



Ectoparasites of companion animals

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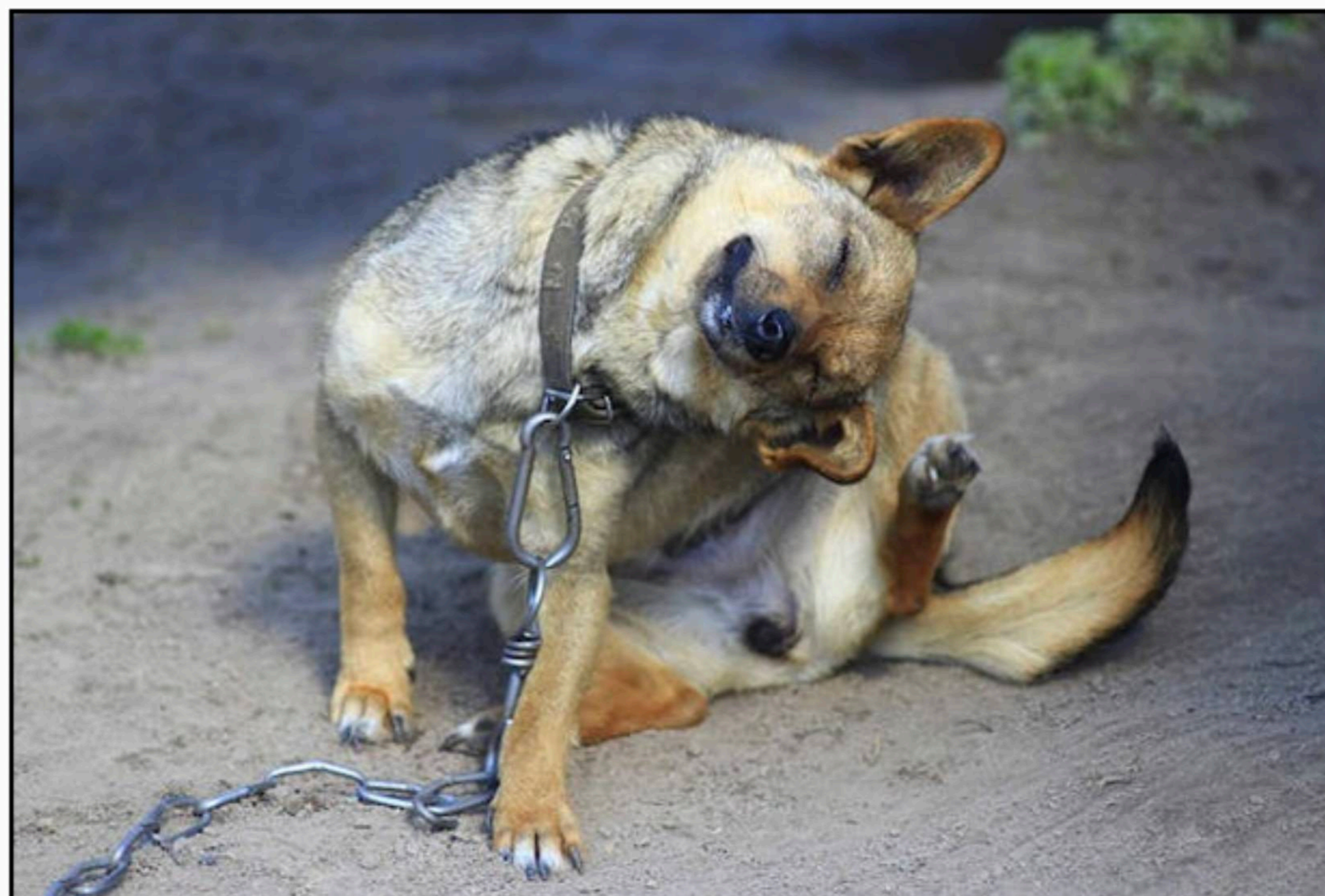
Ectoparasites of companion animals





