

2024-5681
2024-12-04

(sleeve)

GROUP	14	HERBICIDE
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Astir™

Suspension Concentrate

COMMERCIAL

For use on Chickpeas, Field Pea, Flax, Sunflower, Soybeans and Wheat (Spring and Durum)

ACTIVE INGREDIENT: Sulfentrazone ... 480 g/L

Contains 1,2-benzisothiazolin-3-one at 0.00965% as a preservative

READ THE LABEL AND BOOKLET BEFORE USING



CAUTION

POISON

REGISTRATION NO.: 35356 PEST CONTROL PRODUCTS ACT

NET CONTENTS: (1L – 1000 L)

Nufarm Agriculture Inc.
5101, 333-96th Avenue NE
Calgary, Alberta T3K 0S3

Product Information: 1-800-868-5444
24-Hour Emergency Response Number: 1-800-434-9300

Astir™ is a trademark of Nufarm Agriculture Inc.

PRECAUTIONS**KEEP OUT OF REACH OF CHILDREN****Hazardous to Humans and Domestic Animals****CAUTION**

Harmful if inhaled, swallowed, or absorbed through skin. Avoid breathing vapor or spray mist. Avoid contact with skin, eyes or clothing.

Apply only to agricultural crops when the potential for drift to areas of human habitation and human activity, such as houses, cottages, schools and recreational areas, is minimal. Take into consideration wind speed, wind direction, temperature inversions, application equipment, and sprayer settings.

FIRST AID

Take container, label or product name and Pest Control Product Registration Number with you when seeking medical attention.

If swallowed, call a poison control centre or doctor immediately for treatment advice. Have person sip a glass of water if able to swallow. Do not induce vomiting unless told to do so by a poison control centre or doctor. Do not give anything by mouth to an unconscious person.

If on skin or clothing, take off contaminated clothing. Rinse skin immediately with plenty of water for 15–20 minutes. Call a poison control centre or doctor for treatment advice.

If inhaled, move person to fresh air. If person is not breathing, call 911 or an ambulance, then give artificial respiration, preferably by mouth-to-mouth, if possible. Call a poison control centre or doctor for further treatment advice.

If in eyes, hold eye open and rinse slowly and gently with water for 15–20 minutes. Remove contact lenses, if present, after the first 5 minutes, then continue rinsing eye. Call a poison control centre or doctor for treatment advice.

TOXICOLOGICAL INFORMATION

Treat symptomatically.

EMERGENCY TELEPHONE NUMBERS

For spills or transportation accidents, Chemtrec, 1-800-424-9300.

For health or environmental emergencies, ProPharma Group, 1-877-325-1840.

For product and use information, Nufarm Agriculture Inc., 1-800-868-5444.

PERSONAL PROTECTIVE EQUIPMENT (PPE)

Wear a long-sleeved shirt, long pants, chemical-resistant gloves made of waterproof material such as polyethylene or polyvinyl chloride, socks and shoes during mixing, loading, application, clean-up and repair. Gloves are not required during application within a closed cab.

Discard clothing and other absorbent materials that have been drenched or heavily contaminated with this product. Do not reuse them. Follow manufacturer's instructions for cleaning and maintaining PPE. If no such instructions for washables, use detergent and hot water. Keep and wash PPE separately from other laundry.

Remove clothing immediately if pesticide gets inside. Then bathe thoroughly and put on clean clothing.

ENVIRONMENTAL PRECAUTIONS

Sulfentrazone is persistent and may carryover. It is recommended that any products containing sulfentrazone not be used in areas treated with this product during the previous season.

Astir™ used according to the label directions is known to leach through soil into groundwater particularly in areas where soils are permeable (e.g. sandy soil) and/or the depth to the water table is shallow. **DO NOT** use on coarse soils classified as sand which have less than 1% organic matter.

To reduce runoff from treated areas into aquatic habitats, avoid application to areas with a moderate to steep slope, compacted soil, or clay.

Avoid application when heavy rain is forecast.

