

Stable
Management

VOLUME 28

EXTRA

SMART
INSECT
CONTROL
STRATEGIES

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EQUIOXX IMPORTANT SAFETY INFORMATION: As a class, non-steroidal anti inflammatory drugs may be associated with gastrointestinal, hepatic and renal toxicity. Use with other NSAIDs, corticosteroids or nephrotoxic medication should be avoided.

LEGEND IMPORTANT SAFETY INFORMATION: The following adverse reactions have been reported following intravenous injection: occasional depression, lethargy, and fever. Following intra-articular injection: lameness, joint effusion, joint or injection site swelling, and joint pain.

HYALOVET and HYVISC IMPORTANT SAFETY INFORMATION: A mild inflammatory response may occur post injection. For intra-articular injection in horses only. Do not use in horses intended for food. Caution: Federal law restricts this drug to use by or on the order of a licensed veterinarian.

SURPASS IMPORTANT SAFETY INFORMATION: SURPASS topical cream is only approved for use in horses and has not been evaluated in breeding, pregnant, or lactating horses, or in horses under 1 year of age. Do not exceed the recommended dose.



Smart Insect Control Strategies

Keep your horses comfortable when buzzing, biting bugs abound

Diane Rice

Tail swishing. Foot stomping. Skin twitching and head throwing. No, these aren't new dance moves; they're avoidance behaviors your horse exhibits when he's trying to rid himself of pesky flies and other annoying insects that swell to annoying levels with the coming of warmer weather.

But insects don't just harass your horse—their bites can cause welts and rashes, lead to insect bite hypersensitivity, and even transmit diseases such as Eastern and Western equine encephalomyelitis, equine infectious anemia, vesicular stomatitis, and

West Nile virus, among others.

Insects can also affect your horse's weight and hoof condition. "If you have a horse in turnout, particularly if he's on the thin side and you're trying to put weight on him, you don't want him expending calories from constantly pacing and swatting," says Krishona Martinson, PhD, equine extension specialist and co-author on a recent University of Minnesota study of fly-fighting methods. "Likewise, if you're trying to rehab a damaged hoof, the last thing you want is for your horse to be constantly stomping.

"You have to consider each horse's needs when strategizing his care," she adds. "In cases such as these, you might want to buy all the fly gear—fly sheets, masks with ears, leggings, leg bands, and fly spray—to keep insects at bay."

In 2018 Martinson, University of Minnesota emeritus entomologist Roger Moon, PhD, and graduate student Rachel Mottet measured horses' avoidance behaviors under various insect-control methods, and what they found can help you most effectively control the pests that pester your horse.



Train your horse to stand for fly spray. You don't want to waste half the bottle spraying the air around a dancing, jiggling horse that doesn't realize you're trying to help him.

The Study

The researchers measured fly avoidance behaviors of six horses, each of which received a different insect-control treatment once a week for six weeks. At the end of each week's treatment, the horse received a bath to remove dirt, dust, and any residual product.

Insect control methods included a commercially available pyrethrin spray (made from compounds that occur naturally in African chrysanthemum flowers), a commercially available pyrethroid spray (synthetic chemicals, including permethrin, that act like pyrethrins), a water-based citronella spray recipe, leg bands containing fly deterrents, leggings (aka fly boots), and no treatment.

Students counted per-minute occurrences of four insect avoidance behaviors—tail swishes, shoulder twitches, “head-backs”

(moving the head toward the body or limbs), and hoof stomps—over a two-hour period in afternoons following application of each insect control method.

The findings? Surprisingly, they say, leggings, leg bands, and citronella spray most effectively reduced the avoidance behaviors, but no one treatment reduced all the behaviors.

Before we cry foul about the seemingly less-effective pyrethrin and pyrethroid spray treatments, Martinson says we need to look at the overall study.

