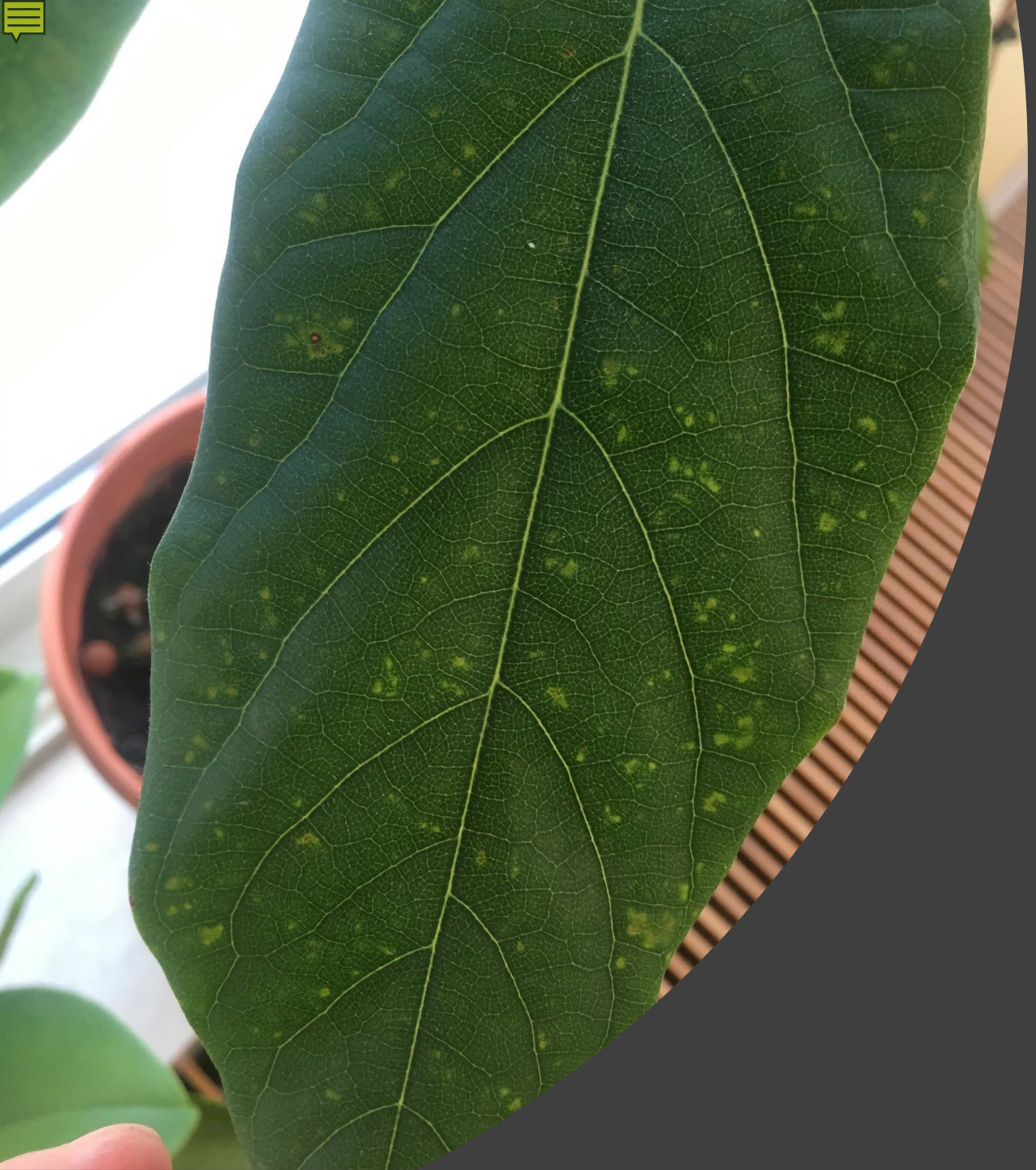
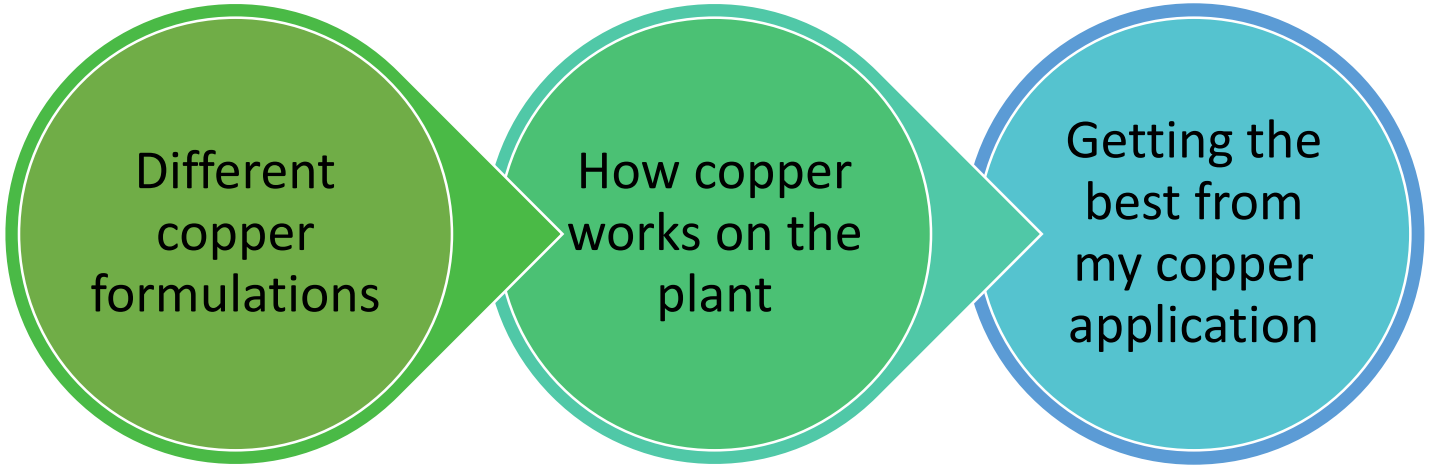


