

## 测土配方施肥指标体系建立中“3414”试验方案应用探讨—以内蒙古海拉尔地区油菜“3414”试

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Application of 3414 field trial design for establishing soil testing and fertilizer recommendation index

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摘要

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**摘要** 针对测土配方施肥指标体系建立中遇到的技术问题, 以内蒙古自治区海拉尔地区2007~2009三年油菜试验数据为例, 对应用“3414”试验数据进行土壤养分分级、基于三元二次肥料效应模型建立施肥指标体系进行了研究, 并就“3414”试验方案实施条件以及不同数学模型在肥料效应函数计算中的应用进行了探讨。提出了海拉尔地区油菜土壤有效磷的分级和施肥指标: 当土壤有效磷低于7 mg/kg时, 推荐施磷量为120 kg/hm<sup>2</sup>; 当土壤有效磷在7~26 mg/kg时, 推荐施磷量为90 kg/hm<sup>2</sup>; 当土壤有效磷在26~50 mg/kg时, 推荐施磷量为60 kg/hm<sup>2</sup>; 而当土壤有效磷高于50mg/kg时, 一般不再推荐施用磷肥。该地区多数土壤速效钾含量在150~400 mg/kg范围, 土壤速效钾含量已经在常规土壤速效钾分级指标的高限范围, 但作为干旱地区风险施肥管理措施, 仍然建议施用20~60 kg/hm<sup>2</sup>钾肥。测土配方施肥指标体系建立中, “3414”试验方案实施前, 应该在首先了解土壤养分限制因素的前提下进行肥料用量试验, 而不是简单地一个地区采用一个试验方案。无论是采用哪种数学模型模拟肥料效应函数, 都必须清楚肥料效应函数除了符合数学模型要求外, 还要求符合肥料报酬递减率等农业化学的基本理论和农业生产实际。

**关键词:** 肥料效应函数 施肥模型 推荐施肥 肥力分级指标

**Abstract:** The paper discussed the application of “3414” field trial design in soil testing and fertilizer recommendation using three years data collected in Hailaer, Inner Mongolia. The results showed phosphorus fertilizer recommended rate were 120, 90, 60 and 0 kg/ha when the soil available P (Olsen-P) was classified as low, medium, optimum and above optimum (Olsen-P < 7 mg/kg, 7–26 mg/kg, 26–50 mg/kg and >50 mg/kg) based on the relative yield and the model of quadratic equation in three variables. Soil available K were at relative high levels in most of the soil but potassium fertilizer was still recommended because of the dry climate condition in this region. The recommended potassium fertilizer rate was 20–60 kg/ha as a risk fertilizer management strategy. Considering fertility field trials is an expensive and time consuming task and the results from field trial were incomplete or incorrect sometimes, it was emphasized the field trials for fertilizer rate should not carried out unless the soil testing results are available. A fixed rate and ratio of NPK in “3414” field trial for all soil nutrient condition should not be adopted for one region. The type of mathematical model selected on the identification of the nutrient rate required for optimum yield is not only meaningful and significant trends ( $P > 0.05$ ) in mathematics but also practical and useful in agricultural production and agricultural chemistry philosophy, which fit the law of diminishing returns of crop response to fertilizer.

**Keywords:** fertilizer response function fertilization mode fertilizer recommendation categories of soil fertility

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