Re: EPA - assistance needed in understanding copper importance in organic ag.

James Jay Farrar

Wed 12/21/2016 1:26 PM

1_week

To:English, LisaRenee <English.LisaRenee@epa.gov>;

Cc:Tindall, Kelly <tindall.kelly@epa.gov>; Chism, William <Chism.Bill@epa.gov>; Matt Enrico Baur <mebaur@ucanr.edu>; Amanda Crump <acrump@ucanr.edu>; Julius.fajardo@ars.usda.gov <Julius.fajardo@ars.usda.gov>;

2 attachments (165 KB)

EPA copper questions.docx; Copper 2014.xlsx;

Hi LisaRenee-

My answers to your questions are in the attached word document. The excel spreadsheet is copper uses in agriculture in California in 2014. The rows in the spreadsheet are summaries by crop and specific copper compound.

Let me know when the conference call is in January. I have some other meetings scheduled Jan 9-12 but will do my best to attend.

Best wishes - Jim

Jim Farrar, Director
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jjfarrar@ucanr.edu

From: "English, LisaRenee" <English.LisaRenee@epa.gov>
Date: Tuesday, December 13, 2016 at 10:49 AM
To: James Jay Farrar <jjfarrar@ucanr.edu>
Cc: "Tindall, Kelly" <tindall.kelly@epa.gov>, "Chism, William" <Chism.Bill@epa.gov>
Subject: RE: EPA - assistance needed in understanding copper importance in organic ag.

Good afternoon Jim,

Thanks for agreeing to work with OPP. I'm trying to get the copper team together for an organic production meeting, but it's a big team and it takes a while. In fact, it looks like we are going to have to wait until after the holidays before everyone is available. Right now I'm shooting for the week of Jan. 9th - and Jan. 12th. Would you have time during this week to meet?

Here's the questions that we would like to focus on. I realize that some of them may be outside your expertise, so please don't spend time on them. It's our hope that we will have two or folks on the conference call, somewhat like a panel discussion. If you think of any other info that might help us, please include it in our discussion.

1. Which organic production crops are most dependent on copper? Please explain.
2. What are the primary target pests of copper? Please explain.
3. What are the alternatives to copper for organic production?
4. What are the advantages and disadvantages of copper for organic crop production relative to the alternatives? Please explain.
5. Are there regions of the country that are more dependent on copper for organic crop production than others? Please explain.
6. What would be the possible economic impact if growers did not have copper.

I'm in the office this week, but will leave Dec. 21st and won't return until after the new year. If you need to contact me between those dates, please use my Gmail account
Lisarenee.english@gmail.com

Warmest Regards,
-LisaRenee

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From: James Jay Farrar [mailto:jjfarrar@ucanr.edu]
Sent: Wednesday, December 07, 2016 6:38 PM
To: English, LisaRenee <English.LisaRenee@epa.gov>
Subject: Re: EPA - assistance needed in understanding copper importance in organic ag.

Hi LisaRenee-

Yes, I am happy to help. Thanks for reaching out. I need to check on some background information before our call so that I can give you good data. Can we talk at 10 am PST on Dec 15th or anytime after 8 am PST on the 16th?

Best wishes - Jim

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From: "English, LisaRenee" <English.LisaRenee@epa.gov>
Date: Wednesday, December 7, 2016 at 11:03 AM
To: James Jay Farrar <jjfarrar@ucanr.edu>
Subject: EPA - assistance needed in understanding copper importance in organic ag.

Hello Dr. Farrar,

I'm a biologist at the EPA (in Office of Pesticides Program [OPP]) working on the reregistration of copper. OPP is aware that copper is important for organic growers since there are few alternatives available for pest management. Unfortunately, we have little data to help us understand just how important it may be. A colleague at the USDA suggested that you might be able to help with some of the specifics, such as, how copper is used, what crops are most dependent on it, what alternatives would growers turn to in lieu of copper, how might loss of copper affect economics of organic production, and anything else you feel may be important to know about copper usage.

If you could volunteer some time to assist OPP in this matter, we would greatly appreciate it. Please let me know if you can assist OPP and if so, when a telephone conversation would fit into your schedule.

If you would like to talk to me about this, please give me a call (or email). I usually leave work around 2:00 PM (PT zone). I look forward to our potential upcoming conversation.

Warmest Regards,
-LisaRenee

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Importance of copper-based pesticides in organic production (and conventional)

Jim Farrar, Director, University of California Integrated Pest Management Program

1. Which organic production crops are most dependent on copper? Please explain.

Many organic and conventional crops are heavily dependent on copper-based pesticides to control bacterial diseases.

Organic and conventional rice production relies on copper for control of tadpole shrimp.

Organic and conventional citrus production depends on copper for control of brown rot caused by Phytophthora species.

Some organic crops are dependent on coppers for control of downy mildew.

Specifically for organic production, pears, spinach, walnuts, citrus, almond, grapes, and olives are very dependent on copper-based pesticides.

The table below identifies the 12 largest uses of copper-based pesticides by pounds of chemical (active ingredient) applied in California in 2014. Pesticide use data was obtained from the 2014 Pesticide Use Report produced by California Department of Pesticide Regulation. (A spreadsheet of the copper use summary data is appended.) Acres of crop production was obtained from the 2015 (2014 Season) California Agricultural Statistics Review.

Crop	Lbs Copper Products	Production Acres
Rice	1,401,507	431,000
Walnut	1,098,825	290,000
Citrus (grapefruit, lemon, lime, orange, tangelo, tangerine)	691,080	267,800
Grapes (raisin, table, wine)	603,455	865,000
Almonds	443,385	1,020,000
Soft Stone Fruits (apricot, cherry, nectarine, peach, plum, prune)	312,271	173,500
Olives	111,969	37,000
Onion	51,482	7,000
Tomatoes	31,290	292,000
Pear	10,977	11,100
Spinach	7,500	26,500
Peppers	5,070	22,000

What are the primary target pests of copper? Please explain.
The primary target pests for copper-based pesticides are tadpole shrimp in rice; bacterial diseases of numerous crops (walnut blight, fireblight of pears and apples, olive knot, bacterial spot of almond and soft stone fruits, bacterial speck of tomatoes, bacterial spot of peppers, bacterial leaf blight of carrots); downy mildews on spinach and onion; leaf curl on soft stone fruits; summer bunch rot of grapes; Phytophthora brown rot of citrus; and scab on almonds.

UC IPM Resources for additional information on pests, losses and management options.
Rice, Tadpole Shrimp, http://ipm.ucanr.edu/PMG/r682500111.html
Walnut, Walnut Blight, http://ipm.ucanr.edu/PMG/r881100111.html
Pear, Fireblight, http://ipm.ucanr.edu/PMG/r603100211.html
Olive, Olive Knot, http://ipm.ucanr.edu/PMG/r583100411.html
Almond, Bacterial Spot, http://ipm.ucanr.edu/EXOTIC/bacterialspot.html
Tomato, Bacterial Speck, http://ipm.ucanr.edu/PMG/r783101611.html
Pepper, Bacterial Spot, http://ipm.ucanr.edu/PMG/r604100311.html
Carrot, Bacterial Leaf Blight, http://ipm.ucanr.edu/PMG/r102100811.html
Spinach, Downy Mildew, http://ipm.ucanr.edu/PMG/r732100111.html
Onion, Downy Mildew, http://ipm.ucanr.edu/PMG/r584100111.html
Peach, Leaf Curl, http://ipm.ucanr.edu/PMG/r602100311.html
Grape, Summer Bunch Rot, http://ipm.ucanr.edu/PMG/r302100211.html
Citrus, Brown Rot, http://ipm.ucanr.edu/PMG/r107100711.html
Almond, Scab, http://ipm.ucanr.edu/PMG/r3100411.html

What are the alternatives to copper for organic production?
What are the advantages and disadvantages of copper for organic crop production relative to the alternatives? Please explain.

