

Are pet parasite products harming the environment more than we think?

Rosemary Perkins argues that the environmental impact of veterinary parasiticide products is cause for concern and that more research needs to be done to fully appreciate their environmental effects.

FIPRONIL and imidacloprid are neurotoxic insecticides that are widely used in pet flea treatments across the globe. But have we been overlooking the environmental risks associated with their use?

First introduced in the 1990s for use in agriculture, these compounds have several properties that make them extremely effective insecticides, including high toxicity towards a wide range of invertebrate species and high environmental persistence. However, these same properties increase the environmental risks associated with their use, and concerns have been raised regarding their impact on non-target insects. Indeed, recent studies have reported large declines in insect populations around the globe, with insecticide use being thought to be one of the drivers for this. In 2018, following a review of the scientific literature, the European Commission concluded that most uses of neonicotinoids represented a threat to wild bees and honeybees, and a ban was issued on the outdoor agricultural use of imidacloprid. Similarly, approval for the agricultural use of fipronil had been withdrawn the year before.

Yet, despite this ban for agricultural use, these products continue to be used as pet flea treatments. It has long been assumed that parasiticide products used in companion animals are unlikely to pose any significant environmental risk, and this belief is reflected in the current environmental impact assessment that veterinary medicines undergo before they

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Have we been overlooking the risks?

References

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- 4 Teerlink J, Hernandez J, Budd R. Fipronil washoff to municipal wastewater from dogs treated with spot-on products. *Sci Total Environ* 2017;599–600:960–6
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get regulatory approval. These guidelines for regulation do not require a thorough environmental impact assessment to be performed on veterinary medicinal products intended for use in non-food animals – the reason being that products used in these animals are usually individual, small-volume treatments so there is less total amount of product used, and therefore less risk to the environment.¹

However, I would argue that these products are not being recommended on an individual, discretionary basis. Although no annual sales data on these products are currently available, the amounts used are likely to be considerable. There are approximately 10.9 million cats and 9.9 million dogs in the UK and the widely accepted advice from many veterinarians and product manufacturers is to apply these products routinely for year-round blanket prophylaxis of fleas and/or ticks.

From an ecotoxicological perspective, the amount applied per dose is substantial, as these compounds are highly toxic to a wide range of non-target invertebrates at very low levels. Fipronil and imidacloprid can disseminate widely throughout the household environment following topical application, with one study finding 3000–5000 ng of fipronil per g of household dust where pets were treated² – enough to deliver an LD₅₀ (dose sufficient to kill 50 per cent of a population) of 4 ng/bee to over 750 bees per g of dust.³

The absence of environmental impact testing on these products has resulted in significant knowledge gaps regarding their environmental fate and effect. However, recent research suggests that potentially significant amounts of product

may be passing from treated pets to waterways via household drains, and bathing of treated pets has been confirmed as a pathway for fipronil to waterways.⁴ Other potential pathways include washing of items that have come into contact with treated pets, such as pet bedding, the owner's hands and clothing. A 2017 report from Buglife found imidacloprid at levels exceeding published environmental toxicity limits in a number of urban rivers in the UK. Veterinary flea spot-ons and collars were implicated as the most likely source.⁵

I believe that we urgently need to undertake further research to ascertain the extent of exposure from these compounds in waterways and examine potential sources. Findings should also be considered in the context of bioavailability, as the whole fraction of insecticide present may not be available to cause an effect (ie, if it binds to organic particles in soil and water). The Veterinary Medicines Directorate is making a start on this work and has commissioned research which will investigate these areas of concern and elucidate the extent and significance of potential environmental exposure pathways for topical veterinary flea products. But do we need to do more?

Of course, we have a responsibility to control parasites affecting our patients, but we also have a responsibility to protect the environment. It's time for a closer look at the environmental impact of parasiticides used in pets (including both topical and oral products), to enable evidence-based treatment decisions that continue to allow us to address the risks posed by parasites to our patients, while also minimising the environmental risks associated with their use. ●