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Potato Portfolio

A Guide to Potato Products from UPL Europe Ltd

January 2019

What We Do

UPL Europe Ltd. (UPL) is a leading global producer of crop protection products, speciality chemicals and other industrial chemicals. We operate in every continent around the world with offices in 30 countries, making us one of the leading producers of post-patent products in the world. We are lean, fit and responsive and our efficient formulation and manufacturing processes enable us to offer cost-effective solutions to farmer's crop protection problems.

How We Do It

We aim to successfully meet the needs of our markets through the development and introduction of both new and existing products, both novel and post-patent. These products are developed to not only meet, but exceed our customer's quality and performance expectations.

Our Areas of Expertise Include:

Product Development

As a major player in the crop protection market, we are constantly striving to acquire new products that will benefit our customers, whilst at the same time seeking to develop and improve our existing product portfolio.

Registration

We have a dedicated registration team based at our European headquarters in Warrington, UK.
We are supporting the re-registration of major molecules with data generation to provide long term security for product registrations.

Manufacture and Formulation

In order for our manufacturing to be as efficient and competitive as possible, we manufacture most products at our own production facilities located in Europe and Asia. Each one operates to the strictest international quality standards.

The majority of our European products are formulated at our own modern plant in the United Kingdom (UK). This plant is capable of producing a wide range of sophisticated formulations both for our own needs and as a toll formulator for many multi-national companies.

Supporting UK Potato Growers

We are continuing to develop our range of potato herbicides, blight fungicides and sprout suppressants.

We market chlorpropham, CIPC, under the name PRO-LONG. We are the global leader in the supply of mancozeb based products.

UPL are constantly developing and acquiring new and exciting products for the potato grower.

UPL Europe Ltd Potato Portfolio

Fungicides				
p4	**CHAMANE**	250g	azoxystrobin	SC
p5	**MANZATE 75WG**	75%	mancozeb	WG
p6	**NAUTILE DG**	5% 68%	cymoxanil mancozeb	WG
p7	**PENNCOZEB 80WP**	80%	mancozeb	WP
p8	**SACRON WG**	45%	cymoxanil	WG
p9	**VIDEO**	5% 68%	cymoxanil mancozeb	WG
Herbicides				
p11	**MISSION 200SL**	200g	diquat	SL
p15	**QUIDAM**	800g	prosulfocarb	EC
p16	**TROY 480**	480g	bentazone	SL
Sprout Suppressants				
p21	**PRO-LONG**	500g	chlorpropham	Liquid
Drought Mitigation Technology				
p22	**ZEBA**	Starch-g-poly		Revolutionary patented starch-based, Super Hydrating Granule

Tank Mixes

For the latest information on tank mix recommendations, please visit our website at **uk.uplonline.com**.

Changes Since the Last Edition

1. Final use dates updated for a number of products – see UPL Potato Portfolio Summary Table on page 12 – 13.

CHAMANE

MAPP No 15922

CHAMANE is a broad-spectrum fungicide for use in potatoes as an in-furrow application for the reduction of *Rhizoctonia solani* that causes Stem Canker, Black Scurf and Black Dot which is caused by *Colletotrichum coccodes*.

Product Profile

Brand	**CHAMANE**
MAPP number	15922
Active ingredient	250g/L azoxystrobin
Formulation	Suspension Concentrate (SC)
Activity	Systemic and Protectant
Maximum individual dose	3L/ha
Maximum number of treatments	1 per crop
Latest time of application	At planting
Other restrictions	Do not use on high organic matter soils Only approved for use as an in-furrow application See label for restrictions on other crops
Target	Stem canker, Black scurf and Black dot
Pack size	5L
Aquatic buffer zone	5m
Other crops	wheat, barley, oats, rye, triticale, asparagus, combining pea, vining pea, field bean, oilseed rape, bulb onion, leek, carrot, brussels sprout, cabbage, cauliflower, kale, collards broccoli/ calabrese

Mode of Action

Azoxystrobin belongs to the **QoI** (**Q**uinone **o**utside **I**nhibitors) fungicide group and is classified by the Fungicide Resistance Action Committee (FRAC) as belonging to the mode of action group 11.