Alternatives to copper-based pesticides for organic production are cultural control methods and biological pesticides. The advantages of copper are low cost and moderate efficacy as compared to higher costs and low-moderate efficacy for many of the biologicals. The disadvantages are phytotoxicity to some crops and the potential accumulation of copper, especially in the soils of repeatedly treated perennial crops. Growers also employ crop rotation, disking in crop residue, seed treatment with hot water, and irrigation management to achieve additional incremental disease management benefits.

In conventional production, copper-based products are often mixed with mancozeb to improve efficacy. Alternatives to copper-based pesticides for bacterial diseases in conventional production are streptomycin, oxytetracycline and kasugamycin for a limited number of crop/pest combinations; systemic acquired resistance products; and biological pesticides. Growers have relied heavily on coppers due to limited antibiotic registrations and lower efficacy of SAR and biologicals. This has resulted in copper resistance in many bacterial diseases and, in some cases, resistance to copper-mancozeb as well.

Alternatives for tadpole shrimp in rice are carbaryl and lambda-cyhalothrin.

Alternatives for downy mildews, Phytophthora brown rot of citrus, summer bunch rot of grapes, leaf curl on soft stone fruits, and scab on almonds are synthetic fungicides. The advantages of copper are low cost and moderate to good efficacy. The disadvantages are potential phytotoxicity in some crops at some times of the year.

Are there regions of the country that are more dependent on copper for organic crop production than others? Please explain.

In California dependence on copper is primarily related to crop / pest / environment interaction.

In pear and walnut production, copper is used during bloom to protect flowers from bacterial diseases during periods of wet weather.

In olives, the primary infective period for olive knot is during wet weather in the winter.

In citrus, copper is used to protect ripening fruit lower on the tree from rain-splashed Phytophthora spores during fall and winter rains.

In spinach and onions, the foliage is susceptible to downy mildew during extended periods of leaf wetness often associated with fog.

For tomatoes and peppers, the transplants need to be protected from bacterial diseases in the greenhouse and if there is wet weather the first few weeks after planting in the field.

For almonds and the soft stone fruits, the important periods for copper applications are during winter dormancy and during wet weather in the spring.

What would be the possible economic impact if growers did not have copper.
If growers did not have copper-based pesticides the potential losses would be significant. Depending on the crop it could range from complete crop failure to significant yield loss and quality reduction.

Fireblight of pears begins as a blossom infection but can move back into the woody tissue of the tree resulting in scaffold and whole tree death.

Walnut blight infections of blossoms results in reduced nut set or stained nut shells which reduce both yield and quality.

Olive knot causes girdling of twigs and branches resulting in twig dieback and fewer fruits. Without copper, significant yield reductions would occur, especially in modern hedgerow orchards of mechanically harvested olives for oil.

Almonds and the soft stone fruits would suffer significant losses to scab and leaf curl indirectly from reduced photosynthetic area of leaves and directly from scab lesions on fruit.

A small percent incidence of downy mildew of spinach can result in total loss and plow down of a field. Downy mildew lesions on leaves are not permitted in fresh spinach and cannot be economically sorted out during washing and bagging.

Downy mildew of onions reduces bulb size by reducing photosynthetic area of the leaves.

Bacterial speck of tomato and bacterial spot of pepper reduce the photosynthetic area of seedlings, thereby slowing growth of the plant.

YEAR	SITE_NAME	CHEMICAL_NAME	SUM_LBS_CHEMICAL	SUM_AMT_TREATED	UNIT_TREATED
2014	ALFALFA (FORAGE - FODDER) (ALFALFA HAY)	COPPER SULFATE (PENTAHYDRATE)	222.75	15.00	A
2014	ALMOND	COPPER	53.00	48.00	A
2014	ALMOND	COPPER HYDROXIDE	204005.11	118712.42	A
2014	ALMOND	COPPER HYDROXIDE	0.48	8.00	U
2014	ALMOND	COPPER OCTANOATE	121.53	145.75	A
2014	ALMOND	COPPER OXIDE (OUS)	54438.90	10746.49	A
2014	ALMOND	COPPER OXYCHLORIDE	8561.12	7287.60	A
2014	ALMOND	COPPER SULFATE (BASIC)	174076.50	40207.45	A
2014	ALMOND	COPPER SULFATE (PENTAHYDRATE)	2128.52	1851.00	A
2014	APPLE	COPPER AMMONIUM COMPLEX	1.44	24.00	U
2014	APPLE	COPPER AMMONIUM COMPLEX	0.49	0.50	A
2014	APPLE	COPPER HYDROXIDE	3337.13	1043.68	A
2014	APPLE	COPPER HYDROXIDE	2.44	44.00	U
2014	APPLE	COPPER HYDROXIDE	0.06	7600.00	S
2014	APPLE	COPPER OCTANOATE	5.55	9.50	A
2014	APPLE	COPPER OXIDE (OUS)	263.59	78.70	A
2014	APPLE	COPPER OXYCHLORIDE	234.58	425.90	A
2014	APPLE	COPPER OXYCHLORIDE	0.07	7600.00	S
2014	APPLE	COPPER SULFATE (BASIC)	41.27	3.25	A
2014	APRICOT	COPPER AMMONIUM COMPLEX	0.30	9.00	U
2014	APRICOT	COPPER HYDROXIDE	11274.42	4182.52	A
2014	APRICOT	COPPER HYDROXIDE	0.07	6.00	U
2014	APRICOT	COPPER HYDROXIDE	0.01	1500.00	S
2014	APRICOT	COPPER OXIDE (OUS)	3874.48	910.71	A
2014	APRICOT	COPPER OXYCHLORIDE	99.52	73.07	A
2014	APRICOT	COPPER OXYCHLORIDE	0.01	1500.00	S
2014	APRICOT	COPPER SULFATE (BASIC)	2628.30	466.50	A
2014	APRICOT	COPPER SULFATE (PENTAHYDRATE)	673.20	68.00	A
2014	AQUATIC AREAS, WATER AREAS (ALL OR UNSPEC)	COPPER ETHANOLAMINE COMPLEXE	774.14	326.25	A
2014	AQUATIC AREAS, WATER AREAS (ALL OR UNSPEC)	COPPER ETHYLENEDIAMINE COMPL	99.92	13.00	A
2014	AQUATIC AREAS, WATER AREAS (ALL OR UNSPEC)	COPPER SULFATE (PENTAHYDRATE)	5024.63	980.90	A
2014	AQUATIC AREAS, WATER AREAS (ALL OR UNSPEC)	COPPER SULFATE (PENTAHYDRATE)	24.75	1.00	U
2014	AVOCADO (ALL OR UNSPEC)	COPPER DIAMMONIUM DIACETATE	13.14	100.00	S
2014	AVOCADO (ALL OR UNSPEC)	COPPER DIAMMONIUM DIACETATE	13.14	1.00	U
2014	AVOCADO (ALL OR UNSPEC)	COPPER HYDROXIDE	329.01	101.96	A
2014	AVOCADO (ALL OR UNSPEC)	COPPER HYDROXIDE	0.01	700.00	S
2014	AVOCADO (ALL OR UNSPEC)	COPPER OXYCHLORIDE	0.01	700.00	S

