Simply. Grow. Together.

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Mastercop® PRODUCT GUIDE







Maximum Control, Minimum Environmental Impact

A Different Copper

- 100% water soluble copper with instant release of copper ions for faster activity
- Smaller copper particles = better coverage, subcuticular activity, rainfastness, and retention of copper on plant
- Copper is more than 90% immediately bio-available, allowing maximum disease control with lower rates, less phytotoxicity, and less environmental impact
- Mastercop performs well under hardwater conditions up to 600 ppm, unlike many traditional coppers
- Mastercop solubility and copper lon release is pH independent, preventing the release of excessive amounts of copper ions that could lead to phyto

What is BioRetain[™]?

BioRetain[™] is a next-generation formulation technology that delivers a smaller copper particle size. This means better spray coverage with uniform & quick distribution of copper metallic ions as well as an improved uptake system, including enhanced leaf adhesion, penetration, bio-availability, and retention within the leaf cuticle. With broad-spectrum protection and multi-site activity, it is ideal for Integrated Pest Management programs.



Mastercop offers similar disease control with at least 5X less metallic copper leading to less environmental impact compared to competition.



In June 2017, The Environmental Protection Agency released a Copper Compounds Proposed Interim Registration Review to reduce the total amount of metallic copper applied to certain crops in the US.

Proposed new copper loads per acre are meant to protect plants and aquatic organisms that come in contact with runoff water. Here's what the EPA says:

"To address these risks, the following mandatory labeling requirements for copper compound applications with the objective of reducing total exposure to aquatic organisms to the extent possible are proposed.

The Agency proposes that labels be updated to reflect changes in maximum **annual** application rates in terms of lbs metallic Cu/A for the following agricultural use sites."

CROPS	PREVIOUS MAX ANNUAL LOAD/ACRE	PROPOSED ANNUAL MAX LOAD/ACRE
Hazelnut	24 lb/A	18 lb/A
Pecan	8.4 lb/A	6.3 lb/A
Walnut	32 lb/A	24 lb/A
Cucurbit	6 lb/A	5 lb/A
Onion	6 lb/A	5 lb/A
Pepper	12 lb/A	8.69 lb/A
Strawberry	8.19 lb/A	6 lb/A
Tobacco	8 lb/A	4 lb/A

For apples and pears, the Agency proposes that labels be updated to reflect changes in maximum **single** application usage rates in terms of lbs metallic Cu/A from 8 lbs/A to 6 lbs/A.



1) What is Mastercop?

Mastercop is a 100% soluble, liquid copper sulfate pentahydrate fungicide/bactericide for use in citrus, vegetables, tree crops, small fruits, vines & field crops. It is the only true copper solution with BioRetain[™] technology.

2. What is BioRetain?

Next generation formulation technology that delivers efficient use of copper particles to the plant. It permits more bio-available copper to penetrate the cuticle and adhere to the plant's surface.

3) What is Mastercop active ingredient?

Copper Sulfate Pentahydrate

4) What is the % Metallic Copper Equivalent (MCE) of Mastercop? 5.4%

5) What are the benefits of Mastercop?

- 100% soluble means no settling in the jug
- BioRetain delivers excellent bioactivity & performance
- Less elemental copper won't load your soil with toxic metal levels
- No blue stained fruit or foliage
- OMRI Listed [®] so you can use one product for both organic and conventional acreage
- Less nozzle/spray equipment wear
- Better tank mix partner

6. What is the benefit of smaller particle size of Mastercop?

The smaller the particle size, the greater the number of particles per gram, thus a larger surface area for better coverage and more effective fungicidal or bacterial activity.

7. How soluble is Mastercop compared to traditional coppers?

Most copper fungicide spray solutions are actually a suspension of copper particles that persist on plant surfaces after the spray dries. Then the copper ions are re-activated every time they come into contact with moisture on the leaf. This limited solubility is meant to avoid phytotoxicity. Mastercop is 100% soluble in water, resulting in the immediate release of effective copper ions without the risk of phyto.