Used alone as a pre-planting treatment (azoxystrobin; **CHAMANE**) does **not** contribute to the total number of applications of QoI fungicides advised on potatoes by FRAG-UK, so the number of foliar treatments of QoI fungicides need not be reduced.

MANZATE 75WG

MAPP No 15052

MANZATE 75WG is a fungicide for the control of late potato blight (*Phytophthora infestans*), and early blight (*Alternaria solani* and *Alternaria alternata*).

Product Profile

Brand	**MANZATE 75WG**
MAPP number	15052
Active ingredient	75% mancozeb
Formulation	Water Dispersible Granule (WDG)
Activity	Protectant
Maximum individual dose	1.7kg/ha
Maximum total dose	13.6kg/ha
Maximum number of treatments	8 per crop
Harvest interval	7 days
Other restrictions	A minimum of 7 days must be observed between applications.
Target	Potato blight
Pack size	10kg
LERAP	B
Other crops	Apple, winter and spring wheat, bulb onions (See label for details at **uk.uplonline.com**)

Mode of Action

Mancozeb is a protectant fungicide that is typically included in a tank mix with other fungicides as a tool to help with resistance management against the control of potato blight. Mancozeb belongs to the dithiocarbamate group of fungicides and is classified by the Fungicide Resistance Action Committee (FRAC) as belonging to the mode of action group M3 (Multi Site Action).

NAUTILE DG

MAPP No 16653

NAUTILE DG is a fungicide for the control of potato blight (*Phytophthora infestans*). It combines local systemic action of cymoxanil and protectant activity of mancozeb in a unique dual action co-formulation.

Product Profile	
Brand	**NAUTILE DG**
MAPP number	16653
Active ingredient	5% cymoxanil + 68% mancozeb
Formulation	Water Dispersible Granule (WDG)
Activity	Protectant and Curative
Maximum individual dose	2.0kg/ha
Maximum total dose	16.0kg/ha
Maximum number of treatments	8
Harvest interval	None stipulated
Other restrictions	A minimum of 7 days must be observed between applications. Maximum concentration must not exceed 2.0kg of product per 300 litres of water. Must not be applied using handheld equipment.
Target	Potato blight
Pack size	10kg
Aquatic Buffer Zone	6m[1]
Other crops	Apple, winter and spring wheat, bulb onions (See label for details at **uk.uplonline.com**)

[1] 6m if horizontal boom sprayers are fitted with three star DRT, otherwise a 30m buffer zone applies.

Mode of Action

Cymoxanil is a local systemic fungicide with protective and curative activity, it penetrates rapidly and when inside the plant it cannot be washed off by rain. It controls disease during the incubation period and prevents damage to the crop.

Cymoxanil belongs to the cyanoacetamide-oxime group and is classified by the Fungicide Resistance Action Committee (FRAC) as belonging to the mode of action group 27.

Mancozeb is a protectant fungicide that is typically included in a tank mix with other fungicides as a tool to help with resistance management against the control of potato blight.

Mancozeb belongs to the dithiocarbamate group of fungicides and is classified by the Fungicide Resistance Action Committee (FRAC) as belonging to the mode of action group M3 (Multi Site Action).

PENNCOZEB 80WP

MAPP No 16953

PENNCOZEB 80WP is a fungicide for the control of late potato blight (*Phytophthora infestans*), and early blight (*Alternaria solani* and *Alternaria alternata*).

