



**Dow AgroSciences**

**PALIO\***



*HERBICIDE*

Product Registration Number: 18349

A water dispersible granule containing 7.08% w/w pyroxsulam, 7.08% cloquintocet-mexyl and 1.42% w/w florasulam.

A post-emergence ALS inhibitor (HRAC group B) for use on all varieties of WINTER WHEAT, RYE and TRITICALE for the control of WILD OATS, RYEGRASS, STERILE BROME and broad-leaved weeds and SPRING WHEAT for the control of broad-leaved weeds. Use only as part of a resistance management strategy that includes cultural methods of control and does not use ALS inhibitors as the sole chemical method of grass weed control.

The (COSHH) Control of Substances Hazardous to Health Regulations may apply to the use of this product at work.

**READ DIRECTIONS FOR USE ON ATTACHED LEAFLET.**

Pack size: 1.06 kg

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This label is compliant with the CPA Voluntary Initiative Guidance.





**Product Identifier according to Art.18 of Reg. (EC) No 1272/2008**  
**[CLP]: Palio®**

**WARNING:**

**Very toxic to aquatic life with long lasting effects.**

Wear protective gloves

Collect spillage

Dispose of contents/container to a licensed hazardous-waste disposal contractor or collection site except for empty clean containers which can be disposed of as non-hazardous waste.

Contains Pyroxsulam and Cloquintocet-mexyl. May produce an allergic reaction

**To avoid risks to human health and the environment, comply with the instructions for use.**

**IMPORTANT INFORMATION.**

FOR USE ONLY AS AN AGRICULTURAL HERBICIDE

<b>Crops</b>	<b>Maximum Individual Dose</b>	<b>Maximum Total Dose</b>	<b>Latest Time of Application</b>
Rye, Triticale, Wheat (Winter)	265 g pr/hectare	265 g pr/hectare	Before third node detectable stage (BBCH 32 inclusive)
Wheat (Spring)	200 g pr/ha	200 g pr/ha	Before third node detectable stage (BBCH 32 inclusive)

**Other Specific Restrictions:**

One application of PALIO per season.

To avoid the build-up of resistance, do not apply this or any other product containing an ALS inhibitor herbicide with claims for control of grass-weeds more than once to any crop.

**READ THE LABEL BEFORE USE. USING THIS PRODUCT IN A MANNER THAT IS INCONSISTENT WITH THE LABEL MAY BE AN OFFENCE. FOLLOW THE CODE OF PRACTICE FOR USING PLANT PROTECTION PRODUCTS.**

## **SAFETY PRECAUTIONS**

### **Operator protection**

WHEN USING, DO NOT EAT, DRINK OR SMOKE.

WASH HANDS AND EXPOSED SKIN before eating, drinking or smoking, and after work.

AVOID EYE AND SKIN CONTACT.

Engineering control of operator exposure must be used where reasonably practicable in addition to the following personal protective equipment:

Operators must wear suitable protective gloves when handling the product or handling contaminated surfaces.

However, engineering controls may replace personal protective equipment if a COSHH assessment shows that they provide an equal or higher standard of protection.

### **Environmental protection:**

Extreme care must be taken to avoid spray drift onto non-crop plants outside of the target area.

Do not contaminate water with the product or its container. Do not clean application equipment near surface water. Avoid contamination via drains from farmyards and roads.

### **Storage and disposal:**

KEEP AWAY FROM FOOD, DRINK AND ANIMAL FEEDINGSTUFFS.

KEEP OUT OF REACH OF CHILDREN.

KEEP IN ORIGINAL CONTAINER, tightly closed, in a safe place away from damp/sources of heat.

DO NOT RE-USE CONTAINER for any purpose.

## **DIRECTIONS FOR USE**

**IMPORTANT:** This information is approved as part of the Product Label. All instructions within this section must be read carefully in order to obtain safe and successful use of this product.

