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NEBRASKA

POTATO EYES

Vol. 13, Issue 1, Spring 2001 • Alexander D. Pavlista, Extension Potato Specialist

Admire or Gaucho?

Section 24(c)

As you should already know the Pesticide Board of Nebraska approved a Section 24(c) for TOPS MZ Gaucho seed treatment in February. Tops MZ Gaucho potato seed-piece treatment is a combination of the seed piece treatment TOPS MZ, already registered under Section 3, and imidacloprid, the active ingredient in Admire and Provado. Admire, a liquid furrow treatment, and Provado, a foliar spray, are already registered under Section 3.

The key advantages of the Tops MZ Gaucho over the furrow and foliar applications of imidacloprid are: Application is directly to seed piece as part of the normal dusting procedure. Special liquid-application, planting equipment would not be needed. Foliar insecticide treatments would be eliminated or at least greatly reduced. The expense of foliar applications would be saved. Several other advantages are: greater safety to beneficial insects, broad spectrum anti-fungal and anti-insect activity on seed, and lack of influence by weather on treatment time.

Efficacies

The first question is does imidacloprid in a seed dust with fungicides (TOPS MZ Gaucho) work. The following tables summarize data that I submitted in support of the Section 24(c) on comparative activities on three insects: Colorado potato beetles (CPB), green peach aphids (GPA), potato leaf hopper (PLH) and potato psyllids (PP). Table 1 gives data from the Univ. of Minnesota collected on CPB, GPA and PLH last year. Table 2 gives data from the Univ. of Wisconsin collected on CPB last year. And, Table 3 gives data at the Panhandle REC at Scottsbluff on PP damage control this past year. Trial data obtained in 1998 and 1999 in Idaho (Dr. R. Stoltz), in Washington (Qualls Ag Labs) and in Wisconsin (Dr. J. Wyman) were similar and showed no difference between TOPS MZ Gaucho seed-piece treatment and Admire liquid in-furrow application.

Economics

Is it worth it? Note the advantages listed above: no liquid spray equipment and no dependency on weather conditions at planting. All costs given are suggested retail prices (SRP); actual costs depends on bulk discounts etc. The SRP for TOPS MZ Gaucho is $5.92 per pound. If one applied the labeled rate of 12 oz/cwt, the cost is $4.44, and if one plants 20 cwt per acre (2 oz seed-pieces planted 11 in apart in 3 ft rows), then the cost is $88.80. If one were to apply the components separately, the SRP for TOPS MZ is $2.08/lb and for Admire is $544/gal. Applying 12 oz dust/cwt would cost $1.56/cwt or $31.20 for 20 cwt/a. Applying the furrow treatment of Admire at 1.3 fl oz/1000 linear feet (1.18 pt/a) amounts to $79.90. Add the two and one gets $111.10 compared to $88.80 and a savings of $22.30/acre not including liquid application costs.

Table 1. Effect of Tops MZ Gaucho on several insects, Univ Minnesota, 2000. [Drs. D. Ragsdale, E. Radcliffe and J. Munyaneza]. Trial was planted 5/19/00 with the variety Cascade. TOPS MZ Gaucho was applied at 12 oz/cwt. Untreated is Maxim only.

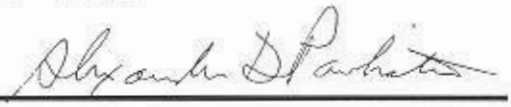
a. Number of CPB larvae per plant (8/8):
   untreated = 15.4
   Tops MZ Gaucho = 4.8
b. Percent defoliation by CPB (8/25):
   untreated = 74%
   Tops MZ Gaucho = 38%
c. Number of GPA per 35 leaves (8/9):
   untreated = 28
   Tops MZ Gaucho = 17
d. Number of PLH nymphs per 35 leaves (8/1):
   untreated = 73
   Tops MZ Gaucho = 38
e. Total yield from CPB and PLH plots (9/26):
   untreated = 330 cwt/a
   Tops MZ Gaucho = 432 cwt/a

Table 2. Effect of Tops MZ Gaucho on CPB, Univ. Wisconsin, 2000. [Dr. J. Wyman]. TOPS MZ Gaucho was applied at 12 oz/cwt. Variety planted was Russet Burbank.

a. Number of CPB larvae per 10 plants (6/23):
   untreated = 140
   Tops MZ Gaucho = 4
a. Number of CPB larvae per 10 plants (6/28):
   untreated = 325
   Tops MZ Gaucho = 11
b. Number of CPB adults per 10 plants (7/19):
   untreated = 133
   Tops MZ Gaucho = 12
c. Percent defoliation (8/3):
   untreated = 90%
   tops MZ Gaucho = 10%

