

EVALUATION THE EFFICIENCY OF SOME INSECTICIDES AND MINERAL OILS AGAINST THE WHEAT APHID ON TURFGRASS

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Abstract

The field experiment was carried out in a turfgrass farm located at Menofia Governorate during 2006 year. Six insecticides and three mineral oils were evaluated for their efficacy as aphicides on wheat aphid insect, *Schizaphis graminum* (Rondani) infesting *Seashore paspalum*, cv Sea Dwarf turfgrass. All treatments gave satisfactory results, whereas Malathion 57% EC, Reldan 40% EC, Deltan 40% EC and Sumithion 50% EC gave highly superior effect. The residual toxicity of these insecticides were 97.7, 97.7, 97.4 and 92.4%, respectively. Folk oil 2% EC gave the least aphicidal effect with a residual toxicity of 63.68%.

INTRODUCTION

Turfgrass is the most widely grown ornamental crop in Egypt, (El-Kiey, 1988). It is grown under many environmental conditions and for different uses, such as sports complexes, parked recreation fields, sod production, golf courses and homeowner lawn care. In urban areas, turfgrass covers thousands of feddans and will likely increase as urban sprawl continues to expand into agricultural lands. The contribution of turfgrasses to erosion control on roadsides, lawns and playgrounds can be measured in thousand of feddans of land saved each year.

Without some maintenance, including pest control, those areas would quickly become damaged and overgrown with undesirable vegetation.

The wheat aphid insect, *Schizaphis graminum* (Rondani) is one of the most serious insect pests infesting turfgrass in Egypt. It causes several damage to the plants if not controlled (Nuessly & Nagate, 2005). Aphids suck the sap from blades and the damage appears as pale areas often with yellow streaking.

Chemical control may be an effective method against this insect, therefore the present study aims to evaluate the insecticidal efficiency of some insecticides and mineral oils against such pest insect.

MATERIALS AND METHODS

The studies were carried out in private farms of turfgrass, at Menofia Governorate during May 2006. *Seashore paspalum*, cv Sea Dwarf turfgrass treated

with six commonly available insecticides and three mineral oils to control the wheat aphid insect, *Schizaphis graminum* (Rondani).

The Insecticides used and their rates per feddan: Malathion 57% EC at 1.5 Lit., Reldan 40% EC at 2 Lit., Deltan 40% EC at 0.4 Lit., Actellic 50% EC at 1.2 Lit., Sumithion 50% EC at 1 Lit. and Acephate 75% SP at 1 Kg.

The mineral oils: KZ-oil 1.5% EC, Folk-oil 2% EC and Royal-oil 1.5% EC at rates 1.5 Lit./feddan.

The site of the experimental area was divided into plots of 1/100 feddan for each. Each treatment or control (treated with water only) was replicated three times (3 plots). All treatments were arranged in a complete randomized block design. The conventional agricultural practices were applied regularly. An ordinary knapsack sprayer of 20 Liters capacity with a bent down nozzle was used. Sample size was the number of alive aphides found on area 50/100/20 cm/plot. The number of aphid was recorded before treatment and 2, 5, 8, 11 and 14 days after treatment. The reduction percentage of population density and the residual activity as a result of insecticide application was estimated using Abbott (1925) formula and Henderson and Tilton (1955) equation.

RESULTS AND DISCUSSION

The data presented in Tables (1&2) indicated obviously the effectiveness of the used insecticides and mineral oils on the population density reduction of the wheat aphid insect, *Schizaphis graminum* (Rondani) on sea Dwarf turfgrass. The percentage of reduction varied considerably due to the type of toxicant and may be to differences in the additives in the formulation (Shetlar, 2003). The data also showed that, the tested insecticides and mineral oils varied significantly in their efficiencies against the wheat aphid.

The tested insecticides could be arranged according to their means of population and reduction percentage after 14 days of spraying into two groups.

The first group includes

Malathion 57% EC, Deltan 40% EC, Reldan 40% EC and Sumithion 50% EC, respectively. This group proved to be highly efficient aphicides, whereas percentages of reduction after 14 days from spraying were 97.4, 96.0, 95.8 and 83.6%, respectively.

The second group includes

Acephat 75% SP and Actellic 50% EC, respectively. This group occupied an intermediate position, whereas the reduction percentages were 78.4 and 68.1%, respectively.

Also, results in the same tables showed that the tested mineral oils differed in their efficiency for aphid control. The means of aphid populations and reduction percentage after 14 days of spraying could be arranged as follows:

Table 1. Efficacy of insecticides and mineral oils against the wheat aphid insect, *Schizaphis graminum* (Rondani) on *Seashore paspalum*, cv Sea Dwarf turfgrass.

