

BOOST YOUR CROP PROTECTION

Aviator[®]
XPRO

▷ TWO MODES OF ACTION



+

UNMATCHED

GROWER SUPPORT

▷ ANTI-RESISTANCE TECHNOLOGY

TECHNICAL GUIDE

Wheat /// Barley /// Canola





INDEX

Product overview	02
Leafshield™ formulation technology	02
Dual mode of action	03
Formulation technology	05
Benefits	06
Disease control overview	06
Zadok's growth scale	08
Bee safety in canola crops	09

WHEAT

Wheat label	10
Wheat Spray Programme	11
Application: Wheat leaf diseases	14
Wheat disease spectrum	16
Trial results: Wheat	18

BARLEY

Barley label	20
Barley Spray Programme	21
Application: Barley leaf diseases	24
Barley disease spectrum	26
Trial results: Barley	28

CANOLA

Canola label	30
Canola Spray Programme	31
Canola growth and flowering stages	32
Application: Blackleg disease control	34
Blackleg control & disease cycle	36
Trial results: Blackleg in canola	37
Application: Sclerotinia disease control	38
Sclerotinia control & disease cycle	39-40
Risk assessor tool	41
Sclerotinia: Disease frequency and pressure	42
Trial results: Sclerotinia control	43



PRODUCT OVERVIEW

Aviator® Xpro™ sets a new benchmark for disease control resulting in healthy crop growth and outstanding yield and return on investment.

Specifically designed for an efficient anti-resistance strategy, **Aviator® Xpro™** is the combination of the two actives bixafen (SDHI) and prothioconazole (DMI) offering broad-spectrum disease control in cereals and canola, resulting in yield improvement. This increase in yield can be attributed to the product's unique distribution through the crop leaf tissue and extended duration of activity due to the **Xpro™** technology. Furthermore, formulated with **Bayer's** innovative **Leafshield™** formulation technology the disease control benefits of bixafen and prothioconazole are further optimised.

Leafshield™ utilises the latest advancements in formulation technology to further optimise the already impressive disease control benefits of bixafen and prothioconazole.

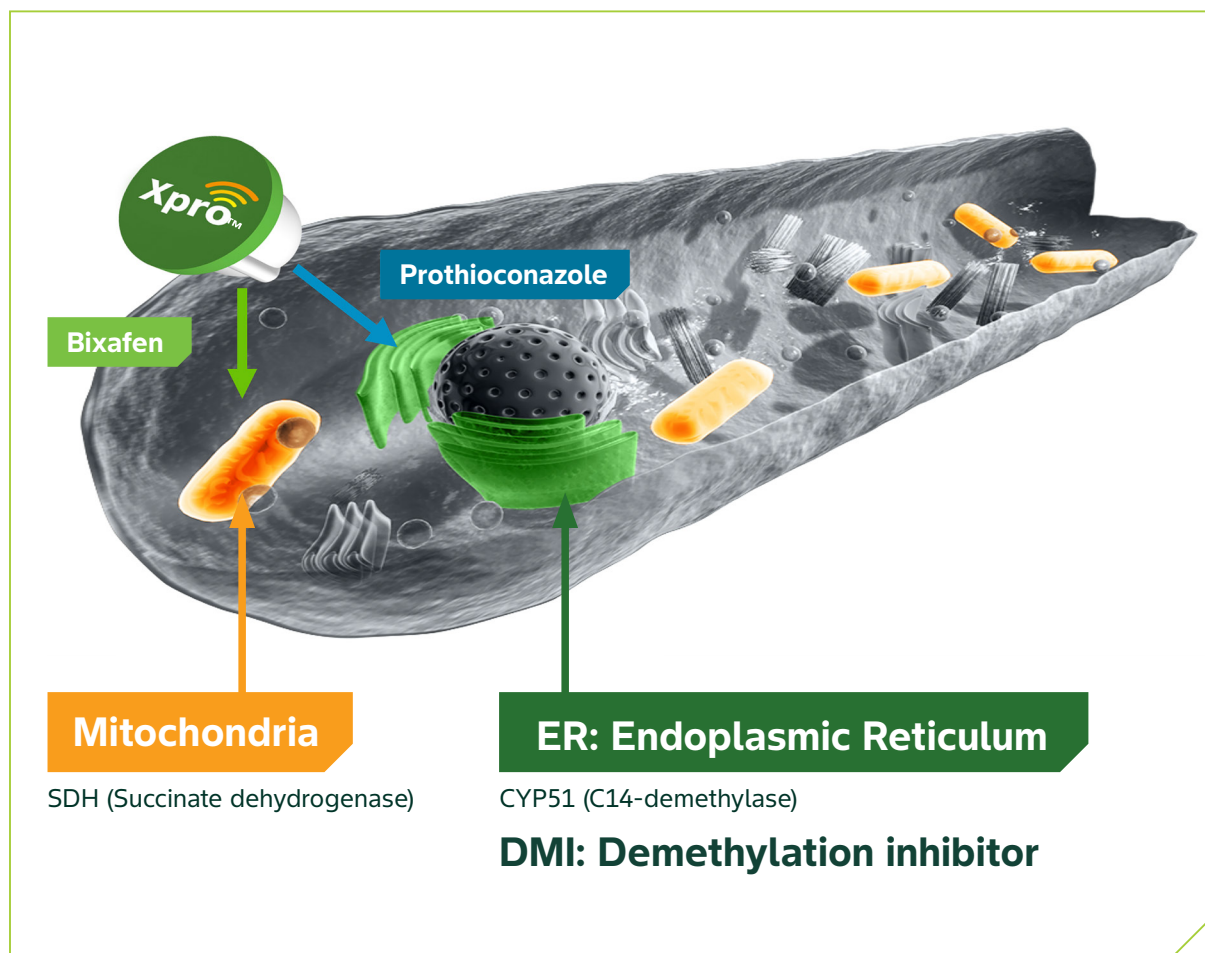
LEAFSHIELD™ FORMULATION TECHNOLOGY

Leafshield formulation system:

- /// Triple adjuvanted formulation
- /// Exceptional crop coverage
- /// Rainfast in minutes
- /// High foliar retention
- /// Steady A.I. delivery
- /// Greater efficacy

DUAL MODE OF ACTION

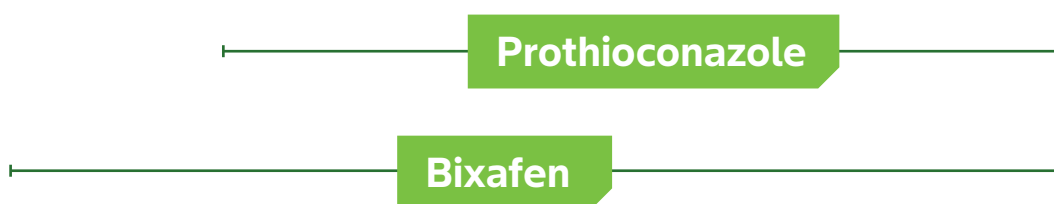
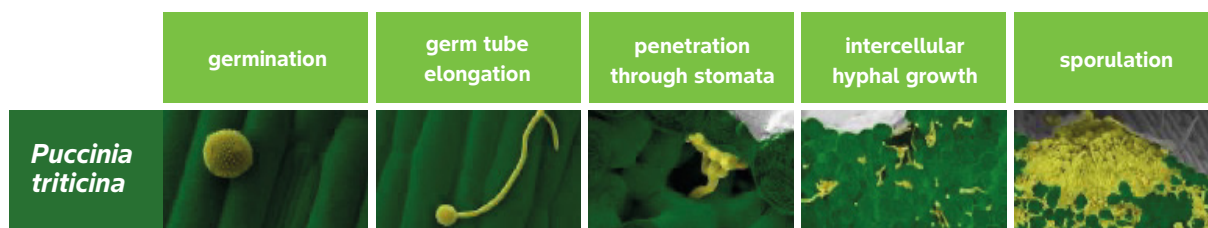
Fungal cell



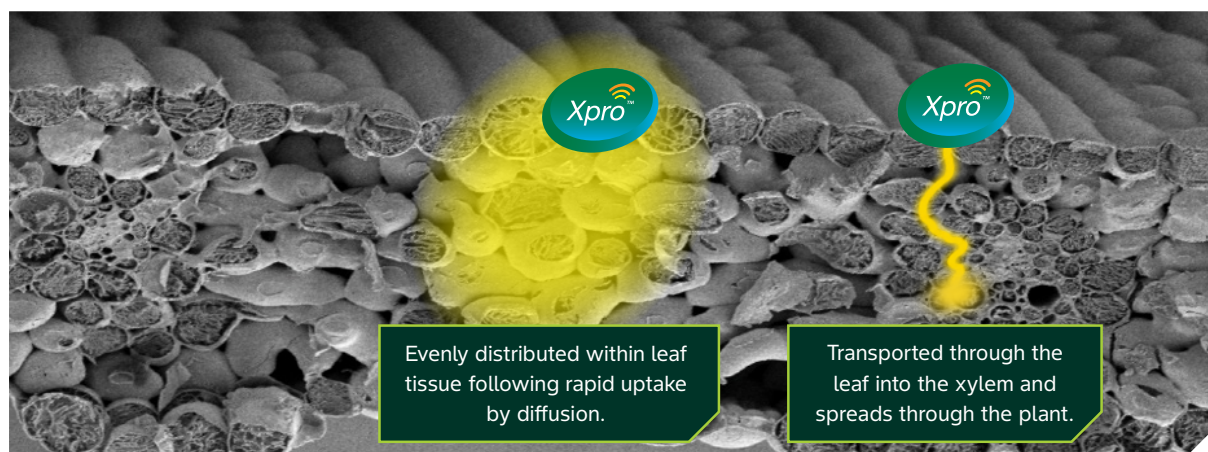
Xpro™ technology targets important enzymes which prevents energy production.

With its complementary modes of action, **Aviator® Xpro™** targets two important fungal enzymes, namely SDH and CYP51, combining bixafen from the succinate dehydrogenase inhibitor mode of action group (Group 7 – SDHI), with the proven performance of prothioconazole - Group 3 (DMI). Both components of **Aviator® Xpro™** are fully systemic with a similar moderate translocation pattern in the leaves, resulting in long-lasting efficacy. More than a protectant, **Aviator® Xpro™** targets various points during the pathogens' development and life cycle, preventing germination and further fungal growth. Furthermore, **Aviator® Xpro™** gives farmers added flexibility on application timing.

Aviator® Xpro™ targets various points during the pathogen's development



Unique distribution in the cereal leaf tissue means an extended duration of activity



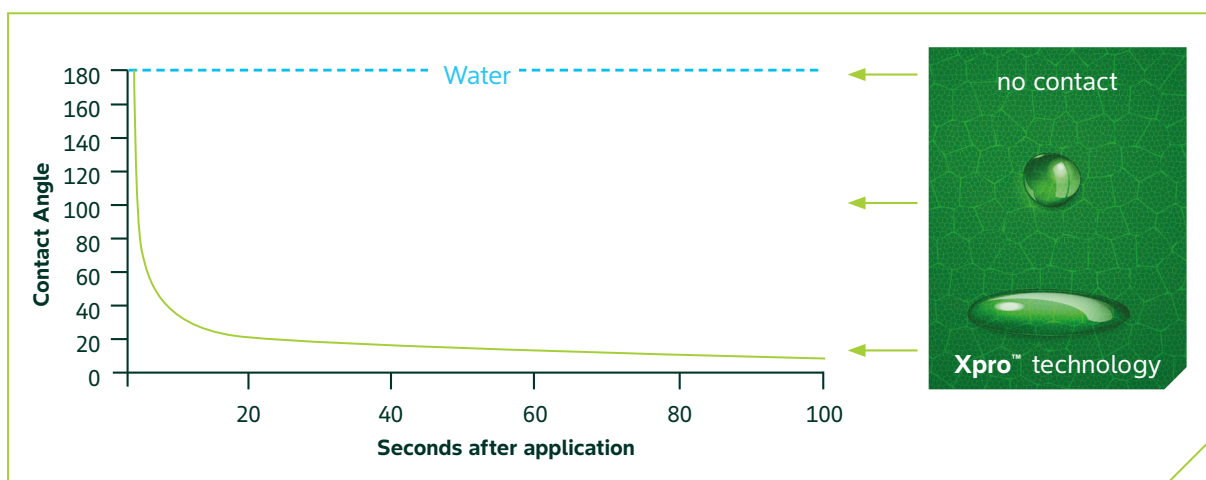
FORMULATION TECHNOLOGY

Aviator® Xpro™ formulation – two actives in a single container



High-tech formulation

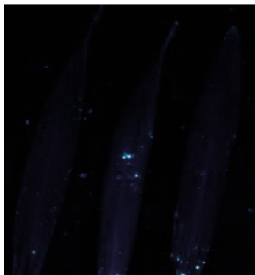
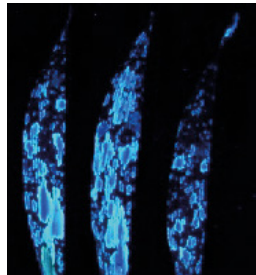
- /// Unique adjuvants reduce the surface tension of the spray droplets.
- /// This increases the spread of the droplets and maximises the contact area with the leaf.
- /// The reduced surface tension (flatter droplets) creates a thin film of protection which adheres to the leaf.