Contamination of aquatic areas as a result of runoff may be reduced by including a vegetative filter strip between the treated area and the edge of the water body.

Toxic to small wild mammals.

Toxic to aquatic organisms.

Toxic to non-target terrestrial plants. Observe spray buffer zones specified under DIRECTIONS FOR USE.

STORAGE

STORE ABOVE 5°C TO KEEP PRODUCT FROM FREEZING. If frozen, thaw before use. If solid crystals are observed, warm material to above 15 °C by placing container in warm location.

Shake or roll container periodically to re-dissolve solids.

Do not use or store near heat or open flame.

Store in original containers only. Store containers in a dry location. Carefully open containers. After partial use, replace lids and close tightly. Do not put concentrate or dilute material into food or drink containers. Do not contaminate other pesticides, fertilizers, water, food, or feed by storage or disposal.

Store this product away from food or feed.

DISPOSAL

For recyclable containers:

DO NOT reuse this container for any purpose. This is a recyclable container, and is to be disposed of at a container collection site. Contact your local distributor/dealer or municipality for the location of the nearest collection site. Before taking the container to the collection site:

1. Triple- or pressure-rinse the empty container. Add the rinsings to the spray mixture in the tank.
2. Make the empty, rinsed container unsuitable for further use.

If there is no container collection site in your area, dispose of the container in accordance with provincial/territorial requirements.

For refillable containers:

For disposal, this container may be returned to the point of purchase (distributor/dealer). It must be refilled by the distributor/dealer with the same product. DO NOT reuse this container for any other purpose.

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For information on disposal of unused, unwanted product, contact the manufacturer or the provincial/territorial regulatory agency. Contact the manufacturer and the provincial/territorial regulatory agency in case of a spill, and for clean-up of spills.

NOTICE TO USER

This pest control product is to be used only in accordance with the directions on the label. It is an offence under the *Pest Control Products Act* to use this product in a way that is inconsistent with the directions on the label.

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(booklet)

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GENERAL INFORMATION

PRODUCT INFORMATION

Astir™ is a selective soil applied herbicide for the control of wild buckwheat, kochia, lamb's-quarters, redroot pigweed, cleavers, Powell pigweed, Eastern black nightshade, common waterhemp, smooth crabgrass, large crabgrass, yellow woodsorrel, common groundsel and common purslane in chickpeas, field peas, flax, sunflower, soybeans and wheat (spring and durum).

Astir is formulated as a flowable (suspension concentrate) containing 480 grams of the active ingredient, sulfentrazone, per litre, intended for dilution with water for application.

Astir is taken up by the plant roots and shoots.

Observe all instructions, mixing directions, application precautions and other label information of **Astir**.

SAFETY AND HANDLING

PROPER HANDLING INSTRUCTIONS

Astir may not be mixed or loaded within 15 meters of any wells (including abandoned wells and drainage wells), sink holes, perennial or intermittent streams or rivers, and natural or impounded lakes and reservoirs. This setback does not apply to properly capped or plugged abandoned wells and does not apply to impervious pads or properly diked mixing/loading areas.

Operations that involve mixing, loading, rinsing or washing of this product into or from pesticide handling or application equipment or containers within 15 metres of any well, are prohibited unless conducted on an impervious pad constructed to withstand the weight of the heaviest load that may be positioned on or moved across the pad. Such a pad shall be designed and maintained to contain any product spills or equipment leaks, container or equipment rinse or wash water, and rainwater that may fall on the pad. Surface water shall not be allowed to either flow over or from the pad, which means the pad must be self-contained. The pad shall be sloped to facilitate material removal. An unroofed pad shall be of sufficient capacity to contain at a minimum 110% of the capacity of the largest pesticide container or application equipment on the pad. A pad that is covered by a roof of sufficient size to completely exclude precipitation from contact with the pad shall have a minimum containment capacity of 100% of the capacity of the largest pesticide container or application equipment on the pad. Containment capacities as described above shall be maintained at all times. The above specific minimum containment capacities do not apply to vehicles when delivering pesticide shipments to the mixing/loading site. Provinces may have in effect additional requirements regarding wellhead setbacks and operational containment.

