

The impact of Ground water at pesticides Addition to wild reeds Control that grow in the archaeological Kufa city as sample.

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Abstract:

This study aimed to reed control that growth around the archaeological area. However the two herbicides differed in chemical composition and application were used. The first one Roundup 48%, is a organophosphate herbicide effective against weeds. The second Clethodium 36% is an cyclohexanedione it is a post growth herbicide used to control common weeds and annually plants The hydraulic conductivity of these herbicides was tested their ability to reach the groundwater in clay soil. the values scored (1.67) (1.37) cm.hour⁻¹ in the Roundup 48% Clethodim 36% treatment respectively compared to the value (0.39) cm.Hour⁻¹ of the control treatment. the pointed to the both pesticides were able to reach and damage the groundwater it was so risky especially in rainy days.

Then the field trial of both herbicides were applied in the dry and hot season directly to the reeds and shrub's beyond they treated with a plant growth regulator (cytokinins) it aimed to stimulating of the growth Plant and dormant buds and increased pesticide effect on the dry weight of vegetative parts , the rhizomes , the number of branches after sequencing the pesticide treatment While it studied growth characteristics like a number of branches it decreased significantly and reached (9.8). (15.2) Branch 0.5/m² and the reduction rates were (53%) and (25%) for both pesticides Roundup 48% Clethodim 36% treatment vs. the control treatment (20) Branch 0.5/m². Meanwhile the mean the rhizome dry weight (0.75), (0.53) kg 0.5/m² and the percentages of decreased were (51%) and (40%) for both pesticides Roundup 48% , Clethodim 36% vs. the control treatment (400) kg 0.5/m² .The total dry weight of the vegetative parts reached means (230). (314) kg 0.5/m² With decrease rates of (23%) and (50%) for both pesticides Roundup 48% ,Clethodim 36% against the control treatment (400) kg 0.5/m² .

1- The introduction:

Kufa is ground features are defined by the flat, alluvial Mesopotamian Plain, hot desert climate, and dense historical architecture. Positioned on the Euphrates River's western bank at a latitude of about 32.05 and a longitude of 44.44. Kufa is an Iraqi city and a district center administratively belonging to Najaf Governorate in the central Euphrates region, south of the capital Baghdad., the city features minimal natural elevation changes, prominent river

embankments, and deep layers of ancient Islamic archaeological ruins hidden beneath the surface Kufa is a historic garrison city located roughly 10 kilometers northeast of the Imam Ali Shrine in Najaf. Its primary geographic and built features include The terrain is dominated by the flat Mesopotamian Plain (3). The underlying soil is alluvial, primarily formed by the historic flooding of the Euphrates River and the branch passing through the city the water

features were the city runs along the Shatt al-Kufa (one branch of the Euphrates River), which features engineered embankments to prevent flooding and manage agricultural irrigation (11).

Above it caused the rise of groundwater in the city of Kufa is due to its proximity to the huge course of the Euphrates River, which leads to large amounts of river water seeping through its channel into the surrounding lands. A few practical studies in this area to control the common reed known as phragmites is of the phocaea family with originates from Eurasia. It is found in marshes and in shallow water along

2. Material & Methods:

2.1.Preparation of the standard doses:

To prepare different concentrations of a solution for UV-Vis spectroscopy, use the serial dilution method (1) starting from a concentrated stock solution. By using Standards solution putted in normative flask capacity 100 ml and added water as a diluent to obtain Stock Solution basis with concentration 1000 mg/L then used the dilution process to prepare the 100 mg/l solution Use this solution in to get initial solution 10 mg/l Which prepared work solution then made series of Roundup insecticide (R0 =water, R0.5 =50 ppm, R1 =100 ppm, R1.5 =150 ppm) By made series concentration took from the stock solution (4800) mg/l. the OD For the pesticide at

the shoreline of lakes, ponds, swamps, ditches, streams, canals, rivers, and estuaries. Once established, Phragmites spreads by rhizomes and often forms dense, mono specific colonies. Rhizomes are reported to grow up to control wild or invasive reeds (such as Phragmites), the most effective chemical method is the direct application of systemic, broad-spectrum herbicides Glyphosate was a systemic herbicide highly effective on reeds above the water line. It is absorbed by the foliage and translocate to the roots (2),(14).

