

EFFECT OF GLYPHOSATE ON DODDER (*Cuscuta sp*) WEED GROWING WITH CLOVER (*Trifolium alexandrinum L*).

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The experiment was conducted during the Agricultural season 2008 in the green house of Field crops .Dept , College of Agriculture and forestry. The effect of different doses of glyphosate (48 , 96 ,144 ,192 ml/ha) with different durations time of herbicide application after (10,20,30days) of plant clover infestation were studied . Dodder can competes strongly with clover , potentially reducing clover growth . Fresh and dry weights of dodder were decreased at the first and second durations of herbicide application . The height of plant & no . of branches were significantly higher at the first duration whereas the dry weight of stems, leaves and roots were significantly decreased as the time of application increased . On the other hand , fresh and dry weights of dodder plants were reduced as the doses of herbicide increased . Clover plant height and no . of branches were increased as the glyphosate doses increased .Dry weights of leaves , stems and roots were inversely related to the dose of glyphosate Fresh and dry weights of dodder were negatively related to the dose of herbicide at all durations of herbicide application . The results of the present study showed that glyphosate caused a clear damage on dodder plants whereas clover plants did not obtain any sign of damage had less effect on it .

Introduction

Clover (*Trifolium alexandrinum L*) is an important leguminous Forage crop used for cattle food . It could be used for feeding in different ways . It is widely suppressed by weed infestation especially with parasitic weeds . In Iraq, dodders (*Cuscuta sp*) considered as a serious parasitic flowering plants (Altekreetee et al 1981). Dodder seeds has the ability to remain viable for many years (Karapetyan 1972 , Ashton 1976) . Maddah , 1976 showed that about 94% of the seedling emerged during a period of 3 weeks from 4 to 25 April . In Morocco , it was found that the decrease of crop yields was due to the presence of dodder plant which were estimated from 20 to 50 % (Saffour 1999) . Similar results were also recorded in Algeria with yield crops losses range from 5-100 % . In Iraq , until now there is no clear strategy in the control of dodder weed . Only an old or traditional method are usually used by the Iraqi farmers such as solarization , herbicides , resistant varieties , trap and catch crops or cultural methods (sowing delayed, distance between plants...etc). Burning are usually used in the case of heavy infestation Norris 1973 . Chemicals are used successfully to control dodder plants in some border countries of Iraq (Abu-Irmaileh and Fucik ,1989).The lack of chemicals and their high costs increases the difficulties in the use of herbicide in the farm .It could be control dodder after it attached with clover by means of chemicals , but this sort of treatment may have a negative effect on clover forage . This was confirmed through
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a research conducted in Egypt by Hacquet et al(1983) who reported that glyphosate at 75-150 g/ha and its analog sulfosate (touch-down) control dodder directly and through their systematic movement within the host phloem system : He added that glyphosate can be applied to clover after dodder cutting . Different doses and application of glyphosate used in Egyptian clover Abd-El-Hamid and shebl , (2000) , Hassanein and Ibrahim ,(2000) .The work described in this study is an attempt to through some light on the factors which govern the effect of time of application & different doses of glyphosate on the behaviour of dodder weed when the plants growing together with foliage crop (*Trifolium alexandrinum* L) .

Materials and Methods

On 28 September 2008 , 10 seeds of Egyptian clover (*Trifolium alexandrinum*) were sown at 1.5 cm deep in 40 cm diameter plastic pots filled with loamly soil in green house at the Field crops dept , College of Agric & Forestry , Mosul Univ .A segments of dodder plants which infested clover crop after one week of emergence were selected. Glyphosate was applied post – emergence by hand sprayer at rates of 0.0 , 48 , 96 , 144 , 192 ml.a.i./ha in 300 L ha⁻¹ of water , with different duration time of applications (after 10 , 20 ,30 day of plants crop in infestation). Watering was done by overhead irrigation using a watering can with a fin rose. The experiment was laid out as a completely randomized design with three replicates arranged on a bench in the green house . At harvest , 60 days after plant infestation , fresh and dry weights of dodder plants were estimated per pot . Moreover crop branch numbers , plant height and dry weights of leaves, stems and roots of three plants per pot were measured. Data were subjected to analysis of variance using the SAS satatistical package . comparison between treatment means was done by Duncans Multiple Range Test.

