Slug Control Strategies Keep Pace With No-Till Trends

Advanced bait technology key to best practices, at-planting approach

The outlook for the grass seed market is favorable and many Oregon growers plan to make it even better by reaping the economic advantages of no-till growing practices. No-till agriculture offers significantly lower production inputs, which is especially important given higher fuel prices. But with no-till, comes higher populations of slugs and soil insects that impact stand and yield. The situation dictates the need to change slug control strategies and implement measures that incorporate the use of advanced slug bait technology.

Tillage trends and their impact

The need for grass seed growers to have better slug control strategies has increased with the expansion of conservation tillage practices. As they took hold in the late 1980s, the practices of reduced tillage, or directly seeding into the untilled roots, crowns and residue of the previous crop, have included different variations such as no-till, direct-seeding, and modified tilling methods.

It's not surprising that growers welcomed conservation tillage practices. Important factors driving these changes began with increasing grower and public concern about cropland soil loss by water and wind erosion. U.S. government policy followed by rewarding growers with economic subsidies for their conservation tillage practices. Added to the mix was increasing national and international competition in the global market, and the need to reduce costs and improve profitability: if you park the plow and don't till, you save on fuel, labor, equipment and other production input costs.

As noted in the study *Slug Populations in Grasses Grown for Seed*, however, a change of farming practices is often accompanied by a corresponding change in insect, mite and slug pests – their population structure and role as pests.[1]

The study reports that plowing and disking that takes place with conventional tillage method prior to planting helped keep slug damage in check two ways. One is by physically crushing slugs. The other is by destroying the cracks and work holes that slugs use to reach the seed furrow. No-till practices, however, increase post-harvest residues on the soil surface. The added benefits of water retention and moisture at the soil surface means that slugs are active earlier in the fall and longer in the spring.

In annual ryegrass seed production, no-till systems, using volunteer seedlings to establish a new fall crop, provide an early and excellent food source for slug populations. If slugs are not controlled at this time, they will move to the surviving plants left after most of the volunteers are sprayed out to establish the stand. Even if the food sources are removed to accommodate a direct-seeded crop, all subsequent feeding activity is shifted to the few plants that emerge.

Shallow tillage, as used to reduce erosion or to minimize weed seed germination, has also created problems because slug populations are not impacted below the shallow depth of cultivations. This allows underground slugs to quickly reach the seed furrow where they

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may feed for days in the furrow without the need to come to the soil surface. The slugs feed undetected under the soil surface, destroying the swelling seeds and young seedlings prior to emergence.

One author of the recent study advises that with no-till practices firmly entrenched, Oregon grass seed growers can expect heavy slug activity in the wet fall season.

"In September or October when the rainy pattern begins, slugs will start to appear and the population will increase," said Dr. Glenn C. Fisher, an extension specialist and professor at the Department of Crop & Soil Science, Oregon State University.

Slug damage.

Slug control strategies

The good news for growers is that slug control practices and products are rising to the challenges presented by conservation tillage systems.

Traditionally, methods of slug control in fall grass seed crops was accomplished by applying bait in a fertilizer blend that is broadcast applied at planting, or shortly afterward. This is a great time to reduce the slug population. As the weather becomes cool and wet, and the days shorten, slugs move to the soil surface, actively feed, mate and begin to lay eggs for the next six months or longer if the weather allows. Timely baiting in the fall greatly reduces the egg load and subsequent slug populations that would otherwise increase.[2]

A relatively new slug control practice and growing trend is to apply slug bait behind the seeds in the furrow using a second hopper that drops bait during seed planting. Doing so allows the bait to protect the seeds from underground slugs, which in turn maximizes germination and final yields. This practice should be particularly effective when many small slugs are present in the soil. This is particularly important since slugs prefer to stay at the bottom of seed furrows rather than travel back and forth to the soil surface in order to feed. Applying slug pellets at planting does not negate the need to subsequently apply bait via broadcast post-emergence. Slug bait is needed to control adult and young slugs that have escaped control at planting, and protect above-ground leaves.

"One-time baiting at-planting, whether in-furrow or broadcast applied on-furrow, seldom provides adequate seedling protection from slugs," Dr. Fisher said. "One or two follow-up applications may be necessary when pressure is great and environmental conditions have been too cold, wet or windy for optimum slug control."

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Oregon State University's Department of Crop & Soil Science conducted field trials during 2005 and 2006 to substantiate the benefits of proper timing, placement and rates of baits measured by seedling stand increase, protection from injury, and increased seed yield or protection.

