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Allelopathic Weeds on Characteristics Seed Growth in Sorghum (*Sorghum Bicolor*l.)

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ABSTRACT

This experiment was conducted to determine the allelopathic effects of ***Loliumrigidum*** and ***Artemisia annua***extracts on ***Sorghum bicolor*** grain germination. The experiment was done during 2014, as a completely randomized block design with 3replications in the laboratory of the agricultural in **Shoushtar**City. The test treatments included different rates of extract from various plant parts of ***Loliumrigidum*** and ***Artemisia annua***consisting of organ, root, and aerialorgan/root combination, as well as variations of density in percentages of 0, 25, 50, 75 and 100.The experimental units were Petri dishes of3cm depth and 9cm diameter. The germination and rate of Sorghum bicolor plant was evaluated according to ISTA (International Seed Testing Association).The results indicated that extracts of ***Loliumrigidum*** and ***Artemisia annua***hadsignificant and various allelophathic effects on ***Sorghum bicolor*** grain germination. ***Sorghum bicolor*** plantdemonstrated a higher degree of sensitivity to***Loliumrigidum***extract particularly the root extract. The most significant allelophathic effect was related to extract of ***Loliumrigidum***root and ***Artemisia annua***aerial organs.

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INTRODUCTION

Rice [7] published a report documenting the history of allelopathy that began in the early 1800s than it has Dkandol (7). It was first discovered in 1832 that some plants secrete substances that have a harmful effect on other plants (6). Almost 50 years later in a report by Estynke the harmful effect on walnut trees from other plants grown in the vicinitywas proposedas a contribution to the field of research. Over 45 years later, another report was published on the joint effects of walnut. Later in 1937 a plant physiologist at the University of Vienna named Hans Molysh coined the term allelopathic. He provided the first definition of allelopathy, the term was defined to include all direct and indirect effects resulting from the transfer of chemicals from one plant to another plant.After Rice [7] who first wrote about allelopathy (7),the term was later defined to include both the positive and negative effects of one plant on another. This definition was been widely accepted. However, some ecologists agree thatonly negative effects are allelopathic. Although allelopathy has been known about for many years, it is only in recent years that it has become an acceptedfield for scientific research and discussion. One of the major problems with this connection is thatsoil is not necessarily an appropriate method for the isolation of allelochemicalcompounds but in recent yearshas significant progress been made in thisfield [4]. Plants such as weedshave many overlapping effects,and inallelopathy, special attention is paid to the interaction of chemicals in weeds and crops. Crops can also have allopathic abilities. The main objective of allopathicresearchis to manipulate these natural chemicals present in the growth of plants and microorganisms, and introduce them to an ecosystem or crop cultivation pattern. Another goal is the identification ofallelochmical plants or allelochemicalmicroorganismsin the environment. The effects of allelochmicalsare considerable, but few have been studied [5].There is much evidence in relation to the allelochmicaleffect on inhibition of weed growth, for example, it has been noted that there is a deterrent effect of soil contaminated with weeds such as *Agropyronspp*on hay, cotton, barley, oat and wheat.Many weeds have allelopathic effectson crops.It has been proven that velvetleaf affectsSorghum bicolor and cotton as a result of the effects of *Cyperusspp [1]*.An allelopathiceffect is caused by secretions of two types of substances that change the phonology of Sorghum ;these changes are based on analysis and identification of new sources and may be

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critical in determining the life cycle of ***Sorghum bicolor***, and planning for the timely application of control methods and effective implementation of combined methods of weed control.