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Ectoparasites of dogs

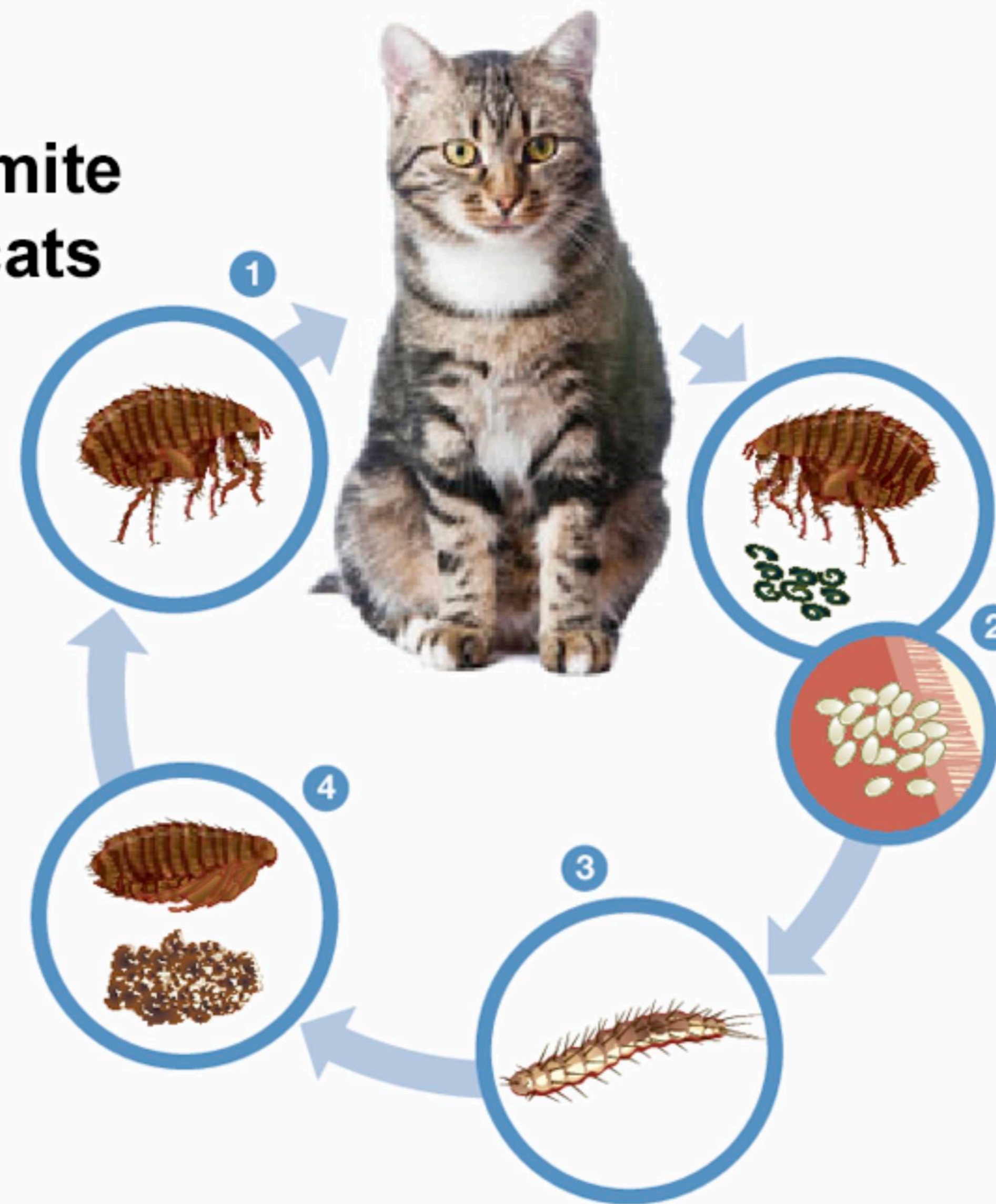
The most important and common ectoparasites of dogs include

- ▶ **Ticks**-the hard tick *Rhipicephalus sanguineus* and the spinose ear tick, *Otobius megnini*
- ▶ **Fleas** - *Ctenocephalides canis*
- ▶ **Mites** - *Sarcoptes*, *Demodex canis*, *Otodectes cyanotis* and *Cheyletiella yasguri*
- ▶ In addition improperly maintained animals may show the presence of lice. There are possibilities of wounds on animals being infested with maggots of flies which is another problem that needs to be attended.



Ectoparasites of cats

- In cats the incidence of ectoparasites are quite less when compared to that of dogs and the reason may be the constant grooming that the cats indulge in when they are healthy
- However, flea infestations as well as fur mite infestations are very common amongst cats
- Tick infestations are very rare





Why is it important to deal with the ectoparasites especially ticks

- ▶ The wounds caused by the tick bites predispose the host to blow fly strike.
- ▶ **Anaemia**
- ▶ Ticks suck blood and heavy infestation results in anaemia
- ▶ In hard ticks, the females are heavy blood feeders and one tick can consume 0.2 to 2 ml of blood
- ▶ **Dermatitis** results due to the tick bite especially
- ▶ **Otacariasis**

