CORROSIVE, ECOTOXIC
KEEP OUT OF REACH OF CHILDREN

CuSOL™

FUNGICIDE/ BACTERICIDE

Contains: 92.8 g/litre copper (Cu) present as copper ammonium acetate as a soluble concentrate

Liquid copper for disease control in various fruit, nut and vegetable crops

zelam
ZELAM LIMITED

PLEASE READ THE ENTIRE LABEL BEFORE MIXING OR USE.

HAZARD CLASSIFICATION; 6.1D, 8.2C, 8.3A, 6.5B, 6.9B, 9.1A, 9.3B

APPROVED HANDLER: This product must be under the control of an approved handler during use. See MSDS for details.

This product must not be used for any purpose or in any manner, contrary to this label, unless authorised under appropriate legislation.

RECORD KEEPING: Records of use must be kept under certain circumstances. See MSDS for details.

DANGER: This product is corrosive to the skin and eyes, it may cause skin burns and eye damage. Avoid skin or eye contact.

WARNING: May be harmful if swallowed, inhaled or absorbed through the skin. May cause skin sensitization from prolonged skin contact. Avoid skin contact. may cause organ damage from repeated oral exposure at high doses.

FIRST AID: If swallowed DO NOT induce vomiting. For advice contact the National Poisons Centre 0800 POISON (0800 764 766) or a doctor immediately. If skin or hair contact occurs, remove contaminated clothing and flush skin and hair with running water. DO NOT scrub the skin. If splashed in eyes, wash out immediately with water for at least 15 minutes. If inhaled move the victim to fresh air immediately. Begin artificial respiration if breathing has stopped.

PERSONAL PROTECTION: Avoid contact with skin or inhalation of spray mist. Gloves should be worn at all times. Wear eye protection when handling the concentrate. Ensure adequate ventilation when handling the concentrate. Remove protective clothing and wash hands and face thoroughly before meals and after work. Wash protective clothing daily after work. Do not eat, drink or smoke while using this product.

ECOTOXIC: Very toxic to fish/aquatic organisms with long lasting effects. Avoid contamination of any water supply with product or empty container. Toxic to terrestrial vertebrates.

STORAGE: Store in original container, tightly closed and in a dry, cool area away from foodstuffs, children and direct sunlight. Store in accordance with NZS 8409 Management of Agrichemicals. Avoid storing in conditions above 35 ^{0}C. Reseal partly used containers promptly to avoid loss of ammonia and the possible formation of crystals.

DISPOSAL: Triple rinse empty container and add rinsate to the spray tank. If recycling, discard cap and deliver clean container to an Agrecovery depot. Alternatively crush and bury in a suitable landfill. Dispose of product only by using according to the label, or at an approved landfill.

SPILLAGE: Wear appropriate protective clothing. Exclude all bystanders from the vicinity of the spill, and prevent material from entering waterways. Contain liquid spills and absorb with inert material and place in waste containers. Wash area with water and absorb with further inert material. Dispose of waste safely in an approved landfill.

MATERIAL SAFETY DATA SHEET: Additional information is listed in the MSDS available from Zelam Limited or www.zelam.com.
Approved pursuant to the HSNO Act 1996, No: HSR100606. See www.epa.govt.nz for approval conditions.
Registered pursuant to the ACVM Act 1997, No: P008532. See www.foodsafety.govt.nz for registration conditions.

GENERAL INFORMATION: CuSol is to be used as a preventative spray generally before or at the first sign of disease. As many diseases do not exhibit symptoms for some time after infection application should start well before symptom expression.

DO NOT apply when temperature is hot (above 35^{O}C).

DO NOT apply when poor drying conditions exist or if it is likely to rain before the spray is dry.

DO NOT apply to wet crops.

DO NOT apply to copper-shy crops or cultivars.

DO NOT mix with acidifying/buffering agents unless they are required to maintain the pH between 6 & 7. The stability and efficacy of CuSol is pH dependent (refer Mixing Instructions).

DO NOT mix with phosphate-based acidifiers or buffers.

NOTICE TO BUYER: The manufacturer and vendors of CuSol warrant the formulation to contain the specified active ingredient within accepted tolerance but make no warranty of any kind on the uses of material and accept no responsibility, whether the material is used in accordance with the label directions or not.

