Fly Control For Horses

Least Toxic Insect Control for Horses:
Fly Sprays, Pass Through Fly Control, Fly Predators, Mechanical Fly Controls and Mosquito Traps
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Why Worry About Pesticides?
Pesticides are Poisons

Pesticides are, by their nature, poisons. In the United States pesticides are regulated based on a risk-benefit analysis: a pesticide can be registered that is exceedingly toxic. Pesticides are regulated under the Federal Insecticide, Fungicide and Rodenticide Act (FIFRA). This law was designed to assure farmers that pesticides would actually do what they are supposed to do: kill insects. FIFRA was not intended to protect humans or the environment from the effects of pesticides, although it has been amended several times to add in chronic toxicity and environmental concerns. EPA regulations specifically prohibit manufacturers of pesticides from making claims like "safe," "harmless," or "nontoxic to humans or pets."

Key Points to Remember about Fly Sprays

When you consider using a fly spray on your horse or in your stable, you should keep in mind the following key points:

1. The EPA (the agency which regulates pesticides in the USA) does not require testing of fly sprays on horses for either acute or chronic toxicity levels of the active ingredients either alone or in the combinations of chemicals found in equine fly products.2
2. EPA testing of pesticides is not a consumer product safety program. It is used to indicate if it will kill a targeted insect or pest, and what level is required to kill.3,26
3. Short term effects from pesticides include eye, skin, respiratory or throat irritation, and neurological damage. Organophosphate pesticides are nerve poisons and can cause headaches, dizziness, fatigue, twitching muscles, mental confusion, neurological damage and more.1,3,9,10,11,12

4. The word 'inert' does not mean 'non-toxic! Many inert used in fly products are as toxic as the 'active' pesticide ingredient, and may be known carcinogens.3,27,28

5. Final products (which are usually a combination of chemicals) do NOT undergo any studies on any animal to document possible side effects from long-term use, such as cancer and damage to the liver and kidneys.2,26

6. Don't confuse the word 'natural' with 'nontoxic.' The word 'natural' often means the product contains pyrethrin, or piperonyl butoxide. Pyrethrin is a neurotoxin, but it is considered 'natural' because it is derived from chrysanthemum flowers. Piperonyl butoxide is a synergist that enhances the neurologic effect and is itself believed to cause liver cancer. Tests recently done at the Tokyo Metropolitan Research Laboratory of Public Health in Japan showed that piperonyl butoxide caused liver cancer in rats and mice, caused damage to the kidneys, and produced fetal death and birth defects (it was 'teratogenic')).2

7. Don't confuse 'pyrethrins' - the chemical group of compounds that are the active ingredients derived from pyrethrum, which is in turn extracted directly from chrysanthemum flowers - with 'permethrin,' which is a synthetic chemical in the family of pyrethroid pesticides. Permethrin is more toxic than the pyrethrins.2,6

8. "Natural" or Non-Chemical Fly Sprays do not undergo the pesticide testing required by the EPA to be legally labeled 'Fly Repellent.' These products use strong-smelling (to flies!) ingredients that repel insects. Always remember that you and your horse can have allergic reactions to the ingredients in these products. Also, many herbs and essential oils are untested for their toxicity levels or side effects. So - test any product on your horse carefully, and observe any signs such as hives, skin twitching or other reactions.2 Remember: "natural" doesn't mean "non-toxic!" Ask the manufacturer or retailer for a "Material Safety Data Sheet" on the product (it is usually called an "MSDS"). Products are required by law to have this information available to you on request, and the MSDS will list any known toxic active ingredients.

9. The label on a fly spray bottle, if it contains a pesticide, is a LEGAL statement. Think about the following statements that appear on labels and decide for yourself if you can use a spray without violating these statements: "Avoid contact with eyes, skin, or clothing." "Avoid breathing spray mist." Do you think it's possible to avoid contact or breathing the mist while spraying it on a horse, or in a barn which uses an automatic spray mist system?2
Toxicity of Specific Pesticides used in Fly Sprays

**Pyrethroids: Overview**

Pyrethroids are a diverse class of pesticides that contain more than 1000 powerful broad-spectrum synthetic insecticides.  

Pyrethroid toxicity varies widely, and is highly dependent on the specific molecular structure of the individual pyrethroid. Route of exposure is critical in figuring out the acute (not long term) toxicity of each pyrethroid. According to a NCAP reference, "Based on laboratory tests with experimental animals, introduction of the compound into the brain is most toxic, followed by introduction into the blood vessels, introduction into the gut, oral exposure, inhalation and dermal (skin) exposure."  