2014	AVOCADO (ALL OR UNSPEC)	COPPER SULFATE (BASIC)	33.02	295000.00	U
2014	BASIL (BUSH, GARDEN, SWEET)	COPPER OCTANOATE	0.58	0.60	A
2014	BEANS (ALL OR UNSPEC)	COPPER HYDROXIDE	0.05	1.10	A
2014	BEANS (ALL OR UNSPEC)	COPPER OXYCHLORIDE	0.06	1.10	A
2014	BEANS, SUCCULENT (OTHER THAN LIMA)	COPPER HYDROXIDE	1.56	11.10	A
2014	BEANS, SUCCULENT (OTHER THAN LIMA)	COPPER OXYCHLORIDE	0.04	0.10	A
2014	BEETS, GENERAL	COPPER HYDROXIDE	91.54	197.30	A
2014	BEETS, GENERAL	COPPER OCTANOATE	16.05	15.73	A
2014	BEETS, GENERAL	COPPER OXIDE (OUS)	50.93	31.03	A
2014	BLACKBERRY	COPPER HYDROXIDE	14.68	15.51	A
2014	BLACKBERRY	COPPER OCTANOATE	55.87	69.50	A
2014	BLACKBERRY	COPPER OXIDE (OUS)	160.75	70.72	A
2014	BLUEBERRY	COPPER HYDROXIDE	1213.83	1014.20	A
2014	BLUEBERRY	COPPER OCTANOATE	278.43	421.13	A
2014	BLUEBERRY	COPPER OXIDE (OUS)	2693.19	496.00	A
2014	BLUEBERRY	COPPER SULFATE (PENTAHYDRATE)	411.84	160.00	A
2014	BOK CHOY (WONG BOK)	COPPER HYDROXIDE	95.06	274.90	A
2014	BROCCOLI	COPPER HYDROXIDE	999.44	2745.00	A
2014	BROCCOLI	COPPER OCTANOATE	373.93	611.55	A
2014	BROCCOLI	COPPER OXIDE (OUS)	212.23	323.30	A
2014	BROCCOLI	COPPER SULFATE (BASIC)	1.62	3.00	A
2014	BRUSSELS SPROUTS	COPPER HYDROXIDE	39.74	107.00	A
2014	CABBAGE	COPPER HYDROXIDE	107.33	354.83	A
2014	CABBAGE	COPPER OCTANOATE	1.67	4.00	A
2014	CABBAGE	COPPER OXIDE (OUS)	3.41	2.03	A
2014	CANTALOUPE	COPPER HYDROXIDE	0.12	0.60	A
2014	CANTALOUPE	COPPER OXYCHLORIDE	0.13	0.60	A
2014	CARROTS, GENERAL	COPPER HYDROXIDE	2239.56	2945.70	A
2014	CARROTS, GENERAL	COPPER OCTANOATE	8.75	41.90	A
2014	CARROTS, GENERAL	COPPER OXIDE (OUS)	183.50	147.05	A
2014	CARROTS, GENERAL	COPPER OXIDE (OUS)	0.31	5040.00	S
2014	CARROTS, GENERAL	COPPER OXYCHLORIDE	125.93	240.40	A
2014	CARROTS, GENERAL	COPPER SULFATE (BASIC)	58.62	71.00	A
2014	CAULIFLOWER	COPPER HYDROXIDE	577.65	1693.35	A
2014	CAULIFLOWER	COPPER OCTANOATE	26.27	63.00	A
2014	CELERIAC (CELERY ROOT)	COPPER HYDROXIDE	16.91	41.98	A
2014	CELERIAC (CELERY ROOT)	COPPER OCTANOATE	4.38	7.00	A
2014	CELERY, GENERAL	COPPER HYDROXIDE	5969.54	8927.78	A

2014	CELERY, GENERAL	COPPER OCTANOATE	837.70	960.70	A
2014	CELERY, GENERAL	COPPER OXIDE (OUS)	4189.09	2774.40	A
2014	CELERY, GENERAL	COPPER OXYCHLORIDE	296.41	1788.65	A
2014	CELERY, GENERAL	COPPER SULFATE (BASIC)	5.44	6.00	A
2014	CHERRY	COPPER AMMONIUM COMPLEX	0.13	4.00	U
2014	CHERRY	COPPER HYDROXIDE	23380.71	6138.24	A
2014	CHERRY	COPPER HYDROXIDE	0.68	16.00	U
2014	CHERRY	COPPER HYDROXIDE	0.01	1600.00	S
2014	CHERRY	COPPER OXIDE (OUS)	7775.44	1604.78	A
2014	CHERRY	COPPER OXYCHLORIDE	533.32	618.40	A
2014	CHERRY	COPPER OXYCHLORIDE	0.01	1600.00	S
2014	CHERRY	COPPER SULFATE (BASIC)	11522.56	1854.93	A
2014	CHERRY	COPPER SULFATE (PENTAHYDRATE)	4365.90	225.50	A
2014	CHINESE CABBAGE (NAPPA, WON BOK, CELERY CABBAGE)	COPPER HYDROXIDE	1.53	4.69	A
2014	CHINESE CABBAGE (NAPPA, WON BOK, CELERY CABBAGE)	COPPER OXIDE (OUS)	6.79	4.05	A
2014	CHINESE CABBAGE (NAPPA, WON BOK, CELERY CABBAGE)	COPPER OXYCHLORIDE	0.69	1.54	A
2014	CHIVE (SIBERICUM)	COPPER HYDROXIDE	7.01	7.50	A
2014	CHIVE (SIBERICUM)	COPPER OCTANOATE	29.99	59.22	A
2014	CILANTRO (CHINESE PARSLEY, CORIANDER LEAVES)	COPPER HYDROXIDE	5.63	5.00	A
2014	CILANTRO (CHINESE PARSLEY, CORIANDER LEAVES)	COPPER OCTANOATE	0.50	3.36	A
2014	CILANTRO (CHINESE PARSLEY, CORIANDER LEAVES)	COPPER OXYCHLORIDE	6.24	5.00	A
2014	CITRUS FRUITS (ALL OR UNSPEC)	COPPER HYDROXIDE	277.43	42.25	A
2014	CITRUS FRUITS (ALL OR UNSPEC)	COPPER HYDROXIDE	0.10	4.00	U
2014	CITRUS FRUITS (ALL OR UNSPEC)	COPPER OXIDE (OUS)	225.53	142.40	A
2014	CITRUS FRUITS (ALL OR UNSPEC)	COPPER SULFATE (BASIC)	178.48	36.50	A
2014	CITRUS FRUITS (ALL OR UNSPEC)	COPPER SULFATE (BASIC)	4.72	23000.00	U
2014	COLLARDS	COPPER HYDROXIDE	9.82	30.00	A
2014	COLLARDS	COPPER OXIDE (OUS)	2.10	1.88	A
2014	CUCUMBER (PICKLING, CHINESE, ETC.)	COPPER HYDROXIDE	15.47	39.65	A
2014	CUCUMBER (PICKLING, CHINESE, ETC.)	COPPER OCTANOATE	0.06	0.07	A
2014	CUCUMBER (PICKLING, CHINESE, ETC.)	COPPER OXYCHLORIDE	0.11	0.40	A
2014	DILL	COPPER HYDROXIDE	32.14	47.10	A
2014	DILL	COPPER OXIDE (OUS)	9.65	12.00	A
2014	EGGPLANT (ORIENTAL EGGPLANT)	COPPER HYDROXIDE	1.18	4.10	A
2014	EGGPLANT (ORIENTAL EGGPLANT)	COPPER OXIDE (OUS)	1.68	1.00	A
2014	EGGPLANT (ORIENTAL EGGPLANT)	COPPER OXYCHLORIDE	0.03	0.10	A
2014	ENDIVE (ESCAROLE)	COPPER OCTANOATE	11.82	18.95	A
2014	GAI LON	COPPER HYDROXIDE	6.98	17.50	A