REGISTERED TO: Tapuae Partnership, Hudson Rd, New Plymouth, NZ

Tel: 06 755-9234 Fax: 06 755-1174

EMERGENCY PHONE: 0800 CHEMCALL 0800 243 6225

PLEASE READ THE ENTIRE LABEL BEFORE MIXING OR USE.

It is an offence to use this product on animals.

DIRECTIONS FOR USE: Vegetables

Use 500 ml/100 litres or 2.5 litres/ha unless specified under individual crops or diseases.

Apply CuSol as a dilute application using a minimum of 500 litres water/ha to thoroughly wet all plant surfaces. For low volume or aerial spraying where water rate is less than 500 litres/ha ensure the per hectare rates are used.

CROP	DISEASE	CRITICAL COMMENTS
BEANS	**Common blight** (*Xanthomonas camestris pv. phaseoli)*	Apply at the first sign of infection or as a preventative spray. Repeat every 7-14 days depending on the disease pressure. Spray immediately after heavy rains, hail or dust storms.
	Bacterial brown spot (*Pseudomonas syringae pv. syringae)*	Apply within 21 days of emergence and repeat every 10 - 14 days depending on the disease pressure.
	Chocolate spot (*Botrytis spp.)* **Rust** (*Uromyces spp.*)	Spray at the first sign of infection. Repeat every 10 - 14 days while conditions allow infection.
	Halo blight *(Pseudomonas syringae pv. phaseolicola)*	**Use 500 to 750 litres or 2.5 to 2.9 litres/ha.** Apply every 10 - 14 days from the time the crop is 15-30 cm high, while conditions allow infection. Use a higher rate when conditions are highly favourable for infection.
BRASSICAS Including: broccoli, Brussels sprouts, cabbage, cauliflower, Chinese cabbage, collards, kale, kohlrabi, mustard, rape, turnip.	**Downy mildew** *(Peronospora parasitica)* **Black rot** *(Xanthomonas campestris pv. campestris)* **Peppery leaf spot** *(Pseudomonas syringae pv. maculicola)* **Ring spot** *(Mycosphaerella brassicicola)*	Begin spraying from the seedling stage until maturity. Spray every 10 - 14 days depending on weather conditions and disease pressure. Do not use on copper sensitive varieties.
CAPSICUMS	**Bacterial spot** *(Xanthomonas campestris pv. vesicatoria)*	SEED BEDS: Apply every 7 days during wet weather. FIELD CROPS: Begin spraying at first sign of disease and repeat every 7 - 14 days depending on weather conditions and disease pressure. Use the shortest interval when conditions are highly favourable for infection.
CARROTS **PARSNIPS**	**Leaf spot** *(Septoria)*	Begin spraying at first sign of disease and repeat every 10 - 14 days depending on weather conditions and disease pressure.
CELERY	**Leaf spot** *(Septoria)* **Bacterial soft rot** *(Erwinia carotovora pv. carotovora)*	Spray every 7 - 14 days. Use the shortest interval when weather conditions favour disease (i.e cool and wet weather).
CURCURBITS Including: cucumbers, melons, pumpkins, squash, watermelon, zucchini	**Downy Mildew** *(Pseudoperonos pora cubensis)* **Powdery mildew** *(Uncinula necator)*	**USE 400 ml/100 litres or 2.5 litres/ha** Spray at early vining stage or when infestation is expected. Only use as a preventative spray. After the disease has established itself a systemic fungicide must be used. Do not spray when plants are under stress i.e hot conditions.
	Angular leaf spot (Pseudomonas syringae pv. Lachrymans) **Bacterial leaf spot** *(Xanthomonas campestris pv. cucurbitae)*	Spray of first sign of disease and repeat every 7 to 10 days.
LETTUCE	**Downy mildew** *(Bremia lactucae)* **Bacterial leaf spot** *(Xanthomonas campestris pv. vitians)* **Anthracnose** *(Microdochium panattonianum)*	**Use 300 ml/100 litres or maximum of 1.0 litre/ha.** Begin spraying at first sign of disease and repeat every 7-10 days depending on weather conditions and disease pressure. This product predisposes lettuce to frost damage. Lettuce should not be treated with this product if frosts are likely since crop damage may occur. Do not use on copper sensitive varieties.
ONIONS	**Downy mildew** *(Peronospora destructor)*	Begin spraying at first sign of disease and repeat every 10 - 14 days depending on weather conditions and disease pressure.
PEAS	**Ascochyta blight** *(Ascochyta spp.)* **Bacterial blight** *(Pseudomonas syringae pv. pisi)*	Begin spraying at first sign of disease and repeat every 10 - 14 days depending on weather conditions and disease pressure.
POTATOES	**Early Blight** (Target spot) *(Alternaria solani)*	Apply from crop emergence to maturity at 7 - 10 day intervals while conditions favour development of this disease. Depending on plant size, apply in high enough water volume to ensure good coverage. Ensure that both upper and lower surfaces are treated. **For late blight add mancozeb (75%) at 200 g/litres or 1kg/ha.**
	Late blight (Irish blight) *(Phytophthora infestans)*	
	Early and late blight - Arial application	**Always use 2.5 litres/ha** Apply in 40 litres of water in a preventative program. Commence application at the 5 leaf stage and repeat at 7 - 10 day intervals.
RED BEET	**Downy mildew** (Peronospora farinosa) **Rust** (Uromyces betae)	Apply every 10 - 14 days, from the seedling stage until maturity, while conditions allow infection.
RHUBARB	**Crown rot** *(Phytophthora spp.)* .	Dip rhubarb crowns before planting.
	Downy mildew *(Peronospora jaapiana)*	Spray at 14 day intervals, from the seedling stage until maturity, while conditions allow infection.
SILVER BEET	**Downy mildew** *(Peronospora farinosa)*	Begin spraying from the seedling stage until maturity and repeat every 10 - 14 days depending on weather conditions and disease pressure. Do not use on copper sensitive varieties.
SPINACH	**Downy mildew** *(Peronospora farinosa)*	Begin spraying at first sign of disease and repeat every 10 - 14 days depending on weather conditions and disease pressure.
TOMATOES	**Bacterial spot** *(Xanthomonas campestris)* **Bacterial speck** *(Pseudomonas syringae)* **Bacterial canker** *(Clavibacter michiganensis)*	Apply as a preventative spray at 7 - 10 day intervals. Depending on plant size, apply spray at a high enough volume to ensure good coverage. Ensure that both the upper and lower surfaces are treated. The shortest interval should be used when conditions are very favourable for infection, ie during wet weather and when inoculum levels are high. Thses applications will reduce the spread of bacterial canker but they will not control seed or soil borne infection.
	Early blight *(Target spot)* *(Alternaria solani)* **Septoria leaf spot** *(Septoria spp.)*	Start application shortly after transplant when plants are 15 cm high and before symptoms appear. Apply every 7 - 10 days depending on weather condition favourable for development of the disease. Depending on plant size, apply spray at a high enough volume to ensure good coverage. Ensure that both the upper and lower surfaces are treated. The shortest interval should be used when condition are highly favourable for infection, ie during wet weather and when inoculum levels are high.
	Late blight *(Irish blight)* *(Phytophthora infestans)*	Begin spraying at first sign of disease and repeat every 10 - 14 days.
TOMATO SEEDLINGS	**Bacterial speck** *(Pseudomonas syringae pv. tomato)*	Spray seedlings at weekly intervals with a hollow cone spray. Ensure that both the upper and lower surfaces are treated.