There is little data on long term toxicity of any of the pyrethroids.

The "inerts" in the specific formulation used for pyrethroids are quite important and can account for a 10-fold increase in toxicity compared to the pure pesticide, especially since some inerts specifically act as synergists with pyrethroids.

Generally speaking, the main effects of pyrethroids are neurotoxicity and liver enlargement. They can also be irritating to the skin and eyes, and some pyrethroids cause a sensitization of facial skin. Other documented effects include suppression of the immune system, damage to the nervous system, and with some pyrethroids reproductive effects.

**Pyrethroids: Cypermethrin**

Cypermethrin is a synthetic pyrethroid. In terms of acute toxicity, Cypermethrin specifically (according to EXTOXNET) "is a moderately toxic material by dermal absorption or ingestion. Symptoms of high dermal exposure include numbness, tingling, itching, burning sensation, loss of bladder control, incoordination, seizures, and possible death. Pyrethroids like cypermethrin may adversely affect the central nervous system. Symptoms of high-dose ingestion include nausea, prolonged vomiting, stomach pains,
and diarrhea which progresses to convulsions, unconsciousness, and coma. Cypermethrin is a slight skin or eye irritant, and may cause allergic skin reactions."  

Cypermethrin has been specifically shown to be mutagenic (this means it causes genetic damage). The EPA has classified cypermethrin as a possible human carcinogen because available information is inconclusive - it causes tumors in female mice, but not in rats. Human exposure studies in China have shown documented fatality from inappropriate handling in workers using Cypermethrin occupationally (in other words, the person who was mixing or spraying it died). Cypermethrin is toxic to fish - quite toxic.

There is no evidence that Cypermethrin is teratogenic (in other words, it doesn't cause birth defects in the offspring of a pregnant mammal exposed to it).

Cypermethrin is considered light-stable, and therefore has a fairly long half-life (apparently up to 16 weeks). Half life means 'how long does it take for half of the substance to biodegrade. So with Cypermethrin, half of the amount used is still there 16 weeks after it was applied, and another 16 weeks after that a quarter of the original amount used is still there, and so forth.

There is no data on Cypermethrin's long term chronic toxicity.

**Pyrethroids: Fenvalerate**

Fenvalerate is moderately toxic compound via ingestion, and less toxic via touch or dermal contact. Acute poisoning data in humans comes from nearly 600 individual cases of poisoning that were reported between 1982 and 1988. Symptoms of acute poisoning included dizziness, burning and itching (which was worsened by sweating and washing). Severe cases of direct contact caused blurred vision, tightness in the chest, and convulsions. In test animals (rats) high acute exposure to fenvalerate produced muscle incoordination, tremors, convulsions, nerve damage, and weight loss. The compound may produce nausea, vomiting, headache, temporary nervous system effects such as weakness, tremors, and incoordination at acute exposure levels in humans. It is a strong eye irritant, producing tearing or blurring of vision.

Fenvalerate is moderately persistent in the environment, with a half-life ranging from about fifteen days to three months depending on soil type.

**Pyrethroids: Permethrin**

Permethrin is neurotoxic via a variety of routes. At high doses permethrin causes tremors, incoordination, hyperactivity, paralysis. At lower doses, it is irritating to eyes and skin, can cause tearing, swelling and blurred vision, redness, swelling and blistering of skin, as well as allergic reactions on the skin. In laboratory tests, at doses that cause no overt toxicity, permethrin reduces immune system functions (e.g., inhibits T-lymphocytes over 40 percent). Permethrin also has reproductive effects, including embryo loss in pregnant test animals (rabbits and rats). It also binds to androgen receptors in human males.
Permethrin also causes damage to genetic material: it is mutagenic in human cell cultures. The EPA (Environmental Protection Agency) lists permethrin as a possible human carcinogen, and causes lung and liver tumors in laboratory tests in mice. 6,7

The half-life (the amount of time required for half of the original amount of a chemical to break down) of permethrin varies from 17 to 43 days. It persists longer in tree needles and bark - here the half-life is one year. When used in cattle ear tags, residues are found in grass three months after the ear tags were applied. 6,7

**Pyrethroids: Other**

Other pyrethroids used in horse products include: Resmethrin, Tetramethrin, S-Bioallethrin, and Sumethrin. They are similar in toxicity and environmental longevity to the products discussed above.