Xpro™ technology improves sticking and spreading on the leaf.

Superior coverage

Unique combination of adjuvants for an optimal coverage on all cereals with all nozzle types and commonly used water volumes.

200 ℓ/ha, air injector nozzle (AI 110-02)		
Water/Standard	Xpro™ technology	SDHI 1 + DMI
		

BENEFITS

- /// High-tech formulation
- /// Superior coverage with no adjuvants required
- /// Excellent rainfastness due to **Leafshield™** formulation technology
- /// Excellent disease control:
 - Two effective chemistry modes of action
 - Rotational product with maximum of two sprays per crop
 - Best-in-class control in broad-spectrum of diseases in wheat, barley and canola
- /// Designed for efficient anti-resistance strategy
- /// Improved disease control compared to traditional protectants, as recorded in trials
- /// Registered for aerial application

DISEASE CONTROL OVERVIEW

Aviator® Xpro™ delivers class-leading control of the following diseases in wheat, barley and canola.

CROP	DISEASE			
Barley	Leaf spot (leaf scald) (<i>Rhynchosporium secalis</i>)	Brown rust (leaf rust) (<i>Puccinia hordei</i>)	Net Blotch (<i>Pyrenophora teres</i>)	Ramularia leaf spot (<i>Ramularia collo-cygni</i>)
Wheat	Leaf rust (<i>Puccinia triticina</i> = <i>Puccinia recondita</i>)	Stem rust (<i>Puccinia graminis</i>)	Powdery mildew (<i>Erysiphe graminis</i>)	Eyespot (<i>Helgardia herpotrichoides</i>) Reduction of lodging caused by Eyespot
Canola	Sclerotinia (<i>Sclerotinia sclerotiorum</i>)	Blackleg (<i>Leptosphaeria maculans</i>)		



”

***“Healthy leaves today,
stronger harvests tomorrow
with Aviator® Xpro™.”***

ZADOK'S GROWTH SCALE FOR WHEAT AND BARLEY

Development phase	Zadok's growth stage	Description
Germination (GS 00 – 09)	GS 0	Dry seed
	GS 09	First green leaf just at tip of coleoptile
Seeding growth (GS 10 – 19)	GS 10	First leaf through coleoptile
	GS 11	First leaf emerged
	GS 13	Three leaves emerged
	GS 15	Five leaves emerged
	GS 19	Nine or more leaves emerged
Tillering (GS 20 – 29)	GS 20	Main stem only
	GS 21	Main stem and one tiller
	GS 23	Main stem and three tillers
	GS 25	Main stem and five tillers
	GS 29	Main stem and nine or more tillers
Stem elongation (GS 30 – 39)	GS 30	Pseudo stem erect Main stem and three tillers
	GS 31	First node detectable
	GS 32	Second node detectable
	GS 33	Third node detectable
	GS 37	Flag leaf just visible
Booting (GS 40 – 49)	GS 41	Flag leaf sheath extending
	GS 43	Boots just visible swollen
	GS 45	Boots swollen
	GS 49	First awns visible
Awn emergence (GS 50 – 59)	GS 51	Tip of ear just visible
	GS 55	Ear half emerged
	GS 59	Ear emergence complete
Flowering (anthesis) (GS 60 – 69)	GS 61	Beginning of anthesis (few anthers at middle of ear)
	GS 69	Anthesis complete
Milk development (GS 70 – 79)	GS 71	Kernel water ripe (no starch)
	GS 77	Late milk
Dough development (GS 80 – 89)	GS 83	Early dough
	GS 85	Soft dough
	GS 87	Hard dough
Ripening (GS 90 – 99)	GS 91	Grain hard, difficult to divide
	GS 93	Grain hard, difficult to divide
	GS 95	Grain loosening in daytime
	GS 97	Seed not dormant
	GS 99	Secondary dormancy lost



BEE SAFETY *IN CANOLA CROPS*

Aviator® Xpro™ is not expected to be toxic to bees when applied according to the registered label. In line with Good Agricultural Practice, avoid spraying during the peak foraging periods, which are typically mid-morning to mid-afternoon, in crops where bees are foraging.

The broadcast spray of any agricultural chemical onto foraging bees, including just water, and especially in applications containing wetting agents, can be enough to disrupt the flight of heavily laden bees causing them difficulty in returning to their hives.



WHEAT

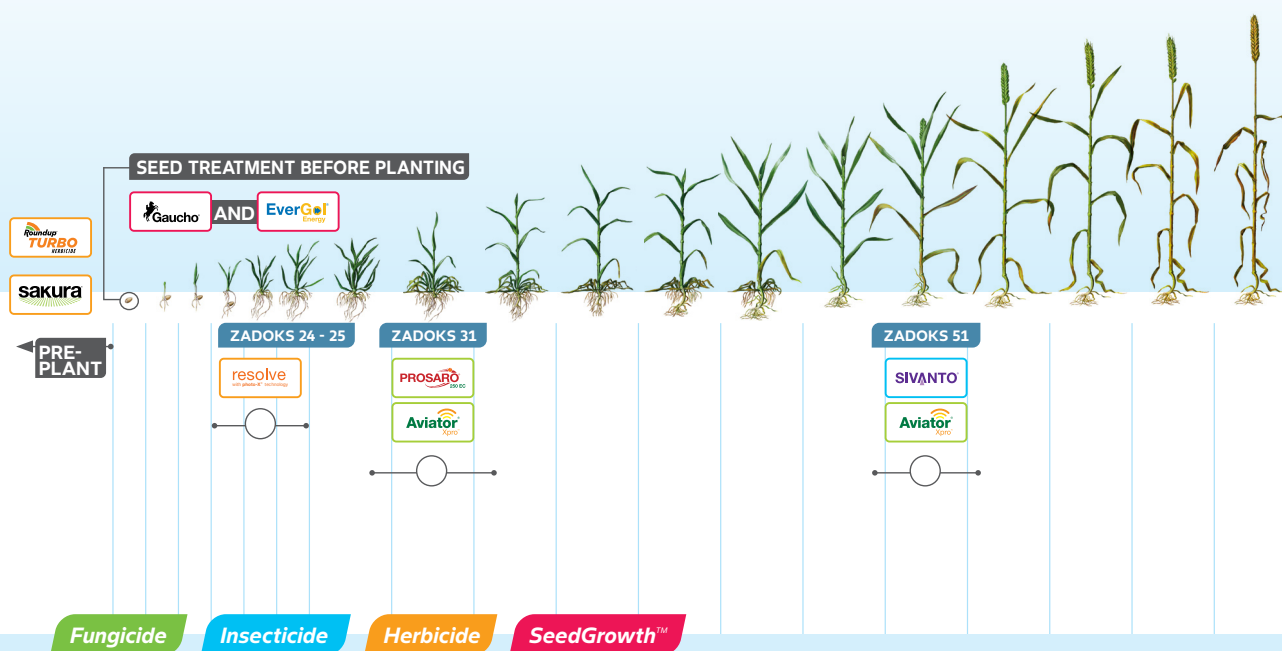
WHEAT LABEL

Product name	Aviator® Xpro™ Foliar Fungicide
Fungicide mode of action groups	Group 7 SDHI + Group 3 DMI
Formulation	Emulsifiable concentrate (EC)
Active ingredients	75 g/ℓ bixafen + 150 g/ℓ prothioconazole
Crop	Wheat
Wheat diseases	Leaf rust, stem rust, powdery mildew and reduction of lodging caused by Eyespot
Application rates and timing for control	Leaf diseases: Apply at first signs of infection before 5% infection level is reached. A second application 3-4 weeks after the initial application is recommended for wheat with a high yield potential, particularly in cases where the initial application was made early (first node stage) or when other diseases develop later in the season. Do not harvest or graze within 42 days of last application.
Dosage	Dosage: 500 mL/ha
Leaf rust (<i>Puccinia triticina</i> = <i>Puccinia recondita</i>)	Spray when first symptoms appear, but not later than the flag leaf stage. Repeat if symptoms reappear.
Stem rust (<i>Puccinia graminis</i>)	Spray as soon as symptoms are noticed.
Powdery mildew (<i>Erysiphe graminis</i>)	Spray as a preventative application before the appearance of powdery mildew symptoms. Repeat application approximately 3-4 weeks later.
Eyespot (<i>Helgardia herpotrichoides</i>): Reduction of lodging caused by Eyespot	Apply between first and second node stage.
Compatibility	Bayer (Pty) Ltd. does not take responsibility for any tank mixtures as no compatibility trials have been done with any other products.
Number of applications per season	Maximum of two applications
Minimum interval between applications	3-4 weeks between applications of Aviator® Xpro™ , depending on disease infection.
Method of application	Ground application & Aerial application.



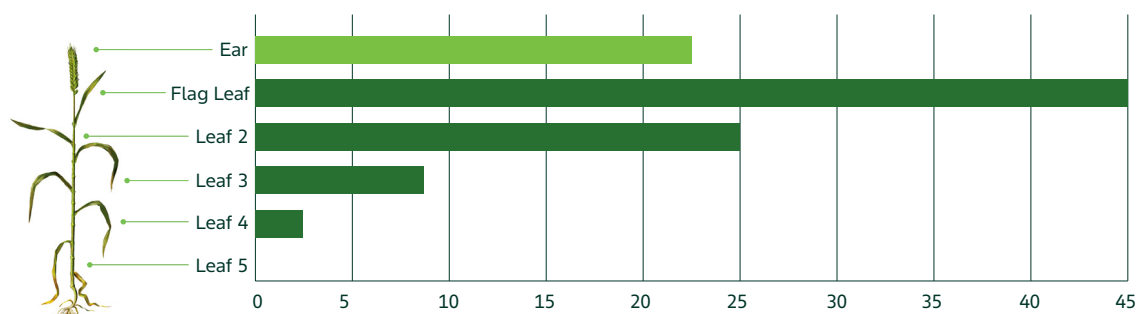
WHEAT SPRAY PROGRAMME

PRE-PLANTING: Always add ammonium sulphate when using **Roundup®** products.



The above indicates recommended placement in a growing season. However, it is not a formal or legal spray programme. Please refer to product labels for usage recommendations, consider Resistance Management guidelines and consult with your agrochemical consultant and exporter for MRL management and guidelines.

OVER 75% OF WHEAT YIELD COMES FROM THE TOP THREE LEAVES



Contribution to yield (%)
HGCA Wheat disease management guide January 2014

REGISTRATION DETAILS

READ THE LABEL BEFORE USE:

The registration owner of Roundup® TURBO and Sakura® is Bayer AG. Roundup® TURBO Reg. No. L7166. Contains Glyphosate (glycine) 450 g/ℓ (contains 551 g potassium salt of glyphosate). Warning. Sakura® Reg. No. L9082. Contains Pyroxasulfone (pyrazole) 850 g/kg. Danger. Sakura® is a registered trademark of Kumiai Chemical Industry Co. Ltd.

The following products are registered trademarks of Bayer AG: Aviator® Xpro™ Reg. No. L10089. Contains Bixafen (pyrazole carboxamide) 75 g/ℓ; Prothioconazole (triazole) 150 g/ℓ. Warning.

EverGol® Energy 176.6 FS Reg No. L11351 (Act Nr. 36 of 1947). Contains 76.8 g/ℓ Prothioconazole (triazole), 61.4 g/ℓ Metalaxyl (phenylamide) and 38.4 g/ℓ Penflufen (pyrazole carboxamide). Warning. Gaucho® FLEXX 600 FS Reg. No. L6562. Contains Imidacloprid (chloro-nicotinyl) 600 g/ℓ. Warning. Prosaro® 250 EC Reg. No. L8510. Contains Prothioconazole (triazole) 125 g/ℓ; Tebuconazole (triazole) 125 g/ℓ. Warning. Resolve® Reg. No. L8708. Contains Pyrasulfotole (pyrazole) 37,5 g/ℓ; Bromoxynil (nitrile) 210 g/ℓ (heptanoate and octanoate esters); Mefenpyr di-ethyl (safener) 9,38 g/ℓ. Warning. Sivanto® Prime Reg. No. L10776. Contains Flupyradifurone (butenolide) 200 g/ℓ. Warning.