Treatments	Rate of application feddan	No. of aphids (pre-treatment)	Mean No. aphids (post-treatment)					Overall mean
			2 days	5 days	8 days	11 days	14 days	
Malathion	1.5 Lit.	1728.3	18.3	36.0	38.0	39.0	44.7	35.20
Actellic	1.2 Lit.	1707.3	253.7	136.3	512.0	519.0	548.3	393.86
Sumithion	1 Lit.	1739.0	88.7	53.3	49.7	136.3	286.7	122.94
Acephate	1 Kg	1726.3	136.7	128.3	232.3	350.0	374.3	244.32
Reldan	0.2 Lit.	1737.3	38.3	32.3	27.0	31.0	72.7	40.26
Deltan	0.4 Lit.	1706.0	34.0	19.7	43.0	51.3	67.7	43.14
KZ-oil	1.5 Lit.	1708.0	511.3	493.0	503.3	517.7	611.7	539.40
Folk-oil	1.5 Lit.	1684.0	916.3	678.3	571.3	589.3	620.7	675.12
Royal-oil	1.5 Lit.	1728.3	369.0	321.6	227.7	157.3	200.7	255.26
Control	-	1711.3	1735.0	1728.3	1713.0	1708.0	1721.0	1721.0

LSD_{0.05} treatment: 4.26

LSD_{0.01} treatment: 6.12

LSD_{0.05} day: 3.54

LSD_{0.01} day: 5.56

Table 2. Reduction percentages and mean residual effect of different insecticides and mineral oils on the wheat aphid insect, *Schizaphis graminum* (Rondani) on *Seashore paspalum*, cv Sea Dwarf turfgrass.

Treatments	Rate of application Feddan	% Reduction					Mean residual effect%
		2 days	5 days	8 days	11 days	14 days	
Malathion	1.5 Lit.	98.96	97.94	97.80	97.74	97.40	97.72
Actellic	1.2 Lit.	85.30	92.10	70.00	69.20	68.10	74.85
Sumithion	1 Lit.	95.00	96.90	97.15	92.10	83.60	92.44
Acephate	1 Kg	92.20	92.60	87.00	79.70	78.40	84.43
Reldan	0.2 Lit./ Feddan	97.80	98.20	98.40	98.20	95.80	97.70
Deltan	0.4 Lit.	98.03	98.90	97.50	97.00	96.00	97.40
KZ-oil	1.5 Lit.	70.50	71.00	71.00	69.60	61.00	68.15
Folk-oil	1.5 Lit.	46.00	60.40	66.10	64.90	63.30	63.68
Royal-oil	1.5 Lit.	78.90	81.60	86.80	91.00	88.50	86.98

Royal-oil 1.5% EC (88.5%), KZ-oil 1.5% EC (61.0%) and Folk-oil 2% EC (63.3%), respectively.

With regard to the mean residual effect of the tested compounds, could be arranged in the following descending order, Malathion, Reldan, Deltan, Sumithion, Royal-oil, Acephate, Actellic, KZ-oil and Folk-oil. The corresponding values of the mean residual toxicity were 97.72, 97.7, 97.4, 92.44, 86.98, 84.43, 74.85, 68.15 and 63.68%, respectively. The previous data show that Malathion was the most potent aphicides against, *S. graminum* among all compounds tested in this experiment, on the contrary, Folk-oil was the least one. Royal-oil proved to be the most effective mineral oils and more effect than some insecticides (Acephat and Actellic). These oils were more safed than insecticides on the environments and gave significant efficacy in reducing the aphid infestation in turfgrass.

Significant difference was observed between all compound treatments and untreated check was shown in Table (1).

The efficiency of aphicides on *S. graminum* under the field conditions was reported by many authors, Miller and Smith (2001), Kovach *et al.* (2003), Shetlar

(2003), Nuessly *et al.* (2004) and Nuessly & Nagate (2005). They observed that chemical control is often needed, when wheat aphid population are causing noticeable damage to turfgrass. Several systemic pyrethroid, organophosphorus and carbamate insecticides are effective against this aphid per on turfgrass.

Baxendale and Johson (1998) reported that, summer oil or horticultural spray oil has proven very effective in reducing population of the greenbugs on turfgrass. Similar results were obtained by Hays *et al.* (1999).

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تقييم كفاءة بعض المبيدات الحشرية والزيوت المعدنية ضد من النجيليات علي المسطحات الخضراء

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أجريت تجربة حقلية في مزرعة مسطحات خضراء بمحافظة المنوفية لتقييم فعالية وكفاءة بعض المبيدات الحشرية والزيوت المعدنية ضد من النجيليات وذلك في شهر مايو سنة ٢٠٠٦ . أظهرت النتائج أن جميع المركبات لها تأثير علي تقليل أعداد حشرات المن وكانت أعلى نسبة إبادة للحشرات لكل من مبيدات الملاثيون والريلدان والدلتان وكذلك السومثيون . حيث أعطت نسبة خفض في الأعداد بلغت ٩٧.٧ ، ٩٧.٧ ، ٩٧.٤ ، ٩٢.٤ % على التوالي بينما الزيوت المعدنية Kz. Oil ، فولك ، رويال أعطت نسبة خفض في الأعداد بلغت ٦٩.١٥ ، ٦٣.٦٨ ، ٨٦.٩٨ % على التوالي .