

Investigating the effect of *Amygdalus scoparia* Spach tillage on some of the physicochemical properties of the soil

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Abstract

Finding the relation between vegetation and edaphic factors is significant for improving productivity, preserving species diversity, preventing financial risk. The present experiment was carried out to determine the impact of *Amygdalus scoparia* spach tillage on some of the physiochemical properties of the soil. Accordingly, three projects of *Amygdalus scoparia* tillage in Eghlid, Arsanjan, and Kazeroun in Fars province were selected. Soil samplings were obtained from two depths (0-50 and 50-100 cm) and two locations (under and between of *Amygdalus scoparia*) in a completely randomized block design with three replications. Samples were sent to laboratory to analyze variables including: organic materials, pH, absorbable phosphorus (PO_4 , P_2O_5), exchangeable potassium (K_2O), electrical conductivity, nitrogen percentage, moisture percentage, bulk density, and soil texture. The results indicated that due to the availability of organic material and moisture (at least in two sites) in the surface layers and a double increase in the amount of exchangeable potassium (K_2O) in the surface and deeper layers of the soil under *Amygdalus scoparia* (in comparison to the soil between the shrubs), this species has a protective impact for its under story species. Hence, it can be applied as a nursing plant for the rangeland species.

Keywords: *Amygdalus scoparia*, Physicochemical Properties, Soil, Fars

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The effect of gamma and Proline radiations on Callus germination and growth in rice (*Oryza sativa* L.)

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Abstract

The current experiment explored the impact of a pretreatment with gamma and proline radiations on the improvement of germination in rice var. tarom (Iranian local rice variety). Fully matured and perfect seeds were irradiated with 3 doses of gamma radiation (0, 20, 100 Gy). For callus induction and germination, the surface of treatment and control seeds were first sterilized and then cultured on MS medium supplemented with 3 doses of proline (0, 5, 10 mM). After 4 weeks, the weight and length of control and treatment calluses were measured. The results of analyses indicated that pretreatment with gamma and proline radiations significantly increases callus growth in comparison to the control sample. The growth percentage in treatment samples significantly differed with the control sample. Additionally, the maximum callus diagonal was observed in proline (10 mM) and gamma (20 Gy) treatments, while it was the minimum in the control sample. The maximum amount of callus wet weight was observed in proline (0 mM) and gamma (100Gy) treatments, whereas the control sample demonstrated the lowest amount of callus weight. The best and most appropriate treatments for quality growth and callus induction in rice were related to proline (10 mM) and gamma (20 Gy) treatments.

Keywords: Rice, Tissue Culture, Proline, Gamma Radiation

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Exploring the application of anatomical and micro-morphological structure of leaf in identification and separation of *Silene* sections and species (grown in the north-east of Iran)

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Abstract

Silene belongs to Caryophyllaceae family which has more than 700 species all over the world, with 98 species, and 14 sub-species growing in Iran. Considering the difficulty of identifying *Silene* species according to morphological properties and the lack of their separation, the present study investigated the anatomical structure of the leaf in 10 species and sub-species belonging to four sections (*Sclerocalycinae*, *Auriculatae*, *Melandrifformes*, and *Conoimorpha*) which grow in Mashhad and its countryside. Cross-section (12-Micron-thick) cuts of the leaf were prepared and stained by Safranin-Fastgreen. After separation, under-leaf epidermis was stained with Metylen blue and was studied using LM (with 100, 400, and 1000 magnification). The upper epidermis was studied by means of SEM (with 500 and 1500 magnification). Various anatomical properties including: the condition of mesophyll, the diameter of palisade and spongy mesophylls, the presence or absence of pilose and its shape, the density and type of stomata, and the number and shape of epidermis cells were used for separating the species. The results indicated that there was a difference between the arrangement and compression of palisade and spongy mesophylls among glabrous and pubescent species. Additionally, in *Conoimorpha* and *Melandrifformes* sections in which the plants are one- and two-year old, the condition of mesophyll is dorsiventral, whereas in *Sclerocalycinae* and *Auriculatae* sections which have older plants, the condition is isolateral. The type of stomata was diacytic in some species and both diacytic and anisocytic in some others. The SEM analyses also revealed differences in the shape and density of piloses.

Keywords: Micro-Morphology, Upper Epidermis, Leaf Anatomy, Caryophyllaceae Family, *Silene*, Mashhad

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Evaluating the yield and yield components in traditional and improved rice cultivars (*Oryza sativa* L.) in comparison to yellow nutsedge (*Cyperus* spp. L.)