### **GENERAL INFORMATION**

PALIO\* has foliar activity against wild oats, ryegrass, sterile brome and broad-leaved weeds. The ideal timing for application is when the weeds are small and actively growing. As PALIO is mainly foliar acting it is essential to ensure good coverage. The effectiveness of PALIO may be reduced when soils are very dry, or temperatures are low and subsequently weed growth is slow. Susceptible weeds that germinate after application will not be controlled.

### **NOTES**

Avoid overlapping of spray swaths.

PALIO is rainfast in one hour.

Do not spray when crops are under stress from cold, drought, water logging, pest damage, nutrient deficiency etc.

Do not roll or harrow 7 days before or after application.

Take extreme care to avoid drift onto susceptible crops, non-target plants or waterways. Do not apply directly to, or allow spray drift to come into contact with agricultural or horticultural crops, amenity plantings, gardens, ponds, lakes or watercourses.

Crop injury may occur if PALIO is applied in tank mixture with plant growth regulators. A minimum interval of 7 days between applications should be observed.

Under some conditions, applications of PALIO on spring wheat may have an adverse impact on yield.

To avoid crop injury do not apply PALIO in tank mixture with an organophosphate insecticide. A minimum interval of 14 days between applications should be observed.

When applying PALIO + an authorised adjuvant in tank mixture with chlorotoluron avoid double spray overlaps on light soils as a reduction in yield may occur.

### **WEED RESISTANCE**

PALIO is a product with an ALS inhibitor mode of action (HRAC group B). Strains of some annual grasses (e.g. blackgrass, wild oats and Italian ryegrass) have developed resistance to herbicides which may lead to poor control. A strategy for preventing and managing such resistance should be adopted. Guidelines have been developed by the Weed Resistance Action Group and copies are available from the HGCA, CPA, your distributor, crop advisor or product manufacturer.

PALIO + an authorised adjuvant should be used in a programme. Following application of pre emergence products, PALIO + an authorised adjuvant should be used in tank mixture with products with a different mode of action. Control may be reduced if PALIO + an authorised adjuvant is applied alone. No more than one application of ALS inhibiting herbicides with claims for the control of grass weeds should be applied for grass weed control.

Do not use products that only contain a herbicide with an ALS mode of action where common poppy, common chickweed or mayweed are present.

Avoid using ALS inhibitors every year in the same field where common poppy, common chickweed or mayweeds are present. Use in mixture or sequences with herbicides with a different mode of action which are effective against these weeds.

## **MANAGEMENT OF RESISTANT BLACKGRASS**

For good resistance management and where resistance is known or suspected to be present to substituted ureas, dinitroanilines or ACCase inhibitors the following is recommended.

1. Good cultural techniques such as drilling date and seedbed preparation should be adopted. See WRAG guidelines.
2. Use only as part of a resistance management strategy that includes cultural methods of control and does not use ALS inhibitors as the sole chemical method of grass-weed control.
3. Use mixtures of herbicides with different modes of action at full-recommended dose rates.
4. Apply herbicides at optimum timing and environmental conditions.
5. A recommended sequence in such a situation would be a pre-emergence product followed by a tank mix of PALIO at 265 g/ha + an authorised adjuvant + a grassweed product with an alternative mode of action. This should be applied within 4 weeks of the pre-emergence treatment. Where weather conditions have prevented an application of PALIO + adjuvant in the autumn a spring application can be made provided that it is used as part of a planned programme of products utilising different modes of action. Contact Dow AgroSciences for recommended programmes.
6. To avoid the build up of resistance do not make more than one application of ALS inhibiting herbicides with claims for the control of grass weeds to any crop.