2014	GARLIC	COPPER HYDROXIDE	1166.41	881.79	A
2014	GARLIC	COPPER SULFATE (BASIC)	39.00	50.00	A
2014	GRAPEFRUIT	COPPER HYDROXIDE	4002.87	2432.50	A
2014	GRAPEFRUIT	COPPER HYDROXIDE	0.00	300.00	S
2014	GRAPEFRUIT	COPPER OCTANOATE	2.08	40.00	A
2014	GRAPEFRUIT	COPPER OXIDE (OUS)	1170.70	507.60	A
2014	GRAPEFRUIT	COPPER OXYCHLORIDE	28.82	27.00	A
2014	GRAPEFRUIT	COPPER OXYCHLORIDE	0.00	300.00	S
2014	GRAPEFRUIT	COPPER SULFATE (BASIC)	5338.78	1086.70	A
2014	GRAPES	COPPER	3700.50	1274.00	A
2014	GRAPES	COPPER HYDROXIDE	106934.88	169668.46	A
2014	GRAPES	COPPER OXIDE (OUS)	17745.73	17206.46	A
2014	GRAPES	COPPER OXYCHLORIDE	135669.80	62711.64	A
2014	GRAPES	COPPER OXYCHLORIDE SULFATE	939.74	615.40	A
2014	GRAPES	COPPER SULFATE (BASIC)	101720.15	89793.54	A
2014	GRAPES	COPPER SULFATE (PENTAHYDRATE)	11731.77	29961.00	A
2014	GRAPES	COPPER-ZINC SULFATE COMPLEX	300.00	60.00	A
2014	GRAPES, WINE	COPPER	30.00	28.09	A
2014	GRAPES, WINE	COPPER HYDROXIDE	142866.93	276432.60	A
2014	GRAPES, WINE	COPPER OCTANOATE	66.93	123.00	A
2014	GRAPES, WINE	COPPER OXIDE (OUS)	20976.22	22252.39	A
2014	GRAPES, WINE	COPPER OXYCHLORIDE	31304.21	59482.89	A
2014	GRAPES, WINE	COPPER OXYCHLORIDE SULFATE	1222.81	444.25	A
2014	GRAPES, WINE	COPPER SULFATE (BASIC)	27940.08	23986.98	A
2014	GRAPES, WINE	COPPER SULFATE (PENTAHYDRATE)	305.72	270.41	A
2014	HOPS	COPPER HYDROXIDE	3.06	19.00	A
2014	HOPS	COPPER OCTANOATE	0.22	2.00	A
2014	HOPS	COPPER OXYCHLORIDE	3.39	19.00	A
2014	KALE	COPPER HYDROXIDE	70.59	240.45	A
2014	KALE	COPPER OCTANOATE	312.38	328.87	A
2014	KIWI FRUIT	COPPER HYDROXIDE	456.22	158.00	A
2014	KIWI FRUIT	COPPER SULFATE (BASIC)	183.94	50.00	A
2014	KOHLRABI	COPPER HYDROXIDE	1.21	3.50	A
2014	KUMQUAT (ALL OR UNSPEC)	COPPER HYDROXIDE	8.60	50.94	A
2014	KUMQUAT (ALL OR UNSPEC)	COPPER OXYCHLORIDE	9.53	50.94	A
2014	LANDSCAPE MAINTENANCE	COPPER SULFATE (BASIC)	0.35	14.00	A
2014	LANDSCAPE MAINTENANCE	COPPER SULFATE (PENTAHYDRATE)	0.64	7.00	A
2014	LEAFY VEGETABLES (ALL OR UNSPEC)	COPPER OCTANOATE	0.12	1.50	A

2014	LEEK	COPPER HYDROXIDE	56.08	108.23	A
2014	LEEK	COPPER OCTANOATE	1.60	1.05	A
2014	LEMON	COPPER	637.88	165.50	A
2014	LEMON	COPPER DIAMMONIUM DIACETATE	268.13	111.80	A
2014	LEMON	COPPER HYDROXIDE	12524.05	7904.60	A
2014	LEMON	COPPER HYDROXIDE	4.84	155.00	U
2014	LEMON	COPPER HYDROXIDE	0.11	13000.00	S
2014	LEMON	COPPER OCTANOATE	11.47	220.00	A
2014	LEMON	COPPER OXIDE (OUS)	5862.90	2230.25	A
2014	LEMON	COPPER OXYCHLORIDE	37.52	60.00	A
2014	LEMON	COPPER OXYCHLORIDE	0.12	13000.00	S
2014	LEMON	COPPER SULFATE (BASIC)	30562.62	6508.68	A
2014	LEMON	COPPER SULFATE (PENTAHYDRATE)	128.70	13.00	A
2014	LETTUCE, HEAD (ALL OR UNSPEC)	COPPER HYDROXIDE	454.76	824.70	A
2014	LETTUCE, HEAD (ALL OR UNSPEC)	COPPER OCTANOATE	5.42	6.50	A
2014	LETTUCE, HEAD (ALL OR UNSPEC)	COPPER OXIDE (OUS)	96.33	102.20	A
2014	LETTUCE, LEAF (ALL OR UNSPEC)	COPPER HYDROXIDE	2180.52	4706.23	A
2014	LETTUCE, LEAF (ALL OR UNSPEC)	COPPER OCTANOATE	1243.73	2954.59	A
2014	LETTUCE, LEAF (ALL OR UNSPEC)	COPPER OXIDE (OUS)	1897.52	1588.77	A
2014	LETTUCE, LEAF (ALL OR UNSPEC)	COPPER OXYCHLORIDE	1.87	3.53	A
2014	LIME (MEXICAN LIME, ETC.)	COPPER DIAMMONIUM DIACETATE	9.85	6.00	A
2014	LIME (MEXICAN LIME, ETC.)	COPPER HYDROXIDE	50.87	25.66	A
2014	LIME (MEXICAN LIME, ETC.)	COPPER OXYCHLORIDE	3.57	7.50	A
2014	LIME (MEXICAN LIME, ETC.)	COPPER SULFATE (BASIC)	22.68	4.25	A
2014	LOGANBERRY (LOGANS)	COPPER OXIDE (OUS)	8.39	2.00	A
2014	MANGO	COPPER SULFATE (BASIC)	1315.90	300.00	A
2014	MELONS	COPPER HYDROXIDE	0.05	0.20	A
2014	MELONS	COPPER OXYCHLORIDE	0.06	0.20	A
2014	MINT (ALL OR UNSPEC)	COPPER OCTANOATE	4.59	9.16	A
2014	MUSHROOMS	COPPER OXIDE (OUS)	0.04	865.00	S
2014	MUSTARD GREENS, (LEAFY VEGETABLE)	COPPER HYDROXIDE	6.45	20.76	A
2014	MUSTARD GREENS, (LEAFY VEGETABLE)	COPPER OXIDE (OUS)	16.73	9.97	A
2014	MUSTARD GREENS, (LEAFY VEGETABLE)	COPPER OXYCHLORIDE	2.15	4.76	A
2014	MUSTARD, CURLED (MIZUNA)	COPPER OCTANOATE	34.15	31.80	A
2014	MUSTARD, GENERAL	COPPER HYDROXIDE	44.49	189.61	A
2014	MUSTARD, GENERAL	COPPER OCTANOATE	63.76	123.01	A
2014	MUSTARD, GENERAL	COPPER OXIDE (OUS)	265.80	337.23	A
2014	MUSTARD, GENERAL	COPPER OXYCHLORIDE	2.02	4.48	A