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Abstract

In an attempt to investigate the effect of nutsedge (*Cyperus* spp. L.) density on yield and some of the yield components of the traditional and improved rice cultivars of rice, a field experiment was conducted at Agricultural Sciences and Natural Resources University of Sari in 2011. The treatments included four levels of the abovementioned weed (control, 60, 120, and 180 plants per square meter) and three rice cultivars (Tarom, as the traditional cultivar, Shirodi and Ghaem as improved cultivars). The study was carried out in factorial based randomized complete block design with three replications. The results of ANOVA indicated that there was a highly significant difference between weed density, cultivars, and their interaction in terms of fertile tiller number, plant length, filled and unfilled grain number, days remaining to 50% flowering and maturity, 1000 grain weight, panicle length, grain figure, and biological and grain yield. On the basis of the means comparison, the highest amount of plant height (122cm), 1000 grain weight (24.49 g), filled grain number (108 grains per panicle), and panicle length (28 cm) was observed in Tarom. The maximum of days to 50% flowering and maturity (113 and 122 days, respectively), tiller number per hill (23), fertile tiller number, biological and grain yield (1800 and 740 g m⁻², respectively) was recorded for Shirodi cultivar in control treatment. The minimum amount of these traits belonged to 180 yellow nutsedge per square meter. The results also indicated that the competitiveness of the rice cultivars was significantly different in various weed densities. Generally, the results of this experiment indicated that yellow nutsedge had high competitiveness ability even in low density and that an increase in the density of this weed up to 180 plant per square meter significantly and linearly reduced the yield and yield component of rice cultivars. Nevertheless, Tarom cultivar had the best competitive index in different nutsedge density due to its good physiological and morphological parameters.

Keywords: Yellow Nutsedge, Rice, Density, Weed,

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Decontamination of the soil polluted with Cadmium and Chromium by phytoremediation in *Lepidum Sativum*

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Abstract

The soil polluted with the heavy metals is a serious problem for the ecosystem and human health. Phytoremediation is an effective and economic strategy for removing toxic metals from the soil. The present experiment was conducted in pot culture using completely randomized design with different levels of Cadmium ($\text{CdCl}_2 \cdot \text{H}_2\text{O}$) concentrations including 0, 5, 50, 100 mg kg^{-1} and also chromium (CrCl_3) concentrations (i.e. 0, 50, 100, 150 mg kg^{-1}) with three replications. The results indicated that an increase in Cadmium and Chrome concentrations of the soil increases the concentration of Cadmium in *Lepidum Sativum* shoots and Chrome concentration was reduced ($P < 0.01$). Hence, *Lepidum Sativum* species is appropriate for Cadmium and Chromium absorption in phytoremediation strategy, but it is not recommended for high soil Chrome concentrations.

Keywords: Soil Pollution, Cadmium, Chromium, Phytoremediation, *Lepidum Sativum*

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An investigation and comparison of quantitative yield and morphological properties of Persian clover (*Trifolium resupinatum*) lines in Karaj

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Abstract

Considering the decreasing amount of livestock feeding supplies and the overgrazed rangelands in Iran, growing forage plants has gained a prominence. Clover, which is among the most important forage crops, not only produces high quality forage for animals, but also plays a special role in enhancing soil fertility through fixing the nitrogen of the air. Persian clover is one of the important subspecies of clover which is native of Iran and Mediterranean regions. In an attempt to determine the quantitative yield and morphological properties of 15 lines of Persian clover, a split-plot experiment was carried out in a completely randomized block design with 15 treatments and 4 replications in the 400-hectare research field of the Institute of Plant Breeding and Seed Preparation in Karaj. On the basis of the results, Lordegan cultivar with 62.63 t/ha in the first cut had the highest wet forage yield. From among the total cuts, Kurdistan, Lordegan, and Mahaliy-e Zabol second cut cultivars had the highest yields with 123.99, 121.98, and 119.58 t/ha, respectively. Regarding dry forage yield, the highest amount belonged to Mahaliy-e Zabol cultivar with 12.04 t/ha in the first cut and after all cuts, Eqlid-e Fars, Mahaliy-e Zabol, and Baladeh-e Kazeroun had the highest yields with 24.35, 24.25, 22.07 t/ha, respectively. With respect to morphological properties, the highest leaf to stem ratio in the first cut and the highest stem with 61.25 cm in the second cut belonged to Eqli-e Fars cultivar.

