

Product Name: NUFARM ASTRAL INSECTICIDE/MITICIDE
APVMA Approval No: 68017/139476



Label Name:	NUFARM ASTRAL INSECTICIDE/MITICIDE
Signal Headings:	POISON KEEP OUT OF REACH OF CHILDREN READ SAFETY DIRECTIONS BEFORE OPENING OR USING
Constituent Statements:	ACTIVE CONSTITUENT: 250 g/L BIFENTHRIN SOLVENT: 640 g/L LIQUID HYDROCARBON
Mode of Action:	GROUP 3A INSECTICIDE
Statement of Claims:	Controls insect pests, mites and whitefly in a range of fruit and vegetable crops, broadacre and other crops including lucerne, poppies and sugarcane as specified in the DIRECTIONS FOR USE table.
Net Contents:	1 L - 200 L
Restrains:	RESTRAINTS DO NOT use as a foliar spray in banana plantations and orchards where mite predators or other beneficials are established and providing effective mite control and/or other pest control. DO NOT apply as a foliar treatment if rainfall is expected before spray deposits dry on leaf surfaces. DO NOT apply to bananas by aircraft. DO NOT use on cucurbit crops (other than cucumbers) grown in covered or protected situations such as glasshouses, greenhouses or plastic tunnels.
Directions for Use:	This section contains file attachment.
Other Limitations:	

Withholding Periods:	<p>WITHHOLDING PERIODS</p> <p>Harvest Apricots, Cucurbits, Eggplant, Nectarines, Peaches, Peppers, Plums, Tomatoes: DO NOT HARVEST FOR 1 DAY AFTER APPLICATION. Bananas: For Ground Applications - DO NOT HARVEST FOR 1 DAY AFTER APPLICATION. For Foliar Applications - DO NOT HARVEST FOR 8 DAYS AFTER APPLICATION. Broccoli, Brussels sprouts, Cauliflowers: DO NOT HARVEST FOR 3 DAYS AFTER APPLICATION. Beans (common green), Cotton, Navy Beans, Pears: DO NOT HARVEST FOR 14 DAYS AFTER APPLICATION. Pineapples: DO NOT HARVEST FOR 3 MONTHS AFTER APPLICATION. Barley, Canola, Citrus, Clover, Faba beans, Field peas, Grapes, Lucerne, Lupins, Mustard, Peas (fresh and processing), Poppies, Subterranean Clover, Sugarcane, Sweet potatoes, Wheat: NOT REQUIRED WHEN USED AS DIRECTED.</p> <p>Grazing Beans (common green), Navy Beans: DO NOT GRAZE OR CUT FOR STOCK FOOD FOR 14 DAYS AFTER APPLICATION. Barley, Canola, Clover, Faba beans, Field peas, Lucerne, Lupins, Mustard, Peas (fresh and processing), Subterranean Clover, Wheat: DO NOT GRAZE OR CUT FOR STOCK FOOD FOR 4 WEEKS AFTER APPLICATION. Cotton: DO NOT GRAZE OR CUT FOR STOCKFEED. DO NOT FEED COTTON TRASH TO LIVESTOCK. Pineapples: DO NOT GRAZE OR CUT FOR STOCK FOOD FOR 6 WEEKS AFTER APPLICATION.</p>
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Trade Advice:	<p>EXPORT OF TREATED PRODUCE</p> <p>To allow produce from treated plants or animals to be supplied or otherwise made available for human consumption the APVMA has established the Maximum Residue Limits (MRLs) for bifenthrin. These limits apply only to produce marketed and consumed in Australia. If treated produce is to be exported due account should be taken of the residue definition and residue limits/import tolerances of importing countries and that any residues must not exceed those requirements of the importing country.</p>
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General Instructions:	This section contains file attachment.
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Resistance Warning:	<p>INSECTICIDE RESISTANCE WARNING GROUP 3A INSECTICIDE</p> <p>For insecticide resistance management Nufarm Astral is a Group 3A insecticide. Some naturally occurring insect biotypes resistant to Nufarm Astral and other Group 3A insecticides may exist through normal genetic variability in any insect population. The resistant individuals can eventually dominate the insect population if Nufarm Astral or other Group 3A insecticides are used repeatedly. The effectiveness of Nufarm Astral on resistant individuals could be significantly reduced. Since occurrence of resistant individuals is difficult to detect prior to use, Nufarm Australia Limited accepts no liability for any losses that may result from the failure of Nufarm Astral to control resistant insects.</p> <p>Nufarm Astral may be subject to specific resistance management strategies. For further information contact your local supplier, Nufarm Australia Limited representative or local agricultural department agronomist.</p>
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Precautions:	<p>PRECAUTIONS</p> <p>DO NOT use human flaggers/workers unless they are protected by engineering controls such as enclosed cabs.</p> <p>Re-entry period DO NOT allow entry into treated areas until spray has dried, unless wearing cotton overalls buttoned to the neck and wrist (or equivalent clothing) and chemical resistant gloves. Clothing must be laundered after each day's use.</p>
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Protections:	<p>PROTECTION OF HONEY BEES AND OTHER INSECT POLLINATORS Dangerous to bees. DO NOT spray any plants in flower while bees are foraging. Spray in the early morning when bees are not actively foraging.</p> <p>PROTECTION OF WILDLIFE, FISH, CRUSTACEANS AND ENVIRONMENT Dangerous to fish and aquatic organisms. DO NOT contaminate streams, rivers or waterways with the product or the used containers. Tail drains which flow from treated areas should be prevented from entering river systems.</p>
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Storage and Disposal:	<p>STORAGE AND DISPOSAL</p> <p>Store in the closed, original container in a cool, well-ventilated area. DO NOT store for prolonged periods in direct sunlight.</p> <p>Triple or preferably pressure rinse empty containers before disposal. Add rinsings to spray tank. DO NOT dispose of undiluted chemicals on site. If recycling, replace cap and return clean containers to recycler or designated collection point. If not recycling, break, crush or puncture and deliver empty packaging for appropriate disposal to an approved waste management facility. If an approved waste management facility is not available bury the empty packaging 500 mm below the surface in a disposal pit specifically marked and set up for this purpose clear of waterways, desirable vegetation and tree roots, in compliance with relevant Local, State or Territory government regulations. DO NOT burn empty containers or product.</p>
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Safety Directions:	<p>SAFETY DIRECTIONS</p> <p>Attacks eyes. Poisonous if swallowed. Harmful if inhaled. Will irritate the skin. Avoid contact with eyes and skin. DO NOT inhale vapour. When opening the container and preparing spray wear cotton overalls buttoned to the neck and wrist (or equivalent clothing), elbow-length PVC gloves and goggles. If applying by hand, wear cotton overalls over normal clothing, buttoned to the neck and wrist and a washable hat and elbow length PVC gloves. If product in eyes, wash it out immediately with water. Wash hands after use. After each day's use, wash gloves, goggles and contaminated clothing.</p>
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First Aid Instructions:	<p>FIRST AID</p> <p>If poisoning occurs, contact a doctor or Poisons Information Centre. Phone Australia 13 11 26. If swallowed, DO NOT induce vomiting. Give a glass of water.</p>
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First Aid Warnings:	
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DIRECTIONS FOR USE

