Technical Information Bulletin

SOLAN™ MZ

Potato ST Fungicide - Potato Seed-Piece Treatment

In This Issue

1. Summary

SOLAN MZ is a new potato seed-piece treatment with a new carrier system containing proprietary inerts. The new carrier system helps in drying and contains no bark, so it is not irritating. *SOLAN MZ* controls Fusarium Dry Rot. Fusarium Dry Rot, which leads to seed-piece decay, causes potato stand reduction. Cutting the seed prior to planting increases the potential for transmission of infection. Using *SOLAN MZ* has resulted in overall increases in yield by giving excellent early season protection against Fusarium Dry Rot and by protecting potato seed-pieces in cold, wet soils.

2. Introduction

To produce a high-yielding, high-quality crop, you must start with high-quality seed. Plant only certified seed from a seed supplier with a proven history of quality. Pay particular attention to the condition of the seed when it arrives at the farm. The seed should not have tubers with symptoms of Fusarium Dry Rot. Remember that the condition of the seed piece at planting time is an important aspect of a successful harvest. *SOLAN MZ* is applied once the seed is cut and prior to planting. The fungicide, MANCOZEB, in *SOLAN MZ* is effective in protecting the spread of Fusarium Dry Rot to other seed-pieces. *SOLAN MZ* is easy to apply and will give a uniform coverage of the seed-piece. It will dry the seed-piece quickly and effectively, allowing for easier planting with less buildup of residues in the planter and less down time. Trials have shown that *SOLAN MZ* gives effective protection against seed-piece decay, leading to better stand and higher yields.

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3. Formulation

SOLAN MZ is a dry powder based product containing 16% MANCOZEB and a new carrier system with proprietary inerts containing no bark. There is no irritation compared to other MANCOZEB products.

4. Mode of Action

4.1 MANCOZEB

MANCOZEB is an ethylene bisdithio-carbamate fungicide (EBDC) that interrupts fungus cell development at six sites. The multi-site characteristic of MANCOZEB is an important feature in disease resistance management.

4.2 Suberization

Suberization is a deposit of suberin on a cut surface and within cell walls below the cut surface. When seed-pieces are cut, moisture is drawn to the surface of the "wound". This is the start of the suberization or healing process. This occurs in three stages:

1. Formation of the scar
2. Suberization of cells directly below the temporary scar layer
3. Cell activity continues to complete healing of the wound

During the initial stage of healing, the cut surface is open to the entry of disease pathogens. The combination of proprietary inerts and the fungicide, MANCOZEB, enhances the wound healing process, provides a rapid and uniform restoration of the cut surface and helps prevent the penetration of pathogens in the seed-piece.

4.3 Drying of the Seed-Piece

SOLAN MZ uniformly covers the cut surfaces and keeps the seed-piece dry, allowing for better protection. Treated seed-pieces flow smoothly through the planter and decrease machine gum-up. Farmers can plant quicker and easier with less down time and fewer skips in the field, leading to a more uniform plant stand and higher yields.

5. Fusarium Dry Rot

5.1 Fusarium Seed-Piece Decay

Controlling seed-piece decay is a perennial problem and severity can vary from year to year depending on variety, seed lot, seed condition, seed handling, the presence of bacteria and the fungal pathogen Fusarium Dry Rot. The speed of bacterial multiplication can destroy tubers in a matter of days, resulting in severe stand reductions. Good sanitation practices are essential in minimizing bacterial infection.

Fusarium Dry Rot, although slower in development, will destroy seed, weaken plants and enhance bacterial decays by triggering multiplication of the bacteria. Fusarium fungi are common in most soils where potatoes are planted. The disease produces light brown to dark brown lesions. Most infections occur as the fungus enters the tuber through the wound.

5.2 Fusarium Symptoms

Fusarium Dry Rot (Fusarium spp) can show up in potatoes with both external and internal symptoms. External symptoms show shrinking and shriveling of lesions. Internal symptoms show light to dark brown dry rot with mycelium-filled cavities.

