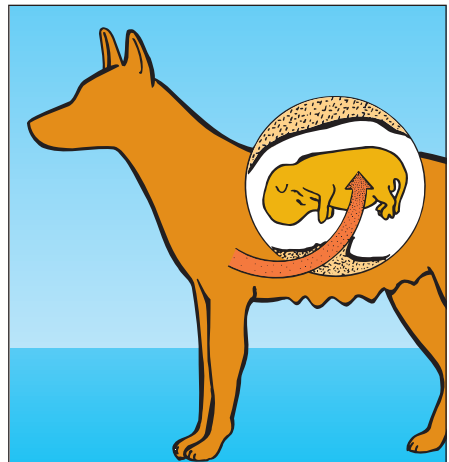
3. By active larval invasion through the skin of the definitive host (hookworms). In per-

cutaneous infection, larvae migrate via the blood stream to various organs.



Intrauterine infection (pre-partum)

4. In dogs older than six months, *T. canis* larvae (the L2) migrate to a wide range of tissues including the liver, lungs, brain, heart and skeletal muscle, and the walls of the alimentary tract. In the pregnant bitch pre-natal infection occurs, larvae becoming mobilised at about three weeks prior to parturition and migrating to the lungs of the foetus where they moult to the L3 stage just before birth. A bitch, once infected, will usually harbour sufficient larvae to infect all her subsequent litters, even if she is never reinfected.

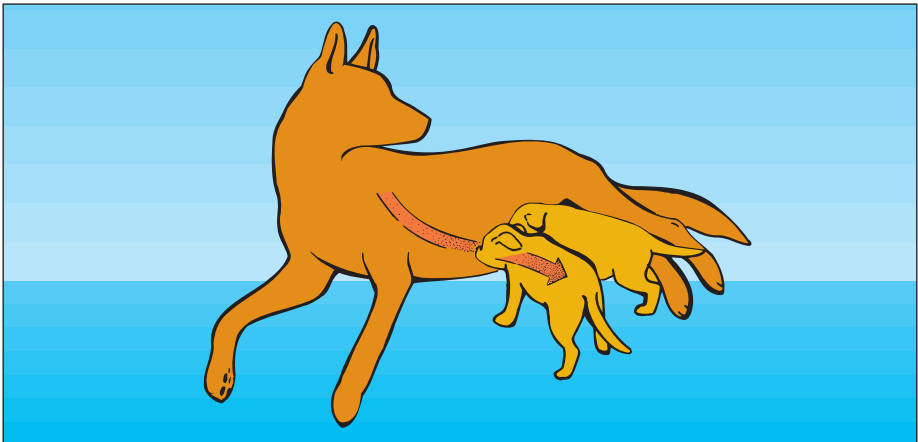


Transmammary infection (post-partum)

5. Some hookworm or ascarid larvae migrate to the skeletal muscles and other tissues where they remain dormant. In pregnant bitches, these arrested larvae may later be reactivated and then migrate into the mammary gland. The suckling pup may also be infected by ingestion of L3 larvae in the

milk during the first three weeks of lactation.

Infection of the bitch on a single occasion has been shown to produce transmammary infections in at least three consecutive litters.



Epidemiological situation of puppies

6. Puppies are much more exposed to the risk of nematode infection than adult dogs, since they can be affected by both vertical transmission (from the the bitch) and horizontal transmission (from adult dogs or other puppies either directly or via an inter-

mediate host). Furthermore, surveys of roundworm prevalence in dogs and puppies show that in most countries *T. canis* infection rates are usually extremely high (frequently more than 80 %), especially in young dogs of less than six months of age.

Health risk in dogs and puppies

The damaging effects of the worms on their host are extremely variable. The pathogenic alterations, either singly or in combination,

can give rise to organic disorders with a wide variety of clinical symptoms.

1. Mechanical damage to the tissue.



Fig. 7: Granulomas under the renal capsule due to larvae of *Toxocara canis*

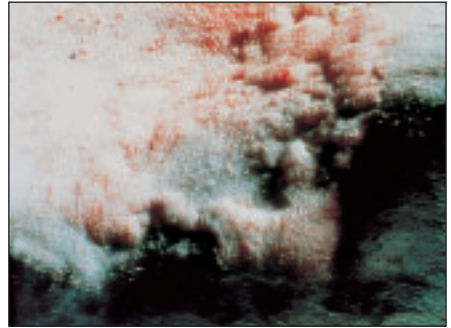


Fig. 8: Skin lesions after percutaneous infection with *Ancylostoma caninum*

2. Obstruction of the gut and the bile ducts caused by massive roundworm infestation.

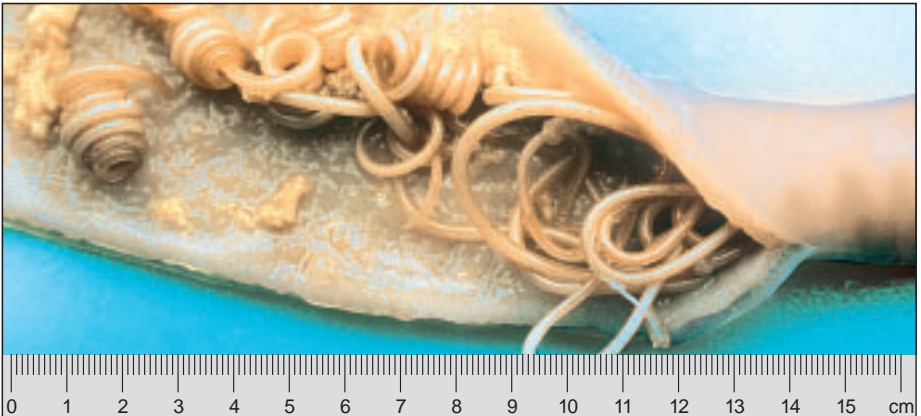


Fig. 9: *Toxocara canis*



Fig. 10: Normal mucosa (pink)



