RESIDUAL EFFECT OF SOME SYSTEMIC INSECTICIDES APPLIED AS SOIL TREATMENT AGAINST COTTON APHIDS AND MITES

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Abstract

Four granular insecticides namely Vydate, Temik, Nemacur and Furadan were applied on cotton at planting at the rates of 10, 7, 15 and 15 kg/f. Gawsho was mixed with cotton seeds at the rate of 7 g/kg seeds before cultivation. To evaluate the residual effect of the systemic insecticides against cotton aphids, *Aphis gossypii* Glover, and the mite , *Tetranychus arabicus* Atttiah, samples of cotton leaves were taken at random from each treatment after irrigation at the intervals 2 , 3 , 4 , 5 , 6 and 7 weeks.

Results clearly showed that Temik was the most effective granular insecticide against aphids. It has a long residual effect uptil week 7 after treatment. Furadan produced a similar patttern but to a lesser extent. Gawsho exhibited moderate but stable toxicity during the fist 5 weeks . Vydate and Nemacur showed low toxicity along the exprimental period.

Data also indicated that the tested insecticides were ineffectice against the mites *T. arabicus* Attiah except Temik which showed high and moderate toxicity at weeks 2 and 4, respectively.

INTRODUCTION

Cotton is the most important economic crop in Egypt . It is liable to attack by sucking pests early , mid and late in the season. In recent years, aphids have become a major pest in cotton and inflicted a considerable damage to leaves.

Apart from that, the honey dew secreted by the pest causes the black sooty mould which covers the leaf surface and prohibits photosynthesis.

Since aphids are found underneath the leaves, insecticidal sprays can rarely reach them by the common aireal or ground application, a situation necessitating to reconsider the use of systemic insecticides as and effective means for aphid control.

The present work aims at evaluating the residual effect of some systemic insecticides applied as soil treatment against contton aphids and mites.

MATERIALS AND METHODS

Five groups of twelve pots each (25cm) were cultivated with cotton seeds . Each group received one insecticidal treatment . Four granular insecticides namely : Vydate (oxamyl 10% granules) (N, N - dimethyl - 2 - methylcarbamoyloxyimino - 2 - (methylthio) acetamide) ; Temik (aldicarb 15% granules) (2- methyl - 2- methythio) propionaldehyde - o - methylcarbomoylxime); Nemacur (fenamiphos 10% granules) (ethyl - 4 - methylthio - m - tolyl iso propyl phosphoramidate) and Furadan (carbofuran10 % granules) (2,3 - dihydro - 2 ,2 dimethylbenzofuran - 7 yl methylcabamate) were applied at planting. Gawsho (imidachloprid) (nithromethyl derivative 70% granules) was mixed with the seeds before cultivation (seed dresing).

The insecticides were applied at the following recommended rates : Vydate 10kg / f, Temik 7 kg / f, Nemacur 15 kg /f, Furadan 15 kg/ F and Gawsho 7 g/ kg seeds.

After cultivation and treatment the pots were irrigated, then left under field conditions .

To evaluate the biological residual effect of the systemic insecticides, samples of cotton leaves were taken at random from each treatment after 2, 3 , 4, 5 , 6, and 7 weeks from cultivation.

For aphicial tests the cotton leaves were put on wet cotton wools placed on small plastic dishes. By a fine brush, 10 adult aphids were transfered to a small plastic cage that was placed on the cotton leaf and fixed with a rubber band. Each

tratment was replicated 3 times . The cages were kept under laboratory conditions for 24 h after which percentage mortality was recorded.

The procedure of siegler (1947) was adopted for mite tests. A disc of two inches in diameter was cut from every treated leaf, then put on a cotton wool wetted with tap water placed in a 9 cm Perti dish. Ten adult females were transferred to the leaf disc by means of a fine brush. Petri dishes containing the treated discs and mites were kept under laboratory conditions. Each treatment was replicated 3 times. After 24 h, alive and dead animals were counted and percentage mortality was recorded.

RESULTS AND DISCUSSION

The systemic and residual effects of the tested insecticides against the cotton aphid *Aphis gossypii* Glover are shown in Fig. I . It is clear that Temik was the most effective insecticide agatinst aphids. It was capable of protecting cótton leaves from infestation until week 7. This is evident in 80% mortality achieved at this period. The mortality percentages in the preceding periods were also high and fluctuated from 30 to 83.3%. The same results were obtained by pond (1967) who found that Temik when applied at planting in furrows at thte rate of 16 ounces of active ingredient per acre was the most effective granular systemic insecticide for the control of the green peach aphid *Myzus persicae* (Sulzer), the potato aphid, *Macrosiphum euphorbiae* (Thomas) and the buckthorn aphis , *Aphis nasturtu* Kaltenbach on potatoes.