All products are registered under Act No. 36 of 1947.

HAZARD STATEMENTS

WARNING — Roundup® TURBO
- Causes serious eye irritation.



DANGER — Sakura®
- Causes damage to organs (liver, kidneys, urinary bladder, cardiovascular system) through prolonged or repeated exposure if swallowed.
- Very toxic to aquatic life with long-lasting effects.



WARNING — Aviator® Xpro™
- Causes serious eye irritation.
- May cause respiratory irritation.
- Very toxic to aquatic life with long-lasting effects.



WARNING — EverGol® Energy 176.6 FS
- Very toxic to aquatic life with long-lasting effects.
- Contains Metalaxyl, 1,2-benzisothiazolin-3-one, reaction mass of 5-chloro-2-methyl-2H-isothiazol-3-one and 2-methyl-2H-isothiazol-3-one (3:1). May produce an allergic reaction.



WARNING — Gaucho® FLEXX 600 FS
- Harmful if swallowed.
- May cause an allergic skin reaction.
- Very toxic to aquatic life with long-lasting effects.



WARNING — Resolve®
- Harmful if swallowed or inhaled.
- May be fatal if swallowed or enters the airways.
- Causes serious eye irritation.
- Suspected of causing cancer.
- Suspected of damaging the unborn child.
- Very toxic to aquatic life with long-lasting effects.



WARNING — Prosaro® 250 EC
- Causes skin irritation.
- Causes serious eye irritation.
- May cause respiratory irritation.
- Suspected of damaging the unborn child.
- Very toxic to aquatic life with long-lasting effects.



WARNING — Sivanto® Prime
- Harmful if inhaled.
- May cause an allergic skin reaction.
- Causes serious eye irritation.
- May cause damage to organs (muscle) through prolonged or repeated exposure.
- Very toxic to aquatic life with long-lasting effects.





APPLICATION: WHEAT LEAF DISEASES

Aviator® Xpro™ should be applied at the first signs of infection before 5% infection level is reached. A second application 3-4 weeks after the initial application is recommended for wheat with a high yield potential, particularly in cases where the initial application was made early (first node stage) or when other diseases develop later in the season.

DISEASE	DOSAGE	COMMENTS
Leaf rust (<i>Puccinia triticina</i> = <i>Puccinia recondita</i>)	500 ml/ha	Spray as soon as symptoms are noticed, but not later than the flag leaf stage. Repeat application should symptoms reappear
Stem rust (<i>Puccinia graminis</i>)	500 ml/ha	Spray as soon as symptoms are noticed.
Powdery mildew (<i>Erysiphe graminis</i>)	500 ml/ha	Spray as preventative application before the appearance of powdery mildew symptoms. Repeat application approximately 3-4 weeks later.
Reduction of lodging caused by Eyespot	500 ml/ha	Apply between first and second node stage.

DO NOT SPRAY MORE THAN TWO APPLICATIONS PER SEASON.

METHOD OF APPLICATION:

Ground Application:

/// **Aviator® Xpro™** may be applied with conventional high volume spray equipment. Calibrate the apparatus before application to ensure that the correct dosage is applied. The distribution of the spray volume must be uniform throughout the target area. Ensure good coverage of the whole plant by using enough water and suitable spraying equipment.

/// **Apply the recommended dosage rate of Aviator® Xpro™ in 250 – 300 litres water per hectare.**

Aerial application:

/// Familiarise yourself and inform the pilot of the Stewardship requirements pertaining to the aerial application of **Aviator® Xpro™ 225 EC**.

/// Notify all inhabitants of the immediate area to be sprayed and issue the necessary warnings. Do not spray over or allow drift to contaminate adjacent areas or water. Please refer to the SANS Code of Practice for the aerial application of agricultural chemicals.

/// Aerial application of **Aviator® Xpro™ 225 EC** may only be done by a registered aerial application operator using a correctly calibrated, registered aircraft according to the instructions of SANS Code 10118 (Aerial Application of Agricultural Pesticides). Ensure that the spray mixture is distributed evenly over the target area and that the loss of spray material during application is restricted to a minimum. It is therefore essential that the following criteria be met:

/// **Volume:** A spray mixture volume of 30 - 40 ℓ per hectare is recommended. As this product has not been evaluated at a reduced volume rate, the registration holder cannot guarantee efficacy, or be held responsible for any adverse effects if this product is applied aerially at a lower volume rate than recommended above.

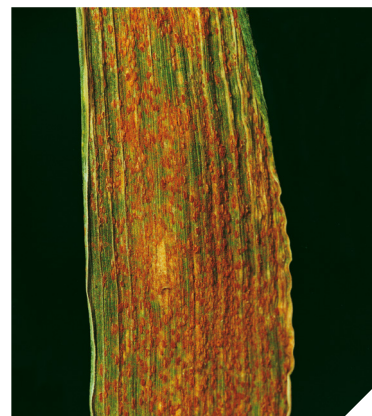
- /// **Droplet coverage:** 25 to 35 droplets per cm² must be recovered at the target area.
- /// **Droplet size:** A droplet spectrum with a VMD of 280 to 300 micron is recommended. Limit the production of fine droplets less than 150 micron (high drift and evaporation potential) to a minimum.
- /// **Flying height:** Maintain the height of the spray boom at 3 to 4 metres above the target. Do not spray when aircraft dives, is in a climb or when banking.
- /// Use suitable **atomising equipment** that will produce the desired droplet size and coverage, but which will ensure the minimum loss of product. The spraying system must produce a droplet spectrum with the lowest possible Relative Span.
- /// Position all the atomisers within the inner 60 to 75% of the wingspan to prevent droplets from entering the **wingtip vortices**.
- /// The difference in **temperature** between the wet and dry bulb thermometers of a whirling hygrometer, should not exceed 8 °C.
- /// Stop spraying if the **wind speed** exceeds 15 km/h.
- /// Stop spraying under **turbulent**, unstable and dry conditions during the heat of the day.
- /// Spraying under temperature **inversion conditions** (spraying in or above the inversion layer) and / or **high humidity conditions** (relative humidity 80% and above) may lead to the following:
 - reduced efficacy due to suspension and evaporation of small droplets in the air (inadequate coverage).
 - damage to other sensitive crops and / or non-target are as through drifting of the suspended spray cloud away from the target field.
- /// Ensure that the aerial spray operator knows exactly which fields to spray.
- /// Obtain an assurance from the aerial spray operator that the above requirements will be met and that relevant data will be compiled in a in a logbook and kept for future reference.

WHEAT DISEASES

Leaf rust

(*Puccinia triticina* = *Puccinia recondita*)

Leaf rust occurs more commonly in susceptible cultivars, causing small round orange-brown pustules to develop on the upper leaf surfaces. These pustules produce orange-brown spores and can be rubbed off. Later in the season, black teliospores develop underneath the leaves of mature plants. These spores are of no value. The upper leaves normally get affected first. Rust fungi survive on volunteer plants between seasons. The uridinio spores that form on volunteer plants act as an inoculum source of the disease for the next season. The rust fungi can also be spread by the wind. Epidemics occurring before or during flowering are critical, especially if the flag leaf is infected. The amounts of grains per ear and grain size are decreased. Leaf rust causes more damage to late cultivars, especially if the weather is cool for long periods. The incubation period normally lasts 6-8 hours at a temperature of 15-22 °C.



Stem rust

(*Puccinia graminis*)

Raised red-brown pustules appear on leaves, leaf sheaths, ears and stems of susceptible cultivars. With light infections, the pustules appear wide spread, but with serious infection they melt together and form a crust. Pustules are oblong and thin and consist of uridinio spores which become black and contain teliospores. Epidemics develop the same as leaf rust, but only in warmer temperatures (15-35 °C). Late planted wheat are more susceptible. The disease could develop quickly at temperature of 20 °C and higher. Great yield losses can occur with serious infection.



Powdery mildew

(*Erysiphe graminis*)

Wheat powdery mildew occurs more commonly in susceptible cultivars and on young growth such as new tillers.

Powdery mildew is characterised by a white, powdery fungus on the leaves and or stem and ear. The fungus appears on the bottom leaves first. It develops fast under warm, moist conditions which alternate with dry and wet cloudy periods. High-density planting as well as high nitrogen fertiliser increases the disease occurrence. Plants are more susceptible during periods of growth, for example during stem elongation. Heavy infections can cause the die off of tillers. When wheat get powdery mildew in the ear, the sap flow decreases, and it gets difficult to control it chemically. Disease development is suppressed at temperatures above 25 °C. The fungus survives mainly as dormant mycelium (filamentous fungal threads) on wheat stubble. Airborne conidia germinate in a wide temperature range (5-22 °C), with temperature of 15-22 °C along with a few hours of high humidity being optimal for germination.



Reduction of lodging caused by Eyespot

(*Helgardia herpotrichoides*)

Eyespot of wheat, also known as strawbreaker foot rot is a lower stem-infecting foot rot pathogen that affects the base of the small grain plant. Eyespot survives on infected wheat straw residue or in the soil until the first winter rains in the Cape spread inoculum to the winter-sown seedlings. Wheat is more susceptible than other small grains. Infection occurs at an early stage and eventually results in characteristic elliptical or eye-shaped lesions on the lower stem. Lesions typically have a dark brown perimeter that distinguishes between healthy and infected tissue. The center of each lesion is typically yellowish-brown and may have dark brown-blackish pseudoparenchyma fruiting bodies. In light infections, Eyespot symptoms may be limited to leaf sheath layers with no progression into the culm. In severe infections, the lesion will penetrate the stem tissue, and a whitish-gray mass of fungus, called mycelium, may be visible inside the hollow wheat stem. Eyespot lesions are brittle in contrast to surrounding healthy tissue and thus weaken the stem, which may result in multidirectional lodging.



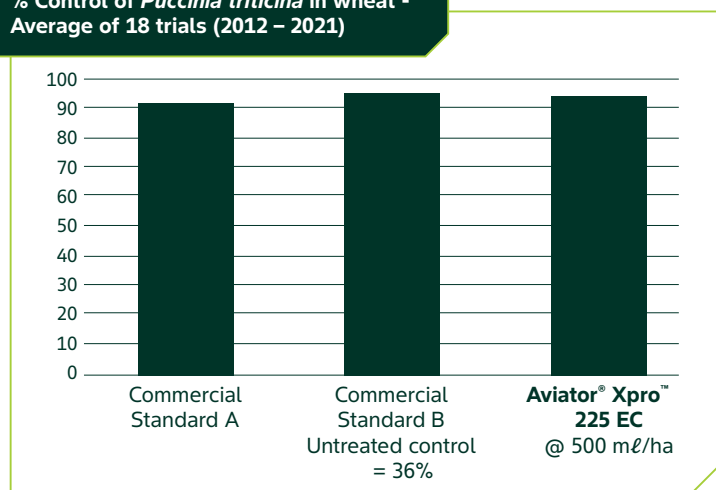
Efficacy Rating 1-6 for F, I, ST

SCALE 1-6	+/- RATING	COLOUR	EFFICACY
1	++++	++++	Excellent
2	+++	+++	Good
3	++	++	Satisfactory
4	+	+	Marginal
5	–	–	Insufficient
6	o	o	No activity
	nt	nt	Not tested

TRIAL RESULTS: WHEAT

Wheat – Leaf rust (also known as Brown rust)

% Control of *Puccinia triticina* in wheat -
Average of 18 trials (2012 – 2021)



A	++++
B	++++
Aviator® Xpro™ 225 EC	+++

Wheat – Stem rust

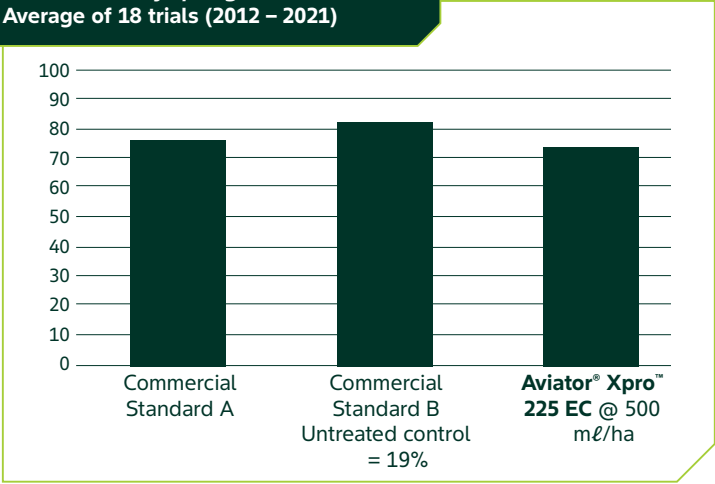
% Control of *Puccinia graminis* in wheat -
Average of 7 trials (2013 – 2021)