Astir must be used in a manner which will prevent back siphoning in wells, spills or improper disposal of excess pesticide, spray mixtures or rinsates.

FIRST AID AND TOXICOLOGICAL INFORMATION

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PRECAUTIONS, PROTECTIVE CLOTHING AND EQUIPMENT

PRECAUTIONS

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To reduce runoff from treated areas into aquatic habitats, avoid application to areas with a moderate to steep slope, compacted soil, or clay.

Avoid application when heavy rain is forecast.

Contamination of aquatic areas as a result of runoff may be reduced by including a vegetative filter strip between the treated area and the edge of the water body.

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Shake or roll container periodically to re-dissolve solids.

Do not use or store near heat or open flame.

Store in original containers only. Store containers in a dry location. Carefully open containers. After partial use, replace lids and close tightly. Do not put concentrate or dilute material into food or drink containers. Do not contaminate other pesticides, fertilizers, water, food, or feed by storage or disposal.

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NOTICE TO USER

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DIRECTIONS FOR USE

As this product is not registered for the control of pests in aquatic systems, **DO NOT** use to control aquatic pests.

DO NOT contaminate irrigation, drinking water supplies or aquatic habitats by cleaning of equipment or disposal of wastes.

CROPS AND WEEDS

CROPS

Astir may be applied to pre-plant or pre-emergent to, chickpeas, field peas, flax, sunflower, soybeans and wheat (spring and durum).

Astir does not control emerged weeds.

WEEDS CONTROLLED

When used as directed, **Astir** will provide control of the listed weeds.

Use rate (L/ha)	Weeds controlled
0.219	Kochia Russian thistle (suppression)
0.292	Above weeds plus: Redroot pigweed Lamb's-quarters Wild buckwheat Eastern black nightshade Common waterhemp Smooth crabgrass Large crabgrass Yellow woodsorrel Common groundsel Powell pigweed Common purslane

Rates of Application

Astir needs to be applied at the following rates of application (milliliters of product) according to soil texture, organic matter content and pH.

Rates of Application for Astir

Percent (%) Organic Matter	Application by Soil Type (mL of Astir per hectare)	
	Medium	Fine
<1.5	219 - 292	--*
1.5 – 3.0	219 - 292	219 - 292
>3.0 - <6.0	219 - 292	219 - 292

Use the higher rates within the rate range for soils with pH less than 7.0 and organic matter greater than 3%.

Do not apply to soils classified as coarse-textured soils.

***Do not apply in fine textured soils with less than 1.5% organic matter.**

Do not apply in any type of soils with an organic matter content greater than 6%.

Do not use on soils with a pH of 7.8 or greater.

SPECIFIC CROP INFORMATION

FIELD CROPS

CHICKPEAS, FIELD PEAS, FLAX, SUNFLOWER, SOYBEANS

Make one pre plant or pre-emergence application every other year. Apply in 100 L of water per ha.

WHEAT (SPRING AND DURUM)

Applications

Make one pre-plant or pre-emergence application at a **maximum rate of 219 mL/ha** every other year for kochia control. Apply in a minimum of 100 L of water per ha.

Restrictions

DO NOT apply Astir (or any other product containing sulfentrazone) to spring wheat if an application of FOCUS® Herbicide (or any other product containing pyroxasulfone) was applied in the previous fall.

TANK MIXES

This product may be tank mixed with a fertilizer, a supplement, or with registered pest control products, whose labels also allow tank mixing, provided the entirety of both labels, including Directions For Use, Precautions, Restrictions, Environmental Precautions, and Spray Buffer Zones are followed for each product. In cases where these requirements differ between the tank mix partner labels, the most restrictive label must be followed. Do not tank mix products containing the same active ingredient unless specifically listed on this label.

In some cases, tank mixing pest control products can result in reduced pesticide efficacy or increased host crop injury. The user should contact Nufarm representatives at 1-800-868-5444 for information before applying any tank mix that is not specifically recommended on this label.