Even with effective pre-planting and at-planting baiting, subsequent post-emergent broadcast baiting is still required. Post-emergent slug baiting is timed to kill the slugs that are breaking the summer dormancy and working their way to the new crop after the effects of the first baiting have diminished. Subsequent post-emergent broadcast applications also help growers counter the effects of bait loss from heavy rains and standing water that may have reduced the efficiency of the earlier slug bait applications.

Second hopper box for slug bait.

Nozzle assembly.

"It doesn't clog, which enables us to apply slug bait at-planting, and it gives growers a better opportunity for success. We applied Metarex to several thousand acres with good results last season, and our plan this year is to use more of it with a keen emphasis on an at-planting approach."

Mike Kelsing,
SureCrop Farm Service

At-planting success hinges on advanced bait technology

A key factor in the success of slug control at-planting hinges on the efficacy of the slug bait. When applied at-planting, the use of a technologically advanced bait pellet that can withstand weathering is recommended. This is because the rainy, wet and moist soil conditions – ideal for seed germination and grass establishment – are also ideal for slugs.

Conventional slug pellets, which are manufactured with the older dry or steam processes, are hygroscopic – meaning they tend to absorb moisture and swell. As such, this often causes problems when the pellets are applied at-planting. Problems occur with seed drills, which typically employ dual bins, with a smaller bin serving as the hopper for slug bait pellets. The outlets for these bins are small gate openings connected to a flex tube about one-inch in diameter. As hygroscopic baits swell, they clog these gate openings and also the seed tube nozzles. The pellet flow is interrupted and the amount discharged is reduced. This can happen without the grower knowing; or it can require the grower to keep cleaning out the gate opening to ensure the right amount of slug bait is discharged.

Another problem, often associated with conventional pellets, has to do with overall efficacy in wet conditions. Specifically, the conventional pellets typically allow the active control ingredient to separate from the bait or carrier, so it can be easily washed away, reducing effectiveness.

A new, more advanced technology is a homogenized pellet developed using a wet manufacturing process that includes Metarex® slug bait. With the new technology, the slug controlling ingredients are evenly dispersed throughout each pellet for maximum control. Additionally, Metarex employs a patented wet manufacturing process similar to the production of pasta or spaghetti to create dense, shorter, and more uniform slug bait pellets that resist the absorption of moisture from rain and irrigation. These pellets often reharden after drying out, retaining their shape and continuing to provide protection – unlike other baits that may break down more quickly. Because the Metarex pellets resist moisture, they won't clog gate openings in the drill's planter boxes. This helps ensure that growers can apply the slug bait at the correct rate for slug control, and saves the growers from having to clean out clogged gates and drill nozzles.

Mike Kelsing, senior fieldman for SureCrop Farm Service, has used Metarex and confirms its at-planting benefits. "It doesn't clog, which enables us to apply slug bait at-planting, and it gives growers a better opportunity for success. We applied Metarex to several thousand acres with good results last season, and our plan this year is to use more of it with a keen emphasis on an at-planting approach."

Additional slug bait considerations

The characteristics of slug bait also play an instrumental role in the success of traditional control methods, such as blending with fertilizer. To blend well with fertilizer, slug bait needs to have an optimum density. Metarex has a bulk density (49 lbs. / ft^3) similar to urea, a common nitrogen fertilizer source. This allows Metarex pellets to mix easily with, and stay properly distributed throughout, the fertilizer. This is due because the uniform, highly-flowable pellets are produced according to strict quality control standards, with 96+% of Metarex pellets manufactured to within a 0.1 mm size tolerance.

With a smaller diameter and a shorter length than conventional slug baits, Metarex provides more baiting points than competitive baits at the same weight. More baiting points means slugs have to travel less to reach the bait, especially less-mobile juvenile slugs. And, more acreage is protected per 50-lb. bag, meaning fewer passes and fewer trips back to the storage shed. In fact, Metarex provides 35,000 baiting points per pound, versus an average of 18,000 per pound for other baits.

The uniformity of Metarex pellets also greatly minimizes dust in both the fertilizer blending and bait broadcast processes. Unlike conventional hygroscopic slug baits, the pellets do not break apart when hitting the spinner plates of broadcast spreaders. Instead, the homogenous pellets spin out with a more even distribution. As a result, there is less equipment clean-up after broadcast.

