PAUL R. LEPAGE
GOVERNOR

STATE OF MAINE
DEPARTMENT OF AGRICULTURE, FOOD AND RURAL RESOURCES
BOARD OF PESTICIDES CONTROL
28 STATE HOUSE STATION
AUGUSTA, MAINE 04333-0028

WALTER WWHITCOMB
COMMISSIONER

HENRY S. JENNINGS
DIRECTOR

To: Board of Pesticides Control Members
From: Mary Tomlinson, Pesticides Registrar/Water Quality Specialist
RE: FIFRA Section 18 application for use of Revus® Fungicide (EPA# 100-1254) to control late blight in seed potatoes
Date: March 6, 2012

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This FIFRA Section 18 application for the use of Revus® Fungicide (EPA# 100-1254) to control late blight in seed potatoes is submitted at the request of Steve Johnson, Crop Specialist at the University of Maine Cooperative Extension. The 2011 late blight epidemic on potatoes in Maine was due to the unusually wet summer and high rainfall associated with Hurricane Irene and infected seed coming into Maine from a western state and from Canada. Enclosed are the above referenced Section 18 application and the proposed Section 18 label for your consideration. In addition, the label for the other mandipropamid containing fungicide, RevusTop® (EPA# 100-1278) is also appended.

The *Phytophthora infestans*-specific fungicides currently available for seed piece treatment have the undesirable side effect of seed decay. Revus® is a liquid formulation without that negative effect. Revus® would be limited to a single, liquid mist application, at the rate of 0.4 oz Revus® per hundred weight (cwt), to seed potatoes only. Foliar applications of the mandipropamide fungicide, RevusTop®, would be limited to three applications per season.

As discussed in the food tolerance section of the Section 18 application, 166.20(a)(6), it is not clear whether the proposed seed treatment use pattern will result in residues that remain below the established tolerance. In discussion with Syngenta, they suggested that a higher food use tolerance than currently exists may be needed to support this use. Our understanding is that it is unusual for a Section 18 request to affect a permanent tolerance; therefore, we hope to discuss this with the EPA Emergency Response Team after their receipt of this application. Lebelle Hicks PhD DABT, prepared the toxicology-risk assessment section of the Section 18 application and worked closely with Syngenta regarding residues and tolerance issues. She will be out of state for the meeting on March 12th, but available by phone.

Your package also includes the following documents for your review.

- Revus® Fungicide (EPA# 100-1254) MSDS
- Letter of support from Larry Zang, Syngenta Crop Protection Services
- Letter of support from Steve Johnson, University of Maine Cooperative Extension

Please review these materials and let me know if you have any questions.

2012 FIFRA SECTION 18 EMERGENCY SPECIFIC EXEMPTION FOR THE USE OF REVUS TO CONTROL LATE BLIGHT ON SEED POTATOES IN MAINE

General information requirements of 40 CFR 166.20(a, b) in an application for a specific exemption.

TYPE OF EXEMPTION BEING REQUESTED

✔ SPECIFIC

QUARANTINE

PUBLIC HEALTH

SECTION 166.20(a)(1): IDENTITY OF CONTACT PERSONS

(i) Contact person:
This application to the Administrator of the Environmental Protection Agency (EPA) is for a specific exemption to authorize the use of Revus (Mandipropamid) as a potato seed treatment for control of seed-borne *Phytophthora infestans*, the causal agent of late blight. This application is submitted by the Maine Board of Pesticides Control. Any questions related to this request should be addressed to:

Mary Tomlinson
Pesticides Registrar
Maine Board of Pesticides Control
Maine Department of Agriculture Food and Rural Resources
State House Station 28
Augusta, ME 04333-0028
mary.e.tomlinson@maine.gov
Phone: (207) 287-7544
Fax: (207) 287-7548

(ii) Qualified experts:
The following qualified expert is also available to answer questions:

Steven B. Johnson, Ph.D.
Crops Specialist and Extension Professor
University of Maine Cooperative Extension
57 Houlton Road
Presque Isle, Maine 04769
207-764-3361
stevenj@maine.edu

SECTION 166.20(a)(2): DESCRIPTION OF PESTICIDE PROPOSED FOR USE

(i) Description of a federally registered pesticide product:

Common Chemical Name
(Active Ingredient): Mandipropamid

Trade Name(s) and EPA Reg. No.: Revus® Fungicide (23.3% active ingredient (a.i.)); EPA Reg. number 100-1254

Registrant: Syngenta Crop Protection, Inc., PO Box 18300, Greensboro, NC 27419.

(A) See the proposed Section 18 label.

SECTION 166.20(a)(3): DESCRIPTION OF PROPOSED USE

(i) Sites to be treated (including locations within the State):
Phytophthora infestans spores are carried primarily by wind to nearby fields. Winds and heavy rain from Hurricane Irene, in August 2011, dispersed the late blight pathogen throughout the potato production area in Maine, resulting in a serious late blight epidemic. Therefore, all potato fields *planted* in Maine, primarily throughout Aroostook, Oxford, and Penobscot Counties are vulnerable to *Phytophthora infestans* and could be potentially treated. The potential utilization of this potato seed treatment would depend primarily upon a grower's 2012 level of late blight and their risk management philosophy.

(ii) Method of Application:
The application is as a seed treatment and will be applied as a mist directly to seed potatoes before planting.

(iii) Rate of application (lbs of product /acre):
Potato seed treatment: use Revus® (EPA# 100-1254) at the rate of 0.4 fl oz per cwt (hundredweight) of potatoes as seed for planting. At a typical planting rate of 20 cwt per acre, the 0.4 fl oz per cwt rate translates to 8 fl oz, or 0.13 lbs, a.i. per acre, which is within the Revus label guidelines. Treatment is to be applied as a liquid mist in 32 to 64 oz of water volume per ton.

(iv) Maximum number of applications:
One application of Revus® (EPA# 100-1254) per season would be allowed as a seed treatment. Revus® (EPA# 100-1254) is not labeled for foliar use on potatoes (Syngenta 2009). Seed potatoes treated with Revus under this Section 18 label may receive foliar applications of RevusTop® (EPA# 100-1278) during the growing season, provided that the Section 3 label requirements on the RevusTop® label are not violated. The Section 3 label for RevusTop® requires that no more four applications of RevusTop®/year are made. If the seed pieces were treated with Revus®, then only three foliar applications of RevusTop® are allowed. The total amount of mandipropamid cannot be over 0.52 lbs a.i./acre (Syngenta, 2008).

(v) Total acreage to be treated:
Maine growers are expected to plant about 55,000 acres of potatoes in 2012. Only a portion of these acres, possibly as high as 50% of the acres (about 27,500 acres), will be treated under this Section 18 request.

(vi) Total amount of pesticide proposed (active ingredient and product):
Assuming that 50% of Maine's potato acreage will be treated at the rate of 0.4 fl oz per cwt planted, 1719 gals of product and 3575 lbs a.i. will be used in the state of Maine under this Section 18 request.

(vii) Restrictions and requirements concerning the proposed use which may not appear on the labeling:

There are no restrictions and requirements for this proposed Section 18 label that do not appear on the Section 18 or Section 3 labels for Revus (100-1254). The precautionary language, mixer loader reentry language, and other safety language on the Section 3 label are appropriate for the proposed Section 18.

(viii) Duration of proposed use:
Potatoes are generally planted from late April to early June in Maine.

(ix) Earliest possible harvest dates:
Potato harvest may begin as early as late-August and continue through early November, depending on seasonal temperatures and environmental conditions.

Section 166.20(a)(4): ALTERNATIVE METHODS OF CONTROL

There is no alternative control method for control of seed infected with *Phytophthora infestans*, the causal agent of late blight. Field destruction of potato plants is used when seed infected with *Phytophthora infestans* emerge.

(i) Currently registered pesticides:

There are no alternatives to dry formulation materials (mancozeb or Curzate formulations) or liquid formulations of mancozeb. Revus® would fill this void. One issue that has arisen with dust applications is seed-piece breakdown. This has occurred in some trials as well as in the field on a large scale. Mancozeb seed treatments formulated as dusts include clay as a drying agent. This can cause the application to be hydroscopic and result in extensive seed-piece decay and poor emergence. Seed piece breakdown is an important consideration in the mancozeb applications. Curzate (EPA# 352-592) 60% cymoxanil in a dry flowable formulation treatments have responded similarly. Liquid mancozeb formulations have not been successfully mixed with other materials and have resulted in similar seed-piece breakdowns and poor emergence. These are some of the reasons that dust treatments and mancozeb liquid treatments have fallen from favor in the field. Revus® is a liquid formulation and none of these issues have been reported with Revus® when used a seed potato treatment in Montana under their recent Section 18 crisis exemption (Syngenta, 2012a, personal communication).

(ii) Alternative Control Practices:

Maine growers have long used prescreening of potato seed for late blight detection which provides the ability to predict the potential of seed-borne late blight epidemics the next season. These seed-borne epidemics occur very early, are not addressed in any late blight prediction and scheduling programs in use, and are devastating. Seed for the 2012 crop potato seed (from 2011 harvest) has been screened and, for the first time in a number of years, there has been late blight detected in Maine potato seed arising from the record setting rainfall and Hurricane Irene in 2011. This unforeseen circumstance creates the emergency.

Section 166.20(a)(5): EFFICACY OF USE PROPOSED UNDER SECTION 18

Unpublished data from Dr. Dave Lambert, UMaine has shown complete control of *Phytophthora infestans* in potato seed. The data from a *Phytophthora infestans*-inoculated trial is found in Table 1.

Table 1. *Phytophthora infestans*-inoculated trial	
Treatment	**Percent *Phytophthora infestans* infection**
Untreated	100
Curzate 60DF 1.0 oz/cwt	3 to 11
Curzate 60DF 0.25 oz/cwt	83 to 97
Revus 0.4 oz/cwt	0

More such data is available from other university researchers, but Dr. Lambert's data suffices to establish that Revus® is indeed an effective *Phytophthora infestans*-specific fungicide. Revus® is a Group 40 fungicide, so it a good fit with our recommendations of providing alternative groups of fungicides for a resistance management. Revus® is labeled for potatoes and has been used foliarly in Maine previously. It does not have any of the seed piece breaks down issues associated with Curzate® or mancozeb dry formulations, nor does it have the mixing and application problems associated with the mancozeb liquid.

Section 166.20(a)(6): EXPECTED RESIDUE LEVELS IN FOOD

There are existing mandipropamid tolerances of 0.01 ppm in the vegetable tuberous and corm group 1C including potatoes and 0.03 ppm in wet potato peel 40CFR180.637 for the foliar use involving RevusTop®. As summarized in the attached document from Syngenta, the proposed use direct seed piece treatment at 0.13 lbs a.i./acre may result in soil levels as high as 0.0325 lb a.i./acre at 96 days post planting (2 soil half-lives of mandipropamid) and that the residue is evenly distributed in 60,000 pounds of potato per acre, the resulting residue would be 0.54 ppm (Appendix A). Syngenta is suggesting a temporary tolerance of 0.5 ppm (Syngenta, 2012b).

In the 2007 human health risk assessment conducted in support of this tolerance, EPA performed an unrefined chronic exposure assessment on the metabolism of mandipropamid. That assessment assumed 100% of the crops were treated with the proposed Section 3 uses including potato (EPA 2008b). Below are summaries of the toxicity and dietary exposure from that risk assessment (EPA, 2007a) and the magnitude of residue study supplied by Syngenta, NOA446510 (Syngenta, 2006).

The residue studies reviewed by EPA demonstrated that mandipropamid undergoes extensive metabolism to form a range of metabolites which are structurally related to, or more polar than the parent. The extent of metabolism appears to be related to pre-harvest intervals (PHI). In crops with shorter PHIs, the parent was detected at higher levels with relatively fewer metabolites (EPA, 2007a).

In the peel of the potato tuber, parent was present at only 0.8 - 4.2% total radioactive residue (TRR) (max. 0.002 ppm) and was not detected in the flesh. The only identified metabolites found at levels > 0.001 ppm in tubers were SYN 500003 (0.005 - 0.006 ppm) and SYN 524199 (0.003 ppm). The latter is expected to be significantly less toxic than the parent mandipropamid and the former, SYN 500003 is considered to be comparably toxic to the parent fungicide. SYN 500003 was detected in potato field trial samples at levels of up to 0.016 ppm. Residues of parent were <0.01 ppm in the tuber raw agricultural commodity in the field trials (EPA 2007a).

Syngenta submitted their study regarding the magnitude of residues in potatoes. Their data is summarized in Table 2.

Table 2. Summary of Residue Data from Crop Field trials with Mandipropamid at a Seasonal Rate of 0.52 lbs a.i./year in Potato Tubers (Syngenta 2006)

Compound	Pre-harvest interval (days)	Number of samples	Maximum Residue (ppm)	Limit of Quantitation (ppm)
Mandipropamid	14	32	< 0.01	0.01
Mandipropamid	28	32	< 0.01	0.01
SYN 500003	14	32	0.016	0.0025

According to EPA, the residue to be used for tolerance enforcement and dietary risk assessment for all primary crops, except root and tuber vegetables, is parent mandipropamid. SYN 500003 is present at higher levels than parent and was included in residue for dietary risk assessment, but not in the tolerance expression. SYN 500003 has a soil half-life of 2 days (EPA, 2007a) and should not be of concern in the proposed temporary tolerance for this Section 18.

Section 166.20(a)(7): DISCUSSION OF RISK ASSESSMENT

HUMAN HEALTH

TOXICOLOGY REVIEW

Acute Toxicity

Mandipropamid has low or minimal acute toxicity via the oral (LD_{50} > 5,000 mg/kg), dermal (LD_{50} > 5,000 mg/kg), and inhalation (LC_{50} > 5.19 mg/L) routes of exposure. It is minimally irritating to the eye and non-irritating to the skin; it is a skin sensitizer (EPA, 2008a). Because the plant/soil metabolite SYN 500003 was not detected in the rat metabolism studies, it was tested for acute toxicity in the rat. The doses were 550 or 2,000 mg/kg and the resulting LD_{50} was 1,049 mg/kg.

Subchronic Toxicity
The liver is the target organ for mandipropamid in rats, mice and dogs. The rat is the more sensitive species and the 90-day no observable adverse effect level (NOAEL) was 41 mg/kg/day in males and 45 mg/kg/day in females. The lowest observable adverse effect level (LOAEL) was 260 mg/kg/day for males and females. In addition to liver effects, there were decreases in body weight, body weight gains in both sexes and a decrease in food utilization in males (EPA, 2008a).

Developmental and Reproductive Toxicity
There was no maternal toxicity or developmental toxicity observed in either rats or rabbits. The NOAELs for both species was 1,000 mg/kg/day, the highest dose tested (HTD) and the LOAEL was not determined (EPA, 2008a).

