Health Canada Santé Canada

Evaluation Report for Category B, Subcategory 3.11 Application

Application Number: 2013-5725, 2013-5727, 2013-5729, 2013-5730, 2013-5731
Application: Changes to Product Label – New Pests
Product: Disarm 480 SC Fungicide
Registration Number: 30811
Active ingredients (a.i.): fluoxastrobin [FXA] fungicide
PMRA Document Number : 2382069

Background

Disarm 480 SC Fungicide (Reg. No. 30811) is a suspension concentrate containing 480 g/L fluoxastrobin for use on turf. Disarm 480 SC Fungicide is currently registered for control of dollar spot on turf at rates of 5.0 – 11.69 ml/100m^2 (2.4 – 5.6 g a.i./100m^2) applied at 14 – 21 day intervals. The maximum seasonal rate is 40 ml/100m^2 or a maximum of four applications (not to exceed the maximum seasonal rate).

Purpose of Application

The purpose of these applications is to add the claims of control pink snow mould (*Microdochium nivale*), grey snow mould (*Typhula incarnata, T. ishikariensis*), summer patch (*Magnaporthe poae*), take-all patch (*Gaeumannomyces graminis*), pythium blight (*Pythium aphanidermatum*), brown ring patch (*Waitea circinata* var. *circinata*), brown patch (*Rhizoctonia solani*), leaf spot/melting out (*Drechslera poae, Bipolaris sorokiniana*), and anthracnose foliar blight and basal rot (*Colletotrichum cereale*) on turf to the Disarm 480 SC Fungicide label. Application rates range from 5.8 – 11.5 ml/100 m^2. Tank mixes are also proposed for certain diseases.

Chemistry, Health and Environmental Assessments

A chemistry assessment was not required since there was no change to product chemistry. Health and environmental assessments were not required since the use pattern, including host crop, application rates and timings, of the component product remained unchanged.

Value Assessment

Turf quality is important on golf courses for maintaining the playable surfaces. The aesthetic quality is also important to the golf turf managers and sod farms to attract clients. High levels of control are expected by turf managers to protect turf quality and the integrity of the game of golf.

Pink snow mould (*Microdochium nivale*) and grey snow mould (*Typhula incarnata, T. ishikariensis*):
A total of 13 trials conducted in Canada and the US between 2005 and 2010 were submitted to

support the claims. Two trials were not reviewed due to very low disease pressure and winter injury assessments in lieu to snow mould assessments due to the absence of the diseases. Control was observed in pink snow mould trials as well as the trials that did not differentiate between the two snow mould diseases in their assessments as a result of treatment with Disarm 480 SC at the proposed rate. The results from the grey snow mould trials were variable and did not always result in control of symptoms with Disarm 480 SC. It was suggested that fluoxastrobin is less effective against *Typhula ishikariensis* as observed in the US, and tank mixes with other products is recommended to improve efficacy. Tank mixes with chlorothalonil provided higher levels of control in the trials, which may be related to improved efficacy against *T. ishikariensis* by the tank mix partner. Although not tested, tank mixes with propiconazole are also expected to improve efficacy against grey snow mould based on current registrations. Although Disarm 480 SC does not control *T. ishikariensis*, the claim of control of grey snow mould is supported based on the value information reviewed for *T. incarnata*. The label will indicate that the use of tank mixes with other registered products is recommended to improve efficacy against *T. ishikariensis* specifically. The submitted value evidence suggests that Disarm 480 SC Fungicide controls both pink and grey snow moulds when applied as proposed.

Summer patch (*Magnaporthe poae*):
One efficacy trial conducted in the US (PA) in 2008 and a scientific rationale were submitted to support the claim. The results from the trial demonstrate high levels of control of summer patch under moderate to high disease pressure that would meet the standards required for golf course turf. The proposed spray intervals were also supported by the data. Use history information from the US also indicates good efficacy against this disease under conditions conducive to disease progression. Although not tested in the trial, the low rate would have value for addressing conditions of low to moderate disease pressures. As this rate is also registered on the US label, the submitted use history also provides support for the low rate to control summer patch. The weight of evidence supports the claim of control of summer patch at the proposed rates and timings.