Choosing The Right Copper For The Right Reasons

Topics For Discussion



Different Types of Copper

Fixed copper

Copper is suspended in water

- Copper hydroxide (ChampION, Kocide opti)
- Tri base copper sulphate (TriBase Blue)
- Copper oxide (Nordox)

- Slower reacting
- Less likely to cause phytotoxicity
- Used for plant protection against fungal and bacterial diseases

Available copper

Copper is dissolve in water

- Copper sulphate heptahydrate
- Copper chelate

- Fast reacting
- More likely to cause phytotoxicity
- Use for plant nutrition

Different Types of Copper

Fixed copper

Copper is suspended in water

- Copper hydroxide (ChampION, Kocide opti)
- Tri base copper sulphate (Tri Base Blue)
- Copper oxide (Nordox)

- Slower reacting
- Less likely to cause phytotoxicity
- Used for plant protection against fungal and bacterial diseases

How Does Copper Work On The Plant

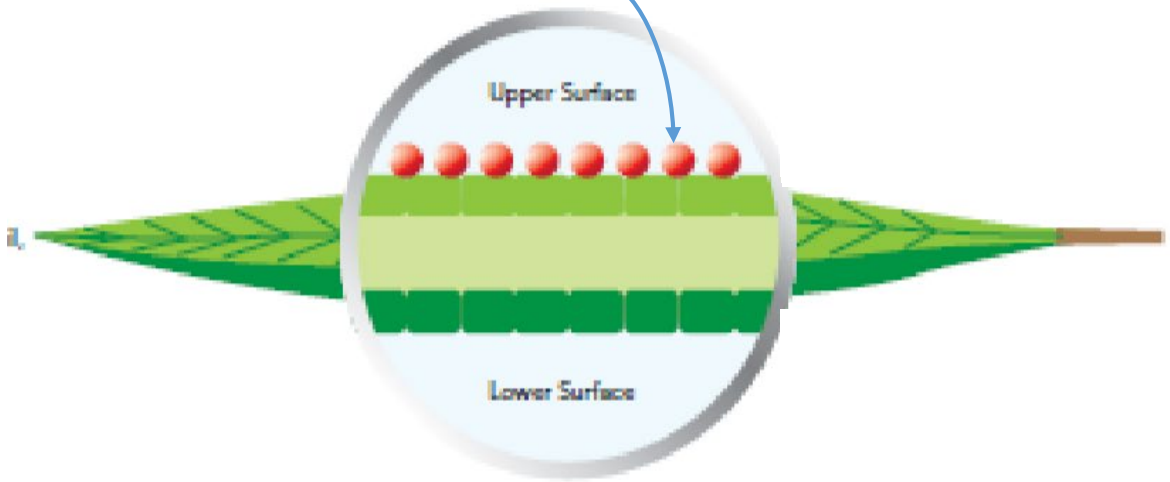
Mixing Copper

- When copper particles are added to water, they are held in suspension
- Agitation is important