In the rat reproduction study, the parental NOAEL was 22.9 mg/kg/day for males and 24.5 mg/kg/day for the females. The LOAELS were 146.3 mg/kg/day and 148.2 mg/kg/day, males and females respectively. The effects observed at the LOAEL were decreases in body weight, body weight gains in both sexes and a decrease in food utilization in males. The reproductive NOAELs were 146.3 for males and 148.2 mg/kg/day for females (HDT). The NOAELs for the offspring were 22.9 mg/kg/day for males and 24.5 mg/kg/day for the females. The LOAELS were 146.3 mg/kg/day and 148.2 mg/kg/day, males and females respectively based on decrease pup body weight in both sexes. The Food Quality Protection Act Safety Factor (FQPA SF) was reduced from 10X to 1X due to the lack of sensitivity in the developing fetus (EPA, 2008a).

Chronic, Carcinogenicity and Mutagenicity Toxicity Assessment
Chronic studies include the 1 year dog study and a 2 year combined chronic carcinogenicity study in the rat and an 18 month carcinogenicity study in the mouse. The dog was the most sensitive study for the liver effects, with a NOAEL of 5 mg/kg/day and a LOAEL of 40 mg/kg/day (EPA, 2008a).

There was no evidence of carcinogenicity in either the rat or the mouse studies and mandipropamid was negative in the battery of *in vitro* mutagenicity assays performed to support EPA registration. EPA classified mandipropamid as "Not Likely to be Carcinogenic to Humans" (EPA, 2008a).

The plant-soil metabolite SYN 500003 was tested in the Ames assay and was negative (EPA, 2007a).

Endocrine Effects
There were no estrogen, androgen, and/or thyroid mediated toxicity (EPA, 2008a).

DOSE RESPONSE ASSESSMENT

There were no appropriate acute toxicity endpoints identified for mandipropamid. Because of this no acute reference dose (aRfD) or acute population adjusted dosed

(cPAD). The chronic RfD (cRfD) was determined as 0.05 mg/kg/day based on the chronic dog study. There were no hazards were found at 1,000 mg/kg/day (HDT, EPA's limit dose) in the dermal rat studies with 21 to 28 day durations. Inhalation risks were evaluated using the 90-day rat study with a NOAEL of 41 mg/kg/day in males and an LOAEL of 260 mg/kg/day (EPA, 2008a).

RISK ASSESSMENT

Dietary Exposure and Risk Assessment

The endpoint used for chronic dietary risk assessment was 5 mg/kg/day from the 1 year dog study. EPA's level of concern (LOC) for chronic dietary exposure was 100 based on uncertainty factors for 10X for extrapolation form animals to humans and 10X for variation in the human population. Because the FQPA SF was reduced to 1X, the chronic PAD was also set at 0.05 mg/kg/day (EPA, 2008a).

Occupational Exposure and Risk Assessment

Occupation exposure to mandipropamid is expected to be short-term (1 to 30 days) or intermediate-term (1 to 6 months). Dermal scenarios for mixer, loaders and applicators were not assessed because no hazards were found at EPA's limit dose of 1,000 mg/kg/day in the dermal rat studies with 21 to 28 day durations.

Occupational inhalation risks were evaluated using the 90-day rat study with a LOAEL of 260 and an assumed 100% absorption rate. Similar to the dietary risk assessment above, EPA's LOC was 100. All of the margins of exposures were greater than 100 indicating no concern on the part of EPA (EPA, 2008a).

Residential Post-Application Exposure and Risk Assessment

There are no residential uses of this fungicide (EPA, 2007; EPA, 2008a; Revus® label; RevusTop® label).

Drinking Water Exposure (see Dietary Risk Assessment)

EPA estimated environmental concentrations (EECs) for the parent compound, mandipropamid, and the two major aquatic metabolites, SYN 500003 and SYN 5040851were estimated by EPA using the SCI-GROW model. The resulting EECs for mandipropamid were 25.2 ppb in surface water and 0.0522 ppb in groundwater. The EECs for SYN 500003 were 2.32 ppb in surface water and 0.585 ppb in groundwater and those for SYN 5040851 were 8.99 ppb in surface water and 1.73 ppb in round water. These values were incorporated into the chronic exposure risk assessment along with food residues (EPA, 2007a).

Acute and Chronic Dietary Risks for Sensitive Subpopulations Particularly Infants and Children

There were no appropriate acute toxicity endpoints for mandipropamid and the plant and soil metabolites, therefore, an acute risk assessment was not performed. The range of the percent of cPAD utilized by the existing agricultural uses range from 16% in children under 1 year old to 29% in children 3 to 5 years old. The % cPAD used by the general

population was 22%. This assessment includes parent and metabolite residues from food, feed and water (EPA, 2007a).

Aggregate Exposure from Multiple Routes Including Dermal, Oral, and Inhalation Cumulative Effects

Because there are no residential uses, the aggregate risks are the same as the dietary risk above (EPA, 2007a).

Risk Characterization, Summary

EPA has evaluated this compound in light of the current use patterns and relevant uncertainty/safety factors and determined that no unreasonable adverse effects to the US population in general, and to children and infants in particular, will result from the labeled uses of the Revus products.

Because rate 0.13 lbs/A of the potato seed treatment use of Revus® is comparable to one application of RevusTop®, the proposed Section 18 use of Revus® as a potato seed piece treatment for late blight will not increase the amount of mandipropamid in the diet and, therefore, will not increase risks.

ENVIRONMENTAL FATE AND RISKS

The proposed Section 18 with 3 subsequent applications of RevusTop®, will not increase the total seasonal load of 0.52 lbs a.i./acre. Because of this, the environmental fate as reviewed by EPA in 2007 and the subsequent environmental risk assessments, including endangered species, remain valid.

THREATENED AND ENDANGERED SPECIES

EPA's Environmental Fate and Effect Division (EFED) reviewed the risks to non-target species including endangered species in 2007 (EPA, 2007b). Environmental risks are assessed using the risk quotient (RQ) method. The RQ is equal to the EEC / Toxicity Value. The estimated environmental risks are then compared to the EPA LOCs for types of registrations. These LOCs for aquatic non-target organisms is 0.05 for acute endangered species. The LOCs for aquatic plants is 1 for acute endangered species.

The RQs for aquatic organisms ranged from 0.01 in Mysid shrimp to 0.003 in freshwater invertebrates and those for aquatic plants were 0.02. All of these levels are lower than the EPA LOCs for endangered species in these groups of organisms. Regarding fish, EFED was unable to assess the acute risk of mandipropamid to fish because all the fish acute toxicity data are deemed invalid (EPA, 2007b).

BENEFICIAL ORGANISMS

EPA uses the honey bee acute contact study using the technical grade active ingredient to screen for effects on beneficial insects. The acceptable 72-hour contact toxicity study of technical grade mandipropamid in honey bees yielded a LD_{50} >200 µg a.i./bee, indicating that technical grade mandipropamid is practically non-toxic to honey bees (EPA, 2007b).

ENVIRONMENTAL FATE

The environmental fate of mandipropamid as described by EPA in their 2007 EFED review is:

> "Mandipropamid is considered to be persistent in the environment. The major route of dissipation is degradation under aerobic aquatic conditions. Mandipropamid degrades to several intermediary degradation products. The transformation products are ultimately degraded to non-extractable residues and carbon dioxide. Mandipropamid is moderately mobile and some of its metabolites are mobile to highly mobile in soils, and therefore have the potential to leach into ground water. Mandipropamid can reach surface waters via spray drift and rainfall events that cause runoff (EPA, 2007b).
>
> Direct application of mandipropamid to streams, lakes, and ponds is prohibited by the product label. Immediately following application, the highest mandipropamid residue levels are expected to be located in surface waters adjacent to treated agricultural fields due to spray drift at the time of application and/or from runoff after a rain event. Mandipropamid may be transported off the field in runoff for several months after application. Exposure estimates for this screening level risk assessment focuses on the total residues for aquatic concentrations of the parent, mandipropamid, and the degradates of toxic concern, SYN500003 and SYN504851." These EECs were described above in the section on drinking water exposure and used in the endangered species evaluations (EPA, 2007b)."

Section 166.20(a)(8): COORDINATION WITH OTHER AFFECTED FEDERAL, STATE, AND LOCAL AGENCIES

The Maine Department of Agriculture's Board of Pesticides Control and the Maine Cooperative Extension have cooperated in the preparation of this petition. Other state and federal agencies will be informed, if necessary, when the exemption is approved.

Section 166.20(a)(9): ACKNOWLEDGEMENT BY REGISTRANT

Syngenta has been notified of this agency's intent regarding this application (see letter of support from L. Zang). The registrant has notified the Maine Department of Agriculture that the magnitude of residue studies are being initiated for the 2012 growing season.

Section 166.20(a)(10): ENFORCEMENT PROGRAM

The Maine Board of Pesticides Control (BPC) is the State Lead Agency for the regulation of pesticides. The BPC will monitor the application of the exempted pesticide as needed to determine that the provisions of the specific exemption are being followed.

Section 166.20(a)(11): REPEAT USES

This is the first year Maine has applied for this specific exemption.

Section 166.25(b)(ii): PROGRESS TOWARDS REGISTRATION

Mandipropamid is registered with EPA under a Section 3 label (Revus®, EPA# 100-1254) for late blight control (Syngenta, 2009). Syngenta has informed the Maine Board of Pesticides Control that they intend to conduct a magnitude of residue study for potato seed piece treatment plus three foliar applications of mandipropamid at the currently approved rates (Syngenta, 2012a, personal communication).

Section 166.20(b)(1): NAME OF PEST

Scientific and Common Name of the Pest: *Phytophthora infestans* (potato late blight)

Section 166.20(b)(2): DISCUSSION OF EVENTS OR CIRCUMSTANCES WHICH BROUGHT ABOUT THE EMERGENCY SITUATION

The emergency situation facing Maine potato growers in 2012 arises from Hurricane Irene and the record seasonal rainfalls in 2011, combined with the importation of infected seed in 2011, which set the stage for the late blight epidemic in Maine in 2011. Many potato fields in Aroostook County had extensive late blight in the tubers and in some cases, growers left the field

unharvested to protect the rest of their crop. Testing has already revealed the fungus is present on 2012 seed, consequently, only a highly effective seed piece treatment will prevent a catastrophic crop failure in 2012.

"Caribou experienced the wettest summer on record in 2011 with 240% of the long-term rainfall average." That quote and the following information were taken from: http://www.erh.noaa.gov/car/News_Items/2011-08-18_item001.php on August 18, 2011.

> Since June 1st, 22.82 inches of rain has fallen in Caribou. The record for the climatological summer (June through August) has already been broken. The previous record occurred in 1981 when 18.86 inches fell. Recordkeeping for Caribou commenced in 1939. Normal rainfall for the period June through August is 11.43 inches.
>
> The summer has featured record rainfall totals for Caribou in both June and July when 9.03 and 7.96 inches fell respectively. For August, 5.83 inches has already fallen in Caribou. This is above the average total for the entire month. The summer has featured six storms that dropped over an inch of rain and three storms that dumped over two inches of rain in a single calendar day. August ended with 9.58 inches of rain recorded (http://www.nws.noaa.gov/climate/index.php?wfo=car).

The following rainfall, in inches, was recorded at the Caribou, Maine NOAA office:

Month	Caribou, Maine 2011 (NOAA data)	1939-1978 (Historical data)
June	**9.03**	3.6
July	**7.96**	3.9
August	**9.58**	3.5

Late blight is caused by a fungus-like organism, *Phytophthora infestans*, which is a specialized pathogen of potato. *Phytophthora infestans* can cause infections in potato foliage and potato tubers. Development of the lesions is favored by cool, moist weather. Tuber infection can occur anytime during the season that tubers are present. Most tuber infection occurs late in the growing season with rain events leading to saturated soil water conditions and cool soil temperatures when the spores from the foliage are washed into the soil.

This organism has been historically treated as a fungus. Maine potato growers used fungicide sprays to prevent late blight establishment and spread during the 2011 crop season. Late in the 2011 season, growers used early vine kill or in some cases, growers left some or all fields unharvested. This served to reduce tuber to tuber transmission of the pathogen that caused late blight while the tubers were entering storage.

In Maine, as elsewhere, *Phytophthora infestans* typically overwinters in infected seed tubers. Infected tubers sprout, the organism develops, and under moist conditions, spore production is

initiated. Winter late blight tests of potato seed samples have verified that the pathogen is present in some of our seed lots. Planted, these will serve as primary inoculum and initiate a late blight epidemic. The full extent of *Phytophthora infestans* infection in Maine's potato seed is unknown, but it is present and at levels that are a concern. Potato seed needs to be treated with a *Phytophthora infestans*-specific fungicide.

To fully understand the potential crisis, one can look at the 2011 season. There was no late blight in Maine commercial potatoes in 2010. Seed-borne late blight epidemics in Maine have not been initiated from Maine seed in over a decade. In 2011, late blight infected-seed was imported from a western state into Maine. This was verified from the *Phytophthora infestans* pathogen isolate characterization. This isolate had never been seen in Maine before. Similarly in 2011, late blight infected-seed was imported from a western province into Maine's neighbor, New Brunswick. This isolate had never been seen in New Brunswick before. This was verified from the *Phytophthora infestans* pathogen isolate characterization. These imported late blight epidemics spread with the 240% over average rainfall. Hurricane Irene swept through the area in August as well. Not only were over 185,000 homes left without power, the high winds and heavy rain dispersed the late blight pathogen widely and wildly throughout Maine.

This epidemic caused substantial loss leading to yield reduction, or in many cases, caused growers to abandon the crop as a total loss. Potatoes from some of these fields will be used for seed for the 2012 crop. These seed potatoes will be cut into seed pieces and planted which will **perpetuate t**he late blight epidemic. The only prevention for seed-borne late blight epidemics is seed treatment. Once seed-borne late blight epidemics have initiated in the above-ground portions of the emerged potato plant, field destruction with a total crop loss is the only option.

As previously stated, potato seed needs to be treated with a *Phytophthora infestans*-specific fungicide. Revus® is such a material. The liquid application is very compatible with the existing liquid seed-treatment applications. Dust applications are rapidly waning in Maine due to lack of efficacy, seed piece breakdown, and risks to workers. As a result, many growers no longer own equipment for applying dry seed treatment formulations. Liquid applications can be metered more accurately that dusts, go on faster and more evenly than dust applications, and eliminate the dust inhalation issues.

One issue that has arisen with dust applications is seed-piece breakdown. This has occurred in some trials as well as in the field on a large scale. Mancozeb seed treatments formulated as dusts include clay as a drying agent. This can cause the application to become hydroscopic and result in extensive seed-piece decay and poor emergence. Curzate treatments have responded similarly (it is formulated as a DF or dry flowable). Liquid mancozeb formulations have not been successfully mixed with other materials and have resulted in similar seed-piece breakdowns and poor emergence. These are some of the reasons that dust treatments and mancozeb liquid treatments have fallen from favor in the field and are not appropriate when seed inoculation has already been confirmed. None of these issues have been reported with Revus®.

Section 166.20(b)(3): DISCUSSION OF ANTICPATED RISKS THAT WOULD BE REMEDIED BY THE PROPOSED USE

There are no known or anticipated risks to endangered or threatened species arising from this proposed use. In addition, the mammalian toxicology profile for mandipropamid is preferable to the alternative fungicides. While environmental fate data suggest a leaching risk associated with mandipropamid, the extremely low per acre use rate is likely to negate any ground water risks.