DIRECTIONS FOR USE: Ornamentals

All uses are for dilute application in water.

DISEASE	RATE	CRITICAL COMMENTS
Bacterial leaf spot	500 ml/100 litres	Begin spraying at first sign of disease and repeat every 7 - 10 days depending on weather conditions and disease pressure. Do not use on copper sensitive varieties. Small scale evaluations consisting of 2 sprays at a 14 day interval should be applied first to test for phytotoxicity.
Downy mildew	750 ml/100 litres	
Algae	500 ml/100 litres	Apply at first sign of algae.

DIRECTIONS FOR USE: Fruit Vine and Nut Crops

Always consult your approved spray programme for your crop. If in doubt with any of the recommendations contact your horticultural advisor.

AVOCADOS, CITRUS, KIWIFRUIT, LYCHEES, PEACHES, NECTARINES, PLUMS, PASSIONFRUIT and MACADAMIAS: *PHYTOPHTHORA* STEM CANKER

Use 250 ml/litre water or water based paint as a stem of vine application. Mix to a smooth consistency. Apply only to stems or vines wherever cankers appear, after removing dead tissue. Repeat appllications up to a maximum of 5 per season until natural healing has commenced. Application with paint carrier may only require 1 or 2 treatments in a season.

All rates are given for dilute application. For concentrate spraying adjust dilution rate accordingly.

