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Control of invasive aquatic plant *(Eichhornia crassipes)* by using extract of medicinal plant

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Abstract

(*Eichhornia crassipes*) is herps had develop a serious environmental problem in Iraq. it contributes to the major part of ecological hazards from the invasion of foreign plant species . Allelopathy interactions are based primarily on the production of secondary chemicals by higher plants that produce a wide array of biochemical compounds that create biological changes , therefore, this herb was growthen in the (4 basine) with the addition of a quantity of water (Calotropis procer) to each basin and added a quantity of the treated plant (45 cm × 82 cm) in the form of powder. The results were observed externally through the descriptive description and internally through the biological indicators in the herb of the Nile During the seven days of growth and follow-up .. The most effective concentrations in controlling the growth of herb Nile is the second (20 mg/L) where the results were prominent and excellent in this concentration.

Keywords: Invasive species, Eichhornia crassiprse , biological control , medicinal plant

Introduction

An invasive species is a non-native species whose introduction does or is likely to cause economic or , environmental harm or harm to human, animal, or plant health. The National Invasive Species Management Plan indicates that NISC will focus on non-native organisms known to cause or likely to [1]. Pollination ause negative impacts and that do not provide an equivalent or greater benefit to society is a major regulating service of high economic, nutritional, and cultural value. About 35% of the global plant-based food supply requires animal pollination, primarily by bees, in order to set fruits and seeds

or increase yields The economic value of pollination services to agriculture is considerable (and the production of insect-pollinated crops is vulnerable to pollinator decline .Understanding the economic impact of invasive pollinators on pollination is crucial for maintaining agricultural and natural plant communities. [2].

Detection is defined as the ability to document the presence of a species, especially one that is rare in abundance compared to other species , Monitoring is defined as documentation of species' relative abundance over time. The goal of this research is to compare the utility of four methods to accurately describe all species present and their relative abundance, with particular interest in each method's ability to detect early-establishing exotic invasive or rare species. While mapping and survey methods that focus on particular species can efficiently describe the distribution of those species and monitor them for adaptive management purposes[3]. Severe contamination of water resources including groundwater with iron (Fe) due to various anthropogenic activities has been a major environmental problem in industrial areas water hyacinth (*Eichhornia crassipes* (Mart.) Solms) in constructed wetlands (floating aquatic macrophyte-based plant treatment systems) to phytoremediate Fe-rich wastewaters seems to be an appealing option [4], . Water hyacinth also has been found to stabilize pH .levels and temperature in experimental lagoons, thereby preventing stratification and increasing mixing within the water column [5], Dissolved oxygen levels can reach dangerously low levels for fish when large water hyacinth mats prevent light infiltration or when a relatively large area of plants decompose at the 20 same time. Dissolved oxygen less than 5 mg l-1 are known to adversely affect function and survival of most fish, and less than 2 mg l-1 can lead to fish kills[6]. Biological controls are often viewed as a long-term, sustainable solution to water hyacinth control. Host specificity is Ideally, the introduced agent will have a narrow critical to any successful biological control programme range of requirements to keep the effects focused on the target plant but broad enough to maintain a viable population when the host plant water hyacinth include various insect species and introduced plant pathogens [7] . Biological control is an environmentally sound and effective means of reducing or mitigating pests and pest effects through the use of natural enemies. The aim of Biological Control is to promote this science and technology through publication of original research articles and reviews of research and theory. The journal devotes a section to reports on biotechnologies dealing with the elucidation and use of genes or gene products for the enhancement of biological control agents. [8].

Materials and Methods:

Sample collection:

The first tank was the control, the second and the third , the fourth another step was added to the herb of the Nile the powder of the plant (calotropis procer) at three different concentrations respectively (10 mg /L, 20mg/L ,30 mg/L) . with equal amount of water in the tanke and left to grow to observe the growth of the herb By kheldahal method (Hesse,P.R. 1971([9] determination the amount nitrogen Other elements of (Ca,K,Na,) were estimated after the preparation of the solvent as previously reported by a device (Flaim photometer).

Statistical analysis :

For statistical analysis of the current study Duncan design was used for laboratory experiments and data were analyzed to study the inhibition capacity of *An.azolla* and at least significant difference was used to compare the significant difference between means at $P<0.05$.