8. Why is pH important?

If the pH of water used in spray solutions with most copper products is below 7.0, the solubility of copper increases and more copper ions are released, which can lead to phytotoxicity. Because it's already 100% soluble in water, Mastercop is pH independent. Copper ions are immediately bio-available, without the risk of damage to fruit & foliage.

9. Is Mastercop appropriate for organic use?

Yes! Mastercop was recently OMRI Listed®.

10. What is the effect of water hardness on copper fungicide performance?

Poor water quality can adversely influence many traditional copper products by reducing solubility, thereby decreasing performance. Mastercop performs well under hardwater conditions up to 600 ppm.

11. What is the PPE requirement for MC?

Protective eyewear, long-sleeve shirt, long pants, chemical resistant gloves, shoes plus socks.

12. Does Mastercop have better leaf retention/absorption vs. the competition?

Yes! BioRetain's novel uptake system enhances leaf adhesion, penetration, retention and bio-availability while providing superior safety to the crop.

13. What kind of residual activity does Mastercop offer?

On average, Mastercop offers 7 days of residual control, while offering quick knockdown of diseases with less phytotoxicity risk and no staining compared to traditional coppers.

14. What products should I avoid in a tank mix with Mastercop?

Mastercop is compatible with most of the pesticides present in the market; do not mix with fenvalerate, parathion, phosetyl-al (Aliette[®]), chlorpyrifos or dichloran. Do not tank mix Mastercop with Fireline[™] 17 WP.

Tomatoes



CROPS	DISEASE	SEASON	USE RATES IN PINTS PER ACRE	MAXIMUM APPLICATION RATE (PINTS PER ACRE)	MAXIMUM ANNUAL RATE (PINTS PER ACRE)	MINIMUM RETREATMENT INTERVAL	USE NOTES
Tomato	Anthracnose, Bacterial Speck, Bacterial Spot, Early Blight Gray Leaf Mold, Late Blight, Septoria Leaf Spot	Growing season	0.5 -3.0	3.0	40.0	3 days	Begin applications when disease first threatens and repeat at 5 to 10 day intervals or as needed depending on disease severity. Use the higher rates when conditions favor disease.

Phytotoxicity on Tomato Plants - GLC Consulting, Quitman, GA-2012



Alternaria in Tomatoes - Yuba City, CA 2011



Tomatoes

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Tomato Yield (Ibs/plot) - Paynesville, MN 2013



Efficacy of Mastercop for Early Blight Control on Tomato - Paynesville, MN 2013



Grapes



CROPS	DISEASE	SEASON	USE RATES IN PINTS PER ACRE	MAXIMUM APPLICATION RATE (PINTS PER ACRE)	MAXIMUM ANNUAL RATE (PINTS PER ACRE)	MINIMUM RETREATMENT INTERVAL	USE NOTES
Grapes	Black Rot*, Downy Mildew, Phomopsis*	Bloom, Growing Season	1.0-3.0	3.0	30.0	3 days	Begin applications at bud break with subsequent applications throughout the season depending on disease severity. Use the higher rates when conditions favor disease.
	Powdery Mildew	Fall, Late Dormant	2.0-3.0				NOTE: Foliage injury may occur on copper sensitive varieties such as Concord, Delaware, Niagara and Rosette.

*Not for use in CA

Powdery Mildew On Grapes - Dr. W. Douglas Gubler, UC Davis - 2011



Cucurbits



CROPS	DISEASE	SEASON	USE RATES IN PINTS PER ACRE	MAXIMUM APPLICATION RATE (PINTS PER ACRE)	MAXIMUM ANNUAL RATE (PINTS PER ACRE)	MINIMUM RETREATMENT INTERVAL	USE NOTES
Cucurbits (Cantaloupe, Cucumber, Honeydew, Muskmelon, Pumpkin, Squash, Watermelon)	Alternaria Leaf Spot, Angular Leaf Spot, Anthracnose, Downy Mildew, Gummy Stem Blight*, Powdery Mildew, Watermelon Bacterial Fruit Blotch (suppression)	Growing season	0.5-1.0	1.0	15.0	5 days	Begin applications prior to disease development and continue while conditions are favorable for disease development. Repeat at 5 to 7 day intervals or as needed. Use the higher rates when conditions favor disease. NOTE: Crop injury may occur from application at higher rates and shorter intervals. Discontinue use if injury occurs.