## **FOLLOWING CROPS**

Crops that can be sown after a crop treated with PALIO:

- |         |  |
|---------|--|
| Autumn  | Winter wheat and barley, winter oats, winter triticale, winter rye, oilseed rape, grass, winter beans, brassica plants as transplants  |
| Spring: | Spring wheat, spring barley, spring oats, triticale, rye, spring oilseed rape, sugar beet, potatoes, grass, clover (as part of a grass/clover ley), beans, peas, maize, linseed, brassica plants as transplants, carrots, parsnips |

Following a sequence of PALIO and metsulfuron-methyl, treated ground should be ploughed to a depth of 15 cm before establishing winter oilseed rape.

Vigour reductions may be seen in following crops of oilseed rape after a dry summer. This will be outgrown and will not result in yield loss.

## **CROP FAILURE**

In the event of a crop failure after a crop has been treated with PALIO + an authorised adjuvant before February 1st only the following crops may be planted after ploughing to a depth of at least 15 cm; Spring wheat, spring barley, grass or maize. At least 6 weeks must elapse between treatment and re-drilling.

Where crop failures occur following an application after February 1<sup>st</sup>, plough and then allow 6 weeks before planting grass or maize.

## **RATE OF USE**

PALIO should be applied at 265 g/ha with an authorised adjuvant at manufacturers recommended rates for winter cereals. The use rate in spring cereals is 200 g/ha with an authorised adjuvant at manufacturers recommended rates.

## **ADJUVANTS**

Authorised adjuvants are esterified and methylated rapeseed types, and those containing alkoxyated fatty amines, polyoxyalkylene glycol and alcohol ethoxylates.

## **CROPS**

PALIO + an authorised adjuvant can be used on all varieties of winter wheat, rye and triticale and on all varieties of spring wheat.

## **TIMING**

PALIO + an authorised adjuvant must be applied during periods of active growth i.e. warm temperatures and moist conditions.

In **WINTER CEREALS**, PALIO + an authorised adjuvant should be applied from 1 leaf (BBCH 11) up to and including the 2<sup>nd</sup> node detectable stage (BBCH 32) inclusive.

In **SPRING CEREALS**, PALIO + an authorised adjuvant may be applied from first tiller detectable (BBCH 21) but not before March 1<sup>st</sup>, up to and including the 2<sup>nd</sup> node detectable stage (BBCH 32) but not after May 31<sup>st</sup>.

## **SPRAY PROGRAMMES**

PALIO + an authorised adjuvant should be used in a programme of pre-emergence products, followed by a tank mixture of PALIO + an authorised adjuvant and products with a different mode of action. Control may be reduced if PALIO + an authorised adjuvant is applied alone.

When applying PALIO + an authorised adjuvant in tank mixture with chlorotoluron avoid double spray overlaps on light soils as a reduction in yield may occur.

Only one application of PALIO + an authorised adjuvant in a spray programme may be made.

Sequences should only be applied within the label recommendations of every product in the sequence.

Recommended pre-emergence products are:

Approved formulations of pendimethalin (MAPP 13405, 13406, 13441, 13442, 13815, 13816, 13859, 14664, 14712, 15761, 17094)

Approved formulations of pendimethalin + flufenacet (MAPP 13914, 13930, 13924, 14106)  
 Approved formulations of flufenacet + diflufenican (MAPP 15353, 14826, 16195)  
 Approved formulations of prosulfocarb (MAPP 16202, 16203, 16204, 16209)

Recommended tank mixtures can be found in the Weed Susceptibility section.

## **RATES OF USE, WEED SUSCEPTIBILITY AND MAXIMUM SIZE CONTROLLED FOR WINTER CEREALS**

Apply PALIO + an authorised adjuvant at 0.5% v/v in a recommended programme as follows:

<b>Weed species</b>	<b>Rate g/ha*</b>	<b>Optimum timing</b>	<b>Susceptibility</b>
Blackgrass	265	Apply to actively growing plants up to 4 tillers	MS
Wild oats	265	Apply to actively growing plants up to second node detectable	S
Sterile brome	265	Apply to actively growing plants up to 4 tillers	S
Ryegrass (from seed)	265	Apply to actively growing plants up to end of tillering	S
Common field speedwell	210	Apply to actively growing plants up to 6 true leaves	S
Cleavers	210	Apply to actively growing plants up to 150 mm	S
Ivy-leaved speedwell	210	Apply to actively growing plants up to 6 true leaves	S
Poppy	210	Apply to actively growing plants up to 6 true leaves	S
Charlock	170	Apply to actively growing plants up to 6 true leaves	S
Common chickweed	170	Apply to actively growing plants up to 100mm	S
Field Pansy	170	Apply to actively growing plants up to 4 true leaves	S
Geranium spp	170	Apply to actively growing plants up to 8 true leaves	S
Mayweed spp	170	Apply to actively growing plants up to 8 true leaves	S
Volunteer oilseed rape	170	Apply to actively growing plants up to 6 true leaves	S

\*Where grass weeds are present, rates of PALIO lower than 265 g/ha should not be used.

## RATES OF USE, WEED SUSCEPTIBILITY AND MAXIMUM SIZE CONTROLLED FOR SPRING CEREALS

Apply PALIO + an authorised adjuvant at 0.5% v/v in a recommended programme as follows:

Weed species	Rate g/ha	Optimum timing	Susceptibility
Common field speedwell	200	Apply to actively growing plants up to 6 true leaves	S
Cleavers	200	Apply to actively growing plants up to 150 mm	S
Ivy-leaved speedwell	200	Apply to actively growing plants up to 6 true leaves	S
Poppy	200	Apply to actively growing plants up to 6 true leaves	S
Charlock	170	Apply to actively growing plants up to 6 true leaves	S
Common chickweed	170	Apply to actively growing plants up to 100mm	S
Field Pansy	170	Apply to actively growing plants up to 4 true leaves	S
Geranium spp	170	Apply to actively growing plants up to 8 true leaves	S
Mayweed spp	170	Apply to actively growing plants up to 8 true leaves	S
Volunteer oilseed rape	170	Apply to actively growing plants up to 6 true leaves	S

PALIO applied to broadleaved weeds in spring wheat will not provide control of grass weeds. Where grass weeds are present, PALIO at 200 g/ha (or lower rates) should not be used.

### RECOMMENDED TANK MIXTURE

Partners are:

Approved formulation of	Grass Weed			
	Blackgrass	Ryegrass	Wild Oats	Sterile Brome
Pendimethalin MAPP 13405, 13406, 13441, 13442, 13815, 13816, 13859, 14664, 14712, 15761, 17094	✓	✓	✓	✓
Pendimethalin + picolinafen MAPP 12534, 12541, 13455, 13456, 13428, 13454, 14986, 14991, 17047	✓	✓	✓	✓

### NOTES:

Tank mixtures should only be applied within the label recommendations of every product in the tank mixture.



## JOINT APPLICATION – WINTER CEREALS ONLY

A joint application is the use of a product in tank mixture or sequence with another product.

**IMPORTANT NOTE:** Joint applications should only be made within the label recommendations of every product in the application. The joint application recommendations apply to winter cereal crops and do not apply to spring wheat.

PALIO may be applied in joint application (**tank mixture or sequences**) to the same cereal crop with **one** of the following ALS products:

Absolute <sup>1,2</sup>	Inka SX
Alias	Jubilee SX
Alias SX	Lancer <sup>1,2</sup>
Ally Express	Lexus Class <sup>1,2</sup>
Ally Max SX	Lexus Millenium <sup>1,2</sup>
Ally SX	Lexus SX <sup>1,2</sup>
Answer SX	Lorate
Avro SX	Mozaic SX
Barton WG <sup>3</sup>	Oklar SX
Biplay SX	Omnera LQM
Boxer <sup>3</sup>	Oriel 50SX
Bullion <sup>1,2</sup>	Parana
Calibre SX	Pennant
Chimera SX	Pinnacle
Cleancrop Mondial	Presite SX
Concert SX	Provalia LQM
Dakota <sup>3</sup>	Quantum
DP 911SX	Quantum SX
Ductis SX <sup>1,2</sup>	Ratio SX
Excalibur <sup>1,2</sup>	Refine Max SX
Exceed SX <sup>1,2</sup>	Seduce
Finish SX	Simba SX
Galaxy <sup>3</sup>	Slalom <sup>3</sup>
Gartrel <sup>3</sup>	Spitfire <sup>3</sup>
GF-184 <sup>3</sup>	Staka SX <sup>1,2</sup>
Gropper SX	Starane XL <sup>3</sup>
Jubilee SX	Taxi
Harmony M SX	Thor
Harmony SX	Traton SX
Hunter <sup>3</sup>	Triad

<sup>1</sup> When used at 5-10 g/ha flupyr-sulfuron-methyl - Approved as a tank-mixture only. Apply only where application may be made within the label recommendations of each product in the mixture. Where used for the control of black-grass application must only be made after an application of an pre-emergence residual herbicide and should also be mixed with a grassweed product with an alternative mode of action e.g. PALIO + flupyr-sulfuron-methyl containing product + a grassweed product with an alternative mode of action. Use in sequence is not authorised.

<sup>2</sup> When used at up to 5 g/ha flupyr-sulfuron-methyl – approved as tank-mixture and sequence. Maximum of 5 g/ha flupyr-sulfuron-methyl permitted.

<sup>3</sup> **The maximum total dose of florasulam applied to the crop must not exceed 7.5 g. For autumn planted crops a maximum total dose of 3.75 g of florasulam must be observed for applications made between crop emergence in the year of planting and February 1<sup>st</sup> in the year of harvest.**

Apart from these specific joint applications PALIO must NOT be applied with any other product containing an ALS inhibitor, for example amidosulfuron or triasulfuron. These sequences must only be used with a robust non-ALS inhibitor autumn herbicide programme. This is especially important where both products are applied in the spring. Do not apply other products containing ALS inhibitors in sequence with PALIO for the control of common chickweed in order to avoid increased selection for herbicide resistant individuals.

Following a joint application of PALIO and metsulfuron-methyl, treated ground should be ploughed to a depth of 15 cm before establishing winter oilseed rape.

### **SEQUENTIAL APPLICATION – WINTER CEREALS ONLY**

When PALIO has been applied in tank-mixture with a flupyr-sulfuron-methyl containing product for the control of blackgrass a further ALS containing product may be applied in **sequenced** application (i.e. as **separate applications on two separate occasions to the same crop**) to the same cereal crop with **one** of the following ALS products:

Alias	Hunter <sup>3</sup>
Alias SX	Inka SX
Ally Express	Jubilee SX
Ally Max SX	Lorate
Ally SX	Mozaic SX
Answer SX	Omnera LQM
Avro SX	Parana
Barton WG <sup>3</sup>	Pennant
Biplay SX	Pinnacle
Boxer <sup>3</sup>	Presite SX
Calibre SX	Provalia LQM
Chimera SX	Quantum
Cleancrop Mondial	Quantum SX
Concert SX	Ratio SX
Dakota <sup>3</sup>	Refine Max SX
DP 911SX	Seduce
Finish SX	Simba SX
Galaxy <sup>3</sup>	Slalom <sup>3</sup>
Gartrel <sup>3</sup>	Spitfire <sup>3</sup>
GF-184 <sup>3</sup>	Starane Vantage <sup>3</sup>
Jubilee SX	Starane XL <sup>3</sup>
Gropper SX	Taxi
Harmony M SX	Thor
Harmony SX	Traton SX
	Triad

<sup>3</sup> **The maximum total dose of florasulam applied to the crop must not exceed 7.5 g. For autumn planted crops a maximum total dose of 3.75 g of florasulam must be observed for**

**applications made between crop emergence in the year of planting and February 1<sup>st</sup> in the year of harvest.**

The ALS joint applications and sequential recommendations apply to winter cereals only and do not apply to spring wheat.