Result and Discussion:

Germination tests found that water hyacinth seeds germinated on filter paper media soaked in distilled water while placed in petri dishes held at a constant temperature of 27 C for 14 d. Seed mortality test results found that seeds of water hyacinth were rendered inviable at temperatures equal to or above 57 C [10]

In the four ponds, description extraction there was a gradient in the withering of the leaf, yellowing and weak growth according to the gradient in increasing the concentration added respectively. However, we noticed that the concentration (20mg /L) is the most concentrated in the the results indicated the nitrogen values, which were considered an .paper, small in size and yellow indicator of the biological growth and metabolic functions of plant cells and protein production. The nitrogen ratio of the herbaceous plant decreased with the increased concentration of the treated plant. This means that the (*calotropis procer*)plant affected the metabolic factor of protein production and the lowest production rate was in the concentration The second (20 mg/L) because this means that the metabolic pathways have been different in the entry of the carobon component and the synthesis of carbon and converting it into protein compounds and that the presence of the treated plant affected it ... through A decrease in the rate of metabolism or photosynthesis and disability due to the addition calotropis procer of to the water of compounds that led to a decrease in the rate of breathing and exploitation (Co2) , which reduced the production of protein and this is to double the growth and thus with the increased concentration of the plant treated by The plant begins with the breakdown of carbohydrate compounds for the production of (C) and the use of breathing , and to benefit from the respiration and this led with increasing the concentration of the treated plant to the weak structure of In the statistical analysis, there were no significant differences .the plant (Nile herb) (table 1). [11] between the concentrations except the weakness in the vegetative growth of the leaf and wilt, especially in the second concentration, it was noted that the most concentrated response to the Nile herb from the plant treated by the cause of the saturation that reached the plant (herb of the Nile) The third concentration of the plant calotropis procer has a higher effect that is less stable and may be due to the location of the plant in the light The concentrations of ions and elements according to the results indicated in the table that there is a high gradient towards the opposite concentration of the this means a defect in the permeability of the plasma .(*calotropis procer*) plant in the ocean membrane of the cells of the(herb of the Nile) because of the addition of *(calotropis procer*) materials of the latest imbalance of ionic between and outside the cells This is called the electric voltage difference of the cells so that it is moved from From the upper concentration area (the ocean) to the low concentration area (inside the cell). Therefore, the significant differences of the calcium component in the second concentration of the by treated plant [12]

The difference between the concentration of sodium and potassium is physiologically the normal form of the cells, so the percentage of(Na) was the opposite of the ratio of potassium and the best proportion was the best form of slow growth of the Nile herb(20mg) (table 2)[13].

(Table 1: N,Ca,K,Na in leave of Eichhornia crassipes in 3 concentration)

Tanks	N%&M.S.	Ca	K	Na
Control	1.12	53	53	17
Concentration 10 mg /L	1.05 ±1.01 0.02	1064 ±1061.000 2.64	50 ±50.000 1.000	26 ±17 26.000
Concentration 20 mg/L	1.0 ±1.00 1.000	1588 ±1585.66^{888} 4.93	151 ±151.000 1.000	23 ±23.000 1.000
Concentration 30 mg/L	0.9 ±0.9000 1.000	2378 ±2378.000 1.000	12 ±127.000 1.000	39 ±39.000 1.000

(Table 2 : wet and dry weight and a ratiof chlorophyll in leave of *Eichhornia crassipes* in 3 concentration)

Tanks	Wet weight	Dry weight	Chlorophyll
Control	1.12	0.08	0.082
Concentration 10 mg/L	0.57	0.01	0.003
Concentration 20 mg/L	0.3	0.01	0.002
Concentration 30 mg/L	0.2	0.002	0.086

($p < 0.05$)