**Organophosphates**

Organophosphates are often called 'nerve poisons.' These pesticides are highly toxic to vertebrates (all mammals) and are chemically related to nerve gases developed and used during and after World War II. Organophosphate pesticides kill through their effect on the nervous system. An organophosphate pesticide kills by inhibiting an enzyme (acetylcholinesterase) which the body needs to break down acetylcholine. Acetylcholine is a chemical essential for transmitting nerve impulses across the junctions between nerves. 1,9,10,11,12

Symptoms of acute organophosphate poisoning in humans include headaches, nausea, dizziness, salivation, tearing, urination, diarrhea, convulsions, muscle weakness, incoordination, abdominal cramps, blurred vision, pupil constriction, slowed heart beat, respiratory depression, paralysis and coma. These symptoms are found after inhalation or dermal (skin) contact with these products. Several of the organophosphates, including those used on horses, are known to be carcinogenic (they cause cancer), mutagenic (cause genetic damage), and teratogenic (cause birth defects in fetuses). 9 Dichlorvos, for example, is exceedingly toxic via relatively tiny amounts through inhalation or touch, and a proven carcinogen. 1,9,10,11,12

Organophosphate pesticides found in horse sprays include: coumaphos, dichlorvos, malathion and tetrachlorvinphos.

**Organochlorines**

Organochlorine compounds which have chlorine atoms attached to one or more carbon rings are called organochlorines. Pesticides within this chemical group are usually highly toxic - examples include DDT. Non-pesticide organochlorine compounds include substances like dioxin and PCBs.
Lindane is an organochlorine pesticide found in horse sprays. Lindane is neurotoxic, causing grand mal seizures, and it is highly carcinogenic in laboratory tests. It also causes aplastic anemia, as well as other blood disorders.

Pass-through or Feed-through (Feed-thru) Fly Control

On Wednesday, December 18th, 2002 the United States Environmental Protection Agency (EPA) published an official notice regarding tetrachlorvinphos feed-through products in the Federal Register / Vol. 67, No. 243. The notice, OPP-2002-0295; FRL-7279-2, specifically declares that tetrachlorvinphos is a cholinesterase inhibitor in equines, stating: "EPA has determined that labels for tetrachlorvinphos feed-through products for horses must state that the product is a cholinesterase inhibitor, describe signs of cholinesterase inhibition in horses, caution against the use with other cholinesterase inhibiting compounds, and direct horse owners to consult a veterinarian before using products containing tetrachlorvinphos on debilitated, aged, breeding, pregnant or nursing animals.

Cholinesterase is essential for the transmission of nerve impulses. In humans, symptoms of acute cholinesterase-inhibition may include the following: numbness, tingling sensations, incoordination, headache, dizziness, tremor, nausea, abdominal cramps, sweating, blurred vision, difficulty breathing or respiratory depression, and slow heartbeat. Very high doses may result in unconsciousness, incontinence, and convulsions or fatality. The effects of cholinesterase suppression, even where acute symptoms are not present, on the performance of horses is unknown.

Currently, many feed producers and feed mills add the organophosphate pesticide tetrachlorvinphos to horse feed as 'pass-through fly control' or 'feed-thru' fly control. The horse eats grain or pelleted feed with the added pesticide, and the product 'passes through' into the manure, where it then kills insects and insect larvae.

"Rabon" and "Equitrol" are examples of products that contain tetrachlorvinphos as their active ingredient.
Tetrachlorvinphos is currently used at 12 pounds per ton of feed for domestic (nonfood) horses. Organophosphate pesticides are highly toxic to vertebrates (all mammals) and are chemically related to nerve gases developed and used during and after World War II. Organophosphate pesticides kill through their effect on the nervous system.

In addition to the information found in section three that applies to all organophosphate pesticides, there is limited evidence that tetrachlorvinphos causes cancer in animals, specifically cancer of the liver.

Tetrachlorvinphos has not been tested for its ability to adversely affect reproduction. Tetrachlorvinphos has high acute toxicity to aquatic life and birds, and moderate acute toxicity to land animals. It has caused germination decreases in an ornamental crop. 

Serious concerns have surfaced from some horse breeders over tetrachlorvinphos's toxicity for the short term as well as the long term in regards to tetrachlorvinphos' effect on equine reproduction.