Fig. 11: Pale mucosa due to heavy infestation with hookworms

3. Blood loss caused by blood-sucking worms (hookworms) leading to anaemia.
4. Deprivation of vitamins and other vital substances (in infection with roundworms)

5. Interference with the immune system (compromises the protection afforded by vaccinations).

6. Loss of condition in the host due to release of such substances as enzymes, toxins, hormones.



*Fig. 12: Rachitic limb deformity in massive intestinal infestation with *Toxocara canis**

Clinical manifestations

Depending on their state of health, their resistance and the degree of parasite infestation, infected animals exhibit a wide variety of symptoms: dull, rough coat, emaciation, anaemia, distension of the abdomen (pot-belly), impaired fertility, reduced fitness and generally lower resistance and vitality.

Ascarids (roundworms) and other nematodes may cause vomiting in the affected

animals.

Hookworms produce very severe anaemia. The blood loss is greatest 10 – 15 days after the onset of infestation. A single female hookworm can remove up to 0.5 ml of blood per day. If a puppy is infected with 50 or more adults the infection is fatal because of the heavy blood loss; and such



Fig. 13: "Pot-belly" in a puppy with massive *Toxocara canis* infestation

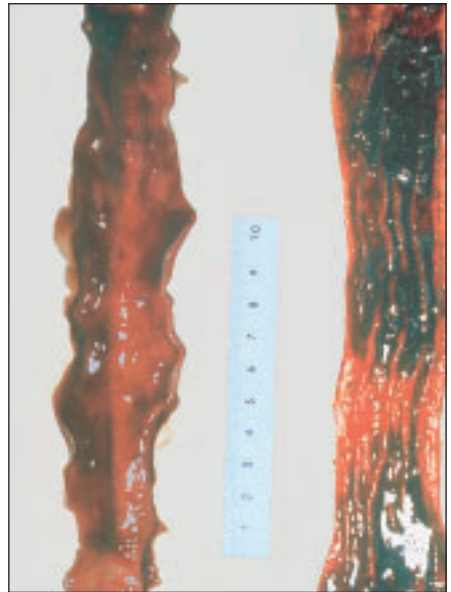


Fig. 14: Bloody enteritis due to *Ancylostoma caninum*

Routes of infestation in man

deaths are by no means uncommon.

Oral infestation

In the vast majority of cases humans become infected by ingesting worm eggs. Infected dogs, cats and other companion animals are the most common vectors. They often pass large numbers of worm eggs in their faeces, thus constituting a permanent source of infection.

The soil in public parks, playgrounds, kennel runs or sandpits where dogs regularly defecate can accumulate large numbers of infective ascarid eggs. Children who often play in these areas are then particularly at risk, since the worm's eggs readily pass from soiled fingers to the mouth. Breeders are also exposed to this contamination and should therefore take the necessary hygiene measures in contaminated kennels. Environmental contamination poses a significant and lasting threat to human health because of the high resistance of worm eggs to unfavourable climatic conditions.

The possible infestation of man with whipworms has occasionally been reported. This also has to be taken into account, especially by breeders, since *T. vulpis* eggs can survi-



ve up to four years in kennels.

Percutaneous infestation

The infective larvae of hookworms can actively penetrate human skin if there is direct exposure to contaminated sandpits,



Human health risk

beaches, city parks or domestic gardens.

1. Damage due to *Toxocara* species

The human disease known as Visceral Larva Migrans is caused by larval forms of the dog or cat roundworm.

When infection has occurred the larvae hatch in the upper portion of the small intestine, penetrate the gut wall and migrate to the lungs by the lympho-haematogenic route. Thereafter they enter the arterial blood stream and are spread throughout the body. In the capillary regions the larvae actively leave the vascular system and migrate into the surrounding tissue. Preferred sites for somatic larvae of *Toxocara* spp. in man are the liver, the CNS and the eye, which considerably increases the dangerous nature of such an infection. At the Hospital for Tropical Diseases in London, 20 – 30 cases of eye lesions caused by *Toxocara* spp. are treated every year.

In the USA approximately 10,000 new cases of Visceral Larva Migrans and 700

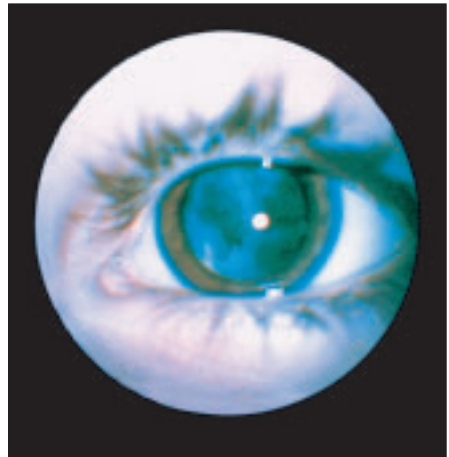


Fig. 15: Leukocoria (white appearance of the pupil) due to retinopathy caused by Toxocara larvae (eight-year-old boy)

cases of Ocular Larva Migrans are diagnosed annually (Stehr-Green and Schantz, 1987). According to a survey of ophthalmologists in Alabama, USA, at least one case of ocular larva migrans is encountered in every 1,000 patients (Maetz et al., 1987).

