

MANAGEMENT OF NEMATODES ASSOCIATED WITH WALNUT (*Juglans regia* L.) BY USING POULTRY MANURE AND CARBOFURAN

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ABSTRACT: Poultry manure and carbofuran were applied for their nematicidal nature on walnut trees affected by stylet bearing nematodes in District Abbottabad of Hazara Division from May 2012 to March 2013. Poultry manure was used at the ratio of 8kg/ tree while carbofuran was used at the ratio of 150gm/ tree. Carbofuran was used for the comparison. Untreated trees were kept for comparison with the treated ones. Both poultry manure and carbofuran were applied around the tree trunk. Soil samples collected at 3, 6 and 12 month were processed by using Bearmann funnel technique. Nematode population was noted under stereoscope microscope and compared with the untreated one. Both poultry manure and carbofuran effectively controlled the *Helicotylenchus pseudorobustus*, *Psilenchus hilarulus* and other nematode population. The recorded data was subjected to analysis of variance (ANOVA) and histograms were prepared.

Keywords: Poultry manure, Carbofuran, Nematodes, Walnut, Abbottabad, ANOVA, Histograms

INTRODUCTION

Several workers used poultry manure for the management of parasitic nematodes associated with walnut tree and other crops (Hassan *et al.* 2009; Samad 2006; Khan and Shaukat 1998, 2000; khan *et al.* 1986, 1997, 1998, 2002; Owino and Waudo 1996; Riegel *et al.* 1992).

The value of manure as a source of plant nutrients has long been recognized. It is easily available. It contains many important nutrients essential for the plant growth. It is full of calcium, magnesium, sulphur, iron, boron, copper, chlorine, manganese, molybdenum and zinc along with water. In addition to being a valuable source of plant nutrients, chicken manure is an important soil conditioner, and it increases the soil's moisture-holding and nutrient-holding capacities. (McCall, 1980).

This study was carried out to evaluate the effect of poultry manure on nematode population associated with walnut (*Juglans regia* L.) in the area of District Abbottabad.

Carbofuran is a chemical nematicide under the trade name Furadan. Effects of poultry manure and carbofuran on nematode population were compared.

MATERIALS and METHODS

The study was conducted in District Abbottabad of Hazara Division from May 2012 to March 2013. Soil samples collected from trees were processed through modified Bearmann funnel technique (Southey, 1970). Nematode population density was determined under the Watson Barnet stereoscope at 4X power per 200ml of soil sample. Permanent mounts were prepared in anhydrous glycerin by slow dehydrating method in autoclave at temperature of about 50 to 60 °C for 48 hours. The stylet bearing nematode population were 70% while 30% were saprophytic.

Poultry manure collected from nearby farms located in Dhamtor was applied at the rate of 8kg/tree at the depth of 20-30 cm by mixing manure in soil with spade. Carbofuran was applied at the rate of 150gram/ tree at the depth of 20-30 cm in the same way. Untreated trees were kept for comparison.

Normal watering and irrigation was followed to keep tree soil moist and free of weeds and herbs. Four replicas were collected after 3, 6 and 12 month. Soil samples were processed and nematode population density was determined. Effect of poultry manure and carbofuran on trees was studied.

STATISTICAL ANALYSIS

The recorded data was subjected to analysis of variance (ANOVA) and histograms were prepared.

RESULTS and DISCUSSION

Effect of poultry manure and carbofuran on nematode population

Effect on overall nematode population

Treatments (poultry manure and carbofuran) were found effective ($F=4.235$, $P<0.0155$, $F=0.4099$, $p>0.7474$). By examining the samples of the treated ones, it was clear that poultry manure and carbofuran were effective against the nematode population. Comparison was one by comparing treated and untreated ones. Samples collected at 3, 6 and 12 months shows remarkable control on nematode population affecting walnut trees. Controlled nematode population is the sign of good effect of both poultry manure and carbofuran on the soil and tree health.

Effect on *Helicotylenchus pseudorobustus*

ANOVA of the recorded data showed that the effect of poultry manure was effective ($F=1.371$, $P> 0.2755$) against *Helicotylenchus pseudorobustus*. The comparison of population ratio of *Helicotylenchus pseudorobustus* before and after treatment show remarkable difference. Histogram fig. showed the decline of *Helicotylenchus pseudorobustus* population in soil samples. Carbofuran was also found effective against its population and soil sample was found saprophytic. Controlled population of *Helicotylenchus pseudorobustus* will have good and positive effects on tree growth.