The problems cited by these breeders include absorption of foals during pregnancy, abortion, prematurity, thyroid problems and more, which they believe are linked to tetrachlorvinphos based feed-thru fly control products, used alone or in combination with other products.

Additional claims from these breeders are that testing for absorption of the product while in the horse's digestive tract was not done, even though the advertising claims say that the product passes quickly through the digestive tract unabsorbed.

Caution is therefore especially advised if you chose to use these products on horses intended for breeding purposes.

Alternatives to Pesticides

While care has been taken to ensure the correctness of following information, I cannot take responsibility for errors or omissions. The presence of a supplier or product in the following list does not mean that the product is effective or non-toxic. I do not endorse the following products in any way.

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You'll have to look at the labels of these (and other) pesticide-free sprays and products and make your own decision based on your needs and those of your horses. Manufacturers' phone numbers are included so you can contact them for
literature and to find a retailer near you that carries their products.

Pesticide-Free Sprays

4. **Espree Aloe Herbal Horse Spray.** Espree, P.O. Box 167707, Irving, TX 75016; 972-756-0626 or 800-238-1317. [http://www.espree.com](http://www.espree.com).

Fly Control for Manure

5. **Arbico Fly Predators** (non-stinging predatory wasps that prey specifically on manure-based flies. Sprinkle them on the manure in spring, release adults monthly in summer). Arbico, P.O. Box 4247, Tucson, AZ 85738, 800-827-2847 or 520-825-9785. [http://www.arbico.com](http://www.arbico.com).

Fly Masks
These are widely available - but make sure to get one that is free of pesticides. Some brands used to come with pesticides already impregnated in them, so be careful to choose a product that is pesticide-free.

Fly Traps

1. **HORSE PAL® fly trap.** Newman Enterprises of Omro, Wisconsin. The Horse Pal is a mechanical fly trap specifically intended for stables and farms. It traps horse flies and deer flies in the Tabanidae family of biting flies. According to the manufacturer, "the biting horsefly and deerfly are not attracted to chemical or smell baits. They are visual hunters. These flies can see, and are attracted to, the critically developed HORSE PAL® target from a long distance. They fly to the target which is specifically designed to attract them. When the flies discover the target is not a blood meal, the trap is designed so that the flies enter the capture bottle, die from the heat of the sun on the bottle, and accumulate in the bottom of the capture bottle."  

The HORSE PAL® Fly trap does not require any maintenance after assembly, except for occasionally emptying the dead flies from the trap. One trap should last for years, according to the manufacturer.  

Several favorable reviews have been published about this product, including an article in the January 2003 issue of Golf Course Management magazine, the April 2002 issue of Horse Journal, and a performance report in Michigan State University's August 25, 2000 Landscape Crop Advisory Team Alert newsletter. You can purchase one directly from Newman Enterprises, 4552 Poygan Avenue Omro, WI 54963-9619 USA. E-mail: horse@northnet.net or Phone (toll free): 888-685-2244. Depending on the terrain of your pastures and paddocks, one Horse Pal Fly trap may be effective for as much as several acres.  


2. **The Fly Trap.** The Fly Trap was developed by a New Zealand farmer to control non-biting flies such as houseflies and their relatives; flesh flies, blow flies and bottle flies, filter flies, and fruit flies. Made from tough polycarbonate, designed for agricultural use, easy to bait and clean. The distributor claims it will attract and capture flies from a full kilometer (about half a mile) away. It can be purchased for $25 (including shipping and handling) from the international distributor, David Lockett, who is located in Perth Australia. http://flytrap.ws.

3. **Biting Fly Traps.** These were developed to control horse flies, deer flies and horn flies Biting flies are attracted to the special fiberglass panel and trapped by replaceable Stiky Sleeve. Each trap can catch as many as 5000 flies. It can be purchased for $17.68 from IPM Labs. IPM Labs, Phone: 315-497-2063.  


4. **EPPS Biting fly Trap.** This large trap attracts large biting flies (e.g., horse flies). According to the manufacturer, it traps up to one pound of biting flies a day "by providing a large, contrasting surface area, with transparent areas (which are actually clear plastic deflectors) representing air space between an animal’s legs and over its back through which the flies would normally circle before feeding. Flies see the deflectors as open spaces and try to fly through then. They hit the
deflectors and ricochet into the soapy water in the trays below. Dish soap is added to the water in the trays to cause the flies to be wetted and drown faster." It can be purchased directly from the manufacturer, Horseline Products, Inc, 1340 Jones Rd., Henderson, TN 38340. Phone: 1-800-208-4846; Fax/Phone: 1-731-989-9963. http://www.horselineproducts.com.