FIELD PEA, SOYBEAN AND WHEAT (SPRING AND DURUM)

Apply **Astir** at 219 ml/ha (for wheat) or 219-292 mL/ha (for field pea and soybean) plus EXPRESS® SG Herbicide at 15 g/ha, tank mixed with glyphosate (present as potassium salt, isopropylamine salt, ammonium salt) at 450 - 810 g ae/ha in a total spray volume of 100 L/ha. This tank mix will control weeds listed on this label, corresponding to the rate of **Astir** applied, as well as those listed in the following table.

Fields treated with this tank mix can be seeded to field pea, soybean or wheat (spring and durum) a minimum of 24 hours after application.

Tank Mix Partner	Application Rate	Application Stage	Weeds Controlled	Weeds Suppressed*
Express SG Herbicide + Glyphosate (present as potassium salt, isopropylamine salt, ammonium salt)	15 g/ha + 450 g ae/ha	Up to 8 cm	Canada fleabane, common ragweed, narrow leaved hawk's beard	Scentless chamomile
		Up to 15 cm	Dandelion, downy brome, flixweed, giant foxtail, green foxtail, hemp nettle, kochia, lady's thumb, lamb's quarters, Persian darnel, redroot pigweed, Russian thistle, stinkweed, volunteer barley, volunteer canola (including glyphosate-tolerant varieties), volunteer flax, volunteer wheat, wild mustard, wild oats	
		Up to 3-leaf	Cow cockle, wild buckwheat	
		Up to 8-leaf	Common chickweed	
		Rosette		Canada thistle, White cockle
Express SG Herbicide + Glyphosate (present as potassium salt, isopropylamine)	15 g/ha + 810 g ae/ha	Weeds up to 15 cm in height	All annual grasses listed above plus crab grass (large and smooth) and annual bluegrass. All annual broadleaf weeds	

salt, ammonium salt)			listed above plus prickly lettuce, shepherd's purse, annual sow thistle and narrow-leaved vetch.	
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*Weed suppression is a visual reduction in weed competition (reduced population or vigour) as compared to an untreated area. Degree of suppression will vary with size of weed and environmental conditions prior to and following treatment.

For pre-seed applications in the spring, injury to pulse crops may occur on coarse textured soils, low in organic matter (less than 3%), or in fields with variable soils, gravelly areas, sandy areas or eroded knolls. Avoid planting pulse crops in soils containing more than 50% sand.

Do not use on soils with less than 3% organic matter.

Use the higher rates within the rate range for soils with pH less than 7.0.

Do not apply to soils classified as coarse-textured soils.

Do not apply in any type of soils with an organic matter content greater than 6%.

Do not use on soils with a pH of 7.8 or greater.

APPLICATION INFORMATION

PREEMERGENCE APPLICATION:

- **Astir** alone, or in tank mixture, may be applied to the soil surface as a broadcast spray after planting of the crop, but prior to weed or crop emergence.
- Preemergence application may be made in all tillage systems (conventional, conservation, minimum, ridge, etc.).
- Rainfall and/or overhead sprinkler irrigation is necessary to move **Astir** into the upper soil surface where weed seeds germinate.
- If adequate moisture is not received within 7 to 10 days after application and weeds begin to emerge from the soil, a light rotary hoeing or shallow incorporation (no deeper than 1.25 cm deep) will improve performance, minimize crop damage, activate chemical and prevent soil crusting.
- Dry weather conditions as well as excessive rainfall or irrigation following application may reduce weed control.
- Do not apply heavy irrigation immediately after application.

BAND APPLICATION:

- If a band application is desired, the chemical may be applied as described in Section 10.1 by using proportionally less **Astir** per hectare:
- Weeds between treated bands should be removed by cultivating, as needed, using protective fenders to keep freshly turned soil off treated bands.