Spraying Copper

Copper particles attached to plant surface

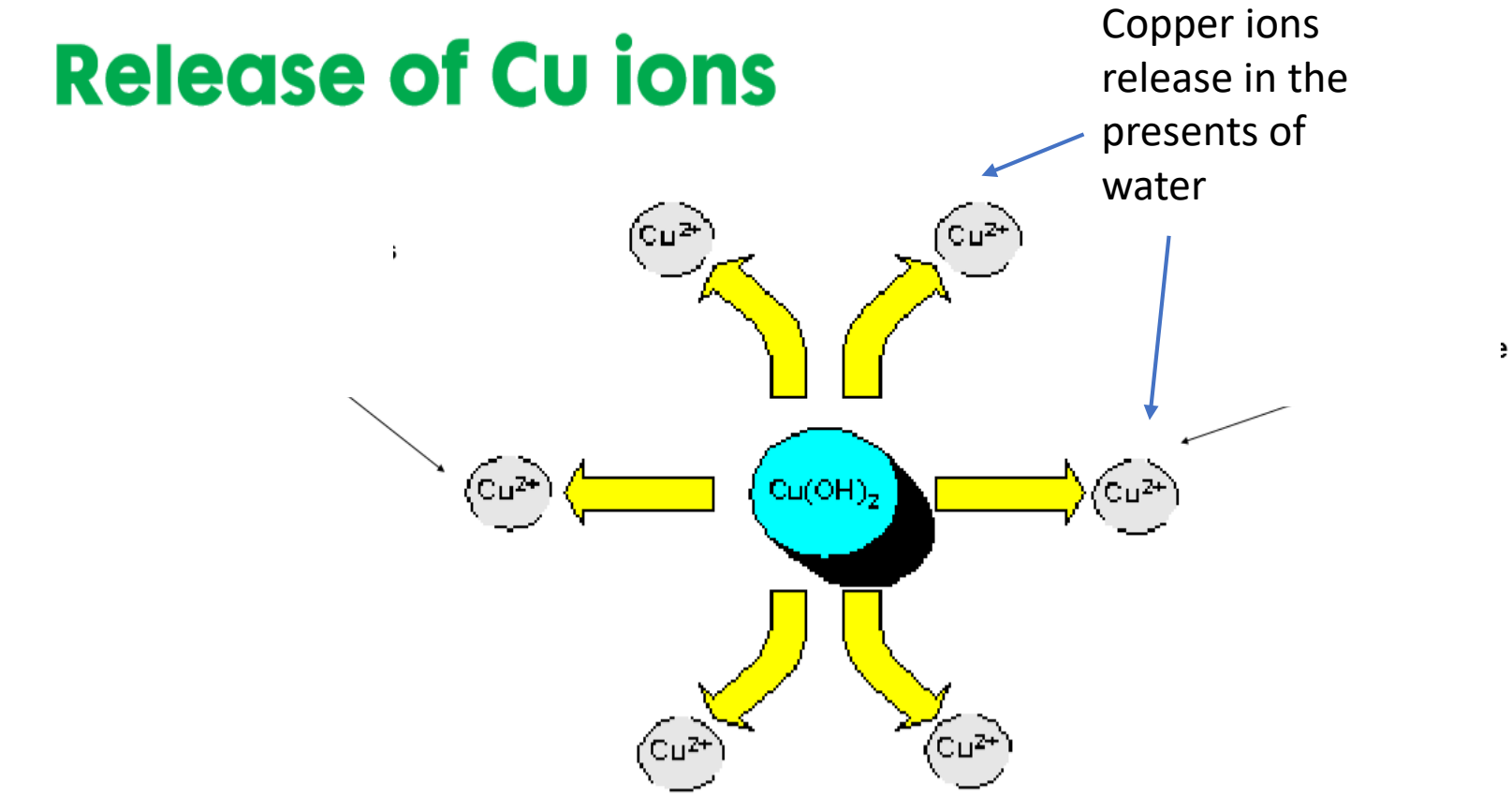
Surface Protection

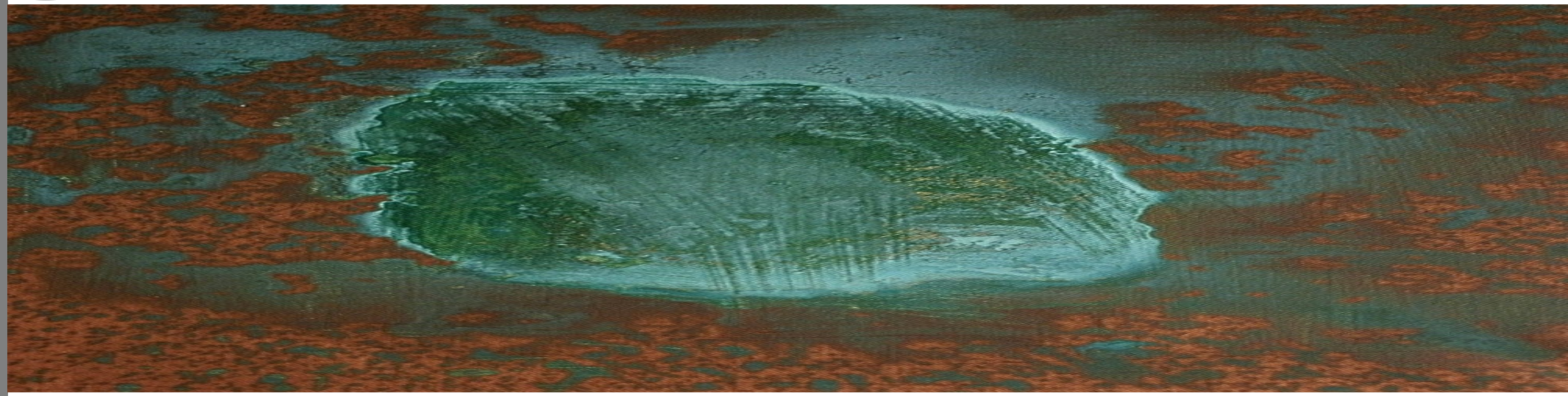


Coverage is essential on all target areas