2014	N-GRNHS GRWN CUT FLWRS OR GREENS	COPPER HYDROXIDE	0.09	0.40	A
2014	N-GRNHS GRWN CUT FLWRS OR GREENS	COPPER SALTS OF FATTY AND ROSIN	5.01	5700.00	S
2014	N-GRNHS GRWN CUT FLWRS OR GREENS	COPPER SALTS OF FATTY AND ROSIN	0.22	2500.00	U
2014	N-GRNHS GRWN CUT FLWRS OR GREENS	COPPER SULFATE (PENTAHYDRATE)	10.37	33.37	A
2014	N-GRNHS GRWN CUT FLWRS OR GREENS	COPPER SULFATE (PENTAHYDRATE)	2.62	305952.00	S
2014	N-GRNHS GRWN PLANTS IN CONTAINERS	COPPER DIAMMONIUM DIACETATE	5.42	2.50	A
2014	N-GRNHS GRWN PLANTS IN CONTAINERS	COPPER HYDROXIDE	403.17	267.79	A
2014	N-GRNHS GRWN PLANTS IN CONTAINERS	COPPER HYDROXIDE	81.15	2605625.00	S
2014	N-GRNHS GRWN PLANTS IN CONTAINERS	COPPER OCTANOATE	47.88	64.71	A
2014	N-GRNHS GRWN PLANTS IN CONTAINERS	COPPER OCTANOATE	40.10	2052067.00	S
2014	N-GRNHS GRWN PLANTS IN CONTAINERS	COPPER OXIDE (OUS)	43.47	18.90	A
2014	N-GRNHS GRWN PLANTS IN CONTAINERS	COPPER OXYCHLORIDE	0.88	4.50	A
2014	N-GRNHS GRWN PLANTS IN CONTAINERS	COPPER SALTS OF FATTY AND ROSIN	105.20	2052210.00	S
2014	N-GRNHS GRWN PLANTS IN CONTAINERS	COPPER SALTS OF FATTY AND ROSIN	47.51	26.50	A
2014	N-GRNHS GRWN PLANTS IN CONTAINERS	COPPER SULFATE (BASIC)	0.10	232460.00	S
2014	N-GRNHS GRWN PLANTS IN CONTAINERS	COPPER SULFATE (PENTAHYDRATE)	554.19	285.83	A
2014	N-GRNHS GRWN PLANTS IN CONTAINERS	COPPER SULFATE (PENTAHYDRATE)	70.97	4390264.75	S
2014	N-GRNHS GRWN PLANTS IN CONTAINERS	COPPER SULFATE (PENTAHYDRATE)	0.31	3040.00	U
2014	N-GRNHS GRWN TRNSPLNT/PRPGTV MTRL	COPPER HYDROXIDE	822.50	843.61	A
2014	N-GRNHS GRWN TRNSPLNT/PRPGTV MTRL	COPPER HYDROXIDE	661.69	16669799.00	S
2014	N-GRNHS GRWN TRNSPLNT/PRPGTV MTRL	COPPER HYDROXIDE	15.19	59.00	U
2014	N-GRNHS GRWN TRNSPLNT/PRPGTV MTRL	COPPER OCTANOATE	95.77	156.45	A
2014	N-GRNHS GRWN TRNSPLNT/PRPGTV MTRL	COPPER OCTANOATE	6.63	1046500.00	S
2014	N-GRNHS GRWN TRNSPLNT/PRPGTV MTRL	COPPER OXIDE (OUS)	324.33	1122.85	A
2014	N-GRNHS GRWN TRNSPLNT/PRPGTV MTRL	COPPER OXIDE (OUS)	4.04	83875.00	S
2014	N-GRNHS GRWN TRNSPLNT/PRPGTV MTRL	COPPER OXYCHLORIDE	20.08	58.30	A
2014	N-GRNHS GRWN TRNSPLNT/PRPGTV MTRL	COPPER OXYCHLORIDE	5.09	1156431.00	S
2014	N-GRNHS GRWN TRNSPLNT/PRPGTV MTRL	COPPER SALTS OF FATTY AND ROSIN	6.31	1.81	A
2014	N-GRNHS GRWN TRNSPLNT/PRPGTV MTRL	COPPER SALTS OF FATTY AND ROSIN	2.27	317250.00	S
2014	N-GRNHS GRWN TRNSPLNT/PRPGTV MTRL	COPPER SULFATE (BASIC)	0.36	0.50	A
2014	N-GRNHS GRWN TRNSPLNT/PRPGTV MTRL	COPPER SULFATE (PENTAHYDRATE)	15.68	995350.00	S
2014	N-GRNHS GRWN TRNSPLNT/PRPGTV MTRL	COPPER SULFATE (PENTAHYDRATE)	12.20	58.00	A
2014	N-OUTDR CONTAINER/FLD GRWN PLANTS	COPPER	0.01	500.00	S
2014	N-OUTDR CONTAINER/FLD GRWN PLANTS	COPPER AMMONIUM CARBONATE	0.06	4000.00	S
2014	N-OUTDR CONTAINER/FLD GRWN PLANTS	COPPER AMMONIUM COMPLEX	0.02	0.50	A
2014	N-OUTDR CONTAINER/FLD GRWN PLANTS	COPPER DIAMMONIUM DIACETATE	18.56	21.17	A
2014	N-OUTDR CONTAINER/FLD GRWN PLANTS	COPPER ETHANOLAMINE COMPLEXE	20.74	3.41	A
2014	N-OUTDR CONTAINER/FLD GRWN PLANTS	COPPER HYDROXIDE	4221.04	2595.53	A

