

## SPOT-ONS (=pipettes, squeeze-ons, drop-ons) against ticks in dogs and cats

**Spot-ons** are **ready-to-use concentrates** containing one or more active ingredients with parasitocidal efficacy. Depending on the active ingredient(s) they are effective against other pet parasites too, e.g. fleas, mites, gastrointestinal worms, heartworms, etc.

Spot-ons are products for **topical administration**, i.e. they are applied on the skin of the pets. They are often sold in single-use squeezable vials or ampoules of different sizes for dogs or cats in a particular weight range. The whole content of a vial is applied on a given "spot" (typically on the neck or on the back). Once applied to the skin, the active ingredient spreads throughout the body of the pet or is absorbed through the skin into the pet's organism (so-called systemic products). Both spreading and/or absorption through the skin can be slower or faster, more or less complete, etc. depending on each animal's features (e.g. size, breed, hair coat, behavior, etc.) and also on the non-active, inert ingredients in the product, i.e. on its formulation, which can vary significantly between manufacturers. This is why product quality (and safety!) depends not only on the active ingredient(s), but also on the formulation (which is true for spot-ons and for whatever parasiticide or medicine, veterinary or human).

Most spot-ons are quite resistant to occasional **washing and shampooing**, i.e. the pet won't lose protection against parasites after a splash. But repeated splashes or shampooing can indeed diminish the length or protection.

[Click here](#) to learn more about **spot-ons, pipettes, squeeze-ons: efficacy, safety**, etc.

The best-known original spot-on brands that control ticks are the following (not all available worldwide):

- **FRONTLINE TOP SPOT**, with fipronil, from **MERIAL**; available for **dogs** and **cats** worldwide. Introduced in the mid 1990s. Fipronil is a broad-spectrum contact insecticide and acaricide that kills ticks and belongs to the **phenylpyrazole** pesticides. Besides ticks it also controls fleas and some mite species. **Fipronil** is also vastly used in agriculture as well as in public and domestic hygiene. There are **numerous generics**.
  - **Follow-up brands** from MERIAL:
    - **FRONTLINE PLUS** = **FRONTLINE COMBO** with fipronil and methoprene. Methoprene is a **juvenile hormone analogue**, i.e. an insect development inhibitor, which prevents deposited flea eggs from hatching, because a few adult fleas may survive the fipronil treatment. For **dogs** and **cats**. Methoprene has no efficacy whatsoever against ticks.
    - **FRONTLINE TRITAK**, with fipronil, methoprene and cyphenothrin (for **dogs**) or etofenprox (for **cats**). Cyphenothrin and etofenprox are synthetic pyrethroids.
    - **CERTIFECT**, which contains amitraz in addition to fipronil and methoprene. Amitraz is a veteran amidine acaricide and lousicide added to strengthen the efficacy against ticks and mites. It has no activity whatsoever against fleas. Both methoprene and amitraz are pesticides used also on livestock and agriculture. CERTIFECT is available **only for dogs**, because **amitraz is toxic to cats**.
- **ADVANTIX**, with imidacloprid and permethrin, from **BAYER**. Available for **dogs** worldwide. Introduced in the early 2000s. Imidacloprid is a broad-spectrum contact insecticide that kills adult fleas (adulticide) and belongs to the **neonicotinoid** pesticides. It has no efficacy whatsoever against ticks. Besides fleas it also controls a few lice species. Permethrin is a synthetic pyrethroid effective against ticks, fleas and many other external parasites. Permethrin is also a broad-spectrum pesticide vastly used on livestock, in agriculture and in hygiene. Imidacloprid is also vastly used in agriculture as well as in public and domestic hygiene. There are **numerous generics** of both imidacloprid and permethrin. ADVANTIX is a follow-up brand of ADVANTAGE, which was introduced in the mid 1990s and has no efficacy against ticks. ADVANTIX is available **only for dogs** because **permethrin is toxic to cats**.
  - **Follow-up brands** from BAYER:
    - **K9 ADVANTIX** with pyriproxyfen in addition to imidacloprid and permethrin. Available in some countries only for **dogs**. **Pyriproxyfen** is a **juvenile hormone analogue**, i.e. an insect development inhibitor, which prevents deposited flea eggs from hatching, because a few adult fleas may survive the imidacloprid treatment. Pyriproxyfen has no efficacy whatsoever against ticks. It is available **only for dogs** in certain countries. Pyriproxyfen is also used in agriculture and hygiene. K9-ADVANTIX is available **only for dogs** because **permethrin is toxic to cats**.
    - Related BAYER brands such as ADVANTAGE and ADVOCATE = ADVANTAGE MULTI are ineffective against ticks.