External Symptoms – shrinking and shrivelling of lesions

Photo courtesy of Dr. R. Peters, AAFC, Charlottetown, PEI, Canada

5.3 The Causal Agent of Fusarium

The causal agent of Fusarium Dry Rot is the fungus Fusarium spp. Fusarium can be soil-borne and can infest soil, where the pathogen survives for many years. Fusarium can also survive as seed-borne inoculum, where the pathogen contaminates potato seed tubers.

Fusarium sambucinum under a microscope

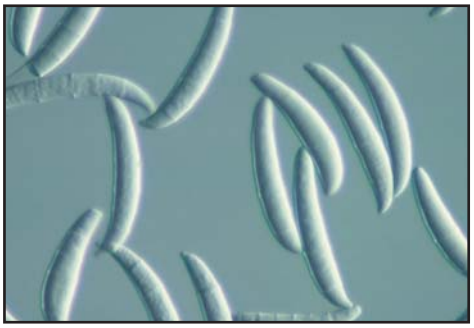

Photo courtesy of Randy Clear, Mycologist, Grain Research Laboratory, CGC, Winnipeg, MB, Canada

5.4 Fusarium – How it Spreads

Fusarium inoculum is spread during seed cutting, handling and planting. This results in misses in the field as well as reduced stem number and plant vigour. Infected seed tubers will infest the surrounding soil. Infection occurs only through wounds in the potato seed tuber.

Internal Symptoms – light to dark brown dry rot with mycelium-filled cavities

Photo courtesy of Dr. R. Peters, AAFC, Charlottetown, PEI, Canada

5.5 Fusarium Dry Rot in Storage

Fusarium Dry Rot can infect potatoes in storage. Inoculum is present in infested soil adhering to tubers and contaminated equipment. The harvesting and handling operation before potatoes go into storage can injure potatoes. Infection occurs only through wounds.

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Fusarium Dry Rot on the Seed Tuber

Photo courtesy of Dr. Tharcisse Barasubiye, Biologist, AAFC, Ottawa, Ontario, Canada

5.6 Fusarium Species

There are several Fusarium species that can affect potatoes, including Fusarium sambucinum, Fusarium coeruleum and Fusarium avenaceum. Other Fusarium species that are found in crops such as cereal crops and forages can also affect potatoes. *SOLAN MZ* will control Fusarium Dry Rot caused by any of these Fusarium species including Fusarium sambucinum, Fusarium coeruleum, Fusarium avenaceum and many other Fusarium species. Fusarium sambucinum, which has shown resistance to other potato seed-piece treatments is controlled by *SOLAN MZ*. See field results (at right).

Photo courtesy of Brendel Farms, P.E.I., Canada

Photo courtesy of Brendel Farms, P.E.I., Canada

6. Disease Management

6.1 At Planting

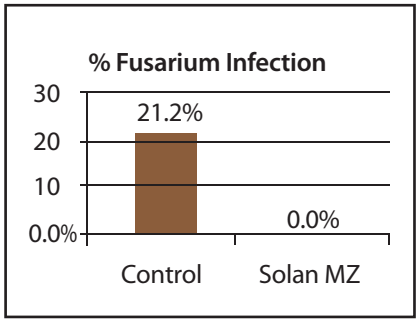
1. Use clean seed; store in a disinfected facility.
2. Warm seed tubers to approximately 7° C (45°F) prior to cutting to promote rapid healing.
3. Remove diseased tubers prior to cutting.
4. Disinfect seed cutting and handling equipment between seed lots and ensure that cutters are sharp to make a clean cut that heals quickly.
5. Don't store treated and cut seed for too long.
6. Use a registered fungicide seed treatment such as *SOLAN MZ*, but follow a resistance management strategy.
7. Test your seed source for Fusarium if possible.
8. Plant when soil and temperature conditions promote rapid sprout growth and emergence.