Furadan was also satisfactorily effective but was comparatively less than Temik. At the same corresponding dates, the percentages of mortality were 33.3 , 50 , 83.3, 33.3 and 73.3 %, respectively . As for the new compound Gawsho, percentages of mortality during the first three periods (weeks 2,3 and 5) were stable and fluctuated around 70%. With the lapse of time , mortality percentages declined to 35 and 26.7 at weeks 6 and 7, respectively .

Vydate and Nemacur were far less potent than Temik and Furadan. Their percentage kill never exceeded 33.3% along the experimental period.

It seems evident from the results demonstrated in Fig. 2 that the same chemi-

cals when tested on *Tetranychus arabicus* Attiah, were not effective as they were on *Aphis gossypii* Glover. Except for Temik which was highly potent two weeks after application (94.4%) and moderately effetive two weeks later (70%), Vydate, Nemacur and Furadan were nearly ineffective. The new chemical Gawsho, produced a low level of mortality three weeks after treatment (45%) whereas at all other intervals was practically ineffective.

The results of the present investigation clearly revealed that Temik has long residual effect against, *Aphis gossypii* Glover until week 7 after treatment. Furadan produdced a similar pattern but to a lesser extent. Gawsho came next and produced moderate but stable toxicity (70%) during the first 5 weeks after which it declined to appreciable levels. As for Vydate and Nemacur, they were not specific against *Aphis gossypii* Glover as exemplyfied by their low rates of mortality obtained along the experimental period.

With the exception ot Temik which showed high and moderate toxicity against *Tetranychus arabicus* Attiah at weeks 2 and 4 respectively, all other chemicals proved inffective . The present findings agree with those of Belal and Hassan (1986 a) who found that only Temik was effective against prostigmatid mites within the first 5 weeks after application , while Furadan was not effective within this period. Belal ans Hassan (1986b) also mentioned that Temik was more toxic than Furadan against *T. urticae* females when applied as soil insecticides around sweet potato seedlings planted in pots in the green house.

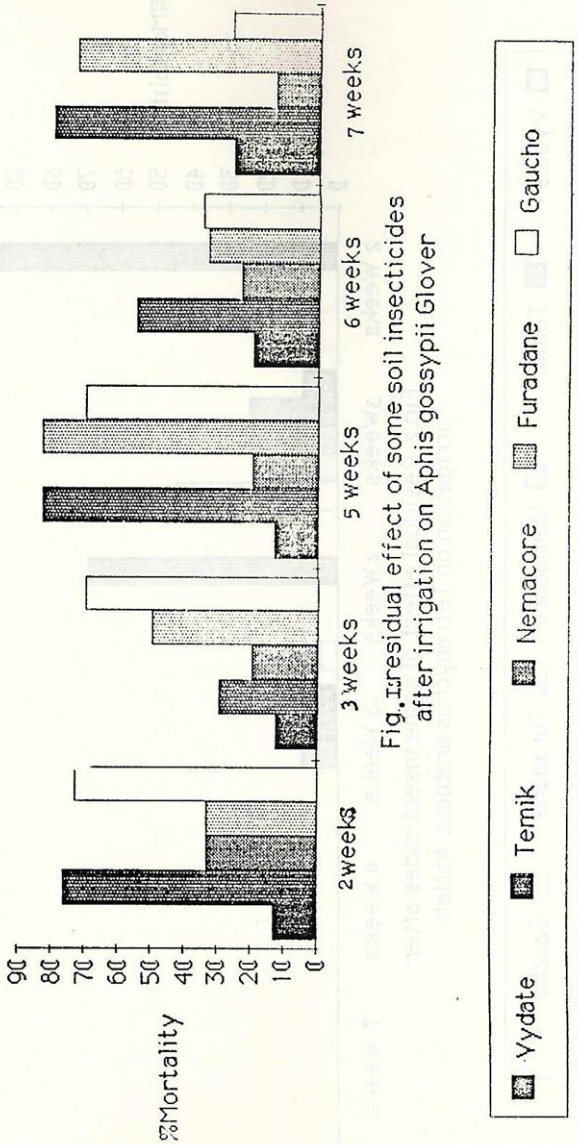

Fig. Iresidual effect of some soil insecticides after irrigation on Aphis gossypii Glover