Section 166.20(b)(4): DISCUSSION OF ECONOMIC LOSS

(i) Anticipated yield in the absence of the emergency and expected losses due to the emergency:

The Maine potato yield for 2010 was 290.0 hundredweight (cwt) per acre (USDA, 2011, p. 39). The yield expected for 2011 was approximately the same before the late blight epidemic. USDA- Farm Service Agency (FSA) agency oversees among other programs, agriculture disaster programs. This USDA agency estimates the potato crop loss from late blight at about 15% or 43.5 cwt (USDA Farm Service Agency, 2012). The Maine Potato Board is the potato commodity organization that represents Maine potato growers. The Maine Potato Board estimates the 2011 crop loss at 25% to 30%, or 72.5 cwt to 87 cwt.

(ii) Anticipated prices in absence of the emergency and changes in prices due to emergency:

Potatoes have the largest agricultural cash receipts in Maine. A recent economic impact of the Maine potato industry lists the economic impact of the industry at 540 million dollars. Every 10% loss translates to a loss 5.4 million dollars (Maine Potato Board, 2012). A 25% to 30% yield loss in 2011translates to a loss 135-162 million dollars.

The 2011 crop insurance claims from potato late blight in Maine have been staggering. Data are still being compiled and claims are still being processed for the 2011 crop. As an indicator, the last serious late blight epidemic which occurred almost a decade ago, and was far less severe than the epidemic in 2011, still had over $9,000,000 worth of insurance claims paid out directly to farmers for late blight losses.

APPENDIX A

Syngenta Crop Protection LLC
Post Office Box 18300
Greensboro, NC 27419

March 12, 2012

Estimation of Mandipropamid Residues in Potato Resulting from Seed-Piece Treatment of Revus®

Mandipropamid is the active ingredient in Revus® (EPA Reg. No. 100-1254), which is registered by Syngenta Crop Protection for use in potato to control Late Blight (*Phytophthora infestans*). Revus® contains 2.08 lb ai/gallon (250 g ai/L). The current use directions provide for up to four broadcast foliar spray foliar applications at the maximum rate of 8 fl. oz. product/A (0.13 lb ai/A) at 7-day intervals with a 14-day pre-harvest interval (PHI). This would result in a maximum of 32 fl. oz. Revus® /A/season (0.52 lbs. a.i./A/season).

The definition of residue for mandipropamid is parent only [4-chloro-N-[2-(3-methoxy-4-(2-propynyloxy)phenyl]ethyl]-alpha-(2-propynyloxy)-benzeneacetamide]. The current U.S. tolerance for mandipropamid in potato is 0.01 ppm for (40 CFR–Part 180 §180.637). The residue data submitted to support this use pattern (EPA MRID 46800139) clearly indicate that mandipropamid applied as a foliar spray results in negligible residues in the potato tubers.

The proposed new use pattern for Revus® in potato would be a seed-piece treatment at 0.4 fl. oz product/100 lb seed pieces followed by three broadcast foliar spray foliar applications at the maximum rate of 7 fl. oz. product/A (0.11 lb ai/A) at 7-day intervals with a 14-day PHI. This would result in a maximum of 0.52 lb ai/A/season.

As there are no residue data available for the proposed use pattern, the purpose of this document is to provide an estimation of the potential residues. Several approaches were explored to estimate the potential residues. The approach presented below estimates the residue based on environmental fate data and is very conservative. Other approaches using residue data from other Syngenta products applied to potato seed-pieces resulted in estimated residues 5 to 10 times lower than the conservative value.

Estimation based on environmental fate residue data

Revus contains 2.08 lb mandipropamid/gallon

Proposed Seed Piece Treatment Rate – 0.4 fl. oz. Revus/100 lb of potato seed-pieces

$$\frac{0.4 \text{ fl oz} \times 2.08 \text{ lb ai/gallon}}{100 \text{ lb seed-pieces} \times 128 \text{ fl oz/gallon}} = 0.000065 \text{ lb ai/lb potatoes}$$

Assumed Seed-Piece Planting Rate Seeding Rate = 2000 lb/A

Mandipropamid Rate/A = 0.000065 lb ai/lb potatoes x 2000 lb/A = 0.13 lb ai/A

MPD half-life in soil was 48 days (NY terrestrial dissipation study; EPA MRID 46800046)

Assume the shortest interval from planting to harvest is 96 days (2 half-lives)

Therefore; ((0.13 lb ai/A/2)/2) = 0.0325 lb ai/A at 96 days

Assume Yield/A = 60,000 lb potato/A

Assume that 100% of MPD remaining at harvest is evenly distributed in/on these potatoes

$$\frac{0.0325 \text{ lb ai/A}}{60{,}000 \text{ lb potato/A}} \times 1{,}000{,}000 = 0.54 \text{ ppm}^*$$

*Note that the residue estimation does not include any residues resulting from the foliar applications as these were shown to be negligible (<0.01 ppm) in the residue study.

Based on this estimation, Syngenta suggests that the temporary tolerance for this seed-piece treatment followed by foliar spray use pattern be established at 0.5 ppm.

REFERENCES

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Maine Potato Board. 2012. Personal communication.

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Potato Program
57 Houlton Road, Presque Isle, ME 04769, (207) 764-3361; Fax (207) 764-3362

March 2, 2012

Mary Tomlinson
Maine Board of Pesticides Control
28 State House, Station
Augusta, ME 04333

Dear Mary:

I would like to initiate a Section 18 exemption for Revus® Fungicide (EPA Reg. number 100-1254; EPA Est. number 100-NE-001) for use on potato seed for control of seed-borne *Phytophthora infestans*, the causal agent of late blight, for the 2012 season. A late blight epidemic occurred in Maine in 2011 where many potato fields in Aroostook County had extensive late blight in the tubers and in some cases, growers left the field unharvested to protect the rest of their crop.

Caribou experienced the wettest summer on record in 2011 with 240% of the long-term rainfall average. The following rainfall, in inches, was recorded at the Caribou, Maine NOAA office:

Month	Caribou, Maine 2011 (NOAA data)	1939-1978 (Historical data)
June	**9.03**	3.6
July	**7.96**	3.9
August	**9.58**	3.5

Late blight is caused by is caused by a fungus-like organism, *Phytophthora infestans*, which is a specialized pathogen of potato. *Phytophthora infestans* can cause infections in potato foliage and potato tubers. Development of the lesions and is favored by cool, moist weather. Tuber infection can occur anytime during the season that tubers are present. Most tuber infection occurs late in the growing season with rain events leading to saturated soil water conditions and cool soil temperatures when the spores from the foliage are washed into the soil. This was the case in Maine in 2011.

Winter late blight tests of potato seed samples have verified that the pathogen is present in some of our seed lots. Planted, these will serve as primary inoculum and initiate a late blight epidemic. We don't know the full extent of *Phytophthora infestans* infection in our potato seed, we only

Potato Program
57 Houlton Road, Presque Isle, ME 04769, (207) 764-3361; Fax (207) 764-3362

know that it is present and at levels that are a concern. Potato seed needs to be treated with a *Phytophthora infestans*-specific fungicide. Revus® is such a material.

To fully understand the potential crisis, one can look at the 2011 season. There was no late blight in Maine commercial potatoes in 2010. Seed-borne late blight epidemics in Maine have not been initiated from Maine seed in over a decade. In 2011, late blight infected-seed was imported from a western state into Maine. This was verified from the *Phytophthora infestans* pathogen isolate characterization. This isolate had never been seen in Maine before. Similarly in 2011, late blight infected-seed was imported from a western province into Maine's neighbor, New Brunswick. This isolate had never been seen in New Brunswick before. This was verified from the *Phytophthora infestans* pathogen isolate characterization. These imported late blight epidemics spread with the 240% over average rainfall. Hurricane Irene swept through the area in August as well. Not only were over 185,000 homes left without power, the high winds and heavy rain dispersed the late blight pathogen widely and wildly throughout Maine.

The only prevention for seed-borne late blight epidemics is seed treatment. Once seed-borne late blight epidemics have initiated in the above-ground portions of the emerged potato plant, field destruction is the only option.

In summary, would like to initiate a section 18 exemption for Revus® Fungicide for the reasons of: an imported late blight epidemic that spread dramatically in 2011; unprecedented weather conditions including Hurricane Irene; and a lack of *Phytophthora infestans*-specific fungicides that do not have undesirable side effects on seed decay or that have application shortfalls. I am proposing using the rate of 0.4 oz Revus® per cwt applied as a liquid mist in 32 to 64 oz of water volume per ton. Treated potatoes are to be used only as seed. As there are in-field limitations of Revus® and RevusTop®, I would propose that if Revus® is used as a seed treatment, then Revus® and RevusTop® should be limited three applications per season. Please feel free to contact me if you have any questions or require further information.

Sincerely,

Steven B. Johnson, Ph.D.
Crops Specialist

Larry Zang
Senior State Regulatory Manager

Syngenta Crop Protection, Inc.
P.O. Box 18300
Greensboro, NC 27419-8300
www.syngenta.com

Tel. 336 632 2146
Fax: 336 632 2884
larry.zang@syngenta.com

March 2, 2012

Ms. Mary Tomlinson
Pesticides Registrar
Board of Pesticides Control
28 State House Station
Augusta, ME 04333-0028

SUBJECT: Revus® (EPA Reg. No. 100-1254)
Support Letter for Revus Seedpiece Treatment on Potato
Active Ingredient: Mandipropamid

Dear Ms. Tomlinson:

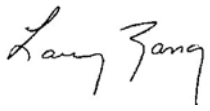
Syngenta Crop Protection supports the Maine Department of Agriculture efforts to obtain a Section 18 Emergency Exemption for the use of Revus fungicide as a seedpiece treatment on potato. Specifically Syngenta supports one seedpiece application of Revus, and 3 foliar applications of Revus Top. Revus Top (mandipropamid + difenoconazole) needs to be considered because it's a commonly used product by Maine potato growers. Three foliar applications of Revus Top are needed to manage potato foliar diseases in Maine. The Section 3 Revus Top label allows up to four foliar applications. If EPA were to issue this Section 18 for Revus, any grower using Revus would be required to by the Section 18 use directions to limit Revus Top to three foliar applications. The limitation to three foliar treatments assures the use pattern is within rates of the environmental fate studies supporting the Section 3 registration.

Syngenta is making progress toward a Section 3 registration; magnitude of residue trials are planned for the 2012 growing season. Syngenta has adequate product to meet the need.

Mandipropamid, the active ingredient in Revus, was designated a Reduced Risk fungicide by the EPA. It has existing food use tolerances on potato based on four foliar treatments for a maximum use rate of 0.52 lb ai/A. Maine requests for a seedpiece use represent a new use pattern not considered in current magnitude of residue trials that support the current tolerance. An analysis of residue trials and environmental characteristics of mandipropamid in addition to our experience with other active ingredients as seed piece treatments on potato indicate a conservation position would be to establish a higher tolerance than the current permanent tolerance of 0.01 ppm.

Please feel free to contact me at 1 (800) 334-9481, ext. 2146 if you have questions or require any further data or information.

Sincerely,



FIFRA

Section 18 Emergency Exemption

FOR DISTRIBUTION AND USE ONLY ON SEED POTATOES IN MAINE

Revus®

EPA Reg. No. 100-1254

EPA File Symbol No. xxxxxx

Effective: Expires:

To Limit the Spread of Seedborne Late Blight in Seed Potatoes

DIRECTIONS FOR USE

It is a violation of Federal law to use this product in a manner inconsistent with its labeling. All applicable directions, restrictions and precautions on the registered product label for Revus fungicide are to be followed.

These directions for use must be in the possession of the user at the time of application. Any adverse effects resulting from the use of Revus under this Emergency Exemption must be reported immediately to the Maine Department of Agriculture.

Specific Crop Use Directions

To limit the spread of seed borne late blight during potato seed cutting, treating and handling operations, apply Revus fungicide in standard liquid potato seed treatment equipment. To ensure good coverage, apply 0.4 fl. oz./cwt (100 lb) of Revus Fungicide in 2.5 to 4 fl. oz. water based slurry to the potato seed tubers (whole tubers or cut seed).

Restrictions:

- Make only 1 seed treatment application of Revus fungicide to seed potatoes.
- Do not exceed 0.4 fl. oz./cwt (100 lb) of Revus fungicide on seed potatoes.
- For use on potatoes intended for seed use only.
- Do not use on potatoes intended for human or livestock consumption.
- Potato crops grown from Revus treated seed potatoes must receive no more than 3 foliar applications of Revus Top (EPA Reg. No. 1278) fungicide according to the directions for the product label.
- Do not exceed 0.52 lb ai/acre/season of mandipropamid containing products.
- Treated seed must be labeled in accordance with the Federal Seed Act
- Do not transport treated seed potatoes outside of the State of Maine.

Attention: To The Revus Seed Treatment User:

The application of Revus seed treatment does not guarantee complete protection against spread of late blight in seed potatoes. Seed treated with Revus seed treatment must be handled in accordance with best potato seed management guidelines proposed by the local University Extension System. Revus seed treatment will not protect seed or seed performance (emergence and stand establishment) against seed decay induced due to weather or other abnormal air or soil conditions. A successful late blight protection program must include all integrated approaches that apply to seed and seed handling, soil treatment, foliar crop protection, harvest and storage management that can eliminate or limit the access of the pathogen Phytophthora infestans on to the potato crop.

Registrant:

Syngenta Crop Protection, LLC
Greensboro, NC 27419

ME1254xxxAB0312

IMPORTANT NOTICE

U.S. LABEL – It is a violation of the United States law to use this product in the United States in a manner inconsistent with its United States labeling

REVUS®

GROUP **40** FUNGICIDE

Fungicide

For control of certain diseases in listed vegetable crops

Active Ingredient/Guarantee:	
Mandipropamid*	23.3%
Other Ingredients:	76.7%
Total:	100.0%

** CAS No. 374726-62-2*

Contains 1,2-benzisothiazolin-3-one at 0.017% as a preservative.

Contains 23.3% Mandipropamid equivalent to 2.08 pounds per gallon or 250 grams per liter of active ingredient

KEEP OUT OF REACH OF CHILDREN.

See additional precautionary statements and directions for use inside booklet.

EPA Reg. 100-1254 *EPA Est. 100-NE-001*

Product of Switzerland
Formulated in USA

SCP 1254A-L1C 0909

1 gallon

Net Contents

syngenta®

FIRST AID
Have the product container or label with you when calling a poison control center or doctor, or going for treatment.
HOT LINE NUMBER For 24-Hour Medical Emergency Assistance (Human or Animal) or Chemical Emergency Assistance (Spill, Leak, Fire, or Accident), Call **1-800-888-8372**

PRECAUTIONARY STATEMENTS

Hazards to Humans and Domestic Animals

Personal Protective Equipment (PPE)

Applicators and other handlers must wear:

- Long-sleeved shirt and long pants
- Shoes plus socks

Follow manufacturer's instructions for cleaning/maintaining PPE. If no such instructions are available for washables, use detergent and hot water. Keep and wash PPE separately from other laundry.

