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Irrigated Crop Diversification Corporation

2013 Field Projects

December 4, 2013

Temple Gardens Moose Jaw



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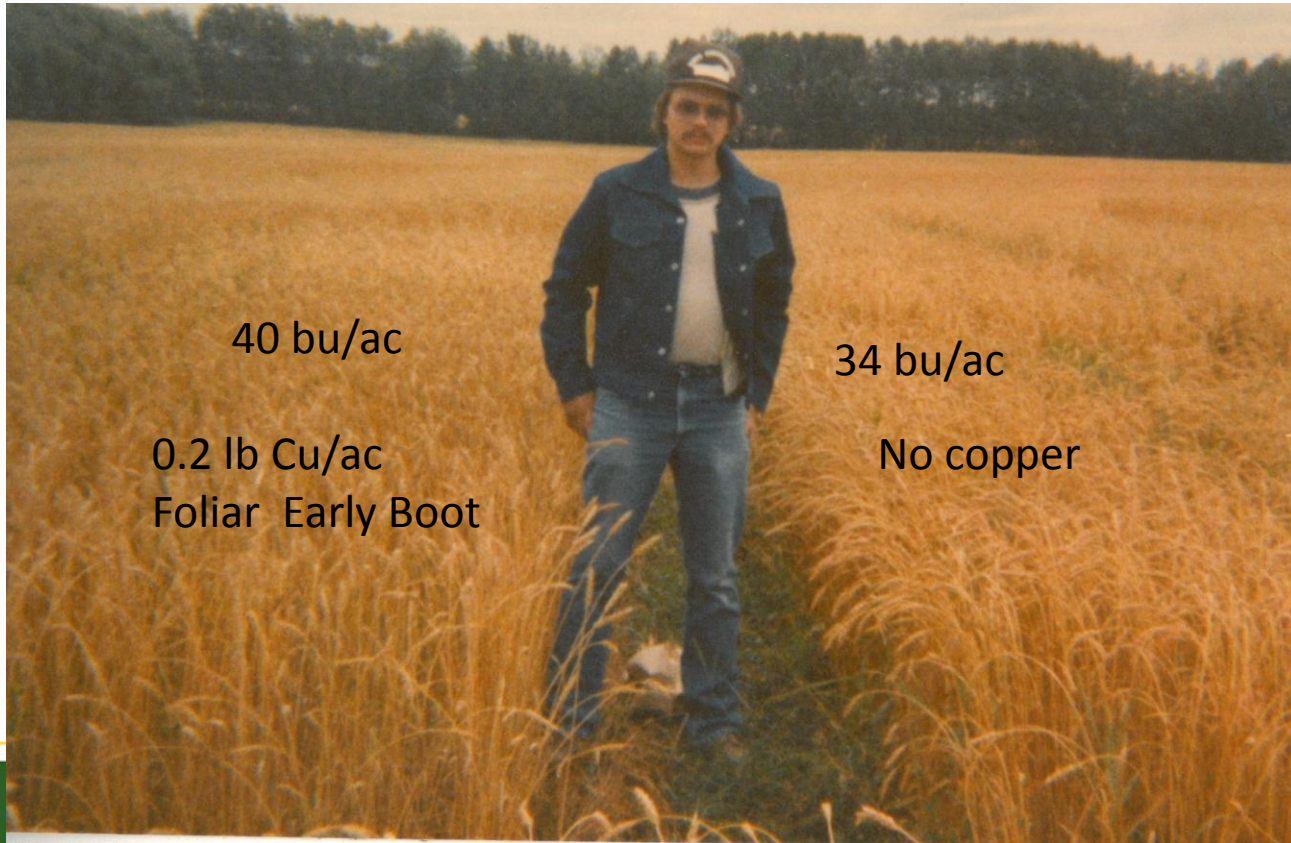


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Foliar Cu on Spring Wheat



40 bu/ac

34 bu/ac

0.2 lb Cu/ac
Foliar Early Boot

No copper

Dryland wheat
at Choceland

Soil Test
0.32 lb Cu/ac

Kruger, 1984



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Foliar Cu on Spring Wheat

Cooperator	Soil Association	DTPA Cu (lb/ac)	Plant Tissue Cu at Flagleaf (ug/g)	Grain Cu of Control (ug/g)	Control Yield (bu/ac)	Yield response
Randy Dahl	Asquith fine sandy loam* *Dryland	0.8	5.8	3.9	27	22% (6 bu)
Ryan Grunerud	Dune Sand sand/sandy loam	0.5	4.5	3.8	72	6% (4 bu)
David Bagshaw	Haverhill loam	1.1	6.0	3.6	79	3% (2 bu)
Peter Hiebert	Birsay fine sandy loam	1.0	5.3	3.9	86	None
Peter Hiebert	Dune Sand sand/sandy loam	0.6	4.8	No control	No control	No control

