

Vine Desiccation (Topkilling) in Potato

Vine desiccation or topkilling is a harvest aid used to reduce the amount of potato vines, to limit late blight tuber infections, to minimize virus infection spread by aphids, to control tuber size and to reduce skinning of the tubers. Vine desiccants are usually applied at least 14 days prior to harvest or whenever the tubers have sized sufficiently, whichever comes first. Desiccation can be carried out using either chemical or mechanical means. Chemical vine kill involves the application of a registered desiccant (topkiller) to halt the growth of the potato vine. Flail beaters, rotary choppers or rotobeaters are popular mechanical methods for vine killing. Machines should be adjusted to avoid disturbing the soil so tubers are not exposed to sunlight, frost or mechanical damage.

For table and processing crops, a relatively slow but complete kill of the potato leaves and vines is most desirable. This type of kill will allow the tubers to continue sizing while still providing the conditions necessary for good skin set. A slow kill allows the tubers to continue converting sugars to starch, something vital to good processing quality. Research in New Brunswick has shown that split applications of a desiccant can result in better coloured french fries out of storage than one application at the full rate. Where the crop's intended use is for seed, a faster kill may be needed to control tuber size and minimize disease spread. To obtain a faster kill, always use the full label rate of a desiccant. It is recommended that growers continue applying blight sprays until the vines are completely dead. While rotobeating does result in an almost immediate halt to tuber growth, the stems should still be treated with a desiccant to ensure that they don't act as a source of blight.

Under normal weather conditions a split application of a desiccant should produce adequate vine death. An application of 1/3 to 2/3 of the full dose is applied and followed in 4-6 days with the remaining amount of chemical. In those seasons where wet weather, combined with over-fertilization, have resulted in lush green tops, a full-dose application may be needed. The practice of rotobeating tends to reduce yields and quality (including colour) and the sudden shock to the potato plant may increase the amount of stem-end discolouration. Use of desiccants has been suggested as one cause of stem-end discolouration. Usually the plants have to be under some form of stress, such as drought, for stem-end browning to occur. Use of a higher than recommended rate of desiccant could also produce discolouration. Drought conditions can increase the potential for discolouration. Under drought conditions, delay desiccant application until the soil is moistened by rainfall or irrigation.

Desiccants are typically contact herbicides, consequently adequate coverage of the spray on the target plant is essential for control. Refer to the product label for the preferred application conditions for each desiccant.

Notes on Vine Desiccation - Topkillers

CARFENTRAZONE-ETHYL (Aim) is applied as a harvest aid when the crop is mature. For optimum results, apply carfentrazone when the potato crop is in the early stages of natural senescence. Thorough vine coverage is essential. Applications should be made in sufficient water volumes to provide complete coverage of the foliage. Apply in a minimum of 200 L of spray volume per hectare. Increased spray volumes will enhance performance. Vary the spray volume and spray

pressure as indicated by the density of the potato canopy and vines to assure thorough spray coverage. Increase the spray volume and pressure if the potato canopy is dense or under cool, cloudy or dry conditions. A surfactant is also required, either Agral 90/Ag-Surf at 0.25% v/v (0.25 L per 100 L of spray solution) or Merge at 1 % v/v (1 L per 100 L of spray solution). Adequate desiccation occurs within 14 days. Under warm, moist conditions, desiccation symptoms may be accelerated. Plants hardened off by drought are less susceptible to desiccation. Do not apply when winds are gusty, changing direction or prone to cause herbicide drift. If the potato crop has active regrowth following application, a second application may be required. If a second desiccant application is required, use diquat at rates listed on label or a second application of carfentrazone. For a tank mix with diquat, apply carfentrazone at labelled rates with a low label rate of diquat. The tank mix can only be applied once. Do not add a surfactant. Carfentrazone is also registered for use as a pre-plant burn-down application or as a row-middle application with a hooded sprayer.

DIQUAT (Reglone, Dessicash, Diquash, Armory) applications should be made after growth has passed its peak and adequate skin set has been established, rather than when plants are growing actively. Applications should be made at least two weeks before harvest. Leaf kill is rapid (3-4 days) with stem kill taking place more gradually (10-14 days). Apply diquat in 550-1100 litres of water per hectare. When potato tops are especially dense or heavy weed growth is present, use 1100 L of water/ha. For heavy, green vines or dense and rapidly growing tops apply 3.5 L/ha once or apply a split application, with 1.25-2.3 L/ha followed in 4-6 days by 1.25 L/ha. For medium vine growth with some maturing tops, apply 1.7-2.3 L/ha and for fully mature tops with no weeds, apply 1.25 L/ha. Effectiveness of this treatment may be enhanced when applications are made on cloudy days or prior to periods of darkness. Do not apply diquat during drought conditions - wait for at least three days after the soil has been thoroughly moistened by rain or irrigation. Use clear water with diquat as it is deactivated by clay or organic particles. Apply in weather conditions that will not promote drift. Laboratory tests show that diquat (Reglone 240) is stable and compatible with the following fungicides: Dithane DG, Polygram DF, Bravo Flowable, Manzate 200DF and copper sulphate. Do not use any wetting agents (Agral 90), spreaders or stickers in Eastern Canada.

ENDOTHALL (Des-I-Cate) is applied to potato vines 10-14 days before harvest. For best results, use a sprayer pressure of 700-1050 kPa using 500-800 L of water/ha. For light vine growth apply 17-22 L/ha of endothall using the higher rate in cloudy, cool (less than 21°C) weather. For heavy vine growth use the full rate and spray to thoroughly wet the lower stems. Under very heavy vine growth, double spraying, first up and then down the field on the same day, applying 11 L/ha per application. This will maximize coverage and top desiccation. To reduce foaming, add endothall to the spray tank after adding water. Do not apply during periods of dead calm. Avoid application of this product when winds are gusty. No wetting agent or emulsifier is needed. Under conditions favourable for rapid vine growth, such as low soil moisture or high temperature, do not use the high rate as stem end discoloration may occur. Treated areas must be harvested by mechanical means.

DESICCANT APPLICATION TABLE										
For additional information, please refer to Notes on Vine Desiccation – Topkillers and Product labels. Always read and follow label directions for every pesticide application.				Formulation	Hazard	Restricted Entry Interval	Pre-Harvest Interval	Group	Buffer Zone	
									Terrestrial	Water <1m
Chemical Name	Product	Product/ha	Surfactant							
carfentrazone-ethyl	Aim	0.233-0.35 L/ha	NIS/Merge	EC	LH	-	7	14	5	-
diquat	Reglone, Dessicash, Diquash, Armory	1.25 – 3.5 L/ha	None	SN	MH	24	14	22	5	10
endothall	Des-I-Cate	17-22 L/ha 11 L/ha split	None	SN	LH	48	10	16	1	10

Formulation: EC – Emulsifiable Concentrate; SN – Solution **Hazard :** LH – Low Hazard; MH – Medium Hazard