Table 3. Effect of Tops MZ Gaucho on PP damage, Univ. Nebraska, 2000. [Dr. A. Pavlista]. Trial was planted 5/18/00 with the variety Atlantic. TOPS MZ Gaucho was applied at 16 oz/cwt and Admire 2F at 1.3 fl oz/1000 ft. Untreated was TOPS MZ at 16 oz/cwt only.

a. Percent plants with PP damage (8/23):
   Tops MZ = 10.4
   Tops MZ Gaucho = 0.7
   Tops MZ + Admire = 1.0
b. Yield of >1 inch tubers:
   Tops MZ = 425 cwt/a
   Tops MZ Gaucho = 496 cwt/a
   Tops MZ + Admire = 461 cwt/a



Inside this issue...

Check out the Nebraska Potato Eyes on the WWW at:
http://www.panhandle.unl.edu/peyes.htm

Admire for Wireworm?

The Admire label as a furrow treatment does not list wireworm and the Genesis liquid seed treatment, a flowable formulation of Admire applied directly to seed-pieces, lists protection only of the seed-piece against wireworm. Genesis when used at the high-end rate, based on 10 inch planting, is about the same amount of imidacloprid as in Admire.

The question arises can Admire be used to keep harvested tubers from being affected by wireworm. Is it as affective as Thimet/Phorate? After several discussions and obtaining data from Idaho and Oregon, here's what is known so far unofficially.

Idaho Research (Dr. Craig Baird)

When Admire was applied in the furrow in a 7-8 inch band with a planter, it controlled wireworm on harvested tubers about like Thimet (Table 1). It did not matter whether the application was before or after seed drop. The checks had 25-40% damage while the Admire-treated had 3-6%. Admire did not work against wireworm when applied broadcast and tilled in nor when applied through the center-pivot irrigation.

In one trial, Admire showed a rate response with 1.3 fl oz/1000 ft being significantly better than 0.8 and 1.04 fl oz/1000' and no significant difference between the two lower rates.

Side-dressing after emergence lowered wireworm damage compared to checks but was significantly poorer than an in-furrow at planting application. Table 2 combines the data from several trials extracting and averaging both Admire and Thimet treatment, and analyzing side-dress versus in-furrow.

Oregon Research (Dr. Gary Read)

In contrast to Idaho, data from Oregon did not show control of wireworm. Admire was applied below the furrow, as a "sub-seed piece" treatment, in a seven inch band. There was no effect on wireworm damage in harvested tubers.

The explanation given for the Oregon data being opposite that of Idaho was that Idaho has predominanatly sugar beet wireworm. Oregon soils are still contaminated with chlorohydrocarbons (Clordane etc.) that affect wireworm. Climatic conditions and soil texture are different.

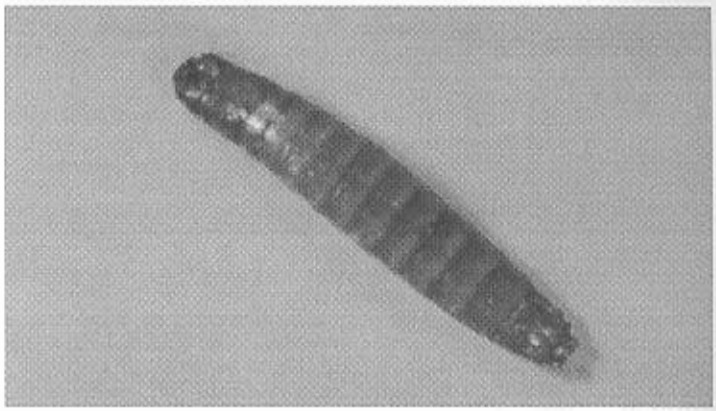
Nebraska Research (Dr. A.D. Pavlista)

A trial was conducted on Admire 4F and wireworm control in 1995 (Table 3). Admire was applied in-furrow, in an 8-inch band, placed below seed pieces, that is sprayed before seed drop. The rate was 1.3 fl oz/1000 ft. The variety was Krantz and trial location was south of North Platte.

Summary

The answer to the question is maybe. It would be wise to first try Admire in a part of a field. Compare Admire next to Thimet, and bait for wireworms to determine the pressure.

For baiting, Gary Read suggested that early in the season, get carrots from the grocery store and put them in the ground, roots down with the tops showing. It's best done when soil temperature is above 45F. It would be advisable to put some black plastic around the carrot. After 10 days, maybe sooner, pull up the carrots and look for wireworm holes. This has never been quantified so no threshold or other information is known. But, it is a quick way to see if wireworms are in the field.