Results and discussion

Effect of duration time of glyphosate application : Table (1) shows that durations of time application had a high significant effect on dodder fresh weight . The fresh weight of dodder plants infested 30 days after spraying was significantly higher than those treated 10 or 20 days durations. The herbicide reductions were 0.112 and 0.071 g for 10 and 20 days duration of application respectively . The reason for this reduction may be attributed to the fact that a high temperature enhanced the effect of herbicide on the plants especially where the plants were still young at the first duration of application .The opposite trend was obtained from the same table for dry weight of stems , leaves and roots where the values were significant weight when the plant treated of days after spraying as compared with those infested 20 or 30 days after treatment . This results are in agreement with those of Dawson and Saghir . (1983) who found that the duration time of herbicide application was more effective on the control of dodder particularly 20 days after infestation on dodder . Hight of clover plants did not affected in the 1st duration as compared with the 3rd duration whereas the hight of plants in the 1st duration significantly were higher with average of 2.39 cm compared with the second duration .Number of branches at the 1st duration were significantly higher with average of 0.14 and 0.17 as compared with the 2nd and 3rd duration respectively. Similar results were obtained for Number

of branches at the first duration which had a significantly higher values as compared for those found at the second and third durations time of herbicide application. It seems likely that when herbicide applied after 10 days of duration the effect was more obvious on the clover plants than dodder, but as the application herbicide delayed for 10-30 days of duration, the clover plants did not show any serious effect.

Effect of glyphosate rates: Table (2) shows that using glyphosate herbicide at different doses were significantly affected the characteristic of dodder plants infested with clover crops. The fresh and dry weights of survival dodder plants were inversely related to the dose of herbicide. The higher the dose of herbicide used the more damage of dodder plants occurred. These results were fully supported by Fer (1983) who reported that using glyphosate high dose was more effect on dodder live plants. Plant height and branch numbers of clover plants were significantly reduced as the dose of herbicide increased but this reduction did not reach to the level of significant effect when using the herbicide at dose of (921ml). On the other hand there was a tendency that plant height increased with increasing herbicide doses. It seems likely that the effect of dodder on clover plants were reduced as the herbicide doses increased. The great reduction of clover plant height and no. of branches were only seen when using herbicide at doses of (48,96,144,192). There is a clear evidence from table (2) that dry weights of leaves, stems and roots increased as the doses of herbicide increased and the dry weights of all these characteristics were significantly reduced as compared with the control treatment.

Interaction effect of durations and herbicide doses : Table (3) shows that the interaction between doses of herbicide and the durations of time of application had a significant effect on all characters studied. The mortality of dodder plants was clearly obtained at the first duration whereas the dodder plants had a great opportunity to survive at the 2nd and 3rd duration times of application. The same results were reflected on the fresh weights of dodder plants. The reason for this may be due to the fact that the effect of herbicide dose caused a high damage on the dodder plants at the first duration of application as compared with any time of application. These results are in agree with those found by Moshalenko and Dement (1991). The dry weights of dodder plants had follow the same pattern of fresh weight. The plant height of clover plants were significantly reduced with increasing the dose of herbicide but this interaction did not reach the significant effect especially when using the dose (144 and 192) at the first duration of application and 192 ml in the third duration as compared with untreated control plants. It can be concluded that increasing the dose of herbicide led to a great damage to the dodder plants and this gave a good opportunity to the clover plants to survive and produces new shoots and grow again with a good establishment. There was a clear evidence that herbicide had no effect on clover characters which had been studied. Moreover, it has been noted that dodder plants were more sensitive to the dose of herbicide than of clover plant. No. of branches for plants survived when glyphosate applied at dose of 192 ml at the 1st duration were significantly higher as compared with all other treatment.

Table (1) : Effect of durations time of glyphosate application on the characteristics of dodder plants growing with clover crop..

Durations time of application	Freshweight (dodder)g/plant	Dry Weight (dodder)g/plant	Length of plant cm	Number of branches/plant	Dry weight(stems) g/3plant	Dry weight(leaves) g/3plant	Dry weight(roots) g/3plant
10	0.158 b	0.0448 b	30 a	1.43 a	0.943 a	0.751 a	0.758 a
20	0.199 b	0.472 b	27.61 b	1.29 b	0.876 b	0.733 b	0.717 b
30	0.270 a	0.0788 a	29.39 a b	1.26 b	0.816 c	0.703 c	0.727 b

Table (2) : Effect of glyphosate rates on the characteristics of dodder plants growing with clover crop...

