

Barrier

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A suspension concentrate contact and local systemic fungicide for the control of fungal diseases on potatoes and tomatoes.



Barrier – a new double action fungicide for potatoes and tomatoes

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In order to combat pests and diseases, various strategies were followed in the past. These included resistance plant breeding, crop rotation, biological control, agronomic practices and chemical control amongst others. Chemical control has been the most effective means of controlling agricultural pests and diseases over the years. The agrochemical industry has also changed in that modern agrochemicals break down within a specific period of time without leaving harmful residues on the produce. This is one of the reasons why chemicals such as Dieldrin and DDT were banned.

Another issue to bear in mind with regard to fungicides and insecticides is the possibility of resistance to the active ingredient. This has been reported before. This happens because of the rapid life cycle of many micro organisms and insects. Within the period of a single life cycle of a host plant, a pest may have tens or even hundreds of life cycles. This means that over time a single fungal spore or bacterium may not be killed by a certain pesticide. A potentially resistant population of the pest could be the result.

Potatoes and tomatoes are two high value crops in South Africa. Potatoes, particularly, are a valuable source of starch in all sectors of the community. However, these two crop plants have also fallen prey to pests and plagues as mentioned above. In the case of potatoes, early (figure 1) and late blights (causal organisms: *Alternaria solani* and *Phytophthora infestans* respectively) are two of the most devastating diseases. If left unchecked, a farmer may lose his entire harvest to these diseases. Unfortunately control strategies other than chemical control have not proved to be sufficiently effective at curbing these diseases. Since potatoes and tomatoes are high value crops, farmers are willing to invest in effective means of controlling diseases and pests if results justify the investment.

Fungal infections occur on aboveground parts of the plant (such as leaves and stems) primarily by air- or waterborne fungal spores. These spores land on the host plant and recognise the host plant by a series of chemical recognition processes. Fungi are in many cases specie specific in their hosts, and if the fungal spore does not recognise the host plant, the spore will not germinate to cause infection. This is why certain



Figure 1. Typical symptoms of early blight (*Alternaria solani*) of potato.

fungi are specific to certain crop plants. Upon recognition, the fungal spore will germinate producing a germ tube which grows on the

leaf surface, "looking" for a place to penetrate the leaf epidermis, such as a stoat or an injury. Once the germ tube reaches such an opening, the fungus can penetrate the leaf surface and cause infection in the plant tissue.

Plaaskem has a new fungicide called Barrier (450 SC) in its range, specifically aimed at leaf diseases of potatoes and tomatoes. The active ingredients of Barrier are Maneb (325 g/l) and Procymidone (125 g/l). Maneb is a dithiocarbamate fungicide with protective action against fungi. Procymidone, on the other hand, is a translaminar systemic dicarboximide fungicide with both protective and curative properties. A translaminar systemic fungicide is one that will move from the adaxial surface (upper surface) of the leaf to the abaxial (lower surface) of the leaf. This means that the chemical need not physically come into contact with the abaxial leaf surface in order to control fungal pathogens that are resident there.

Therefore Barrier has a dual action: both preventative and curative. This means that Barrier is effective at two points in the life-cycle of the fungal pathogen i.e. the point when the fungal spore lands on the leaf, and once the spore has germinated and actually penetrated the leaf surface, causing disease. The preventative action of Barrier will prevent the spore from germinating while the curative action can serve to prevent the development of an established lesion on the leaf.

There has never been any documented resistance to Maneb. Certain instances of resistance to dicarboximide have been reported but there is evidence that the fitness penalty of this resistance is becoming less with time.

Barrier has been registered for the control of early and late blight of potatoes and tomatoes, as well as the control of septoria leafspot and botrytis rot of tomatoes. In large scale field trials the efficacy of Barrier for the control of early blight of potato was clearly demonstrated in the Delmas area (figure 2). The strip of potatoes in the middle of the photo was left unsprayed, while the rest of the field was sprayed with Barrier as recommended on the label.



Figure 2. A potato field close to Delmas where a single strip of the field was left unsprayed while the rest of the field was sprayed with Barrier. The effect of early blight can clearly be seen.