*Not for use in CA

Downy Mildew in Cucumber - Barr, New York 2011





CROPS	DISEASE	SEASON	USE RATES IN PINTS PER ACRE	MAXIMUM APPLICATION RATE (PINTS PER ACRE)	MAXIMUM ANNUAL RATE (PINTS PER ACRE)	MINIMUM RETREATMENT INTERVAL	USE NOTES
Strawberry	Angular Leaf Spot (Xanthomonas) Leaf Blight*, Leaf Scorch*, Leaf Spot	Growing Season	0.5 -1.0	1.0	22.0	7 days	Begin application when plants are established and continue on a weekly schedule throughout the season. Apply in at least 20 gallons of water. Use the higher rates when conditions favor disease.
							NOTE: Discontinue applications if signs of crop injury appear.

*Not for use in CA





CROPS	DISEASE	SEASON	USE RATES IN PINTS PER ACRE	MAXIMUM APPLICATION RATE (PINTS PER ACRE)	MAXIMUM ANNUAL RATE (PINTS PER ACRE)	MINIMUM RETREATMENT INTERVAL	USE NOTES
Pepper	Anthracnose*, Bacterial Spot, Cercospora Leaf Spot	Growing season	0.5-3.0	3.0	30.0	3 days	Begin applications when conditions first favor disease development and repeat at 7 to 10 day intervals or as needed depending on disease severity. Use the higher rates when conditions favor disease.

*Not for use in CA

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Bacterial Spot In Pepper - Dr. Roberts, UFL, 2012







Carrots

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CROPS	DISEASE	SEASON	USE RATES IN PINTS PER ACRE	MAXIMUM APPLICATION RATE (PINTS PER ACRE)	MAXIMUM ANNUAL RATE (PINTS PER ACRE)	MINIMUM RETREATMENT INTERVAL	USE NOTES
Carrot	Alternaria Leaf Spot, Cercospora Leaf Spot	Growing Season	0.5-1.5	1.5	15.0	7 days	Begin applications when disease first threatens and repeat at 7 to 14 day intervals or as needed depending on disease severity.



Walnuts



CROPS	DISEASE	SEASON	USE RATES IN PINTS PER ACRE	MAXIMUM APPLICATION RATE (PINTS PER ACRE)	MAXIMUM ANNUAL RATE (PINTS PER ACRE)	MINIMUM RETREATMENT INTERVAL	USE NOTES
Walnuts	Walnut Blight	Early Season	3.0-6.0	6.0	30.0	7 days	Apply first spray at early prebloom prior to or when catkins are partially expanded. Make additional applications during bloom and early nutlet stage or as needed when frequent rainfall or extended periods of moisture occur. Thorough coverage of catkins, leaves, and nutlets is essential for effective control. NOTE: Adequate control may not be obtained when copper tolerant species of <i>Xanthomonas</i> bacteria are present.



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Onions



CROPS	DISEASE	SEASON	USE RATES IN PINTS PER ACRE	MAXIMUM APPLICATION RATE (PINTS PER ACRE)	MAXIMUM ANNUAL RATE (PINTS PER ACRE)	MINIMUM RETREATMENT INTERVAL	USE NOTES
Onion, Garlic	Bacterial Blight, Downy Mildew, Purple Blotch*	Growing Season	0.5 -1.5	1.5	15.0	7 days	Begin when plants are 4 to 6 inches high and repeat at 7 to 10 day intervals or as needed depending on disease severity. Can cause phytotoxicity to leaves.