Take-all patch (*Gaeumannomyces graminis*):
One trial conducted in the US (PA) in 2008 and a scientific rationale were submitted to support the claim. The level of efficacy observed when Disarm 480 SC was applied at the proposed rate and approximate spray interval would meet industry expectations. Additional value information from the US suggests that fluoxastrobin will control take-all patch on turf. There are several Group 11 products already registered for this use and only one alternate mode of action for resistance management. From an agronomic perspective, it is possible that the use pattern may help delay the development of resistance as only two applications applied on a long interval are required to control take-all patch in spring and/or fall. The use of spot spraying to treat only affected areas also helps delay resistance development. Based on the weight of value evidence submitted, the claim of control of take-all patch on turf is supported at the proposed rates and timings.

Pythium blight (*Pythium aphanidermatum*):
Three trials conducted in the US (PA) between 2007 and 2009 were submitted and reviewed to support the claim. Under high disease pressure, Disarm 480 SC Fungicide applied at the proposed rate controlled pythium blight at a level comparable to the commercial standards. The data showed that the proposed application interval of seven days was appropriate due to the

aggressive disease progression observed under optimal conditions. An extended interval of 14 days was also supported for lower disease pressures that may occur under intermittent infection periods. The claim of control of pythium blight on turf is supported as proposed.

Brown ring patch (*Waitea circinata* var. *circinata*):
One trial conducted in the US (VA) in 2008 and a rationale were submitted to support the claim. Disarm 480 SC applied at the proposed rate at extended intervals provided complete control of brown ring patch under moderate to high disease pressure. The data shows that the duration of control is sufficient for the proposed spray interval of 14 – 21 days. Currently, turf managers have only three active ingredients to treat brown ring patch on turf. Since this disease is fairly new to North America, there is little information on the effectiveness of fungicide products against brown ring patch. The registration of Disarm 480 SC for this use would provide an alternative product for disease management to Canadian turf managers. The claim of control of brown ring patch was supported at the proposed rates and timings.

Brown patch (*Rhizoctonia solani*):
Eight trials conducted in the US between 2007 and 2009 were submitted to support the claim of control of brown patch. One trial was not reviewed due to low disease pressure. Disarm 480 SC provided industry accepted levels of control of brown patch comparable to the standard treatments when applied at the low rate and a mid-rate on 14 – 28 day intervals. The value of the high rate was also elicited from the data. The weight of evidence supports the claim of control of brown patch at the proposed rate and timings.

Leaf spot/melting out (*Drechslera poae, Bipolaris sorokiniana*):
Two trials conducted in the US (PA) in 2008 and 2009 were submitted to support the claims for melting out and leaf spot. Additional value information was also submitted in the form of scientific rationales and use history information. The submitted trials demonstrated industry accepted levels of control of leaf spot with the low rate and short interval under moderate to high disease pressure. Use history information confirms that the higher rate and longer interval also have value for addressing different disease pressures and duration of disease epidemics. The high rate may be appropriate in the presence of high disease pressure and environmental conditions conducive to disease development or when the disease has advanced to the melting out phase. Only leaf spot was assessed in the trials. A rationale was submitted to support the claim for melting out. Use history information from the US confirms efficacy against both leaf spot and melting out. The claims control of leaf spot and melting out were supported as proposed.

Anthracnose foliar blight and basal rot (*Colletotrichum cereale*):
One efficacy trial conducted in the US (CT) in 2007 and a scientific rationale were submitted to support the claims. The Disarm 480 SC treatment provided good control against anthracnose basal rot in the trial, but the disease pressure was too low to accurately determine the level of efficacy. Use history information from two sources in the US confirms that fluoxastrobin provides industry accepted levels of control against these diseases. The claims of control of anthracnose basal rot and foliar blight were supported as proposed. Tank mixes were also supported for use under severe disease conditions.