(190-210) nm for the calibration line, with R² 0.98 as correlation coefficient fits with curve. and in the same way attended a series Clethodim pesticide (C0 =water, C0.5 =50 ppm, C1 =100 ppm, C1.5 =150 ppm) dissolving each concentration took from the stock solution (3600) mg/l. the OD for the pesticide at (250-270) nm to calibrate line with coefficient value 0.99 R². This method allows you to generate a multi-point calibration curve and determine the concentration of unknown samples using Beer-Lambert's law could be expressed by the equation $A = \epsilon l c$, where A represents absorbance, ϵ is the molar extinction coefficient, l is the length of the medium, and c is the concentration of the solution (9).

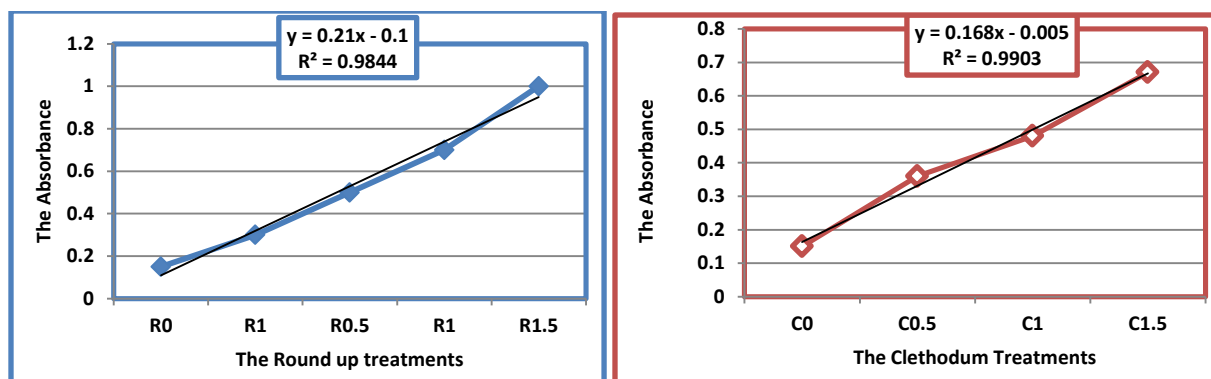


Fig (1) shows the standard curve for round Up, clethodium herbicides via spectrophotometer.

Chemical group / Molecular weight	Chemical composition	Active ingredient/solubility mg.Lnr-1	Trade name
C ₃ H ₈ NO ₅ P 169.08		Phosphoglycine	Roundup
C ₁₇ H ₂₆ ClN ₃ O ₃ S 359.9		Cyclohexanedione	Centurion Plus

Table(1) the chemical structure of the both herbicides.

2.2.The Filed Experiment:

It carried out in the common filed located at 32°02'00.08"N 44°21'56.70"E Kufa city an effected with reed and cans during dry

season in Summer 2025 with R.C.B.D design (treatment=4 doses* 2 types of pesticides *blocks=3) the control process made for the weed grow stages then some of green feature were studied (branches Number, dry weight of green parts, Dry weight of rhizomes)the results analyzed via

SPSS 2010 *($D_{0.05}$ =Dunett's comparison at significant level 0.05).

2.3.The Application:

Round Up Spray directly on the foliage of actively growing weeds on a calm, dry day. Most formulas are run fast within 1 to 4 hours. mix according to the instructions on the label. For example, some advanced concentrates require a dilution of roughly 200 mL per 1 L of water (8).