Some other odds and ends of note about Admire are:

- Soil temperature does not seem to affect Admire activity nor its uptake.
- Placement of Admire is key. It must be near the seed-piece for early and rapid uptake.
- Admire does not affect the potato eyes and sprouting.
- Admire can be applied as a band over the seed-pieces after drop.
- The active ingredient is now available in a seed dust, TOPS MZ Gaucho.

Table 1. Idaho Data summary comparing Admire and Thimet.
Thimet 20G was applied at 11.3 oz/1000 ft in-furrow.
Admire 2F was applied at 1.3 fl oz/1000 ft in-furrow.
[Means of Trials conducted in 1997, 1998 and 1999]

Treatment	% tubers with wireworm
check	19.2%
Thimet 20G	7.2%
Admire 2F	5.6%

Table 2. Idaho Data Summary comparing applications:

application timing	% tubers with wireworm
side-dress	11.3 % (7 trials)
in-furrow	6.5 % (10 trials)

Table 3. Nebraska Trial on Krantz in 1995.

	% Tubers with No Holes	% Tubers with Five or More Holes
check	9	73
Admire	23	48

PAA meeting

The 85th annual meeting of the Potato Assn. Amer. will be from April 22 to 26 this year and will be held at the World Golf Village in St. Augustine, Florida. The meeting is being hosted by the Univ. of Florida - Hastings Res. & Educ. Ctr. For information etc., contact the IFAS Office of Conferences at (532) 392-5930 or fax at -9734.

Ridomil: At Planting or Foliar?

In 2000, Ridomil EC received registration for use in potato. This formulation is designed for application in the furrow at planting. Pink rot (*Phytophthora erythroseptica*) is a recurring problem, in part with the rise of blight infestations. Pythium leak (*Pythium* spp.) is also a problem at many sites. Losses due to these two pathogens may run as high as 25% when no Ridomil (metalaxyl) application are made, especially when late summer is unusually warm and wet.

Uptake

Metalaxyl's (Ridomil by Syngenta, formerly Novartis) primary mode of uptake is through the roots; stem and leaf uptake are secondary and less efficient. Upon uptake, it translocates to the tubers where Ridomil protects the tubers from pink rot and leak. Currently, Ridomil (MZ) is fully registered as a foliar application requiring higher residues on the plant for effective disease control. Furthermore, full-field exposure is needed with a foliar application while a banded application at planting would expose one-quarter of the ground. Environmentally, application at planting would be much safer than the current foliar application; Ridomil would be placed locally in a smaller area where it would do the most good with more efficient uptake by the plant.

Resistance Management

Pink rot resistance to Ridomil had been reported on a few samples in a nationwide survey. In 1994, pathologists at the U. Maine identified several pink rot isolates with resistance. In 1997, pathologists at No. Dakota St. U. also identified several pink rot isolates demonstrating an intermediate level of insensitivity. At-planting application of Ridomil would minimize the exposure of high population of pink rot to metalaxyl since only a banded portion of the soil would be treated and not the entire acre. At planting application would also not interfere with blight control programs.

Efficacies

An important disadvantage of foliar application is that, if plants are experiencing any form of stress, their ability to take up metalaxyl is extremely limited. This will make protection less effective (Table 1). In field trials with inoculated tubers, a complete loss without Ridomil treatment has been shown and a single, banded, soil treatment (EC) works as well as several foliar treatments (MZ).

Economics

Two foliar applications of Ridomil Gold MZ at 2.5 lb/acre (labeled rate) would cost to growers $52.50/acre based on $10.50/lb. Ridomil Gold EC at 0.42 fl oz/1000 linear feet applied into the furrow would cost $31.44/acre based on $660/gal. Although Ridomil Gold GR is not available to potato growers here, based on the Australian label, the cost for use would be about $99/acre based on $5.50/lb.

Conclusion

Ridomil Gold (metalaxyl) is the only material which provides protection against both field infection by pink rot and leak, and spread of infection in storage. Resistance has been detected in pink rot and to maintain viable control of it, an insensitivity management strategy is needed. The key to this is to avoid curative use, foliar application and use a more preventative approach. Prevention is best by applying the material at planting when the soil population is at its lowest. Environmentally, this application would also involve less ground exposure and greater plant uptake. Data indicate that application in-furrow at-planting is as effective as two foliar applications of Ridomil and it is less costly than the recommended foliar applications.