Conclusion

The submitted value information was sufficient to support the following claims:

- control of grey snow mould (*Typhula incarnata*) with Disarm 480 SC Fungicide when applied once prior to permanent snow cover at a rate of 11.5 ml/100m^2. Control of *Typhula ishikariensis* must be addressed with a tank mix.
- tank mix with Banner 130 EC Fungicide or Daconil 2787 Flowable Fungicide to improve efficacy against the grey snow mould pathogen *Typhula ishikariensis*.
- control of pink snow mould (*Microdochium nivale*) with Disarm 480 SC Fungicide when applied once prior to permanent snow cover at a rate of 11.5 ml/100m^2.
- control of summer patch (*Magnaporthe poae*) with Disarm 480 SC Fungicide when applied preventatively at a rate of 5.8 – 11.5 ml/100m^2 applied three to four times on a 14 – 28 day interval (not to exceed the maximum seasonal rate of 40 ml/100m^2).
- control of take-all patch (*Gaeumannomyces graminis*) with Disarm 480 SC Fungicide when applied preventatively at a rate of 11.5 ml/100m^2 applied up to two times in the spring and/or fall on a 28 day interval with a maximum of three applications per season.
- control of pythium blight (*Pythium aphanidermatum*) with Disarm 480 SC Fungicide when applied preventatively at a rate of 11.5 ml/100m^2 applied up to three times on a 7 – 14 day interval.
- control of brown ring patch (*Waitea circinata* var. *circinata*) with Disarm 480 SC Fungicide when applied preventatively at a rate of 5.8 – 11.5 ml/100m^2 applied three or four times on a 14 – 21 day interval (not to exceed the maximum seasonal rate of 40 ml/100m^2).
- control of leaf spot/melting out (*Drechslera poae, Bipolaris sorokiniana*) with Disarm 480 SC Fungicide when applied preventatively at a rate of 5.8 – 11.5 ml/100m^2 applied three to four times on a 14 – 21 day interval (not to exceed the maximum seasonal rate of 40 ml/100m^2)
- control of brown patch (*Rhizoctonia solani*) with Disarm 480 SC Fungicide when applied preventatively at a rate of 5.8 – 11.5 ml/100m^2 applied three to four times on a 14 – 28 day interval (not to exceed the maximum seasonal rate of 40 ml/100m^2).
- control of anthracnose foliar blight (*Colletotrichum cereale*) with Disarm 480 SC Fungicide when applied preventatively at a rate of 5.8 – 11.5 ml/100m^2 applied three to four times on a 14 – 28 day interval (not to exceed the maximum seasonal rate of 40 ml/100m^2).
- control of anthracnose basal rot (*Colletotrichum cereale*) with Disarm 480 SC Fungicide when applied preventatively at a rate of 11.5 ml/100 m^2 applied three times on a 14 – 21 day interval (not to exceed the maximum seasonal rate of 40 ml/100m^2).
- under severe conditions, tank mix with Banner 130 EC Fungicide or Daconil 2787 Flowable Fungicide to improve efficacy against anthracnose.

References

2354923	2013, Efficacy Summary for Disarm 480 SC Fungicide to Expand Label for Disease Control in Turf, DACO: 10.1,10.2.2,10.2.3.1,10.3.2(B)
2354928	2007, Preventive control of brown patch in a colonial bentgrass fairway with various fungicides, 2007., DACO: 10.2.3.3(D)

2354929 2007, Control of early season anthracnose basal rot with various fungicides, 2007., DACO: 10.2.3.3(D)

2354930 2007, Evaluation of fungicides for control of Pythium foliar blight in perennial ryegrass, 2007., DACO: 10.2.3.3(D)

2354931 2009, Evaluation of fungicides for control of Pythium foliar blight in perennial ryegrass, 2009., DACO: 10.2.3.3(D)

