

Wildlife Services Tech Note

Sodium Lauryl Sulfate: European Starling and Blackbird Wetting Agent

Ingredients

- Sodium lauryl sulfate: 28–30%
- Water: 70–72%

European starlings (*Sturnus vulgaris*) and various blackbird species sometimes roost in areas where they can cause agricultural, health, and esthetic problems. Concerns associated with these roosts include increased noise levels, fecal accumulation, and disease threats. These birds can also compete with other avian species for resources. For example, introduced starlings compete with native birds for nest sites. Brown-headed cowbirds (a type of blackbird) are known to parasitize songbird nests and may be a major factor in the decline of neotropical migratory birds, such as the endangered Kirtland's warbler.

Employees of the U.S. Department of Agriculture's (USDA) Wildlife Services (WS) program are often asked by State agencies, municipalities, business owners, and landowners for assistance with dispersing or removing starling and blackbird roosts.

This tech note describes the use of sodium lauryl sulfate (SLS) as a wetting agent in managing European starling; red-winged, yellow-headed, and Brewer's blackbird; cowbird; grackle; American crow; common raven; and magpie roosts. SLS is a surfactant commonly used in soap products. When applied to birds, SLS allows water to penetrate and saturate the feathers so that with low temperatures (less than 41 °F) and sufficient water, birds die of hypothermia.

This product is for use on upland roosts located away from bodies of water. In some situations, this tool may be an appropriate alternative to the registered avicide DRC-1339.

A copy of this tech note and the material safety data sheet (MSDS) must be in the possession of any WS employee or official cooperator applying SLS.



Use Requirements From the Environmental Protection Agency

In 1996, the U.S. Environmental Protection Agency (EPA) exempted 31 minimum-risk pesticides from requirements of the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) if the pesticides satisfy certain conditions. In general, conditions for claiming that a pesticide should be exempt from registration under FIFRA Section 25 (b) are that claims cannot be made regarding control of public-health pests, and the product cannot be used on food or feed crops. SLS (Chemical Abstract Service No. 151-21-3) was included on the list of 31 exempt compounds. Individual States retain the right to accept EPA's regulatory exemption or to require State registration.

Efficacy Data

From 2004 to 2007, WS' National Wildlife Research Center and Missouri State office conducted outdoor cage, flight-pen, and small-scale field tests to investigate the effectiveness of SLS in removing urban blackbird roosts. Results document that SLS causes mortality in European starlings, red-winged blackbirds, common grackles, and brown-headed cowbirds and may be useful as part of integrated wildlife damage management programs designed to reduce local blackbird populations. Birds died as soon as 30 minutes after exposure to SLS.

Obtaining SLS

SLS may be purchased in powder form and mixed with water at 28-30% w/w SLS (CAS No. 151-21-3). If purchasing a pre-mixed liquid solution of 28-30% SLS, the product must consist solely of SLS and water.

Application Description

Before using SLS, please review the Applicator's Checklist and system schematic included at the end of this tech note.

Equipment

The following is an example of equipment used to develop one ground-based spray system.

■ Pump

- Pacer 5.5-hp Briggs and Stratton pump (gas) or equivalent
- 2-inch T-coupler (for connecting SLS line to water supply line)
- Quick-fit couplers for hose and pump
- Water-pressure gauge
- 2-inch-diameter supply hose from the water source to the pump
- 1-inch-diameter supply hose from the SLS to the pump
- 1.5-inch-diameter rolled hose from pump to spray system
- Two 2-inch ball valves for SLS and water supply lines

■ Sprayer

- Wobbler Standard Angle nozzle, 24 degree angle and 0.55 cm (7/32 inch) (Senninger Irrigation Inc., www.senninger.com) or equivalent
- Bell adaptor, 3/4 inch to 1 inch in diameter, to attach sprinkler head to pipe
- Three 10-foot sections of 1-inch-diameter steel or aluminum pipe with threaded ends (stand pipe)
- One four-legged sprinkler tower base
- Three 24-inch rebar anchors for base and guy wires
- Guy wire
- Three guy-wire plates

■ Other

- 5 gallons of SLS and water mixture
- SLS transport cooler
- One 10-foot Y-tipped pole (to help raise sprinkler tower)
- Wrenches for couplers
- Silicon tape for stand-pipe joints
- Water source of 6 gallons per minute and a total of 500 gallons per sprinkler head
- Portable temperature and wind gauges
- Data sheet
- Trash bags
- Rakes and shovels for bird pickup
- Personal protective equipment for each worker handling SLS (impervious gloves and goggles or a face shield) and birds (impervious gloves)

Pumping System Requirements

The pump must be able to deliver 500 gallons of water at a rate of 6 gallons per minute per sprinkler head. Operating below 6 gallons per minute is not recommended. A pressure gauge should be installed on the outlet pipe near the pump in order to monitor the flow rate. The pressure needed to operate the system effectively can be calculated with the following formula:

$$\text{psi} = H/2.3 \text{ ft/psi} + 15 \text{ psi} + 10 \text{ psi}$$

H = height of tower in feet

15 psi = minimum operating pressure for sprinkler head

10 psi = friction loss in system

For example, a 30-foot tower would require $30/2.3 + 15 + 10 = 38$ psi to achieve the necessary flowrate. The psi will not change if more towers of the same height are included; however, the pump must be capable of delivering the necessary water at 38 psi. Multiple sprinkler heads should not be run in series.