A	++++
B	+++
Aviator® Xpro™ 225 EC	++++

Wheat – Powdery mildew

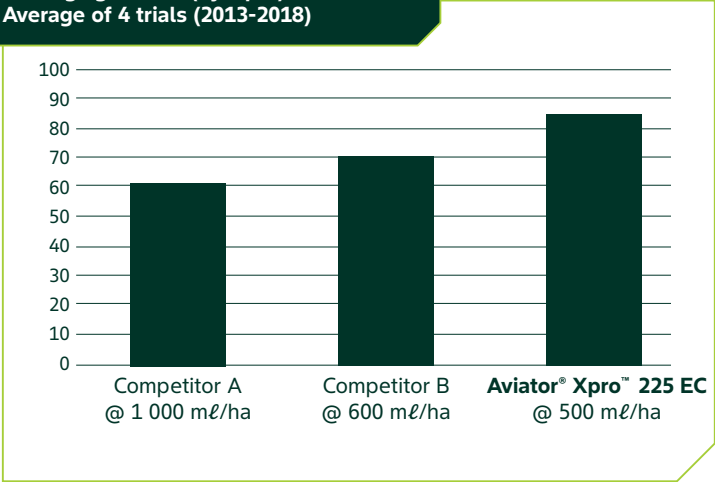
% Control of *Erysiphe graminis* in wheat - Average of 18 trials (2012 – 2021)



A	+++
B	+++
Aviator® Xpro™ 225 EC	+++

Wheat – Eyespot

% Lodging control (Eyespot) in wheat - Average of 4 trials (2013-2018)



A	+++
B	+++
Aviator® Xpro™ 225 EC	++++



BARLEY

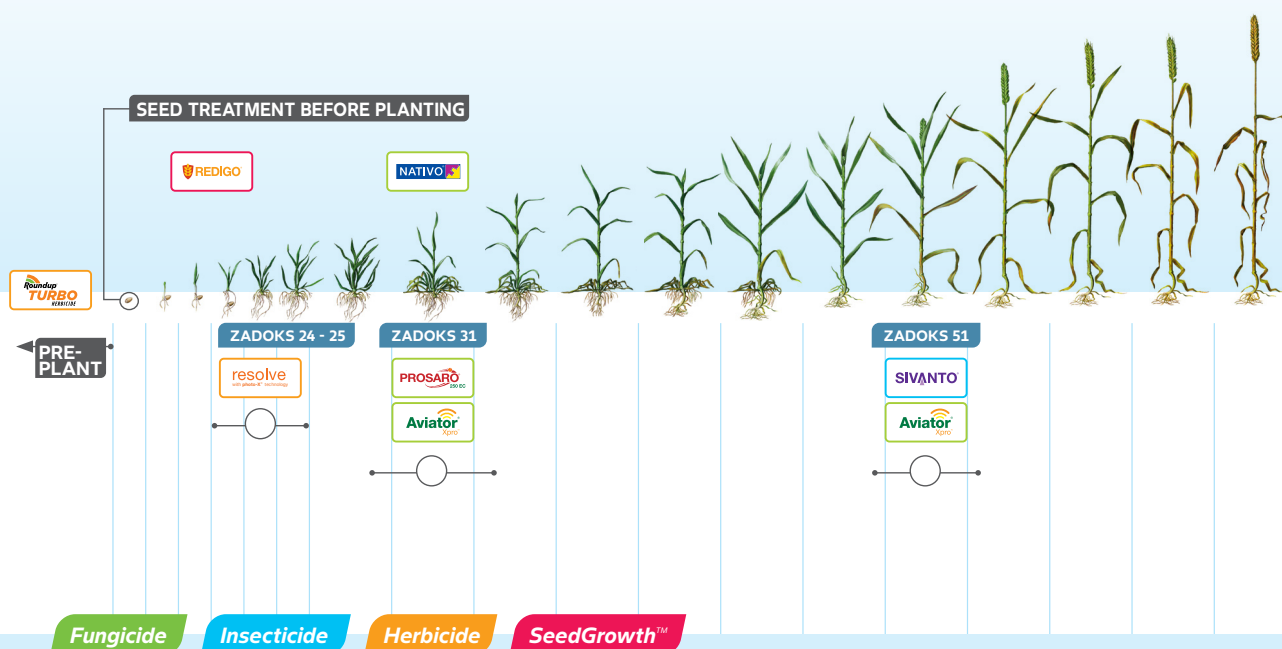
BARLEY LABEL

Product name	Aviator® Xpro™ Foliar Fungicide
Fungicide mode of action groups	Group 7 SDHI + Group 3 DMI
Formulation	Emulsifiable concentrate (EC)
Active ingredients	75 g/ℓ bixafen + 150 g/ℓ prothioconazole
Crop	Barley
Wheat diseases	Leaf spot (leaf scald), brown rust (leaf rust), net blotch, Ramularia leaf spot
Application rates and timing for control	Dosage: 400 ml/ha
Leaf spot (Leaf scald) (<i>Rhynchosporium secalis</i>)	Apply when first symptoms appear, or in the period between the seven-leaf and flag leaf stages.
Brown rust (Leaf rust) (<i>Puccinia hordei</i>)	Spray as soon as first symptoms are noticed. Repeat application approximately 3-4 weeks later should symptoms reappear.
Net blotch (<i>Pyrenophora teres</i>)	Apply when first symptoms are noticed. Under conditions of high infection pressure a second application 3-4 weeks later is recommended.
Ramularia leaf spot (<i>Ramularia collo-cygni</i>)	Apply when first symptoms are noticed. Under conditions of high infection pressure a second application 3-4 weeks later is recommended.
Compatibility	Bayer (Pty) Ltd. does not take responsibility for any tank mixtures as no compatibility trials have been done with any other products.
Number of applications per season	Maximum of two applications
Minimum interval between applications	3-4 weeks between applications of Aviator® Xpro™
Method of application	Ground application & Aerial application.



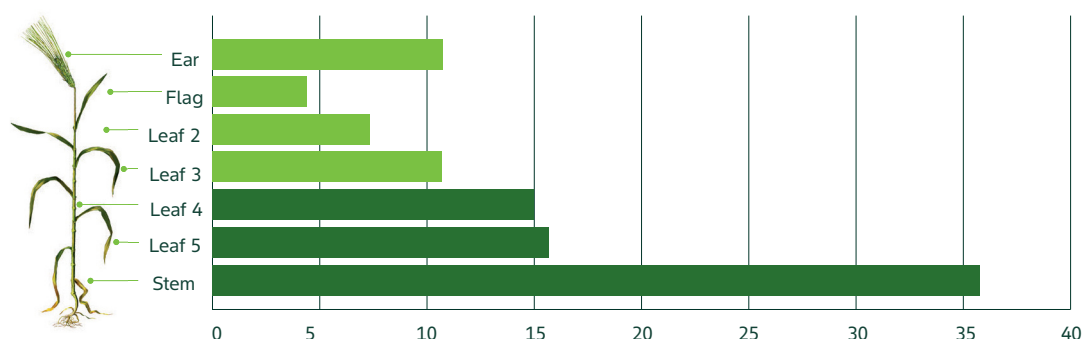
BARLEY SPRAY PROGRAMME

PRE-PLANTING: Always add ammonium sulphate when using **Roundup®** products.



The above indicates recommended placement in a growing season. However, it is not a formal or legal spray programme. Please refer to product labels for usage recommendations, consider Resistance Management guidelines and consult with your agrochemical consultant and exporter for MRL management and guidelines.

YIELD CONTRIBUTION FROM LEAVES IN BARLEY



Contribution to yield (%)
Adapted from HGCA Wheat disease management guide January 2014

REGISTRATION DETAILS

READ THE LABEL BEFORE USE:

The registration owner of Roundup® TURBO is Bayer AG.

Roundup® TURBO Reg. No. L7166. Contains Glyphosate (glycine) 450 g/ℓ (contains 551 g potassium salt of glyphosate). Warning.

The following products are registered trademarks of Bayer AG:

Aviator® Xpro™ Reg. No. L10089. Contains Bixafen (pyrazole carboxamide) 75 g/ℓ; Prothioconazole (triazole) 150 g/ℓ. **Native®** Reg. No. L8942. Contains Tebuconazole (triazole) 200 g/ℓ and Trifloxystrobin (strobilurin) 100 g/ℓ. Warning. **Prosaro® 250 EC** Reg. No. L8510. Contains Prothioconazole (triazole) 125 g/ℓ; Tebuconazole (triazole) 125 g/ℓ. Warning.

Redigo® Reg. No. L8616. Contains Prothioconazole (triazole) 100 g/ℓ. Warning. **Resolve®** Reg. No. L8708. Contains Pyrasulfotole (pyrazole) 37,5 g/ℓ; Bromoxynil (nitrite) 210 g/ℓ (heptanoate and octanoate esters); Mefenpyr di-ethyl (safener) 9,38 g/ℓ. Warning. **Sivanto® Prime** Reg. No. L10776. Contains Flupyradifurone (butenolide) 200 g/ℓ. Warning.

All products are registered under Act No. 36 of 1947.

HAZARD STATEMENTS

WARNING — **Roundup® TURBO**
- Causes serious eye irritation.



WARNING — **Aviator® Xpro™**
- Causes serious eye irritation.
- May cause respiratory irritation.
- Very toxic to aquatic life with long-lasting effects.



WARNING — **Native®**
- Suspected of damaging the unborn child.
- May cause harm to breast-fed children.
- Very toxic to aquatic life with long-lasting effects.
- Contains Trifloxystrobin, 1,2-benzisothiazolin-3-one, reactionmass of 5-chloro-2-methyl-2H-isothiazol-3-one and 2-methyl-2H-isothiazol-3-one (3:1). May produce an allergic reaction.



WARNING — **Prosaro® 250 EC**
- Causes skin irritation.
- Causes serious eye irritation.
- May cause respiratory irritation.
- Suspected of damaging the unborn child.
- Very toxic to aquatic life with long-lasting effects.



WARNING — **Redigo®**
- May cause an allergic skin reaction.
- Very toxic to aquatic life with long-lasting effects.



WARNING — **Resolve®**
- Harmful if swallowed or inhaled.
- May be fatal if swallowed or enters the airways.
- Causes serious eye irritation.
- Suspected of causing cancer.
- Suspected of damaging the unborn child.
- Very toxic to aquatic life with long-lasting effects.



WARNING — **Sivanto® Prime**
- Harmful if inhaled.
- May cause an allergic skin reaction.
- Causes serious eye irritation.
- May cause damage to organs (muscle) through prolonged or repeated exposure.
- Very toxic to aquatic life with long-lasting effects.





APPLICATION: BARLEY LEAF DISEASES

CROP	DISEASE	COMMENTS
Leaf spot (Leaf scald) (<i>Rhynchosporium secalis</i>)	400 mL/ha	Apply when first symptoms are noticed or in the period between the seven-leaf and flag leaf stages.
Brown rust (Leaf rust) (<i>Puccinia hordei</i>)	400 mL/ha	Spray as soon as first symptoms appear. Repeat application approximately 3-4 weeks later should symptoms reappear.
Net blotch (<i>Pyrenophora teres</i>)	400 mL/ha	Apply when first symptoms are noticed. Under conditions of high infection pressure a second application 3-4 weeks later is recommended.
Ramularia leaf spot (<i>Ramularia collo-cygni</i>)	400 mL/ha	Apply when first symptoms are noticed. Under conditions of high infection pressure a second application 3-4 weeks later is recommended.

DO NOT SPRAY MORE THAN TWO APPLICATIONS PER SEASON.

METHOD OF APPLICATION:

Ground Application:

/// **Aviator® Xpro™** may be applied with conventional high volume spray equipment. Calibrate the apparatus before application to ensure that the correct dosage is applied. The distribution of the spray volume must be uniform throughout the target area. Ensure good coverage of the whole plant by using enough water and suitable spraying equipment.

/// **Apply the recommended dosage rate of Aviator® Xpro™ in 250 – 300 litres water per hectare.**

Aerial application:

/// Familiarise yourself and inform the pilot of the Stewardship requirements pertaining to the aerial application of **Aviator® Xpro™ 225 EC**

/// Notify all inhabitants of the immediate area to be sprayed and issue the necessary warnings. Do not spray over or allow drift to contaminate adjacent areas or water. Please refer to the SANS Code of Practice for the aerial application of agricultural chemicals.