“We mixed the spray concentrates according to manufacturer directions to the best of our ability in identical spray bottles, and to get the correct amount on the horse, we counted how many times we pressed the spray-bottle trigger,” she says. “Although all the horses weighed approximately 1,100 pounds, their weights did vary. So we have

to ask if we used enough concentrate in the spray mixture, if each sprayer sprayed identical amounts, and if each horse received spray in identical doses according to its weight.

“All the products we used tended to bring down the numbers of avoidance behaviors,” she adds. “But none of the products resulted in complete elimination of fly activity or fly avoidance behaviors.”

Consider the Climate

Moon poses an important question: How long do fly sprays last on horses? “Longevity of leggings, bands, and citronella sprays may not depend so much on weather, but duration of pyrethrin and pyrethroid sprays can depend on environmental exposure,” he says. “Pyrethrins and pyrethroids decay faster outdoors than indoors due to exposure to UV rays. And regardless of where horses are housed, pyrethrins break down faster than pyrethroids. Degradation also occurs faster when horses are exposed to moisture, either from rain; from working in deep, wet vegetation; or from working hard, to a sweat or lather.”

“You really have to read the labels,” says Martinson. “Labels on the sprays we used recommended keeping the product in a climate-controlled area out of direct sunlight, and you’ll notice that commercial sprays come in colored bottles to avoid exposure to light. Even when we were out in the field, we kept the bottles in a cooler to make sure they didn’t get exposed to sunlight or become overly hot.

“Labels are really good at outlining directions for storing, with upper and lower temperature values to make sure that the active ingredient stays intact,” she adds.

Focus or Avoid?

Another consideration when assembling your anti-bug armor is how and where to apply sprays. “You have to think about where flies want to attack, and respond accordingly,” Martinson says. “Frequently, the whole horse needs some type of treatment.”

Stable flies, for instance, like to attack horses’ legs, so leg bands and leggings are effective in addition to or instead of fly sprays, she says.

“Insects also like moisture, so you’ll need some protection around the horse’s



Approved by FDA under NADA # 141-458

EQUIOXX® Tablets

(firocoxib) 57mg

Brief Summary: This information is not comprehensive. Before using EQUIOXX® (firocoxib) tablets, please consult the product insert for full prescribing information. The product insert may be obtained from your veterinarian or by visiting www.equioxx.com.

CAUTION: Federal (USA) law restricts this drug to use by or on the order of a licensed veterinarian.

Indications:

EQUIOXX Tablets are administered once daily for up to 14 days for the control of pain and inflammation associated with osteoarthritis in horses.

Dosage and Administration:

Provide the Client Information Sheet with the prescription. The recommended dosage of EQUIOXX Tablets is one 57 mg tablet administered orally to horses weighing 800–1300 lbs, once daily for up to 14 days. For ease of administration, EQUIOXX Tablets may be given with food.

The overall duration of treatment with any firocoxib formulation in horses, including EQUIOXX Tablets, Injection or Oral Paste, should not exceed 14 days. Please see the package insert for EQUIOXX Injection or Oral Paste for appropriate prescribing information for those formulations.

Contraindications:

Horses with a hypersensitivity to firocoxib should not receive EQUIOXX Tablets.

Warnings:

For use in horses only. Do not use in horses intended for human consumption. Store EQUIOXX Tablets out of the reach of dogs and other pets in a secured location in order to prevent accidental ingestion or overdose.

Human Warnings: Not for use in humans. Keep this and all medications out of the reach of children. Consult a physician in case of accidental ingestion by humans.

Precautions:

Horses should undergo a thorough history and physical examination before initiation of NSAID therapy. Appropriate laboratory tests should be conducted to establish hematological and serum biochemical baseline data before and periodically during administration of any NSAID. Clients should be advised to observe for signs of potential drug toxicity and be given a Client Information Sheet with each prescription. See Information for Owner or Person Treating Horse section of this package insert.

Treatment with EQUIOXX Tablets should be terminated if signs such as inappetence, colic, abnormal feces, or lethargy are observed.