Importance of nematode infections in man		
Worm species	Infective agent	Developmental stage in man
1. <i>Toxocara</i> spp.	Infective eggs	Larvae
2. <i>Ancylostoma</i> spp., <i>Uncinaria</i> spp.	Infective larvae	Larvae
3. <i>T. vulpis</i>	Infective larvae	Adult worm

2. Damage due to hookworms

Cutaneous Larva Migrans is a dermatitis caused by migrating nematode larvae. This disease is usually caused by larvae of *Ancylostoma* or *Uncinaria* species.

Infection of humans occurs through skin contact with larvae. The most common sources of infection are shady, moist and warm sand or soil, contaminated either directly by faeces of infected dogs and cats or indirectly via sewage or effluent containing developmental stages or the causal agents of cutaneous larva migrans. Children are especially at risk of catching the disease in sandpits, on playgrounds and in public parks. Bathing beaches can also be a source of infection.

At the site of penetration reddish, severely itching skin lesions similar to insect bites appear 2–4 days after the infection. A common complication is secondary bacterial invasion of the affected skin areas which can give rise to purulent eczema.

Larva migration in the skin can be interrupted for many weeks and months only to resume suddenly for some as yet unknown reason. Small papules form at the resting sites of the larvae.

The diagnosis of Cutaneous Larva Migrans is straightforward because of the pathognomonic symptoms.



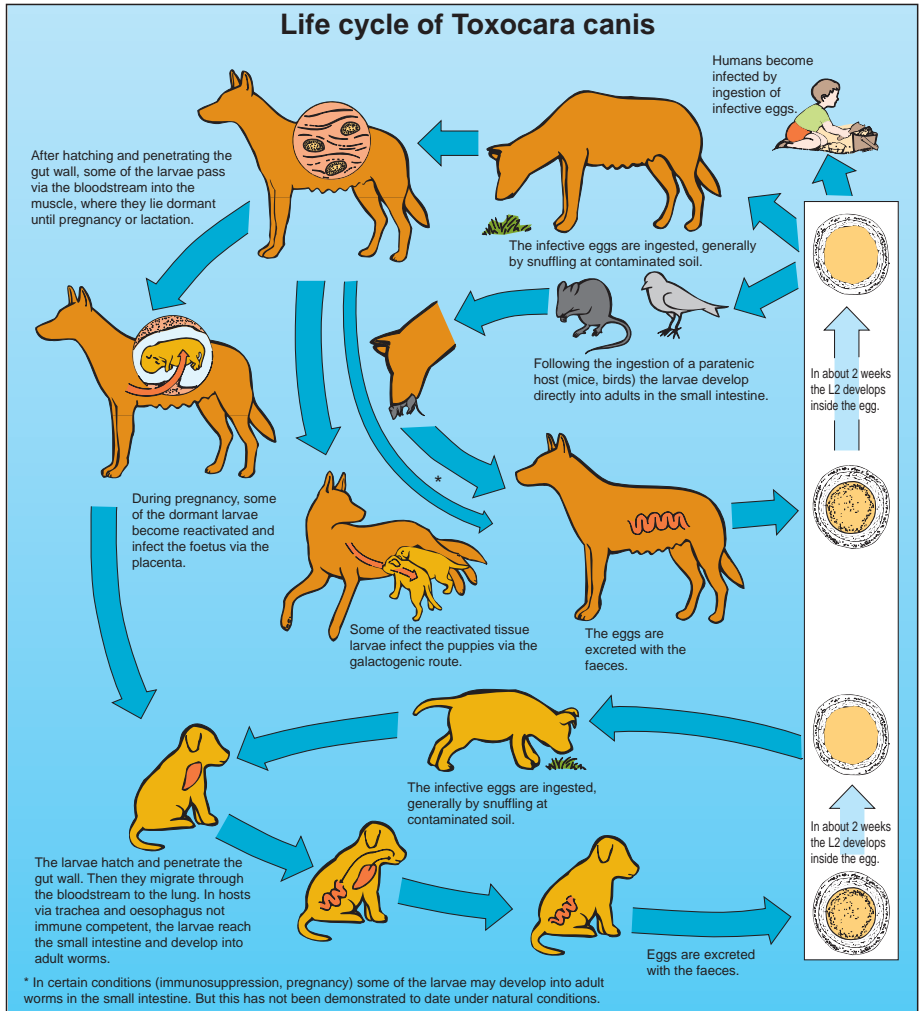
Fig. 16: *Cutaneous larva migrans* (sole of foot)
(Prof. Seitz)

