

## 风化煤复合包裹控释肥对小麦生长发育及土壤酶活性的影响

党建友<sup>1</sup>, 王秀斌<sup>2</sup>, 裴雪霞<sup>1,2</sup>, 杨峰<sup>1</sup>, 程麦风<sup>1</sup>, 王姣爱<sup>1</sup>, 张定一<sup>1\*</sup><sup>1</sup>山西省农科院小麦研究所, 山西临汾041000, <sup>2</sup>中国农业科学院农业资源与农业区划研究所, 北京100081

## Effect of weathered coal-based coated fertilizer on winter wheat growth and soil enzyme activity

DANG Jian-you<sup>1</sup>, WANG Xiu-bin<sup>2</sup>, PEI Xue-xia<sup>1, 2</sup>, YANG Feng<sup>1</sup>, CHENG Mai-feng<sup>1</sup>,  
WANG Jiao-ai<sup>1</sup>, ZHANG Ding-yi<sup>1\*</sup>\*  
<sup>1</sup> Wheat Research Institute, Shanxi Academy of Agricultural Sciences, Linfen, Shanxi 041000, China;  
<sup>2</sup> Institute of Agricultural Resources and Regional Planning, CAAS, Beijing 100081, China[摘要](#)[参考文献](#)[相关文章](#)Download: [PDF \(435KB\)](#) [HTML \(0KB\)](#) Export: [BibTeX](#) or [EndNote \(RIS\)](#) [Supporting Info](#)

## 摘要

通过田间试验, 研究了风化煤复合包裹控释肥对小麦产量、叶片净光合速率(Pn)、植株干重及养分和土壤速效养分及酶活性的影响。结果表明, 施用控释肥均较不施肥(CK)和氮磷钾配施(NPK)小麦产量提高, 结构改善。与NPK相比成穗数降低, 千粒重和穗粒数提高; 等养分量控释肥增产6.69%~16.92%。控释肥使冬小麦中后期叶片Pn、植株干重、全N和全K含量提高; 等养分量控释肥较NPK处理子粒蛋白质含量提高。与NPK处理相比, 控释肥处理土壤速效养分在冬小麦生长发育前期低、中后期高, 同时提高了土壤酶活性, 有利于小麦养分吸收与运转, 使得肥料利用率提高。供试控释肥中以水玻璃控释材料包裹的控释肥(WCRF)效果最好, 明显激活了土壤酶活性, 使土壤养分供应充足, 小麦生长发育后期叶片Pn、干重及养分含量及子粒产量最高。

**关键词:** 风化煤复合包裹控释肥 冬小麦 生长发育 土壤酶活性 风化煤复合包裹控释肥 冬小麦 生长发育 土壤酶活性

## Abstract:

Controlled-release fertilizer (CRF) has emerged as a potential approach to solving the problems associated with the application of conventional fertilizers. It can improve fertilizer use efficiency, reduce application times and environment pollution. Three controlled-release fertilizers coated with three controlled-release materials, modified starch, resin and water glass, combined with weathered coal were called as MCRF, RCRF, and WCRF, respectively. The treatments were, no fertilizer (CK), NPK fertilizers (NPK), MCRF<sub>1</sub>, RCRF<sub>1</sub>, WCRF<sub>1</sub> (which used equivalent NPK rate to NPK treatment), MCRF<sub>2</sub>, RCRF<sub>2</sub>, WCRF<sub>2</sub>, (which used 80% NPK rate to NPK treatment). Effects of weathered coal-based coated fertilizer on wheat yield, leaf net photosynthesis (P<sub>n</sub>), plant dry weight, plant nutrient content, soil available nutrients and soil enzyme activity were studied. Results showed that, CRF application improved yield components, and so yield was increased compared with CK and NPK treatments. Compared with NPK treatment, CRF decreased spike numbers per hectare, but increased 1000-kernel weight and grains per spike. Yield of CRF<sub>1</sub> (included MCRF<sub>1</sub>, RCRF<sub>1</sub>, WCRF<sub>1</sub>) were increased 6.69%–16.92% over NPK treatment. CRF increased leaf Pn in middle and later stage of wheat, plant dry weight and nutrient contents, and increased grain protein content over NPK treatment. WCRF increased soil enzymes activity, soil nutrient contents, leaf Pn in middle and late growth stage, plant dry weight, plant nutrient contents, and wheat yield. Its nutrient release was more synchronized with nutrient need than other treatments.

## Keywords:

Received 2007-11-16;

## 引用本文:

党建友<sup>1</sup>, 王秀斌<sup>2</sup>, 裴雪霞<sup>1,2</sup>, 杨峰<sup>1</sup>, 程麦风<sup>1</sup>, 王姣爱<sup>1</sup>, 张定一<sup>1\*</sup>. 风化煤复合包裹控释肥对小麦生长发育及土壤酶活性的影响 [J] 植物营养与肥科学报, 2008, V14(6): 1186-1192DANG Jian-you<sup>1</sup>, WANG Xiu-bin<sup>2</sup>, PEI Xue-xia<sup>1, 2</sup>, YANG Feng<sup>1</sup>, CHENG Mai-feng<sup>1</sup>,  
WANG Jiao-ai<sup>1</sup>, ZHANG Ding-yi<sup>1\*</sup>

.Effect of weathered coal-based coated fertilizer on winter wheat growth and soil enzyme activity

[J] Acta Metallurgica Sinica, 2008, V14(6): 1186-1192

## Service

- [▶ 把本文推荐给朋友](#)
- [▶ 加入我的书架](#)
- [▶ 加入引用管理器](#)
- [▶ Email Alert](#)
- [▶ RSS](#)

[作者相关文章](#)

