TECH NOTE

Wildlife Services

APHIS

United States Department of Agriculture

Animal and Plant Health Inspection Service

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DRC-1339 (Starlicide)

DRC-1339 (3-chloro-4-methyl benzenamine HCl, Chemical Abstract Service Reg. No. 7745-89-3) is a slow-acting avicide that is registered with the Environmental Protection Agency (EPA) for the control of several species of pest birds, including blackbirds, starlings, pigeons, crows, ravens, magpies, and gulls. Technical DRC-1339 (Starlicide Technical, EPA Reg. No. 602-134) contains 97 percent DRC-1339. Starlicide products and DRC-1339 were developed jointly by Ralston Purina, Inc., Purina Mills, Inc., and the National Wildlife Research Center (NWRC) of the U.S. Department of Agriculture's Animal and Plant Health Inspection Service (APHIS). Registrations are maintained by PM Resources, Inc., Earth City Resources, and APHIS.

APHIS/WS currently has the following DRC-1339 products registered with EPA to resolve bird problems that cannot be solved by the use of the commercially available Starlicide Complete (EPA Reg. No. 602-136) [See table].

The use of all APHIS/WS DRC-1339 registrations is restricted to Certified Applicators and WS personnel trained in bird control (or persons under their direct, onsite supervision). All APHIS/WS DRC-1339 products are prepared from Starlicide Technical.

A number of APHIS/WS State Special Local Need (Section 24[c]) registrations also are available to solve local problems, such as blackbirds in sunflowers, blackbirds in rice, and grackles in citrus.

Acute Toxicity to Birds and Mammals

DRC-1339 was developed as an avicide because of its differential toxicity to animals. More acute avian toxicity data are available for DRC-1339 than for any other pesticide used in the world: more than 40 species have been tested. DRC-1339 is highly toxic to most sensitive bird species (LD_{50}'s range from 1 to 10 mg/kg), allowing a toxic dose to be placed on a single bait. But it is only slightly to moderately toxic to many nonsensitive birds, most predatory birds, and most mammals (LD_{50}'s range from 100 to 1,000 mg/kg). Some species, including waterfowl and gallinaceous birds, are intermediate in sensitivity to DRC-1339 (LD_{50}'s range from 10 to 100 mg/kg). Most bird species that are sometimes pests, including starlings, pigeons, blackbirds, crows, and magpies, are sensitive to DRC-1339. Many other bird species, such as raptors and some small granivores are classified as nonsensitive. Known exceptions are owls and felines, with LD_{50}'s of about 5 mg/kg placing them in the sensitive category.

Mode of Action

The mode of action of DRC-1339 in sensitive birds is irreversible kidney and heart damage; a quiet and apparently painless death normally occurs 1-3 days following ingestion. In nonsensitive species, the mode of action is quite different, and the process requires 10-100 times more DRC-1339. In these species, the central nervous system is depressed, resulting in cardiac

Product	Registered Uses
Compound DRC-1339 Concentrate-Feedlots (EPA Reg. No. 56228-10)	For controlling blackbirds and starlings in livestock feedlots.
1339 Gull Toxicant 98% Concentrate (EPA Reg. No. 56228-17)	For controlling gulls to protect colonial nesting seabirds.
Compound DRC-1339 Concentrate-Pigeons (EPA Reg. No. 56228-28)	For controlling pigeons in and around structures
Compound DRC-1339 Concentrate–Livestock Depredations (EPA Reg. No. 56228-29)	For controlling corvids (e.g., ravens) depredating on newborn livestock, threatened or endangered species, or other species needing special protection.
Compound DRC-1339 Concentrate--Staging Areas (EPA Reg. No. 56228-30)	For controlling birds in staging areas associated with roosts.

or respiratory arrest; a quiet death usually occurs after 2-10 hours. The kidney and heart damage that occurs in sensitive birds that ingest DRC-1339 is irreversible; however, the central nervous system depression resulting from ingestion of DRC-1339 in nonsensitive mammals and raptors can be successfully treated symptomatically.