Flow rates should be adjusted before application and checked during application using the pressure gauge. Run the pump at the desired pressure during the entire application. If the flow rate is too high or low, throttle the pump to the desired level until the correct pressure is achieved.

Testing has been done with up to four sprinkler-head spray systems running off one pump. Placement of more than four systems in a roost will require increasing the size of the pump or adding more pumps and increasing the water source.

Applying SLS to Roosting Birds

The following steps describe the application of SLS and water through a ground-based sprinkler-head spray system. Other application techniques (e.g., aerial, water cannon, or hand-held wand) have not been tested. These steps are in compliance with FIFRA 25(b) exemption requirements.

1. Ensure that the top of the stand pipe is higher than the top of the roosting vegetation to be sprayed. The system has been tested up to a height of 30 feet.
2. Build the system(s) in areas of the roost where they will be most effective in bird coverage and need minimum supply hose. The spray area for one nozzle is about 2,000 ft² (a 50-foot-diameter circle).
3. To build a single system, attach a sprinkler head to the end of a 10-foot section of 1-inch-diameter aluminum or steel pipe.
4. As the three sections of pipe are connected together with couplers, place a guy-wire plate above each coupler with three attachment points evenly spaced around the plate.
5. Make sure the base is a four-legged "pyramid"-style frame that supports the standpipe. The base should have a 90° elbow section of pipe welded in the center so that the upright standpipe can be coupled to the supply line (fig. 1).
6. Once you've assembled the sections on the ground and attached guy wires to the plate, have two people raise the tower by pulling on the guy wires while a third person supports the tower by hand (fig. 2). A 10-foot pole with a "Y" on the end can be helpful to raise the towers.
7. Secure guy wires at a 30° angle from the standpipe and attach them to rebar anchors driven into the ground about 18 inches.
8. Once you've built a system, move all equipment and personnel at least 200 feet away to avoid being sprayed by the SLS solution or disturbing the birds.
9. The pump is attached to the system using 1.5-inch rolled hose. If you use more than two systems, attach the supply line to a central system and branch out to all sprinkler systems. Do not run the supply line in series—this will reduce pressure to each successive sprinkler.
10. Attach a supply of water (at least 500 gallons of water per sprinkler head) to the pump with a 2-inch-diameter flexible hose. Water trailers containing 1,000 gallons or more work well and can be transported to the site. The recommended distance between the pump and sprinkler head is 400 feet.



Figure 1. SLS base



Figure 2. Positioning the SLS sprayer may require three or more people.



Figure 3. SLS pump

11. Connect a 1-inch-diameter supply line for the SLS to the pump. You can fit two supply lines to the pump with a "T" fitting with on/off valves on each side (fig. 3). All connections should be "quick-connect fittings" for ease of assembly and disassembly.
12. Test the sprinkler system before birds arrive at the roost to make sure it's working properly.

13. Close or slow down the system so water is barely running out of the top to avoid letting any air siphon back into the lines. Any noise during the spray procedure, such as air leaving the sprinkler head(s) or guy wires hitting the pipe, will cause birds to flush.
14. For best results, ambient air temperature should be below 41 °F at the time of application and immediately afterward. Do not spray when the wind exceeds 20 miles per hour; doing so will cause significant drift and incomplete coverage of the target area.
15. About 30 minutes after birds have settled into the roost, begin the spray operation.
16. Bring the system up to operating pressure slowly to reduce the amount of noise generated by air escaping the system.
17. Once the birds have become accustomed to the water, slowly introduce SLS into the system through the supply line. (**Note:** The SLS must remain heated above 70 °F before use. See suggestions on how to do this at right under “Storing SLS.”)
18. To inject SLS into the system, slowly open the SLS supply line so water can back-fill the line and expel any air.
19. Once the SLS supply line has been purged of air, slowly close the water supply line while keeping the SLS supply line completely open. During this part of the operation, if at any time you see birds flush or leave the roost, close the SLS supply line and open the water supply line. Only reintroduce the SLS after the birds have settled back down.
20. After injecting the SLS into the system, close the SLS supply line while opening the water supply line. In total, about 5 gallons of SLS should be sprayed per system.
21. Continue spraying until two-thirds of the birds are dead or dying or until the water runs out.
22. Do not disturb the birds during the spray operation. Observe the roost through binoculars from at least 200 feet away to ensure that the birds are not flushed from the roost.

Storing SLS

At a minimum, all containers of the SLS mixture must have a product label that lists the two ingredients and their weight concentration (% w/w), as well as the address and phone number of the company for which the product was produced. All storage facilities must have a current Safety Data Sheet for the SLS available. Follow the storage instructions indicated on the original SLS product's label.