Section 1.

CROP	PEST	STATE	RATE	WHP	CRITICAL COMMENTS
Bananas	Banana weevil borer (<i>Cosmopolites sordidus</i>)	Qld, NSW, WA & NT only	Seasonal Program Stool Treatment Method 100- 130mL/100L twice per year OR 265mL/100L once per year	1 day	<p><u>Seasonal Program</u> Twice per year Timing Apply in October/November (spring/early summer) and March/April (late summer/autumn). Use the higher rate (concentration) when borer pressure or damage is high. Once per year Timing Apply in October/November OR March/April.</p> <p><u>Monitoring Program</u> Monitor weevil borer populations carefully by trap counts and/or corm damage ratings, beginning in September when pest activity is on the increase and continue until April. Apply treatment when banana weevil borers reach or exceed acceptable threshold levels. Monitor borer control after application and re-treat as required.</p> <p>Banana weevil borer: Application should be made after rain or irrigation during periods of high adult borer activity. Banana rust thrips: Application against banana weevil borer will give coincident rust thrips control, particularly when application is made when thrips activity is on the increase usually beginning September and into the summer months.</p> <p><u>Application Method</u> <u>Stool Treatment Application</u> Remove trash from the base of stools and apply 500 - 750mL of spray solution to each stool, depending on stool size. Treat the bottom 30cm of each stool as well as the soil in a 30cm band around each stool, ensuring thorough treatment of both butt(s) and follower(s). Use the lower spray volume of 500mL on small stools less than 50cm across the entire base. <u>Band Treatment Application</u> Apply as a band application with a side delivery boom and offset nozzles on both sides of the row with the spray pattern positioned to spray 30cm of soil on either side of the row and 30cm in height. Aim to apply a total spray volume of 1L/stool area. For single sucker row configurations apply 28L of solution per 100 metres of row in a band 0.5m wide on each side of the row overlapping in the centre. For double sucker row configurations apply 56L of solution per 100 metres of row in a band 1m wide on each side of the double row with the spray pattern overlapping between the rows.</p>
	Banana rust thrips (<i>Chaetanaphothrips signipennis</i>)		Band Treatment Method 100mL/100L twice per year		
	Strawberry spider mite (<i>Tetranychus lambi</i>)	Qld & WA only	16mL/100L	8 days	<p>Monitor mite population on old leaves particularly during hot dry conditions. Apply Nufarm Astral as a preventative rather than a curative treatment before damage occurs, and before mite numbers build up to damaging levels. Follow up applications may be required at 10 - 14 day intervals. Thorough coverage of the lower leaf surface is essential to ensure good control. Use a total spray volume of 300 – 500L/ha.</p>