3. Damage due to whipworms

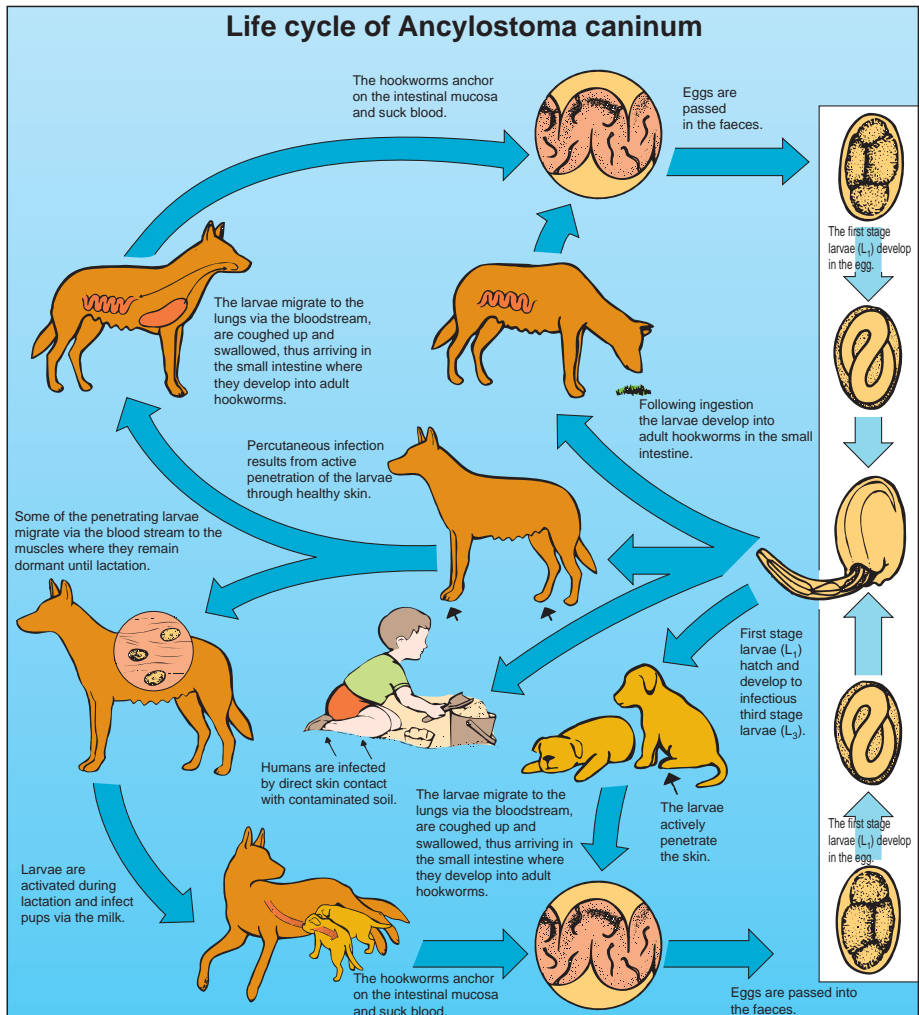
Whipworm infection is very occasionally diagnosed, mainly in children. The main morphological peculiarity of *T. vulpis* eggs compared with the eggs of *T. trichura*, a parasite normally harboured by man, is their larger size. Because in clinical parasitology laboratories no importance is usually attributed to the size of *Trichuris* eggs, it is thus possible that the incidence of this zoonosis is underestimated (Kenney et al., 1978). Little is known about the lesions caused by *T. vulpis* in man.

Life cycle of the most important intestinal nematodes of dogs and pups

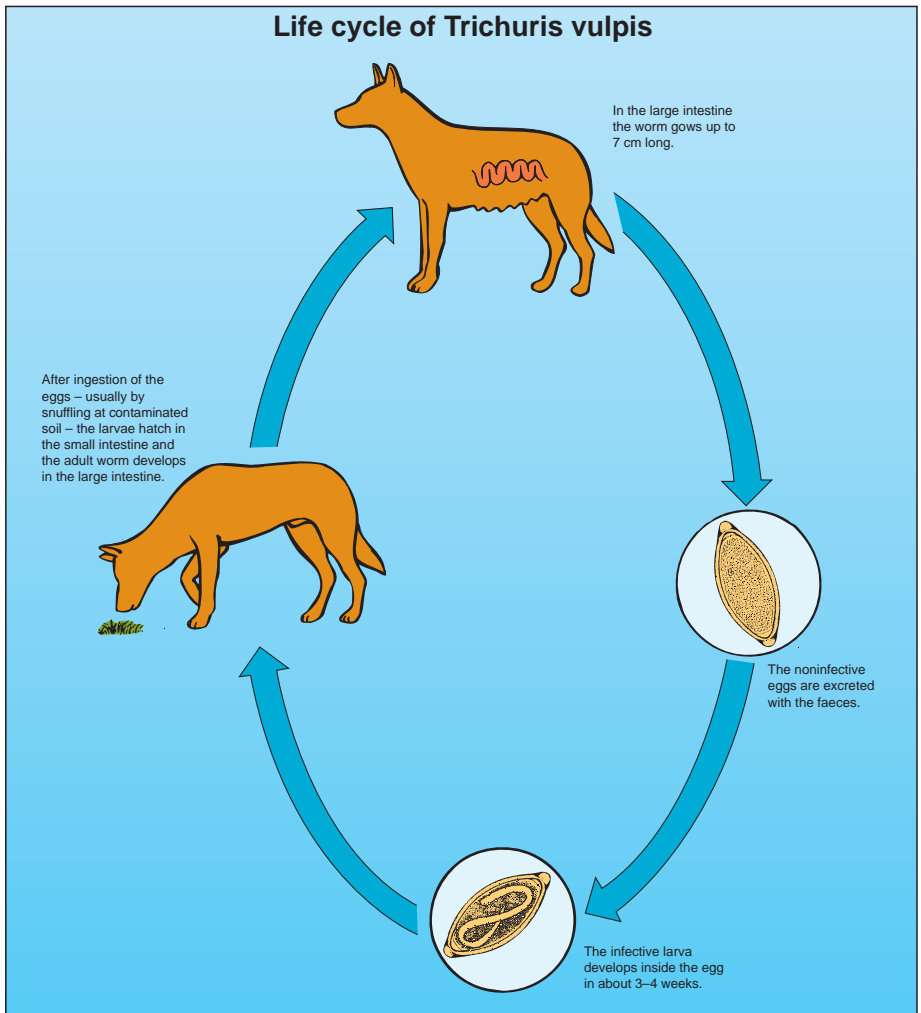
1. Ascariids



2. Hookworms



3. Whipworms



Control of worm infections

Diagnosis and pre-patent periods

The most commonly practised laboratory method for the diagnosis of helminth infection is microscopic examination of the faeces. This can only serve as an aid in establishing a diagnosis, however, as the method has some inherent weaknesses.


