PHYSIOLOGICAL RESPONSE OF SOYBEAN AND WHEAT TO GAMMA RADIATION AND GIBBERELLIN

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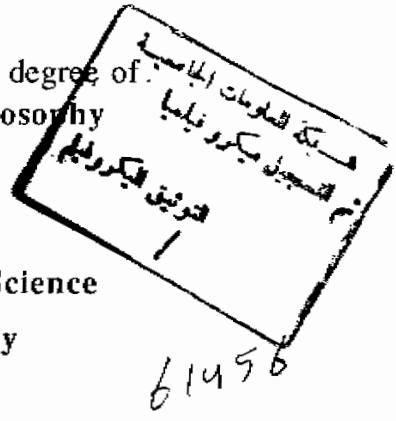

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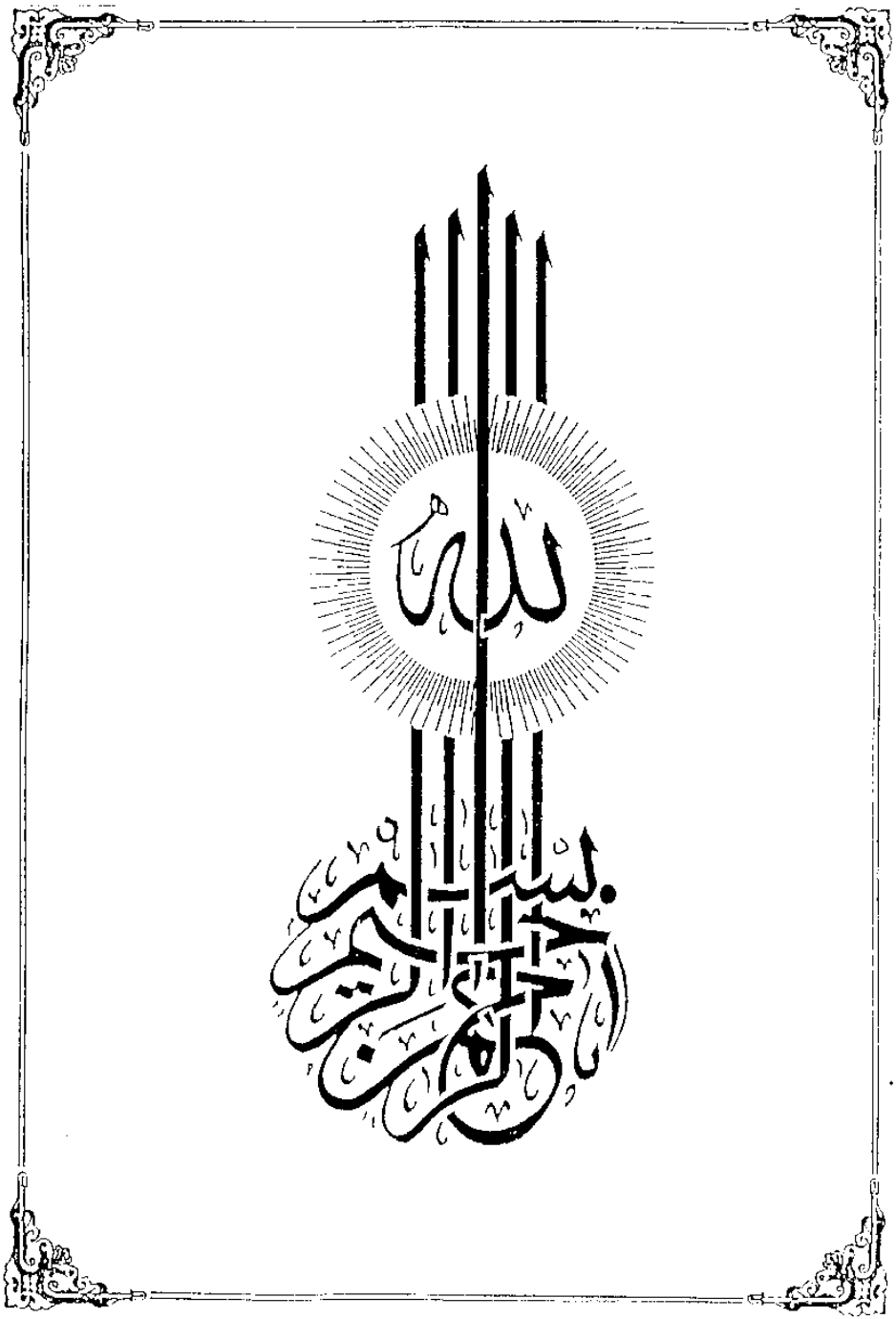

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ABSTRACT

Galal Mohamed Maghraby; Physiological response of soybean and wheat to gamma radiation and gibberellin, Unpublished Doctor of Philosophy, Univ. of Ain Shams, Faculty of Agriculture, Department of Agronomy (1997).

The main objective of this work is to study and evaluate physiological effects of gamma radiation and/or GA_3 on plant growth, nutritional status of plants, yield and some quality of seeds of soybean and wheat.

Two field experiments were conducted under the condition of clay loam soil at Kaliobia governorate during 1993 & 1994 and 1992/1993 & 1993/1994 for soybean and wheat, respectively.

Growth of soybean and wheat plants was considerably stimulated by irradiating seeds before sowing with low gramma doses and/or low concentration of GA_3. Maximum growth of both plants was obtained by the combined treatment of "20 Gy x 25 ppm GA_3 " and "10 Gy x 100 ppm GA_3" for soybean and wheat, respectively.

On the contrary high gamma doses and/or high rates of GA_3 depressed growth of both plants. Low gamma doses and/or GA_3 at low concentration greatly encouraged nutrients uptake by soybean and wheat plants, i.e., N, Fe, Mn and Zn which seemed to be positively related to plant growth. Whereas, high doses and/or high concentrations of GA_3 reduced these nutrients in plant.

Potential yield of soybean seeds and wheat grains or straw were positively related to plant growth where (r)

ranged from 0.75 to 0.94 for soybean and from 0.90 to 0.96 for wheat during the two seasons.

In general, low gamma doses and/or low rates of GA_3 increased the yield of both crops whereas high gamma doses and/or high concentration of GA_3 decreased it.

Seed index value of soybean and wheat was gradually increased by increasing gamma doses meanwhile GA_3 had a slight effect on it. Concentration of protein and oil in soybean seeds or protein in wheat grains were slightly affected by the used treatments. However, total content of protein and oil of soybean was positively related to seed yield.

Finally, it can be added that the beneficial effects of certain combined treatments, in particular 20 Gy x 25 ppm GA_3 for soybean and 10 Gy x 100 ppm GA_3 for wheat, on dry matter accumulation, nutritional status of plant and seed yield were more pronounced than those of single treatments of either gamma rays or GA_3.

Keywords: Soybean-Wheat-Radiation-GA_3-Growth-Dry matter-Seed yield-Nutritional status-Protein-Oil.

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