Table 1. Comparative effects on tuber pink rot when plant is stressed. [Field tubers were inoculated with pink rot. Foliar treatments were applied when plants were stressed.]

Treatment & Application	Percent Tuber with Pink Rot
Protectants Program, Foliar	53%
Ridomil Gold MZ Twice, Foliar	45%
Ridomil Gold EC In-Furrow	8%

In a recently published article on research conducted in Australia (Wicks et al., AJPR 77:233-240. 2000), application of Ridomil GR (granules) in the furrow at planting was compared to two and three applications of Ridomil Gold MZ to the foliage after tuber initiation. Note Ridomil GR is not registered in the USA. The authors conclusion based on two greenhouse and three field comparisons was that there was no difference in pink rot on harvested tubers between in-furrow and foliar applications (Table 2). Ridomil Gold GR was applied in-furrow below and next to seed-pieces at planting. They also detected no significant difference in pink rot incidence between foliar applications of Ridomil Gold MZ at 1.12 and 2.23 (Table 3).

Table 2. Naturally-infested field trials on 'Red LaSoda'

	Percent by Wt. Tubers with Pink Rot	
	1997/98	1998/99
check	5.3	21.1
Ridomil Gold MZ @ 2.23 #/a	--	4.5 [a]
Ridomil Gold MZ @ 4.46 #/a	2.4 [b]	--
Ridomil Gold GR @ 17.8 #/a	0.7 [c]	0 [c]

[a] applied twice at 39 and 55 d post-plant
[b] applied thrice at 40, 54 and 68 d post-plant
[c] applied in-furrow below and aside the seed-piece

Table 3. Naturally-infested field trials on foliar application rates.

	Percent Tubers with Pink Rot	
	Rus. Burbank	Kennebec
check	11.1	9.6
Ridomil Gold MZ @ 1.12 #/a	1.8 [a]	2.1 [b]
Ridomil Gold MZ @ 2.23 #/a	0.9 [a]	0.3 [b]

[a] applied twice at 44 and 56 d post-plant
[b] applied twice at 39 and 51 d post-plant

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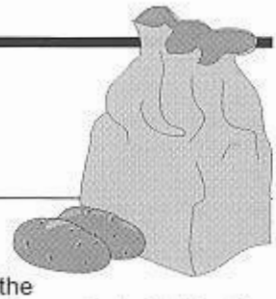

Fuel Saving with Tractors

As high fuel costs drive up agricultural production costs, many growers are looking for ways to save on fuel. A technique for operating tractors, known as "gear up and throttle down," may help reduce tractor operating costs. This practice requires 15 percent to 25 percent less energy than operating tractors at full power according to Dr. Bobby Grisso, a University of Nebraska agricultural engineer. The practice is effective for light operations that don't require full power. For these tasks, producers save fuel by shifting to a faster gear and slowing the engine speed.

Tests conducted by the University of Nebraska's Tractor Test Lab showed that a 110-PTO horsepower tractor pulling 50 percent of its maximum drawbar load at full throttle used 4.5 gallons of fuel per hour. [PTO horsepower is the amount of power a tractor's power take-off delivers.] That same tractor pulling 50 percent at a reduced throttle setting used only 3.7 gallons of fuel per hour, a savings of three-fourths of a gallon per hour. With home-delivery fuel prices at $1.09, producers can save $7.36 in a nine-hour work day.

Grisso said the practice shouldn't be used when the power take-off is operating. The power take-off will run correspondingly slower when the engine speed decreases and may not provide enough power to properly run PTO-driven equipment. Gearing up and throttling down also can damage the engine by creating too much torque.

Operators also should avoid overloading or "lugging" the engine. To check for overload, run the tractor using the desired speed and throttle setting. Open the engine to full throttle. If the engine rapidly picks up speed, the setting is appropriate; a slow response or black smoke indicates a problem. To resolve the problem, operators should shift down a gear or increase the engine's speed.

Gearing up and throttling down isn't the only way to save fuel this spring, Grisso said. To conserve fuel, Grisso recommended the following:

- Avoid unnecessary tillage.
- Combine operations, such as spraying and planting.
- Keep machinery well-maintained.
- Remove extra ballast for light loads to reduce rolling resistence.

For more information, consult NU Cooperative Extension NebGuide G96-1296-A, "Gear Up and Throttle Down — Saving Fuel," available at local cooperative extension offices or online at the extension publications' website: http://www.ianr.unl.edu/pubs/farmpower/g1296.htm.

[taken from press release authored by Bobby Grisso, Ph.D., professor of biological systems engineering, at (402)472-6714.