Product Profile	
Brand	**PENNCOZEB 80WP**
MAPP number	16953
Active ingredient	80% mancozeb
Formulation	Wettable Powder (WP)
Activity	Protectant
Maximum individual dose	1.7kg/ha
Maximum total dose	13.6kg/ha
Maximum number of treatments	8 per crop
Harvest interval	7 days
Other restrictions	A minimum of 7 days must be observed between applications.
Target	Potato blight
Pack size	25kg
LERAP	B
Other crops	Apple, bulb onion, wheat (See label for details at **uk.uplonline.com**)

Mode of Action

Mancozeb is a protectant fungicide that is typically included in tank mix with other fungicides as a tool to help with resistance management against the control of potato blight. Mancozeb belongs to the dithiocarbamate group of fungicides and is classified by the Fungicide Resistance Action Committee (FRAC) as belonging to the mode of action group M3 (Multi Site Action).

SACRON WG

MAPP No 16433

SACRON WG is a fungicide for the control of potato blight (*Phytophthora infestans*).

SACRON WG must always be used in tank mix with a contact preventative fungicide such as MANZATE 75WG or PENNCOZEB 80WP.

Product Profile

Brand	**SACRON WG**
MAPP number	16433
Active ingredient	45% cymoxanil
Formulation	Water Dispersible Granule (WDG)
Activity	Protectant and Curative
Maximum individual dose	0.22kg/ha
Maximum total dose	1.76kg/ha
Maximum number of treatments	8
Harvest interval	14 days
Application interval	None stipulated
Other restrictions	Maximum concentration must not exceed 220g of product per 300 litres water.
Target	Potato late blight
Pack size	500g
LERAP	B

Mode of Action

Cymoxanil is a locally systemic fungicide with protective and curative activity, it penetrates rapidly and when inside the plant it cannot be washed off by rain. It controls disease during the incubation period and prevents damage to the crop.

Cymoxanil belongs to the cyanoacetamide-oxime group and is classified by the Fungicide Resistance Action Committee (FRAC) as belonging to the mode of action group 27.

VIDEO

MAPP No 16685

VIDEO is a fungicide for the control of potato blight (*Phytophthora infestans*). It combines the local systemic action of cymoxanil and the protectant activity of mancozeb in a unique dual action co-formulation.

Product Profile

Brand	**VIDEO**
MAPP number	16685
Active ingredient	5% cymoxanil + 68% mancozeb
Formulation	Water Dispersible Granule (WDG)
Activity	Protectant and Curative
Maximum individual dose	2.0kg/ha
Maximum total dose	16kg/ha
Maximum number of treatments	8
Harvest interval	None stipulated
Other restrictions	A minimum of 7 days must be observed between applications. Maximum concentration must not exceed 2.2kg of product per 300 litres of water. Must not be applied using handheld equipment.
Target	Potato blight
Pack size	10kg
Aquatic Buffer Zone	6m[1]
LERAP	B

[1] 6m if horizontal boom sprayers are fitted with three star DRT, otherwise a 30m buffer zone applies.

Mode of Action

Cymoxanil is a local systemic fungicide with protective and curative activity, it penetrates rapidly and when inside the plant it cannot be washed off by rain. It controls disease during the incubation period and prevents damage to the crop.

Cymoxanil belongs to the cyanoacetamide-oxime group and is classified by the Fungicide Resistance Action Committee (FRAC) as belonging to the mode of action group 27.

Mancozeb is a protectant fungicide that is typically included in tank mix with other fungicides as a tool to help with resistance management against the control of potato blight.

Mancozeb belongs to the dithiocarbamate group of fungicides and is classified by the Fungicide Resistance Action Committee (FRAC) as belonging to the mode of action group M3 (Multi Site Action).

MISSION 200SL

MAPP No 16977*

MISSION 200SL can be used as a desiccant and for weed control in potatoes as it acts rapidly on green parts of plants and is rainfast within 15 minutes.