/// Aerial application of **Aviator® Xpro™ 225 EC** may only be done by a registered aerial application operator using a correctly calibrated, registered aircraft according to the instructions of SANS Code 10118 (Aerial Application of Agricultural Pesticides). Ensure that the spray mixture is distributed evenly over the target area and that the loss of spray material during application is restricted to a minimum. It is therefore essential that the following criteria be met:

/// **Volume:** A spray mixture volume of 30 – 40 ℓ per hectare is recommended. As this product has not been evaluated at a reduced volume rate, the registration holder cannot guarantee efficacy, or be held responsible for any adverse effects if this product is applied aerially at a lower volume rate than recommended above.

/// **Droplet coverage:** 25 to 35 droplets per cm² must be recovered at the target area.

/// **Droplet size:** A droplet spectrum with a VMD of 280 to 300 micron is recommended. Limit the production of fine droplets less than 150 micron (high drift and evaporation potential) to a minimum.

/// **Flying height:** Maintain the height of the spray boom at 3 to 4 metres above the target. Do not spray when aircraft dives, is in a climb or when banking.

- /// Use suitable **atomising equipment** that will produce the desired droplet size and coverage, but which will ensure the minimum loss of product. The spraying system must produce a droplet spectrum with the lowest possible Relative Span.
- /// Position all the atomisers within the inner 60 to 75% of the wingspan to prevent droplets from entering the **wingtip vortices**.
- /// The difference in **temperature** between the wet and dry bulb thermometers of a whirling hygrometer, should not exceed 8 °C.
- /// Stop spraying if the **wind speed** exceeds 15 km/h.
- /// Stop spraying under **turbulent**, unstable and dry conditions during the heat of the day.
- /// Spraying under temperature **inversion conditions** (spraying in or above the inversion layer) and / or **high humidity conditions** (relative humidity 80% and above) may lead to the following:
 - reduced efficacy due to suspension and evaporation of small droplets in the air (inadequate coverage).
 - damage to other sensitive crops and / or non-target are as through drifting of the suspended spray cloud away from the target field.
- /// Ensure that the aerial spray operator knows exactly which fields to spray.
- /// Obtain an assurance from the aerial spray operator that the above requirements will be met and that relevant data will be compiled in a logbook and kept for future reference.

BARLEY DISEASE SPECTRUM

Most of current common barley varieties only carry VS-MS ratings for scald and spot form net blotch. Therefore, fungicide choice is critical to keeping barley clean of diseases to maximise yields and grain quality. The below table demonstrates that **Aviator® Xpro™** offers comprehensive broad-spectrum disease control at often unrivalled levels.

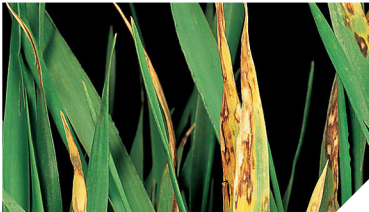
Product tested & application rate / ha	Brown rust (Leaf rust)	Leaf spot (Leaf scald)	Net form net blotch	Ramularia
Aviator® Xpro™ 500 ml/ha	★★★★	★★★★	★★★★	★★★
Best available or only registered product ★★★★★	Better than commercial standards tested ★★★★	Comparable to best commercial standards tested ★★★	Good efficacy or suppression only ★★	Not registered NR

BARLEY DISEASES

Leaf spot (Leaf scald)

(*Rhynchosporium secalis*)

Leaf scald initially spreads through infected stubble and plants. Once initial infection occurs, further spread happens by rain splash and dew. Infection risk increases in cool, moist conditions occurring commonly during winter and early spring. Leaf scald results in the development of irregularly shaped pale grey lesions with distinctive dark brown margins. Leaf scald outbreaks have been recorded to reduce yield by up to 40%.



Net blotch

(*Pyrenophora teres f. teres*)

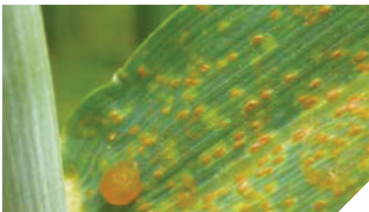
Net blotch can spread through infected stubble and can, more rarely, in the case of net form, be seed-borne. Cool, moist conditions increase chance of infection, which results in dark brown, streaky leaf lesions which form a distinctive net-like pattern. Net form net blotch has been recorded to reduce grain quality and yield by 10-30%.



Brown rust (Leaf rust)

(*Puccinia hordei*)

Leaf rust occurs more commonly in susceptible cultivars, causing small circular pustules to develop on the upper leaf surfaces. These pustules produce powdery orange-brown spores. When early infection occurs, significant yield losses can result.



Ramularia leaf spot

(*Ramularia collo-cygni*)

Ramularia is caused by *Ramularia collo-cygni*. *Ramularia* has a complex life cycle which could start with infected seed but can also spread by airborne spores.



First stage: *Ramularia* are irregular brown pepper spots on the leaf surface of the bottom leaves during tillering. It is just visible to the naked eye. The lesions are visible on the top and bottom surface of the leaf. Physiological spots only appear on the top surface.

Intermediate stage: The early “pepper spot” symptoms of *Ramularia* rapidly develop into the typical rectangular *Ramularia* leaf spot lesion. The rectangular red-brown lesions are 2 mm x 0.5 mm in size. The middle of the lesion is more dark brown because it is where the pepper spot symptom occurred. The red-brown lesion is surrounded by a yellow circle. During this stage the rest of the leaf is the normal green colour.

Late stage: The rectangular lesions are still visible at the bottom and top of the leaf, the leaves lose their green colour, turn yellow and then die completely. The death of the leaves begins at the leaf tips. At the bottom of the leaf, traces of *Ramularia collo-cygni* develop translucent spores. These spores have nothing to do with the rectangular lesions and will always be visible on dead leaves. Wet conditions in late season cause red discolouration of the *Ramularia* leaf spot lesions on dead leaves.

Net blotch (Trial ID: 16SB12) untreated vs treated



Untreated



Treated with Aviator® Xpro™

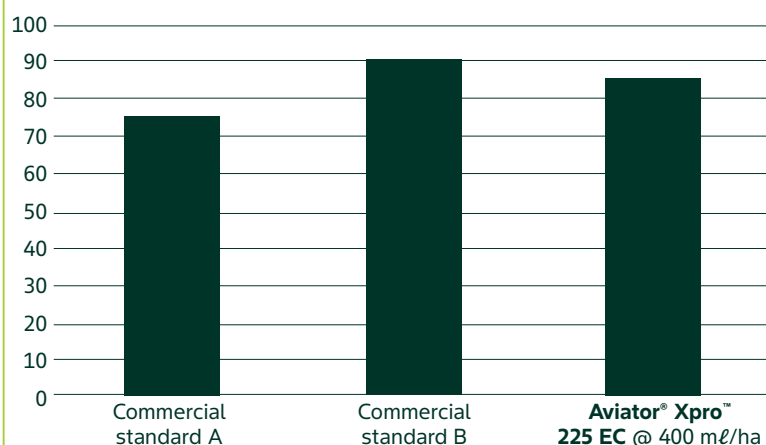
Efficacy Rating 1-6 for F, I, ST

SCALE 1-6	+/- RATING	COLOUR	EFFICACY
1	++++	++++	Excellent
2	+++	+++	Good
3	++	++	Satisfactory
4	+	+	Marginal
5	–	–	Insufficient
6	o	o	No activity
	nt	nt	Not tested

TRIAL RESULTS: BARLEY

Barley – Net blotch

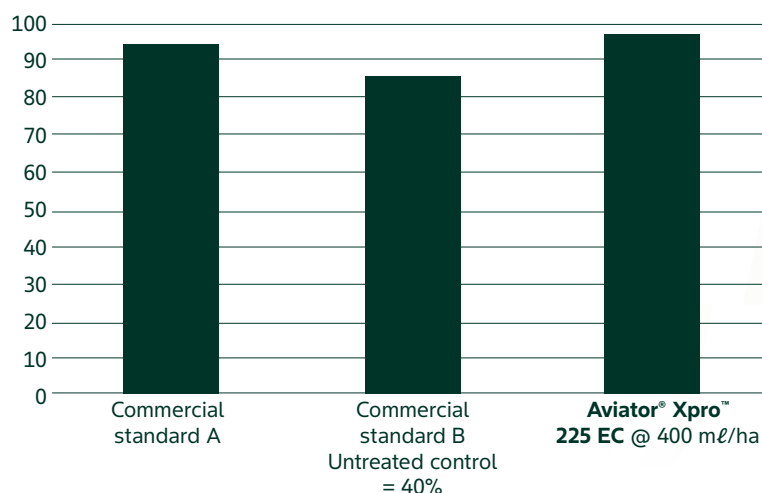
% Control of *Pyrenophora teres* in barley –
Average of 13 trials (2016 - 2021)



A	+++
B	+++
Aviator® Xpro™ 225 EC	+++

Barley – Leaf blotch

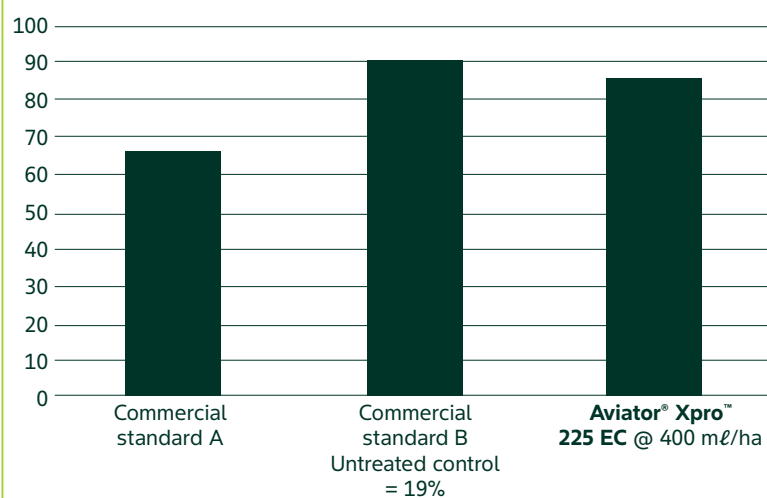
% Control of *Rhynchosporium secalis* in barley –
Average of 14 trials (2014 - 2018)



A	++++
B	+++
Aviator® Xpro™ 225 EC	++++

Barley – Ramularia

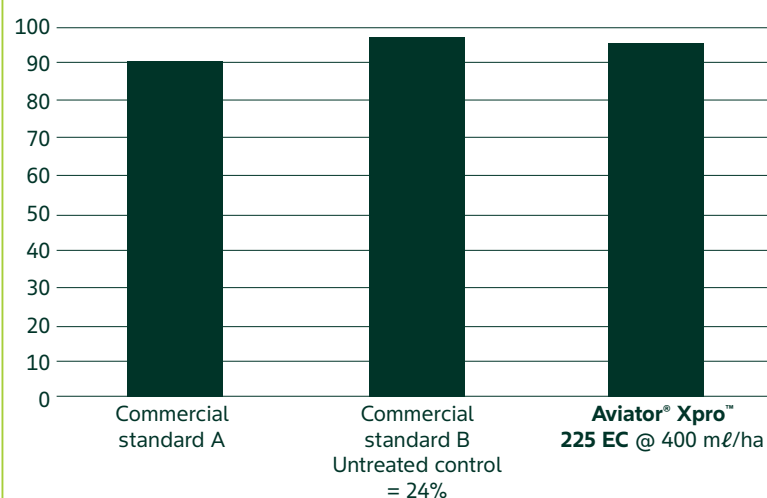
% Control of *Ramularia collo-cygni* in barley –
Average of 10 trials (2017 - 2018)



A	++
B	++++
Aviator® Xpro™ 225 EC	+++

Barley – Brown rust

% Control of *Puccinia hordei* in barley –
Average of 10 trials (2016 - 2021)