2014	N-OUTDR CONTAINER/FLD GRWN PLANTS	COPPER HYDROXIDE	32.07	907649.00	S
2014	N-OUTDR CONTAINER/FLD GRWN PLANTS	COPPER NAPHTHENATE	1.00	900.00	U
2014	N-OUTDR CONTAINER/FLD GRWN PLANTS	COPPER OCTANOATE	312.38	352.59	A
2014	N-OUTDR CONTAINER/FLD GRWN PLANTS	COPPER OCTANOATE	9.50	364479.00	S
2014	N-OUTDR CONTAINER/FLD GRWN PLANTS	COPPER OXIDE (OUS)	145.68	135.78	A
2014	N-OUTDR CONTAINER/FLD GRWN PLANTS	COPPER OXYCHLORIDE	74.91	78.62	A
2014	N-OUTDR CONTAINER/FLD GRWN PLANTS	COPPER SALTS OF FATTY AND ROSIN	143.06	60.76	A
2014	N-OUTDR CONTAINER/FLD GRWN PLANTS	COPPER SALTS OF FATTY AND ROSIN	12.21	154340.00	S
2014	N-OUTDR CONTAINER/FLD GRWN PLANTS	COPPER SULFATE (BASIC)	778.71	201.42	A
2014	N-OUTDR CONTAINER/FLD GRWN PLANTS	COPPER SULFATE (BASIC)	0.06	320000.00	S
2014	N-OUTDR CONTAINER/FLD GRWN PLANTS	COPPER SULFATE (PENTAHYDRATE)	2007.63	1662.35	A
2014	N-OUTDR CONTAINER/FLD GRWN PLANTS	COPPER SULFATE (PENTAHYDRATE)	41.37	1006980.00	S
2014	N-OUTDR GRWN CUT FLWRS OR GREENS	COPPER HYDROXIDE	297.13	283.22	A
2014	N-OUTDR GRWN CUT FLWRS OR GREENS	COPPER OXYCHLORIDE	2.00	16.00	A
2014	N-OUTDR GRWN CUT FLWRS OR GREENS	COPPER SULFATE (BASIC)	0.09	0.12	A
2014	N-OUTDR GRWN CUT FLWRS OR GREENS	COPPER SULFATE (BASIC)	0.02	16632.00	S
2014	N-OUTDR GRWN CUT FLWRS OR GREENS	COPPER SULFATE (PENTAHYDRATE)	15.25	43.25	A
2014	N-OUTDR GRWN CUT FLWRS OR GREENS	COPPER SULFATE (PENTAHYDRATE)	0.01	18820.00	S
2014	N-OUTDR GRWN TRNSPLNT/PRPGTV MTRL	COPPER	103.88	98.00	A
2014	N-OUTDR GRWN TRNSPLNT/PRPGTV MTRL	COPPER DIAMMONIUM DIACETATE	52.56	40.00	A
2014	N-OUTDR GRWN TRNSPLNT/PRPGTV MTRL	COPPER HYDROXIDE	8773.66	3611.79	A
2014	N-OUTDR GRWN TRNSPLNT/PRPGTV MTRL	COPPER HYDROXIDE	250.43	7747559.00	S
2014	N-OUTDR GRWN TRNSPLNT/PRPGTV MTRL	COPPER OCTANOATE	207.68	14880603.00	S
2014	N-OUTDR GRWN TRNSPLNT/PRPGTV MTRL	COPPER OCTANOATE	112.81	166.69	A
2014	N-OUTDR GRWN TRNSPLNT/PRPGTV MTRL	COPPER OXIDE (OUS)	121.54	43.51	A
2014	N-OUTDR GRWN TRNSPLNT/PRPGTV MTRL	COPPER OXIDE (OUS)	36.65	2062860.00	S
2014	N-OUTDR GRWN TRNSPLNT/PRPGTV MTRL	COPPER OXYCHLORIDE	56.82	124.17	A
2014	N-OUTDR GRWN TRNSPLNT/PRPGTV MTRL	COPPER OXYCHLORIDE	0.66	137807.00	S
2014	N-OUTDR GRWN TRNSPLNT/PRPGTV MTRL	COPPER SALTS OF FATTY AND ROSIN	1.14	37500.00	S
2014	N-OUTDR GRWN TRNSPLNT/PRPGTV MTRL	COPPER SULFATE (BASIC)	935.97	346.52	A
2014	N-OUTDR GRWN TRNSPLNT/PRPGTV MTRL	COPPER SULFATE (PENTAHYDRATE)	4856.29	626.01	A
2014	N-OUTDR GRWN TRNSPLNT/PRPGTV MTRL	COPPER SULFATE (PENTAHYDRATE)	1.19	121000.00	S
2014	NECTARINE	COPPER AMMONIUM COMPLEX	1.39	0.25	A
2014	NECTARINE	COPPER AMMONIUM COMPLEX	0.46	9.00	U
2014	NECTARINE	COPPER HYDROXIDE	17328.11	4954.13	A
2014	NECTARINE	COPPER HYDROXIDE	0.14	14.00	U
2014	NECTARINE	COPPER HYDROXIDE	0.01	1200.00	S
2014	NECTARINE	COPPER OXIDE (OUS)	15643.96	2729.48	A

2014	NECTARINE	COPPER OXYCHLORIDE	734.63	500.38	A
2014	NECTARINE	COPPER OXYCHLORIDE	0.01	1200.00	S
2014	NECTARINE	COPPER SULFATE (BASIC)	3148.38	427.25	A
2014	NECTARINE	COPPER SULFATE (PENTAHYDRATE)	342.79	26.50	A
2014	NUT CROPS, NUT TREES (ALL OR UNSPEC)	COPPER HYDROXIDE	0.26	0.10	A
2014	OATS (FORAGE - FODDER)	COPPER HYDROXIDE	18.44	8.00	A
2014	OATS, GENERAL	COPPER HYDROXIDE	2.31	1.00	A
2014	OLIVE (ALL OR UNSPEC)	COPPER ETHYLENEDIAMINE COMPL	6.71	2.50	A
2014	OLIVE (ALL OR UNSPEC)	COPPER HYDROXIDE	59663.55	20732.35	A
2014	OLIVE (ALL OR UNSPEC)	COPPER HYDROXIDE	0.22	6.00	U
2014	OLIVE (ALL OR UNSPEC)	COPPER HYDROXIDE	0.12	9600.00	S
2014	OLIVE (ALL OR UNSPEC)	COPPER OCTANOATE	0.44	0.50	A
2014	OLIVE (ALL OR UNSPEC)	COPPER OXIDE (OUS)	4094.72	563.77	A
2014	OLIVE (ALL OR UNSPEC)	COPPER OXYCHLORIDE	2047.04	1643.48	A
2014	OLIVE (ALL OR UNSPEC)	COPPER OXYCHLORIDE	0.14	9600.00	S
2014	OLIVE (ALL OR UNSPEC)	COPPER SULFATE (BASIC)	17297.58	1955.00	A
2014	OLIVE (ALL OR UNSPEC)	COPPER SULFATE (PENTAHYDRATE)	28850.58	1197.00	A
2014	OLIVE (ALL OR UNSPEC)	COPPER TRIETHANOLAMINE COMPL	7.57	2.50	A
2014	ONION (DRY, SPANISH, WHITE, YELLOW, RED, ETC.)	COPPER HYDROXIDE	16851.59	22845.93	A
2014	ONION (DRY, SPANISH, WHITE, YELLOW, RED, ETC.)	COPPER OCTANOATE	4.17	45.00	A
2014	ONION (DRY, SPANISH, WHITE, YELLOW, RED, ETC.)	COPPER OXIDE (OUS)	271.94	241.20	A
2014	ONION (DRY, SPANISH, WHITE, YELLOW, RED, ETC.)	COPPER OXYCHLORIDE	43.47	200.85	A
2014	ONION (DRY, SPANISH, WHITE, YELLOW, RED, ETC.)	COPPER SULFATE (BASIC)	33748.51	19435.21	A
2014	ONIONS (GREEN)	COPPER HYDROXIDE	315.18	292.75	A
2014	ONIONS (GREEN)	COPPER OCTANOATE	1.28	1.35	A
2014	ONIONS (GREEN)	COPPER OXIDE (OUS)	29.45	17.51	A
2014	ONIONS (GREEN)	COPPER SULFATE (BASIC)	216.14	152.00	A
2014	ORANGE (ALL OR UNSPEC)	COPPER	7122.42	2469.01	A
2014	ORANGE (ALL OR UNSPEC)	COPPER HYDROXIDE	69855.59	23351.69	A
2014	ORANGE (ALL OR UNSPEC)	COPPER HYDROXIDE	0.05	3400.00	S
2014	ORANGE (ALL OR UNSPEC)	COPPER OXIDE (OUS)	47393.94	15140.74	A
2014	ORANGE (ALL OR UNSPEC)	COPPER OXYCHLORIDE	0.06	3400.00	S
2014	ORANGE (ALL OR UNSPEC)	COPPER SULFATE (BASIC)	370611.57	78977.86	A
2014	ORANGE (ALL OR UNSPEC)	COPPER SULFATE (PENTAHYDRATE)	3545.59	533.00	A
2014	PARSLEY (LEAFY VEGETABLE)	COPPER HYDROXIDE	1491.67	2540.09	A
2014	PARSLEY (LEAFY VEGETABLE)	COPPER OCTANOATE	97.78	99.37	A
2014	PARSLEY (LEAFY VEGETABLE)	COPPER OXIDE (OUS)	704.43	510.30	A
2014	PEACH	COPPER	196.10	74.00	A