DRC-1339 is metabolized and excreted from all animals very quickly, with 90 percent or more of the compound lost within 2 hours. Most metabolites are much less toxic than DRC-1339. DRC-1339 is not accumulated in the body, thus the compound's residues generally range from 0 to less than 0.1 ppm when death occurs.

Potential Primary Hazards

Repeated exposure to DRC-1339 in feed can result in the poisoning of sensitive species. The concentration of DRC-1339 in feed that is lethal to 50 percent of treated starlings (LC_{50}) is 4.7 ppm after 30 days of exposure and 1.0 ppm after 90 days exposure. For bobwhite quail, the LC_{50} concentration in feed is 14.1 ppm, and for species of intermediate sensitivity, such as mallard ducks, the 5-day LC_{50} is 322 ppm. DRC-1339 does not appear to affect avian reproduction except at levels very close to where toxicity is expressed.

Numerous studies conducted by NWRC and WS Operations show that DRC-1339 poses a small risk of primary poisoning to most nontarget species. The primary hazards to nontarget birds are generally site specific and can be controlled by selecting a bait and bait sites that are not used by nontarget birds. The risk to nontarget birds can be further mitigated by careful prebaiting and observation prior to bait application. The risk of primary poisoning to most mammals is extremely low because of the low level of toxicity of DRC-1339 to most mammals, the baits that are used, bait dilution factors, and minimal treatment rates. Birds and mammals that may be at risk are identified in the WS Technical Notes prepared for specific DRC-1339 end-use products.

Potential Secondary Hazards

NWRC and WS Operations have been monitoring the use of all DRC-1339 products since 1968. There have been no documented secondary poisonings of mammalian or avian scavengers and predators with DRC-1339, except for a crow that may have scavenged the gut contents of a recently treated pigeon. NWRC has conducted long-term feeding studies where birds poisoned by DRC-1339 were collected and fed to raptors and scavenger mammals for 30 to more than 200 days. No symptoms of poisoning or mortalities occurred.

Special precautions may be warranted when using DRC-1339 where owls and cats may be exposed to poisoned birds. Although it is possible that a cat or owl could ingest a lethal dose of DRC-1339 if fed birds poisoned by the compound exclusively for more than 100 days, the actual risk is normally minimal because exposure to DRC-1339-poisoned birds occurs over a few weeks or less. To reduce any potential hazard, poisoned birds should be retrieved, then burned or buried, whenever possible.

Toxicity and Stability in the Environment

DRC-1339 is generally unstable in the environment and degrades rapidly when exposed to sunlight and heat or ultraviolet radiation. DRC-1339 is highly soluble in water but does not hydrolyze. Photodegradation occurs in water with a half-life that ranges from 6.5 to 41 hours, depending upon the season (faster in summer, slower in winter). DRC-1339 is very tightly bound to soil (70-90 percent) and has low mobility. The half-life of DRC-1339 in biologically active soil is about 25 hours, and identified metabolites have low toxicity. These data indicate that DRC-1339 degrades rapidly in soils, does not persist, and will not migrate. The 96-hour LC_{50} of DRC-1339 to bluegill sunfish is 11 ppm; to rainbow trout, 9.7 ppm; and to water fleas, 0.079 ppm, indicating that DRC-1339 is only moderately toxic to fish but that some invertebrates may be very sensitive to the compound.

Sources of Information

Additional information on this product can be found in the April 1994 ADC Final Environmental Impact Statement (Appendix P), in Material Safety Data Sheets supplied by the Pocatello Supply Depot, and in the 1995 Handbook on Prevention and Control of Wildlife Damage. Specific information on this product can be obtained through the National Wildlife Research Center (NWRC) (970-266-6000) or through the NWRC web site http://www.aphis.usda.gov/ws/nwrc. For further information about the availability of this product, contact your WS State Director, or the Pocatello Supply Depot.