Keywords: Forage Plants, Persian Clover, Morphological Properties, Quantitative Yield

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Phytochemical evaluation of *Verbascum cheirantifolium* shoot (flower, leaf, and stem) essences of in Dena mountain slopes in Iran

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Abstract

Nowadays, curing diseases by means of medicinal plants is a challenging and significant issue. The present study aimed at exploring the chemical compounds in shoot essences (i.e. flower, leaf, and stem) of *Verbascum cheirantifolium*. Shoots were collected separately from the main habitats of the plant in the mountain slopes of Dena in Kohgyluyeh and Buyerahmad province during July 2011. After drying the shoots in shadow, their essences were extracted via digestion method. The chemical compounds of extracts were analyzed and identified by means of a gaseous chromatography instrument which was equipped with mass spectrometer (GC-MS). On the whole, 18, 16, and 18 compounds were respectively identified in the essences obtained from flower, leaf, and stem organs. The main substances identified in flower extracts included butyl ester, butanoic acid (35.29%), 1-Tert-butoxy-5-trimethylsilyloxypentane (18.82), and exo-cyanobicyclo [3.2.2] nona-3, 6-dien-2-one (11.16%). The highest amount of compounds in leaf essence belonged to butyl ester, butanoic acid (31.38%), 1,1-dibutoxy (16.76%), octal ester, 2,2-dimethyl-, and Propionic acid (10.25%). The highest amount of substance in stem essences belonged to butyl ester, butanoic acid (33.2%), 2,5-difluoro, Benzamine, (16.49%), and 8.exo.-cyanobicyclo [3.2.2]nona-3,6-dien-2-one (9.61%). Generally speaking, the results indicated that the compounds in leaf and stem organs were more diverse in comparison to those in the follower. Butyl ester and butanoic acid were the most significant and the highest amount of compound in all three organs under study.

Keywords: *Verbascum cheirantifolium* BOISS , Dena, GC-MS, Phytochemical, Extracts

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Exploring the antiviral properties of Alhagi maurorum extract for controlling the stereotypical factors of food-and-mouth disease (FMD)

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Abstract

Alhagi maurorum is medicinal plant and belongs to legume species which is commonly known as Camel thorn. Plant essences have been studied with respect to their antiviral effects. It has been observed that the majority of the essences extracted from plants comprise antifungal, anti-parasitic, and antimicrobial properties. The present study was carried out in two replications, in an attempt to investigate the impact of aqueous-alcoholic extract of alhagi maurorum on deactivating O, Asia, and C serotypes of FMD's virus. FMD is a fast-spreading viral disease which attacks even-hooves animals. The toxic degree of refined aqueous-alcoholic extract at 1.5, 1.10, 1.20, 1.80, up to 1.1280 concentrations was determined by means of IBRS2 cell and neutral red color. On the basis of the results, it can be argued that there was no significant difference between the amount of virus which was exposed to different concentrations of alhagi maurorum's aqueous-alcoholic extract and the control virus at 37 and 25 degree centigrade. Hence, the aqueous-alcoholic extract of alhagi maurorum does not have a preventing or neutralizing effect on the spread or infection of O, Asia, and C serotypes of FMD's virus.

Keywords: Food-and-Mouth Disease, Alhagimaurorum, Antiviral Effect

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A comparison of antibacterial activity of aqueous, Ethanol, and Methanol extracts of olive in two polluted and clean regions

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Abstract

Olive is medicinal which is nowadays grown as an ornamental plant in cities. Given the tendency of people to use herbs, it appears essential to explore whether the plants grown in cities have the same properties as the naturally grown plants or some of their traits are changed due to the pollution of the air in the cities. The antimicrobial effect of olive leaf extracts on the activity of two gram-positive (i.e. *Bacillus subtilis* and *Staphylococcus aureus*) and gram-negative bacterium (i.e. *Pseudomonas aeruginosa* and *Escherichia coli*) was explored under laboratory condition. Olive *Olea europaea* leaves were collected from a clean (district 22) and polluted (district 6 and 7) areas. Different aqueous, ethanol, and methanol concentrations (10, 20, and 50%) were prepared. To compare the antimicrobial effects of extracts, broad-spectrum antibiotics ciprofloxacin disks (CP) and Cefprozime (CT) were used. The analyses indicated that there was a significant difference in the activity of olive leave in clean and polluted areas and different methods of extraction. The highest amount of antimicrobial properties was observed in ethanol extracts. These extracts had antibacterial effect on *Escherichia coli*, *Pseudomonas aeruginosa*, and *Bacillus subtilis*, in clean area. Thereby, people should be informed that the olives planted in the polluted regions of Tehran (street, park, or houses) are merely ornamental and do not have medicinal value.

Keywords: Olive, Air Pollution, Antimicrobial, Antibiotic, Bacteria

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