These Crop Specific Use directions are based upon the interactive effects of **Astir** (sulfentrazone) and the primary soil and environmental factors, which affect its activity on various weed species and tolerance among crops. The user is required to observe the instructions and guidance presented under General Application Instructions, General **Astir** Product Use Rates, Rotational Crop Guidelines, Replanting Instructions, Weeds Controlled and any other section of this label pertinent to the anticipated crop use. It is important to note that not all varieties or cultivars of a given crop species have been evaluated under treatment with **Astir**. Consult university or extension weed management specialists for additional information on specific local varieties or cultivars and any other pertinent information on **Astir** under specific local conditions.

APPLICATION INFORMATION

GENERAL APPLICATION INSTRUCTIONS

DO NOT apply by air.

Astir can be applied with conventional ground spraying equipment.

Astir may be applied pre-plant or pre-emergence **AS A SINGLE GROUND APPLICATION**. **Astir** can be applied prior to planting or up to 3 days after planting, but before seed germination.

When applications after planting are delayed greater than 3 days, injury may occur if seeds are germinating. **Astir** applied near or after crop emergence may cause severe injury to the crop.

Do not make fall applications to a crop unless it is specifically recommended on this label.

Water must be used as the carrier for **Astir**. Do not allow spray mixtures to sit overnight due to potential settling of product and difficulty in resuspending may occur. Avoid spray drift to adjacent plants as injury to other plants may occur.

Ground Application

Utilize a boom and nozzle sprayer or boomless ground sprayer equipped with the appropriate nozzles, spray tips and screens and adjusted to provide optimum spray distribution and coverage at the appropriate operating pressures. Utilize nozzles and pressures that produce a medium spray as classified by the American Society of Agricultural Engineers (ASAE S572.1) to avoid spray drift or inadequate foliar and soil coverage. Consult with spray nozzle manufacturer's charts to determine the correct nozzle and pressure combination required to achieve a medium spray. Utilize nozzles that produce minimal amounts of fine spray droplets to avoid spray drift or inadequate foliar and soil coverage. Do not exceed 175 kPa spray pressure unless otherwise required by the manufacturer of drift reducing nozzles or boomless application systems. Apply a minimum of 100 litres of finished spray per hectare by ground. Be aware that spray pattern overlaps and slower ground speeds while starting, stopping or turning while spraying may result in excessive application and subsequent crop response.

Band Application

When applied as a banded treatment (50% band or less), refer to formula in chart below for rate and volume. **Astir** may be applied once every other year.

For band treatments, apply the broadcast equivalent rate and volume per ha. To determine these:

$$\begin{array}{l} \text{Band width} \\ \text{in centimetres} \end{array} \times \begin{array}{l} \text{Broadcast Rate} \\ \text{per hectare} \end{array} = \begin{array}{l} \text{Band rate per hectare} \end{array}$$

Row width
in centimeters

$$\begin{array}{l} \text{Band width} \\ \text{in centimetres} \end{array} \times \begin{array}{l} \text{Broadcast Volume} \\ \text{per hectare} \end{array} = \begin{array}{l} \text{Band volume per hectare} \end{array}$$

Row width
in centimeters

Spray Drift Management

Minimizing spray drift at the application site is the responsibility of the applicator and the grower.

The interaction of many equipment and weather-related factors determine the potential for spray drift. The applicator and the grower are responsible for considering all these factors when making decisions.

DO NOT apply during periods of dead calm. Avoid application of this product when winds are gusty.

Controlling Spray Droplet Size

Volume: Use high flow rate nozzles to apply the greatest practical spray volume. Nozzles with higher rated flow generally produce larger droplets.

Pressure: When higher flow rates are needed, use higher flow rate nozzles rather than increasing spray pressure. Do not exceed the nozzle manufacturer's recommended pressures. Lower pressure produces larger droplets in many types of nozzles.

Nozzle Type: Use a nozzle type that is designed for the intended application. With most nozzle types, narrower spray angles produce larger droplets. Consider using low-drift nozzles for ground applications.

Do not apply with spray droplets smaller than the American Society of Agricultural Engineers (ASAE S572.1) medium classification. Consult with spray nozzle manufacturer's charts to determine the correct nozzle and pressure combination required to achieve a medium spray. Boom height must be 60 cm or less above the crop or ground.