MATERIALS AND METHODS

Laboratory tests were carried out on weeds in2014 at the Faculty of Agriculture;Shoushtar. Each experiment was repeated,amounting to 33 test units. The treatments were as follows:
-aqueous extract of ***Loliumrigidum***shoots
-aqueous extract of the underground organs of ***Loliumrigidum***
-extract of aqueous mixture of ***Loliumrigidum*** shoot + underground organs
-aqueous extract of aerial debris of ***Artemisia annua***
-extract of the water residue of ***Artemisiaannua***roots
-extract the aqueous mixture of air + limb residue of ***Artemisia annua*** roots
-aqueous extract of Artemisia annua+ air mixture residue of ***Loliumrigidum*** shoot
-extract of the aqueous mixture of ***Artemisia annua*** root residue + underground organs of ***Loliumrigidum***

All treatments were applied at four concentrations of extract, 25 and 50, 75 and 100%. Also treatments had a control (distilled water) with a concentration of zero;there were a total of 22 units in each experiment.

Test plan:

The experiment was conducted as a completely randomized design with four replicates.

Preparation of the aqueous extracts:

Loliumrigidum was collected from the field. The complete sorghum plants were washed in a laboratory with distilled water.The organs were separated and then ground. The extracts were thenprepared as follows; passed through a sieve of a millimeter in order to extract the concentrated extract of the first 10% weight by volume (10% extract in 100 ml of distilled water).Before the first extract the juice extract of the sorghum aerial organs, underground shoot, and the mixed extract of shoot and root, tumbleweed debris, mixed debris of *Artemisia annua*, wild shoot sorghum, Loliumrigidum and mixed debris mixed with remnants of the underground organs of *Artemisia annua*,*Loliumrigidum* mixture (air and water) were prepared and then added to distilled water to make the extracts that were then placed in the mixer for 24 hours. Then mixture of 4-layer cotton fabric is passed through and 15 minutes (5000 rpm) were centrifuged. Complete solution for the treatment of grade 1 Whatman filter paper was used, this solution was used as the base solution (10% weight by volume) and then from that concentration of 25, 50, 75 and 100% were obtained. Distilled water was used as the control.

Sorghum bicolor grain type, s, c704 was used as the plant indicator in a completely random design with 3 repetitions and 33 treatments. The treatments in the experiment consisted of *Loliumrigidum*and *Artemisia annua*extract (aerial organ, underground organ and mixture of both) and densities 0, 25, 50, 75, 100 percent of their extract. The test units were Petri dishes, diameter 9cm and depth 3cm. For prevention of growth and activity of the various microbes, both seeds and dishes were disinfected, then the 10 grains were placed on 2 layers, and 15 milt extract was added to each one. The Petri dishes were placed in the growth room day and night in complete darkness at the temperature of 25^0C. In order to neutralize evaporation and changing to the various extracts, the tops of the Petri dishes were firmly shut. Airing and counting sprouts was accomplished according to ISTA guidelines. Ultimate evaluations of germination rate, length, dry weight of rootlet and stem let of Sorghum bicolor grains, werecarried out on the basis of ISTA. So, to obtain dry weight of rootlet and stem let its, first, single samples were dried at temperature 60^0C for 4 hours at a time, and then finally weighed.Statical analysis was done using SAS software and Excel.Comparisonsof averages were done by LSD testing at 5%.

RESULTS AND DISCUSSION

Evaluate the effectiveness of various treatments of Loliumrigidumand Artemisia annuaroot extracts on the germination of Sorghum bicolor:

Based on analysis of variance with SPSS software these treatment levels were compared with Duncan's test and there was no significant difference between the treatment concentration of 25% and the control. Because the 25% level had a smaller*amount* of extract this was not enough to facilitate germination but at other levels, and with increased extract allelopathiccomparisons with the controls showed significant difference.And the uniformity of the curve with 25% of control levels, the decline curve is balancedAnd damaging effects to the treatment extract treated sorghum shoots and *wildArtemisia annua* is less. Most of the increase in speed of germination and germination rate (less over time) is,And what is certainThe presence of 3 or 4 live plants of two weeds *sorghum* and *Artemisia annua* or *sorghum*plant residue root and two *Artemisia annua*plants caused severe damage and had a tangible effect on *Sorghum bicolor* germination percentage and speed (3).