As a class, cyclooxygenase inhibitory NSAIDs may be associated with gastrointestinal, renal, and hepatic toxicity. Sensitivity to drug-associated adverse events varies with the individual patient. Horses that have experienced adverse reactions from one NSAID may experience adverse reactions from another NSAID. Patients at greatest risk for adverse events are those that are dehydrated, on diuretic therapy, or those with existing renal, cardiovascular, and/or hepatic dysfunction. Concurrent administration of potentially nephrotoxic drugs should be carefully approached or avoided. NSAIDs may inhibit the prostaglandins that maintain normal homeostatic function. Such anti-prostaglandin effects may result in clinically significant disease in patients with underlying or pre-existing disease that has not been previously diagnosed. Since many NSAIDs possess the potential to produce gastrointestinal ulcerations and/or gastrointestinal perforation, concomitant use of EQUIOXX Tablets with other anti-inflammatory drugs, such as NSAIDs or corticosteroids, should be avoided.

The concomitant use of protein bound drugs with EQUIOXX Tablets has not been studied in horses. The influence of concomitant drugs that may inhibit the metabolism of EQUIOXX Tablets has not been evaluated. Drug compatibility should be monitored in patients requiring adjunctive therapy. The safe use of EQUIOXX Tablets in horses less than one year in age, horses used for breeding, or in pregnant or lactating mares has not been evaluated. Consider appropriate washout times when switching from one NSAID to another NSAID or corticosteroid.

Adverse Reactions:

The safety and effectiveness of EQUIOXX Tablets was established in a relative bioavailability study comparing EQUIOXX Tablets and EQUIOXX (firocoxib) Oral Paste. Therefore, additional field studies were not performed to support the effectiveness of EQUIOXX Tablets.

In controlled field studies, 127 horses (ages 3 to 37 years) were evaluated for safety when given EQUIOXX Oral Paste at a dose of 0.045 mg/lb (0.1 mg/kg) orally once daily for up to 14 days. The following adverse reactions were observed. Horses may have experienced more than one of the observed adverse reactions during the study.

Table 1: Adverse Reactions Seen in U.S. Field Studies with EQUIOXX Oral Paste:

Adverse Reactions	EQUIOXX n=127	Active Control n=125
Abdominal Pain	0	1
Diarrhea	2	0
Excitation	1	0
Lethargy	0	1
Loose Stool	1	0
Polydipsia	0	1
Urticaria	0	1

In these field trials, EQUIOXX Oral Paste was safely used concomitantly with other therapies, including vaccines, anthelmintics, and antibiotics. The safety data sheet (SDS) contains more information on safety.

To report suspected adverse events, for technical assistance, or to obtain a copy of the SDS, contact Boehringer Ingelheim Animal Health USA Inc. at 1-888-637-4251. For additional information, visit www.equioxx.com. For reporting for animal drugs, contact FDA at 1-888-FDA-VETS or online at www.fda.gov/reportanimal.

Animal Safety:

The safety of EQUIOXX Tablets was supported by a relative bioavailability study comparing EQUIOXX Tablets and EQUIOXX Oral Paste (see CLINICAL PHARMACOLOGY, Relative Bioavailability, Study). Pharmacovigilance information, and target animal safety data for existing firocoxib containing products in horses. No additional target animal safety studies were conducted with EQUIOXX Tablets.

In a target animal safety study conducted to support the approval of EQUIOXX Oral Paste, firocoxib was administered orally to healthy adult horses (two male castrates and four females per group) at 0.1, 0.3 and 0.5 mg firocoxib/kg body weight (1, 3 and 5X the recommended dose) for 30 days. Administration of firocoxib at 0.3 and 0.5 mg/kg body weight was associated with an increased incidence of oral ulcers as compared to the control group but, no oral ulcers were noted with 0.1 mg/kg. There were no other drug-related adverse findings in this study.

In another target animal safety study, firocoxib was administered orally to healthy adult horses (four males or male castrates and four females per group) at 0.1, 0.3 and 0.5 mg firocoxib/kg body weight (1, 3 and 5X the recommended dose) for 42 days. Administration of firocoxib at 0.1, 0.3 and 0.5 mg/kg body weight was associated with delayed healing of pre-existing oral ulcers, tongue, gingival ulcers. In addition, the incidence of oral ulcers was higher in all treated groups as compared to the control group.

