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# Control of wireworms by wood ash and aqueous extract of olives

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**Abstract:**

This study was conducted to evaluate the role of four concentrations ( 25, 50, 75 and 100 ) g /L from the aqueous extract of the olive wood plant and ash to control the worm, *Agriotes lineatus* (L.) ( Coleoptera: Elateridae). The results showed that the worm, *A. lineatus* mortality rate increased significantly when it reached the water extract of olive plant ( 10,30,50 and 70%) after three hours of treatment . While it reached using olive wood ash ( 30, 50 , 80 and 100%) after 24 hours .The results also showed that the ash of olive wood as is more effective than the aqueous extract of olive plant and the same concentrations above ,and the results were analyzed using a complete randomized design .

## Introduction

Wireworms are important and dangerous pests on potatoes, the species of the genus *Agriotes*, *Agriotes lineatus* (Linnaeus) ( Coleoptera: Elateridae) is one of the most important pest species on potato crop. Wireworms feed on newly grown seeds, small roots and seedlings, killing plants directly or injuring them (AL-Jorany and Sadik, 2014). These wounds are an ideal gateway to opportunistic pathogens that aggravate symptoms. In the potato crop, potato seeds can be dug in the spring into growing tubers in the fall. Symptoms are caused by the stage of immature larvae and can be up to 2 cm long, and have slender and cylindrical objects with a yellowish-white or coppery color. Crop damage is usually detected after planting and it is too late to take effective measures. This makes sure that the field is free from the worm. It is possible to implement a number of agricultural measures that help to reduce the acidity of the soil and create unfavorable conditions for the worm habitat (Vernon and Pats, 1997) The olive tree is one of the oldest trees that man has dealt with since ancient times (Guinda *et al* ., 2004). ‹Researchers have found that linoleic acid, which is present in olive leaves, can kill many bacteria, viruses and parasitic primitives (Gordon *et al.,* 2001). Ash is used as an organic fertilizer to improve agricultural soils, being a source of potassium and calcium carbonate and is an environmentally friendly alternative. It is used to control the smell of compost in agricultural applications, especially in fertilization. Studies show that kiln ash plays an important role in controlling pests of

stores .The ancient Egyptians relied on mixing grains with the ashes of furnaces because of its great role in absorbing moisture from grains and seeds ( Abdel Gawad and Khatab, 1985) , as well as scratching the layer of cuticle covering the body of the insect lose moisture and die ( Akob and Ewete, 2007).

**The aim of this study is** to evaluate the role of the aqueous extract of the olive wood plant and ash to control the wireworm, *A. lineatus*.

**Material and methods**

Samples were obtained from the soil of onion field in Kirkuk containing the worm and the soil PH was measured by a sunflower leaf. The color from yellow to red is an indicator of the acidic soil and placed in plastic cans capacity of one liter and covered cans with cloth .The olive tree pruning was then collected, the wood burned and the resulting ash sifted and sifted on a 40m sieve in order to obtain homogeneity of the ash pellets for use in subsequent experiments. Four concentrations of ash 20, 50, 75 and 100% were used ، Prepare aqueous extract after crushing the plant by 1-2 fabric / water using hot distilled water and placed in the incubator vibrator at 40 ° C for 48 hours after filtering by filter paper and then put the filtrate in the centrifuge for 4 minutes at a speed (4000 r / min), then was prepared Several concentrations (100,75,50 and 25) per sample, 10 wireworms were taken for each repeater and sprayed at the above concentrations using a plastic sprinkler and three replicates for each concentration. After three hours, the mortality rate was calculated, and the results were analyzed using the complete random design. Chemical detection of some active compounds in olive leaves was also used: Mulchen reagents, benedict, and iodine test to detect the presence of multiple clycosides. It revealed the aldehyde amino acids. and aqueous ferric chloride to detect phenols. Turbidity revealed resins. marquez (prepared from the addition of 40% formaldehyde to 10 ml of concentrated sulfuric acid) and a volume of 3 ml and picric acid 2 ml to detect alkaloids. The shaking method was also used in detecting soap. To detect the turbines, 1 g of dry extract was taken in a little chloroform and a drop of anhydrous acetic acid from concentrated sulfuric acid was added.

**Results and discussion**

The results of Table (1) of the olive plant showed that it contains the active compounds glycosides, phenolic compounds, resins, soaps, alkaloids and turbines. It was observed that there was a significant and direct effect on the worm *A. lineatus* mortality rate at different concentrations of olive leaf extract. The reason may be due to the presence of some toxic compounds resulting from the metabolic activities of the olive plant that affect and interfere with many physiological activities of the insect (Al-Araji, 2003). Bowers (1984) explained that larval mortality was caused by the action of certain plant compounds in killing the epithelial cells lining the insect's gut duct. As shown in Table (2), there is a direct correlation between the concentration of the extract of the olive plant and the percentage of insect decay as the percentage of wire worm decay using concentrations (25,50, 75 and 100). Wireworms and the results are identical with Abbas (1998) and Al-Rubaie *et al.* (2000). As for Table (3) a direct correlation was observed between the concentration of olive wood ash and insect mortality. The effectiveness of olive wood ash concentration was evaluated (25,50,75, and 100) g. The mortality rate was calculated after 24 hours due to the physical properties of the ash. Different types of ash are effective in protecting seeds from storage insects (Ofuya and Salami, 2002 and Appel *et al*., 1999). The modern control strategy relied on reducing the possible use of pesticides and replacing them with other safe materials and methods to preserve the environment (Hagstrum *et al.*, 2010). The most important

of these methods are the use of repellents, extracts, vegetable oils and furnace ash as one of the modern trends of insect pests. Ash is used as an organic fertilizer to improve agricultural soils, being a source of potassium and calcium carbonate and is an alternative to the environment , Ash is also light weight, so it is applied in a very large amount to make the soil alkaline due to low pH (Misra *et al.*, 1993 and Jean *et al*., 2015).

**Table (1) : Effective chemical compounds in olive leaf extract.**

| Effective chemical compounds | The result |
|---|---|
| Glycosides | + |
| Phenolic compounds | + |
| Resins | + |
| Alkali | + |
| Soaps | + |
| Turbines | + |

**(+) Means the presence of the compound in the plant extract.**

**Table (2): Effect of olive plant extract on *Agriotes lineatus* .**

| Concentrations / G / l | *Agriotes lineatus* | %Perdition |
|---|---|---|
| 25 | 9 | 10 |
| 50 | 7 | 30 |
| 75 | 5 | 50 |
| 100 | 3 | 70 |

**P - Value = 0.000**

**Table (3): Effect of olive wood ash on soil containing *Agriotes lineatus* .**

| | Concentrations / G / l | *Agriotes lineatus* | %Perdition |
|---|---|---|---|
| Time 24 | 25 | 7 | 30 |
| | 50 | 5 | 50 |
| | 75 | 2 | 80 |
| | 100 | 0 | 100 |

**p – Value = 0.000**

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