CROP	PEST	STATE	RATE	WHP	CRITICAL COMMENTS
Beans (common – fresh and processing)	Silverleaf whitefly (<i>Bemisia tabaci</i>) Biotype B	All States	High Volume 24mL/100L or Low Volume 240mL/ha Plus wetter (at label rates)	14 days (harvest and grazing)	Closely monitor adult whitefly numbers and apply control measures before adult populations reach high levels. DO NOT apply more than 2 applications of Nufarm Astral per crop. Good spray coverage is essential. For low volume spraying use a total spray volume of 500-800L/ha. Allow a minimum retreatment interval of 7 days between sprays. Apply using a calibrated boom sprayer, air-blast sprayer or similar equipment. DO NOT apply more than two (2) consecutive applications of insecticides that have the same Mode of Action (MoA) within and between seasons to avoid resistance.
	Redlegged earth mite (<i>Halotydeus destructor</i>)		20-40mL/ha		DO NOT apply more than 1 bare earth application per crop. Apply as a broadcast ground rig application in a total water volume of 50-200L/ha. Apply to bare soil after conventional cultivation and sowing. Treat infested paddocks after sowing and before or soon after seedling emergence. Use the higher rate on heavier infestations and for longer residual protection. Where possible, use in rotation with other chemicals approved for this purpose. Crop Safety: Because of the large number of bean varieties available, it is not possible to evaluate the crop safety of Nufarm Astral on all these varieties. Growers are strongly advised to check the crop safety of Nufarm Astral before applying to a bean variety on which they have not previously used the product
Broccoli, Brussels sprouts, Cauliflowers	Silverleaf whitefly (<i>Bemisia tabaci</i>) Biotype B	All States	High Volume 24mL/100L or Low Volume 240mL/ha Plus wetter (at label rates)	3 days	Closely monitor adult whitefly numbers and apply control measures before adult populations reach high levels. DO NOT apply more than 2 applications of Nufarm Astral per crop. Good spray coverage is essential. For low volume spraying use a total spray volume of 500-800L/ha. Allow a minimum retreatment interval of 7 days between sprays. Apply using a calibrated boom sprayer, air-blast sprayer or similar equipment. DO NOT apply more than two (2) consecutive applications of insecticides that have the same Mode of Action (MoA) within and between seasons to avoid resistance. Crop Safety: Because of the large number of brassica varieties available, it is not possible to evaluate the crop safety of Nufarm Astral on all these varieties. Growers are strongly advised to check the crop safety of Nufarm Astral before applying to a brassica variety on which they have not previously used the product.

CROP	PEST	STATE	RATE	WHP	CRITICAL COMMENTS
Canola Mustard (oilseed cultivars) Faba beans Subterranean clover Clover Barley Field peas Lupins Lucerne Wheat	Redlegged earth mite (<i>Halotydeus destructor</i>) Brown pasture looper (<i>Ciampa arietaria</i>) Blue oat mite (<i>Penthaleus major</i>) Pasture Webworm (<i>Hednota</i> spp) Bryobia mites (<i>Bryobia</i> spp)	All States	20-40mL/ha 40mL/ha 80mL/ha 40-80mL/ha	4 weeks (grazing)	Apply as a broadcast ground rig application in a total water volume of 50-200L/ha or by air in a minimum total water volume of 20L/ha. Apply to bare soil after conventional cultivation and sowing or onto well grazed or sprayed pasture after direct drilling. Treat infested paddocks after sowing and before or soon after seedling emergence. Use the higher rate on heavier infestations and for longer residual protection. Nufarm Astral is compatible with some herbicides. See compatibility statement for details. Use the 40mL rate when pest pressure is low. Monitor adjacent habitat and edges of the field for the presence of vegetable weevil prior to making a decision whether to spray.
Canola Mustard (oilseed cultivars)	Vegetable weevil (<i>Listroderes difficilis</i>)				
Citrus	Leafeating weevil (<i>Eutinophaea bicristata</i>)	All States	Pre-emergence program 5 or 10mL/tree Post-emergence monitoring program 2.4mL/tree	Not required when used as directed	Apply as a high volume band application in a 1.5 to 2 metre wide swath, to the ground, both sides of the row, under each tree. Aim to apply a total spray volume of 5 to 10L/tree (e.g. at 250 trees/ha = 1250 to 2500L/ha). Pre-emergence program: Apply just prior to, or at the first sign of major beetle emergence in mid-October. Use the higher rate in blocks with a history of high beetle numbers or when longer residual control is required. Post-emergence monitoring program: Apply at peak beetle emergence in October / November as indicated by field monitoring. (Refer to monitoring statement on label). Follow up treatment maybe necessary based on a threshold of 25 beetles per 10 sites per orchard in consecutive counts 1-2 weeks apart.
Cotton	Native budworm (<i>Helicoverpa punctigera</i>) Cotton bollworm (<i>Helicoverpa armigera</i>) Two spotted mite (<i>Tetranychus urticae</i>) Green mirid (<i>Creontiades dilutus</i>) Apple dimpling bug (<i>Campylomma liebknechti</i>)	Qld, NSW & WA only	240-320mL/ha	14 days (H) DO NOT GRAZE OR CUT FOR STOCK-FEED. DO NOT FEED COTTON TRASH TO LIVE-STOCK.	Apply as indicated by field checks. Use the higher rate when pest pressure is high, conditions favour pest development and when increased residual protection is required. Budworm and Bollworm: Applications should be timed to coincide with egg hatch and when small larvae up to 5mm are present. DO NOT apply this product to <i>Helicoverpa</i> (= <i>Heliiothis</i>) <i>armigera</i> larvae larger than 5mm in length. Two spotted mite: Applications against <i>Helicoverpa</i> spp will give good control of coincident two spotted mite, particularly when applied on low mite populations (around 10% leaf infestation). If conditions continue to favour mite development a second application may be required 14 - 20 days later. Green mirid & Apple dimpling bug: Apply at recommended threshold levels as indicated by field checks. Use the higher rate for increased pest pressure and longer residual protection.