Engineering Control Statements

When handlers use closed systems, enclosed cabs, or aircraft in a manner that meets the requirements listed in the Worker Protection Standard (WPS) for agricultural pesticides [40 CFR 170.240(d)(4-6)], the handler PPE requirements may be reduced or modified as specified in the WPS.

User Safety Recommendations

Users should:

- Wash hands before eating, drinking, chewing gum, using tobacco or using the toilet. Wash thoroughly with soap and water after handling.
- Remove clothing immediately if pesticide gets inside. Then wash thoroughly and put on clean clothing.

continued…

PRECAUTIONARY STATEMENTS *(continued)*

Environmental Hazards

Do not apply directly to water, to areas where surface water is present, or to intertidal areas below the mean high water mark. Do not contaminate water when disposing of equipment washwater or rinsate.

This product may contaminate water through drift of spray in wind. This product has a potential for runoff for several months or more after application. Poorly draining soils and soils with shallow water tables are more prone to produce runoff that contains this product. A level, well maintained vegetative buffer strip between areas to which this product is applied and surface water features such as ponds, streams, and springs will reduce the potential for contamination of water from rainfall-runoff. Runoff of this product will be reduced by avoiding applications when rainfall is forecasted to occur within 48 hours.

Do not discharge effluent containing this product into lakes, streams, ponds, estuaries, oceans, or other waters unless in accordance with the requirements of a National Pollutant Discharge Elimination System (NPDES) permit and the permitting authority has been notified in writing prior to discharge. Do not discharge effluent containing this product to sewer systems without previously notifying the local sewage treatment plant authority. For guidance, contact your State Water Board or regional office of the EPA.

CONDITIONS OF SALE AND LIMITATION OF WARRANTY AND LIABILITY

NOTICE: Read the entire Directions for Use and Conditions of Sale and Limitation of Warranty and Liability before buying or using this product. If the terms are not acceptable, return the product at once, unopened, and the purchase price will be refunded.

U.S. Label

The Directions for Use of this product must be followed carefully. It is impossible to eliminate all risks inherently associated with the use of this product. Crop injury, ineffectiveness or other unintended consequences may result because of such factors as manner of use or application, weather or crop conditions, presence of other materials or other influencing factors in the use of the product, which are beyond the control of SYNGENTA CROP PROTECTION, INC. or Seller. To the extent permitted by applicable law, Buyer and User agree to hold SYNGENTA and Seller harmless for any claims relating to such factors.

SYNGENTA warrants that this product conforms to the chemical description on the label and is reasonably fit for the purposes stated in the Directions for Use, subject to the inherent risks referred to above, when used in accordance with directions under normal use conditions. To the extent permitted by applicable law: (1) this warranty does not extend to the use of this product contrary to label instructions or under conditions not reasonably foreseeable to or beyond the control of Seller or SYNGENTA, and, (2) Buyer and User assume the risk of any such use. TO THE EXTENT PERMITTED BY APPLICABLE LAW, SYNGENTA MAKES NO WARRANTIES OF MERCHANTABILITY OR OF FITNESS FOR A PARTICULAR PURPOSE NOR ANY OTHER EXPRESS OR IMPLIED WARRANTY EXCEPT AS WARRANTED BY THIS LABEL.

To the extent permitted by applicable law, in no event shall SYNGENTA be liable for any incidental, consequential or special damages resulting from the use or handling of this product. **TO THE EXTENT PERMITTED BY APPLICABLE LAW, THE EXCLUSIVE REMEDY OF THE USER OR BUYER, AND THE EXCLUSIVE LIABILITY OF SYNGENTA AND SELLER FOR ANY AND ALL CLAIMS, LOSSES, INJURIES OR DAMAGES (INCLUDING CLAIMS BASED ON BREACH OF WARRANTY, CONTRACT, NEGLIGENCE, TORT, STRICT LIABILITY OR OTHERWISE) RESULTING FROM THE USE OR HANDLING OF THIS PRODUCT, SHALL BE THE RETURN OF THE PURCHASE PRICE OF THE PRODUCT OR, AT THE ELECTION OF SYNGENTA OR SELLER, THE REPLACEMENT OF THE PRODUCT.**

SYNGENTA and Seller offer this product, and Buyer and User accept it, subject to the foregoing Conditions of Sale and Limitation of Warranty and Liability, which may not be modified except by written agreement signed by a duly authorized representative of SYNGENTA.

DIRECTIONS FOR USE

It is a violation of Federal law to use this product in a manner inconsistent with its labeling.

Do not apply this product in a way that will contact workers or other persons, either directly or through drift. Only protected handlers may be in the area during application. For any requirements specific to your State or Tribe, consult the agency responsible for pesticide regulation.

AGRICULTURAL USE REQUIREMENTS

Use this product only in accordance with its labeling and with the Worker Protection Standard, 40 CFR Part 170. This Standard contains requirements for the protection of agricultural workers on farms, forests, nurseries, and greenhouses, and handlers of agricultural pesticides. It contains requirements for training, decontamination, notification, and emergency assistance. It also contains specific instructions and exceptions pertaining to the statements on this label about personal protective equipment (PPE) and restricted-entry interval. The requirements in this box only apply to uses of this product that are covered by the Worker Protection Standard.

Do not enter or allow worker entry into treated areas during the restricted-entry interval (REI) of 4 hours.

PPE required for early entry to treated areas that is permitted under the Worker Protection Standard and that involves contact with anything that has been treated, such as plants, soil, or water is:

- Coveralls
- Chemical-resistant gloves made of any waterproof material
- Shoes plus socks

GENERAL USE PRECAUTIONS

FAILURE TO FOLLOW DIRECTIONS AND PRECAUTIONS ON THIS LABEL MAY RESULT IN CROP INJURY, POOR DISEASE CONTROL, AND/OR ILLEGAL RESIDUES.

GENERAL INFORMATION

Revus provides control of diseases caused by downy mildews. It has preventative and limited curative properties. Revus is applied as a foliar spray and can be used in block, alternating spray, or tank mix programs with other crop protection products. All applications must be made according to the use directions that follow.

GENERAL USE INSTRUCTIONS

Application: Thorough coverage is necessary to provide good disease control. Mix only the amount of spray solution needed for immediate application. Avoid spray overlap, as crop injury may occur.

Adjuvants: For some uses on this label, a spreading/penetrating type adjuvant such as a non-ionic surfactant, crop oil concentrate, silicone based, or blend must be added at the manufacturer's recommended rates. For other crop uses, an adjuvant is recommended. When an adjuvant is to be used with this product, SYNGENTA recommends the use of a Chemical Producers and Distributors Association certified adjuvant.

Efficacy: Under certain conditions conducive to extended infection periods, use another registered fungicide for additional applications if maximum amount of Revus has been used. If isolates that are resistant to Group 40 fungicides are present, efficacy may be reduced for certain diseases. The higher rates in the rate range and/or shorter spray intervals may be required under conditions of heavy infection pressure, highly susceptible varieties, or when environmental conditions conducive to disease exist.

Disease Suppression: If a use indicates suppression it refers to erratic control from fair to good, or consistent control at a level below that obtained with products registered for control.

Integrated Pest Management (IPM): Revus should be integrated into an overall disease and pest management strategy whenever the use of a fungicide is required. Cultural practices known to reduce disease development should be followed. Consult your local agricultural authorities for additional IPM strategies established for your area. Revus may be used in State Agricultural Extension advisory (disease forecasting) programs which recommend application timing based on environmental factors favorable for disease development.

Resistance Management:

GROUP	40	FUNGICIDE

Revus contains mandipropamid, a Carboxylic Acid Amide (CAA) fungicide in Group 40. Fungal pathogens can develop resistance to products with the same mode of action when used repeatedly. Because resistance development cannot be predicted, use of this product should conform to resistance management strategies established for the crop and use area. Consult your local or State agricultural authorities for resistance management strategies that are complementary to those in this label. Resistance management strategies may include rotating and/or tank mixing with products having different modes of action or limiting the total number of applications per season. SYNGENTA encourages responsible resistance management to ensure effective long-term control of the fungal diseases on this label. Revus must not be alternated or tank mixed with any fungicide to which resistance has already developed.

As part of a resistance management strategy:

- Apply a maximum of 4 sprays during one crop cycle.
- Apply no more than 2 sequential applications unless otherwise stated in the crop section.
- When tank mixing or alternating, use an effective partner – one that provides satisfactory disease control when used alone at the mixture rate.
- Do not use Revus in transplant production.

Rotational Crops: To avoid possible illegal residues, do not plant any other crop within 30 days of a Revus application to the preceding crop unless the crop appears on this label.

Crop Tolerance: Plant tolerance has been found acceptable for all crops on the label, however, not all possible tank mix combinations have been tested under all conditions. When possible, it is recommended to test the combinations on a small portion of the crop to ensure a phytotoxic response will not occur as a result of application.

Spray Drift Management: To avoid spray drift, do not apply when conditions favor drift beyond the target area. The interaction of many equipment and weather related factors determine the potential for spray drift. AVOIDING SPRAY DRIFT AT THE APPLICATION SITE IS THE RESPONSIBILITY OF THE APPLICATOR AND THE GROWER. More information on managing spray drift can be found on the SYNGENTA CROP PROTECTION website under Environmental Stewardship:

http://www.syngentacropprotection.com/Env_Stewardship

MIXING AND APPLICATION METHODS

Spray Equipment

Nozzles

- Equip sprayers with nozzles that provide accurate and uniform application.
- Nozzles should be the same size and uniformly spaced across the boom.
- Calibrate sprayer before use.
- It is suggested that screens be used to protect the pump and to prevent nozzles from clogging.
- Screens placed on suction side of pump should be 16-mesh or coarser.
- Do not place a screen in the recirculation line.
- Use 50-mesh or coarser screens between the pump and boom, and where required, at the nozzles.
- Check nozzle manufacturer's recommendations.

Pump

- Use a pump with capacity to:
  (1) maintain 35-40 psi at nozzles
  (2) provide sufficient agitation in tank to keep mixture in suspension - this requires recirculation of 10% of tank volume per minute.
- Use a jet agitator or liquid sparge tube for agitation.
- Do not air sparge.

For more information on spray equipment and calibration, consult sprayer manufacturers and state recommendations. For specific local directions and spray schedules, consult the current state agricultural recommendations.

Mixing Instructions

- Prepare no more spray mixture than is required for the immediate operation.
- Thoroughly clean spray equipment before using this product.
- Agitate the spray solution before and during application.
- Rinse spray tank thoroughly with clean water after each day's use and dispose of pesticide rinsate by application to an already treated area.
- Do not allow spray mixture to stand overnight or for prolonged periods of time (more than 3 hours) without agitation.

Revus Alone (no tank mix):

- Add 1/2-2/3 of the required amount of water to the spray or mixing tank.
- With the agitator running, add Revus to the tank.
- Continue agitation while adding the remainder of the water.
- Begin application of the spray solution after Revus has completely dispersed into the mix water.
- Maintain agitation until all of the mixture has been sprayed.

Revus + Tank Mixtures: Revus is usually compatible with all tank-mix partners listed on this label. To determine the physical compatibility of Revus with other products, use a jar test. Using a quart jar, add the proportionate amounts of the products to 1 qt. of water. Add wettable powders and water dispersible granular products first, then liquid flowables, and emulsifiable concentrates last. After thoroughly mixing, let stand for at least 5 minutes. If the combination remains mixed or can be remixed readily, it is physically compatible. Once compatibility has been proven, use the same procedure for adding required ingredients to the spray tank.

It is important to mix only the amount of product that can be sprayed immediately. Continuous agitation is recommended. If circumstances cause a delay of more than 3 hours, the product(s) may settle and be difficult to re-suspend. If this occurs, good agitation is required for a minimum of 15 minutes before and during spray operation.

Mixing in the Spray Tank

- Add 1/2-2/3 of the required amount of water to the spray or mixing tank.
- With the agitator running, add the tank mix partner(s) into the tank in the same order as described above.
- Allow the material to completely dissolve and disperse into the mix water. Continue agitation while adding the remainder of the water and Revus to the spray tank.
- Allow Revus to completely disperse.
- Spray the mixture with the agitator running.

Application Instructions

Revus may be applied with all types of spray equipment commonly used for making ground and aerial applications. Proper adjustments and calibration of spraying equipment to give good canopy penetration and coverage is essential for good disease control.

Ground Application:

- Apply in a minimum of 10 gallons of water per acre, unless specified otherwise on this label.
- Do not apply through any ultra-low volume (ULV) spray system.
- Thorough coverage is necessary to provide good disease control.

Aerial Application:

- Use only on crops where aerial applications are indicated.
- Thorough coverage is necessary to provide good disease control.
- Apply in a minimum of 5 gallons of water per acre unless specified otherwise on this label.
- Avoid application under conditions when uniform coverage cannot be obtained or when excessive spray drift may occur.
- Do not apply directly to humans or animals.
- Do not apply through any ultra-low volume (ULV) spray system.

Application Through Irrigation Systems (Chemigation) –

- Use only on crops where chemigation is specified on this label.
- Apply this product only through center pivot, solid set, hand move, or moving wheel irrigation systems. Do not apply this product through any other type of irrigation system.
- Crop injury, lack of effectiveness, or illegal pesticide residues in the crop can result from non-uniform distribution of treated water.
- Apply Revus use rates in 0.1 – 0.25 inches per acre. Excessive water may reduce efficacy.
- If you have questions about calibration, you should contact State Extension Service specialists, equipment manufacturers, or other experts.
- Do not connect an irrigation system (including greenhouse systems) used for pesticide application to a public water system, unless the pesticide label-prescribed safety devices for public water systems are in place.
- A person knowledgeable of the chemigation system and responsible for its operation, or under the supervision of the responsible person, shall shut the system down and make necessary adjustments should the need arise.

Operating Instructions

1. The system must contain a functional check-valve, vacuum relief valve, and low pressure drain appropriately located on the irrigation pipeline to prevent water-source contamination from backflow.
2. The pesticide injection pipeline must contain a functional, automatic, quick-closing check-valve to prevent the flow of fluid back toward the injection pump.
3. The pesticide injection pipeline must also contain a functional, normally closed, solenoid-operated valve located on the intake side of the injection pump and connected to the system interlock to prevent fluid from being withdrawn from the supply tank when the irrigation system is either automatically or manually shut down.
4. The system must contain functional interlocking controls to automatically shut off the pesticide injection pump when the water pump motor stops.

5. The irrigation line or water pump must include a functional pressure switch which will stop the water pump motor when the water pressure decreases to the point where pesticide distribution is adversely affected.
6. Systems must use a metering pump, such as a positive displacement injection pump (e.g., diaphragm pump), effectively designed and constructed of materials that are compatible with pesticides and capable of being fitted with a system interlock.
7. Do not apply when wind speed favors drift beyond the area intended.