Clethdiom is applied post-emergence using ground or aerial sprayers, and should be applied when the grass weeds are young and actively growing. Systemic Action . It is absorbed by the foliage and translocate down to the roots and growing points. Mechanism: It inhibits the ACCase enzyme, which is essential for fatty acid synthesis in grasses, leading to plant death within 7 to 14 days (4).

2.4.Soil water conductivity:

This physical property of water and soil was estimated using a method the shallow

$$K = \frac{1.15 r \left[\log_{10} \left(h_1 + \frac{r}{2} \right) - \log_{10} \left(h_2 + \frac{r}{2} \right) \right]}{\Delta t}$$

where that:

K= water conductivity of the soil. **r**= the radius of the hole. **h1**= water depth in the hole.**h2**= water depth in the hole beyond limited time. **tΔ**=the difference of the time.

3.Results and discussion:

well pump and include this is amazing the method on measurement size Water The flow horizontally from hole Keeps In it on Water compressor fixed by float where It is holes by drill The diameter 10 cm to required depth during soil intended examine it then scratch surface interior for the hole To remove drilling operation effect on water entrance condition to soil and fill The pit with water (PH=7.8,EC=4,5 ds.m⁻¹) to level required and the water remains when this level by tied raft topic above surface on basin water. The soil's water conductivity was measured in two stages for three replicates with soil had features (PH=7.5,EC=5,5 ds.m⁻¹,OM=1.2,Clay=43 gm.kg) by passing pesticide solutions according to the recommended concentrations of the two pesticides respectively, and the values were calculated at equilibrium Steady State value. Then second stage begins with measuring the water conductivity of the control treatment by passing water only., it is calculated using the following equation (10).

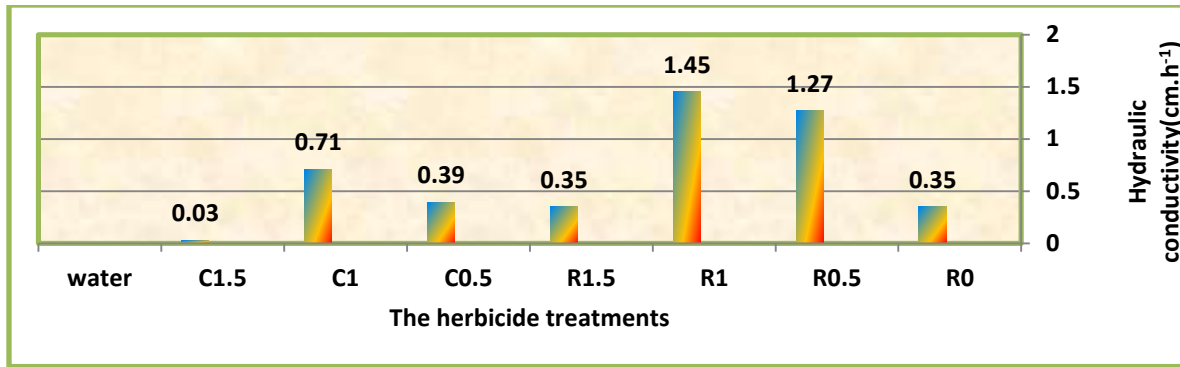


fig (2) the hydraulic conductivity of both pesticides in the clay soil.

3.1 The Pesticides Motions:

The figure (2) explains the impact pesticides in those values according to water saturated, so It observed that values increased Roundup pesticide 48% of soil studied, and it reached less Value it had (0.71,1.27,1.45) , cm.h⁻¹ with ($D_{0.05}=0.17$) . While it reached for the pesticide Clethodim 36% (0.71,0.39,0.35) cm.h⁻¹ with ($D_{0.05}=0.01$) compared to control treatment to (water only) Which reached values (0.03,0.04,0.05) cm.h⁻¹ ,($D_{0.05}=0.21$) respectively . This variation in pesticide

movement is related to a number of factors specific to the pesticide itself (chemical composition, active group, stability) and different soil properties : organic matter, cation exchange capacity, soil texture (7). Because the pesticides are oregano-phosphorus groups Roundup and chloride membership Clethodim These pesticides, characterized by their stability in the soil for more than 12 weeks (5),(13).