Release of Cu ions

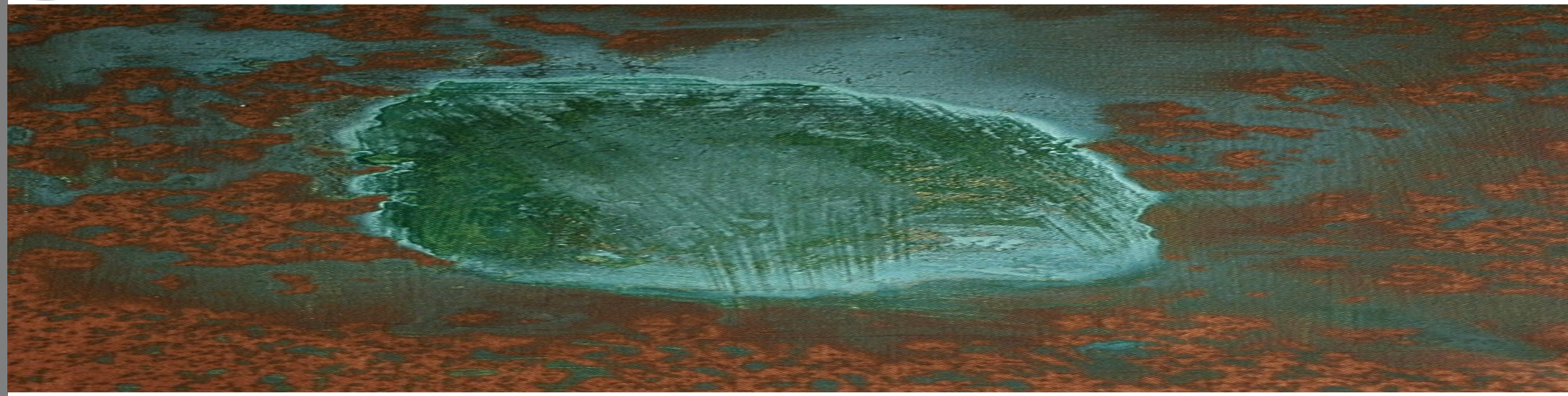
Oxidation of Copper





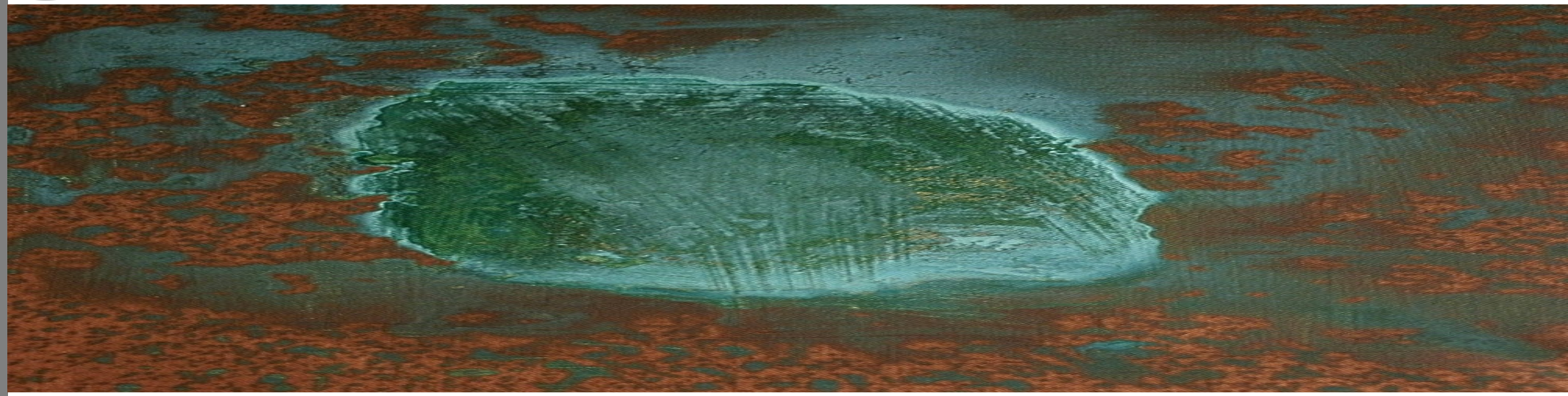
Oxidation of Copper

Fast oxidation		Slow oxidation
• Quicker to provide a protective cover	⟷	• Slower to provide a protective cover
• Less time active on the plant	⟷	• Longer active time on the plant
• More likely to cause phytotoxicity	⟷	• Less likely to cause phytotoxicity