Important: The SLS mixture solidifies at temperatures below 55 °F. **SLS must remain heated above 70 °F before and during use** to ensure proper flow throughout application. This can be accomplished by leaving SLS in a heated vehicle until injecting it into the system.

Evaluating Roost Mortality

After the spray operation, you must estimate roost mortality to fulfill requirements of the depredation order, State depredation permit, and/or the WS Management Information System and evaluate the operation's overall success. Data gathered should include the number and type of each species, total weight of birds collected, and the average weight per bird.

For More Information

National Wildlife Research Center
Wildlife Services
Animal and Plant Health Inspection Service
U.S. Department of Agriculture
4101 LaPorte Avenue
Fort Collins, CO 80521
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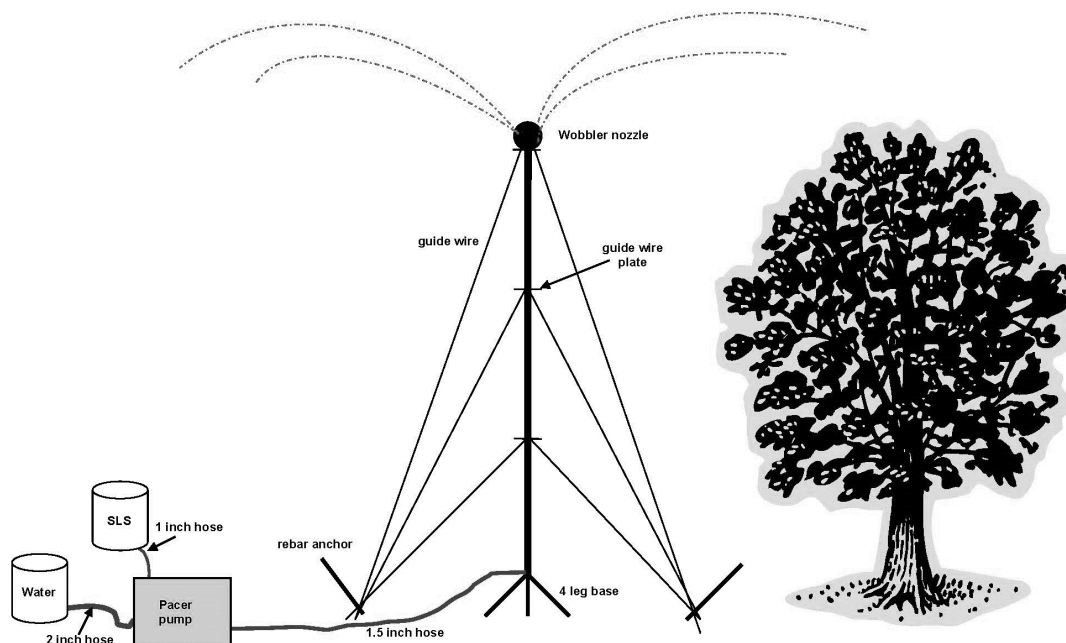
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This publication reports research involving pesticides. All uses of pesticides must be registered by appropriate State and/or Federal agencies before they can be recommended.

CAUTION: Pesticides can be injurious to humans, domestic animals, desirable plants, and fish or other wildlife—if they are not handled or applied properly. Use all pesticides selectively and carefully. Follow recommended practices for the disposal of surplus pesticides and pesticide containers.

Applicator's Checklist for Sodium Lauryl Sulfate

- Ensure that the take of birds is consistent with depredation orders, State and Federal permitting requirements, and/or other authorities.
- Contact the appropriate State regulatory agency to confirm that sodium lauryl sulfate (SLS) can be used in the State under a Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) Section 25(b) exemption. Not all States accept the U.S. Environmental Protection Agency (EPA) minimum-risk designation. You must submit a wetting-agent product label and, in some cases, efficacy data to each State that does not accept the EPA minimum-risk designation for SLS.
- Consult with appropriate Federal and State wildlife authorities to ensure that the use of SLS presents no hazard to threatened or endangered species.
- Discuss the proper use of personal protective equipment with workers before removing bird carcasses after application. Develop a plan for disposing of bird carcasses. Large roosts can result in several tons worth of carcasses (10,000 birds weigh about 1 ton).
- Carry printed copies of this tech note and the material data safety sheet (MSDS). These items must be in the possession of any individual applying SLS.
- Use SLS as described in this tech note in order to meet FIFRA Section 25(b) exemption requirements.
- Limit applications to upland areas where direct runoff will not enter permanent bodies of water. SLS is considered moderately toxic to aquatic organisms. It can also impact aquatic organisms, such as mosquitoes and water spiders, by lowering the surface tension of the water. There is some evidence that SLS is harmful to plants. Use care when applying it around ornamental plantings.
- Monitor the spray area before application to determine if nontarget species are present. Nontarget birds, such as American robins and cardinals, may be affected if they roost in the spray area.



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