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Germinability of treated soybean seed as affected by oxygen diffusion rate under the different soil moisture contents

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Seed germination has been considered largely in relation to seed viability under the conditions of favorable moisture and oxygen supply in soil. We conducted experiments with two seed lots and two Captan treatments including 1) Control, 2) Control + Captan, 3) one week-aged, and 4) one week-aged + Captan. The oxygen diffusion rate (ODR) was assessed under the different soil moisture contents, 17, 18, 19, 20 and 20.5% in the sandy loam soil. The aim of the present study was to determine the ODR that is characterized by the optimum oxygen conditions in the soil and plays an important role in the emergence depending on the vigor of soybean seeds. We discovered a critical point of soil moisture content that is lower than 20.5%, because the seed emergence was sharply decreased due to ODR decrease under 36.4 g/m².sec during the experiment. As 19 ~ 20 % of soil moisture content levels, the percent emergence and number of normal seedlings were greater at the seeds treated with Captan compared to control. However, no difference was observed between with or without Captan treatment at different aged seeds. In the results, the value of 17% soil moisture content might be considered as the optimum condition for soybean emergence, when ODR was reached 101.8 g/m².sec. The finding could provide a new insight on the germination of soybean seeds about the relationship between the seed vigor and soil moisture contents.

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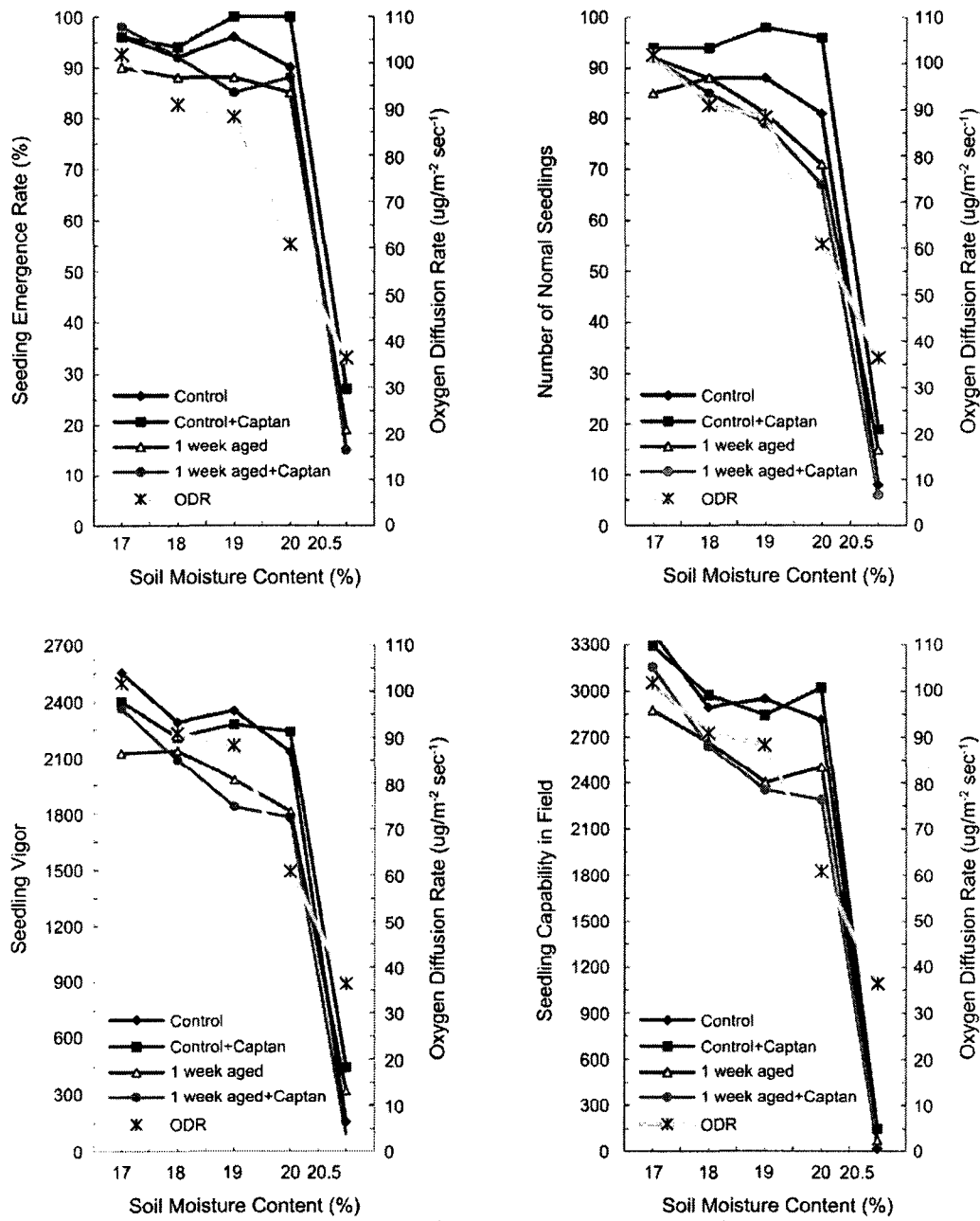


Fig. 1. Relationship between captan-treated soybean seed germinability and oxygen diffusion rate under the different soil moisture contents.