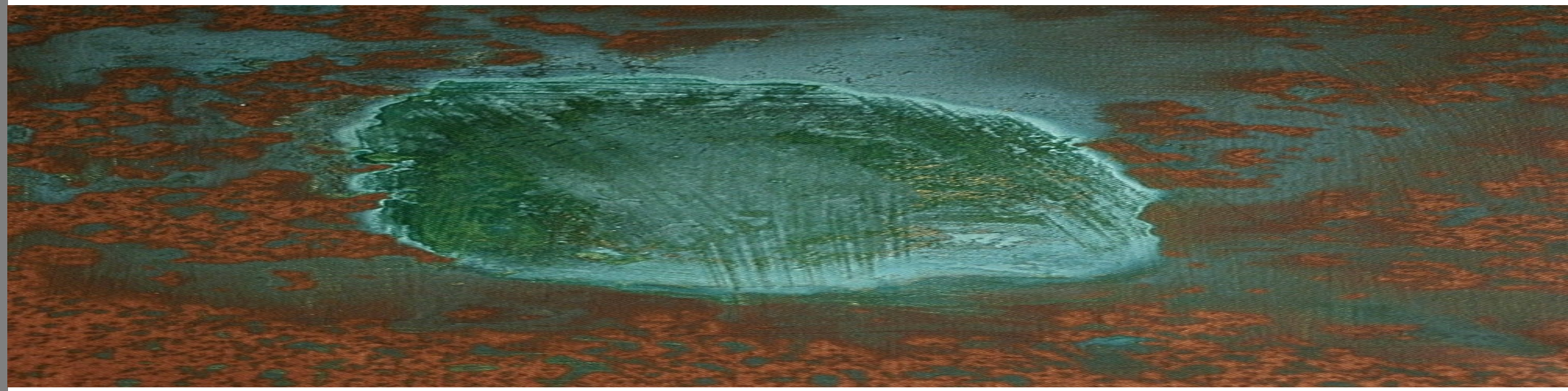
Factor To Consider About Oxidation

- Water Availability
- Particle Size
- Ph
- Copper Formulation



Water Availability

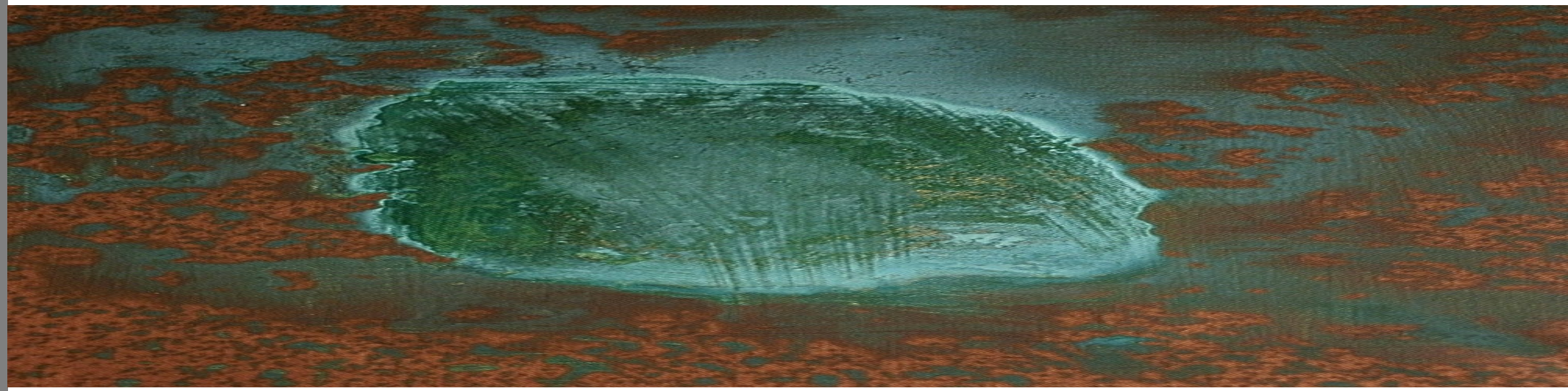
Water is required for oxidation.
Rain or high humidity will increase the rate of oxidation



