

GROWTH, NUTRIENT STATUS AND YIELD OF LE-CONTE PEAR TREES AS INFLUENCED BY SOME ORGANIC AND BIOFERTILIZER RATES COMPARED WITH CHEMICAL FERTILIZER

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ABSTRACT

This investigation was carried out during the 2006 and 2007 growing seasons on a 3 year old Le-Conte pear trees (*Pyrus communis* L. X *Pyrus pyrifolia* N.) grafted on *Pyrus betulaefolia* rootstock and planted at 5 × 5 meters apart (169 trees / faddan) in sandy soil under drip irrigation system, at El-Kassasien Horticultural Research Station, Ismailia Governorate. One source of organic fertilizers (compost) plus natural rocks (rock phosphate + feldspare), with or without biofertilizers (phosphorein and biogein) plus humic acid plus compost tea, were compared with chemical fertilization. Application of compost with biofertilizers plus humic acid plus compost tea gave a better effect on all vegetative characteristics (growth rate of trunk diameter, shoot diameter, shoot length, number of leaves per shoot and leaf area) and chemical leaf constituents (leaf pigments, macro and micro elements, total carbohydrates, C/N ratio, protein contents) and yield compared to other organic treatments. Also vegetative growth, nutritional status and yield were significantly increased from the first till the second season indicating the accumulation effect of organic manure plus biofertilizers plus humic acid plus compost tea. Chemical fertilizer gave the highest vegetative and yield characteristics and leaf chemical contents compared to all organic rates with or without biofertilizers, humic acid and compost tea in the two seasons of study.

Key words: *biofertilizer, compost, compost tea, humic acid, pear, organic fertilizer.*

1. INTRODUCTION

Organic fertilizers improve the physical, chemical and biological properties of nearly all soil types, adjusting soil pH, increasing nutrient solubility and production of the plants (Zhou *et al.*, 2001). The addition of organic manure to the soil encourages proliferation of soil micro organisms, increases microbial population and activity of microbial enzymes, viz. dehydrogenase, urease and nitrogenase (Abou-Hussein *et al.*, 2002). Some investigators studied the effect of organic manure as compared with chemical fertilizer on different fruit crops Huilian *et al.* (2000) on pears, Kassem & Marzouk, (2002) and El- Shenawy & Fayed (2005a) on grapevines, Abou- Taleb, (2004) on pecans, Fayed, (2005) on peaches, and Fayed (2005b) on apples]. They reported that, under organic systems, soil biotic life increased as a result of the plant synthesis of more vitamins and sugar. Moreover, the addition of organic fertilizer is necessary for the best growth when compared to mineral fertilizers. Application of natural rocks (rock phosphate + feldspare) caused the release of the macro and

micro elements P, K, Ca and Mg, and converted them to soluble forms in comparison with the same mixtures (compost) without natural rocks (El-Haggar *et al.*, 2004).

Biofertilizers are of the most importance for plant production and soil, as they play an important role in increasing vegetative characteristics (Fayed, 2005b on apple). Also, Hassan and Abou-Rayya (2003) showed that all bio-fertilizers (nitrobein, phosphorein, biogein and rhizobacterien at 10, 20, 30 gm per tree) were effective in improving nutritional status of Anna apple trees.

Humic acid (polymeric polyhydroxy acid) was the most significant component of organic substances in aquatic systems. Humic acid is highly beneficial to both plants and soil; its importance for increasing microbial and mycorrhizal activity, it is considered as a plant growth bio-stimulant, an effective soil enhancer; it promotes nutrient uptake (chelating agent) and improves vegetative characteristics, nutritional status and leaf pigments [Eissa *et al.* (2007a) and Ismail *et al.* (2007) on Le-Conte pear trees].