Product Profile

Brand	**MISSION 200SL**
MAPP number	16977
Active ingredient	200g/L diquat
Formulation	Soluble Concentrate (SL)
Activity	Contact
Maximum individual dose	Weed control: 2L/ha Desiccation: 4L/ha
Maximum total dose	Weed control and inter-row application: 2L/ha Desiccation: 4L/ha
Maximum number of treatments	Not stipulated apart from inter-row application where only 1 is allowed
Harvest interval	Desiccation: Leave 14 days before lifting after treatment if potatoes are to be stored.
Latest time of application	Weed control: Earlies, up to 10% crop emergence. Maincrop, up to 40% emergence until the crop is 15cm high.
Other restrictions	Do not add wetters to desiccant sprays for potatoes. The label must be consulted for advice regarding haulm destruction during or shortly after dry periods.
Target	Chickweed, cleavers, knotgrass, annual nettle
Pack size	10L
LERAP	None
Other crops	All edible crops (around), all non edible crops (around), bulb onion, chicory, combining pea (harvested dry), field bean (for animal feed), hops, linseed, oats (for animal feed), oilseed rape, ornamental plant production, potato, red clover (seed crop), strawberry (around), sugar beet, white clover (seed crop) (See label for details at **uk.uplonline.com**)

* The European Commission is proposing that diquat is withdrawn from the market by 4 May 2019, with a use-up period for growers up to 4 February 2020.

Mode of Action

MISSION 200SL is a non-residual bipyridyl contact herbicide and crop desiccant. Classified by the Herbicide Resistance Action Committee (HRAC) as mode of action code D.

Weed Control

Weeds controlled with MISSION 200SL are chickweed, cleavers, knotgrass and annual nettle. Diquat is usually mixed with a residual herbicide such as metribuzin, add an alcohol ethoxylate adjuvant, e.g. Activator 90 in accordance with the manufacturer's instructions. **Note:** An adjuvant is not recommended with all products.

Inter-row Spraying for Weed Control

Application of MISSION 200SL after the crop has emerged should be made using a spray guard to avoid contact with the crop foliage. Best results are achieved when MISSION 200SL is applied to seedling weeds. Common fumitory and knotgrass should be treated at the first true leaf stage, cleavers when two whorls or leaves are present, and wild oats and volunteer cereals from the two-leaf stage. Only 1 inter-row application is allowed with a maximum individual dose of 2.0L/ha.

UPL Potato Portfolio Summary Table

Product Profile	Fungicides						Herbicides		
	CHAMANE	MANZATE 75WG	NAUTILE DG	PENNCOZEB 80WP	SACRON WG	VIDEO DG	MISSION 200SL	QUIDAM	TROY 480
MAPP Number[1]	15922	15052	16653	16953	16433	16685	16977	17595	16954
Active ingredient(s) (g/L)	250g azoxystrobin	750g mancozeb	680g mancozeb 50g cymoxanil	800g mancozeb	45g cymoxanil	680g mancozeb 50g cymoxanil	200g diquat	800g prosulfocarb	480g bentazone
Formulation	SC	WG	WG	WP	WG	WG	SL	EC	SL
Activity	Systemic Protectant	Protectant	Protectant Curative	Protectant	Protectant Curative	Protectant Curative	Contact	Contact Residual	Contact
MOA classification*	11	M3	M3 27	M3	27	M3 27	D	N	C3
Maximum individual dose (L/ha/yr)	3.0L	1.7kg	2.0kg	1.7kg	0.22kg	2.0kg	2.0L Weed control 4.0L Desiccation 2.0L Inter-row	5.0L	3.0L
Maximum number of applications	1	8	8	8	8	8	NS – Apart from Inter-row application where only 1 application allowed	1	2
Maximum total dose (kg/L/ha/yr)	3.0L	13.6kg	16.0kg	13.6kg	1.76kg	16.0kg	2.0L Weed control 4.0L Desiccation	5.0L	3.0L
Application interval	—	7 days	7 days	7 days	—	7 days	NS	—	NS
Harvest interval for potatoes	—	7 days	NS	7 days	14 days	NS	Leave 14 days between desiccation and lifting	—	NS
Latest time of application	At planting	NS	NS	NS	NS	NS	Earlies: up to 10% emergence Maincrop: up to 40% emergence	At emergence (soil rising over emerging potato shoots)	Before shoots exceed 15cm in height
LERAP	—	B	—	B	B	—	—	—	—
Aquatic Buffer Zone	5m	—	6m	—	—	6m	—	5m	—
Other information							Restrictions apply if using during or shortly after dry periods.[2]	This product should not be applied via hand-held equipment	Do not use on seed crops or following post-emergence metribuzin. Varietal restrictions apply.[2]
Final use date	06.02.21	31.07.21	31.07.21	31.07.21	29.02.24	31.07.21	04.02.20[3]	30.04.22	31.12.20