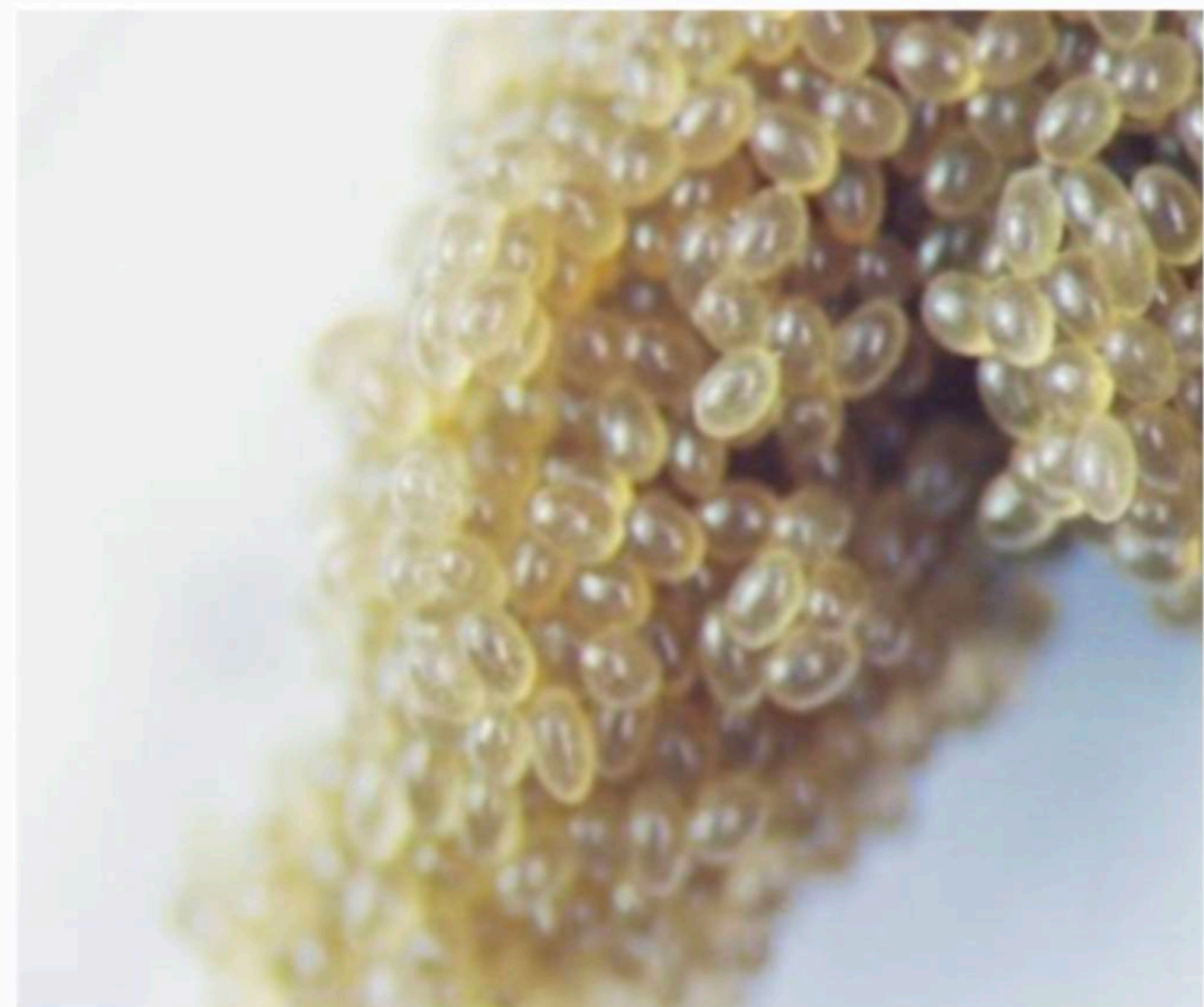


Why is it important to deal with the ectoparasites especially ticks

- ▶ Apart from the direct effect, ticks are effective vectors protozoans such as *Babesia vogeli*, *B.gibsoni* as well as *Hepatozoon canis* . *Ehrilichia canis* and *Anaplasma platys* are the rickettsia transmitted by the ticks
- ▶ Fleas can cause flea allergy dermatitis in dogs and in cats miliary dermatitis as well as transmit diseases
- ▶ Mites cause damage to the skin of companion animals
Mites can be of zoonotic importance