A	+++
B	++++
Aviator® Xpro™ 225 EC	++++



CANOLA

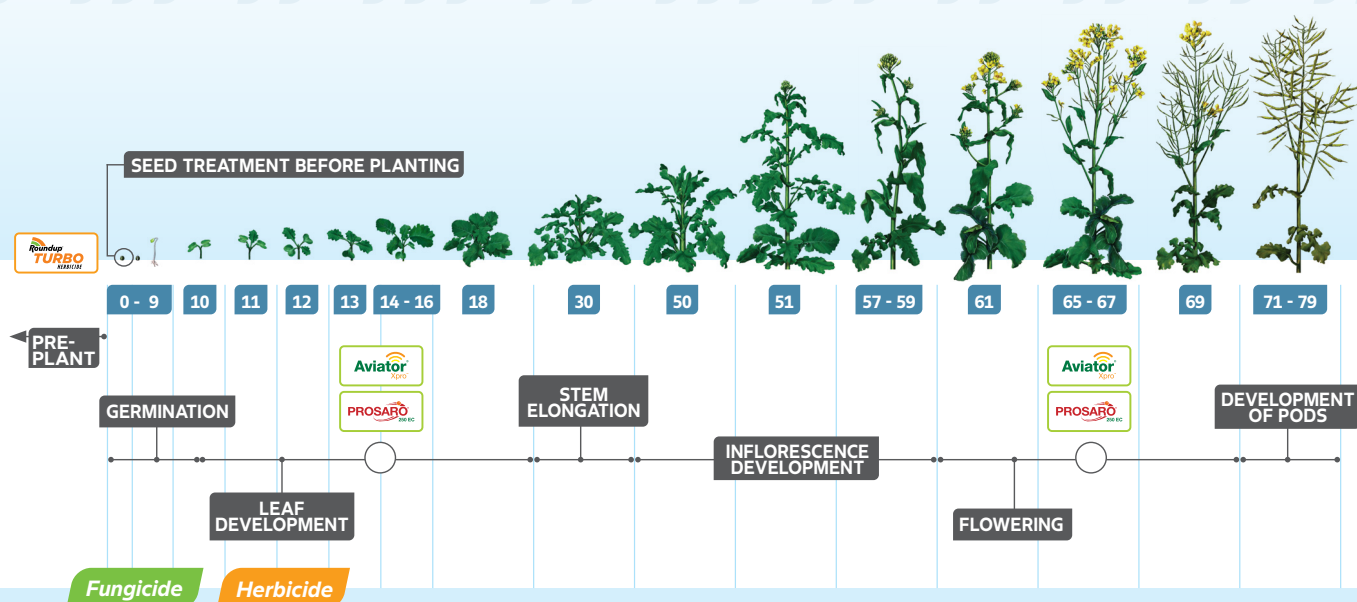
CANOLA LABEL

Product name	Aviator® Xpro™ Foliar Fungicide
Fungicide mode of action groups	Group 7 SDHI + Group 3 DMI
Formulation	Emulsifiable concentrate (EC)
Active ingredients	75 g/ℓ bixafen + 150 g/ℓ prothioconazole
Crop	Canola
Canola diseases	Blackleg, Sclerotinia stem rot
Application rates and timing for control	Dosage: 700 ml/ha
Blackleg (<i>Leptosphaeria maculans</i>)	Apply at 4-6 leaf crop stage of blackleg susceptible cultivars or in situations of high blackleg risk. Will reduce lodging and stem canker from blackleg. A follow-up application may be required at green bud stage in high disease risk situations or where an effective blackleg seed treatment has not been used.
Sclerotinia stem rot (<i>Sclerotinia sclerotiorum</i>)	Apply between 20% and 50% (full bloom) flowering. For best results apply as a preventative application at 20%-30% flowering prior to significant disease expression. Good coverage throughout the entire canopy is essential.
Compatibility	Bayer (Pty) Ltd. does not take responsibility for any tank mixtures as no compatibility trials have been done with any other products.
Number of applications per season	Maximum of two applications DO NOT apply after 50% flowering growth stage (BBCH65)
Method of application	Ground application & Aerial application.



CANOLA SPRAY PROGRAMME

PRE-PLANTING: Always add ammonium sulphate when using **Roundup®** products.



The above indicates recommended placement in a growing season. However, it is not a formal or legal spray programme. Please refer to product labels for usage recommendations, consider Resistance Management guidelines and consult with your agrochemical consultant and exporter for MRL management and guidelines.

READ THE LABEL BEFORE USE:

The registration owner of Roundup® TURBO is Bayer AG.
Roundup® TURBO Reg. No. L7166. Contains Glyphosate (glycine) 450 g/l (contains 551 g potassium salt of glyphosate). Warning.

The following products are registered trademarks of Bayer AG:
Aviator® Xpro™ Reg. No. L10089. Contains Bixafen (pyrazole carboxamide) 75 g/l; Prothioconazole (triazole) 150 g/l. Warning.
Prosaro® 250 EC Reg. No. L8510. Contains Prothioconazole (triazole) 125 g/l; Tebuconazole (triazole) 125 g/l. Warning.

All products are registered under Act No. 36 of 1947.

HAZARD STATEMENTS

WARNING

Roundup® TURBO
 - Causes serious eye irritation.



WARNING

Aviator® Xpro™
 - Causes serious eye irritation.
 - May cause respiratory irritation.
 - Very toxic to aquatic life with long-lasting effects.



WARNING

Prosaro® 250 EC
 - Causes skin irritation.
 - Causes serious eye irritation.
 - May cause respiratory irritation.
 - Suspected of damaging the unborn child.
 - Very toxic to aquatic life with long-lasting effects.



CANOLA GROWTH STAGES

GROWTH STAGE	BBCH CODE	DESCRIPTION
Vegetative growth stages	9	Emergence: cotyledons emerge through soil surface
	11	First leaf unfolded
	12	2 leaves unfolded
	13	3 leaves unfolded
	19	9 or more leaves unfolded
Flowering	50	Flower buds present, still enclosed by leaves
	51	Flower buds visible from above ('green bud')
	60	First flowers open
	61	10% of flowers on main raceme open, main raceme elongating
	62	20% of flowers on main raceme open
	63	30% of flowers on main raceme open
	64	40% of flowers on main raceme open
	65	Full flowering: 50% of flowers on main raceme open, older petals falling
	69	End of flowering
Development of fruit	71	10% of pods have reached final size
	75	50% of pods have reached final size
	79	Nearly all pods have reached final size
Ripening	80	Beginning of ripening: seed green, filling pod cavity
	81	10% of pods ripe, seeds dark and hard
	85	50% of pods ripe, seeds dark and hard
	89	Fully ripe: nearly all pods ripe, seeds dark and hard
Senescence	97	Plant dead and dry
	99	Harvested product

CANOLA FLOWERING STAGES

Flowering stages should be assessed on the main stem and take into account both flowers that are open and any developing pods.



10%

10 flowers open on main stem



20%

14 – 16 flowers open on main stem



30%

20 or more flowers open on main stem



50%

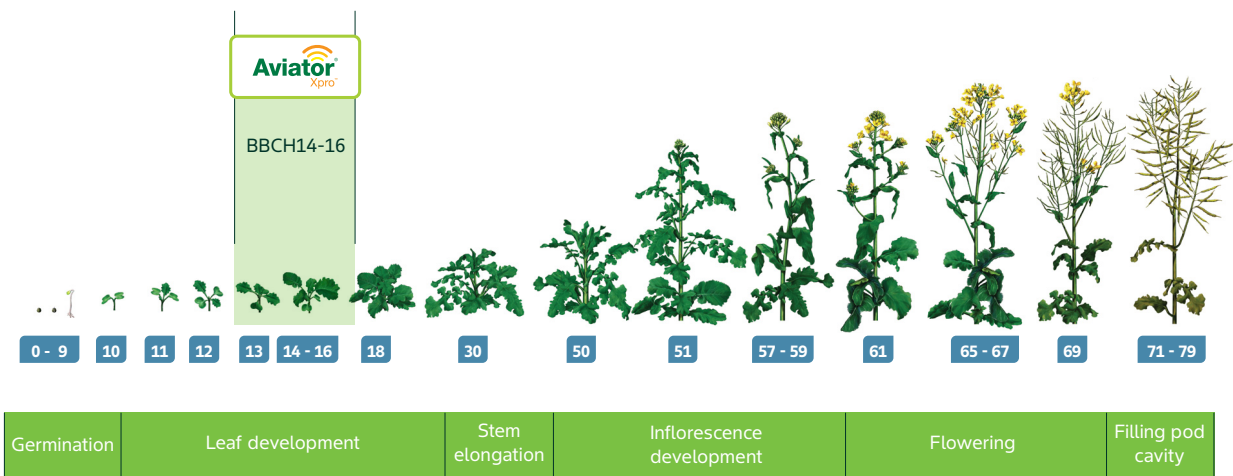
All flowers are open or have the main stem, crop is at its most opened on intense yellow



APPLICATION: DISEASE CONTROL BLACKLEG

Blackleg control application timing

Application window for Aviator® Xpro™ in canola (up to BBCH14-16)



Application window for **Aviator® Xpro™** in canola (up to BBCH14-16)

Aviator® Xpro™ should be used in conjunction with an effective seed treatment to achieve the best control of blackleg. A positive economic return is more likely in MS and MS-MR blackleg disease-rated canola varieties. However, canola varieties with higher blackleg resistance ratings that have been grown continually in a region, where genetic resistance has broken down, can also show a positive economic return.

An early (4 to 6-leaf stage) foliar application generally provides more consistent disease control and better protection of crop yield than the later (green bud) timing.

Canola plants that have been sprayed with **Aviator® Xpro™** will often appear greener and retain older leaves for longer, due to exceptional levels of disease control.

Blackleg control application limits

Application rates and timing for blackleg control	700 mL/ha; 4 to 6-leaf crop stage or in situations of high blackleg risk. Follow-up application if needed at green bud stage in high disease risk situations or where an effective blackleg seed treatment has not been used.
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Blackleg control: Label

DISEASE	DOSAGE RATE	COMMENTS
Blackleg (<i>Leptosphaeria maculans</i>)	700 mL/ha	Apply at 4-6 leaf crop stage of blackleg susceptible cultivars or in situations of high blackleg risk. Will reduce lodging and stem canker from blackleg. A follow-up application may be required at green bud stage in high disease risk situations or where an effective blackleg seed treatment has not been used.

METHOD OF APPLICATION:

Ground Application:

- /// **Aviator® Xpro™** may be applied with conventional high volume spray equipment. Calibrate the apparatus before application to ensure that the correct dosage is applied. The distribution of the spray volume must be uniform throughout the target area. Ensure good coverage of the whole plant by using enough water and suitable spraying equipment.
- /// **Apply the recommended dosage rate of Aviator® Xpro™ in 250 – 300 litres water per hectare.**

Aerial application:

- /// Familiarise yourself and inform the pilot of the Stewardship requirements pertaining to the aerial application of **Aviator® Xpro™ 225 EC**
- /// Notify all inhabitants of the immediate area to be sprayed and issue the necessary warnings. Do not spray over or allow drift to contaminate adjacent areas or water. Please refer to the SANS Code of Practice for the aerial application of agricultural chemicals.
- /// Aerial application of **Aviator® Xpro™ 225 EC** may only be done by a registered aerial application operator using a correctly calibrated, registered aircraft according to the instructions of SANS Code 10118 (Aerial Application of Agricultural Pesticides). Ensure that the spray mixture is distributed evenly over the target area and that the loss of spray material during application is restricted to a minimum. It is therefore essential that the following criteria be met:
 - /// **Volume:** A spray mixture volume of 30 – 40 ℓ per hectare is recommended. As this product has not been evaluated at a reduced volume rate, the registration holder cannot guarantee efficacy, or be held responsible for any adverse effects if this product is applied aerially at a lower volume rate than recommended above.
 - /// **Droplet coverage:** 25 to 35 droplets per cm² must be recovered at the target area.
 - /// **Droplet size:** A droplet spectrum with a VMD of 280 to 300 micron is recommended. Limit the production of fine droplets less than 150 micron (high drift and evaporation potential) to a minimum.
 - /// **Flying height:** Maintain the height of the spray boom at 3 to 4 metres above the target. Do not spray when aircraft dives, is in a climb or when banking.
 - /// Use suitable **atomising equipment** that will produce the desired droplet size and coverage, but which will ensure the minimum loss of product. The spraying system must produce a droplet spectrum with the lowest possible Relative Span.
 - /// Position all the atomisers within the inner 60 to 75% of the wingspan to prevent droplets from entering the **wingtip vortices**.
 - /// The difference in **temperature** between the wet and dry bulb thermometers of a whirling hygrometer, should not exceed 8 °C.
 - /// Stop spraying if the **wind speed** exceeds 15 km/h.
 - /// Stop spraying under **turbulent**, unstable and dry conditions during the heat of the day.
 - /// Spraying under temperature **inversion conditions** (spraying in or above the inversion layer) and or **high humidity conditions** (relative humidity 80% and above) may lead to the following:
 - reduced efficacy due to suspension and evaporation of small droplets in the air (inadequate coverage).
 - damage to other sensitive crops and / or non-target are as through drifting of the suspended spray cloud away from the target field.
 - /// Ensure that the aerial spray operator knows exactly which fields to spray.
 - /// Obtain an assurance from the aerial spray operator that the above requirements will be met and that relevant data will be compiled in a in a logbook and kept for future reference.