* HRAC (Herbicide Resistance Action Committee) or FRAC (Fungicide Resistance Action Committee) ratings.

[1] Information for currently marketed MAPP numbers is given. For information regarding other MAPP numbers, please see the relevant product page.

[2] Please refer to the product label for full details (also available at uk.uplonline.com).

[3] Mission 200SL (diquat) is withdrawn from the market on 4 May 2019 with a use-up period for growers ending on February 2020.

WG = Water Dispersible Granules
SC = Suspension Concentrate
SL = Soluble Concentrate
WP = Wettable Powder
NS = Not Stipulated

QUIDAM

MAPP No 17595

QUIDAM is a herbicide for use in potatoes (early and main crop) for the control of annual grass weeds and annual broad-leaved weeds.

Product Profile	
Brand	**QUIDAM**
MAPP number	17595
Active ingredient	800g/L prosulfocarb
Formulation	Emulsifiable Concentrate (EC)
Activity	Contact and Residual
Maximum individual dose	5L/ha
Maximum number of treatments	1
Latest time of application	At emergence (soil rising over emerging potato shoots)
Other restrictions	This product must not be applied via hand-held equipment
Pack size	10L
Aquatic buffer zone	5m
Other crops	Winter wheat, Winter barley

Mode of Action

QUIDAM belongs to the Thiocarbamates family and works by inhibition of lipid synthesis – not ACCase inhibition, and is classified by the Herbicide Resistance Action Committee (HRAC) as mode of action code N.

Key Information About Quidam

- Before applying **QUIDAM**, complete ridge formation and do not disturb soil after treating.
- For pre-emergence applications only, **QUIDAM** can be tank mixed with active substances containing metribuzin.
- **QUIDAM** will control a range of grass weeds and annual broad-leaved weeds, for further information see Tables 1 and 2 on pages 17 – 18.

TROY 480

MAPP No 16954

TROY 480 is a post-emergence contact herbicide for the control of broad-leaved weeds.

Product Profile	
Brand	**TROY 480**
MAPP number	16954
Active ingredient	480g/L bentazone
Formulation	Soluble Concentrate (SL)
Activity	Contact
Maximum individual dose	3L/ha
Maximum total dose	3L/ha per year
Maximum number of treatments	2
Latest time of application	Before shoots exceed 15cm in height.
Other restrictions	Do not use on seed crops or first earlies. Do not apply following a post-emergence application of metribuzin.
Pack size	5L
LERAP	None
Other crops	Broad bean, combining pea, dwarf french bean, field bean (spring), field bean (winter), linseed, ornamental plant production, runner bean, vining pea (See label for details at uk.uplonline.com)

Mode of Action

TROY 480 is absorbed mainly by the foliage, with very little translocation. It is also absorbed by the root with translocation in the xylem providing control of broad-leaved weeds in crop and horticultural situations. Classified by the Herbicide Resistance Action Committee (HRAC) as mode of action code C3.