Center Pivot Irrigation Equipment

Notes: (1) Use only with drive systems which provide uniform water distribution. (2) Do not use end guns when chemigating Revus through center pivot systems, because of non-uniform application.

- Determine the size of the area to be treated.
- Determine the time required to apply 1/8-1/2 inch of water over the area to be treated when the system and injection equipment are operated at normal pressures as recommended by the equipment manufacturer. When applying Revus through irrigation equipment, use the lowest obtainable water volume while maintaining uniform distribution. Run the system at 80-95% of the manufacturer's rated capacity.
- Using water, determine the injection pump output when operated at normal line pressure.
- Determine the amount of Revus required to treat the area covered by the irrigation system.
- Add the required amount of Revus and sufficient water to meet the injection time requirements to the solution tank.
- Make sure the system is fully charged with water before starting injection of the Revus solution. Time the injection to last at least as long as it takes to bring the system to full pressure.
- Maintain constant solution tank agitation during the injection period.
- Continue to operate the system until the Revus solution has cleared the sprinkler head.

Solid Set, Hand Move, and Moving Wheel Irrigation Equipment

- Determine the acreage covered by the sprinklers.
- Fill injector solution tank with water and adjust flow rate to use the contents over a 20 to 30-minute interval. When applying Revus through irrigation equipment use the lowest obtainable water volume while maintaining uniform distribution.
- Determine the amount of Revus required to treat the area covered by the irrigation system.
- Add the required amount of Revus into the same quantity of water used to calibrate the injection period.
- Operate the system at the same pressure and time interval established during the calibration.
- Stop injection equipment after treatment is completed. Continue to operate the system until the Revus solution has cleared the last sprinkler head.

SPECIFIC INSTRUCTIONS FOR PUBLIC WATER SYSTEMS

1. Public water system means a system for the provision to the public of piped water for human consumption if such system has at least 15 service connections or regularly serves an average of at least 25 individuals daily at least 60 days out of the year.
2. Chemigation systems connected to public water systems must contain a functional, reduced-pressure zone, back-flow preventer (RPZ) or the functional equivalent in the water supply line upstream from the point of pesticide introduction. As an option to the RPZ, the water from the public water system should be discharged into a reservoir tank prior to pesticide introduction. There shall be a complete physical break (air gap) between the outlet end of the fill pipe and the top or overflow rim of the reservoir tank of at least twice the inside diameter of the fill pipe.

3. The pesticide injection pipeline must contain a functional, automatic, quick-closing check valve to prevent the flow of fluid back toward the injection pump.
4. The pesticide injection pipeline must contain a functional, normally closed, solenoid-operated valve located on the intake side of the injection pump and connected to the system interlock to prevent fluid from being withdrawn from the supply tank, when the irrigation system is either automatically or manually shut down.
5. The system must contain functional interlocking controls to automatically shut off the pesticide injection pump when the water pump motor stops, or in cases where there is no water pump when the water pressure decreases to the point where pesticide distribution is adversely affected.
6. Systems must use a metering pump, such as a positive displacement injection pump (e.g., diaphragm pump) effectively designed and constructed of materials that are compatible with pesticides, and capable of being fitted with a system interlock.
7. Do not apply when wind speed favors drift beyond the area intended for treatment.

SPECIFIC DIRECTIONS FOR USE

Crop	Disease	Rate fl. oz./Acre (lb a.i./A)	Remarks
Brassica – all crops in head/stem and leafy greens subgroups Broccoli Brussels sprouts Cabbage Cauliflower Collards Kale Mustard greens *Including all cultivars and/or hybrids of these.* *See additional crops below.*	Downy mildew (*Peronospora parasitica*)	8.0 (0.13)	Begin applications prior to disease development and continue throughout the season on a 7-10 day interval. Make no more than 2 consecutive applications before switching to another effective non-Group 40 fungicide. Use the shorter interval and/or higher rates under high pressure or when conditions are conducive to disease. Revus may be tank mixed with another fungicide labeled for downy mildew that has a different mode of action. A spreading/penetrating type adjuvant such as a silicone based adjuvant, non-ionic surfactant, crop oil concentrate, or blend must be added at recommended rates when applied by ground or air.
	Application: For best results, use sufficient water volume to provide thorough coverage. Revus may be applied by ground, chemigation, or aerial application.		
Additional Crops in Head and Stem subgroup: Chinese broccoli (gai lon), Chinese cabbage (napa), Chinese mustard cabbage (gai choy), Cavalo broccolo, Kohlrabi **Additional Crops in the Leafy Greens subgroup:** Broccoli raab, Chinese cabbage, Mizuna, Mustard spinach, Rape greens			
Specific Use Restrictions: • Do not apply more than 32 fl oz of product/A/season (0.52 lb a.i./A/season). • Do not apply within 1 day of harvest (1-day PHI).			

Crop	Disease	Rate fl. oz./Acre (lb a.i./A)	Remarks
Bulb Vegetables: **Dry bulb** Onion, bulb Garlic Shallot **Green Onion** Onions, green Leek Welch onion	Downy mildew *(Peronospora destructor)*	8.0 (0.13)	Begin applications prior to disease development and continue throughout the season on a 7-10 day interval. Make no more than 2 consecutive applications before switching to another effective non-Group 40 fungicide. Use the shorter interval and/or higher rates under high pressure or when conditions are conducive to disease. Revus may be tank mixed with another fungicide labeled for downy mildew that has a different mode of action. A silicone-based adjuvant must be added at recommended rates.
	Application: For best results, use sufficient water volume to provide thorough coverage. Revus may be applied by ground, chemigation, or aerial application.		

Specific Use Restrictions:

- For dry bulb vegetables do not apply more than 32 fl oz of product/A/season (0.52 lb a.i./A/season).
- For green onions do not apply more than 24 fl oz of product/A/season (0.39 lb a.i./A/season).
- Do not apply within 7 days of harvest (7-day PHI).

Crop	Disease	Rate fl. oz./Acre (lb a.i./A)	Remarks
Cucurbits: Cantaloupe Cucumber Honeydew Muskmelon Watermelon Pumpkin Squash Zucchini *Including cultivars and/or hybrids of these.* *See additional cucurbit crops below.*	For suppression of: Downy mildew (*Pseudoperonospora cubensis*)	8.0 (0.13)	Begin applications prior to disease development and continue throughout the season on a 7-10 day interval. Make no more than 1 application before switching to another effective non-Group 40 fungicide. Revus must be tank mixed with another fungicide labeled for downy mildew that has a different mode of action. Use the shorter interval and/or higher rates under high pressure or when conditions are conducive to disease. A spreading/penetrating type adjuvant such as a non-ionic surfactant, crop oil concentrate, or blend must be added at recommended rates.

Crop	Disease	Rate fl. oz./Acre (lb a.i./A)	Remarks
Cucurbits: (continued) Cantaloupe Cucumber Honeydew Muskmelon Watermelon Pumpkin Squash Zucchini *Including cultivars and/or hybrids of these.* *See additional cucurbit crops below.*	For suppression of: Phytophthora blight (*P. capsici*)	8.0 (0.13)	For best results, begin the disease management program with an initial treatment at planting or transplanting with a fungicide registered for this use. Apply Revus as a foliar spray in a mixture with a copper based fungicide (at the recommended rate) beginning at first sign of disease or based on local recommendations. Revus should be alternated with another registered fungicide such as Ridomil Gold® Copper on a 7-14 day interval. Use adjuvants as recommended above.
	Application: For best results, use sufficient water volume to provide thorough coverage. Revus may be applied by ground, chemigation, or aerial application. For *P. capsici* applications use a minimum of 20 gal/A by ground.		
Additional cucurbit crops: Chayote, Chinese waxgourd, Gourds, *Momordica* spp. (Bitter melon, Balsam apple)			
Specific Use Restrictions: • Do not apply more than 32 fl oz of product/A/season (0.52 lb a.i./A/season). • May be applied the day of harvest (0-day PHI).			

Crop	Disease	Rate fl. oz./Acre (lb a.i./A)	Remarks
Grapes	Downy mildew *(Plasmopora viticola)*	8.0 (0.13)	Begin applications prior to disease development and continue throughout the season on a 7-day interval. Make no more than 2 consecutive applications before switching to another effective non-Group 40 fungicide. Use the shorter interval and/or higher rates under high pressure or when conditions are conducive to disease. The addition of a spreading/penetrating type adjuvant such as a nonionic based surfactant or crop oil concentrate or blend is recommended.
	Application: For best results, use sufficient water volume to provide thorough coverage. Revus may be applied by either ground (15 gal minimum) or aerial application (10 gal minimum).		
Specific Use Restrictions: • Do not apply more than 32 fl oz of product/A/season (0.52 lb a.i./A/season). • Do not apply within 14 days of harvest (14-day PHI).			

Crop	Disease	Rate fl. oz./Acre (lb a.i./A)	Remarks
Hops	Downy mildew *(Pseudoperonospora humuli)*	8.0 (0.13)	Begin applications prior to disease development and continue throughout the season on a 7-10 day interval. Make no more than 2 consecutive applications before switching to an effective non-Group 40 fungicide. For resistance management, no more than 50% of the sprays should be Revus. Use the shorter interval under high pressure or when conditions are conducive to disease. Revus may be tank mixed with another fungicide labeled for downy mildew that has a different mode of action. The addition of a spreading/penetrating type adjuvant such as a non-ionic based surfactant or blend is recommended.
	Application: For best results, use sufficient water volume to provide thorough coverage. Revus may be applied by ground, chemigation, or aerial application.		
Specific Use Restrictions: • Do not apply more than 24 fl oz of product/A/season (0.39 lb a.i./A/season). • Do not apply within 7 days of harvest (7-day PHI).			

Crop	Disease	Rate fl. oz./Acre (lb a.i./A)	Remarks
Leafy Vegetables Lettuce, leaf and head Spinach Celery *Including cultivars and/or hybrids of these.* *See additional crops below.*	Blue mold *(Peronospora effusa)* Downy mildew *(Bremia lactucae)* Downy mildew *(Plasmopora umbellifera-rum)* Downy mildew *(Peronospora* spp.*)*	8.0 (0.13)	Begin applications prior to disease development and continue throughout the season on a 7-10 day interval. Make no more than 2 consecutive applications before switching to another effective non-Group 40 fungicide. Use the shorter interval and/or higher rates under high pressure or when conditions are conducive to disease. The addition of a spreading/penetrating type adjuvant such as a non-ionic surfactant or crop oil concentrate or blend is recommended.
	Application: For best results, use sufficient water volume to provide thorough coverage. Revus may be applied by ground, chemigation, or aerial application.		
Additional Leafy Vegetables: Amaranth, Arugula, Cardoon, Celery (Chinese), Celtuce, Chervil, Chrysanthemum (edible-leaved and garland), Corn salad, Cress (garden and upland), Dandelion, Dock, Endive, Fennel (Florence), Orach, Parsley, Purslane (garden and winter), Radicchio (red chicory), Rhubarb, Spinach (New Zealand and vine), and Swiss chard.			
Specific Use Restrictions: • Do not apply more than 32 fl oz of product/A/season (0.52 lb a.i./A/season). • Do not apply within 1 day of harvest (1 day PHI).			

Crop	Disease	Rate fl. oz./Acre (lb a.i./A)	Remarks
Peppers and other Fruiting Vegetables: Peppers Bell pepper Non-bell pepper Sweet non-bell	Downy mildew *(Peronospora tabacina)*	8.0 (0.13)	Begin applications prior to disease development and continue throughout the season on a 7-10 day interval. Make no more than 2 consecutive applications before switching to another effective non-Group 40 fungicide. Use the shorter interval and/or higher rates under high pressure or when conditions are conducive to disease. The addition of a spreading/penetrating type adjuvant such as a non-ionic surfactant or crop oil concentrate or blend is recommended.

continued...

Crop	Disease	Rate fl. oz./Acre (lb a.i./A)	Remarks
Peppers and other Fruiting Vegetables: (continued) Peppers Bell pepper Non-bell pepper Sweet non-bell	*For suppression of:* Phytophthora blight (*P. capsici*)	8.0 (0.13)	For best results, begin the disease management program with an initial treatment at planting or transplanting with a fungicide registered for this use. Apply Revus as a foliar spray in a mixture with a copper based fungicide (at the recommended rate) beginning at first sign of disease or based on local recommendations. Alternate Revus with another registered fungicide such as Ridomil Gold Copper on a 7-14 day interval or use in a blocking program of 2 applications of Revus, followed by another fungicide for additional applications. Use adjuvants as recommended above.
	Application: For best results, use sufficient water volume to provide thorough coverage. Revus may be applied by ground, chemigation, or aerial application. For *P. capsici* applications use a minimum of 20 gal/A by ground.		
Specific Use Restrictions: • Do not apply more than 32 fl oz of product/A/season (0.52 lb a.i./A/season). • Do not apply within 1 day of harvest (1-day PHI).			

Revus Conversion Table

Oz product/acre	Lb a.i./acre
8.0	0.13

STORAGE AND DISPOSAL

Do not contaminate water, food, or feed by storage or disposal.

Pesticide Storage

Store in original containers only. Store in a cool, dry place. Keep container closed when not in use. Do not store near food or feed. In case of spill on floor or paved surfaces, mop and remove to chemical waste storage area until proper disposal can be made if product cannot be used according to the label.

Pesticide Disposal

Pesticide wastes may be acutely hazardous. Improper disposal of excess pesticide, spray mixture, or rinsate is a violation of Federal law. If these wastes cannot be disposed of by use according to label instructions, contact your State Pesticide or Environmental Control Agency, or the Hazardous Waste representative at the nearest EPA Regional Office for guidance in proper disposal methods.

Container Handling

Non-refillable container. Do not reuse or refill this container. Offer for recycling if available. Triple rinse container (or equivalent) promptly after emptying. Triple rinse as follows: Empty the remaining contents into application equipment or mix tank and drain for 10 seconds after the flow begins to drip. Fill the container 1/4 full with water and recap. Shake for 10 seconds. Pour rinsate into application equipment or mix tank or store rinsate for later use and disposal. Drain for 10 seconds after the flow begins to drip. Repeat this procedure two more times. Then offer for recycling if available or puncture and dispose of in a sanitary landfill, or by incineration, or, if allowed by state and local authorities, by burning. If burned, stay out of smoke.

CONTAINER IS NOT SAFE FOR FOOD, FEED, OR DRINKING WATER.

U.S. Label

For non-emergency (e.g., current product information), call Syngenta Crop Protection at 1-800-334-9481.

Manufactured for:
Syngenta Crop Protection, Inc.
P.O. Box 18300
Greensboro, North Carolina 27419-8300

SCP 1254A-L1C 0909

IMPORTANT NOTICE

This product is registered in both the U.S. and Canada.
It has BOTH U.S. and Canadian Labeling.
You must follow ONLY the U.S. label WHEN USING THIS product in the U.S.
You must follow ONLY the Canadian label WHEN USING THIS product in Canada.