Clinical chemistry and coagulation abnormalities were seen in several horses in the 0.5 mg/kg 5X group. One 5X male horse developed a mildly elevated BUN and creatinine over the course of the study, prolonged buccal mucosal bleeding time (BMBT), and a dilated prothrombin time (PT). Another 5X male had a similar mild increase in creatinine during the study but did not have any gross abnormal findings. One female in the 5X group had a prolonged BMBT, bilateral tubulointerstitial nephropathy and bilateral papillary necrosis.

Tubulointerstitial nephropathy occurred in one 3X female, two 3X male horses, and the 5X female horse discussed above with the prolonged BMBT. Papillary necrosis was present in one 1X male horse and the 5X female horse discussed above. Despite the gross and microscopic renal lesions, all of the horses were clinically healthy and had normal hematology, clinical chemistry and urinalysis values.

In another target animal safety study, firocoxib was administered orally to healthy adult horses (three females, two male castrates and one male per group) at 0.1, 0.25 mg/kg, 0.75 mg/kg and 1.25 mg/kg (2.5, 7.5 and 12.5X the recommended dose of 0.1 mg/kg) for 92 days. An additional group of three females, two male castrates and one male per group, was dosed at 1.25 mg/kg for 92 days but was monitored until Day 147-149. There were treatment-related adverse events in all treated groups. These consisted of ulcers of the lips, gingiva and tongue and erosions of the skin of the mandible and head. Gross and microscopic lesions of the kidneys consistent with tubulointerstitial nephropathy were seen in all treated groups. Papillary necrosis was seen in the 2.5X and 12.5X groups. In addition, several 12.5X horses had elevated liver enzymes (GGT, SDH, AST and ALT). One 2.5X male horse treated urine GGT and urine protein levels which was due to renal hemorrhage and nephropathy. Gastric ulcers of the margo plicatus and glandular area were more prevalent in the 2.5X and 5X groups, but not seen in the 12.5X group. The group of horses that were monitored until Days 147-149 showed partial to full recovery from oral and skin ulcers, but no recovery from tubulointerstitial nephropathy.

Storage Information:

Store at room temperature, between 59°–86°F (15°–30°C). Brief periods up to 104°F (40°C) are permitted.

How Supplied:

EQUIOXX is available as round, beige to tan, half-scored tablets, containing 57 mg firocoxib. EQUIOXX Tablets are supplied in 60 and 180 count bottles.

1. McCann MC, Rickes EJ, Hora DP, Cunningham PK et al. In vitro effects and in vivo efficacy of a novel cyclooxygenase-2 inhibitor in cats with lipopolysaccharide-induced colitis. *Am J Vet Res*. 2005 Jul;66(7):1278-84.

2. McCann MC, Anderson DR, Briddle C et al. In vitro activity and in vivo efficacy of a novel COX-2 inhibitor in the horse. *Proceedings of the Academy of Veterinary Internal Medicine*. 2002. Abstract T14, p.789.

3. Data on file made in France.

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GETTY IMAGES

Because insects like moisture, you might need protection around the horse's face—particularly the ears, eyes, and nose. A properly fitted fly mask can be a good solution.

face—particularly the ears, eyes, and nose,” Martinson says, noting her team used masks with covered ears on all their study horses. “The horse's body is also an insect target, and we've all seen horses getting eaten raw from gnats, especially where their legs come into their chest and mares around their udders.”

But some areas are spray no-nos: Avoid udders and teats, especially when mares are nursing. “You don't want a foal to not want to nurse because the area smells or tastes funny,” Martinson says. “Instead, you can wipe spray on the inside of the mare's legs to keep her comfortable.”