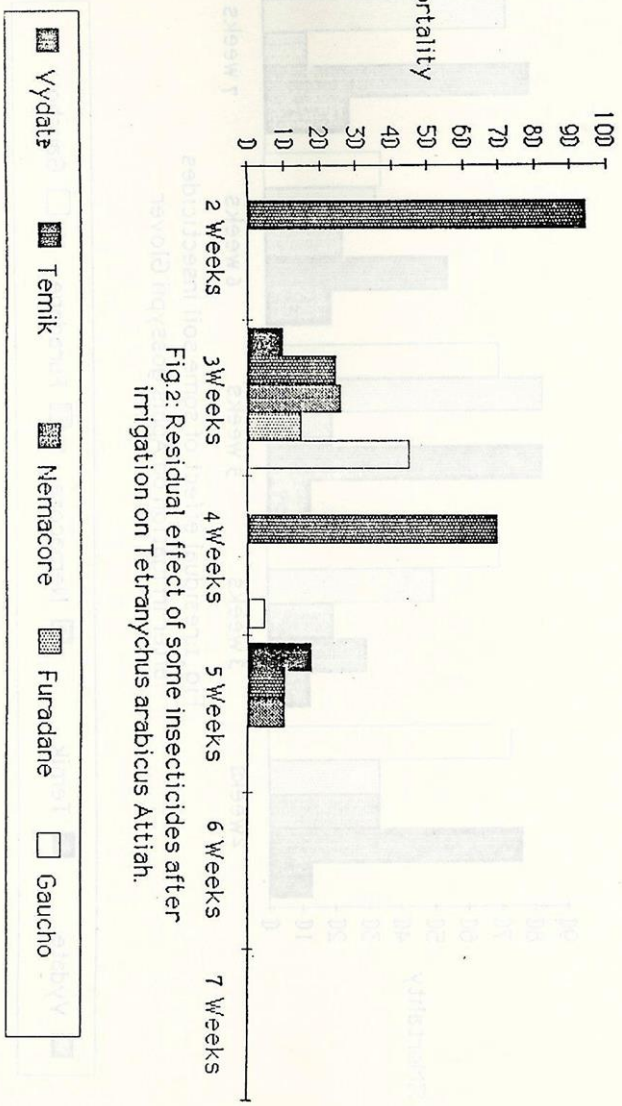

Fig.2: Residual effect of some insecticides after irrigation on Tetranychus arabicus Attiah.

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تأثير بعض المبيدات الجهازية المستخدمة في التربة لمكافحة من وأكاروس القطن

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تم اختبار خمسة مبيدات جهازية في صورة محببات علي أفتي من القطن *Aphis gossypii Glo-ver* واكاروس القطن *Tetranychus arabicas* attiah وهي مبيدات فايديت ، تيميك ، نيماكور، فيوردان، وجاوشو . وقد وضعت الأربعه مبيدات الأولي بجانب بذور القطن عند الزراعة بنسب ١٠ ، ٧ ، ١٥ ثم ١٥ كجم للفدان علي التوالي ، بينما خلط مبيد الجاوشو مع البذور بنسبه ٧جم لكل كيلو جرام من البذور قبل زراعتها.

ولتقدير الاثر الباقي لهذه المبيدات الجهازية علي من واكاروس القطن ، اخذت اوراق القطن عشوائيا من كل معاملة بعد الري علي فترات ٢ ، ٣ ، ٤ ، ٥، ٦ ، ٧ ، اسبوع علي التوالي . ولقد اوضحت النتائج أن مبيد التميك كان أكثر المبيدات فعاليه ضد المن كما كان له أثر باقي عالي حتي الأسبوع السابع بعد المعاملة ، وبالنسبه لمبيد الفيوردان فلقد اعطي نتائج قريبه من مبيد التيميك ولكن بنسبه أقل في السمية . أما مبيد الجاوشو فقد اعطي سمية متوسطة وكانت نسبتها ثاتبه خلال الخمسة اسابيع الأولي .

وبالنسبة لمبيدي الفايديت والنيماكور فلقد أظهرا سمية منخفضة طوال مدة التجربة ، كما اوضحت النتائج أيضا أن كل هذه المبيدات كانت غير فعالة علي اكاروس القطن فيما عدا التيميك الذي كانت سميته عاليه ومتوسطه خلال الاسبوع الثاني والرابع علي التوالي .