BLACKLEG CONTROL & DISEASE CYCLE

Blackleg

Blackleg (*Leptosphaeria maculans*) infections are primarily initiated by airborne ascospores originating from matured pseudothecia (fruiting bodies) of the fungus on previous years' infected stubble and crop residues.



Higher temperatures and lower moisture conditions during summer and autumn favour the maturity of pseudothecia. Once matured, pseudothecia are triggered to release ascospores by rainfall or even heavy dews and high humidity.

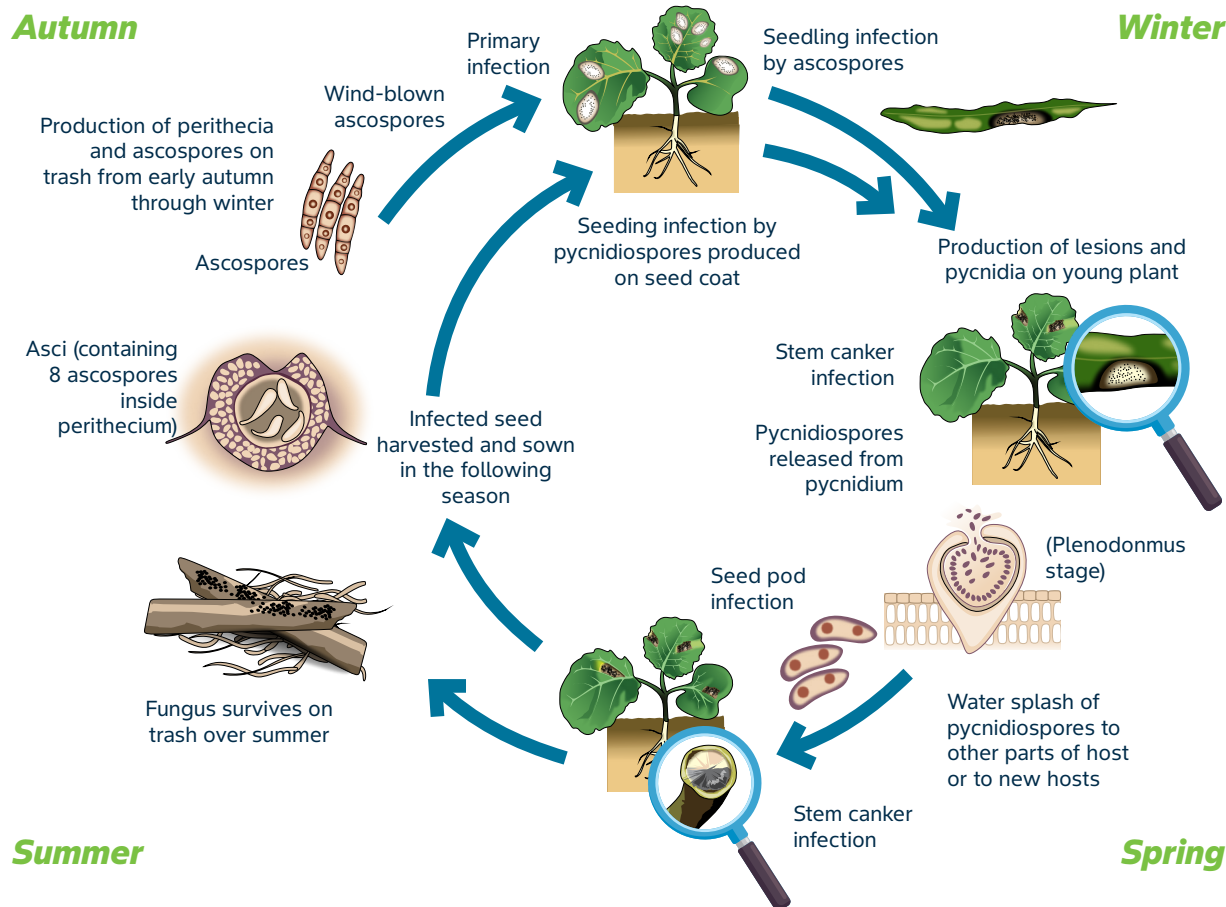
Early seedling infections are the most critical as they are more likely to produce severe stem cankers and yield loss. The two most important blackleg risk factors are the proximity of the current season's crop to infected canola crop residue and the timing of the first major ascospore release from old canola crop residues that synchronise with the seedling-susceptible stage of this year's crop.

Assessing the risk of blackleg in your canola

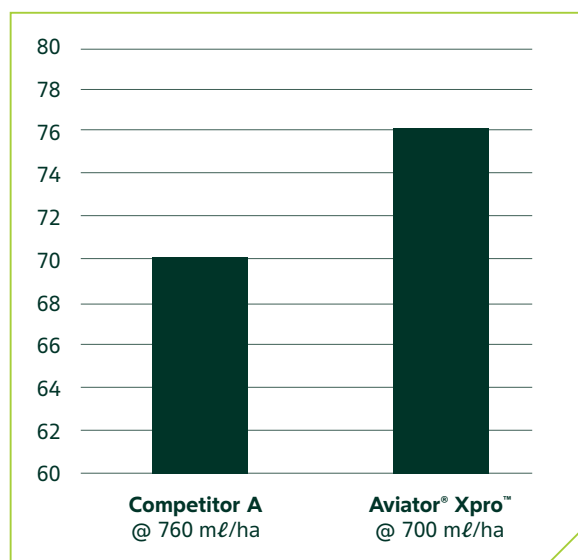
REGIONAL BLACKLEG FACTORS									
Environmental factors that determine risk of severe blackleg infection	Blackleg severity risk factor								
	High risk			Medium risk			Low risk		
Regional canola intensity (% area sown to canola)	Above 20	16-20	15	11-14	11-14	10	6-9	5	Below 5
Annual rainfall (mm)	Above 600	551-600	501-550	451-500	401-450	351-400	301-350	251-300	Below 250
Total rainfall received March – May prior to sowing (mm)	Above 100	Above 100	Above 100	Above 100	91-100	81-90	71-80	61-70	Below 60
Combined high canola intensity and adequate rainfall increases the probability of severe blackleg infection.									

Courtesy: GRDC 2013 Blackleg Management Guide

BLACKLEG DISEASE CYCLE



TRIAL RESULTS: BLACKLEG IN CANOLA



Average number of trials: 7 Blackleg - UTC 22% infection

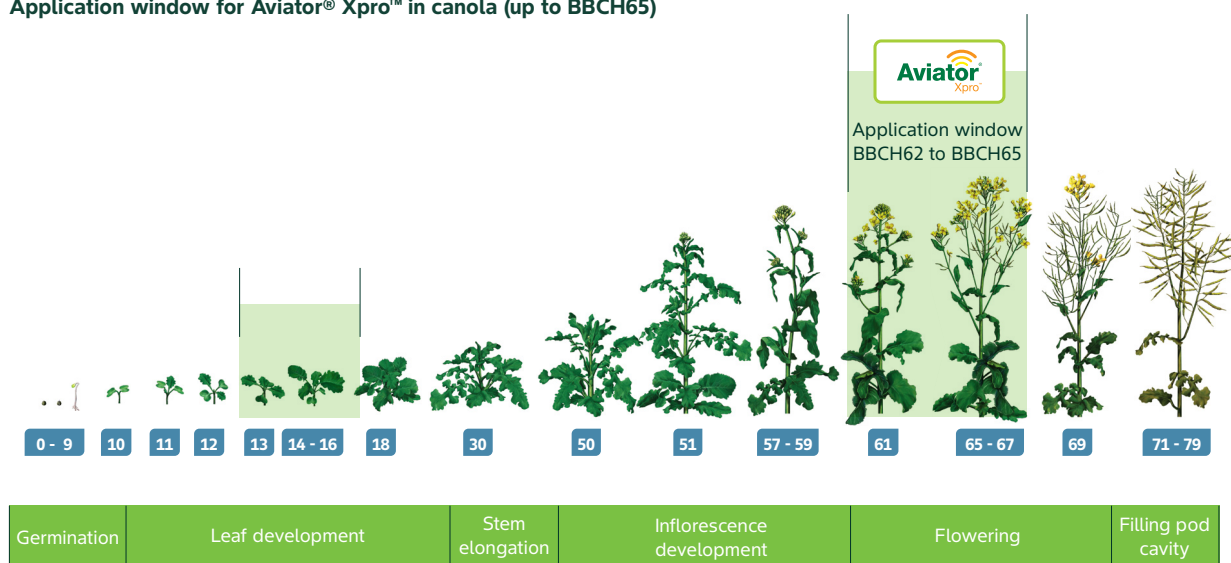
Blackleg control observations

- /// **Aviator® Xpro™** should be used in conjunction with an effective seed treatment registered for blackleg control.
- /// A 4-6-leaf spray offers the most consistent reduction of leaf infection and positive yield responses.
- /// Positive yield responses from **Aviator® Xpro™** were consistently recorded on blackleg susceptible varieties under high blackleg pressure.
- /// Canola varieties with blackleg disease ratings MS and MS-MR are the best varieties for an economical return when applying **Aviator® Xpro™**. Economic responses can also be achieved on MR varieties.

APPLICATION: SCLEROTINIA DISEASE CONTROL

Sclerotinia control application timing

Application window for Aviator® Xpro™ in canola (up to BBCH65)



Application window for **Aviator® Xpro™** in canola (up to BBCH62-65)

The time of application depends on the environmental conditions and can differ from one year to another. As a general guideline, apply between 20 and 50% (full bloom) flowering. For best results apply as a preventative application at 20-30% flowering prior to significant disease expression. Good coverage throughout the entire canopy is essential.

Optimising application

- /// Temperature and rainfall are more important than flowering stage.
- /// If it's dry for a week or more, wait until after rain to spray.
- /// To achieve the maximum benefit from the application of **Aviator® Xpro™** for sclerotinia control it is recommended to consider whether upcoming weather conditions are conducive to sclerotinia infection as well as the flowering stage of the crop.
- /// Apply **Aviator® Xpro™** within the recommended crop stage, closer to periods of higher infection risk such as weather events where leaf wetness and soil moisture are high and likely to favour disease development. This should ensure that **Aviator® Xpro™** is offering protection for as long as possible under conditions conducive to disease development.
- /// Faster growing crops may have a reduced window of fungicide protection due to growth dilution occurring in the plant. For example, **Aviator® Xpro™** applied at 20% flowering may not provide the desired period of protection due to new unprotected growth when compared to a more effectively timed application between 40% and 50% flowering.
- /// Treat sclerotinia the same as managing a weed seed bank. Sclerotes can last in the soil for up to seven years; crops should be rotated and treated regularly to prevent disease build up in the soil.

Sclerotinia control application limits

Application rates and timing for blackleg control	700 mℓ/ha; Apply between 20%-50% (full bloom) flowering. For best results apply as a preventative application at 20%-50% flowering prior to significant disease expression. Good coverage throughout the entire canopy is essential.
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DO NOT SPRAY MORE THAN TWO APPLICATIONS PER SEASON.

Sclerotinia control label

DISEASE	DOSAGE RATE	COMMENTS
Sclerotinia stem rot (<i>Sclerotinia sclerotiorum</i>)	700 mℓ/ha	Apply between 20% and 50% (full bloom) flowering. For best results apply as a preventative application at 20%-30% flowering prior to significant disease expression. Good coverage throughout the entire canopy is essential, particularly ensuring spray coverage down to the base of the canopy is important. Using a water rate at the higher end of the range will improve spray coverage. A maximum of two applications may be made per crop with a minimum re-treatment interval of 14 days. DO NOT apply after 50% (full bloom) flowering growth stage (BBCH65).

