Effects of Chicken Manure Application on Olive (Olea europaea) Growth

Sabriye Atmaca
Akdeniz University Faculty of Agriculture Department of Horticulture Antalya / Turkey

Sara Demiral
Akdeniz University Faculty of Agriculture Department of Horticulture Antalya / Turkey

Salih Ülger
Akdeniz University Faculty of Agriculture Department of Horticulture Antalya / Turkey

Abstract: In this research, the possibilities of use of chicken wastes which have significant potential in Turkey were investigated in olive orchards. Different doses of solid and liquid chicken manure wastes were applied to high density planted olive trees to determine their effects on plant growth and developing. Trunk diameter development and plant height were measured 3 month cycles during the experiment.

Introduction

The olive tree (*Olea europaea* L.) originated from Upper Mesopotamia and Southwest Asia, including a part of South East Anatolia Region of Turkey (Özkaya et al., 2004). Archaeological studies showed that olive cultivation was started in 4000 BC (Ülger, 2010).

Olive cultivation in the worldwide is made in Mediterranean Basin with 90% and the rest part in the Latin American countries. Approximately 17 million ton olive is produced from 900 million trees in 9 million hectares of land in the world (Ülger, 2010).

In Turkey, according to 2006 data, approximately 1.8 million tons of olive produced from 650.000 hectares of land (Table 2) and 550.000 tones table olives and 170.000 tons olive oil were obtained from this production (Ülger, 2010).

High density olive growing, a growing system is made to obtain high-efficiency oil. The system has also significant advantage in terms of early fruiting of trees (usually in 3 years), reduction of trend of alternate-bearing, allowing to mechanical harvest, collecting of fruits untouched by hand and quick processing (Anonymous, 2008).

Fertilization is one of the important factors for fruit growing. Fertilization is essential to obtain enough growing and yield. Fruit trees remove nutrients from the soil in significant amounts in yearly. If these removed nutrients can not be substituted the trees show some nutrient deficiency and yield reductions occur. Necessary nutrient supplements should be made to soil to prevent this situation (Anonymous, 2009).

In the poultry business, juicy chicken manure is an important environment problem due to its bad smell and overflows of sewage to the environment. Therefore, juicy chicken manure, polluting the environment should be turned organic fertilizer to use in agriculture. U.S. and European developed countries solved this problem by the processing of poultry waste to animal feed and fertilizer in years ago (Dogan, 2003).

Many researches have determined nutrient content of chicken manure. Fresh chicken manure contents as 51.9% water and 30.8% organic matter, 1.78% N, 1.78% P, 1% K, 1% Na, 0.07% Ca and 1.6% Mg (Şeker, 2005). Inal et al., (1996) found that the chicken manure had high plant nutrient and they recommend the chicken manure to be used as fertilizer in agriculture.

In this study, the effects of different doses of solid and liquid forms of processed chicken manure on tree height and trunk diameter growth in olive (*Olea europaea* L.) trees were investigated.

Materials and Methods

This study was conducted on 3 years old and 4x1.5 m planted "Gemlik" olive trees in Application and Research Field of Faculty of Agriculture, Akdeniz University in 2009-2010. Processed solid chicken manure (PSCM, trade name ORG-M-VIT) and processed liquid commercial manure (PLCM, trade name KAL) were applied to the trees in the experiment. First 0, 1, 2, 4, 6, 8 kg/tree PSCM (Table 1) were applied to the olive trees in March and then 150 mL PLCM were applied to these olive trees in March, April, May, June, July and August (Table 1). Trunk diameter and plant height were measured three months intervals after application. Tree height was determined from ground level by tape measure and trunk diameter was measured from 30 cm above the ground level by calliper. The experiment was designed as randomized block and three replications, and each block has 3 trees.

Applications	Application dosages and application dates
Control	0 kg/tree PSCM + 0 PLCM
2. application	1 kg/tree PSCM (March) + 150 mL PLCM (March, April, May, June, July, August)
3. application	2 kg/tree PSCM (March) + 150 mL PLCM (March, April, May, June, July, August)
4. application	4 kg/tree PSCM (March) + 150 mL PLCM (March, April, May, June, July, August)
5. application	6 kg/tree PSCM (March) + 150 mL PLCM (March, April, May, June, July, August)
6. application	8 kg/tree PSCM (March) + 150 mL PLCM (March, April, May, June, July, August)

Table 1. Used dosages and application time of PSCM and PLCM.

Results and Discussion

The best average tree height developing was obtained from application of 4 kg/tree PSCM in March +150 mL PLCM in March, April, May, June, July, August. The average height of tree was 121 cm at first measuring time, and then the average height was reached 186 cm at the fourth measuring time in the fourth application group trees. The differentiation between the first and fourth measurement was 75 cm. The average smallest tree height developing was determined in sixth application groups with 24 cm differentiation (Figure 1).