Key Information About TROY 480

- It can be used on any soil type as it has no residual soil activity.
- Best weed control is achieved when weeds are small.
- **A good option for controlling cleavers and volunteer OSR.**
- Unsatisfactory weed control may result if applications are made in periods of drought or cold weather.
- TROY 480 is a contact acting herbicide, therefore good spray cover is essential and high pressure should be used to produce a fine penetrating spray.
- Avoid applying to crops which have suffered damage and stress.
- Do not spray at temperatures above 21°C, spraying should be delayed until the evening when cooler.
- Do not apply insecticides within 7 days of treatment with TROY 480.
- Leave an interval of at least 7 days before applying post-emergence grass herbicides and 14 days after.
- 6 hours rain free period required.
- Consult processor before using on crops for processing.

Use of TROY 480 to Avoid Unacceptable Risks to Water

The best use guide for bentazone produced by the Voluntary Initiative can be downloaded from their website (www.voluntaryinitiative.org.uk), an updated version was issued in March 2017.

Weed Control

TROY 480 controls a large number of weeds, as shown in Table 1 on page 17.

Varietal Restrictions for TROY 480

The following maincrop and second early varieties can be safely treated: Ambo, Ausonia, Brodick*, Cara, Costello, Cultra, Erntestolz*, Marfona, Maris Piper, Maris Peer, Nadine, Navan* Obelix*. Pentland Crown, Pentland Dell, Pentland Squire, Record, Romano, Saturna*, Saxon*, Shula*, Wilja, Vekaro and Vanessa.

The following varieties have shown more foliage scorch than others: Ailsa*, Picasso*, Premiere*, Balmoral*, Desiree, Estima, Hermes* and King Edward.

Particular attention should be paid to the crop growth stage and factors affecting crop tolerance.

Do not treat the following varieties: Bintje, Fianna, Lady Rosetta, Morag, Morene, Rode Pipo, Russett Burbank, Sante, Shepody, Stemster and Stroma.

* Based on 2 years' data.

Weed Control Tables

Table 1: Susceptibility of broad-leaved weeds to UPL herbicides approved for use in potatoes

Product	QUIDAM		TROY 480	
Mode of Action	Contact Residual		Contact	
Active Ingredient	prosulfocarb		bentazone	
Growth Stage of Weeds	Pre-em	Cotyledon	Cotyledon – 2 leaves	2 – 6 leaves
Common Name				
Annual meadow grass	MS	MS		
Annual nettle				
Black bindweed	MR		S	MS
Black nightshade	S		S	S
Charlock			S	S
Chickweed	S	S	S	S
Cleavers	S	S	S	S
Crane's-bill	S		S	S
Corn marigold			S	S
Corn spurrey			S	S
Creeping thistle				
Dead-nettle	S		R	R
Fat-hen	MS	R	S	MS
Field penny-cress	S		S	S
Forget-me-not	S		S	S
Fumitory	S		S	MS
Groundsel	MR	R	S	MS
Hemp-nettle			R	R
Knotgrass	MR		R	R
Mayweed	MR	R	S	S
Orache			S	MS
Pale persicaria	MR		S	S
Pansy	MS			
Poppy	MR		S	MS
Redshank	MR	R	S	S
Scarlet pimpernel			S	S
Shepherd's purse	S	S	S	S
Small nettle	MR	R	S	S
Sowthistle				
Speedwell spp.	S	S	R	R
Volunteer OSR	MS		S	S
Wild radish			S	S

Table 2: Susceptibility of grass weeds to QUIDAM in potatoes

Product	QUIDAM	
Mode of Action	Contact Residual	
Active Ingredient	prosulfocarb	
Growth Stage of Weeds	Pre-em	Cotyledon
Common Name		
Annual meadow grass	MS	MS
Blackgrass	MS*	
Italian rye-grass	MS*	
Loose silky-bent	MS	
Rough stalked meadow-grass	S	
Wild oats	MR	

* A pre-emergence application of **QUIDAM** will reduce levels of black-grass and Italian rye-grass, however it should only be used as part of a resistance management strategy including use of sequences with products with different modes of action and cultural control techniques.

