AS> Vol.3 No.5, September 2012

OPEN ACCESS

Reducing toxic effect of seed-soaked Cu fertilizer on germination of wheat

PDF (Size:313KB) PP. 674-677 DOI: 10.4236/as.2012.35082

Author(s)

Sukhdev S. Malhi, D. Leach

ABSTRACT

A laboratory incubation experiment (20℃) was conducted to find if the detrimental effects of seed-soaked Cu on wheat seedlings can be minimized by reducing time duration of seed in contact with Cu EDTA fertilizer solution. The 24 treatments in a 6 x 4 factorial arrangement included 6 rates/amounts of Cu (0, 15, 30, 60, 120 and 240 g Cu 100 kg^{-1} seed) and 4 seed-soaking time durations (0, 4, 8 and 16 h). The germination of wheat seed was 100% in the zero-Cu control treatments, irrespective of the duration of seed soaking time. However, seed germination decreased with increasing amount of fertilizer Cu in the seed-soaking solution, and the magnitude of reduction in seed germination due to Cu toxicity increased with increasing duration of seed-soaking time in the Cu fertilizer solution. For the seed-soaked treatments, the detrimental effect of Cu on germination was greatest with 16 h soaking, where only 13% - 18% of the seeds germinated with Cu applied at 15 to 30 g Cu 100 kg^{-1} seed. For the 4 and 8 h seed soaking treatments, germination of wheat seed ranged from 73% to 83% with 15 g Cu 100 kg^{-1} seed treatment and 42% to 62% with 30 g Cu 100 kg^{-1} seed. The findings suggest that the detrimental effect of Cu on germination of wheat seed soaked in Cu EDTA solution can be decreased by reducing duration of soaking time from 16 h to 4 or 8 h, but this needs further investigation using soil under growth chamber and/or field conditions in order to make valid recommendations for use of this new technology on a commercial scale.

KEYWORDS

Amount/rate of Cu; Seed-Soaked Cu; Soaking Time/Duration, Solution Cu

Cite this paper

Malhi, S. and Leach, D. (2012) Reducing toxic effect of seed-soaked Cu fertilizer on germination of wheat. *Agricultural Sciences*, 3, 674-677. doi: 10.4236/as.2012.35082.

References

[1] Alberta Agriculture, Food and Rural Development. (1995) Copper deficiency in cereal crops. Agri-Fax, Edmonton, Alberta, Canada. 5 pp.

[2] Saskatchewan Agriculture and Food. (2000) Micronutrients in crop production. Farm Facts. Saskatchewan Agriculture and Food, Regina, Saskatchewan, Canada. 6 pp.

[3] Karamanos, R.E., Walley F.L. and Flaten, P.L. (2005) Effectiveness of seedrow placement of granular copper products for wheat. Canadian Journal of Soil Science 85, 295-306.

[4] Malhi, S.S., Cowell, L. and Kutcher, H.R. (2005) Relative effectiveness of various sources, methods, times and rates of copper fertilizers in improving grain yield of wheat on a Cu-deficient soil. Canadian Journal of Plant Science 85, 59-65.

[5] Karamanos, R.E., Pomarenski, Q., Goh, T.B. and Flore, N.A. (2004) The effect of foliar copper application on grain yield and quality of wheat. Canadian Journal of Plant Science 84, 47-56.

[6] Malhi, S.S. (2009) Effectiveness of seed-soaked Cu, autumn-versus spring-applied Cu, and Cu-coated P fertilizer on seed yield of wheat and residual soil nitrate-N on a Cu-deficient soil. Canadian Journal of Plant Science 89, 1017-1030.

- Open Special Issues
- Published Special Issues
- Special Issues Guideline

AS Subscription

Most popular papers in AS

About AS News

Frequently Asked Questions

Recommend to Peers

Recommend to Library

Contact Us

[7] Robson, A.D. and Reuter, D.J. (1981) Diagnosis of copper deficiency and toxicity. Loneragan, J.F., Robson, A.D. and Graham, R.D., Eds., Copper in Soils and Plants. Academic Press, Sydney, Australia. 287-312.