Rainfall Requirement

All soil applications of **Astir** require adequate rainfall for herbicidal activation. The ultimate amount of moisture, whether supplied by rainfall or irrigation, is dependent on several factors. These factors include but are not limited to existing soil moisture at application, soil type,

organic matter and pH. In crop situations, dependent on rainfall, **Astir** can await activating moisture for extended periods (10 to 14 days or longer) depending on the soil parameters described above. Once activated, **Astir** will provide activity on existing weeds. Where irrigation is not available and rainfall has not provided activation, particularly for surface applications of **Astir**, a shallow incorporation is recommended to initiate the process of activation with existing soil moisture. In circumstances where prolonged periods without rainfall or irrigation are not possible, alternative or additional weed management practices (cultivation or postapplied herbicides) may be required.

When activating moisture is received after dry conditions, **Astir** may provide a reduced level of control of susceptible germinating weeds. Soil applications of **Astir** must be made before crop seed germination to prevent injury to the emerging crop seedlings. When applications after planting are delayed, injury may occur if seeds are germinating or if they are located near the soil surface.

Mode of Action

Sulfentrazone, the active ingredient in **Astir**, is a potent inhibitor of the enzyme Protoporphyrinogen Oxidase IX (Protox) required for the formation of chlorophyll. Inhibition of the PPO IX enzyme results in the liberation of singlet oxygen (O) that, in turn, disrupts cellular membranes and causes cellular leakage. The ultimate manifestation of the process is cellular death leading to plant death. The selective herbicidal activity of sulfentrazone is based on its greater affinity for the PPO IX enzyme in weed species versus crop plants.

Mechanism of Action

Following the application of **Astir** to soil, germinating seeds and seedlings take up sulfentrazone from the soil solution. The amount of sulfentrazone in soil solution, and available for weed uptake, is determined primarily by soil type, organic matter and soil pH. Sulfentrazone adsorbs to the clay and organic matter fractions of soils effectively limiting the amount of active ingredient immediately available to control weeds. Soils typically increase in clay content through the series from coarse to fine as noted in the following Soil Classification Chart.

Soil Classification Chart

Coarse*	Medium	Fine
Sand	Sandy clay loam	Silty clay loam
Loamy sand	Sandy clay	Silty clay
Sandy Loam	Loam	Clay loam
	Silt loam	Clay
	Silt	

Influence of Soil Type, Organic Matter and pH on Astir Use Rates and Crop Response

Soil organic matter content can vary widely and independently of soil type and requires an accurate analysis of representative soil samples to determine its content. Soil pH also exerts a dramatic effect on sulfentrazone availability in the soil solution. As soil pH increases, sulfentrazone availability increases. Determining soil pH requires an accurate analysis of

representative soil samples. ***DO NOT** apply to coarse soils classified as sand containing less than 1% organic matter.

The total amount of sulfentrazone available in solution, in any given soil, is determined by the interaction of soil type (primarily clay content), % organic matter and pH. The application timing (relative to the emergence of the crop and weeds) and amount of rainfall and/or irrigation received will ultimately determine, in conjunction with the soil parameters and pH, the amount of sulfentrazone in soil solution. It is important to note that **Astir** can await activating moisture. However, diminished weed control may result due to the successive increase in weed growth versus timing of activation.

It is important to note that irrigation with highly alkaline water (high pH) following an **Astir** soil application can also significantly increase the amount of sulfentrazone available, in the soil solution. Irrigation with water having a pH greater than 7.5 could result in adverse crop response. This response will ultimately depend on initial **Astir** application rate, timing, amount and pH of irrigation water and sensitivity of the crop and its growth stage when irrigated. The risk of adverse crop response will lessen with the advances in growth stages among most crops.