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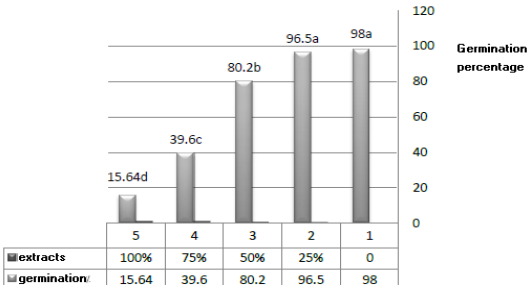

Chart 1: Evaluate the effectiveness of various treatments of*Loliumrigidum*and *Artemisia annua* root extracts on the germination of *Sorghumbicolor*.

Evaluation of different treatments of Artemisia annuaand Loliumrigidum root extracts on the germination rate of Sorghum bicolor:

In the treatments and controlsat all levels there were significant differences in the levels of curve that increased with higher levels. But the upward turn as an indicator of damage; was greater and longer according to the time taken for germination. The germination percentage was low; less speed (direct connection) was greater than the waiting time for germination. Andthis result is consistent with studiesby FereshtehRezaei in2006. And it is understandable from the physiological changes in seed composition and reception; that value and time of feeding had a significant relationship and that extracts from 50 percent to 25 percent of the amount of damage to its surface, unlike allelochmical showed.

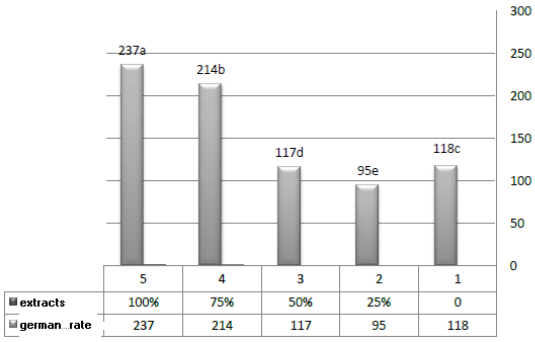

Chart 2: Evaluation of different treatments of *Artemisia annua* and *Loliumrigidum* root extracts on the germination rate of *Sorghum bicolor.*

Evaluate the effectiveness of various treatments of Artemisia annua root extract on the percentage and germination rate of Sorghum bicolor:

The significant difference between treatments with respect to time and at all levels is to control the level of damage was 100%,242 hours, indicates a very low germination rate and speed of germination. Better germination rate at 25% of the control. Good physical condition is due to the soil A total of Allelopaticall levels to wild-treated roots *Sorghum* But in less than 100 percent and 100 percent of the treated Allelopatictreated *Loliumrigidum* roots that it has changed the speed ratio.

Assessment of various treatments of Loliumrigidum root extracts on germination rate and percentage of Sorghum bicolor:

All levels of the treatment and control were significant. The direct dependence of the germination treatment values.It is marked with a specified amount. That it fits well with all levels of significant difference in germination rate and germination rate at 25 percent, but the damage is even more evidence that it dates back to the seeds of destruction, forced to sleep seed, and seed damage and physical injurie. In addition to the treatment extract root Artemisia annuahad less damaging and a more positive effect on germination rate (2).

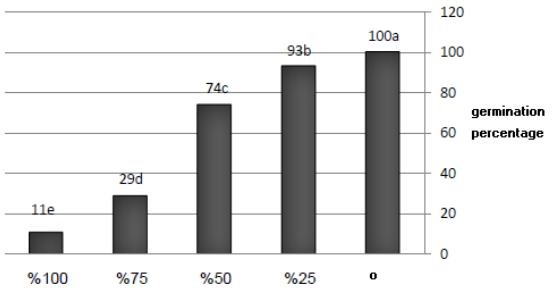

Chart 3: Evaluate the effectiveness of various treatments of *Artemisia annua* root extract on the percentage of *Sorghum bicolor.*