CROP	PEST	STATE	RATE	WHP	CRITICAL COMMENTS
	Silverleaf whitefly (<i>Bemisia tabaci</i>) Biotype B		320mL/ha		Apply as indicated by field checks before populations reach damaging levels. Thorough coverage of the crop canopy is essential. The adult stage of silverleaf whitefly should be targeted. DO NOT spray crops with a high population of the juvenile stages of silverleaf whitefly unless using with another insecticide that is effective against these stages. Use Nufarm Astral in rotation with insecticides from at least 2 other insecticide groups that are registered or permitted for use against silverleaf whitefly on cotton. DO NOT apply more than 2 applications of Nufarm Astral per crop. If an approved Resistance Management Strategy is in place for a particular area, this should be followed. Tank mixes of Nufarm Astral with Synergy® Insecticide Synergist may improve control of silverleaf whitefly.
	False wireworm (<i>Pterohlaeus alternatus</i>) Sugarcane wireworm (<i>Agrypnus variabilis</i>)		150mL/ha* or 1.5mL/100m of row		Wireworms: Apply as a spray into the furrow at planting. Use a spray nozzle which will deliver a coarse spray in a total volume of 60 - 100L/ha in a 10cm band over the seed before soil is brought in behind covering tynes in front of the press wheel. * The rate is based on a 1m row spacing. If row spacing varies from 1m then apply at the use rate according to mL/100m of row.
Cucumbers (field and protected crops)	Greenhouse whitefly (<i>Trialeurodes vaporariorum</i>) Thrips (excluding western flower thrip)	All States	High Volume 24-32mL/100L or	1 day	Closely monitor adult whitefly numbers and apply control measures before adult populations reach high levels. DO NOT apply more than 2 applications of Nufarm Astral per crop. Good spray coverage is essential.
Cucumbers (protected cropping situations)	Silverleaf whitefly (<i>Bemisia tabaci</i>) Biotype B		Low Volume 240-320mL/ha Plus wetter (at label rates)		For low volume spraying use a total spray volume of 2500L/ha. Allow a minimum retreatment interval of 7 days between sprays. Apply using a calibrated boom sprayer, air-blast sprayer or similar equipment. DO NOT apply more than two (2) consecutive applications of insecticides that have the same Mode of Action (MoA) within and between seasons to avoid resistance. Tank mixes of Nufarm Astral with Synergy® Insecticide Synergist may improve control of silverleaf whitefly. Crop Safety: Because of the large number of cucumber varieties available, it is not possible to evaluate the crop safety of Nufarm Astral alone or Nufarm Astral and Synergy mixtures on all these varieties. Growers are strongly advised to check the crop safety of Nufarm Astral and Synergy mixtures before applying to a cucumber variety on which they have not previously used Nufarm Astral or the mixture. Refer to Synergy label for further information.