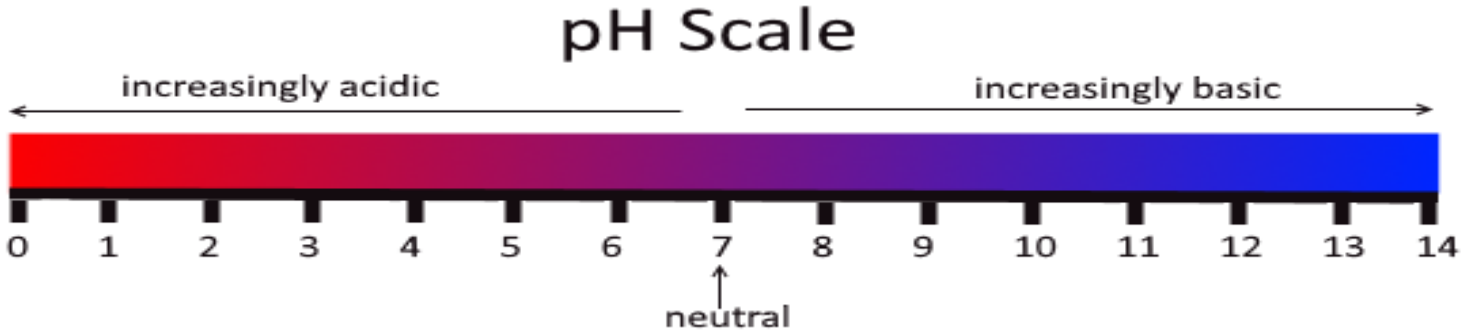
Particle Size

Smaller particles = more surface area.
More surface area = faster oxidation

Kocide Opti	2.5 micron
ChampION	1.2 micro
Tribase Blue	0.7 micron

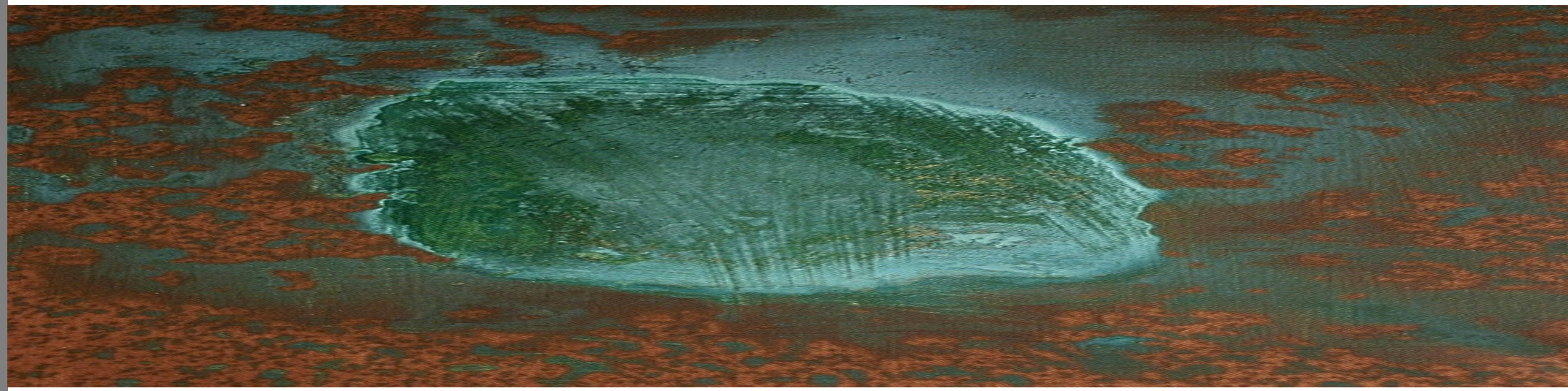


Water Availability



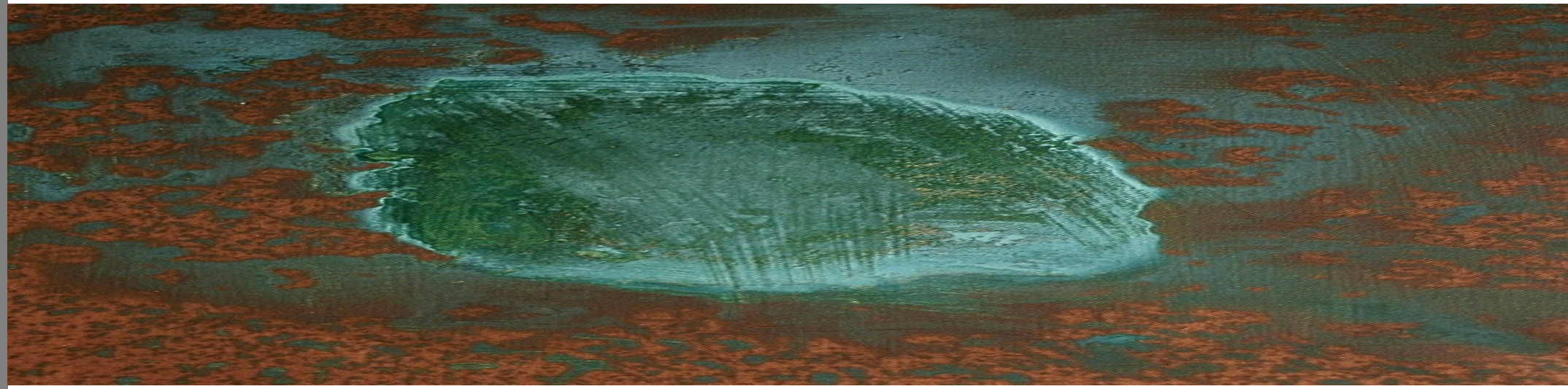
Water pH is important to consider

- At a pH of >7 copper will oxidise slowly.
- At a pH of < 6.5 will oxidise faster



Copper Formulation

- Copper Hydroxide – Easy to oxidise
- Tri-base Copper Sulphate – Easy to oxidise
- Copper Oxides - Slow to oxidase