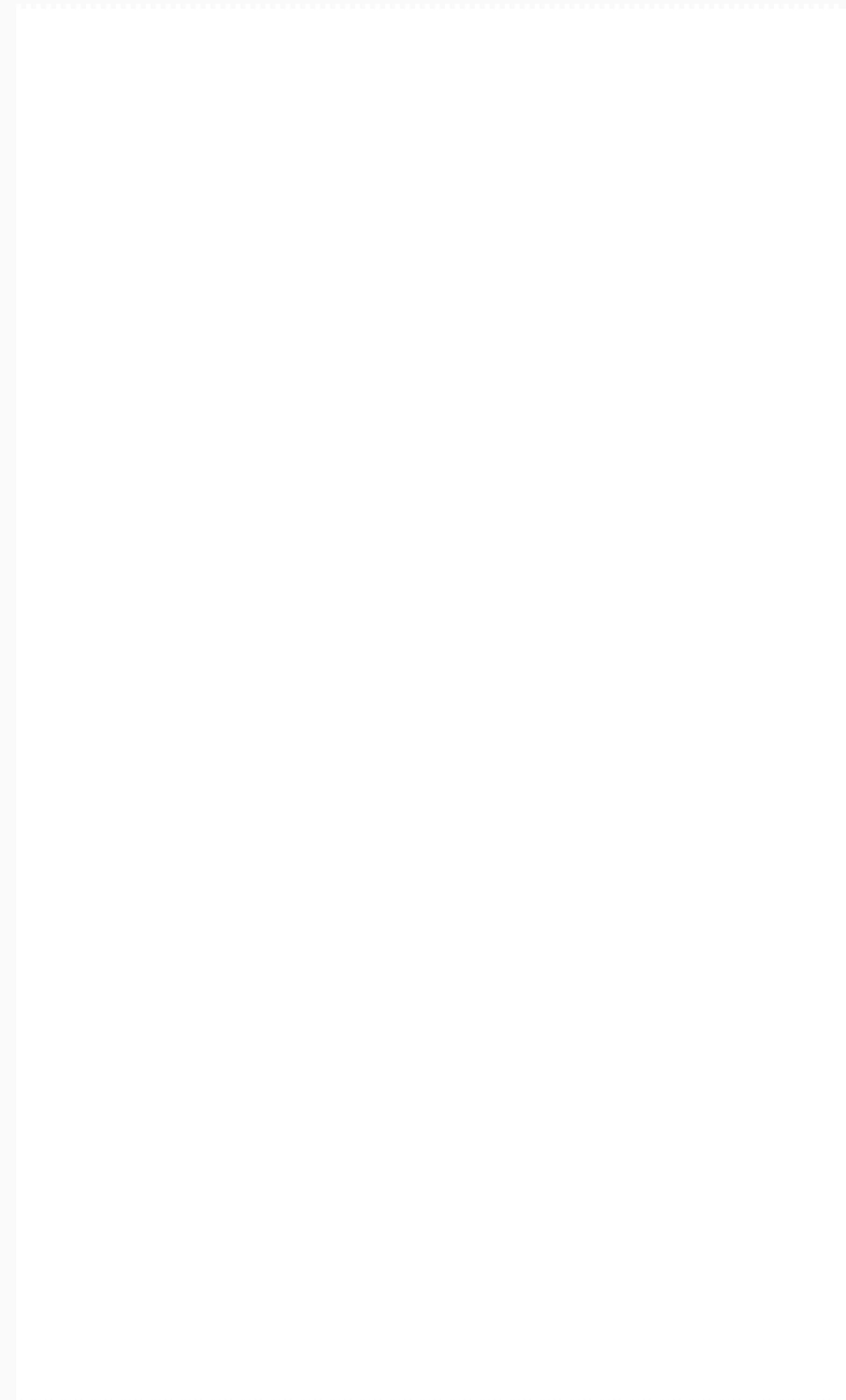


Engorged ticks



Dog with tick infestation

Eggs of ticks





Life cycle of ticks and implication on control

The implications of the lifecycle on control is that all the stages of the tick, larvae, nymph and adults feed on the host, the dog and hence it is very difficult to control. The adult engorged tick is seen in the environment and around 7000 eggs are laid by one engorged tick which can lead to heavy build up of infestations in short period of time. This results in a dog being reinfested within days of being treated for the ticks



Fleas - implication of lifecycle on control

- ▶ Both male and female fleas flea *Ctenocephalides canis* suck blood, the female flea produces about 200 eggs in 2-4 days time
- ▶ Eggs may be sticky or may fall on the floor or bedding and L₁ develops in two days time. Sometimes the egg sticks to the body and the larvae may even hatch out resulting in the host hair bearing the adult, eggs as well as larvae
- ▶ Since the flea is not a permanent ectoparasite there is difficulty in control since on-host control alone is not sufficient but the treatment of the immediate environment of the companion animal is also recommended.