Avoid other sensitive areas, including genitals and wounds, and be cautious around a horse's face, especially his eyes, nostrils, and mouth. “You can hand-wipe those sensitive areas (or use roll-ons) if for some reason you can't use a mask,” she says. “And just like humans, some horses have sensitivities to different kinds of fly sprays. So if you notice that a horse you sprayed comes down with hives, discontinue that spray.”

Spray the Right Way

Insect spray isn't cheap, so you'll want to make sure you get the best results from the

least amount of product—and time spent applying it.

Always start with a clean horse. Although you don't need to bathe your horse before you spray, you do want to groom him to remove loose hair and dirt.

Follow the manufacturer's label instructions for application. Some advise wiping versus spraying, while others recommend brushing hair against its growth while spraying so the spray reaches hair roots and skin. Some advise wearing goggles to avoid contact with eyes, and some suggest wearing protective clothing such as long sleeves and pants or spraying outdoors.

Mind the frequency. Although some commercial product labels claim efficacy for up to 14 days or longer, Moon says not to expect it to exceed a day under the best of outdoor conditions.

Train your horse to stand for spray (TheHorse.com/112298). You don't want to waste half the bottle spraying the air around a dancing, jiggling horse that doesn't realize you're trying to help him.

Integrated Pest Management

Your goal is to keep your horse comfortable,



If you don't have a barn, be sure pastured horses have shade and shelter they can take advantage of during fly season.

which might require extra effort during insect season. To that end, you might have to employ a variety of techniques to both repel and kill insects.

"Fly sprays by themselves aren't going to be cure-alls," Martinson says. "Fly control is a comprehensive strategy, and the biggest component is simply good housekeeping."

Without it, you'll work double duty to keep insect populations down.

First on your to-do list: manure management. "Remove old bedding on a daily basis, and if you have old feed, put it on the manure pile as well," she says. "And make sure your manure pile is as far from your horse as possible."

If you compost your manure, turning it weekly encourages hot composting, which kills immature houseflies and stable flies, adds Moon.

Because flies are attracted to moisture, "fix any leaky faucets that could cause a puddle," says Martinson.

Residual premise sprays also help, as do screens on stable openings where practical; just be sure screens do not impede barn ventilation.

Avoid turning horses out at peak insect feeding times. "We know that mosquitoes come out at dawn and dusk, so put your horse away during those times, and let him out when the mosquitoes are less active," Martinson says. "Other biting flies are active during the daytime, so watch your horse for fly aversion behaviors that will tell you he's being bothered."

If you don't have a barn, be sure pastured horses have shade and shelter they can take advantage of during fly season.

Take-Home Message

Our responsibility as horse owners is to keep our horses healthy, safe, and comfortable. Building an effective fly-fighting arsenal comprising multiple techniques can help us do just that. **SM**



Remove manure and old bedding from stalls daily, and locate your manure pile as far from your horse as possible.

Feel confident in their comfort

**EQUIOXX® (firocoxib) HAS MORE
SAFETY DATA THAN ANY OTHER NSAID.^{1,2}**

For a horse, joint disease means living in the shadow
of its former self. EQUIOXX helps them escape the shadows
with up to 24 hours of pain relief in just one dose!
Talk to your veterinarian about EQUIOXX.

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Equioxx®
(firocoxib)



IMPORTANT SAFETY INFORMATION: As with any prescription medication, prior to use, a veterinarian should perform a physical examination and review the horse's medical history. A veterinarian should advise horse owners to observe for signs of potential drug toxicity. As a class, nonsteroidal anti-inflammatory drugs may be associated with gastrointestinal, hepatic and renal toxicity. Use with other NSAIDs, corticosteroids or nephrotoxic medication should be avoided. EQUIOXX has not been tested in horses less than 1 year of age or in breeding horses, or pregnant or lactating mares.

¹ EQUIOXX product labels and FOI summaries and supplements

² Kvaternik V, Pollmeier M, et al. Pharmacokinetics and metabolism of orally administered firocoxib, a novel second generation coxib in horses. J Vet Pharmacol Ther. 2007;30(3):208-217.

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