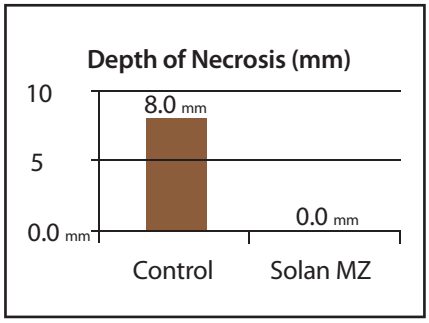
6.2 At Harvest & in Storage

1. Reduce tuber injury during harvest and handling operations.
2. Provide conditions for rapid wound healing early in storage, then drop temperatures.
3. Monitor storage conditions.

7. Research Trials

Canadian research trials indicated that seed-piece decay is a major cause of reduced vigour, stand and yield. *SOLAN MZ* provided excellent disease control and yield when tested under Fusarium treated plots and showed no resistance to Fusarium.





P.E.I Dr. R. Peters, AAFC, Charlottetown PEI, Canada

The depth of Fusarium infection (necrosis) is important since the deeper the infection gets into the potato seed tuber, the less healthy the plant will be. In these trials the *SOLAN MZ* treated potatoes showed excellent plant health with no necrosis as the Fusarium Dry Rot was controlled.

8. Application

ALWAYS FOLLOW LABEL DIRECTIONS WHEN APPLYING *SOLAN MZ*.

Apply *SOLAN MZ* at the rate of 500 g per 100 kg of seed. Thoroughly coat the surface of whole or cut seed-pieces with dust. If treated whole seed is cut, make a second application to protect the cut surfaces. Plant as soon as possible after treating. However, if planting of cut seed is delayed beyond 2 days after treating, seed should be stored in open crates to allow air drying until dry before bagging or loose piling.

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It is important to remember that rot develops in tubers most frequently under conditions of oxygen depletion. Prolonged storage from cutting to planting at warmer temperatures and without proper ventilation will enhance bacterial decays by triggering multiplication of the bacteria, resulting in poor plant stand.

9. Safety and Precautions

Store product in a cool, dry, ventilated place. Do not allow product to become wet or overheated during storage as chemical changes may occur which impairs fungicidal effectiveness and may generate flammable vapours. May irritate eyes, nose, throat and skin. Avoid contact with skin, eyes or clothing. Wash thoroughly after handling and before eating, drinking or smoking. When treating or handling treated seed, work in a well-ventilated area and wear a suitable dust mask, goggles and gloves. Do not contaminate food or feed. Do not store near food or feed. Do not contaminate any body of water. Treated seed should be labeled **"POISONOUS TO MAN AND ANIMALS. This seed has been treated with MANCOZEB for the control of fusarium decay. Do not use for food or feed purposes."**

FEATURE	ADVANTAGE	BENEFIT
Proven fungicide	Prevents Fusarium Dry Rot Infections	Effective disease protection
Multi-site fungicide, MANCOZEB	No resistance	Important resistance management tool
Proprietary Inert System	Not irritating	Better to work with
Dries seed-pieces quickly	Reduced moisture	Minimized risk of secondary bacterial infection
More uniform coverage	Better protection of the seed-piece	Better stand, leading to higher yield potential
Cost effective	Low cost treatment for effective disease protection	High return for little investment
Produced in Canada	Commercially available	Convenient to access

10. Emergency Number

All Hours
1-613-787-5620
Only for Health and Environmental

Photo courtesy of Engage Agro, Manitoba, Canada

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Notice:

The information contained in this Technical Information Bulletin regarding the use of *SOLAN MZ* is offered only as a guide and has been prepared in good faith. It is not intended to be all-inclusive and the manner and conditions of use may involve other and additional considerations including regional variations as well as provincial guidelines on product use. You should consult your local agricultural supply dealer or extension specialist for more detailed information. *SOLAN MZ* should be used only as recommended on the label. Always read and follow instructions carefully. It is an offence under the ***Pest Control Products Act*** to use a control product under unsafe conditions. No warranty is given or implied and Norac Concepts Inc., will not be liable for any direct or consequential damages or losses that may result from the use of or reliance on any information contained herein.