3.2 Branches Number:

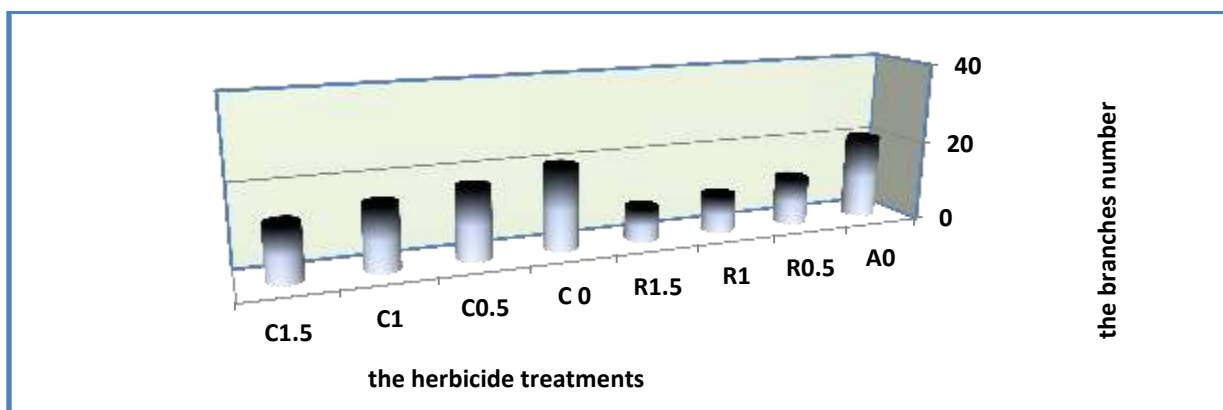


Fig (3) The impact of pesticides on branches Number.

The results indicate that fig (3) The significant effect of pesticides in reducing

the number of branches after adding a pesticides (Roundup and Clethodim) It

reached (11.7, 9.3, 8.2) , (13.2,15.4,17.3) branch / 0.5 m² at ($D_{0.05} = 0.32$, 0.25) respectively . the decrease ratios of pesticides were (60, 55, 44) and (35, 25, 16) Compared to the treatment Control. Whatever the plants continued to grow

normally during the lowest levels. this result could be showed to the fact that compounds (cytokinins) stimulated bud growth by breaking top dominance and releasing the rhizome buds of dormancy tending to green aerobic parts (2), (6).

3.3. Dry weight of rhizomes:

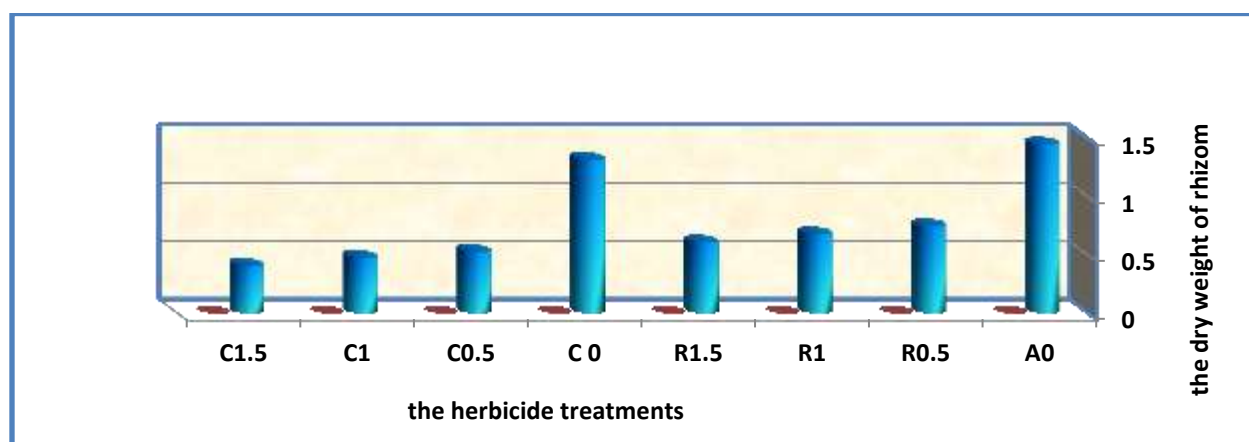


Fig (4) The impact of pesticides on the rhizome dry weight .