CROP	PEST	STATE	RATE	WHP	CRITICAL COMMENTS
Cucurbits (field grown only)	Native budworm (<i>Helicoverpa punctigera</i>) Corn earworm (<i>Helicoverpa armigera</i>) Cucumber moth (<i>Diaphania indica</i>)	All States	High Volume 16-24mL/100L or Low Volume 160-240mL/ha	1 day	Crop Monitoring Program Apply as indicated by field checks. Applications should be timed to coincide with egg hatch and when small larvae up to 5mm are present. DO NOT apply this product to <i>Helicoverpa</i> (=Heliopsis) <i>armigera</i> larvae larger than 5mm in length. Schedule Spray Program If fields are not checked during pest infestation periods, apply on a 7-10 day alternating program. Use the higher rate and shorter interval when pest infestations are more severe and when increased residual protection is required. DO NOT apply this product to <i>Helicoverpa armigera</i> larvae larger than 5mm in length. Use Nufarm Astral in rotation with insecticides from at least 2 other non-pyrethroid insecticide groups that are registered or permitted for use against Heliopsis in cucurbits. DO NOT apply more than 2 applications of Nufarm Astral per crop.
	Silverleaf whitefly (<i>Bemisia tabaci</i>) Biotype B	All States	High Volume 24-32mL/100L or Low Volume 240-320mL/ha	1 day	Apply as indicated by field checks before populations reach damaging levels. The higher rate should be used where moderate to high populations are present. When applying as a dilute spray use a minimum water volume of 500L/ha increasing to 1500L/ha as crops grow. Thorough coverage of all leaf surfaces is important to obtain good control. The adult stage of silverleaf whitefly should be targeted. DO NOT spray crops with a high population of the juvenile stages of silverleaf whitefly unless using with another insecticide that is effective against these stages. Use Nufarm Astral in rotation with insecticides from at least 2 other insecticide groups that are registered or permitted for use against silverleaf whitefly in cucurbits. DO NOT apply more than 2 applications of Nufarm Astral per crop. If an approved Resistance Management Strategy is in place for a particular area (eg. Silverleaf Whitefly in the Burdekin and Bowen Districts of central Queensland), this should be followed. Tank mixes of Nufarm Astral with Synergy® Insecticide Synergist may improve control of silverleaf whitefly. Crop Safety: Because of the large number of cucurbit varieties available, it is not possible to evaluate the crop safety of Nufarm Astral alone or Nufarm Astral and Synergy mixtures on all these varieties. Growers are strongly advised to check the crop safety of Nufarm Astral and Synergy mixtures before applying to a cucurbit variety on which they have not previously used Nufarm Astral or the mixture. Damage to zucchini varieties Blackjack and Vaquer has occurred in some trials. Refer to Synergy label for further information.
Grapes	Fig longicorn (<i>Acalolepta vastator</i>)	NSW, ACT & WA only	400mL/100L	Not required when used as directed	The application MUST be made at late dormancy after pruning and before bud burst. Apply a single high volume spray, with nozzles directing the spray solution to the trunk and cordons (arms) of grape vines to achieve thorough wetting of the bark. Total spray volume should be about 500mL/vine achieved by hand application.

CROP	PEST	STATE	RATE	WHP	CRITICAL COMMENTS
Lucerne seed crops	Native budworm (<i>Helicoverpa punctigera</i>)	All States	160-240mL/ha	Not required when used as directed (harvest) 4 weeks (grazing)	DO NOT treat lucerne seed crops for alfalfa sprout production. Apply as indicated by field checks after the commencement of flowering. Use the higher rate when pest pressure is high, conditions favour pest development and when increased residual protection is required. Native Budworm: Applications should be timed to coincide with egg hatch and when small larvae up to 5mm are present.
Navy beans	Native budworm (<i>Helicoverpa punctigera</i>) Corn earworm (<i>Helicoverpa armigera</i>)	All States	240-320mL/ha	14 days (harvest and grazing)	Apply as indicated by field checks from flowering onwards. Use the higher rate when pest pressure is high, conditions favour pest development and when increased residual protection is required. Budworm and Earworm: Applications should be timed to coincide with egg hatch and when small larvae up to 5mm are present. DO NOT apply this product to <i>Helicoverpa</i> (= <i>Heliothis</i>) <i>armigera</i> larvae larger than 5mm in length.
Peaches Nectarines Plums Apricots	Carpophilus beetles (<i>Carpophilus</i> spp.)	All States	Dilute spraying 20mL/100L Concentrate spraying Refer to the Mixing/ Application section	1 day	Monitor stone fruit orchards for <i>Carpophilus</i> beetle as fruit approach maturity and become susceptible to attack. Apply Nufarm Astral as a dilute spray before beetles reach damaging levels. Apply to the foliage and fruit of trees. Continue to monitor beetle numbers and if necessary reapply Nufarm Astral up to 1 day before harvest or use another insecticide registered for this purpose. Apply no more than 2 applications per season. There must be a minimum of 10 days between the re-treatment and the initial application. Apply the same total amount of product to the target crop whether applying this product by dilute or concentrate spraying methods. DO NOT use at rates greater than 40mL per 100L of water when using concentrate spraying. Cultural control methods (eg. destruction of fallen fruit by mulching) should be used to prevent excessive build up of <i>carpophilus</i> beetle.
Pears	Longtailed mealybug (<i>Pseudococcus longispinus</i>)	Vic. & WA only	10mL/100L plus Ampol DC Tron at 1L/100L	14 days	Examine wood for the presence of over wintering longtailed mealy bugs but DO NOT spray until large numbers of young nymphs emerge in spring. Apply this mixture to near the point of runoff to all above ground parts of the tree between green tip to commencement of flowering. DO NOT spray after flowering has commenced.
Peas (fresh and processing)	Redlegged earth mite (<i>Halotydeus destructor</i>) Blue oat mite (<i>Penthaleus major</i>)	All States	20-40mL/ha 40mL/ha	Not required when used as directed (harvest) 4 weeks (grazing)	DO NOT apply more than 1 bare earth application per crop. Apply as a broadcast ground rig application in a total water volume of 50-200L/ha. Apply to bare soil after conventional cultivation and sowing. Treat infested paddocks after sowing and before or soon after seedling emergence. For redlegged earth mite, use the higher rate on heavier infestations and for longer residual protection. Where possible, use in rotation with other chemicals approved for this purpose.