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Another advantage of the more dense and uniform Metarex pellet is improved dispersion in broadcast applications. Metarex can be broadcast from 40 to 60 feet with consistent coverage, while competitive pellets broadcast only 30 feet using similar equipment due to their poor integrity and shattering from the impact of the spinner plates. More effective broadcast means fewer passes over the field, less fuel expense and less labor.

Important for growers seeking to control production costs, as well as slugs, the sum total of these spreader-friendly qualities is a savings on slug bait of approximately four percent: about one percent due to zero loss in the bag, plus three percent due to less disintegration at blending/broadcast.

When choosing slug bait, it's also important to consider palatability and packaging. Metarex uses food-grade ingredients that appeal to slugs. Unlike competitive pellets, the 4 percent metaldehyde found in Metarex is blended homogeneously throughout the pellet, leading to earlier feeding and faster control. In laboratory trials using 100 Petri dishes each of carrots with Metarex and lettuce with Metarex, slugs fed on Metarex three to one versus the vegetables. In addition to standard, 50-lb. bags, Metarex is also available in 2,000-lb. totes. These innovative, gusseted totes hold their shape on shipping pallets, so they are easier to move around a storage facility, and less likely to be accidentally damaged.

Joe Cacka, an agronomist with CPS - Crop Production Service, Cascade Division, has seen the benefits of Metarex to grass seed growers first-hand. "In our trials, we were seeing significantly less slug occurrence in as much as 28 days after treatment. The slug population was down at that time and control was very good."

"We're also seeing less dust with Metarex. Because of its smaller pellet size, we're getting better distribution over the ground surface. Slugs are more likely to come in contact with it, and we're getting more effective control. Our plan is to increase use of Metarex if we have our typical wet conditions this fall and winter," Cacka said.

Application recommendations

To provide the most effective slug control for direct-seeded stands this fall, the recommended strategies and application intervals for Metarex are:

- Pre-plant broadcast application of baits applied one or two weeks prior to planting. This can be alone or blended with fertilizer when early fall rains have stimulated visible slug activity prior to planting.
- In-furrow planter box, and/or on-furrow, broadcast application of baits at seeding.
- Follow-up, post-seedling emergence broadcast applications as needed.

The minimum recommended application rate for all methods is five pounds per acre at each interval.

Because it holds up better and longer, timing the application of Metarex is less critical than competitive baits. If growers need to delay planting due to weather for example, the pre-planting application of Metarex will be there working for them. The post-emergent application of Metarex should take place when the first true leaves appear, or certainly as soon as slug feeding is noticed.

Besides application timing and intervals, the final component critical to proper slug control is the application rate used. Because of reduced-rate technology, which gives it more baiting points and longer field life, Metarex can often be used at much lower rates. It can be applied at rates of five to seven pounds per acre, which is 50 to 65 percent of the rate required for conventional, dry process metaldehyde baits (that require rates of 10 lbs. per acre or more for comparable efficacy).

Reduced-rate technology creates the need to ensure gate openings of broadcast spreaders can be adjusted down far enough to achieve the lower rates. Spot-treating with ATVs and broadcast spinners at lower application rates, but increased baiting points, will also benefit growers since they will need to make fewer trips to the barn to load slug bait.

Gaining control, taking advantage

No-till growing practices, and the associated high slug pressure, require the use of innovative strategies to successfully control these defiant pests. Fortunately for growers, advanced slug bait technology is now available for controlling slugs at-planting by placing bait in the seed furrow, as well as during the more customary pre-planting and post-emergence broadcast applications.

According to Dr. Fisher, "Growers need to start early – before, or at the very least, at-planting to get ahead of slug pressure in no-till."

Following these guidelines increases the likelihood of successful slug control – while also allowing growers to capitalize on the economic and environmental benefits that no-till practices offer.

For more information about Metarex slug control solutions, and to find a dealer near you, call (888) 331-7900 or visit www.liphatech.com.

References

1. G.C. Fisher, J.T. DeFrancesco and R.N. Horton, "Slug Populations in Grasses Grown for Seed," Oregon State University (USDA-ARS Cooperating) 1997.
2. G.C. Fisher and J.J. Steiner, "Slug Observations In Different Grass Seed Cropping Systems," Oregon State University (USDA-ARS Cooperating) 1994.

Additional contributors include SureCrop Farm Service, Junction City, Oregon, and CPS - Crop Production Service, Cascade Division, Tangent, Oregon.