Revus®

Fungicide

GROUP 40 FUNGICIDE

SUSPENSION

AGRICULTURAL

READ THE LABEL AND ATTACHED BOOKLET BEFORE USING

KEEP OUT OF REACH OF CHILDREN

ACTIVE INGREDIENT/ GUARANTEE:

Mandipropamid*	23.3%
Other Ingredients:	76.7%
Total:	100.0%

*CAS No.: 374726-62-2
Contains 1,2-benzisothiazolin-3-one at 0.017% as a preservative.

Contains 23.3% Mandipropamid equivalent to 2.08 pounds per gallon or 250 grams per liter of active ingredient

Syngenta Crop Protection, Inc.
PO Box 18300
Greensboro, NC 27419
Telephone (U.S.): 1-866-796-4368

Syngenta Crop Protection Canada, Inc.
140 Research Lane, Research Park
Guelph, ON N1G 4Z3
Telephone (Canada):1-877-964-3682

In case of emergency involving a major spill, fire, or poisoning, call 1-800-888-8372 (in the US.) or 1-800-327-8633 (FASTMED)(in Canada)

NET CONTENTS: 1 gallon / 3.78 L

EPA Reg. No. 100-1254/ EPA Est. 100-NE-001
REGISTRATION NO. : 29074
PEST CONTROL PRODUCTS ACT

FIRST AID: When seeking medical attention, take the container label if possible. If not, take information which identifies the product, that is, the product name and registration numbers. If swallowed, call a poison control center or doctor **IMMEDIATELY** for treatment advice. Have person sip a glass of water if able to swallow. Do not induce vomiting unless told to by a poison control center or doctor. Do not give anything by mouth to an unconscious person. **If on skin or clothing,** take off contaminated clothing. Rinse skin immediately with plenty of water for 15-20 minutes. Call a poison control center or doctor for treatment advice. **If inhaled,** move person to fresh air. If person is not breathing, call 911 or an ambulance, then give artificial respiration, preferably by mouth-to-mouth, if possible. Call a poison control center or doctor for further treatment advice. **If in eyes,** hold eye open and rinse slowly and gently with water for 15-20 minutes. Remove contact lenses, if present, after the first 5 minutes, then continue rinsing eye. Call a poison control center or doctor for treatment advice.

Use this product only in accordance with its labeling and with the *Worker Protection Standard*, 40CFR Part 170. Refer to supplemental labeling under "Agricultural Use Requirements" in the Directions for Use section for information about this standard.

STORAGE: Store in a cool, dry place. Do not store food, beverages or tobacco products in storage area.
IN THE UNITED STATES: It is a violation of United States law to use this product without having obtained the United States label at the time of purchase and following the U.S. label at the time of application.
IN CANADA: NOTICE TO USER: This pest control product is to be used only in accordance with the directions on the label. It is an offence under the *Pest Control Products Act* to use this product in a way that is inconsistent with the directions on the label. The user assumes the risk to persons or property that arises from any such use of this product.
Refer to country specific label booklet for additional information including precautions, protective clothing and equipment, user safety recommendations, environmental hazards, environmental precautions, storage and disposal directions and warranty information.

Product of Switzerland, Formulated in the USA

syngenta®

08-08-22
SCP 1254A-L2 0808
279421

Revus NAFTA English label
size 6.75 x 6.75

GROUP 3 40 FUNGICIDES

PULL HERE TO OPEN

RevusTop®

syngenta®

Fungicide

Active Ingredients:	
Mandipropamid (CAS No. 374726-62-2)	21.9%
Difenoconazole (CAS No. 119446-68-3)	21.9%
Other Ingredients:	56.2%
Total:	**100.0%**

Contains 2.08 pounds of mandipropamid active ingredient and 2.08 pounds of difenoconazole active ingredient per gallon

KEEP OUT OF REACH OF CHILDREN.

CAUTION

See additional precautionary statements and directions for use inside booklet.

EPA Reg. 100-1278

EPA Est. 100-NE-001

SCP 1278A-L1C 1210
338408

2.5 gallons
Net Contents

™

FIRST AID	
If swallowed	• Call a poison control center or doctor immediately for treatment advice. • Have person sip a glass of water if able to swallow. • Do not induce vomiting unless told to by a poison control center or doctor. • Do not give anything to an unconscious person.
Have the product container or label with you when calling a poison control center or doctor, or going for treatment.	
HOT LINE NUMBER For 24-Hour Medical Emergency Assistance (Human or Animal) Or Chemical Emergency Assistance (Spill, Leak, Fire or Accident) Call **1-800-888-8372**	

PRECAUTIONARY STATEMENTS

Hazards to Humans and Domestic Animals

CAUTION

Harmful if swallowed. Wash thoroughly with soap and water after handling and before eating, drinking, chewing gum, using tobacco or using the toilet.

Personal Protective Equipment (PPE)

Applicators and other handlers must wear:

- Long-sleeved shirt and long pants
- Shoes plus socks
- Chemical-resistant gloves made of any waterproof materials such as polyvinyl chloride, nitrile rubber or butyl rubber.

Follow manufacturer's instructions for cleaning/maintaining PPE. If no such instructions for washables, use detergent and hot water. Keep and wash PPE separately from other laundry.

Engineering Control Statements

When handlers use closed systems, enclosed cabs, or aircraft in a manner that meets the requirements listed in the Worker Protection Standard (WPS) for agricultural pesticides [40 CFR 170.240(d)(4-6)], the handler PPE requirements may be reduced or modified as specified in the WPS.

User Safety Recommendations

Users should:

- Wash hands before eating, drinking, chewing gum, using tobacco, or using the toilet.
- Remove clothing immediately if pesticide gets inside. Then wash thoroughly and put on clean clothing.

Environmental Hazards

This pesticide is toxic to fish, mammals, and aquatic invertebrates. Drift and runoff may be hazardous to aquatic **estuarine/marine** organisms in water adjacent to treated area. Do not apply directly to water, areas where surface water is present, or intertidal areas below the mean high water mark. Do not contaminate water when disposing of equipment washwater or rinsate.

continued...

PRECAUTIONARY STATEMENTS *(continued)*

This product may impact surface water quality due to runoff of rain water. This is especially true for poorly draining soils and soils with shallow ground water. This product has a potential for runoff for several months or more after application. A level, well maintained vegetative buffer strip between areas to which this product is applied and surface water features such as ponds, streams, and springs will reduce the potential for contamination of water from rainfall-runoff. Runoff of this product will be reduced by avoiding applications when rainfall is forecasted to occur within 48 hours. Sound erosion control practices will reduce this products' potential to reach surface water.

Do not discharge effluent containing this product into lakes, streams, ponds, estuaries, oceans, or other waters unless in accordance with the requirements of a National Pollutant Discharge Elimination System (NPDES) permit and the permitting authority has been notified in writing prior to discharge. Do not discharge effluent containing this product to sewer systems without previously notifying the local sewage treatment plant authority. For guidance, contact your State Water Board or regional office of the EPA.

CONDITIONS OF SALE AND LIMITATION OF WARRANTY AND LIABILITY

NOTICE: Read the entire Directions for Use and Conditions of Sale and Limitation of Warranty and Liability before buying or using this product. If the terms are not acceptable, return the product at once, unopened, and the purchase price will be refunded.

The Directions for Use of this product must be followed carefully. It is impossible to eliminate all risks inherently associated with the use of this product. Crop injury, ineffectiveness or other unintended consequences may result because of such factors as manner of use or application, weather or crop conditions, presence of other materials or other influencing factors in the use of the product, which are beyond the control of SYNGENTA CROP PROTECTION, LLC or Seller. To the extent permitted by applicable law, Buyer and User agree to hold SYNGENTA and Seller harmless for any claims relating to such factors.

SYNGENTA warrants that this product conforms to the chemical description on the label and is reasonably fit for the purposes stated in the Directions for Use, subject to the inherent risks referred to above, when used in accordance with directions under normal use conditions. To the extent permitted by applicable law: (1) this warranty does not extend to the use of this product contrary to label instructions or under conditions not reasonably foreseeable to or beyond the control of Seller or SYNGENTA, and, (2) Buyer and User assume the risk of any such use. TO THE EXTENT PERMITTED BY APPLICABLE LAW, SYNGENTA MAKES NO WARRANTIES OF MERCHANTABILITY OR OF FITNESS FOR A PARTICULAR PURPOSE NOR ANY OTHER EXPRESS OR IMPLIED WARRANTY EXCEPT AS WARRANTED BY THIS LABEL.

To the extent permitted by applicable law, in no event shall SYNGENTA be liable for any incidental, consequential or special damages resulting from the use or handling of this product. **TO THE EXTENT PERMITTED BY APPLICABLE LAW, THE EXCLUSIVE REMEDY OF THE USER OR BUYER, AND THE EXCLUSIVE LIABILITY OF SYNGENTA AND SELLER FOR ANY AND ALL CLAIMS, LOSSES, INJURIES OR DAMAGES (INCLUDING CLAIMS BASED ON BREACH OF WARRANTY, CONTRACT, NEGLIGENCE, TORT, STRICT LIABILITY OR OTHERWISE) RESULTING FROM THE USE OR HANDLING OF THIS PRODUCT, SHALL BE THE RETURN OF THE PURCHASE PRICE OF THE PRODUCT OR, AT THE ELECTION OF SYNGENTA OR SELLER, THE REPLACEMENT OF THE PRODUCT.**

SYNGENTA and Seller offer this product, and Buyer and User accept it, subject to the foregoing Conditions of Sale and Limitation of Warranty and Liability, which may not be modified except by written agreement signed by a duly authorized representative of SYNGENTA.

DIRECTIONS FOR USE

It is a violation of Federal law to use this product in a manner inconsistent with its labeling.

Do not apply this product in a way that will contact workers or other persons, either directly or through drift. Only protected handlers may be in the area during application. For any requirements specific to your State or Tribe, consult the agency responsible for pesticide regulation.

AGRICULTURAL USE REQUIREMENTS

Use this product only in accordance with its labeling and with the Worker Protection Standard, 40 CFR Part 170. This Standard contains requirements for the protection of agricultural workers on farms, forests, nurseries, and greenhouses, and handlers of agricultural pesticides. It contains requirements for training, decontamination, notification, and emergency assistance. It also contains specific instructions and exceptions pertaining to the statements on this label about personal protective equipment (PPE) and restricted-entry interval. The requirements in this box only apply to uses of this product that are covered by the Worker Protection Standard.

Do not enter or allow worker entry into treated areas during the restricted-entry interval (REI) of 12 hours.

PPE required for early entry to treated areas that is permitted under the Worker Protection Standard and that involves contact with anything that has been treated, such as plants, soil, or water is:

- Coveralls
- Chemical-resistant gloves made of any waterproof materials such as polyvinyl chloride, nitrile rubber or butyl rubber.
- Shoes plus socks

PRODUCT USE PRECAUTIONS

FAILURE TO FOLLOW DIRECTIONS AND PRECAUTIONS ON THIS LABEL MAY RESULT IN CROP INJURY, POOR DISEASE CONTROL, AND/OR ILLEGAL RESIDUES.

PRODUCT INFORMATION

Revus Top is a broad spectrum product containing two fungicides. It has preventative, systemic and curative properties and is recommended for the control of many important plant diseases. Revus Top provides excellent disease control of many leaf spots, powdery mildews, and downy mildews. Revus Top is applied as a foliar spray and can be used in block, alternating spray, or tank mix programs with other crop protection products. All applications must be made according to the use directions that follow.

PRODUCT USE INSTRUCTIONS

Application: Thorough coverage is necessary to provide good disease control. Mix only the amount of spray solution needed for immediate application. Avoid spray overlap, as crop injury may occur.

Adjuvants: A spreading/penetrating type adjuvant such as a non-ionic surfactant, crop oil concentrate, or blend is recommended at the manufacturer's recommended rates. When an adjuvant is to be used with this product, the use of an adjuvant that meets the standards of the Chemical Producers and Distributors Association (CPDA) adjuvant certification program is recommended.

Efficacy: Under certain conditions conducive to extended infection periods, use another registered fungicide for additional applications if maximum amount of Revus Top has been used. If fungal isolates that are resistant to Group 3 or Group 40 fungicides are present, efficacy may be reduced for certain diseases. The higher rates in the rate range and/or shorter spray intervals may be required under conditions of heavy infection pressure, highly susceptible varieties, or when environmental conditions conducive to disease exist.

Integrated Pest Management (IPM): Revus Top should be integrated into an overall disease and pest management strategy whenever the use of a fungicide is required. Cultural practices known to reduce disease development should be followed. Consult your local agricultural authorities for additional IPM strategies established for your area. Revus Top may be used in State Agricultural Extension advisory (disease forecasting) programs which recommend application timing based on environmental factors favorable for disease development.

Resistance Management:

GROUP **3** **40** FUNGICIDES

Revus Top contains two fungicides - mandipropamid, a Carboxylic Acid Amide (CAA) fungicide in Group 40 and difenoconazole, a triazole fungicide in Group 3. Fungal pathogens can develop resistance to products with the same mode of action when used repeatedly. Because resistance development cannot be predicted, use of this product should conform to resistance management strategies established for the crop and use area. Consult your local or State agricultural authorities for resistance management strategies that are complementary to those in this label. Resistance management strategies may include rotating and/or tank mixing with products having different modes of action or limiting the total number of applications per season. SYNGENTA encourages responsible resistance management to ensure effective long-term control of the fungal diseases on this label. Revus Top must not be alternated or tank mixed with any fungicide to which resistance has already developed.

As part of a resistance management strategy:

- Apply a maximum of 4 sprays during one crop cycle
- Apply no more than 2 sequential applications unless otherwise stated in the crop section.
- When tank mixing or alternating, use an effective partner – one that provides satisfactory disease control when used alone at the mixture rate.
- Do not use Revus Top for transplant production.

Rotational Crops: Please see table below for crop rotational restrictions:

Rotational Crop	**Planting Time From Last Revus Top Application**
Cucurbit vegetables Brassica (Cole) leafy vegetables Bulb vegetables Tomatoes Fruiting vegetables Potatoes Tuberous & corm vegetables	0 days
Cereals (wheat, barley, triticale) Sweet corn Canola Cotton Sugar beets	30 days
All other crops intended for food and feed	8 months

Crop Tolerance: Plant tolerance has been found acceptable for all crops on the label, however, not all possible tank mix combinations have been tested under all conditions. When possible, it is recommended to test the combinations on a small portion of the crop to ensure a phytotoxic response will not occur as a result of application.

Spray Drift Management: To avoid spray drift, do not apply when conditions favor drift beyond the target area. The interaction of many equipment and weather related factors determine the potential for spray drift. AVOIDING SPRAY DRIFT AT THE APPLICATION SITE IS THE RESPONSIBILITY OF THE APPLICATOR AND THE GROWER. More information on managing spray drift can be found on this website under Stewardship
http://www.syngentacropprotection.com/Env_Stewardship/driftmanagement/index.aspx?nav=drift_management

MIXING AND APPLICATION METHODS

Spray Equipment

Nozzles

- Equip sprayers with nozzles that provide accurate and uniform application.
- Nozzles should be the same size and uniformly spaced across the boom.
- Calibrate sprayer before use.
- It is suggested that screens be used to protect the pump and to prevent nozzles from clogging.
- Screens placed on suction side of pump should be *16-mesh or coarser*.
- Do not place a screen in the recirculation line.
- Use 50-mesh or coarser screens between the pump and boom, and where required, at the nozzles.
- Check nozzle manufacturer's recommendations.