CROP	PEST	STATE	RATE	WHP	CRITICAL COMMENTS
Peppers (sweet/ capsicum and chilli), Eggplant	Silverleaf whitefly (<i>Bemisia tabaci</i>) Biotype B	All States	High Volume 24mL/100L or Low Volume 240mL/ha Plus wetter (at label rates)	1 day	Closely monitor adult whitefly numbers and apply control measures before adult populations reach high levels. DO NOT apply more than 2 applications of Nufarm Astral per crop. Good spray coverage is essential. For low volume spraying use a total spray volume of 500-800L/ha. Allow a minimum retreatment interval of 7 days between sprays. Apply using a calibrated boom sprayer, air-blast sprayer or similar equipment. DO NOT apply more than two (2) consecutive applications of insecticides that have the same Mode of Action (MoA) within and between seasons to avoid resistance.
	Two spotted mite (<i>Tetranychus urticae</i>) Greenhouse whitefly (<i>Trialeurodes vaporariorum</i>)	All States	16-24mL/100L	1 day	Apply before pest populations reach economic threshold levels. DO NOT apply more than 2 applications of Nufarm Astral per crop. Apply in sufficient volume of water to penetrate the plant canopy and evenly cover the plant surface. If conditions continue to favour mite development, a second application may be required 14-20 days later. Crop Safety: Because of the large number of pepper and eggplant varieties available, it is not possible to evaluate the crop safety of Nufarm Astral on all these varieties. Growers are strongly advised to check the crop safety of Nufarm Astral before applying to a pepper or eggplant variety on which they have not previously used the product.
Pineapples	Symphylids (<i>Hanseniella</i> spp.)	Qld only	Pre-plant 2L/ha	3 months (harvest)	DO NOT apply closer than 3 months before plant crop or ratoon crop harvest. Apply using high volume nozzles (such as the Quick Turbo Floodjet range QCTF-SS120 nozzle) at appropriate pressures and spray rig speeds to achieve a spray volume of 3000-6000L/ha. Pre-Plant Apply as a broadcast spray to the soil surface just prior to bedding up. Incorporate into the soil within 2 hours of application with a rotary hoe working to a depth of 15-20cm before bedding up. Post-Plant <u>Plant Crop:</u> Two to four months after initial pre-plant application, apply Nufarm Astral at 400mL/ha as a high volume foliar drench. Repeated foliar applications should be made at 2-4 month intervals up to 3 months prior to the plant crop harvest. <u>Ratoon Crop:</u> Repeated foliar applications should be made at 2-4 month intervals up to 3 months prior to the ratoon crop harvest.
			Post-plant 400mL/ha	6 weeks (grazing)	

CROP	PEST	STATE	RATE	WHP	CRITICAL COMMENTS
Poppies	Redlegged earth mite (<i>Halotydeus destructor</i>)	Tas. only	20-40mL/ha	Not required when used as directed	Apply as a broadcast ground rig application in a total water volume of 50-200L/ha or by air in a minimum total water volume of 20L/ha. Apply to bare soil after conventional cultivation and sowing or onto well grazed or sprayed pasture after direct drilling. Treat infested paddocks after sowing and before or soon after seedling emergence. Use the higher rate on heavier infestations and for longer residual protection. Nufarm Astral is compatible with some herbicides. See compatibility statement for details.
Sugarcane	Sugarcane wireworm (<i>Agrypnus</i> spp.) Symphylans (<i>Hanseniella</i> spp.)	Qld, NSW & WA only	150mL/ha* or 2.25mL/100m of row	Not required when used as directed	Apply as a spray into the furrow at planting. Use a spray nozzle which will deliver a coarse spray in a total volume of 60 – 100L/ha in a band 20 - 30cm wide over the base of the furrow on top of the setts and before covering soil is brought in by tynes. * The rate is based on single row cane with a 1.5m row spacing. If row spacing varies from 1.5m then apply at the use rate according to mL/100m of row.
Sweet potato	Wireworm (<i>Heteroderes</i> spp.)	Qld, NSW, SA, WA & NT only	2L/ha	Not required when used as directed	Apply as a soil surface spray in a total volume of 200 to 500L/ha in front of a rotary hoe working to a depth of 30cm prior to or during the bed forming process 1-5 days before planting. Summer Planted or Short Season Crops Nufarm Astral will provide up to 110 days protection from wireworm damage on red loam soils and up to 140 days protection from wireworm damage on sandy loam soils. If longer protection is required, additional measures may be required to protect the crop. Autumn Planted or Long Season Crops Nufarm Astral will provide up to 200 days protection from wireworm damage. If longer protection is required additional measures may be required to protect the crop.
	Sweet potato weevil (<i>Cylas formicarius</i>)		24mL/100L		Apply as a dilute application with a high volume boom spray, so that the crowns and runners in contact with the soil are sprayed to runoff. An application volume of 500L/ha (applied as a 25% band over the establishing plants) early in the life of the crop should be sequentially increased up to 2000L/ha to provide full cover when the crop is at full maturity. (This is equivalent to 200mL/sprayed m ² through the life of the crop.) Commence applications once sweet potato weevil are first found in the crop and repeat at monthly intervals until 4 weeks before crop maturity. Under heavy pest pressure more frequent applications (14 day intervals) may be required.