5. Hanging fly traps that capture flies are available from a variety of manufacturers such as Victors) that are baited with a sex pheromone or a food attractant in your barn. There are reusable traps, as well as ones you can just toss out when they are getting full. Do not use hanging fly traps that contain a pesticide, if you wish to avoid pesticides.

6. Do not use fly strips that are impregnated with pesticides, if you wish to avoid pesticides!

7. Sticky fly strips that the insects stick to aren't practical in barns - they get dust coated quickly and lose their effectiveness.

Mosquito Traps

With the spread of West Nile Virus in the United States, several manufacturers have introduced mosquito traps that use a combination of carbon dioxide, heat, octenol and other attractants to capture mosquitoes. These traps range in price from $50 to over $1200, and vary in coverage, expense to run, and effectiveness. BIRC (Bio-Integral Resource Center) has an excellent review and evaluation of sixteen mosquito traps in their Spring, 2003 publication, "Common Sense Pest Control Quarterly." BIRC concludes that two traps, the Mosquito Magnets and MegaCatch, generally outperformed other traps in comparison tests. BIRC also notes that shopping around for best prices may yield significant savings when purchasing these traps, and advises checking on-line sources such as Amazon.com for price comparisons.

1. Mosquito Magnets are available in a variety of models from the manufacturer, American Biophysics Corporation, at their website, from on-line stores and
1. **MegaCatch** is available from the U.S. representative for the manufacturer, Mosquito Wizard, 4800 District Blvd., Vernon, CA 90058, Phone 866-339-4927. The manufacturer, Envirosafe, can be contacted at: 120 Albert St., Westpac Trust Tower, 7th Floor, Auckland, NZ. Phone: +64 9416 1544, or through the manufacturer's website, [http://www.megacatch.com](http://www.megacatch.com).

2. **Flowtron and Flowtron Power Trap** are available from on-line stores and retailers. Information is available from the manufacturer's website, [http://www.flowtron.com](http://www.flowtron.com) or by contacting the manufacturer at 2 Main St., Melrose, MA 02176. Phone: 781-321-2300.

3. **Gobblin Mosquito Eater** is available from the manufacturer, Davros Developments, at their website, [http://www.mosquitoeater.com](http://www.mosquitoeater.com) and from on-line stores and retailers. The manufacturer, Davros Developments, can be contacted at: 136E 8th Street, Unit # 175, Port Angeles, WA 98362. Phone: Tel: 250-748-3628.

4. **Mosquito Deleto** is manufactured by Coleman, and available from on-line stores and retailers. Information about the product is available at Coleman's website, [http://www.coleman.com](http://www.coleman.com).

5. **Lentek Eco-Trap and Lentek MKOI** are available from the manufacturer's website, [http://www.lentek.com](http://www.lentek.com) and from on-line stores and retailers. Lentek International can be contacted by phone at: 407-857-8786.


7. **Skeeter Vac** is manufactured by Blue Rhino, and available from on-line stores and retailers. Information about the product is available at Blue Rhino's website, [http://www.bluerhino.com](http://www.bluerhino.com) or by contacting the manufacturer at 888-753-7137.

Copies of BIRC's article in the Spring 2003 "Common Sense Pest Control Quarterly," "Mosquito Attractants and Traps," are available from BIRC for $7.50 (including shipping and handling, to USA addresses). You can request one by calling BIRC at: 510-524-2567 or contacting them for more information at their website, [http://www.birc.org](http://www.birc.org) or by writing them at: BIRC, PO Box 7414, Berkeley, CA 94707.

References and Acknowledgments

References

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29 Newman Enterprises FAQ. http://bitingflies.com


32 "Mosquito Attractants and Traps." BIRC, Common Sense Pest Control XIX(2) Spring 2003: pp. 4-13. Copies are available from BIRC for $7.50 (including shipping and handling, to USA addresses). You can request one by calling BIRC at: 510-524-2567 or contacting them for more information at their website, http://www.birc.org or by writing them at: BIRC, PO Box 7414, Berkeley, CA 94707.