- **PRAC-TIC**, with **pyriprole**, from **ELANCO (NOVARTIS)**. Available in the EU and other countries, but e.g. not in the USA. **Only for dogs**. Introduced in 2007. Pyriprole is a broad-spectrum contact insecticide and acaricide that kills ticks and adult fleas (adulticide) and belongs to the **phenylpyrazole** pesticides. It is quite similar to **fipronil**. Pyriprole is not used on livestock, agriculture or hygiene: it is only used on dogs. There are **no generics** so far.
- **REVOLUTION = STRONGHOLD**, with **selamectin**, from **PFIZER=ZOETIS**. Available for **dogs and cats** worldwide. Introduced in the late 1990s. Selamectin is a **macrocyclic lactone** effective against **a few** tick species in addition to adult fleas and certain lice and mite species, as well as against roundworms, including heartworms. It has a **systemic** mode of action, i.e. it is first absorbed through the skin into blood and then distributed through the whole body of the pet. There are **no generics** so far.
- **BRAVECTO TOPICAL**, with **fluralaner**, from **MERCK (MSD) ANIMAL HEALTH**. Available **only for dogs** in certain countries. Introduced in 2016. Fluralaner is one of the newest insecticidal active ingredients from the chemical class of the **isoxazolines**. With a unique **3-months** protection claim against **ticks** and **fleas**. It has also a **systemic** mode of action, i.e. it is absorbed into blood and then distributed through the whole body of the pet. There are **no generics** so far.

Be aware that excepting **selamectin**, other **macrocyclic lactones** (e.g. **ivermectin**) at their usual therapeutic dose are **not effective** against pet ticks, neither as injectables, nor as tablets, drenches, feed additives or whatever formulation. Off-label use of livestock products with macrocyclic lactones (they are much cheaper...) in dogs can be fatal for ivermectin-sensitive dog breeds.

---

## TABLETS, pills, chewables, against dog and cat ticks

All products for internal use, including tablets, pills, etc. contain active ingredients with a **systemic** mode of action, i.e. once ingested they are absorbed into blood and distributed throughout the pet's body. They reach the ticks during their blood meals, wherever they are biting, which is not always the case for products for external use that act by contact. This means also that they remain unaffected by whatever external influences such as washing, shampooing, rain, exposure to sunlight, dirt, etc. But to be killed they have to bite the pet first, and therefore such products may not be able to completely prevent disease transmission by the ticks.

Such products are a good option for pet owners that want to avoid getting themselves or their children in contact with pesticides, which is unavoidable when using topical products such as spot-ons, collars, shampoos, sprays, etc.

Until 2014 there were no tablets (or other oral products) for tick control on dogs. Since 2014 several new brands have been introduced:

- **BRAVECTO**, with **fluralaner**, from **MERCK (MSD) ANIMAL HEALTH**. Available **only for dogs** in certain countries. Introduced in 2014. Fluralaner is one of the newest insecticidal active ingredients from the chemical class of the **isoxazolines**. With a unique **3-month** claim against **ticks** and **fleas**. There are **no generics**.
- **NEXGARD**, with **afoxolaner**, from **MERIAL**. Available **only for dogs** in certain countries. Introduced in 2014. Afoxolaner is one of the newest insecticidal active ingredients from the chemical class of the **isoxazolines**. For monthly administration against **ticks** and **fleas**. There are **no generics**.
- **NEXGARD SPECTRA**, with **afoxolaner** and **milbemycin oxime**, from **MERIAL**. Available **only for dogs** in certain countries. Introduced in 2015. For monthly administration against **ticks**, **fleas**, several **roundworm** species and for **heartworm** prevention. There are **no generics**.
- **SIMPARICA**, with **sarolaner**, from **ZOETIS**. Available **only for dogs** in certain countries. Introduced in 2016. Sarolaner is one of the newest insecticidal active ingredients from the chemical class of the **isoxazolines**. For monthly administration against **ticks**, **fleas**, and certain **mite** species. There are **no generics**.