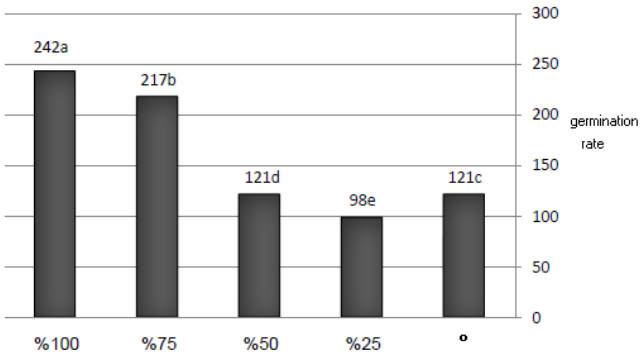

Chart 4: Evaluate the effectiveness of various treatments of *Artemisia annua* root extract on germination rate of *Sorghum bicolor.*

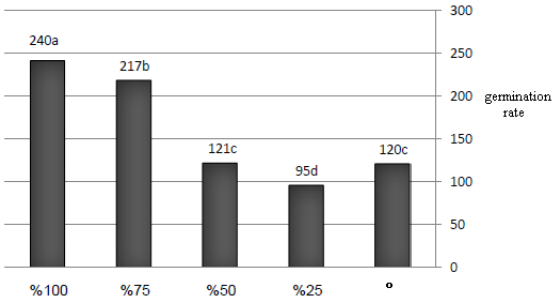

Chart 5: Assessment of various treatments of*Loliumrigidum* root extracts on germination rate *of Sorghum bicolor.*

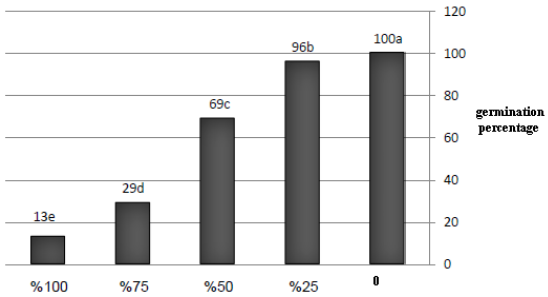

Chart 6: Assessment of various treatments of *Loliumrigidum* root extracts on germination percentage of *Sorghum bicolor.*

Weed competition, will narrow niche ecological crops and the poorer. Production and cause damage in different stages of plant growth substances Allelopatic and are the product yield. Use of allelopathicmethods of weed control instead of chemical pesticides can reduce environmental pollution and this is the most important reasons for conducting research such as this. To investigate the effects of a loss as Allelopaticthat Barry is one

sided. Understanding of nature and ecology of weeds in the cycle and the relationship with biotype biochemical is required.The results showed that the concentration of the extract, andduration of the treatment residual weed Allelopatictheir roots both in the direct loss of more than all the attributes of length, surface, weight, and crop yield.In all treatments the most damage resulted from a concentration of 100% plant extract and the lowest level of damage was from the concentration of 25% compared to the controls.In addition, some 25% higher level of damage was not alone, but due to the physical conditions that were good for *Sorghumbicolor*root growth than the conditions of the control. Comparison of the effects of treatments, and red root *Artemisia annua*plant was demonstrated both on *Loliumrigidum* had also caused damage. This result highlights the worth of this experiment for the identification of natural herbicides for weed control and thereforewarrants further research. Most of allelopathic effect was incurred at her stage of germination, seedling establishment and *Sorghum bicolor* (the crisis) in addition to competition for water and food during this time, however the best time for weed control is before planting the *Sorghum bicolor* or during the critical first trimester of the growth stage. With a concentration of extract at 50%, significant damage to the various organs and other harmful effects can be controlled. An amount of 75 to 100 percent juice Or 4 to 5 living plants per square meter of living than the weeds in a *Sorghum bicolor*field is recommended*Sorghum bicolor*, Finally, the expense and lack of economic justification to show that this field of *Sorghum bicolor* to be placed under the care and economic losses seeking to prevent the outcome. It is recommended that the plant extract be plowed on to a *Sorghum bicolor*field as a form of green manure.

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