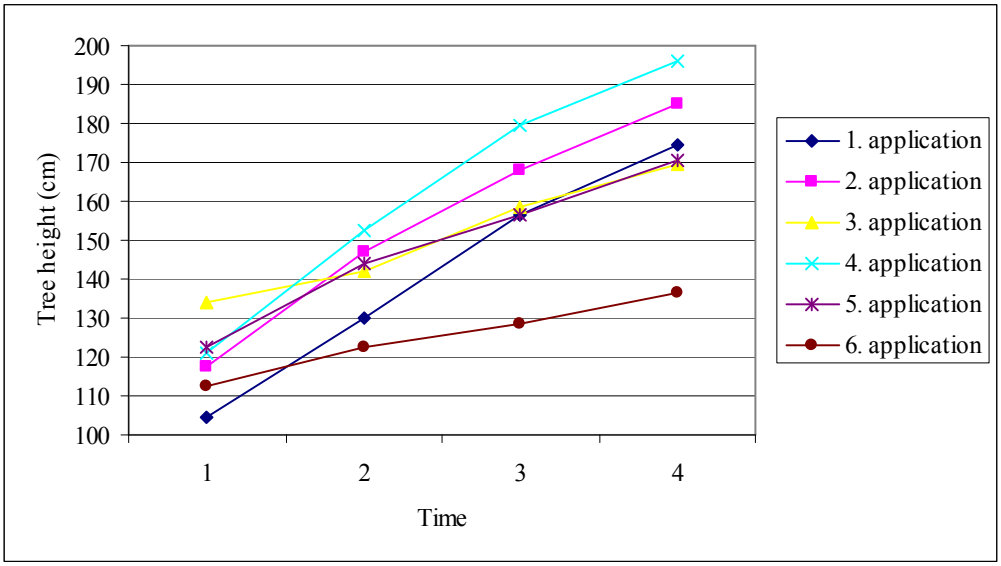

Figure 1. Average plant height after application of different dosages and application time of PSCM+PLCM

Average trunk diameter and thickness increased depending on time after PSCM+PLCM application. The strongest and weakest body diameter development were observed with 43.70 and 8.25 mm respectively in number 4 applications (4 kg/tree PSCM in March + 150 mL PLCM in March, April, May, June, July, August) and in number 6 applications (8 kg/tree PSCM inMarch+150 mL PLCM in March, April, May, June, July, August) (Figure 2).

PSCM+PLCM application positively affected trunk and height development of "Gemlik" olive cultivars. Similarly, positive results were obtained by Polat (2001) in organic lettuce growing, Dogan (2003) in tomato and cucumber seedlings growing and Şeker (2005) in maize development after chicken manure application.

Since olive is a perennial plant, the effects of chicken manure may not be seen with one year results. But one year results showed that some dosages of chicken manure had positive effect in terms of plant height and trunk development in olive trees.

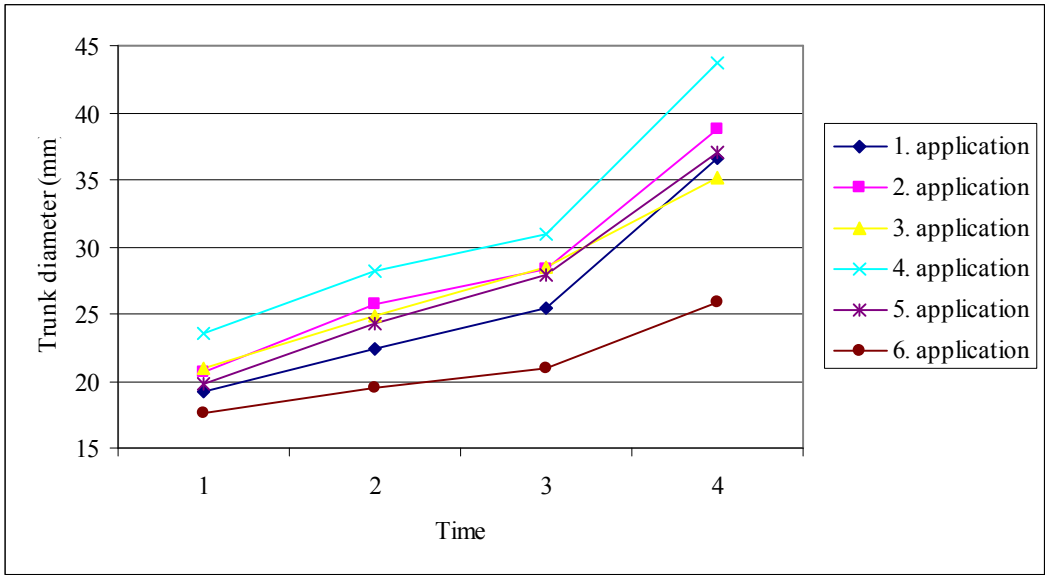

Figure 2. Average plant trunk diameter developing after application of different dosages and application time of PSCM+PLCM

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