2014	PEACH	COPPER AMMONIUM COMPLEX	1.14	24.00	U
2014	PEACH	COPPER AMMONIUM COMPLEX	0.39	1.25	A
2014	PEACH	COPPER AMMONIUM COMPLEX	0.01	200.00	S
2014	PEACH	COPPER HYDROXIDE	66433.27	16101.99	A
2014	PEACH	COPPER HYDROXIDE	1.46	111.00	U
2014	PEACH	COPPER HYDROXIDE	0.03	3000.00	S
2014	PEACH	COPPER OCTANOATE	0.05	0.10	A
2014	PEACH	COPPER OXIDE (OUS)	36593.50	6163.95	A
2014	PEACH	COPPER OXYCHLORIDE	2612.97	1886.03	A
2014	PEACH	COPPER OXYCHLORIDE	0.03	3000.00	S
2014	PEACH	COPPER SULFATE (BASIC)	65757.61	5954.04	A
2014	PEACH	COPPER SULFATE (PENTAHYDRATE)	485.10	35.00	A
2014	PEAR	COPPER AMMONIUM COMPLEX	0.96	16.00	U
2014	PEAR	COPPER HYDROXIDE	6969.89	14831.41	A
2014	PEAR	COPPER HYDROXIDE	0.28	8.00	U
2014	PEAR	COPPER HYDROXIDE	0.03	3300.00	S
2014	PEAR	COPPER OXIDE (OUS)	999.81	469.03	A
2014	PEAR	COPPER OXYCHLORIDE	3005.92	4547.62	A
2014	PEAR	COPPER OXYCHLORIDE	0.03	3300.00	S
2014	PEAS, GENERAL	COPPER HYDROXIDE	159.60	291.18	A
2014	PEAS, GENERAL	COPPER OXYCHLORIDE	0.04	0.20	A
2014	PEPPERS (CHILI TYPE) (FLAVORING AND SPICE CROP)	COPPER HYDROXIDE	185.80	328.10	A
2014	PEPPERS (FRUITING VEGETABLE), (BELL,CHILI, ETC.)	COPPER HYDROXIDE	3701.91	7231.53	A
2014	PEPPERS (FRUITING VEGETABLE), (BELL,CHILI, ETC.)	COPPER OCTANOATE	70.44	210.83	A
2014	PEPPERS (FRUITING VEGETABLE), (BELL,CHILI, ETC.)	COPPER OXIDE (OUS)	1010.66	828.75	A
2014	PEPPERS (FRUITING VEGETABLE), (BELL,CHILI, ETC.)	COPPER OXYCHLORIDE	1.96	38.35	A
2014	PEPPERS (FRUITING VEGETABLE), (BELL,CHILI, ETC.)	COPPER SULFATE (BASIC)	99.21	87.60	A
2014	PISTACHIO (PISTACHE NUT)	COPPER HYDROXIDE	531.67	2095.00	A
2014	PLUM (INCLUDES WILD PLUMS FOR HUMAN CONSUMPTION)	COPPER AMMONIUM COMPLEX	0.41	8.00	U
2014	PLUM (INCLUDES WILD PLUMS FOR HUMAN CONSUMPTION)	COPPER HYDROXIDE	6490.00	2251.14	A
2014	PLUM (INCLUDES WILD PLUMS FOR HUMAN CONSUMPTION)	COPPER HYDROXIDE	0.57	12.00	U
2014	PLUM (INCLUDES WILD PLUMS FOR HUMAN CONSUMPTION)	COPPER HYDROXIDE	0.02	2000.00	S
2014	PLUM (INCLUDES WILD PLUMS FOR HUMAN CONSUMPTION)	COPPER OCTANOATE	0.05	0.10	A
2014	PLUM (INCLUDES WILD PLUMS FOR HUMAN CONSUMPTION)	COPPER OXIDE (OUS)	13111.49	2243.93	A
2014	PLUM (INCLUDES WILD PLUMS FOR HUMAN CONSUMPTION)	COPPER OXYCHLORIDE	104.09	104.50	A
2014	PLUM (INCLUDES WILD PLUMS FOR HUMAN CONSUMPTION)	COPPER OXYCHLORIDE	0.02	2000.00	S
2014	PLUM (INCLUDES WILD PLUMS FOR HUMAN CONSUMPTION)	COPPER SULFATE (BASIC)	521.26	80.42	A
2014	PLUOT	COPPER HYDROXIDE	69.44	15.30	A

2014	PLUOT	COPPER OXIDE (OUS)	73.33	8.46	A
2014	POME FRUITS (ALL OR UNSPEC)	COPPER HYDROXIDE	0.47	0.50	A
2014	POME FRUITS (ALL OR UNSPEC)	COPPER OXYCHLORIDE	0.24	0.25	A
2014	POMEGRANATE (MISCELLANEOUS FRUIT)	COPPER HYDROXIDE	0.39	0.40	A
2014	POMEGRANATE (MISCELLANEOUS FRUIT)	COPPER OXIDE (OUS)	87.88	26.00	A
2014	POMELO (SHADDOCK) (CITRUS GRANDIS)	COPPER HYDROXIDE	30.80	10.00	A
2014	POMELO (SHADDOCK) (CITRUS GRANDIS)	COPPER OXIDE (OUS)	116.65	44.00	A
2014	POMELO (SHADDOCK) (CITRUS GRANDIS)	COPPER SULFATE (BASIC)	1118.88	207.00	A
2014	POTATO (WHITE, IRISH, RED, RUSSET)	COPPER HYDROXIDE	5542.06	4193.28	A
2014	POTATO (WHITE, IRISH, RED, RUSSET)	COPPER OCTANOATE	367.94	376.00	A
2014	POTATO (WHITE, IRISH, RED, RUSSET)	COPPER OXIDE (OUS)	630.88	474.30	A
2014	PRUNE	COPPER HYDROXIDE	8188.25	2700.82	A
2014	PRUNE	COPPER HYDROXIDE	0.36	6.00	U
2014	PRUNE	COPPER OXIDE (OUS)	1244.42	284.71	A
2014	PRUNE	COPPER OXYCHLORIDE	152.45	160.00	A
2014	PRUNE	COPPER SULFATE (BASIC)	5264.79	455.00	A
2014	PRUNE	COPPER SULFATE (PENTAHYDRATE)	990.00	50.00	A
2014	PUMPKIN	COPPER HYDROXIDE	99.69	172.50	A
2014	QUINCE	COPPER HYDROXIDE	107.13	203.50	A
2014	QUINCE	COPPER OXIDE (OUS)	37.76	9.00	A
2014	RADISH	COPPER AMMONIUM CARBONATE	4.09	10.67	A
2014	RADISH	COPPER HYDROXIDE	314.88	266.40	A
2014	RASPBERRY (ALL OR UNSPEC)	COPPER HYDROXIDE	128.50	144.00	A
2014	RASPBERRY (ALL OR UNSPEC)	COPPER OCTANOATE	89.87	111.82	A
2014	RASPBERRY (ALL OR UNSPEC)	COPPER OXIDE (OUS)	305.52	293.71	A
2014	RESEARCH COMMODITY	COPPER HYDROXIDE	5.14	3.59	A
2014	RESEARCH COMMODITY	COPPER HYDROXIDE	0.91	12100.00	S
2014	RESEARCH COMMODITY	COPPER OCTANOATE	0.01	2500.00	S
2014	RICE (ALL OR UNSPEC)	COPPER HYDROXIDE	43.12	14.00	A
2014	RICE (ALL OR UNSPEC)	COPPER SULFATE (PENTAHYDRATE)	1376689.30	101695.01	A
2014	RICE, WILD (GRAIN CROP)	COPPER SULFATE (PENTAHYDRATE)	24774.35	1955.30	A
2014	RIGHTS OF WAY	COPPER SULFATE (PENTAHYDRATE)	0.48	1.50	A
2014	SPINACH	COPPER HYDROXIDE	7.88	37.83	A
2014	SPINACH	COPPER OCTANOATE	7420.25	8528.09	A
2014	SPINACH	COPPER OXIDE (OUS)	43.39	33.96	A
2014	SPINACH	COPPER OXYCHLORIDE	7.79	32.71	A
2014	SQUASH (ALL OR UNSPEC)	COPPER HYDROXIDE	11.14	19.60	A
2014	SQUASH (ALL OR UNSPEC)	COPPER OCTANOATE	2.08	5.00	A