Effect on *Psilenchus hilarulus*

ANOVA of the recorded data of *Psilenchus hilarulus* ($F=1.556$, $P> 0.2260$) showed that poultry manure and carbofuran were effective. Histograms of the recorded data also showed that the population was declined in treated samples. Soil samples from tree treated with carbofuran were found saprophytic while trees treated with poultry manure had reduced population of *Psilenchus hilarulus*.

Effect of poultry manure and carbofuran on walnut tree

By applying poultry manure, soil health improves and nematode population in the soil decreases. As a result, it improves the plant growth which in turns improves the fruit yield. At the same time no toxic effects were observed in the environment because of poultry manure's environment friendly nature. By applying carbofuran, although the population is abated but since it is a chemical it can have adverse effects on animals, plant and underground water. With the eradication of nematode population, soil health improves resulting in better growth of trees and fruit yield.

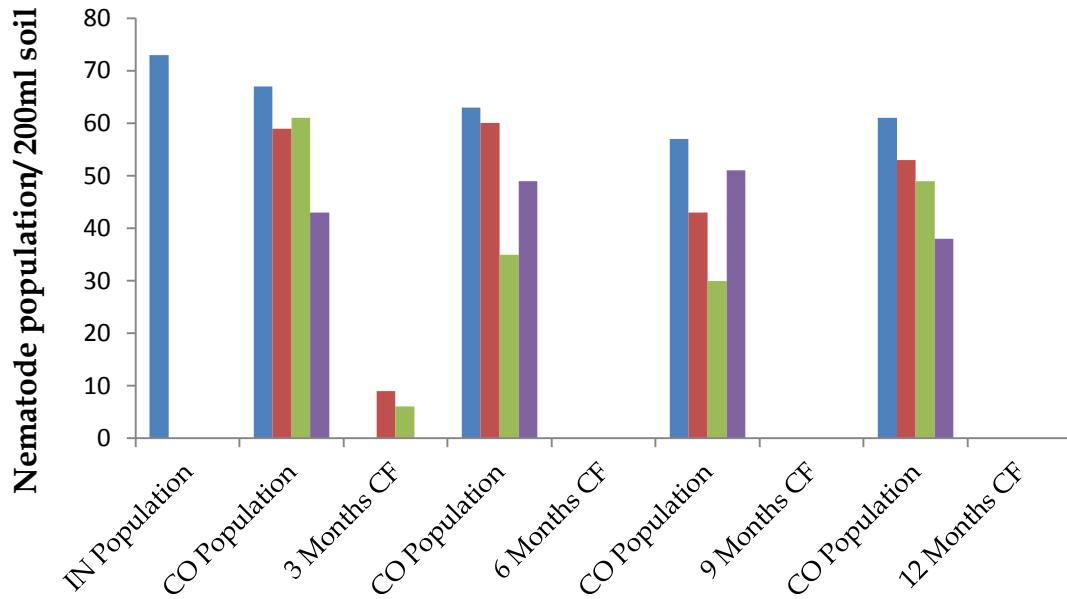


Fig.1. Histogram showing the effect of Carbofuran on nematode population.