Sulfentrazone is persistent and will last in the soils (carryover) for one to two years. DO NOT APPLY ASTIR TO FIELDS PREVIOUSLY TREATED WITH ANY SULFENTRAZONE-CONTAINING PRODUCT IN CONSECUTIVE YEARS (24 MONTHS). In case of drought in any of those years, a subsequent application of Astir should be further delayed by the equivalent number of years in which drought occurred. Astir requires one (1) to two (2) cm of rain or irrigation water to be effective. If adequate moisture from rainfall or irrigation is not received within 7 to 10 days of application, a shallow incorporation no deeper than 5 cm may be needed to obtain adequate weed control.

SPRAY BUFFER ZONES

The spray buffer zones specified in the table below are required between the point of direct application and the closest downwind edge of sensitive terrestrial habitats (such as grasslands, forested areas, shelter belts, woodlots, hedgerows, riparian areas and shrublands) and sensitive freshwater habitats (such as lakes, rivers, sloughs, ponds, prairie potholes, creeks, marshes, streams, reservoirs and wetlands).

Method of Application	Crop	Spray Buffer Zones (metres) Required for the Protection of:		
		Freshwater Habitat of Depths		Terrestrial Habitat
		Less than 1 m	Greater than 1 m	
Field sprayer	Chickpea, Field Pea, Flax, Sunflower, Soybean and Wheat (spring and durum)	1	0	10

When tank mixes are permitted, consult the labels of the tank-mix partners and observe the largest (most restrictive) spray buffer zone of the products involved in the tank mixture and apply using the coarsest spray (ASAE) category indicated on the labels for those tank mix partners.

The spray buffer zones for this product can be modified based on weather conditions and spray equipment configuration by accessing the Spray Buffer Zone Calculator on the Pesticides portion of the Canada.ca website.

ROTATIONAL CROP GUIDELINES

The following table shows the minimum interval in months from the time of the last **Astir** application until **Astir** treated soil can be replanted to the crops listed as follows.

Rotational crops and replant intervals for Astir.

Rotational Crop	Replant Interval (Months)
Chickpea, field pea, flax, soybean, sunflowers, wheat (spring and durum; low rate only)	0
Winter wheat	4
Alfalfa, barley, canola, field corn, wheat (spring and durum; high rate)	12
Sweet and popcorn, lentils, sorghum	24

For crops listed in the rotational crop table, the minimum replant interval listed in the table must be observed. For crops not listed in the rotational crop table, A MINIMUM ROTATIONAL CROP INTERVAL OF 36 MONTHS must be observed, and a representative bioassay of the field must be conducted with the rotational crop and adequate soil moisture to evaluate potential crop sensitivity.

If there is a lack of adequate or normal soil moisture due to drought conditions following an application of Astir, the minimum rotational crop interval listed in the table must be extended for one additional year and a representative bioassay of the field must be conducted with the potential rotational crop and adequate soil moisture to determine the crop sensitivity to Astir.

REPLANTING INSTRUCTIONS

If initial planting of labeled crops fails to produce a stand, only labeled crops for **Astir**, may be planted. **DO NOT** retreat field with **Astir**. Do not plant treated fields with any crop at intervals that are inconsistent with the Rotational Crop Guidelines on this label. When replanting use minimum soil tillage to preserve the herbicide barrier and achieve maximum weed control.

RESTRICTED ENTRY INTERVAL

DO NOT enter or allow worker entry into treated areas during the restricted entry interval (REI) of 12 hours.

IMPORTANT

- **DO NOT** apply this product in a way that will contact workers or other persons, either directly or through drift. Only protected handlers may be in the area during application. For any requirements specific to your area, consult the provincial agency responsible for pesticide regulation.
- **DO NOT** apply more than the allowed amount per hectare per twelve-month period. The twelve-month period is considered to begin upon the initial application.

MIXING AND LOADING INSTRUCTIONS

Spray Tank Preparation

It is important that spray equipment is clean and free of existing pesticide deposits before using this product. Follow the spray tank clean out procedures specified on the label of product previously applied before adding **Astir** to the tank.

Mixing and Loading Instructions

Astir is a suspension concentrate intended for dilution with water. For best results, fill spray tank with one half of the volume of clean water needed for the area to be treated. Start the agitation system. Slowly add the **Astir** to the spray tank. Complete filling the spray tank to the desired level. Continuous spray tank agitation is required at all times to maintain a uniform spray solution. Make sure **Astir** is thoroughly mixed before application.