2014	SQUASH (ALL OR UNSPEC)	COPPER OXYCHLORIDE	0.11	0.60	A
2014	SQUASH (SUMMER)	COPPER HYDROXIDE	0.13	0.50	A
2014	SQUASH (SUMMER)	COPPER OCTANOATE	0.70	1.08	A
2014	SQUASH (SUMMER)	COPPER OXYCHLORIDE	0.15	0.50	A
2014	SQUASH (WINTER) (HUBBARD SQUASH, CALABAZA, ETC.)	COPPER OCTANOATE	0.63	0.50	A
2014	SQUASH (ZUCCHINI)	COPPER HYDROXIDE	0.05	0.40	A
2014	SQUASH (ZUCCHINI)	COPPER OXYCHLORIDE	0.05	0.40	A
2014	STONE FRUITS (ALL OR UNSPEC)	COPPER HYDROXIDE	54.55	19.80	A
2014	STONE FRUITS (ALL OR UNSPEC)	COPPER OXIDE (OUS)	503.29	118.50	A
2014	STONE FRUITS (ALL OR UNSPEC)	COPPER OXYCHLORIDE	0.24	0.25	A
2014	STONE FRUITS (ALL OR UNSPEC)	COPPER SULFATE (BASIC)	47.17	3.00	A
2014	STRAWBERRY (ALL OR UNSPEC)	COPPER HYDROXIDE	6698.86	3044.40	A
2014	STRAWBERRY (ALL OR UNSPEC)	COPPER OCTANOATE	3906.47	4066.02	A
2014	STRAWBERRY (ALL OR UNSPEC)	COPPER SULFATE (BASIC)	1871.24	964.08	A
2014	STRAWBERRY (ALL OR UNSPEC)	COPPER SULFATE (PENTAHYDRATE)	9.64	30.00	A
2014	SWISS CHARD (SPINACH BEET)	COPPER HYDROXIDE	5.80	27.00	A
2014	SWISS CHARD (SPINACH BEET)	COPPER OCTANOATE	552.91	791.03	A
2014	SWISS CHARD (SPINACH BEET)	COPPER OXYCHLORIDE	6.43	27.00	A
2014	TANGELO	COPPER HYDROXIDE	1953.15	837.60	A
2014	TANGELO	COPPER HYDROXIDE	0.00	100.00	S
2014	TANGELO	COPPER OCTANOATE	1.78	34.00	A
2014	TANGELO	COPPER OXIDE (OUS)	1203.18	330.28	A
2014	TANGELO	COPPER OXYCHLORIDE	0.00	100.00	S
2014	TANGELO	COPPER SULFATE (BASIC)	12755.61	2605.68	A
2014	TANGERINE (MANDARIN, SATSUMA, MURCOTT, ETC.)	COPPER	304.00	107.35	A
2014	TANGERINE (MANDARIN, SATSUMA, MURCOTT, ETC.)	COPPER HYDROXIDE	40467.58	19483.16	A
2014	TANGERINE (MANDARIN, SATSUMA, MURCOTT, ETC.)	COPPER HYDROXIDE	0.00	500.00	S
2014	TANGERINE (MANDARIN, SATSUMA, MURCOTT, ETC.)	COPPER OCTANOATE	1.25	24.00	A
2014	TANGERINE (MANDARIN, SATSUMA, MURCOTT, ETC.)	COPPER OXIDE (OUS)	3150.56	1328.17	A
2014	TANGERINE (MANDARIN, SATSUMA, MURCOTT, ETC.)	COPPER OXYCHLORIDE	42.16	59.00	A
2014	TANGERINE (MANDARIN, SATSUMA, MURCOTT, ETC.)	COPPER OXYCHLORIDE	0.00	500.00	S
2014	TANGERINE (MANDARIN, SATSUMA, MURCOTT, ETC.)	COPPER SULFATE (BASIC)	69790.74	17147.36	A
2014	TANGERINE (MANDARIN, SATSUMA, MURCOTT, ETC.)	COPPER SULFATE (PENTAHYDRATE)	2215.17	322.00	A
2014	TOMATO	COPPER HYDROXIDE	10883.90	12227.92	A
2014	TOMATO	COPPER OCTANOATE	15.77	15.20	A
2014	TOMATO	COPPER OXIDE (OUS)	199.89	155.50	A
2014	TOMATO	COPPER OXYCHLORIDE	170.65	476.07	A
2014	TOMATO	COPPER SULFATE (BASIC)	13.24	14.00	A

2014	TOMATO	COPPER SULFATE (PENTAHYDRATE)	1.20	2.50	A
2014	TOMATOES, FOR PROCESSING/CANNING	COPPER HYDROXIDE	15103.58	27876.74	A
2014	TOMATOES, FOR PROCESSING/CANNING	COPPER OXIDE (OUS)	664.14	442.43	A
2014	TOMATOES, FOR PROCESSING/CANNING	COPPER OXYCHLORIDE	531.62	1993.27	A
2014	TOMATOES, FOR PROCESSING/CANNING	COPPER SULFATE (BASIC)	3706.17	2984.10	A
2014	TURNIP, GENERAL	COPPER HYDROXIDE	0.22	0.78	A
2014	TURNIP, GENERAL	COPPER OXIDE (OUS)	46.28	65.30	A
2014	UNCULTIVATED AGRICULTURAL AREAS (ALL OR UNSPEC)	COPPER HYDROXIDE	215.75	465.00	A
2014	UNCULTIVATED AGRICULTURAL AREAS (ALL OR UNSPEC)	COPPER SULFATE (PENTAHYDRATE)	4835.99	578.15	A
2014	UNCULTIVATED NON-AG AREAS (ALL OR UNSPEC)	COPPER HYDROXIDE	57.63	25.00	A
2014	VEGETABLES (ALL OR UNSPEC)	COPPER HYDROXIDE	0.19	1.00	A
2014	VEGETABLES (ALL OR UNSPEC)	COPPER OXIDE (OUS)	58.73	7.00	A
2014	VETCH (FORAGE - FODDER)	COPPER SULFATE (PENTAHYDRATE)	1668.65	146.50	A
2014	WALNUT (ENGLISH WALNUT, PERSIAN WALNUT)	COPPER	241.15	38.00	A
2014	WALNUT (ENGLISH WALNUT, PERSIAN WALNUT)	COPPER DIAMMONIUM DIACETATE	10.51	16.00	A
2014	WALNUT (ENGLISH WALNUT, PERSIAN WALNUT)	COPPER HYDROXIDE	924819.78	294110.75	A
2014	WALNUT (ENGLISH WALNUT, PERSIAN WALNUT)	COPPER HYDROXIDE	0.12	2.00	U
2014	WALNUT (ENGLISH WALNUT, PERSIAN WALNUT)	COPPER OXIDE (OUS)	57164.80	12352.52	A
2014	WALNUT (ENGLISH WALNUT, PERSIAN WALNUT)	COPPER OXYCHLORIDE	46428.33	41732.59	A
2014	WALNUT (ENGLISH WALNUT, PERSIAN WALNUT)	COPPER SULFATE (BASIC)	63462.85	14526.83	A
2014	WALNUT (ENGLISH WALNUT, PERSIAN WALNUT)	COPPER SULFATE (PENTAHYDRATE)	6697.35	371.00	A
2014	WATERCRESS	COPPER HYDROXIDE	0.58	3.50	A
2014	WATERMELONS	COPPER HYDROXIDE	315.61	704.92	A
2014	WATERMELONS	COPPER OXYCHLORIDE	0.20	0.80	A
2014		COPPER HYDROXIDE	0.05	0.20	A
2014		COPPER OXYCHLORIDE	0.06	0.20	A
					A=acres
					S=square feet
					U=units