Pump

- Use a pump with capacity to:
  (1) maintain 35-40 psi at nozzles
  (2) provide sufficient agitation in tank to keep mixture in suspension - this requires recirculation of 10% of tank volume per minute.
- Use a jet agitator or liquid sparge tube for agitation.
- Do not air sparge.

For more information on spray equipment and calibration, consult sprayer manufacturers' and state recommendations. For specific local directions and spray schedules, consult the current state agricultural recommendations.

Mixing Instructions

- Prepare no more spray mixture than is required for the immediate operation.
- Thoroughly clean spray equipment before using this product.
- Agitate the spray solution before and during application.
- Rinse spray tank thoroughly with clean water after each day's use and dispose of pesticide rinsate by application to an already treated area.
- Do not allow spray mixture to stand overnight or for prolonged periods of time (more than 3 hours) without agitation.

Revus Top Alone (no tank mix):

- Add 1/2-2/3 of the required amount of water to the spray or mixing tank.
- With the agitator running, add Revus Top to the tank.
- Continue agitation while adding the remainder of the water.
- Begin application of the spray solution after Revus Top has completely dispersed into the mix water.
- Maintain agitation until all of the mixture has been sprayed.

Revus Top + Tank Mixtures: Revus Top is usually compatible with all tank-mix partners. To determine the physical compatibility of Revus Top with other products, use a jar test. Using a quart jar, add the proportionate amounts of the products to 1 qt. of water. Add wettable powders and water dispersible granular products first, then liquid flowables, and emulsifiable concentrates last. After thoroughly mixing, let stand for at least 5 minutes. If the combination remains mixed or can be remixed readily, it is physically compatible. Once compatibility has been proven, use the same procedure for adding required ingredients to the spray tank.

It is important to mix only the amount of product that can be sprayed immediately. Continuous agitation is recommended. If circumstances cause a delay of more than 3 hours, the product(s) may settle and be difficult to re-suspend. If this occurs, good agitation is required for a minimum of 15 minutes before and during spray operation.

Mixing in the Spray Tank

- Add 1/2-2/3 of the required amount of water to the spray or mixing tank.
- With the agitator running, add the tank mix partner(s) into the tank in the same order as described above.
- Allow the material to completely dissolve and disperse into the mix water. Continue agitation while adding the remainder of the water and Revus Top to the spray tank.
- Allow Revus Top to completely disperse.
- Spray the mixture with the agitator running.

Application Instructions

Revus Top may be applied with all types of spray equipment commonly used for making ground and aerial applications. Proper adjustments and calibration of spraying equipment to give good canopy penetration and coverage is essential for good disease control.

Ground Application:

- Apply in a minimum of 10 gals. of water per acre, unless specified otherwise.
- Do not apply through any ultra-low volume (ULV) spray system.
- Thorough coverage is necessary to provide good disease control.

Aerial Application:

- Use only on crops where aerial applications are indicated.
- Thorough coverage is necessary to provide good disease control.
- Apply in a minimum of 5 gallons of water per acre unless specified otherwise.
- Avoid application under conditions when uniform coverage cannot be obtained or when excessive spray drift may occur.
- Do not apply directly to humans or animals.
- Do not apply through any ultra-low volume (ULV) spray system.

Application Through Irrigation Systems (Chemigation)

- Use only on crops for which chemigation is specified on this label.
- Apply this product only through center pivot, solid set, hand move, or moving wheel irrigation systems. Do not apply this product through any other type of irrigation system.
- Crop injury, lack of effectiveness, or illegal pesticide residues in the crop can result from non-uniform distribution of treated water.
- Apply Revus Top use rates in 0.1 – 0.25 inches per acre. Excessive water may reduce efficacy.
- If you have questions about calibration, you should contact State Extension Service specialists, equipment manufacturers, or other experts.
- Do not connect an irrigation system (including greenhouse systems) used for pesticide application to a public water system, unless the pesticide label-prescribed safety devices for public water systems are in place.
- A person knowledgeable of the chemigation system and responsible for its operation, or under the supervision of the responsible person, shall shut the system down and make necessary adjustments should the need arise.

Operating Instructions

1. The system must contain a functional check-valve, vacuum relief valve, and low pressure drain appropriately located on the irrigation pipeline to prevent water-source contamination from backflow.
2. The pesticide injection pipeline must contain a functional, automatic, quick-closing check-valve to prevent the flow of fluid back toward the injection pump.

3. The pesticide injection pipeline must also contain a functional, normally closed, solenoid-operated valve located on the intake side of the injection pump and connected to the system interlock to prevent fluid from being withdrawn from the supply tank when the irrigation system is either automatically or manually shut down.
4. The system must contain functional interlocking controls to automatically shut off the pesticide injection pump when the water pump motor stops.
5. The irrigation line or water pump must include a functional pressure switch which will stop the water pump motor when the water pressure decreases to the point where pesticide distribution is adversely affected.
6. Systems must use a metering pump, such as a positive displacement injection pump (e.g., diaphragm pump), effectively designed and constructed of materials that are compatible with pesticides and capable of being fitted with a system interlock.
7. Do not apply when wind speed favors drift beyond the area intended.

Center Pivot Irrigation Equipment

Notes: (1) Use only with drive systems which provide uniform water distribution. (2) Do not use end guns when chemigating Revus Top through center pivot systems because of non-uniform application.

- Determine the size of the area to be treated.
- Determine the time required to apply 1/8-1/2 inch of water over the area to be treated when the system and injection equipment are operated at normal pressures as recommended by the equipment manufacturer. When applying Revus Top through irrigation equipment use the lowest obtainable water volume while maintaining uniform distribution. Run the system at 80-95% of the manufacturer's rated capacity.
- Using water, determine the injection pump output when operated at normal line pressure.
- Determine the amount of Revus Top required to treat the area covered by the irrigation system.
- Add the required amount of Revus Top and sufficient water to meet the injection time requirements to the solution tank.
- Make sure the system is fully charged with water before starting injection of the Revus Top solution. Time the injection to last at least as long as it takes to bring the system to full pressure.
- Maintain constant solution tank agitation during the injection period.
- Continue to operate the system until the Revus Top solution has cleared the sprinkler head.

Solid Set, Hand Move, and Moving Wheel Irrigation Equipment

- Determine the acreage covered by the sprinklers.
- Fill injector solution tank with water and adjust flow rate to use the contents over a 20- to 30-minute interval. When applying Revus Top through irrigation equipment use the lowest obtainable water volume while maintaining uniform distribution.
- Determine the amount of Revus Top required to treat the area covered by the irrigation system.
- Add the required amount of Revus Top into the same quantity of water used to calibrate the injection period.
- Operate the system at the same pressure and time interval established during the calibration.
- Stop injection equipment after treatment is completed. Continue to operate the system until the Revus Top solution has cleared the last sprinkler head.

SPECIFIC INSTRUCTIONS FOR PUBLIC WATER SYSTEMS

1. Public water system means a system for the provision to the public of piped water for human consumption if such system has at least 15 service connections or regularly serves an average of at least 25 individuals daily at least 60 days out of the year.

2. Chemigation systems connected to public water systems must contain a functional, reduced-pressure zone, back-flow preventer (RPZ) or the functional equivalent in the water supply line upstream from the point of pesticide introduction. As an option to the RPZ, the water from the public water system should be discharged into a reservoir tank prior to pesticide introduction. There shall be a complete physical break (air gap) between the outlet end of the fill pipe and the top or overflow rim of the reservoir tank of at least twice the inside diameter of the fill pipe.
3. The pesticide injection pipeline must contain a functional, automatic, quick-closing check valve to prevent the flow of fluid back toward the injection pump.
4. The pesticide injection pipeline must contain a functional, normally closed, solenoid-operated valve located on the intake side of the injection pump and connected to the system interlock to prevent fluid from being withdrawn from the supply tank when the irrigation system is either automatically or manually shut down.
5. The system must contain functional interlocking controls to automatically shut off the pesticide injection pump when the water pump motor stops, or in cases where there is no water pump, when the water pressure decreases to the point where pesticide distribution is adversely affected.
6. Systems must use a metering pump, such as a positive displacement injection pump (e.g., diaphragm pump) effectively designed and constructed of materials that are compatible with pesticides and capable of being fitted with a system interlock.
7. Do not apply when wind speed favors drift beyond the area intended for treatment.

SPECIFIC DIRECTIONS FOR USE

Crop	Target Disease	Use Rate fl oz Product per Acre	Remarks
Grapes (except Concord, Concord Seedless, and Thomcord. See Precaution under Remarks.)	Alternaria rot (*A. alternata*) Powdery mildew (*Uncinula necator*) Rotbrenner (*Pseudopezicula tracheiphila*) Septoria leaf spot (*S. ampelina*) Phomopsis cane and leaf spot (*P. viticola*) Black rot (*Guignarda bidwellii*) Angular leaf spot (*Mycosphearella angulata*) Anthracnose (*Elsinoe ampelina*) Leaf blight (*Pseudocercospora vitis*) Downy mildew (*Plasmopara viticola*)	7.0	For powdery mildew, begin at bud break and apply on a 10-21 day interval, making no more than 2 sequential applications before alternating to a fungicide with a different mode of action. For Phomopsis diseases, apply at bud break, before shoots are 0.5 inches in length, and then again when shoots are 5-6 inches in length. For black rot, begin when shoot length is 1-3 inches and continue on a 10 day interval. For all other diseases, begin applications prior to disease onset when conditions are conducive for disease. Apply Revus Top on a 10-14 day schedule making no more than 2 sequential applications before alternating to another fungicide with a different mode of action. If disease pressure is high, use the shortest interval. The addition of a spreading/penetrating type adjuvant such as a non-ionic surfactant or crop oil concentrate or blend is recommended when applying by ground or air. **PRECAUTION: On *V. labrusca*, *V. labrusca* hybrids, and other non-viniferea hybrids where sensitivity is not known - the use of Revus Top by itself or in tank mixtures with materials that may increase uptake (adjuvants, foliar fertilizers) may result in leaf burning or other phytotoxic effects.**

Application: For best results, sufficient water volume must be used to provide thorough coverage. Revus Top can be applied by either ground or aerial application. A minimum of 15 gal/A for ground applications is recommended. For aerial applications a minimum of 10 gal/A of water is recommended.

Specific Use Restrictions:

1) Do not apply more than 28 fl oz/A of Revus Top per crop per season.
2) Do not apply more than 0.46 lb ai/A per season of difenoconazole containing products.
3) Do not apply more than 0.52 lb ai/A per season of mandipropamid containing products.
4) Do not apply within 14 days of harvest (14-day PHI).

Crop	Target Disease	Use Rate fl oz Product per Acre	Remarks
Potatoes	Black dot (*Colletotrichum coccodes*) Brown spot (*Alternaria alternata*) Early blight (*Alternaria solani*) Late blight (*Phytophthora infestans*) Powdery mildew (*Erysiphe cichoracearum*) Septoria leafspot (*S. lycopersici*)	5.5 - 7.0	Begin applications prior to disease development and continue throughout the season on a 7-10 day interval. Make no more than 2 consecutive applications before switching to another effective fungicide with a different mode of action. If disease pressure is high, use the shortest interval and highest rate. The addition of a spreading/penetrating type adjuvant such as a non-ionic surfactant or crop oil concentrate or blend is recommended when applying by ground or air.
Application: For best results, use sufficient water volume to provide thorough coverage. Revus Top may be applied by ground, chemigation, or aerial application. For chemigation, apply in 0.1-0.25 inches/A of water. Chemigation with excessive water may lead to a decrease in efficacy.			
Specific Use Restrictions: 1) Do not apply more than 28 fl oz/A per season of Revus Top. 2) Do not apply more than 0.52 lb ai/A per season of mandipropamid containing products 3) Do not apply more than 0.46 lb ai/A per season of difenoconazole containing products. 4) Do not apply within 14 days of harvest (14-day PHI).			

Crop	Target Disease	Use Rate fl oz Product per Acre	Remarks
Tomatoes Tomatillo	Anthracnose (*Colletotrichum* spp.) Black mold (*A. alternata*) Early blight (*Alternaria solani*) Gray leafspot (*Stemphylium botryosum*) Late blight (*Phytophthora infestans*) Leaf mold (*Fulvia fulva*) Powdery mildew (*Leveillula taurica*) Septoria leafspot (*S. lycopersici*) Target spot (*Corynespora cassiicola*)	5.5 - 7.0	Begin applications prior to disease development and continue throughout the season on a 7-10 day interval. Make no more than 2 consecutive applications before switching to another effective fungicide with a different mode of action. If disease pressure is high, use the shortest interval and highest rate. The addition of a spreading/penetrating type adjuvant such as a non-ionic surfactant or crop oil concentrate or blend is recommended when applying by ground or air.
Application: For best results, use sufficient water volume to provide thorough coverage. Revus Top may be applied by ground, chemigation, or aerial application. For chemigation, apply in 0.1-0.25 inches/A of water. Chemigation with excessive water may lead to decrease in efficacy.			
Specific Use Restrictions: 1) Do not use on varieties in which the mature tomatoes will be less than 2 inches (such as cherry tomatoes). 2) Do not apply more than 28 fl oz/A per season of Revus Top. 3) Do not apply more than 0.52 lb ai/A per season of mandipropamid containing products. 4) Do not apply more than 0.46 lb ai/A per season of difenoconazole containing products. 5) Do not apply within 1 day of harvest (1-day PHI).			

Product Conversion Table

Oz Revus Top/Acre	Lb A.I. Mandipropamid	Lb A.I. Difenoconazole
5.5	0.089	0.089
6.0	0.098	0.098
6.5	0.106	0.106
7.0	0.114	0.114

STORAGE AND DISPOSAL

Do not contaminate water, food, or feed by storage and disposal.

Pesticide Storage

Store in original container only. Store in a cool, dry and well-ventilated place. Protect from excessive heat. Keep container closed when not in use. Do not store near food or feed.

Pesticide Disposal

Pesticide wastes may be toxic. Improper disposal of unused pesticide, spray mixture, or rinse water is a violation of Federal law. If these wastes cannot be used according to label instructions, contact your State Pesticide or Environmental Control Agency, or the Hazardous Waste representative at the nearest EPA Regional Office for guidance in proper disposal methods.

Container Handling

Non-refillable container. Do not reuse or refill this container. Offer for recycling if available. Triple rinse container (or equivalent) promptly after emptying. Triple rinse as follows: Empty the remaining contents into application equipment or a mix tank and drain for 10 seconds after the flow begins to drip. Fill the container 1/4 full with water and recap. Shake for 10 seconds. Pour rinsate into application equipment or a mix tank or store rinsate for later use and disposal. Drain for 10 seconds after the flow begins to drip. Repeat this procedure two more times. Then offer for recycling if available or puncture and dispose of in a sanitary landfill, by incineration, or, if allowed by state and local authorities, by burning. If burned, stay out of smoke.