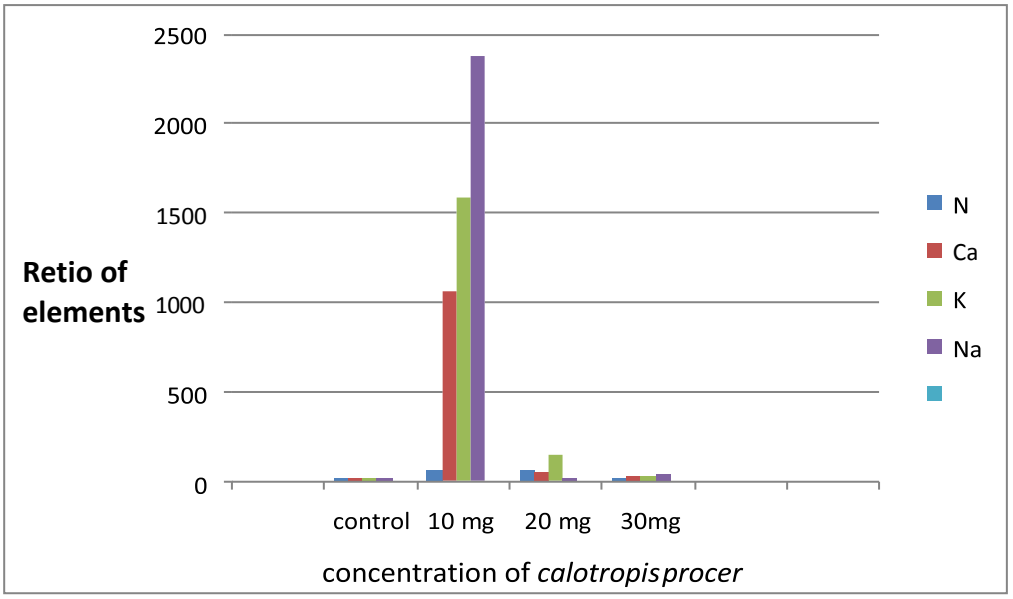

Figure (1) : Elements (N,Ca,K,Na) in Eichhornia crassipes opposite concentration calotropis procer treatment by using extract of medicinal plant.

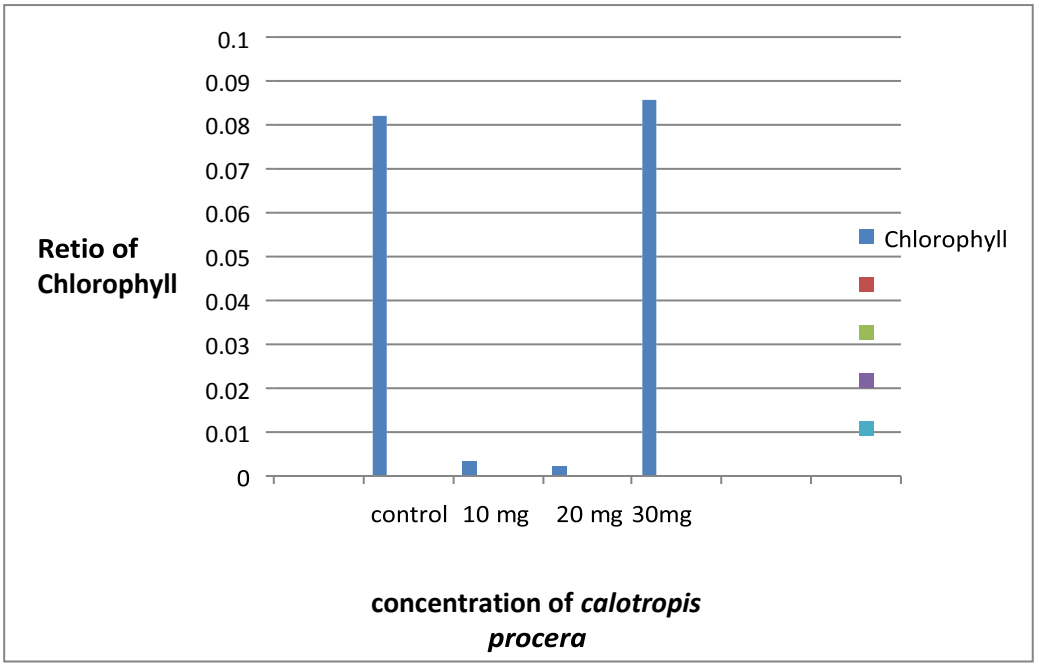

Figure (2) : Chlorophyll in Eichhornia crassipes opposite concentration calotropis procer treatment by using extract of medicinal plant.

Conclusion:

The results of this study show that there is a strong possibility of using (*Calotropis procer*) as a biological control agent, to limit the growth and diffusion of (*Eichhornia crassipes*) , as well as the extract of (Calotropis procer) can be used for further work with other plants that need to be controled. The application of Plant extracts provid an eco - friendly method and have no dangerous residue on the environment and living organisms

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