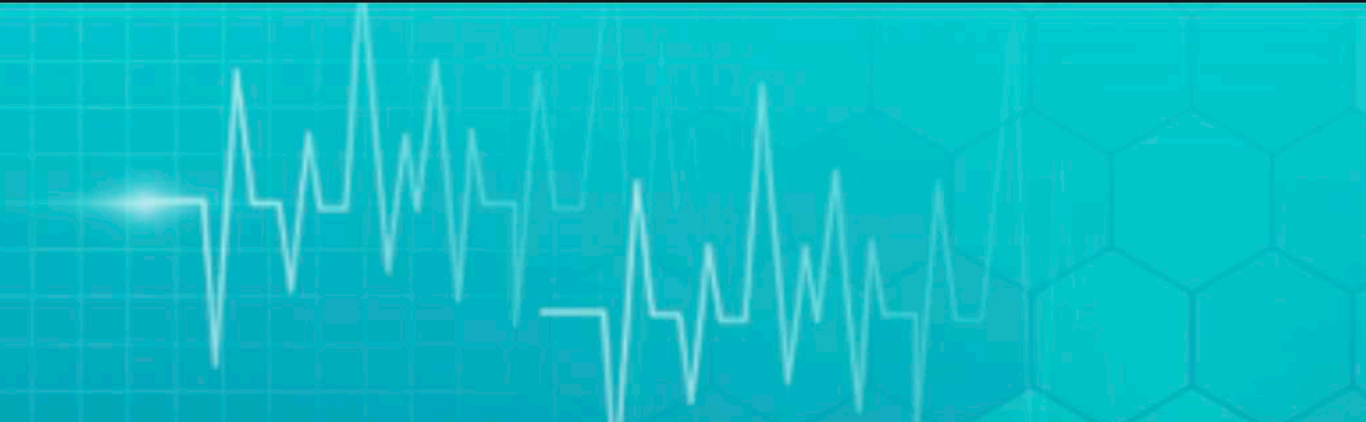
Larvae of *Ctenocephalides* fleas from the ground. Note that they have fed on blood.



