PHYSIOLOGICAL STUDIES OF SOME PLANT GROWTH REGULATORS, PLANT EXTRACTS AND SOME ALLELOPATHIC COMPOUNDS ON STRAWBERRY PLANT

By

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B.Sc. Agric. Sc. (Plant Pathology), Ain Shams University, 1997

M.Sc. Agric. Sc. (Plant Physiology), Ain Shams University, 2003

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ABSTRACT

Ahmed Abd El-Rahman El- Deeb: Physiological Studies of Some Plant Growth Regulators, Plant Extracts and Some Allelopathic Compounds on Strawberry Plant. Unpublished Ph.D. Thesis, Department of Agricultural Botany, Faculty of Agriculture, Ain Shams University, 2010.

Two field experiments were conducted at the Experimental Farm of Strawberry and Non-Traditional Crop Improvement Center during the two successive seasons 2006/2007 and 2007/2008 to investigate the physiological roles of plant growth regulators (GA_3 at 50, 100 ppm JA at 4, 8 ppm and CPPU at 20, 40 ppm), allelopathic compounds (SA and GB at 50, 100 ppm and SEW at 250 g/feddan; 500 g/feddan as recommended dose and 750 g/feddan) as well as water extracts from shoots or roots of *Beta vulgaris* (BSE, BRE), *Arachis hypogia* (ASE, ARE), *Zea mays* (ZSE, ZRE) at 50, 100g/L and control on the vegetative, reproductive and yield parameters as well as the fruit quality of strawberry plants. Foliar spary was conducted three times starting three weeks before each three fruiting cycles.

The results indicated that, concerning the vegetative parameters, foliar spray with GA_3 SA and GB at 100 ppm, CPPU at 40 ppm, SWE at 500, 750g/ Fed., and BSE, BRE and ZRE at 50& 100 g/L significantly increased some growth parameters whereas the treatments of JA at 8 ppm, ASE, ARE at 50 & 100 g/L decreased these parameters.

Regarding the flowering and yield parameters, the treatments of GB and SA at 100ppm, BSE at 100 g/L and CPPU at 40 ppm achieved the highest number of inflorescences/ plant and flowers / inflorescence. The applications of SA and GB at 100 ppm and CPPU at 40 ppm obtained the highest early and total yield while the

treatments of ASE, ARE and JA at 8 ppm recorded the lowest values of these parameters.

As for the fruit quality, the highest fruit weight and fruit firmness was recorded by SA, GB, BSE and SA, CPPU, JA with the high concentration respectively. The highest value of TSS and TSS/ TA ratio was recorded by SA, GB at 100 ppm and beet water extracts. The highest content of ascorbic acid was due to the treatment of BRE, SA and GB at the high concentration. The treatments of SA, GB and BSE at the high concentration obtained the highest content of reducing and total sugars. The highest content of anthocyanin and total phenols in strawberry fruits were recorded by SA, GB and CPPU at the high concentration respectively.

The applications of GA_3 decreased flowering and yield of strawberry. The most benefit of GA_3 is due to promote the development of runners and the reproduction of new plants. Also, the fruit quality was negatively affected by GA_3 applications since it gave the highest values of TA and the lowest values of TSS. On the other hand, CPPU at 40 ppm increased vegetative and reproductive parameters.

Allelopathic compounds gave significant increase in vegetative growth, flowering and fruit quality. In this respect, the most effective compounds were SA followed by GB then SEW.

The water extracts of *Beta vulgaris* and *Zea maize* increased the growth and fruit yield especially at the high concentration. Accordingly, it could be recommended that cultivation of strawberry plants after maize crop is more successful than peanuts crop. So, the residual of maize plants had promotive effect upon growth and yield of strawberry plant. The water extracts of *Arachis hypogia* showed a reverse effect on growth of plants and fruiting.

Keywords:

Plant growth regulators, allelopathic compounds, plant water extracts, growth, flowering, yield, fruit quality, strawberry, *Fragaria x ananassa*.

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