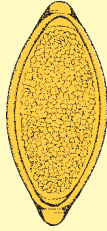


– *If faecal findings are positive:*

Identification of one egg type may often overlook the potential presence of other worm species (e.g. in simultaneous infec-

tion with both *Toxocara* and *Trichuris*). Treatment based only on this finding might then be only partially successful if the spectrum of activity of the chosen nematocide is too narrow.

– *If faecal findings are negative:*

Helminth infections during the pre-patent period and dormant larvae in the muscles (e.g. of pregnant bitches) are not detected by routine laboratory tests.

Common nematode eggs in dog			
from 50 x 80 µm to 35 x 50 µm <i>Ancylostoma</i>	80 x 35 µm <i>Trichuris vulpis</i>	75 x 85 µm <i>Toxascaris leonina</i>	75 x 90 µm <i>Toxocara canis</i>
			

Treatment programmes

The worldwide danger posed by worm infections can be reduced by appropriate education campaigns and deworming programmes.

In view of the wide variability in the pre-patent periods of individual nematode species in the dog (from two weeks to three months), the unreliability of faecal examinations, and the constant threat of reinfection from the environment (eggs and infective larvae), a policy of routine deworming

treatments is advisable. Dogs and puppies should therefore be wormed regularly .

Welpan is the product of choice for the treatment of puppies and young dogs, because of its broad nematocidal spectrum of activity. Adult dogs should be wormed every three months or, if the risk of infection is high, at intervals corresponding to the pre-patent period. Breeding bitches should also be wormed before mating and after whelping at the same time as the pups from the

litter.	
Treatment programme for puppies and young dogs:	
Worming	At age
1st	2 weeks
2nd	4 weeks
3rd	8 weeks
4th	12 weeks
5th	4 months
6th	5 months

7th
6
months

Hygiene measures

In order to reduce the risk of nematode contamination of dogs and puppies from the environment, some general hygiene measures can be recommended, especially for kennels. Kennel floors should be free of crevices and dry, and the bedding should be disposed of daily. Faeces should be removed with a shovel before hosing. After removal of all organic debris from paved

runs and other non-porous surfaces, spraying or mopping with a 1% solution of sodium hypochlorite (750 ml of commercial bleach in 4 litres of cool water) will facilitate the removal of ascarid and hookworm of eggs. Dogs should not be allowed onto the surface until it is dry. This treatment acts by stripping the protein coats from the eggs, making them easier to remove from the surface but not killing them.

Destruction of *T. vulpis* eggs in the environ-

ment is extremely difficult since there is no chemical known to be effective against them (J.R.Georgy and M.E. Georgy, 1992).

Taxonomy of the major nematodes of the dog			
Phylum	Nemathelminthes		
Subphylum	Nematoda (thread- or roundworms)		
Class			
Order	Ascaridida	Strongylida	Enoplida
Family	Ascaridae (roundworms)	Ancylostomatidae (hookworms)	Trichuridae (whipworms)

The most important intestinal nematodes of the dog						
General name	Scientific name	Length in cm (approx.)		Host	False or paratenic hosts	Special features
		Male	Female			
Roundworms	<i>Toxocara canis</i>	4–10	5–18	Dog	Mice, birds, (man)	The majority of puppies are infected by the intrauterine and transmammary or oral route
	<i>Toxascaris leonina</i>	2–7	2–10	Dog, cat	“reservoir” small mammals, birds	
Hookworms	<i>Ancylostoma caninum</i>	0.9–1.2	1.5–1.8	Dog	“reservoir” mouse, (man)	Transmammary, oral and percutaneous routes of infection
	<i>Uncinaria stenocephala</i>	0.4–0.5	0.7–1.2	Dog		
Whipworms	<i>Trichuris vulpis</i>	4.5–7.5	4.5–7.5	Dog		Dogs of all ages are at risk

Pre-patent period of the most important intestinal nematodes of the dog													
Worm species	Pre-patent period	weeks											
		1	2	3	4	5	6	7	8	9	10	11	12
Roundworms													
<i>Toxocara canis</i>	4–5 weeks after oral infection	█	█	█	█	█							
	3 weeks after pre-natal infection	█	█	█									
<i>Toxascaris leonina</i>	approx. 10 weeks	█	█	█	█	█	█	█	█	█	█		
Hookworms													
<i>Ancylostoma caninum</i>	2.5–3 weeks	█	█	█	█								
<i>Uncinaria stenocephala</i>	2–2.5 weeks	█	█	█									
Whipworms													
<i>Trichuris vulpis</i>	11–12 weeks	█	█	█	█	█	█	█	█	█	█	█	█

Welpan product profile

Species Toxocara canis
 Ancylostoma caninum
 Trichuris vulpis
 Toxascaris leonina
 Uncinaria stenocephala

1. General profile and advantages

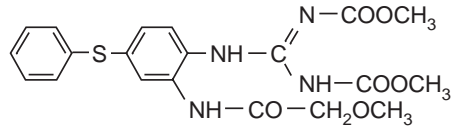
Welpan for puppies and young dogs is a broad-spectrum nematocide containing a combination of the active ingredients febantel and pyrantel embonate.