CROP	PEST	STATE	RATE	WHP	CRITICAL COMMENTS
Tomatoes	Native budworm (<i>Helicoverpa punctigera</i>) Corn earworm (<i>Helicoverpa armigera</i>) Two spotted mite (<i>Tetranychus urticae</i>) Tomato russet mite (<i>Aculops lycopersici</i>)	All States	High Volume 16-24mL/100L or Low Volume 240mL/ha	1 day	DO NOT use low volume ground or air application on trellis tomatoes. <u>Crop Monitoring Program</u> Helicoverpa spp: Apply as indicated by field checks. Applications should be timed to coincide with egg hatch and when small larvae up to 5mm are present. DO NOT apply this product to Helicoverpa (= Heliiothis) armigera larvae larger than 5mm in length. Mites: Applications against Helicoverpa spp will give good control of coincident mites, particularly when applied on low mite populations. If conditions continue to favour mite development, a second application may be required 14-20 days later. <u>Schedule Spray Program</u> If fields are not checked during pest infestation periods, apply on a 7-10 day alternating program with a non-pyrethroid insecticide. Use the higher rate (high volume application) and shorter interval when pest infestation is more severe and when increased residual protection is required. DO NOT apply this product to Helicoverpa armigera larvae larger than 5mm in length.
	Silverleaf whitefly (<i>Bemisia tabaci</i>) Biotype B	All States	High Volume 24-32mL/100L or Low Volume 240-320mL/ha	1 day	Apply as indicated by field checks before populations reach damaging levels. The higher rate should be used where moderate to high populations are present. When applying as a dilute spray use a minimum water volume of 500L/ha increasing to 1500L/ha as crops grow. Thorough coverage of all leaf surfaces is important to obtain good control. The adult stage of silverleaf whitefly should be targeted. DO NOT spray crops with a high population of the juvenile stages of silverleaf whitefly unless using with another insecticide that is effective against these stages. Use Nufarm Astral in rotation with insecticides from at least 2 other insecticide groups that are registered or permitted for use against silverleaf whitefly in tomatoes. DO NOT apply more than 2 applications of Nufarm Astral per crop. If an approved Resistance Management Strategy is in place for a particular area (eg. Silverleaf Whitefly in the Burdekin and Bowen Districts of central Queensland), this should be followed. Tank mixes of Nufarm Astral with Synergy® Insecticide Synergist may improve control of silverleaf whitefly.
	Whitefly (<i>Trialeurodes vaporariorum</i>)		12mL/100L water		Apply as indicated by pest incidence and repeat as necessary. Use a total spray volume of 2500L/ha.

NOT TO BE USED FOR ANY PURPOSE, OR IN ANY MANNER, CONTRARY TO THIS LABEL UNLESS AUTHORISED UNDER APPROPRIATE LEGISLATION.

GENERAL INSTRUCTIONS

Nufarm Astral Insecticide/Miticide is a contact and residual insecticide/miticide. It can be used as a protective treatment when applied at regular intervals or as a knockdown treatment to control existing pests. Best results are obtained when Nufarm Astral is applied before pest populations build up to damaging levels.

Precautions should be taken to minimise disturbance on the natural control system and predators such as the Silverleaf whitefly parasitoid wasp (*Eretmocerus*) where Integrated Pest Management (IPM) is not actively implemented, including:

- Avoid spraying in the morning if bees and beneficial insects are active; and
- Applying bifenthrin in the later stages of the crop development to allow predators and parasitoids to build-up and provide natural control.

Where IPM is actively implemented, this product is not suitable for use where mite or other insect predators or parasites are established and providing effective mite and other insect control.

APPLICATION

Nufarm Astral may be applied by either ground rig or aircraft. Thorough coverage is essential to ensure adequate control. **DO NOT** apply as a fog or mist.

Dilute Spraying:

- Use a sprayer designed to apply high volumes of water up to the point of run-off and matched to the crop being sprayed.
- Set up and operate the sprayer to achieve even coverage throughout the crop canopy. Apply sufficient water to cover the crop to the point of run-off. Avoid excessive run-off.
- The required water volume may be determined by applying different test volumes, using different settings on the sprayer, from industry guidelines or expert advice.
- Add the amount of product specified in the Directions for Use table for each 100L of water. Spray to the point of run-off.
- The required dilute spray volume will change, and the sprayer set up and operation may also need to be changed as the crop grows.

