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The response of yield and related traits of soybean genotypes with different iron-efficiency levels to Fe-EDDHA fertilizer in calcareous soil

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Iron deficiency has become a yield-limiting factor for soybean in many calcareous soil areas. This study was conducted to ascertain the response of yield and related traits of soybean genotypes with different iron-efficiency levels to Fe-EDDHA fertilizer under iron deficiency. In 2014 and 2015, this study was carried out in calcareous soil areas of Jilin province. 6 prescreened soybean genotypes with different iron-efficiency levels, and 6 Fe-EDDHA concentrations including 0, 3, 6, 9, 12 and 15 kg hm⁻² were used, then leaf SPAD, yield and related agronomic traits were determined in this study. The results show that the responses of leaf SPAD, yield and related agronomic traits to Fe-EDDHA between soybean genotypes with different iron-efficiency levels were different significantly. There was a gradually increasing trend in demand for iron fertilizer from Fe-efficient to Fe-inefficient genotypes, in order to avoid yield loss. And the demand of Fe-efficient, Fe-mid-efficient, Fe-inefficient for Fe-EDDHA were 0-3 kg hm⁻², 3-6 kg hm⁻², 6-9 kg hm⁻² respectively. But there was no significant effect of more and more Fe-EDDHA on yield. The responses of yield related traits to Fe-EDDHA were different, seed weight per plant > pods weight per plant > SPAD value at R2 stage > SPAD value at V3 stage > plant height > 100-seed weight. The response of soybean genotypes to Fe-EDDHA showed a year effect. More Fe-EDDHA was needed to keep the normal yield in 2015. Therefore, one of the most cost-effective measures in calcareous soil areas is to plant Fe-efficient genotypes, and less Fe-EDDHA needs to be applied in serious iron deficiency areas.