---

## COLLARS impregnated with tickicides against ticks on dogs and cats

Before the introduction of modern spot-ons in the 1990s, insecticide-impregnated collars were quite popular for controlling fleas and ticks on pets. Many brands are still available.

**Good collars** should kill 80-90% of the ticks within 1 week after application and provide a about a 90-60% protection against re-infestation for 8 to 12 weeks, whereby efficacy usually diminishes during the last weeks.

Most collars consist of a plastic or a thick textile strip impregnated with a tickicide that is slowly released to the hair coat around the collar. It spreads more or less rapidly and completely to the rest of the hair coat. All insecticides used in collars kill adult fleas or ticks by **contact**.

Most insecticide-impregnated collars are quite resistant to occasional **washing and shampooing**, i.e. the pet won't loose protection against ticks due to a splash. But repeated splashes or shampooing can indeed diminish the length or protection.

Such collars contain mostly only one active ingredient, frequently a "veteran" from the following chemical classes:

- Amitraz. Broad-spectrum tickicide and acaricide.
- Carbamates, e.g. **carbaryl**, **propoxur**. Broad-spectrum insecticides and acaricides.
- Organophosphates, mainly diazinon. Broad-spectrum insecticides and acaricides.
- Synthetic pyrethroids, e.g. **cypermethrin**, **deltamethrin**, flumethrin, **permethrin**. Broad-spectrum insecticides and acaricides.

Some collars have also some efficacy against fleas, lice, mites, etc.

All these pesticides are vastly used on livestock as well as in agriculture and in public and domestic hygiene.

There are also collars impregnated with "soft" natural insecticides such as **pyrethrins**, **d-limonene**, **linalool**, etc. Their efficacy against ticks is usually rather modest.

---

## Baths, shampoos, soaps, sprays, etc. for the control of ticks on dogs and cats

A common feature of all these products is that efficacy strongly depends on product administration, which can be cumbersome: it is quite easy to do it wrong. As a consequence parts of the pet's body remain insufficiently treated by the product. Therefore, such topical products are often **not very reliable** for tick control. But they are often the cheapest.

Many products of this category contain veteran, broad-spectrum acaricides such as:

- Amitraz. Broad-spectrum tickicide and acaricide.
- Carbamates, e.g. **carbaryl**, **propoxur**. Broad-spectrum insecticides and acaricides.
- Organophosphates, e.g. chlorpyrifos, coumaphos, diazinon. Broad-spectrum insecticides and acaricides.
- **Phenylpyrazoles** (mainly flipronil). Broad-spectrum insecticides and acaricides.
- Synthetic pyrethroids, e.g. **cypermethrin**, **deltamethrin**, flumethrin, **permethrin**. Broad-spectrum insecticides and acaricides.

They are often used in **mixtures**, sometimes with a synergist. Most such products have also some efficacy against fleas, lice, mites, etc.

Many such products contain also natural insecticides such as **pyrethrins**, **d-limonene**, **linalool**, etc. Their efficacy against ticks is usually rather modest.

To ensure complete coverage of the whole body surface dipping the pet is usually a more reliable approach than spraying.

---

## **RESISTANCE of dog and cat ticks to tickicides**

There are a few reports on resistance of the **brown dog tick**, *Rhipicephalus sanguineus* to amitraz, organophosphates and synthetic pyrethroids, of *Rhipicephalus evertsi* and *Rhipicephalus appendiculatus* to organophosphates and synthetic pyrethroids and of *Amblyomma cajennense* to synthetic pyrethroids. So far there are no reports on confirmed resistance of dog ticks to the newest tickicides (fipronil, pyriprole, afoxolaner, fluralaner, selamectin, etc).

This means that if a particular product has not achieved the expected control, it is **most likely** because the product is not adequate for tick control on pets or because it was not used correctly, not because the ticks are resistant.