16th SYMPOSIUM

Samsun 2013

24-27 June, 2013



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European Weed Research Society

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TÜBİTAK

Investigation of allelopathic effect of some plant oils on germination of common vetch (*Vicia sativa*) and redroot pigweed (*Amaranthus retroflexus*)

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Common vetch (*Vicia sativa* L.) and redroot pigweed (*Amaranthus retroflexus* L.) are important weed species which are problem in many crops. In this study, allelopathic effects of plant oils belonging to different plant species on seed germination of common vetch and redroot pigweed were investigated. For this purpose, 12 different plant species (anise (*Illicium verum* Hook.f.), fennel (*Foeniculum vulgare* Mill.), castor oil plant (*Ricinus communis* L.), mustard (*Brassica alba* L.), black seed (*Nigella sativa* L.), clove (*Syzygium aromaticum* (L.) Merrill & Perry), eucalyptus (*Eucalyptus globulus* Labill.), peppermint (*Mentha piperita* L.), basil (*Ocimum basilicum* L.), orange (*Citrus sinensis* (L.) Osbeck.), grapefruit (*Citrus paradisi* Macfad.), lemon (*Citrus limon* (L.) Burm.f.))'s oils obtained by steam distillation and cold pressing methods were applied at various doses on seeds of these two weed species. Twenty-five seeds for common vetch and a hundred seeds for redroot pigweed put into each nine cm diameter sterile petri dishes. Different doses (0, 5µℓ, 10µℓ and 15µℓ) of plant oils were mixed with ten ml pure water and applied to petri dishes. Seeds of common vetch and redroot pigweed left to germinate at 20 °C and 30 °C, respectively. The seeds were counted on 3rd, 5th, 7th, 10th, 14th and 19th days from the beginning of the experiment and when their radicula length reached to 0,5 cm, accepted as germinated. As a result of the experiment, *Amaranthus retroflexus* was determined to be more sensitive to plant oils than *Vicia sativa*. The all plant oils (except *Ricinus communis* oil) inhibited germination of *Amaranthus retroflexus* at different ratios. Most effective plant oil was found *Syzygium aromaticum* against to redroot pigweed and *M. piperita, I. verum, F. vulgare* and *O. basilicum* was followed respectively. *S. aromaticum* oil reduced germination of *Amaranthus retroflexus* by 7%, 99% and 100% at the rate of 5µℓ, 10µℓ and 15µℓ, respectively. One of the most effective species was found *Mentha piperita* to redroot pigweed. The oil of peppermint reduced germination by 56%, 64% and 96% at the rate of 5µℓ, 10µℓ and 15µℓ, respectively. *Vicia sativa* was affected by just clove and peppermint oils. Reduction of germination by clove oil at the rate of 5µℓ, 10µℓ and 15µℓ was 96%, 96% and 100% respectively. Peppermint oil caused reduction of germination by 0%, 8% and 56% at the same ratio respectively. Efficacy ratio of the other species on germination of common vetch remained between 0% - 8% level at the highest dose. In conclusion, oil of *Syzygium aromaticum* was found the most effective plant oil among the tested plants for both weed species and it is promising that can be used in practice. Therefore, field experiments should be done.