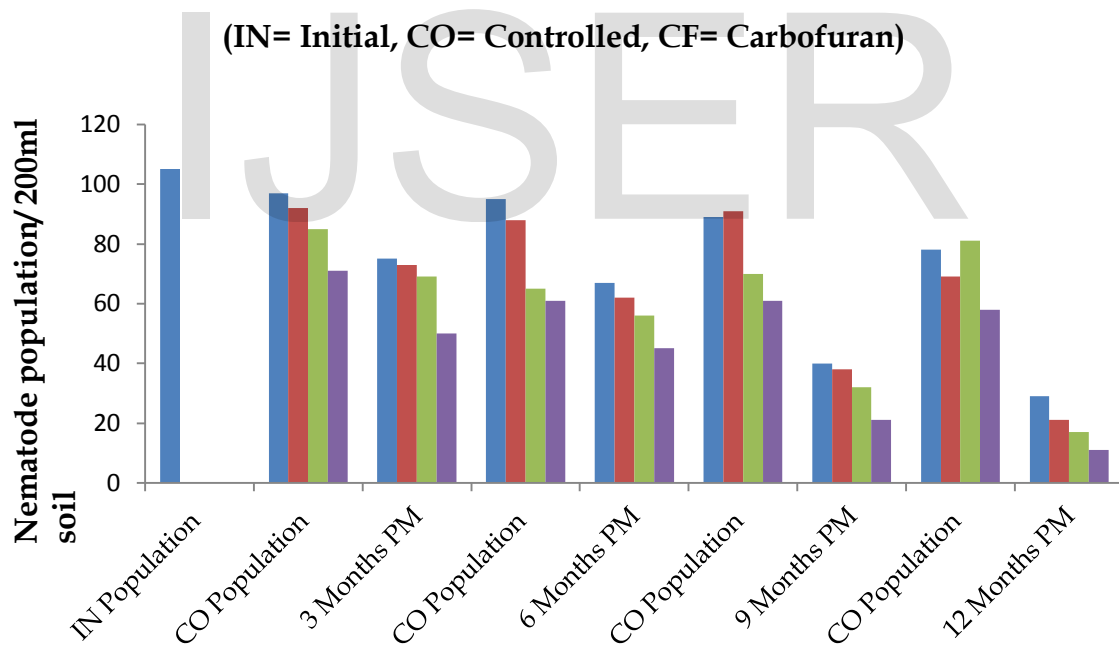


Fig.2. Histogram showing the effect of poultry manure on nematode population.

(IN= Initial, CO= Controlled, PM= Poultry manure)

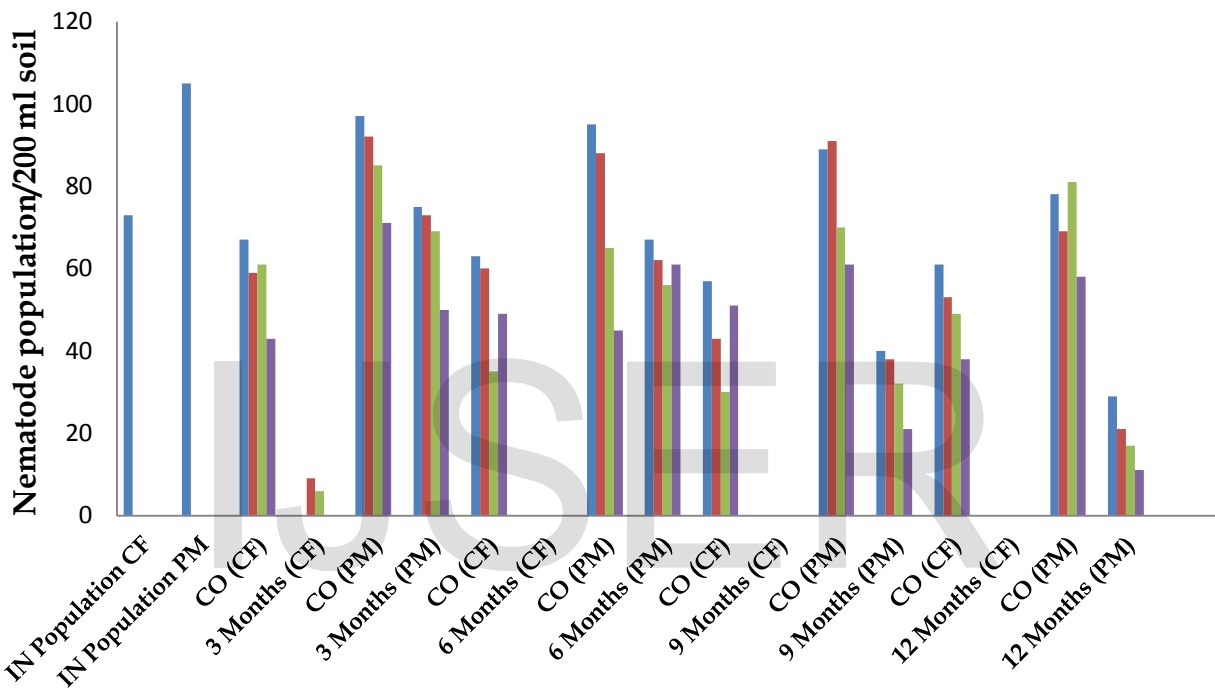


Fig.3. Histogram showing the comparison of effect of carbofuran and poultry manure on nematode population.

(IN= Initial, CO= Controlled, CF= Carbofuran, PM= Poultry manure)