*Not for use in CA





% INFECTION 8 DA

% INFECTION 15 DA

Citrus



CROPS	DISEASE	SEASON	USE RATES IN PINTS PER ACRE	MAXIMUM APPLICATION RATE (PINTS PER ACRE)	MAXIMUM ANNUAL RATE (PINTS PER ACRE)	MINIMUM RETREATMENT INTERVAL	USE NOTES
Citrus: Grapefruit, Kumquat, Lemon, Lime, Oranges, Pummelo, Tangelo, Tangerine	Citrus Canker (Suppression)	Growing season	1.0 -3.0	3.0	51.0	7 days	Spray flushes 7 to 14 days after shoots begin to grow. Young fruit may require an additional application. Number and timing of applications will be dependent upon disease pressure. Under heavy pressure, each flush of new growth should be sprayed.
	Algal Spot*, Melanose*, Scab*	Early Season	1.5 -5.0	5.0		14 days	Apply as pre-bloom and post bloom sprays. Use higher rates when conditions favor disease.
	Alternaria Brown Rot	Early Season	1.5 - 3.5	3.5		14 days	On susceptible varieties, apply when the first spring flush appears and each following flush. Application to fruit should start after 2/3 of the petals have fallen and be repeated on a 21 day schedule or as needed. Use the higher rates when conditions favor disease.
	Greasy Spot, Pink Pitting	Growing Season	0.5 -2.5	2.5		14 days	Apply in summer on expanded new flush. Repeat on subsequent flushes where disease pressure is severe. Use the higher rates when conditions favor disease.

*Not for use in CA

Canker on Valencia Oranges - Ag Consulting, Groveland, FL 2013



Potatoes



CROPS	DISEASE	SEASON	USE RATES IN PINTS PER ACRE	MAXIMUM APPLICATION RATE (PINTS PER ACRE)	MAXIMUM ANNUAL RATE (PINTS PER ACRE)	MINIMUM RETREATMENT INTERVAL	USE NOTES
Potato*	Early Blight, Late Blight	Growing Season	0.5 -1.5	1.5	22.0	5 days	Apply 0.5 to 1.5 pints at 7 to 10 day intervals or as needed starting when plants are 2 to 6 inches high in locations where disease is light. Apply up to 1.5 pints per acre when disease is more severe. Under conditions of severe disease, control with Mastercop will be improved by tank mixing with other compatible fungicides registered for use on potatoes. Read and follow all label instructions of tank mix partners.

*Not for use in CA

Blight in Potatoes - University of Wisconsin, 2011



Apples



CROPS	DISEASE	SEASON	USE RATES IN PINTS PER ACRE	MAXIMUM APPLICATION RATE (PINTS PER ACRE)	MAXIMUM ANNUAL RATE (PINTS PER ACRE)	MINIMUM RETREATMENT INTERVAL	USE NOTES
Apple	Anthracnose, Blossom Blast, European Canker	Fall	4.0-6.0	6.0	15.0	7 days	Apply before fall rains. Use the higher rates when conditions favor disease.
	(Nectria)* Shoot Blast (Pseudomonas)*						NOTE: Use on yellow varieties may cause discoloration. To avoid discoloration pick before spraying.
	Apple Scab, Fire Blight	Fall, Late Dormant	3.0-6.0	6.0	-	Only 1 application per season permitted	Make application between silvertip and green tip. Apply as a full cover spray for early season disease suppression.
			injury may occur fror application. After gre reaches 1/2 inch, use	NOTE: Moderate to severe cro injury may occur from late application. After green tip reaches 1/2 inch, use only on varieties not prone to fruit			
					_	acidifying sur buffered phos Do not apply just prior to p	russeting. Do not tank mix wi acidifying surfactants or non- buffered phosphite fungicides Do not apply Mastercop just prior to predicted frosts.
	Apple Scab	Growing Season	0.5 -1.5	1.5		5 days	Extended spray schedule where fruit finish is not a concern: Continued applications may be made at to 7 day intervals or as neede
	Fire Blight	Growing Season	0.5 -1.5	1.5		5 days	between ó inch green-tip an first cover spray. The addition of spray oil may enhance coverage of the wood in dormant sprays.
							NOTE: Moderate to severe cro injury may result from this extended spray schedule depending on variety. Caution should be taken on varieties prone to fruit russetting.