## **SOIL**

PALIO may be used on all soil types. On light soils some crop vigour effects may be observed. These are transient symptoms and will not affect crop yield.

## **APPLICATION**

PALIO + an authorised adjuvant should be applied through tractor-mounted hydraulic sprayers providing they are in good working order and have been calibrated according to the manufacturers' recommendations.

Do not apply through CDA applicators.

## **WATER VOLUME**

Apply PALIO + an authorised adjuvant in 100 to 200 litres of water per hectare. The lower volume must only be used in open crops on small weeds.

## **SPRAY QUALITY**

Apply PALIO as a FINE to MEDIUM spray as defined by the BCPC system. Nozzles that deliver a MEDIUM to COARSE droplet size eg Air Induction types are not recommended as product performance may be reduced.

## **MIXING**

Half fill the spray tank with clean water. Maintain agitation levels at all times.

### **Option 1: Using an Induction Bowl**

Ensure adequate suction at outlet in base of bowl and rinse bar is working.

Add required amount of PALIO by pouring the granules at a controlled flow directly into the opening to the suction pipe outlet.

Avoid the granules bridging or adhering to internal surfaces whilst filling.

### **Option 2: Top Tank Loading**

Remove tank lid and filter basket.

Add required amount of PALIO by pouring the granules at a controlled flow into the agitating water.

Ensure PALIO is dispersed and does not adhere to internal structures such as tank sprinklers.

Add the remainder of the clean water, maintaining agitation until spraying is complete.

## **TANK CLEANING**

To avoid subsequent injury to crops other than wheat, rye and triticale, all spraying equipment must be thoroughly cleaned both inside and out, using All Clear Extra spray cleaner as follows:

1. Immediately after spraying, drain tank completely. Any contamination on the outside of the spraying equipment should be removed by washing with clean water.
2. Rinse inside of tank with clean water and flush through booms and hoses using at least one tenth of the spray tank volume. Drain tank completely.

3. Half fill tank with clean water and add All Clear Extra at the recommended rate. Agitate and then briefly flush the boom and hoses with the cleaning solution. Top up with water making sure the tank is completely full and allow to stand for 15 minutes with agitation. Flush the boom and hoses and drain tank completely.
4. Nozzles and filters should be removed and cleaned separately with All Clear Extra solution containing 50 ml of All Clear Extra per 10 litres of water.
5. Rinse the tank with clean water and flush through the boom and hoses using at least one tenth of the spray tank volume. Drain tank completely.
6. For disposal of washings, follow Code of Practice for Using Plant Protection Products. Do not spray onto sensitive crop or land intended for cropping with sensitive crop.

**Note:** If it is not possible to drain the tank completely, step 3 must be repeated before going onto step 4.

## **COMPANY ADVISORY INFORMATION**

This section is not part of the Product Label under Regulation (EC) no 1107/2009.

## **TRADEMARK ACKNOWLEDGEMENTS**

Broadway, Barton, Bofix, Boxer, Galaxy, Hiker, Hunter, Image, Palio, Primus 25SC, Slalom, Spitfire, Starane and Vantage are trademarks of Dow AgroSciences LLC.

All other brand names referred to are trademarks of other manufacturers in which proprietary rights might exist.

## **DOW AGROSCIENCES CONDITIONS OF SUPPLY**

All goods supplied by us are of high grade and we believe them to be suitable but, as we cannot exercise control over their storage, handling, mixing or use, or the weather conditions before, during or after application which may affect the performance of the goods, all conditions and warranties, statutory or otherwise, as to the quality or fitness for any purpose of our goods are excluded. No responsibility will be accepted by us or re-sellers for any failure in performance, damage or injury whatsoever arising from their storage, handling, application or use. These conditions cannot be varied by our staff or agents whether or not they supervise or assist in the use of such goods.