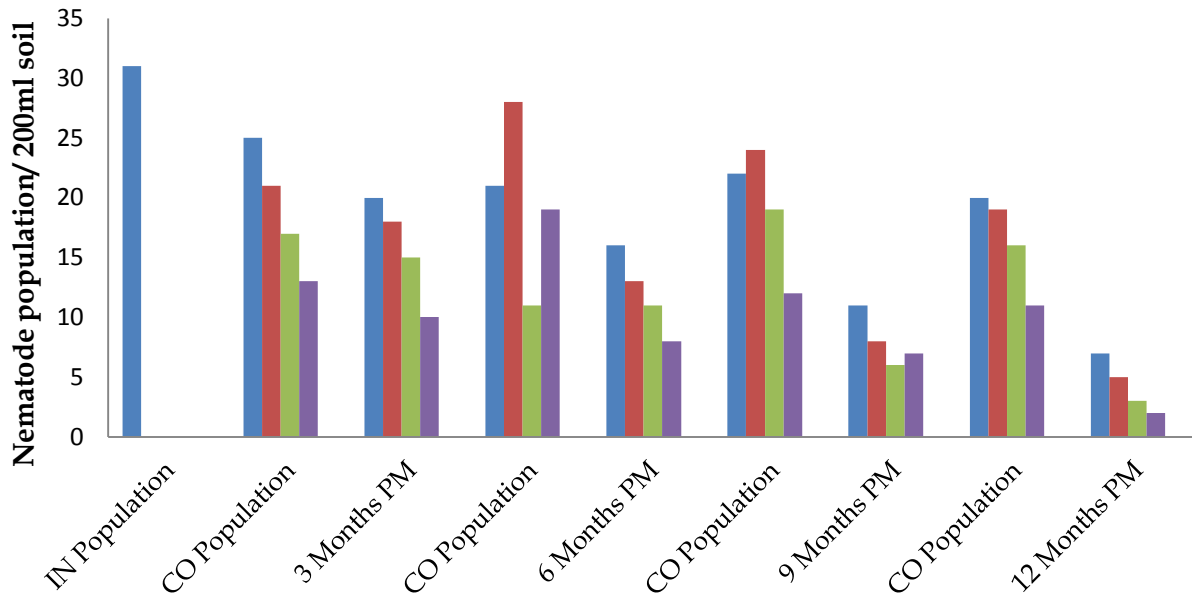


Fig.4. Histogram showing the effect of poultry manure on *Helicotylenchus pseudorobustus*.

(IN= Initial, CO= Controlled, PM= Poultry manure)

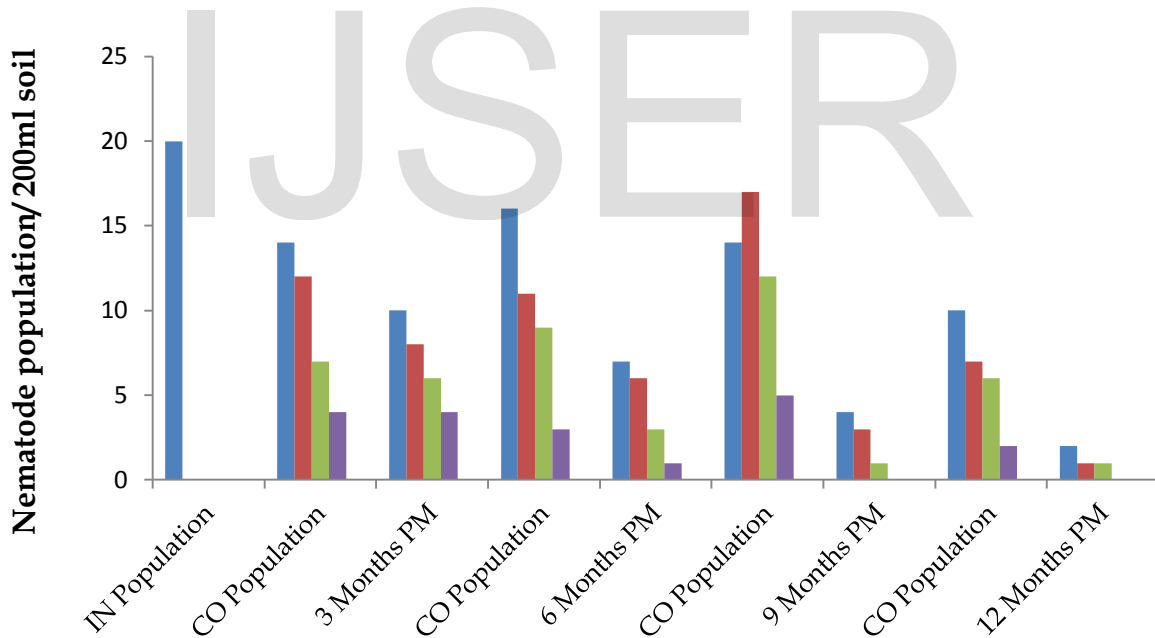


Fig-5: Histogram of effect of poultry manure on *Psilenchus hilarulus*.

(IN= Initial, CO= Controlled, PM= Poultry manure)

CONCLUSION

It is concluded that both nematicide and organic matter can be used to control and eradicate the nematode population which are real threat to the plant growth and health. Among them poultry manure is more suitable as it is organic and so less toxic as compared to nematicide. More profound results can be achieved by using nematicide along with the poultry manure. Poultry manure is environment friendly in nature. Poultry manure also improves the plant health and growth. The availability of the poultry manure is also very easy and is available anytime at low cost. Use of environment friendly material is the need of the time.

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