CROP	DISEASE	RATE	CRITICAL COMMENTS
APPLES	**Black spot** (scab) *(Venturia inaequalis)*	500 ml/100 litres water Minimum 7 litres/ha	Apply at green tip. Apply as a dilute or concentrate spray. Do not use a concentration factor greater than 2. ***NOTE:*** Crop injury (russetting) may occur from late application. Discontinue use when green tip on the earliest developing buds reaches 1 cm. Before applying to recently introduced varieties, ascertain their tolerance to copper sprays first.
PEARS	**Black spot** (scab) *(Venturia pirina)*		
AVOCADOS	**Anthracnose** *(Colletotrichum gloeosporioides)* **Cercospora spot** *(Pseudocercospora purpurea)* **Sooty Blotch** *(Akaropeltopsis sp.)*	500 ml/100 litres water For large trees do not apply more than 18.6 litres/ha	Spray every four weeks from the end of flowering to harvest. During extended wet weather spray every 14 days. Start spraying during low infestation and preferably as a last spray in a spray program.
APRICOTS	**Shot hole** *(Wilsonomyces carpophilus)* **Freckle** *(Venturia carpophila)*	500 ml/100 litres water Minimum 7 litres/ha	Spray at bud swell prior to earliest signs of leaf/bud movement. Spray at least one post harvest application.
	Bacterial gummosis *(Pseudomonas syringae)*	625 ml/100 litres water	*Autumn:* Apply at 25 - 50% leaf fall. Apply again at 90 - 100% leaf fall. Winter: Apply in mid-winter
		500 ml/100 litres water	*Spring:* Apply at first sign of bud movement. Repeat application 7 - 10 days later
		325 ml/100 litres water	Apply 1 week after petal fall. Repeat application 7 - 10 days later. These sprays control the high leaf population of the bacteria in mid to late spring.
CHERRIES	**Shot hole** *(Wilsonomyces carpophilus)*	500 ml/100 litres water Minimum 7 litres/ha	Spray when buds are swelling but before or within one week of bud opening.
	Bacterial gummosis *(Pseudomonas syringae*	625 ml/100 litres water	*Autumn:* Apply at 25 - 50% leaf fall. Apply again at 90 - 100% leaf fall. *Winter:* Apply in mid-winter *Spring:* Apply at first sign of bud movement. Repeat application 7 - 10 days later.
		325 ml/100 litres water	Apply 1 week after petal fall. Repeat application 7 - 10 days later. These sprays control the high leaf population of the bacteria in mid to late spring.
NECTARINES, PEACHES	**Shot hole** *(Wilsonomyces carpophilus)*	500 ml/100 litres water Minimum 7 litres/ha	Spray when buds are swelling but before or within one week of bud opening.
	Leaf curl *(Taphrina deformans)*	500 ml/100 litres water Minimum 7 litres/ha	CORRECT TIMING IS CRITICAL FOR EFFECTIVE CONTROL. Spray when buds are swelling but before or within one week of bud opening. For a given variety, the time of bud opening will vary from year to year, depending on the weather, and in any year, it will vary between varieties. Thus, the bud development of each variety in the orchard should be monitored each year to determine the correct time of application. Blocks containing more than one variety may need to be treated more than once, to treat each variety at the correct time. Where leaf curl is or is likely to be a severe problem based on previous experience, the following program should be followed: 1. *Autumn* - apply at leaf fall. 2. Apply at the first sign of bud swell and repeat one week later.
PLUMS	**Shot hole** *(Wilsonomyces carpophilus)*	500 ml/100 litres water Minimum 7 litres/ha	Spray when buds are swelling but before or within one week of bud opening.
CITRUS	**Melanose verrucosis**	500 - 750 ml/100 litres water. Minimum 5.6 litres/ha *plus* 300 - 600 ml/ha extender adjuvant.	Apply at petal fall. Apply the higher rate in coastal districts.
LYCHEES	**Parasitic algae** *(Cephaleuros virescens)*	1 litre/100 litres water plus 300 - 600 ml/ha extender adjuvant	Spray affected trunk and limbs until until runoff occurs. Apply monthly during the wet season.
	Lychee pepper spot (Colletotrichum gloeosporioides)	500 ml/100 litres water	Spray every 4 weeks from the end of flowering to harvest. During extended wet weather, spray every 14 days.
STRAW-BERRIES	**Leaf spot** *(Mycosphaerella fragariae)* **Grey mould** *(Botrytis cinerea)*	500 ml/100 litres water or 2.5 litres/ha	Spray when plants are established and repeat every 7 - 10 days throughout the season. Discontinue application if signs of phytotoxicity appear (reddening of leaf veins or new growth inhibition). Early in the season, alternating with other approved fungicides will assist in reducing the development of grey mould.
GRAPES Wine and table grapes	**Downy mildew** *(Plasmopara vitcola)* **Powdery mildew** *(Uncinula necator)*	500 ml/100 litres water. Minimum 3.6 litres/ha Under high disease pressure use 4.6 litres/ha	Apply when shoots are 10 cm long and repeat at 10 - 14 day intervals or as necessary while weather conditions favour infection. Addition of a low rate of sulphur may be necessary when fruit is present under high Powdery Mildew disease pressure. Leaf damage may occur on copper sensitive varieties.
NUTS	**Leaf curl** *(Taphrina deformans*	500 ml/100 litres water Minimum 7 litres/ha	CORRECT TIMING IS CRITICAL FOR EFFECTIVE CONTROL. Spray when buds are swelling but before or within one week of bud opening. For a given variety, the time of bud opening will vary from year to year, depending on the weather, and in any year, it will vary between varieties. Thus, the bud development of each variety in the orchard should be monitored each year to determine the correct time of application. Blocks containing more than one variety may need to be treated more than once, to treat each variety at the correct time. Where leaf curl is or is likely to be a severe problem based on previous experience, the following program should be followed: 1. Autumn - apply at leaf fall. 2. Apply at the first sign of bud swell and repeat one week later.
MACADAMIAS	**Husk spot** *(Pseudocercospora sp.)*	500 ml/100 litres water	Good spray penetration of foliage is essential. Apply from nut set late September - December. Apply at least 3 sprays at 3 - 4 week intervals.
WALUTS	**Walnut blight** *(Xanthomonas campestris pv. juglandis)*	750 ml/100 litres water plus Flextend or similar	Spray a minimum of three sprays at 7 - 10 day intervals, commencing when the catkins are partially opened. Further sprays may be necessary if conditions allow infection.