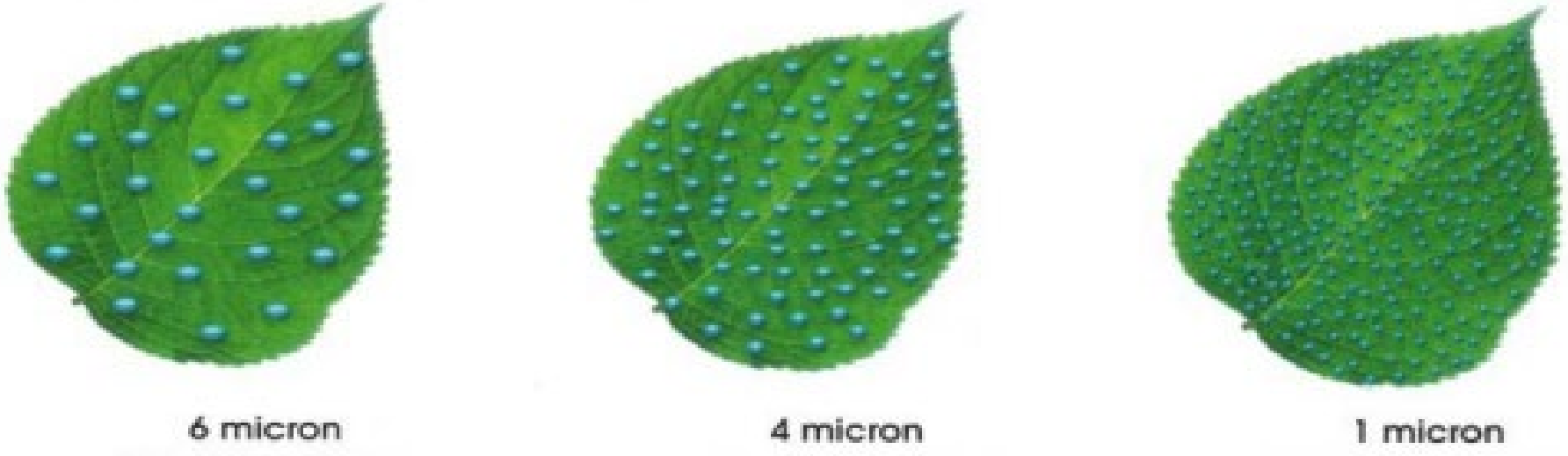


Getting the best from my copper application

- Oxidation rate
- Coverage
- Appling at label rate

Leaf coverage improves with smaller particles of copper fungicide

Number of Particles per gram of Product



Coverage is increased with smaller particle size

Kocide Opti	2.5 micron
ChampION	1.2 micron
Nordox	1 micron
Tribase Blue	0.7 micron

Apply at the recommended label rate

CROP	DISEASE	RATE g/100litres	APPLICATION RATE AND TIMING
Apples	Black spot	110 (minimum 2.2 kg/ha)	Apply as a full cover spray. Make application between silver-tip and green-tip. CAUTION: Late application may cause phytotoxicity. Discontinue use when green-tip is 1 cm.
Asparagus	Stemphylium leaf spot	250 – 375 (minimum 2.5 kg/ha)	Commence spraying at first appearance of disease after closing up and repeat at 14 day intervals. Ensure good plant coverage. Under high disease pressure a programme of up to six applications may be necessary.
Avocado	Anthracnose	70 – 90 (minimum 2.0 kg/ha)	Apply at monthly intervals from flowering to harvest. Use the higher rate when conditions favour disease. During prolonged wet weather, reduce application intervals to 14 days.
Beans	Bacterial blight (Halo and common)	250 – 310 (minimum of 1.36 kg/ha)	Apply as a protective spray at 7 - 14 day intervals when plants are 15 cm high.
Bushfruit Cane	Cane Wilt, Cane Spot, Spur Blight, Leaf Spot	70 – 90 (minimum 0.65 kg/ha)	Apply at bud burst and green tip and as a seasonal spray at 10-14 day intervals. Use the higher rate early season or under high disease pressure.
Celery	Septoria Leaf Spot	90 (minimum 0.44 kg/ha)	Apply as soon as the plants are set in the field, then at 5 - 7 day intervals depending on disease severity and environmental conditions. Sunspray® may be added at 1 litre per 100 litres of spray mix.
Citrus	Melanose, Verrucosis	45 – 90 (minimum 1.75 kg/ha for mature trees)	Apply during pre and post bloom periods.
	Brown Rot	90 – 110 (minimum 1.75 kg/ha for mature trees)	Apply in the autumn and continue as needed. Apply to skirts of trees to a height of at least 1 metre. Apply also to bare ground 0.5 metres beyond skirt. Use higher rates when conditions favour disease. Copper marking may occur on sensitive varieties or under slow drying conditions.
Cucurbits	Angular Leaf Spot. Downy Mildew	70 – 130 (minimum 0.65 kg/ha)	Apply at 7 day intervals after plants have started to vine.
Feijoas	Leaf Spot (Glomerella sphaceloma)	70 – 90 (minimum 1.0 kg/ha)	Repeat as necessary.