SCLEROTINIA CONTROL & DISEASE CYCLE

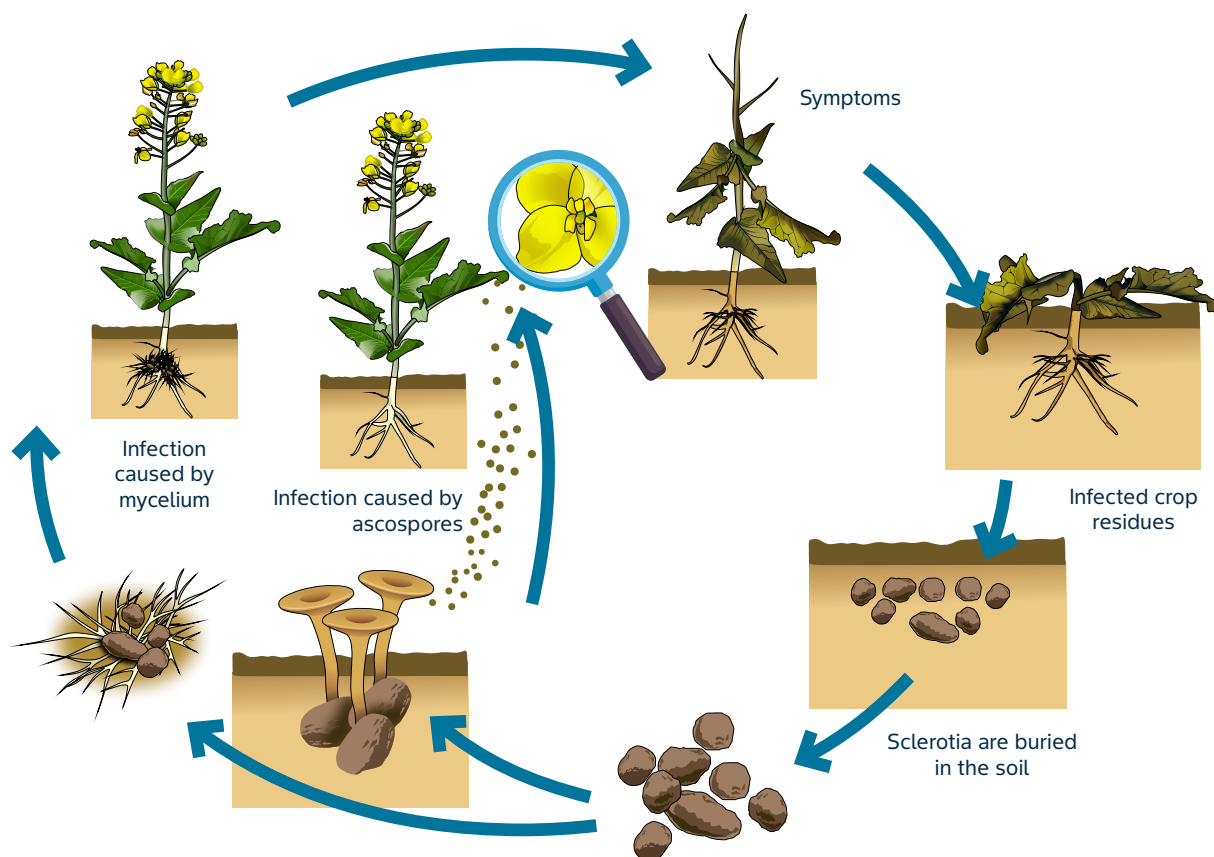


Sclerotinia is caused by *Sclerotinia sclerotiorum*. This fungus survives as sclerotia (resting structures) in the soil or in the stubble on the soil surface. Moisture is an important requirement in the development of Sclerotinia. Good soil moisture conditions two weeks prior to flowering and continuing until after flowering will benefit the risk of the development of Sclerotinia. Alternatively, low rainfall and low humidity in this period will decrease the risk of disease development. Moisture could include rain, relative humidity of 80% and dew.

After appropriate rainfall and if conditions permit, it takes 10 to 12 days for the apothecia

(fruiting bodies) to release the ascospores. The ascospores are spread by wind to nearby plants. Ascospores can't infect the plant directly, but need dead plant material (like petals) to develop. The dead petals enveloping the spores create an ideal micro climate for the disease to develop. They also supply the necessary energy to the ascospores to develop hifes (mycelium) which release oxalic acid in order to penetrate the plant material. When the fungus is within the plant, it grows up- and downwards, which constricts the flow of moisture and nutrients in the plant and could lead to the death of the plant.

SCLEROTINIA DISEASE CYCLE



Sclerotinia quick facts

- /// Sclerotes survive for long periods in the soil (approximately six years); therefore, a one in three-year rotation, for example, will reduce but not eliminate risk.
- /// A single sclerote can produce up to 15 apothecia. Apothecia will emerge after seven to ten days of suitable environmental conditions and will keep emerging while conditions are favourable.
- /// The primary infection generally occurs on petals or leaves with soil contact and the secondary infection can occur from contact with infected leaves or stems.
- /// Main stem infections result in higher yield loss than lateral ones occurring later in the season.

Sclerotinia risks: Conditions and agronomic factors

The following environmental conditions can lead to the development of Sclerotinia:

- /// 25 – 50 mm of rain 10 to 14 days before the start of flowering, so wet climatic conditions for 10 days at the soil surface during mid until late winter. Temperatures of 11 – 15 °C are required for the sclerotia to germinate and release spores.
- /// Prolonged wet periods during the flowering period, for petal infection.
- /// Prolonged wet periods during petal fall. The fall of petals on the stem which can consequently cause stem infection. Strain lesion development is favoured by humid / wet conditions and temperatures of between 20 – 25 °C.

RISK ASSESSOR TOOL

Application window for Aviator® Xpro™ in canola (up to BBCH65)

The below risk assessor tool is widely used in Canada and the USA to determine whether a fungicide spray for sclerotinia will deliver an economic return. In the absence of any locally validated disease-warning tool, it is included to highlight the risk factors that directly influence the incidence and severity of sclerotinia stem rot in canola and therefore guide you in deciding whether to spray.

RISK FACTORS	POSSIBLE ANSWERS	RISK POINTS
Number of years since last canola crop	More than six years	0
	Three to six years	5
	One or two years	10
Disease incidence in last host crop	None	0
	Low (1-10%)	5
	Moderate (11-30%)	10
	High (31-100%)	15
Crop density	Low	0
	Normal	5
	High	10
Rain in the last two weeks	Less than 10 mm (40 points)	0
	10-30 mm (40-120 points)	5
	More than 30 mm (120 points)	10
Weather forecast	High pressure	0
	Variable	10
	Low pressure	15
Regional risk for apothecia development	None found	0
	Low numbers	10
	High numbers	15
	Total risk points for all risk factors =	

A risk score of 40 or more should deliver an economic return from application of fungicide.

SCLEROTINIA: DISEASE FREQUENCY AND PRESSURE

ENDEMIC: CONSISTENT ECONOMIC LOSSES (30% + STEM INFECTION)

- /// History and rotational experience of the disease
- /// Sclerotes present in the field at high levels
- /// Apothecia emerge every year in crop
- /// Adjacent fields also have a high incidence of disease
- /// Leaf lesion (petal infection) frequency is high
- /// Plant to plant (leaves, stem) infection is high and it is not uncommon to see infection initiating between contacting leaves
- /// **An application of an effective fungicide for control of sclerotinia should be considered crucial. An application of Aviator® Xpro™ at about 20% flowering as part of a 2-spray strategy is recommended in a season with above 1.5 t/ha yield forecast.**

HIGH PRESSURE (10 – 30% STEM INFECTION)

- /// The field has had low disease levels previously and/or an adjacent field (within 50 – 100 m) has had high levels
- /// Sclerotes may be present in the field at low levels
- /// Apothecia are found easily in adjacent fields of cereals but it is hard to find in crop
- /// Leaf lesion frequency may be moderate to high, but disease will initiate under ideal conditions
- /// Plant to plant infection occurs as primary infection takes off
- /// **A well-timed single spray of an effective sclerotinia fungicide is likely to provide an economic return. Aviator® Xpro™ applied at 20% – 50% flowering has been shown to provide economic returns under these conditions. A second application may be required under high disease pressure.**

MODERATE (0-10% STEM INFECTION)

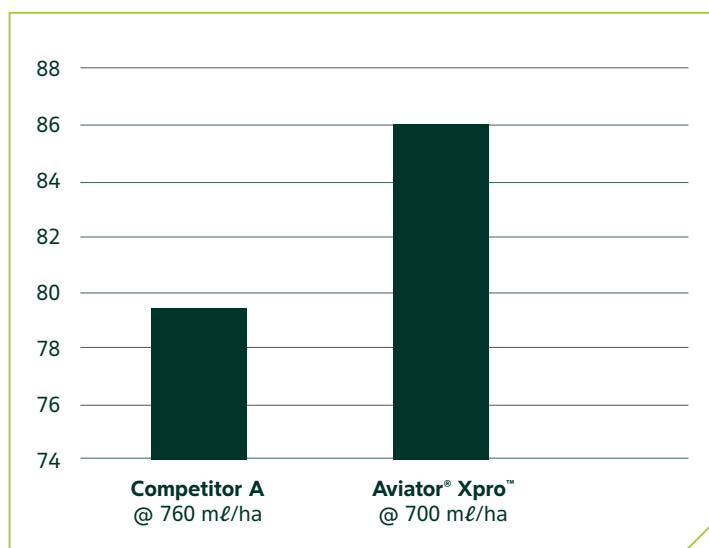
- /// The field has had no disease observed previously
- /// Apothecia can't always be found
- /// Adjacent fields with previous history are within 200 – 500 m
- /// Leaf lesion frequency is low to moderate. Disease may initiate under ideal conditions, most likely during mid-flowering
- /// Spray economics are dependent on conditions and yield potential
- /// **A single application of an effective sclerotinia fungicide may be required under disease conducive conditions. Aviator® Xpro™ applied at 20% – 50% flowering has been shown to prevent paddocks building an endemic sclerote bank in the soil.**

LOW RISK

- /// No history of sclerotinia disease in the area
- /// Apothecia can't be found
- /// Low rainfall region with extended dry periods and open low yielding canopies
- /// Applications of foliar fungicides for sclerotinia control are unlikely to produce an economic response.

TRIAL RESULTS: SCLEROTINIA CONTROL

Pest severity: Sclerotinia in canola



Average number of trials: 8 Sclerotinia - UTC 22% infection

Sclerotinia stem rot control observations

- /// The fungi survives as sclerotia in the soil or in the stubble.
- /// The sclerotia germinates to form apothecia (mushrooms).
- /// After rain it can take up to 10 – 12 days to release ascospores (at temperatures of 11 – 15 °C).
- /// Wind spreads the spores, but ascospores cannot infect the plant directly.
- /// Dead plant material (e.g. flower petals) are required to complete the cycle.
- /// Dead (decomposing) flower petals provide ascospores the necessary energy to form mycelium, which in turn release oxalic acid, which is required for the fungi to penetrate the plant material and cause infection.
- /// When in the plant, the fungi will grow both up- and downwards in the stem, cutting off the movement of nutrients and water in the plant and eventually kills the plant.

Why spray during flowering?

- /// Since the petal plays such an important role in the development of Sclerotinia, it is of utmost importance to do a fungicide spray during the peak flowering period of canola.
- /// Fungicides do not heal, but prevent spores from growing on petals after the petals fell on leaves or stems. It is easier to spray flowers at the top of the plant during the peak of the flowering period than when it has already fallen. That is why flowers are the target.
- /// Applications before 20% of flowering is not effective, since no flowers have fallen and no pods have formed yet. At 30% of flowering the flowers begin to fall. Most of the flowers fall during this period. An application between 20 and 30% of flowering ensures that a great amount of flowers are open and the application coats the petals before they fall.
- /// Fungicides reduce the appearance of the disease but will not control Sclerotinia entirely (especially if conditions are favourable during the flowering period). As a general guideline, the yield loss is half the infection.

TAKE NOTES

[illegible]

A close-up photograph of a corn cob, showing the golden-brown husks and the underlying kernels. A bright green diagonal line runs from the top left towards the bottom of the frame. In the lower-left area, there is a dark green rectangular box containing a quote. A large white quotation mark is positioned above the text box.

”

***“Protect the leaf,
power the crop, and
harvest the rewards.”***



The information and recommendations set out in this brochure are based on tests and data believed to be reliable at the time of publication. Results may vary, as the use and application of the products are beyond our control and may be subject to climatic, geographical, or biological variables, and/or developed resistance. Any product referred to in this brochure must be used strictly as directed, and in accordance with all instructions appearing on the label for that product and in other applicable reference material. So far as it is lawfully able to do so, **Bayer CropScience Pty Ltd** accepts no liability or responsibility for loss or damage arising from failure to follow such directions and instructions.

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READ LABEL BEFORE USE:

Aviator® Xpro™ Reg. No. L10089 (Act No. 36 of 1947). Contains 75 g/l Bixafen (pyrazolecarboxamide) and 150 g/l Prothioconazole (triazole). Warning, **Aviator® Xpro™** and **Leafshield™** are registered trademarks of **Bayer AG, Bayer (Pty) Ltd.** Reg. No. 1968/011192/07. Collaboration Hub, First Floor, Waterfall Circle, 9 Country Estate Drive, Waterfall City, Midrand, 2090

WARNING



Hazard statements: Aviator® Xpro™

- Causes serious eye irritation.
- May cause respiratory irritation.
- Very toxic to aquatic life with long-lasting effects.