2354932 2008, Evaluation of fungicides for control of Pythium foliar blight in perennial ryegrass, 2008. The study was conducted at the Valentine Turfgrass Research Center, University Park, DACO: 10.2.3.3(D)

2354933 2008, Evaluation of fungicides for the preventative control of gray snow mold in central Oregon, 2008 - 2009., DACO: 10.2.3.3(D)

2354934 2008, Evaluation of fungicides for the preventative control of gray snow mold in central Oregon, 2008 - 2009., DACO: 10.2.3.3(D)

2354935 2008, Preventative fungicide applications for the control of snow mold on creeping bentgrass, 2008-2009 (II)., DACO: 10.2.3.3(D)

2354937 2008, TIMBERSTONE GOLF COURSE SNOW MOLD TRIAL, DACO: 10.2.3.3(D)

2354939 2009, Evaluate DISARM Fungicide for control of pink and grey snow mould. , DACO: 10.2.3.3(D)

2354942 2009, Evaluate DISARM Fungicide for control of pink and grey snow mould. , DACO: 10.2.3.3(D)

2354943 2008, Control of brown patch on a golf course fairway with fungicides, 2008., DACO: 10.2.3.3(D)

2354944 2008, Control of Drechslera leaf spot/melting-out of Kentucky bluegrass with fungicides, 2008., DACO: 10.2.3.3(D)

2354945 2009, Control of Drechslera leaf spot/melting-out of Kentucky bluegrass with fungicides, 2009., DACO: 10.2.3.3(D)

2354946 2008, Control of Brown Ring Patch in a Mixed *Poa annua* and Creeping Bentgrass Green, 2008, DACO: 10.2.3.3(D)

2354947 2008, Summer Patch Control at The Novacare Complex, 2008, DACO: 10.2.3.3(D)

2354949 2008, Take All Patch Control with Various Commercially Available and Confidential Fungicides, 2008 , DACO: 10.2.3.3(D)

2354950 2006, 2005 - 2006 Snow Mold Fungicide Report , DACO: 10.2.3.3(D)

2354951 2009, 2008 - 2009 Fungicide Report , DACO: 10.2.3.3(D)

2354955 2009, Control of brown patch with fungicides on a creeping bentgrass putting green in Jackson Springs, NC, 2009., DACO: 10.2.3.3(D)

2354956 2008, Effect of Disarm 480SC, Disarm C SC and ARY-0473-009 G on brown patch in creeping bentgrass - Griffin, GA 2008, DACO: 10.2.3.3(D)

2354957 2008, PREVENTATIVE FUNGICIDE APPLICATION FOR CONTROL OF BROWN PATCH ON COLONIAL BENTGRASS FAIRWAY, DACO: 10.2.3.3(D)

2354958 2008, 2008-2009 Snow Mold Control Evaluation - Ekwanok Country Club, Manchester, VT , DACO: 10.2.3.3(D)

2354962	2009, Evaluation of Arysta DisArm formulations for residual control of brown patch, DACO: 10.2.3.3(D)
2354964	2008, Evaluate Disarm for control of Brown Patch of turf, DACO: 10.2.3.3(D)
2354967	2009, Evaluation of Disarm for Control of Brown Patch (Rhizoctonia solani) in Turf, DACO: 10.2.3.3(D)
2364495	2013, Disarm 480 SC Fungicide for control of Summer Patch and Take-All Patch on Turfgrass., DACO: 10.1
2364497	2013, Disarm 480 SC Fungicide for control of Waitea Patch (Brown Ring) on Turfgrass., DACO: 10.1
2364499	2013, Disarm 480 SC Fungicide for Control of Leaf Spot/Melting Out on Turfgrass, DACO: 10.1
2364501	2013, Disarm 480 SC Fungicide for Control of Anthracnose Basal Rot and Anthracnose Foliar Blight on turfgrass., DACO: 10.1

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