Doses of herbicide	Fresh weight (dodder)g/plant	Dry Weight (dodder)g/plant	Length of plant cm	Number of branches/plant	Dry weight(stems) g/3plant	Dry weight(leaves) g/3plant	Dry weight(roots) g/3plant
control	Zero d	Zero c	36.67 a	2.33 a	1.230 a	1.103 a	0.933 a
Infection without spray	0.725 a	0.200 a	21.33 d	1.23 b	0.393 f	0.244 f	0.548 e
48	0.391 b	0.1130 b	24.00 c d	1.06 c	0.589 e	0.488 e	0.680 d
96	0.093 c	0.0190 c	26.11 c	1.00 c	0.802 d	0.731 d	0.747 c
144	0.039 c d	0.0065 c	31.67 b	1.00 c	0.988 c	0.884 c	0.688 d
192	0.008 d	0.0027 c	34.22 ab	1.33 b	1.159 b	0.924 b	0.808 b

Table (3) : The Intraction of durations and time herbicide doses on the characterties of dodder plants growing with clover crop..

Durations of time	Doses of herbicide	Fresh weight (dodder)g/plant	Dry Weight (dodder)g/plant	Length of plant cm	Number of branches/plant	Dry weight(stems) g/3plant	Dry weight(leaves) g/3plant	Dry weight(roots) g/3plant
10	control	Zero c	Zero c	36.67 a	2.33 a	0.933 a	1.10 a	1.320 a
	Infection without spray	0.725 a	0.22 a	20.00 f	1.23 c	0.573 e	0.267 i	0.450 k
	48	0.108 c	0.053 b	24.67 c-f	1.0 c	0.720 c	0.527 g	0.627 i
	96	0.075 c	0.004 bc	27.00 b-d	1.0 c	0.770 c	0.787 e	0.873 g
	144	0.041 c	0.0125 bc	35.00 a	1.0 c	0.727 c	0.920 c	1.090 d
	192	Zero c	Zero c	36.67 a	2.00 b	0.823 b	0.905 c	1.247 b
20	control	Zero c	Zero c	36.67 a	2.33 a	0.933 a	1.10 a	1.320 a
	Infection without spray	0.725 c	0.20 a	21.67 ef	1.23 c	0.520 f	0.243 I j	0.397 l
	48	0.289 b	0.048 bc	21.00 ef	1.13 c	0.670 d	0.483 h	0.577 j
	96	0.107 c	0.027 bc	26.00 c-e	1.0 c	0.743 c	0.723 f	0.783 h
	144	0.063 c	0.004 bc	28.33 bc	1.0 c	0.663 c	0.877 cd	0.987 f
	192	0.011 c	0.004 bc	32.00 ab	1.0 c	0.770 c	0.970 b	1.190 c
30	Control	Zero c	Zero c	36.67 a	2.33 a	0.933 a	1.10 a	1.320 a
	Infection without spray	0.0725 a	0.200 a	22.33 d-f	1.23 c	0.550 ef	0.223 j	0.333 m
	48	0.774 a	0.239 a	26.33 c-e	1.0 c	0.650 d	0.453 h	0.563 j
	96	0.098 c	0.026 bc	25.33 c-f	1.0 c	0.727 c	0.683 f	0.750 h
	144	0.013 c	0.0036 bc	31.67 ab	1.0 c	0.673 d	0.857 d	0.887 g
	192	0.012 c	0.004 bc	34.00 a	1.0 c	0.830 b	0.897 cd	1.040 e

Values within dody of the table followed by the same letter are not significant different at $p < 0.05$ according to Duncan test .

تأثير مبيد الكلايوفوسيت في الحامول (*Cuscuta sp*) النامي على محصول البرسيم
(*Trifolium alexandrinum* L).