This combined formulation has the following advantages:

1. Comprehensive spectrum of activity including ascarids, hookworms and whipworms, specially adapted to puppies and young dogs.
2. High efficacy due to the synergistic action between febantel and pyrantel embonate.
3. Single administration per worming.
4. Good palatability so that the product can be administered either directly into the dog's mouth or mixed with food.
5. Excellent tolerability.

Presentation and composition:

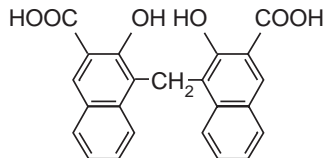
Welpan is an oral suspension for puppies and young dogs sold in a 100 ml bottle with a calibrated syringe. Each ml of suspension contains 14.4 mg pyrantel embonate (equivalent to 5 mg pyrantel base) and 15 mg febantel.



L-metoxo-acetamide (IUPAC)

Pyrantel embonate (INN)

Pyrantel pamate (USAN's)
 (E)-1, 4, 5, 6-tetrahydro-1-methyl-2-[2-(2-thienyl)vinyl]pyridine 4,4'-methylenebis[2-hydroxy-2-naphthoate] 1:1 (IUPAC)



3. Mode of action

Febantel

The mechanism of action of febantel is primarily based on interference with the carbohydrate metabolism of the worm. The suppression of mitochondrial reactions (inhibition of fumarate reductase) and interference with glucose transport act not only on all developmental stages of the helminths but also on the eggs containing the larvae. Benzimidazoles, and also probenzimidazoles such as febantel, bind to the structural protein tubulin, thereby preventing its polymerisation to microtubules which provide the transport system for the intestinal cells. The consequence of blocking this transport activity is incomplete absorption and digestion of nutrients and cellular autolysis through the activation of lysosomal enzymes.

Pyrantel embonate

Pyrantel, an anthelmintic of the tetrahydropyrimidine group, acts by inducing a depolarising neuromuscular blockade. Pyrantel, being a cholinergic agonist, acts as an excitatory neurotransmitter at the nicotinic receptor, causing irreversible spastic paralysis of the parasite. The embonate salt of pyrantel is poorly soluble in water, which offers the advantage of reduced absorption from the gut, allowing the drug to express its high nematocidal efficacy directly within the digestive tract.

4. Spectrum of activity/indications

Welpan has a wide nematocidal spectrum of activity which covers infection with the following canine worm species:

Ascarids

- *Toxocara canis*
- *Toxascaris leonina*

Hookworms

- *Ancylostoma caninum*
- *Uncinaria stenocephala*

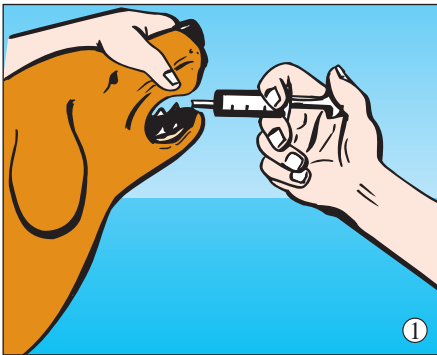
Whipworms

- *Trichuris vulpis*

5. Dosage

1 ml per 1 kg bodyweight

The suspension is administered orally to the animal, either directly into the dog's mouth with the calibrated syringe (1) or mixed with food (2).



No special dietary measures are required either in young dogs or in puppies.

The product is given as a single dose. (administration over several days is not necessary).

6. Efficacy

Welpan has been tested on a large number of dogs of various ages and breeds and in both sexes. Efficacy has been demonstrated on the basis of laboratory studies and clinical field studies.

The synergistic effect

Pyrantel embonate is an anthelmintic with high efficacy against ascarids and hookworms in dogs, but with no efficacy against whipworms. Febantel has a spectrum of activity which includes ascarids, hookworms and also whipworms.

In a development programme to formulate a highly effective canine nematocide, pyrantel embonate and febantel were tested alone and in combination against the major nematodes of the dog: *Toxocara canis*, *Ancylostoma caninum* and *Trichuris vulpis*. Pyrantel embonate and febantel were ad-

ministered at 14.4 mg of the salt/kg bodyweight (equivalent to 5 mg pyrantel base/kg bodyweight) and 15 mg/kg bodyweight respectively. The tested combination of pyrantel embonate and febantel was formulated

at the same dose rates.

The percentage reduction in worm numbers following treatment is shown in Fig. 17.