Key to Both Tables:

S = Susceptible MS = Moderately Susceptible MR = Moderately Resistant R = Resistant

Chlorpropham (CIPC)

CIPC currently remains available to the industry but stewardship is essential to comply with label requirements and minimise the risk of any MRL exceedances.

At the time of printing there has been no vote and there are no updates on potential further timelines for product authorisations.

Chlorpropham (or CIPC) is isopropyl-N-(3-chlorophenyl) carbamate, and is widely used as a sprout suppressing agrochemical applied to stored potatoes. It works by interfering with cell division to inhibit sprout development.

CIPC has been available for over fifty years and was in place even before refrigeration/temperature controlled storage was an option to growers. It is currently applied to approximately half of the stored potato crop in Great Britain (GB).

The Potato Industry CIPC Stewardship Group (PICSG)

The use of CIPC is now subject to a stewardship process which is operated by the Potato Industry CIPC Stewardship Group.

New controls planned by CIPC approval holders and backed by the Potato Industry Stewardship Group, will mean all CIPC applications from the 2017 harvest onwards need to be made using 'active recirculation'. Different ways of preparing potato stores for active recirculation are shown in a new Stewardship booklet entitled CIPC APPLICATION: A STORE OWNER'S GUIDE, this is available at www.cipccompliant.co.uk.

PICSG is a collaboration between key industry organisations including UPL that have come together to promote the stewardship of CIPC. Further information about CIPC and the Stewardship Group including the 'Action Plan' can be found at www.cipccompliant.co.uk.

Label Rates Published for CIPC

For 2018-19 the following currently applies. "The total dose applied may not exceed 24g/tonne and 36g/tonne for fresh and processing potatoes (including fish & chip shop supplies) respectively."
The maximum individual dose is 18g/tonne and the harvest interval is now 14 days. These are statutory changes.

Key Requirements

Total dose
Fresh market: **24g/tonne**.
Processing (incl. fish & chip shops): **36g/tonne**.

Harvest interval
The latest time of application is **14 days** before removal from store for sale or processing.

Equipment
Equipment must be inspected and certified annually by **NSTS**.

Personnel
Applicators must be qualified to **NPTC PA1**, **PA9** and should be members of the National Association of Agricultural Contractors (NAAC) CIPC Applicators' group.

Advisors
Recommendations for CIPC must be made by **BASIS** qualified advisors.

Stores
Stores must be inspected and reported as fit for CIPC application under the Red Tractor Assurance Scheme.

Responsibility
Overall responsibility for CIPC use lies with the **crop owner** – not the store manager or the CIPC applicator.

PRO-LONG

MAPP No 14389

PRO-LONG is a liquid sprout inhibitor for use on stored potatoes. Please check with the CIPC stewardship website at www.cipccompliant.co.uk to ensure you are complying with the latest industry protocols.

Product Profile

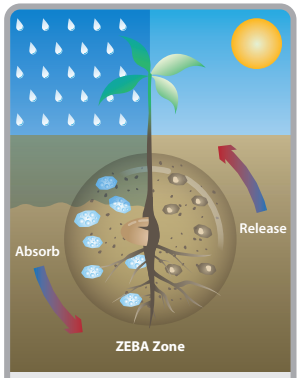
Brand	**PRO-LONG**
MAPP number	14389
Active ingredient	500g chlorpropham (CIPC)
Formulation	Liquid
Label crops	Potato (post harvest use, excluding seed)
Maximum individual dose	24ml product (12g CIPC)/tonne of potatoes.
Maximum total dose	Fresh market potatoes: 48ml product (24g CIPC) /tonne potatoes. Potatoes for processing: 72ml product (36g CIPC) /tonne potatoes.
Latest time of application	14 days before removal from store for sale or processing
Pack size	20L
LERAP	None

Note: If the total dose applied (from any combination of products containing chlorpropham) is greater than 24g chlorpropham per tonne, then treated potatoes must only be used for commercial processing. In any case, the total dose applied (from any combination of products containing chlorpropham) to a stored ware potato crop must not exceed 36g chlorpropham per tonne.