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الخلاصة

دراسة عن مكافحة الادغال المتطفلة في محصول البرسيم ، نفذت التجربة خلال الموسم الزراعي ٢٠٠٨ في الظلة السلوكية لقسم المحاصيل الحقلية / كلية الزراعة والغابات ، اشتملت التجربة عاملين الاول تراكيز مختلفة من مبيد الكلايوفوسيت صفر 48 ، ٩٦ ، ١٤٤ ، ١٩٢ سم^٣ مادة فعالة / هكتار فضلا عن المقارنة بدون اصابة والعامل الثاني فترات رش مختلفة من مبيد الكلايوفوسيت ١٠ و ٢٠ و ٣٠ يوم بعد اصابة نبات البرسيم بالحامول ، طبقت التجربة بالتصميم العشوائي الكامل وبثلاثة مكررات ، انخفض الوزن الرطب والجاف للحامول في الفترة الزمنية الاولى والثانية لرش المبيد بينما ارتفاع النبات وعدد الفروع تفوق معنويا في فترة الرش الاولى أما الوزن الجاف للسيقان والاوراق والجذور فقد انخفض معنويا بزيادة استخدام المبيد بطريقة اخرى ، الوزن الرطب والجاف لنبات الحامول انخفض بزيادة تركيز المبيد ، ارتفاع نباتات البرسيم وعدد الفروع يزداد بزيادة تركيز المبيد ، الوزن الجاف للاوراق والسيقان والجذور يرتبط عكسيا مع تركيز المبيد الوزن الرطب والجاف للحامول يرتبط بشكل ايجابي بتركيز المبيد في كل فترات الرش للمبيد النتائج اظهرت بان مبيد الكلايوفوسيت يسبب تأثير واضح على الحامول ولم يكن له أي ضرر معنوي على البرسيم البرسيم .

References

- Abd El-Hamid , M.M. and S.M.Shebl.(2000).Weed control research. Section Field Crops Res . Institute , A.R.C.Giza, Egypt.
- Abu-Irmaileh , B.E.and ,J.E Fucik.(1989) Using glyghosate to control eastern dodder on citrus in Jordan . HortScience 24,311-312 .
- Altekrette R.A, T.Y.Rezek, and , H.A Alromme . (1981) Forage Crops and Pasture . Mosul Univ .
- Ashton,F.M.(1976) . *Cuscuta* spp. dodder . A literature review of its biology and control . Bull . Div. Agric. Scien.Univ.Cal.(1):22pp.
- Dawson ,J.H.and A.R.Saghir (1983). Herbicides applied to dodder (*Cuscuta* spp) after attachment to alfalfa(*Medicago sativa*) Weed Science 31 :465-471 .
- Fer , A.(1983) Investigation of a new strategy for dodder using systemic herbicides . results with labelled molecules in the laboratory (in French. In Compte Rendu de la 12e Conference du COLUMA1,pp.179-186.
- Hacquet, J. ; R. DumontFer.; A.Cadot and Rousselot . 1983. Account of trials in 1982 and 1983 for dodder control in lucerne. 12th Conference Columa, pp. 196-178.
- Hassanein E.E. and , H.M. Ibrahim . (2000) . Weed Control Resaerch . Section , field crops Resaerch . Institute , A.R.C.Giza,Egypt .
- Karapetyan , N .O.1972 . The effects of the depth and duration of burial of dodder seeds in the soil on the germination . Izvestiya- selskohozyaistvennykh-Nauk-Armyanskoi-ssr..5,49-54.
- Maddah, M.B.(1976). Prolonged emergence of dodder (*Cuscuta* approximate Bob.) in alfalfa . Iranian Jornal of plant Pathology . 12:3/4,29.
- Moshalenko , G.P.and ,P.E Dement'ev, (1991) Control of *Cuscuta* species (in Russian) .zashchita Rastenii 4, 48-49.
- Norris,R.F. 1973. Winter weed control in alfalfa- shattering the myth. Calif Weed Conc. 25th Annual. Anaheim. (C.F. AL-Jubori, B.A and Al- Hasawy, K.S. 1982. Weeds and Weed Management.)
- Saffour . K.(1999) La cuscute (*Cuscuta* spp) dans le Sais le pre-Rif : Importance enemis naturels . In Klein , O. &Kroschel , J.(ed) :Rapport final d' activites duprojet supraregional Ecologie et gestion des plantes parasites 1992-1999 Description du projet , resume des activites , recommandations et liste de publications projet Supraregional Ecologie et Gestion des plantes parasites ,Fes , Maroc . 59-62.