Use the **Astir** mixture immediately after mixing.

Do not store the sprayer overnight or for any extended period of time with the sulfentrazone spray mixture remaining in the tank.

Premixing **Astir** spray solutions in nurse tanks is not recommended.

Tank Mixtures: Fill spray tank one-half to two-thirds full of water. With agitator operating, add the recommended amount of ingredients using the following order:

- **Wettable** powders and dispersible granules
- **Agitate** tank mix thoroughly
- **Micro-encapsulated** suspensions

- Liquid flowables and suspensions
- Emulsifiable concentrate formulations
 - Fill spray tank nearly full of water
- Glyphosate formulations
- Surfactants
 - Complete filling the spray tank to the desired level

SPRAYER EQUIPMENT CLEANOUT

After spraying **Astir** and before using sprayer equipment for any other applications, the sprayer must be thoroughly cleaned using the following procedure:

1. Drain sprayer tank, hoses, and spray boom. Use a high-pressure detergent wash to remove physical sediment and residues from the inside of the sprayer tank and thoroughly rinse. Then thoroughly flush all sprayer hoses, booms, and nozzles with clean water.
2. Prepare a sprayer cleaning solution by adding three litres of ammonia (containing at least 3% active) per 100 litres of clean water. Prepare sufficient cleaning solution to allow the operation of the spray system for a minimum of 15 minutes to thoroughly flush hoses, spray boom and spray nozzles.
3. Convenient and thorough cleaning of the sprayer can be achieved if the ammonia solution or fresh water is left in the spray tank, hoses, spray booms and spray nozzles overnight or during storage.
4. Drain the sprayer system. Rinse the tank with clean water and flush through the hoses, boom, and nozzles. Remove and clean spray tips and all strainers and screens separately in an ammonia solution.
5. Properly dispose of all cleaning solution and rinsate in accordance with provincial guidelines and regulations.

Do not drain or flush equipment on or near desirable trees or plants.

Do not contaminate any body of water including irrigation water that may be used on other plants or crops.

RESISTANCE MANAGEMENT RECOMMENDATIONS

For resistance management, **Astir** is a Group 14 herbicide. Any weed population may contain or develop plants naturally resistant to **Astir** and other Group 14 herbicides. The resistant biotypes may dominate the weed population if these herbicides are used repeatedly in the same field. Other resistance mechanisms that are not linked to site of action, but specific for individual chemicals, such as enhanced metabolism, may also exist. Appropriate resistance-management strategies should be followed.

To delay herbicide resistance:

- Where possible, rotate the use of **Astir** or other Group 14 herbicides within a growing season (sequence) or among growing seasons with different groups that control the same weeds in a field.

- Use tank mixtures with herbicides from a different group when such use is permitted. To delay resistance, the less resistance-prone partner should control the target weed(s) as effectively as the more resistance-prone partner.
- Herbicide use should be based on an integrated weed management program that includes scouting, historical information related to herbicide use and crop rotation, and considers tillage (or other mechanical control methods), cultural (for example, higher crop seeding rates; precision fertilizer application method and timing to favour the crop and not the weeds), biological (weed-competitive crops or varieties) and other management practices.
- Monitor weed populations after herbicide application for signs of resistance development (for example, only one weed species on the herbicide label not controlled). If resistance is suspected, prevent weed seed production in the affected area, if possible, by an alternative herbicide from a different group. Prevent movement of resistant weed seeds to other fields by cleaning harvesting and tillage equipment when moving between fields and planting clean seed.
- Have suspected resistant weed seeds tested by a qualified laboratory to confirm resistance and identify alternative herbicide options.
- Contact your local extension specialist or certified crop advisors for any additional pesticide resistance-management and/or integrated weed-management recommendations for specific crops and weed biotypes.
- For further information or to report suspected resistance, contact Nufarm representatives at 1-800-868-5444 for further information.

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