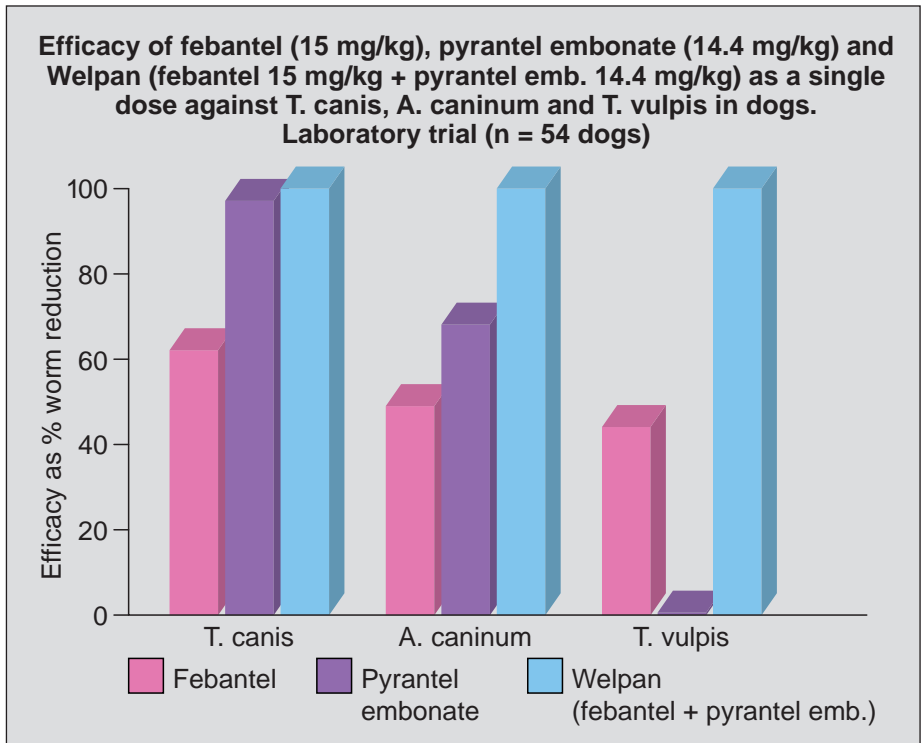


Fig. 17

Nematocidal efficacy is significantly increased when pyrantel embonate and febantel are administered simultaneously, demonstrating a synergistic effect. Due to this synergism, high efficacy can thus be

achieved with a single-dose treatment against *T. canis*, *A. caninum* and *T. vulpis*.

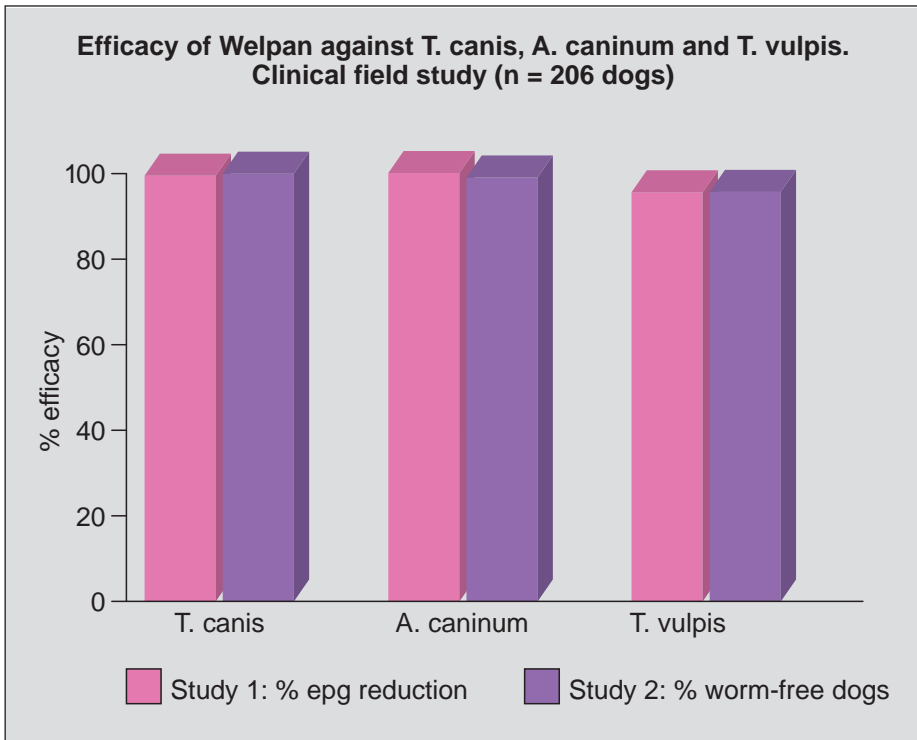


Fig. 18

Clinical field trials results

Efficacy against monoinfestations

Welpan has also been tested on a large number of dogs and puppies naturally infested with one of the following worm spe-

cies: *T. canis*, *A. caninum* or *T. vulpis*. The results are shown in Fig. 18.

Efficacy against mixed infestations

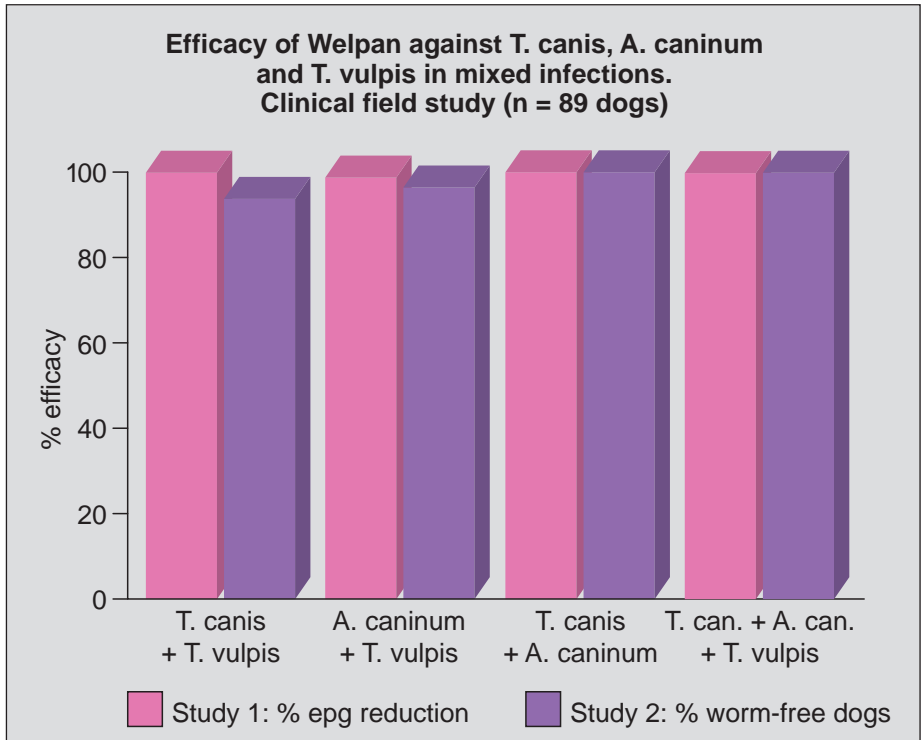


Fig. 19

Trials have been carried out with various dogs and puppies naturally infested with two or three different worm species simultaneously, including *T. canis*, *A. caninum* and/or *T. vulpis*. The results obtained after a single treatment with Welpan at the standard dosage are shown in Fig. 19.