ZEBA

What is ZEBA?

- Revolutionary patented starch-based granule intended for soil incorporation in the root zone
- It has the function to absorb water up to 495 times its own weight, forming hydrogels suspended in and around the roots
- Performing in all soil types, it hydrates and releases water on demand multiple times in cycle before fully degrading
- Increases the soils water holding capacity (WHC), positively impacting on water use efficiency (WUE)
- Very high Cation Exchange Capacity (CEC) positively impacts on nutrient use efficiency (NUE)
- Non-toxic, safe and degradable



As more water enters the soil, ZEBA repeatedly hydrates and releases captured moisture, on demand, as plants need it.

ZEBA Water Holding Capacity Tests

Due to either the lack of overall irrigation, precipitation or the infrequency of water delivery to potatoes, it is very important to hold moisture around the tuber development zone, especially during the 4 – 5 week period of tuber initiation.

Allowing the soil to dry out at this critical stage can effect nutrient supply, tuber numbers and affecting skin quality.

ZEBA is ideally able to increase a soil's water holding capacity above that of a control.

ZEBA is repeatedly able to release the water it absorbs back to the plant more easily than that of clay, therefore providing a valuable source of water supply and nutrients, whilst providing a stable environment for soil microbes.

Soil Types of Test Samples

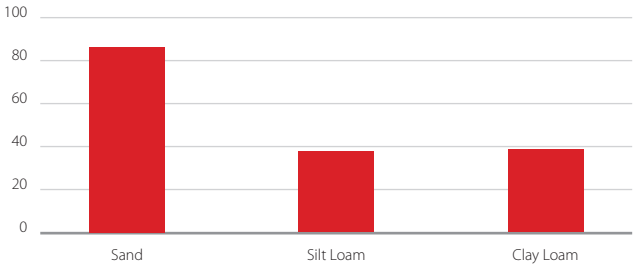
Sample	Type	% Sand	% Silt	% Clay
1	Sand	100	0	0
2	Silt Loam	37	40	23
3	Clay Loam	30	48	22

Soil Types of Test Samples

Type	Test	Water Passing (ml)	Water Retained (ml)	% Retained	% Increase
Sand	Control	425	325	43.3	—
	w/ZEBA	150	600	80	85
Silt Loam	Control	275	475	63.3	—
	w/ZEBA	100	650	86.1	37
Clay Loam	Control	352	398	53.1	—
	w/ZEBA	200	550	73.3	38

Source: PICSG/Jul 2013/v3.1

% Increase in Water Holding Capacity



Source: Logan Labs, LLC. Dose rate: 12kg/ha

ZEBA in Potatoes

- **ZEBA** is a starch based Super Hydrating Granule which helps plants use water efficiently, producing healthier, higher quality, higher yielding crops
- Helps to maintain stomata function and tuber bulking rates for higher yields
- Reduces stress from lack of water
- Maintains moisture around the tuber at critical times e.g. tuber initiation, leading to increases in saleable grades and overall yield
- **ZEBA** is commonly applied using all standard granular application methods
- **ZEBA** is superior to wetting agents, other additive and soil conditioners in its ability to provide maximum water, precisely when plant roots need it most.
- Unlike products applied monthly, **ZEBA** is applied only once per year.
- Through efficient water management, **ZEBA** can allow longer intervals between watering.

Rates of Application in Potatoes

10 – 12kg/ha in row; 20 – 25kg/ha overall.

Summary

- **ZEBA** increases the water holding capacity of soils
- **ZEBA** has direct and indirect influences on beneficial soil properties
- **ZEBA** maintains a level of moisture in the applied root zone (rhizosphere)
- **ZEBA** reduces leaching of key nutrients
- **ZEBA** is a fully degradable starch Super Hydrating Granule
- **ZEBA** supports soil microbial communities and adds to a sustainable soil policy

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Always read the label and product information before use.

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