Fleas - implication of lifecycle on control



- *Sarcoptes scabiei*
- *Otodectes cyanotis*
- *Demodex canis*

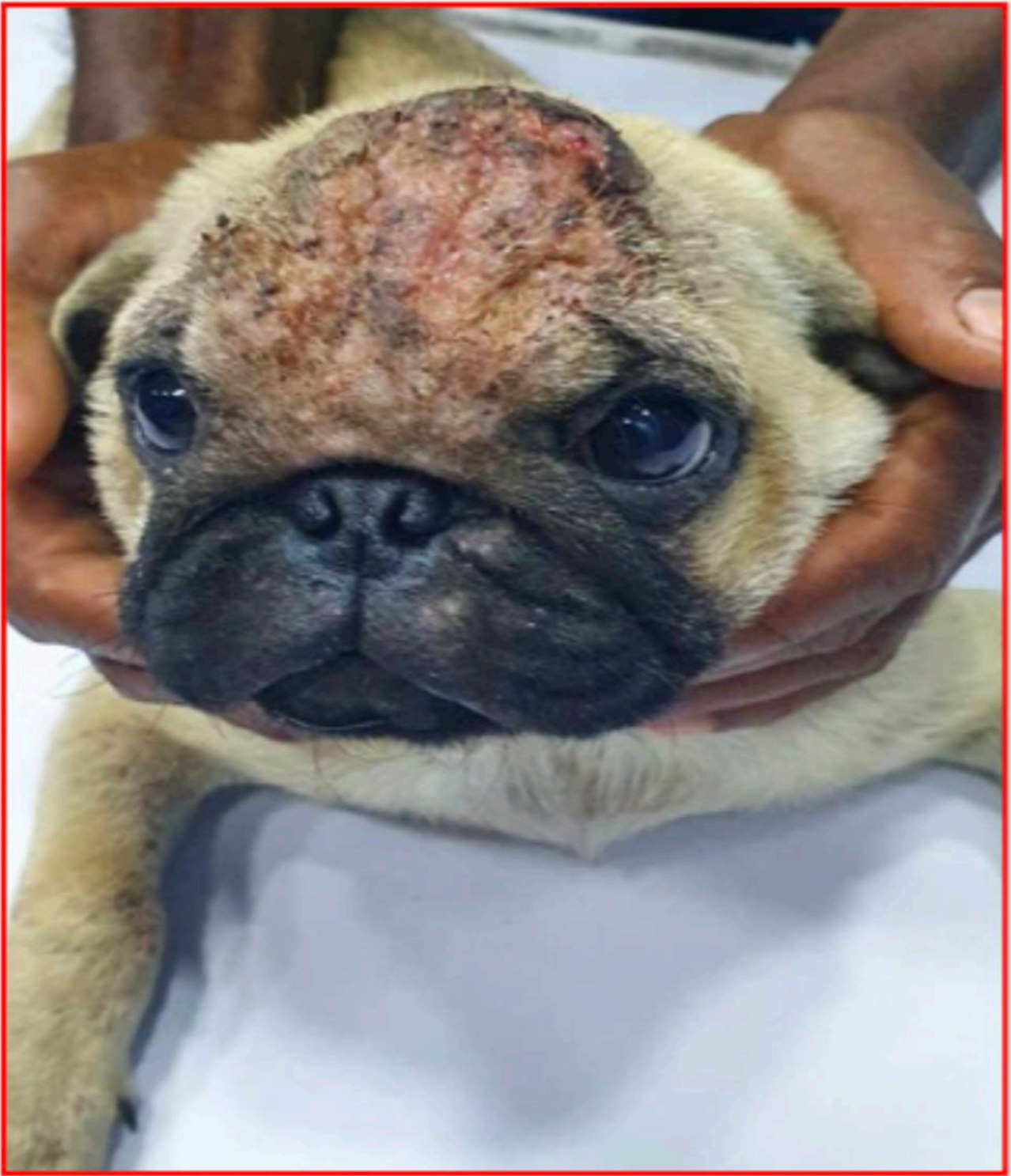


Demodicosis

Form	Feature
Juvenile demodicosis	Occurs in young animals
Adult onset demodicosis	Occurs in adults
Localized demodicosis	Localized lesions are seen in muzzle, face, periorbital region and forelimbs
Podo demodicosis	Only legs show infestation
Generalized demodicosis	Full body affected, which is manifested as Scaly / Squamous form and Pustular / Follicular form



Localized canine demodicosis



Generalized canine demodicosis



- **Examination of deep skin scraping along with hair is the diagnostic test of choice**
- **Canine demodicosis is an immunodeficiency disorder and therefore treatment failure is common in advanced cases. Prolonged treatment for 3-6 months is necessary. Repeated treatment is needed since mites are deeply located. Prior to treatment, the hair should be clipped, washed with anti-seborrhoeic shampoo containing benzyl benzoate to loosen the crusts and sebum. The skin should be thoroughly dried prior to application of specific miticide.**



Otodectes cynotis

- ▶ It is a common mite residing in the external acoustic meatus of dogs and cats
- ▶ They cause intense irritation resulting in aural pruritus. Copious cerumen production ensues until a thick, waxy, dark brown otorrhoea (exudate) obstructs the external acoustic meatus. Condition caused is **otitis externa**. There is secondary bacterial infection with mostly *Staphylococcus* sp. resulting in purulent otitis. Frequent head shaking and ear scratching results in haematoma of the pinna/aural haematoma



Currently used control methods for ticks

CHEMICAL CONTROL

- ▶ Carbaryl shampoo
- ▶ Synthetic Pyrethroids such as Deltamethrin, flumethrin, cypermethrin
- ▶ Fermented products of *Streptomyces avermitilis* with broad spectrum activity covering several ectoparasites. E.g. Ivermectin and its synthetic analogue doramectin
- ▶ Fluazuron, the only tick IGR which is effective in tick control, is a chitin synthesis inhibitor. Effective against *Rhipicephalus (Boophilus)* ticks. The pour-on formulation reduces the fecundity and fertility of engorged females to close to zero. Causes significant mortality among immature ticks. It is excreted in milk and thus benefit suckling calves. However it has long withholding time, treated animals should be slaughtered for meat six weeks after treatment
- ▶ Spynosins-Spinosad is a fermentation metabolite of an actinomycete – causes excitation of the nervous system leading to involuntary muscle contractions, tremors, paralysis and death of ticks
- ▶ A combination of Sarolaner, moxidectin and pyrantel chewable tablets is currently available as an endectoparasiticide.