Foliar Cu on Spring Wheat

Symptom	Degree of Deficiency		
	Slight	Moderate	Severe
Head bending	X	X	
Delay in heading and maturity	X	X	
Melanism	X	X	
Whip tail of leaf tip		X	X
Increased susceptibility to disease			X
Excessive late tillering		X	X
Loss in grain yield (%)	5-20	20-50	50-100
Loss in straw yield (%)	Nil	0-10	10-20

Graham and Nambiar, 1981

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Slight Deficiency of Cu on Spring Wheat



Withered leaf tips
bending at mid blade



Photo credit: International Plant Nutrition Institute



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Foliar Cu on Spring Wheat

- **Highlights – Foliar Cu on Spring Wheat**
 - Sandy sites most likely to show response
 - Asquith, Dune Sand – yield response of 4 - 6 bu/ac
 - 2013 projects did not show correction of head bending
 - Maximum copper applied foliar to wheat at flagleaf on responsive site – 0.065 lb Cu/ac (0.5 L product/ac)



Plant Tissue Analysis and Grain Yield for Liquid and Granular Phosphorus Canola 2012

Treatment	N (%)	P (%)	K (%)	S (%)	Cu (ug/g)	Zn (ug/g)	Canola Yield (bu/ac)
No Granular No Liquid	5.76	0.54	4.65	1.00	8.2	55	33.5
No Granular 8 lb P ₂ O ₅ Liquid	5.58	0.47	4.43	0.89	9.1	51	33.9
No Granular 14 lb P ₂ O ₅ Liquid	6.10	0.63	5.87	0.85	7.1	48	33.9
20 P ₂ O ₅ Granular No Liquid	6.26	0.73	4.98	1.31	8.5	55	33.1
20 P ₂ O ₅ Granular 8 lb P ₂ O ₅ Liquid	5.51	0.76	4.71	1.24	8.5	54	20.4*
20 P ₂ O ₅ Granular 14 lb P ₂ O ₅ Liquid	5.50	0.61	3.59	0.83	8.9	51	33.4
Threshold	3.00	0.25	2.00	0.40	4.5	15	

Seeding Date: June 6, 2012

* Yield reduced due to waterlogging

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Plant Tissue Analysis and Grain Yield for Liquid and Granular Phosphorus Wheat 2013

Treatment	N (%)	P (%)	K (%)	S (%)	Cu (ug/g)	Zn (ug/g)	Wheat Yield (bu/ac)
No Granular No Liquid	3.11	0.26	4.2	0.35	6.4	28	43.6
No Granular 8 lb P ₂ O ₅ Liquid	3.42	0.28	4.3	0.45	6.2	23	53.1
No Granular 14 lb P ₂ O ₅ Liquid	3.03	0.27	3.9	0.36	7.2	29	57.5
20 P ₂ O ₅ Granular No Liquid	3.08	0.27	4.2	0.34	8.9	32	58.3
20 P ₂ O ₅ Granular 8 lb P ₂ O ₅ Liquid	3.53	0.27	4.2	0.41	7.6	26	57.4
20 P ₂ O ₅ Granular 14 lb P ₂ O ₅ Liquid	3.49	0.28	4.1	0.40	7.0	25	53.1
Threshold	2.10	0.20	2.0	0.15	4.5	15	

Seeding Date: June 3, 2013

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Liquid and Granular Phosphate

Canola Yield Summary for 2012

Granular		Liquid		
0 P ₂ O ₅ /ac	20 P ₂ O ₅ /ac	0 P ₂ O ₅ /ac	8 P ₂ O ₅ /ac	14 P ₂ O ₅ /ac
33.8 bu/ac	29.0 bu/ac	33.3 bu/ac	27.2 bu/ac	33.7 bu/ac

Canola Phosphorus Tissue Concentration Summary for 2012

Granular		Liquid		
0 P ₂ O ₅ /ac	20 P ₂ O ₅ /ac	0 P ₂ O ₅ /ac	8 P ₂ O ₅ /ac	14 P ₂ O ₅ /ac
0.55 %	0.70 %	0.64 %	0.62 %	0.62 %



Liquid and Granular Phosphate

Wheat Yield Summary for 2013

Granular		Liquid		
0 P ₂ O ₅ /ac	20 P ₂ O ₅ /ac	0 P ₂ O ₅ /ac	8 P ₂ O ₅ /ac	14 P ₂ O ₅ /ac
51.4 bu/ac	56.2 bu/ac	50.9 bu/ac	55.2 bu/ac	55.3 bu/ac

Wheat Phosphorus Tissue Concentration Summary for 2013

Granular		Liquid		
0 P ₂ O ₅ /ac	20 P ₂ O ₅ /ac	0 P ₂ O ₅ /ac	8 P ₂ O ₅ /ac	14 P ₂ O ₅ /ac
0.27 %	0.27 %	0.27 %	0.28 %	0.28 %



Major Conclusions

- 1) Two of five sites had increased yield of 4-6 bu./ac of spring wheat with 0.5 L/ac of foliar copper at flag leaf stage. Ergot levels were not affected.
- 2) Spring wheat responded with 4-5 bu/ac yield increase to both liquid and granular phosphate.



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