7. Safety

Both pyrantel embonate and febantel have been shown to be safe. This high level of safety is also achieved by the combination of these two compounds in Welpan. In dogs, the acute oral LD₅₀ for pyrantel embonate is greater than 690 mg/kg body-weight, while febantel has an acute oral LD₅₀ greater than 10,000 mg/kg body-weight.

The tolerance of the pyrantel embonate/febantel combination was tested in 465 dogs and puppies of various breeds and both sexes. Both single-dose and multiple dose treatment was carried out.

In laboratory trials, single doses corresponding to 5 times the standard recommended dosage were administered. None of the treated dogs showed any side effects or any modification of biochemical or haematological parameters. In a further study, an overdose of 10 times the standard dose caused vomiting in 2 out of 30 dogs (6.7%) without any change in the other investigated parameters.

Repeated treatments were also tested. The recommended dose was administered daily over 3 days, without causing any side effects.

Investigated parameters included body-weight gain and haematological, biochemical and urinary parameters.

In clinical field studies involving 423 dogs and puppies, Welpan administered at the recommended dose demonstrated excellent palatability without side effects.

Interaction with other drugs

Piperazine should not be administered at the same time as Welpan as its efficacy may be impaired.

Contraindications

Welpan should not be used in pregnant bitches, until sufficient studies have been performed with the combination of pyrantel embonate and febantel.

Warning

Keep out of the reach of children. For animal treatment only.

References

BRADLY, R.E., CONWAY, D.P. (1970):
Evaluation of pyrantel hydrochloride as an anthelmintic in dogs.
Vet. Med., Vol. 65, No. 8, 767-769

COWSER, J.K., ROTH, G.J., RONALD, N.C. (1977):
Critical evaluations of four anthelmintics for the removal of gastrointestinal nematodes in dogs.
Southw. Vet., Vol. 30, No. 3, 286-289

GEORGI, J.R., GEORGI, M.E. (1992):
Nematodes in canine clinical parasitology,
Lea and Febiger, chap. 6, 151-209

HOPKINS, T.J., GYR, P. (1991):
Synergismus einer Kombination von Febantel und Pyran-

telmonat gegen *Ancylostoma caninum* beim Hund.
Vet. Med. Nachr., 61, 3-9

JACOBS, D.E. (1986):
Control of *Toxocara canis* in puppies: a comparison of screening techniques and evaluation of a dosing programme.
J. Vet. Pharmacol. Therap., Vol. 9

KENNEY, M., EVELAND, L.K. (1978):
Infection of man with *Trichuris vulpis*, the whipworm of dogs.
Amer. J. Clin. Pathol., 69:199
LINDQUIST W.D. (1975):
Drug evaluation of pyrantel pamoate against *Ancylostoma*, *Toxocara*, and *Toxascaris* in eleven dogs.
Americ. J. of Vet. Res., Vol. 36, No. 9, 1387-1389

MEATZ, H. M., KLEINSTEIN, R. N., FEDERICA, D., WAYNE, J. (1987):
Estimated prevalence of ocular toxoplasmosis and toxocarosis in Alabama.
J. Inf. Dis., 156,414

ROBINSON, M., HOOKE, F.G., IVERSON, K.E. (1976):
Efficacy of pyrantel pamoate and piperazine citrate against roundworm and hookworm species in dogs.
Austr. Vet. Pract., Vol. 6, No. 2, 104-108



Bayer AG, Leverkusen

Welpan[®]

Nematocide for puppies and young dogs

Product information

International Edition



Bayer AG, Leverkusen

Welpan[®] **Active ingredients:** each ml of suspension contains 14.4 mg pyrantel embonate and 15 mg febantel. **Indications:** for the treatment of intestinal nematodes in puppies and young dogs. Worms controlled include: Roundworms (ascarids); *Toxocara canis*, *Toxascaris leonina*, Hookworms; *Ancylostoma caninum*, *Uncinaria stenocephala*, Whipworms; *Trichuris vulpis*. **Dosage:** 1 ml per 1 kg body weight for oral administration. The dose can be administered directly via the mouth or mixed with the food. **Presentation:** bottle of 100 ml with calibrated syringe. **Contraindications, warnings etc.:** Do not use during pregnancy. Do not use simultaneously with piperazine compounds. For animal treatment only. Keep out of the reach of children.

Produktprofil

SCHANTZ, P.M., STEHR-GREEN, J.K. (1988):
Toxocaral larva migrans.
J. Am. Vet. Med. Ass., 192, 28-32

STOYE, M., SCHORN, A. (1985):
Zur Wirkung von Pyrantel-Pamoat-Suspension auf
geschlechtsreife Stadien von *Toxocara canis*.
Prakt. Tierarzt, Vol. 66, No. 3, 238-240