CONTROL-Adult flea

- ▶ Use of insecticides in the form of collars-flea collar, which are plastic strips impregnated with either dichlorvos (DDVP- 9.3% for dogs and 4.65% for cats) or 10% zetacypermethrin is effective.
- ▶ Long acting collars which are effective up to 8 months are now available. Collars impregnated with a combination of imidacloprid (10%) and flumethrin (4.5%) are available (Seresto[®]), the former for fleas while the latter is for tick control.
- ▶ Insecticide impregnated medallions for dogs are used



- ▶ **A wide range of commercialized formulations in the form of spot-on, chewable tablets, sprays, traps are available. Spot-on preparations are widely employed in the control of fleas and they are known to protect against reinfestation for a period up to 3 months. These preparations are lipophilic and get accumulated in the fat deposits and sebaceous glands under the skin. When the flea feeds, it also takes up the medication and dies. The medication also gets excreted in flea dirt and the larvae feeding on it also dies.**
- ▶ **Fluralaner is a new addition to the long list of products available for flea control. It is available as chewable tablet and topical solution.**
- ▶ **Flea combs are available. Fleas collected by combing can be killed by dipping them in hot soapy water. Electric flea combs are available wherein fleas are spontaneously killed during combing itself.**
- ▶ **Ultrasound based flea repellent devices are available.**
- ▶ **Carbaryl formulated shampoos can be used in mild infestations.**



- ▶ **Allethrin, resmethrin and other synthetic pyrethroids with piperonyl butoxide are also useful**
- ▶ **Currently fleas are controlled mainly by using insect growth regulators. The chitin synthesis inhibitor Lufenuron is commonly used. One tablet given to a dog or cat can protect the animal for a month.**
- ▶ **Fipronil, imidacloprid, nitenpyram, spinosad, selamectin (which is topically applied but enters blood transdermally) are also currently in use against fleas.**
- ▶ **Juvenile hormone analogues such as methoprene and pyriproxyfen are generally combined with adulticides.**
- ▶ **Fleas are able to jump to a height of 33 cm and mechanical control in dog kennels can be made possible by increasing the height of the kennel from the floor to 35 cm. This control method is feasible when dogs are reared in cages in breeding houses**



Flea control: Larvae and pupae

- Control of larvae and pupae is the most important part of flea control
- Insect growth regulators, juvenile hormone analogues such as methoprene can be used to control the immature stages of fleas within the house.
- Vacuum cleaning of carpets and areas frequented by dogs/cats is one of the best methods of mechanical control of fleas.
- Steam cleaning of the environment where the hosts rest is also advocated.
- Spraying insecticides in the kennels/sheds especially in the corners of the room is effective in killing the immature stages.
- In heavy infestations, it would be better to destroy the bedding material of the pets in order to destroy the immature stages.
- Application of sodium borax powder causes desiccation of the immature stages.
- D-limonene, a citrus extract is used to control immature stages



Novel methods of control

Syloxanthes scabra, a leguminous plant, has lethal effect on the larvae and nymph of the dog tick by trapping them with its sticky exudates

► Use of Pheromones in traps

Assembly pheromone has been successfully used in the control of the dog tick. The assembly pheromone acted as the lure to attract all the tick stages while a double sided sticky tape or a solar powered grid aided in trapping or killing the attracted ticks. The advantage was that only a small amount of chemical is needed to control the ticks, at times even dispensing the use of toxic acaricides thus aiding in evolving an ecofriendly tick control strategy.

► Use of ultrasound tick repellants

Ultrasound devices are also used to control ticks. These devices repel the ticks away from the pets by emitting a series of ultrasonic pulses that disrupt the sensory system of ticks and they are stopped from detecting the hosts in the vicinity. The ultrasonic pulses are safe and imperceptible to animals and humans. The ultrasound devices can be attached to the collar of pets, they are ecofriendly and water resistant. E.g. TickLess Pet®.

► Robots in tick control

TickBot is a semi-automatic 4-wheeled robot used to control ticks questing in the environment (pasture, open areas, terrains etc.). The robot is fitted with a tick drag made of denim cloth treated with permethrin as acaricide. CO₂ is used as attractant. It sweeps the vegetation infested with ticks and kill them. Field trials indicate that the TickBot was highly effective in reducing overall densities of *Amblyomma* to nearly zero.