Apples



CROPS	DISEASE	SEASON	USE RATES IN PINTS PER ACRE	MAXIMUM APPLICATION RATE (PINTS PER ACRE)	MAXIMUM ANNUAL RATE (PINTS PER ACRE)	MINIMUM RETREATMENT INTERVAL	USE NOTES
Apple	Collar Rot*, Crown Rot*	Dormant Spring /Fall	1.5	1.5	15.0	30 days	Mix in 100 gallons of water. Apply 4 gallons of suspension as a drench on the lower trunk area of each tree. Apply in early spring or in fall after harvest for best results. Do not apply to foliage or fruit. NOTE: Do not use if soil pH is below 5.5 since copper toxicity may result.

*Not for use in CA

Phytotoxicity in Apples (In Season) - New York, 2011



Apple Scab Control (Dormant) - VA Tech, Virginia - 2012





ADAMA has partnered with Rabo AgriFinance to offer growers competitive financing options.

Rabo AgriFinance supports leading agricultural producers and agribusinesses in the United States, using industry expertise, client focused solutions and by creating long-term business relationships. Rabo AgriFinance representatives add value by offering a wide array of financial services and knowledge to help customers realize their ambitions. Rabo AgriFinance is a division of Rabobank, the premier lender to the global agriculture industry and one of the world's largest and safest banks.

Program Overview

FINANCING PROGRAM					
**Program Terms	Eligible Products				
0% APR	Tier One Brands: Acephate, Apollo, Armor, Bravo, Cormoran, Cotoran,Diamond, Diazinon, Fulfill, Incognito, Mastercop, NIMITZ, Pruvin, Pummel, Torment, Trigard, Vulcan				
Prime	All other ADAMA products				

* The application must be approved and invoices submitted for payment by the above deadline dates to receive the corresponding interest rate. ** Prime shall be the rate of interest described as the prime rate of leading financial institutions as published from time to time in "The Wall Street Journal-Midwest Edition"

- Application Dates*: Oct. 1, 2017 to Aug. 31, 2018
- All loans are due Dec. 31, 2018
- Minimum purchase of \$10,000
- Line of credit from Rabo AgriFinance is exclusive for financing your ADAMA purchases
- Easy and convenient credit with rapid approval for qualified applicants

To Apply

Apply online at grower.raboag.com for quick, accurate and convenient processing

• Applications can also be obtained through your ADAMA retailer or Rabo AgriFinance Customer Service at 888-395-8505

Follow these simple steps

- For any questions or assistance, including credit limit increase requests,contact Rabo AgriFinance
- Rabo AgriFinance
 6919 Chancellor Drive
 Cedar Falls, IA 50613 or
 Phone: 888-395-8505
 Fax: 866-349-3139
 Email: QuickLink@raboag.com
- You will be contacted by Rabo AgriFinance once your completed application is received
- Subject to Rabo AgriFinance approval and merchant participation. Minimum purchase may be required











Simply.

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Our customers are central to everything we do. We recognize the complexities within agriculture and your business. Our singular focus is to create simplicity, never settling for the status quo. For you, this means we will always strive to deliver our solutions, our services and ourselves as simply as possible. This is what drives us.

Grow.

We understand that our growth and our customers' growth go hand-inhand. We are not interested in the quick return or win-lose relationships. Through our no-nonsense approach – as individuals and as ADAMA – we strive for mutual, sustainable growth and development wherever we invest ourselves. This is what our people and our customers can expect from us.

Together.

At ADAMA, we seek always to listen, to understand and to evolve with our customers. We recognize that in isolation, we can only be partially successful. That is why, when developing a new product or service, we work together with peers and customers. This collaboration ensures our solutions create value for all.

Simply. Grow. Together.





For additional product information call 866-406-6262 or visit adama.com

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