ΤΕΧΝΟΛΟΓΙΚΟ ΠΑΝΕΠΙΣΤΗΜΙΟ ΚΥΠΡΟΥ

ΣΧΟΛΗ ΓΕΩΤΕΧΝΙΚΩΝ ΕΠΙΣΤΗΜΩΝ ΚΑΙ ΔΙΑΧΕΙΡΙΣΗΣ ΠΕΡΙΒΑΛΛΟΝΤΟΣ

Πτυχιακή εργασία

Η ΕΠΙΔΡΑΣΗ ΤΗΣ ΥΔΑΤΙΚΗΣ ΚΑΤΑΠΟΝΗΣΗΣ ΣΤΑ ΦΥΤΑ ΛΕΒΑΝΤΑΣ ΚΑΙ ΦΑΣΚΟΜΗΛΟΥ ΚΑΙ Η ΧΡΗΣΗ ΤΩΝ ΑΙΘΕΡΙΩΝ ΕΛΑΙΩΝ ΤΟΥΣ ΕΝΑΝΤΙ ΤΟΥ *TETRANYCHUS URTICAE*

Σωτηρούλλα Λαουτάρη

Λεμεσός 2015

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Σωτηρούλλα Λαουτάρη

Σύμβουλοι καθηγητές
Δρ. Νικόλαος Τζωρτζάκης
Δρ. Μενέλαος Σταυρινίδης

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ABSTRACT

Cyprus in recent years has been facing a serious water scarcity problem. According to the Water Development Department of Cyprus, the annual rainfall of Cyprus and the flow of water to the dams in 2013-2014 was the lowest of the last 20 years. Water scarcity causes various adverse effects on the environment, and consequently in agriculture. Farmers often use supplemental irrigation if rainfall does not cover their needs, resulting in a substantial increase of production costs. The current study investigated the effect of water stress on the growth and essential oil quality of lavender (*Lavandula angustifolia*) and sage (*Salvia officinalis*) plants. In addition, the toxicity of essential oils to the two spotted spider mite (*Tetranychus urticae*) was evaluated. The plants of lavender and sage were grown in the Hydroponic Greenhouse of the Cyprus University of Technology in Limassol, under normal irrigation (no stress), medium and intense water stress. Measurements of plant growth parameters were carried out, including plant height, number and length of leaves, the number and thickness of stems, fresh and dry weight of the plant, as well as the concentration of phenols, chlorophyll a and b, total chlorophylls and the amount of essential oils hydrodistilled from plants. In general, plants under water stress, despite having degraded appearance, showed a better quality and yield of essential oils with higher concentrations of antioxidants (phenolic) substances. Essential oils from lavender plants under medium water stress caused significantly higher mortality to *T. urticae* females, than oils from plants under regular irrigation. Essential oils from sage plants under water stress caused similar mortality to *T. urticae* as plants under regular irrigation. The results of the study suggest that plant essential oils provide an alternative to chemical acaricides, for the management of *T. urticae* populations. Further experimental studies need to evaluate the toxicity of essential oils of additional plants to *T. urticae*, as well as their effectiveness under field conditions.

Keywords: lavender (*Lavandula angustifolia*), sage (*Salvia officinalis*), essential oils, water stress, two- spotted spider mite (*Tetranychus urticae*).