FIELD TRIALS





Solar powered vapour patch AP pheromone trap for dog ticks



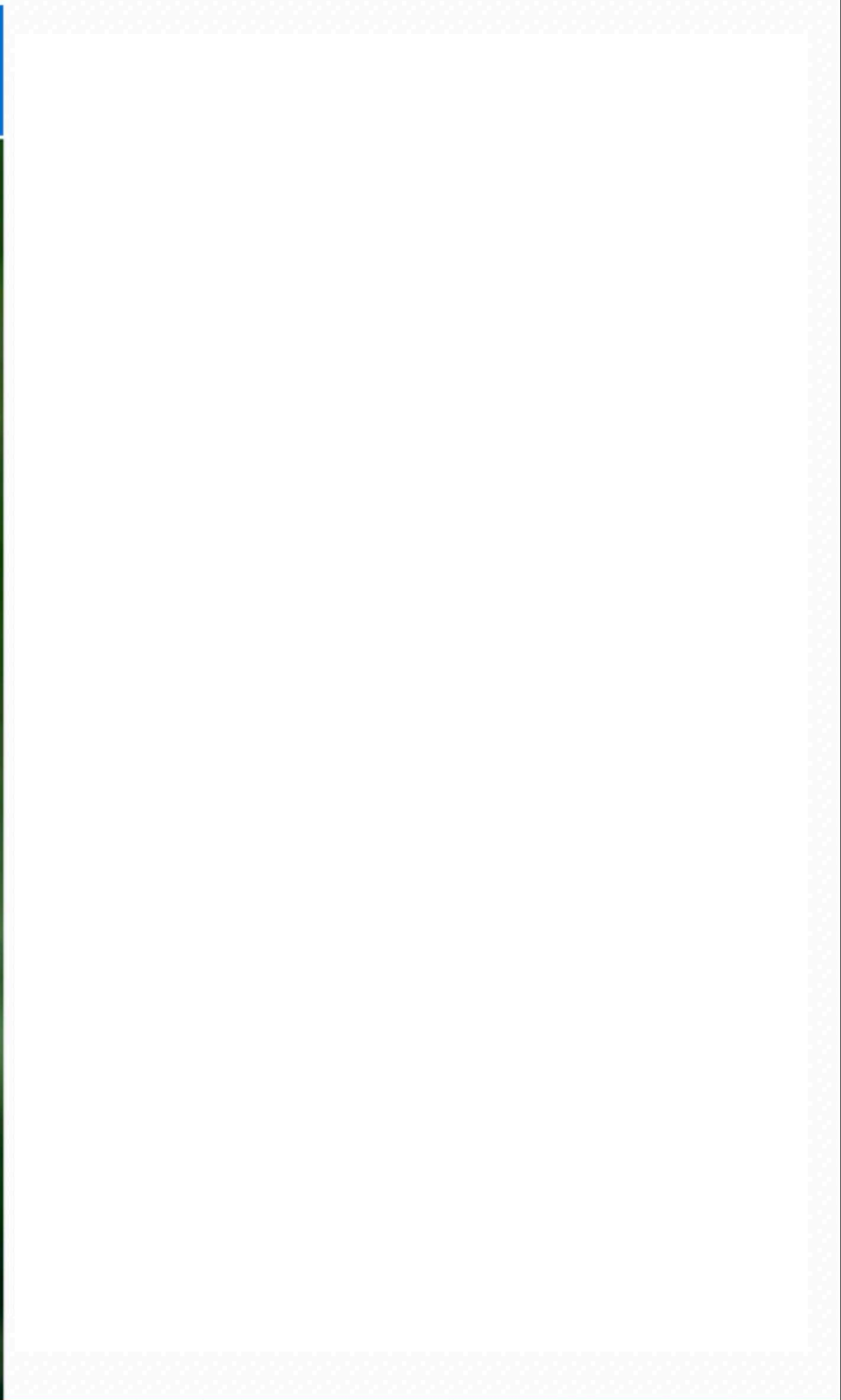


Treatment options for Demodicosis

- ▶ Amitraz is highly effective and widely used as a rinse, 3-6 times topical application in an interval of 14 days at a dose of 250 ppm
- ▶ Benzyl benzoate (20%), benzyl cresol (0.5%), BHC (0.25%) can be applied
- ▶ Closantel: 5 mg/kg b.wt. SC followed by 2.5 mg/kg b.wt. weekly
- ▶ Ivermectin: 0.2 mg/kg b.wt. SC
- ▶ Milbemycin oxime: 1-2 mg/kg b.wt. PO for generalized demodicosis
- ▶ Moxidectin is effective: 0.2-0.5 mg/kg b.wt./day PO
- ▶ Doramectin: 0.6 mg/kg b.wt. SC weekly is effective
- ▶ **Corticosteroids are contraindicated in demodicosis**
- ▶ Drugs such as Fluralaner (25-50 mg/kg b.wt. PO), Lotilaner (20 mg/kg b.wt. PO) and Afoxolaner (2.7 mg/kg b.wt. PO) which are prescribed for flea infestations are highly effective against canine demodicosis and are available as chewable tablets



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Thank you