Concentrate Spraying:

- (a) Use a sprayer designed and set up for concentrate spraying (that is a sprayer which applies water volumes less than those required to reach the point of run-off) and matched to the crop being sprayed.
- (b) Set up and operate the sprayer to achieve even coverage throughout the crop canopy using your chosen water volume.
- (c) Determine an appropriate dilute spray volume (See Dilute Spraying above) for the crop canopy. This is needed to calculate the concentrate mixing rate.
- (d) The mixing rate for concentrate spraying can then be calculated in the following way:

Example only

1. Dilute spray volume as determined above: For example, 1000L/ha.
 2. Your chosen concentrate spray volume: For example, 500L/ha.
 3. The concentration factor in this example is: 2 X (i.e. $1000L \div 500L = 2$).
 4. If the dilute label rate is 50mL/100L, then the concentrate rate becomes 2 x 50, that is 100mL/100L of concentrate spray.
- (e) The chosen spray volume, amount of product per 100L of water, and the sprayer set up and operation may need to be changed as the crop grows.
 - (f) For further information on concentrate spraying, users are advised to consult relevant industry guidelines, undertake appropriate competency training and follow industry Best Practices.

Ground Application:

Applications should be made as a fine spray preferably using hollow cone nozzles and a droplet size of 150 to 200 microns. The application volume will depend on the type of crop to be treated. The following are suggested: Low volume broadcast applications to - e.g., cereals, canola, grain legumes, lucerne, poppies, subterranean clover: 50-200L/ha.

Low volume row crops applications to cotton, cucurbits, tomatoes, navy beans and for bare earth application to fresh and processing peas and beans: 50-200L/ha; To brassica, eggplant, peppers and for foliar application to fresh and processing beans: 500-800L/ha.

High volume applications to row crops - e.g., trellised tomatoes, cucurbits: 200 - 1500L/ha except as noted in critical comments. Use 200L/ha from transplanting increasing to 1500L/ha at maturity.

High volume directed spray:

Grapes: Apply by hand application, using a high-volume coarse spray of 500mL/vine. (e.g., at approx. 2500 vines/ha = 1250L/ha).

Foliar sprays to bananas: 300 to 500L/ha.

High volume application to stone fruit: 1000 to 2000L/ha.

Soil Applied Sprays:

High volume application

Bananas:

Stool treatment: Apply as a coarse spray at 500-750mL per stool.

Band treatment: Apply as a band application with a side delivery boom and offset nozzles - 1L of spray solution per stool.

Citrus: Apply as a high volume, directed spray to the ground under each tree. For optimum control apply to both sides of the tree. Total spray volume should be 5 to 10L/tree (e.g., at 250 trees/ha = 1250 to 2500L/ha).

In furrow applications:

Cotton & Sugarcane: Use a coarse spray: 60 to 100L/ha as a band over the seed or sett before covering with soil - refer to critical comments for details.

Aerial Application:

Use at least 20L/ha of total spray volume. Spray during the cooler parts of the day or night. To reduce possibility of drift avoid spraying in calm conditions or when wind is light and variable. Preferably, spray in a crosswind. Use suitable application equipment and/or nozzles to deliver a fine spray with a droplet size of 150 to 200 microns.

A spraydrift minimisation strategy should be employed at all times when aurally applying sprays to, or near, sensitive areas. The strategy envisaged is best exemplified by the cotton industry's Best Management Practice manual.

MONITORING

Post-emergence monitoring of Citrus leafeating weevil populations: At first sign of major beetle emergence in mid-October commence monitoring at 1 to 2 week intervals. Place polystyrene fruit box (330 x 480mm) under tree, shake branches vigorously, repeat on ten randomly selected trees throughout orchard. If 25 beetles or more are recorded in consecutive counts, treatment is required.

MIXING

Add the required quantity of Nufarm Astral to water in the spray tank and mix thoroughly. Maintain agitation during mixing and application.

SURFACTANTS

Nufarm Astral contains a surfactant. Additional surfactant may only be necessary on hard to wet plants and in high volume situations.

RESISTANCE MANAGEMENT

Apply in accordance with the SLW Resistance Management Strategy. Contact the State Department of Agriculture/Primary Industries for details. To avoid resistance build up, the product should be rotated with other approved insecticides from different Mode of Action (MoA) chemical groups for Silverleaf Whitefly control.

*** NOTICE ***

Helicoverpa (= *Heliothis*) *armigera* resistance in Northern NSW and Qld. To help contain pyrethroid resistance in *H. armigera*, the Summer Crop Insecticide strategy as developed by the Qld Department of Primary Industries and NSW Agriculture should be adhered to. Failure to observe the strategy may result in widespread resistance affecting the future viability of summer cropping.