CONTAINER IS NOT SAFE FOR FOOD, FEED, OR DRINKING WATER.

For non-emergency (e.g., current product information), call
Syngenta Crop Protection at 1-800-334-9481.

Manufactured for:
Syngenta Crop Protection, LLC
P.O. Box 18300
Greensboro, North Carolina 27419-8300

SCP 1278A-L1C 1210
338408

GROUP 3 40 FUNGICIDES

RevusTop®

Fungicide

Active Ingredients:
Mandipropamid (CAS No. 374726-62-2) . . . 21.9%
Difenoconazole (CAS No.119446-68-3) 21.9%

Other Ingredients:	56.2%
Total:	100.0%

Contains 2.08 pounds of mandipropamid active ingredient and 2.08 pounds of difenoconazole active ingredient per gallon

See additional precautionary statements and directions for use inside booklet.

AGRICULTURAL USE REQUIREMENTS

Use this product only in accordance with its labeling and with the Worker Protection Standard, 40 CFR part 170. Refer to supplemental labeling under "Agricultural Use Requirements" in the Directions for Use section for information about this standard.

EPA Reg. 100-1278 EPA Est. 100-NE-001

Manufactured for:
Syngenta Crop Protection, LLC
P.O. Box 18300
Greensboro, North Carolina 27419-8300

SCP 1278A-L1C 1210
338408

BAR CODE # IS
(01) 0 07 02941 35026
LAST DIGIT IS CHECK DIGIT
UCC/EAN 128

2.5 gallons
Net Contents

KEEP OUT OF REACH OF CHILDREN.

CAUTION

FIRST AID

If swallowed: Call a poison control center or doctor immediately for treatment advice. Have person sip a glass of water if able to swallow. Do not induce vomiting unless told to by a poison control center or doctor. Do not give anything to an unconscious person.

Have the product container or label with you when calling a poison control center or doctor, or going for treatment.

HOT LINE NUMBER: For 24-Hour Medical Emergency Assistance (Human or Animal) Or Chemical Emergency Assistance (Spill, Leak, Fire or Accident) Call **1-800-888-8372.**

PRECAUTIONARY STATEMENTS

Hazards to Humans and Domestic Animals

CAUTION

Harmful if swallowed. Wash thoroughly with soap and water after handling and before eating, drinking, chewing gum, using tobacco or using the toilet.

Environmental Hazards: This pesticide is toxic to fish, mammals, and aquatic invertebrates. Drift and runoff may be hazardous to aquatic **estuarine/marine** organisms in water adjacent to treated area. Do not apply directly to water, areas where surface water is present, or intertidal areas below the mean high water mark. Do not contaminate water when disposing of equipment washwater or rinsate.

This product may impact surface water quality due to runoff of rain water. This product has a potential for runoff for several months or more after application. A level, well maintained vegetative buffer strip between areas to which this product is applied and surface water features such as ponds, streams, and springs will reduce the potential for contamination of water from rainfall-runoff. Runoff of this product will be reduced by avoiding applications when rainfall is forecasted to occur within 48 hours. Sound erosion control practices will reduce this products' potential to reach surface water.

Do not discharge effluent containing this product into lakes, streams, ponds, estuaries, oceans, or other waters unless in accordance with the requirements of a National Pollutant Discharge Elimination System (NPDES) permit and the permitting authority has been notified in writing prior to discharge. Do not discharge effluent containing this product to sewer systems without previously notifying the local sewage treatment plant authority. For guidance, contact your State Water Board or regional office of the EPA.

STORAGE AND DISPOSAL

Do not contaminate water, food, or feed by storage and disposal.

Pesticide Storage: Store in original container only. Store in a cool, dry and well-ventilated place. Protect from excessive heat. Keep container closed when not in use. Do not store near food or feed.

Pesticide Disposal: Pesticide wastes may be toxic. Improper disposal of unused pesticide, spray mixture, or rinse water is a violation of Federal law. If these wastes cannot be used according to label instructions, contact your State Pesticide or Environmental Control Agency, or the Hazardous Waste representative at the nearest EPA Regional Office for guidance in proper disposal methods.

Container Handling: Non-refillable container. Do not reuse or refill this container. Offer for recycling if available. Triple rinse container (or equivalent) promptly after emptying. Triple rinse as follows: Empty the remaining contents into application equipment or a mix tank and drain for 10 seconds after the flow begins to drip. Fill the container 1/4 full with water and recap. Shake for 10 seconds. Pour rinsate into application equipment or a mix tank or store rinsate for later use and disposal. Drain for 10 seconds after the flow begins to drip. Repeat this procedure two more times. Then offer for recycling if available or puncture and dispose of in a sanitary landfill, by incineration, or, if allowed by state and local authorities, by burning. If burned, stay out of smoke.

CONTAINER IS NOT SAFE FOR FOOD, FEED, OR DRINKING WATER.

syngenta®

MATERIAL SAFETY DATA SHEET

Syngenta Crop Protection, Inc.
Post Office Box 18300
Greensboro, NC 27419

In Case of Emergency, Call
1-800-888-8372

1. PRODUCT IDENTIFICATION

Product Name: **REVUS FUNGICIDE** Product No.: A12946B

EPA Signal Word: Caution

Active Ingredient(%): Mandipropamid (23.3%) CAS No.: 374726-62-2

Chemical Name: 2-(4-chloro-phenyl)-N-[2-(3-methoxy-4-prop-2-ynyloxy-phenyl)-ethyl]-2-prop-2-ynyloxy-acetamide

Chemical Class: Fungicide

EPA Registration Number(s): 100-1254 **Section(s) Revised: 1, 8**

2. HAZARDS IDENTIFICATION

Health and Environmental

Presents a low hazard during normal handling.

Hazardous Decomposition Products

May decompose at high temperatures forming toxic gases.

Physical Properties

Appearance: Light beige liquid

Odor: Not particular

Unusual Fire, Explosion and Reactivity Hazards

During a fire, irritating and possibly toxic gases may be generated by thermal decomposition or combustion.

3. COMPOSITION/INFORMATION ON INGREDIENTS

Material	OSHA PEL	ACGIH TLV	Other	NTP/IARC/OSHA Carcinogen
Propylene Glycol	Not Established	Not Established	50 ppm TWA AIHA WEEL ****	No
Mandipropamid (23.3%)	Not Established	Not Established	10 mg/m³ TWA ***	No

*** Syngenta Occupational Exposure Limit (OEL)

**** Recommended by AIHA (American Industrial Hygiene Association)

Ingredients not precisely identified are proprietary or non-hazardous. Values are not product specifications.
Syngenta Hazard Category: A

4. FIRST AID MEASURES

Have the product container, label or Material Safety Data Sheet with you when calling Syngenta (800-888-8372), a poison contol center or doctor, or going for treatment.

Ingestion: If swallowed: Call Syngenta (800-888-8372), a poison control center or doctor immediately for treatment advice. Have the person sip a glass of water if able to swallow. Do not induce vomiting unless told to do so after calling 800-888-8372 or by a poison control center or doctor. Do not give anything by mouth to an

unconscious person.

Eye Contact: If in eyes: Hold eye open and rinse slowly and gently with water for 15-20 minutes. Remove contact lenses, if present, after 5 minutes, then continue rinsing eye. Call Syngenta (800-888-8372), a poison control center or doctor for treatment advice.

Skin Contact: If on skin or clothing: Take off contaminated clothing. Rinse skin immediately with plenty of water for 15-20 minutes. Call Syngenta (800-888-8372), a poison control center or doctor for treatment advice.

Inhalation: If inhaled: Move person to fresh air. If person is not breathing, call 911 or an ambulance, then give artificial respiration, preferably mouth-to-mouth if possible. Call Syngenta (800-888-8372), a poison control center or doctor for further treatment advice.

Notes to Physician

There is no specific antidote if this product is ingested.

Treat symptomatically.

Medical Condition Likely to be Aggravated by Exposure

None known.

5. FIRE FIGHTING MEASURES

Fire and Explosion

Flash Point (Test Method):	> 214°F (Pensky-Martens CC)	
Flammable Limits (% in Air):	Lower: Not Applicable	Upper: Not Applicable
Autoignition Temperature:	Not Available	
Flammability:	Not Applicable	

Unusual Fire, Explosion and Reactivity Hazards

During a fire, irritating and possibly toxic gases may be generated by thermal decomposition or combustion.

In Case of Fire

Use dry chemical, foam or CO2 extinguishing media. Wear full protective clothing and self-contained breathing apparatus. Evacuate nonessential personnel from the area to prevent human exposure to fire, smoke, fumes or products of combustion. Prevent use of contaminated buildings, area, and equipment until decontaminated. Water runoff can cause environmental damage. If water is used to fight fire, dike and collect runoff.

6. ACCIDENTAL RELEASE MEASURES

In Case of Spill or Leak

Control the spill at its source. Contain the spill to prevent from spreading or contaminating soil or from entering sewage and drainage systems or any body of water. Clean up spills immediately, observing precautions outlined in Section 8. Cover entire spill with absorbing material and place into compatible disposal container. Scrub area with hard water detergent (e.g. commercial products such as Tide, Joy, Spic and Span). Pick up wash liquid with additional absorbent and place into compatible disposal container. Once all material is cleaned up and placed in a disposal container, seal container and arrange for disposition.

7. HANDLING AND STORAGE

Store the material in a well-ventilated, secure area out of reach of children and domestic animals. Do not store food, beverages or tobacco products in the storage area. Prevent eating, drinking, tobacco use, and cosmetic application in areas where there is a potential for exposure to the material. Wash thoroughly with soap and water after handling.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

THE FOLLOWING RECOMMENDATIONS FOR EXPOSURE CONTROLS/PERSONAL PROTECTION ARE INTENDED FOR THE MANUFACTURE, FORMULATION, PACKAGING AND USE OF THIS PRODUCT.

FOR COMMERCIAL APPLICATIONS AND/OR ON-FARM APPLICATIONS CONSULT THE PRODUCT LABEL.

Ingestion: Prevent eating, drinking, tobacco usage and cosmetic application in areas where there is a potential for exposure to the material. Wash thoroughly with soap and water after handling.

Eye Contact:	Where eye contact is likely, use chemical splash goggles.
Skin Contact:	Where contact is likely, wear chemical-resistant gloves (such as barrier laminate, butyl rubber, nitrile rubber, neoprene rubber, polyvinyl chloride [PVC] or Viton), coveralls, socks and chemical-resistant footwear. For overhead exposure, wear chemical-resistant headgear.
Inhalation:	A respirator is not normally required when handling this substance. In case of emergency spills, use a NIOSH approved respirator with any N, R, P or HE filter.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance:	Light beige liquid
Odor:	Not particular
Melting Point:	Not Applicable
Boiling Point:	Not Available
Specific Gravity/Density:	1.07 g/cm³
pH:	5 - 9 @ 1% w/v

Solubility in H2O

Mandipropamid: 4.2 mg/l @ 77°F (25°C)

Vapor Pressure

Mandipropamid: 7.1 x 10(-9) mmHg @ 68°F (20°C)

10. STABILITY AND REACTIVITY

Stability:	Stable under normal use and storage conditions.
Hazardous Polymerization:	Will not occur.
Conditions to Avoid:	None known.
Materials to Avoid:	None known.
Hazardous Decomposition Products:	May decompose at high temperatures forming toxic gases.

11. TOXICOLOGICAL INFORMATION

Acute Toxicity/Irritation Studies (Finished Product)

Ingestion:

Oral (LD50 Female Rat) : > 5000 mg/kg body weight

Dermal:

Dermal (LD50 Rat) : > 5000 mg/kg body weight

Inhalation:

Inhalation (LC50 Rat) : Not Available

Eye Contact: Non-Irritating (Rabbit)

Skin Contact: Non-Irritating (Rabbit)

Skin Sensitization: Not a Sensitizer (Guinea Pig)

Reproductive/Developmental Effects

Mandipropamid: Not Available

Chronic/Subchronic Toxicity Studies

Mandipropamid: Not Available

Carcinogenicity

Mandipropamid: Test on bacterial or mammalian cell cultures did not show mutagenic effects.

Other Toxicity Information

None

Toxicity of Other Components

Propylene Glycol

Test results reported in Section 11 for the final product take into account any acute hazards related to the propylene glycol in the formulation.
Reported to cause central nervous system depression (anesthesia, dizziness, confusion), headache and nausea. Chronic dietary exposure caused kidney and liver injury in experimental animals.

Target Organs

Active Ingredients

Mandipropamid: Not Available

Inert Ingredients

Propylene Glycol: CNS, kidney, liver

12. ECOLOGICAL INFORMATION

Summary of Effects

Mandipropamid:

Toxic to aquatic life.

Eco-Acute Toxicity

Mandipropamid:

Invertebrate (Water Flea) Daphnia magna EC50 > 7.1 mg/l

Green Algae ErC50 > 40 mg/l

Fish (Rainbow Trout) LC50 > 2.3 mg/l

Eco-Chronic Toxicity

Mandipropamid:

Not Available

Environmental Fate

Mandipropamid:

The information presented here is for the active ingredient, mandipropamid.
Not readily biodegradable. Low potential for bioaccumulation. Not persistent in soil. Low mobility in soil.

13. DISPOSAL CONSIDERATIONS

Disposal

Do not reuse product containers. Dispose of product containers, waste containers, and residues according to local, state, and federal health and environmental regulations.

Characteristic Waste: Under certain circumstances, discarded product may exhibit TCLP hazardous characteristics. A hazardous waste determination should be done on a case by case basis.

Listed Waste: Not Applicable

14. TRANSPORT INFORMATION

DOT Classification

Ground Transport - NAFTA
Not regulated by US DOT.

Air Transport - NAFTA
Not regulated by US DOT.

B/L Freight Classification

Fungicides, NOIBN, O/T Poison

Comments

Water Transport - International

Not regulated by IMDG.

Air Transport - International
Not regulated by IATA.

15. REGULATORY INFORMATION

EPCRA SARA Title III Classification

Section 311/312 Hazard Classes: Acute Health Hazard

Section 313 Toxic Chemicals: Not Applicable

California Proposition 65

Not Applicable

CERCLA/SARA 302 Reportable Quantity (RQ)

None

RCRA Hazardous Waste Classification (40 CFR 261)

Not Applicable

TSCA Status

Exempt from TSCA, subject to FIFRA

16. OTHER INFORMATION

NFPA Hazard Ratings		HMIS Hazard Ratings	
Health:	1	Health:	1
Flammability:	1	Flammability:	1
Instability:	0	Reactivity:	0

0	Minimal
1	Slight
2	Moderate
3	Serious
4	Extreme

For non-emergency questions about this product call:

1-800-334-9481

Original Issued Date: 10/9/2006
Revision Date: 1/22/2008 Replaces:

The information and recommendations contained herein are based upon data believed to be correct. However, no guarantee or warranty of any kind, expressed or implied, is made with respect to the information contained herein.

End of MSDS