Reduced Agent and Area Treatments (RAATs)

A schematic of an ATV-RAAT application with a 15 feet spray swath and 33% coverage.

Exceptions to the “Rules”

Higher rates and/or coverages may be needed if:

1. treatments are applied to late-instar nymphs (especially if using Dimilin® 2L),
2. ground temperatures exceed air temperatures,
3. grasshopper densities are extreme (e.g., >40 per square yard),
4. forage cover is tall and/or dense, or
5. terrain is rough.

In all cases, grasshopper management software (CARMA¹ or HOPPER²) should be used to assess program options. Always apply insecticides in accordance with label directions and established guidelines for buffers around water, bees, and human habitations.

¹For more information on RAATs or to download CARMA, visit www.wygisc.uwyo.edu/grasshopper/
²Available from the USDA-ARS Northern Plains Agricultural Research Laboratory at www.sidney.ars.usda.gov/grasshopper/Support/Hopper.htm

Operator Safety Equipment and Training

ATVs can be hazardous to operate. ATV-sprayers should only be operated by persons at least 18 years old. Always wear recommended safety equipment such as gloves, safety goggles, and a helmet. Be sure to take a training course on the safe operation of an ATV. Drive cautiously as fully-loaded spray tanks will add more than 200 pounds of weight that will affect the braking and handling characteristics of an ATV.

Carbaryl-Bran Application

Carbaryl-treated wheat bran is sometimes a good choice for grasshopper control because it is fairly target specific and it reduces the amount of insecticide introduced in the environment. The susceptibility to carbaryl bran of the predominant grasshopper species in the infestation must be determined, because not all grasshopper species will pick up treated bran flakes. Bait susceptibility information is available at http://www.sidney.ars.usda.gov/grasshopper/. Peacock Industries makes both systemic insecticide wheat bran and the Model 20 ATV-compatible applicator. More information can be found at www.grasshoppercontrol.com or by calling (306) 225-4691.

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Ground-Based spraying to control grasshopper infestations is not new, but it has been largely disregarded by pest managers for two reasons. First, blanketing thousands of infested acres using a spray rig is impractical. However, economically and rapidly treating moderately-sized “hot spots” (up to 640 acres) can prevent them from growing into serious outbreaks. Second, equipment and operators can’t stand the abuse when using traditional tractor or truck-mounted sprayers on rangeland. But now there is a viable alternative to these vehicles.

By combining RAATs and heavy-duty, 4-wheel drive All-Terrain Vehicles (ATVs), a way has been found to suppress incipient infestations. ATVs are widely used for applying herbicides in rough country, and these systems can be easily adapted to grasshopper control. By adapting strategies gleaned from eight years of aerial-RAAT research, grasshopper control for less than $1.00/acre protected is now possible.

What are RAATs?
RAATs are a method of integrated pest management (IPM) for rangeland grasshoppers in which the rate of insecticide is reduced from conventional levels and untreated swaths (refuges) are alternated with treated swaths. RAATs work through biological control, chemical control, and conservation biological control, which allows predators and parasites preserved in untreated swaths to recolonize and thereby reestablish natural regulation of grasshopper populations. For these reasons, RAAT programs may also allow for higher densities of birds than blanket applications.

Formulation, Rate, and Application Recommendations

Only emulsifiable concentrate formulations of carbaryl¹ (Sevin® XLR Plus), and diflubenzuron² (Dimilin® 2L) which are labeled for grasshopper control on rangeland are suitable for ATV-RAATS. The recommended minimum rates of these two products for ATV-RAATs are: 1 fluid ounce of Dimilin® 2L per treated acre and a minimum of 16 fluid ounces of Sevin® XLR Plus per treated acre. To ensure good coverage, these two products for ATV-RAATS are: 1 fluid ounce of Dimilin® 2L per treated acre and a minimum of 16 fluid ounces of Sevin® XLR Plus per treated acre. To ensure good coverage on the range vegetation and to increase efficacy, we recommend the addition of at least 8 ounces of oil adjuvant per treated acre. Crop oil concentrate by itself or a mixture of 1 part crop oil concentrate and 7 parts corn or canola oil work well as spray adjuvants. In the experimental plots, their inclusion has increased control by at least 10%. Always refer to current labels of both of these insecticides to ensure safe, effective control.

Coverage Recommendations

Test results indicate that the percent coverage should be approximately equal to the average number (density) of grasshoppers/square yard in the infestation, with a minimum of 33% coverage. For example, if there are 40 grasshoppers/square yard and the swath is 17 feet wide, the swath will need to be treated every 42.5 feet (17 feet ×0.4 = 42.5 feet) to get 40% coverage. For all but the most extreme grasshopper infestations, 50% coverage should be the maximum needed. To achieve uniformly spaced and treated swaths, use swath markers, a handheld or mounted geographic positioning system (GPS), compass headings, previous swath turns at the ends of swaths. For this latter method, to apply a swath every 42.5 feet, for