The results shows that fig (4) The significant effect of pesticides reducing the rhizome dry weight through adding a pesticides (Roundup and, Clethodim) It reached normally to its lowest level. It reached (0.61, 0.68, 0.75), (0.41, 0.48, 0.53) kg/0.5m² at ($D_{0.05} = 0.46$, 0.32) respectively compared to the control treatment . The variety of the highest average rhizome dry weight reached 1.45 kg 0.5/m² . Because the plants continued to exhibit normal growth and branching and leaf formation under the

control treatment causing an increase in the dry weight of the aerial vegetative parts due to increased dry matter accumulation. However, treatments with the addition of pesticides may inhibit photosynthesis and nutrient production, beside causing the death of many branches and leaves, reducing the dry weight. So that lowed the pesticides efficiency to kill perennial weeds especially rhizome types like reeds the unstable relation between the source & sink throw spry treatment (4),(15).

3.4. The total dry weight:

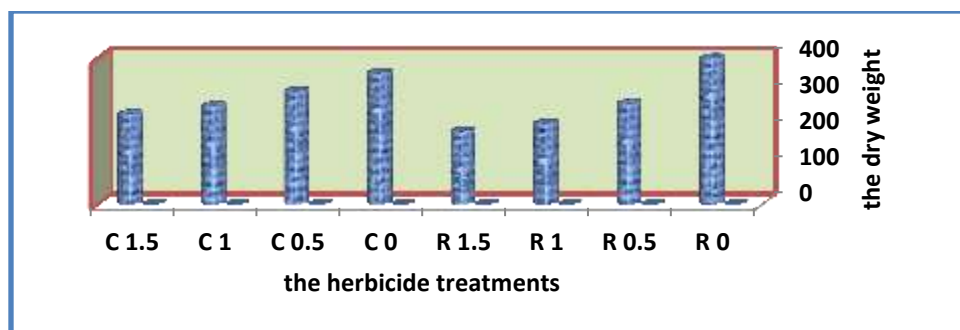


Fig (5) The impact of pesticides on the total dry weight.

The results fig (5) refers to the significant effect of pesticides in reducing the total dry weight after adding a pesticide (Roundup and Clethodim) It reached (275, 221, 200) , (310,269,247) kg/0.5m² at ($D_{0.05}$ = 65 , 53) respectively .

the decrease ratios of pesticides were (32, 38, 50) and (15, 25, 30). So this conduct came from the huge existence ratio of buds on rhizomes in dormancy it arrives 90% especially the sites non explosion to external factor made most rhizomes buds Sites ineffective. That never accumulated

enough Quantities of pesticides into those sites to kill. So that the modern studies of control programs for perennial weeds must focus on study possibility change pattern growth pattern relationship between sink – source by motivation growth buds convert it the Sites effective site metabolically Because these weeds allocate carbon and nitrogen reserves to underground organs (sinks) for winter survival and spring regeneration, altering this growth pattern is the key to preventing long-term re-infestation and spreading (12), (15).

The Recommendations:

- Using the Clethodim pesticides more saver than the Roundup because the low move to the ground water.
- Using the Clethodim pesticides more effective than the Roundup in the dry weight of rhizome.
- Chronically this study open the entrance to dig out the residual effects of these pesticides after addition via the concentration knowledge.
- Focusing in the root system at the application & growth features should be most perfectly way to the next studies.
- Considering those pesticides as environmental friends in summer season there was no harm to add it in the hot times.

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