MIXING
Fill the spray tank to three quarters of the required volume of water. Add any tank-mix products to the spray tank first and check pH. The stability and efficacy of CuSol is pH dependent.
DO NOT apply in a spray solution having a pH of less than 6.0 as phytotoxicity may occur.
If pH is greater than 7.0, adjust to pH 6 to 7 with a suitable buffer/acidifier. DO NOT use with phosphate buffer/acidifier.
Slowly pour CuSol into the spray tank, with the agitation system running. Thoroughly mix and top-up to the required volume with water. Formation of an aquagel is normal, but will not clog nozzles.

IMPORTANT
It is essential that CuSol be kept agitated throughout the entire mixing and spraying operation. CuSol must be applied within one hour of the product being diluted with water, therefore mix only the amount that can be used. All containers containing the concentrated product must be sealed properly once opened to prevent the loss of ammonia and the possible formation of crystals.

ADJUVANTS
The addition of an extending agent is recommended, especially when applying CuSol to Brassicas, faba beans, peas and onions, irrespective of the method of application. Use of oils and wetting agents is not recommended as these may enhance uptake of copper and increase phytotoxicity.

APPLICATION
CuSol is a non-systemic/preventative fungicides/ bactericide and the application should aim to thoroughly cover all plant surfaces. DO NOT apply in water volumes resulting in application rates of less than 2.5 litres/ha unless otherwise specified.Continuous agitation of the spray solution is necessary or setting of the aquagel may occur. Good by-pass agitation is adequate.

COMPATIBILITY
CuSol is compatible with a wide range of commonly used fungicides, insecticides and miticides. Mixtures with more than one of the above products are not recommended. Such mixtures may be ineffective or may cause crop damage. CuSol may NOT be compatible with some foliar fertilizers (primarily because of pH) and a test should be conducted before use. CuSol should not be mixed with Ca-EDTA, or fungicides containing carbendazim.

RESISTANCE MANAGEMENT **GROUP M1 FUNGICIDE**
CuSol contains a multi site contact activity mode of action fungicide. Disease control may be reduced if strains of pathogens less sensitive to CuSol and related inorganic products develop. To minimise this risk use strictly in accordance with the label instructions. Apply CuSol preventatively or as early as possible in the disease cycle.