

INSECT ANTIFEEDANT PROPERTIES OF *VENKA ROSA* (APOCYNACEAE) AGAINST *SCHISTOCERCA GREGARIA* FORSKAL.

A. M. EL-GAMMAL¹, M. T. MOHAMED¹, N. S. BADAWY¹
M. S. AMER² AND M. A. TAHA³

1 . Plant Protection Research Institute , Agricultural Research Centre, Dokki, Egypt.

2 . Faculty of Science, Al-Azhar University, Egypt.

3 . Faculty of Science, Menofia University, Egypt.

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Abstract

The antifeeding properties of *Venka rosa* was studied on 2nd, 3rd, 4th and 5th instar nymphs and adult stages of *Schistocerca gregaria*. Crude extracts in water and acetone were used. Acetone extract was more potent than water extract. Feeding reduction percentages were 100% against the nymphal instars and 81.97. % against the adult stage. In case of water extract, the feeding reduction percentages ranged from 95.89 to 100% against the tested nymphal instars and was 96.29% against the adult stage.

Feeding reduction percentages decreased by water dilution. The percentages ranged from 100 to 31.25% against the 5th nymphal instar and from 100 to 81.61% for the adult stage.

INTRODUCTION

Since Pruthi (1937) discovered the repellent action of the neem tree *Azadirachta indica* against storage pests, screening for the bioactive compounds in plants has attracted much attention. The antifeedant properties of other plant species against *S. gregaria* were reported by Rao (1982) in *Calotropis gigantea*; Singh and Pant (1980 a) in *Crinum bulbispermum* and *C. asiaticum*; Singh and Pant (1980 b) in *Hymenocallis littoralis*; Saxena (1980) in *Anethum sowa*; Beranys and Luca (1980) in *Stachytarpheta mutabilis*; Mohamed (1985) in *Lantana camara*; El-Gammal

et al., (1988) and El-Gammal *et al.*, (1990) in *Argemon mixicana*, *Zygaphyllum simple*, *Calotropis procera*, *Withania somnifera*, *Azadirachta indica* and *Solanum do-bium*.

The present work is directed to study the antifeedant properties of the orna-mental plant, *Venka rosa* (Apocynaceae) against the desert locust *S. gregaria*.

MATERIALS AND METHODS

Crude extracts preparation

The whole plant of *Vinca rosa* was collected , thoroughly rinsed in tap water and allowed to dry at room temperature. Air dried plants were ground by a house hold grinder (Moulinex), the fine powder was extracted in water and acetone, sep-arately.

Ten grams of the fine powder were mixed with 100ml of each solvent and kept in a conical flask. These mixtures were left for 48 hours at room temperature.

Occasional shaking of mixture was carried out to get maximum extraction. The extracts were filtered and their antifeedant properties were examined against *S. gregaria*.

Bioassay of the antifeedant properties of *V. rosa* against *S. gre-garia*

The antifeedant action of *V.rosa* was examined as described by Butterworth and Morgan (1971). Discs of filter paper (Whatman No. 1, 5.5cm in diameter) were impregnated with each filtrate while the control discs were dipped in 0.25 M su-crose alone for three minutes then left to dry in room temperature for 24h. The discs were sprayed again with 0.25 M sucrose, allowed to dry then weighed before being introduced to the insects.

The 2nd, 3rd, 4th, 5th, instar nymphs and the immature adults of *S. gregaria* were left to starve for 24h. before testing for antifeedant properties. The treated and untreated discs were fixed in a vertical position by the sand in the bottom of cy-lindrical glass containers (12cm height x12 cm diameter). Each disc was placed in a

container. The starved insects were divided into groups of 4 for the first two instars and into 2 groups for the 5th instar nymphs and the adult stage. Five replicates were used for each extract. After eight hours from feeding, the treated and control discs were weighed to estimate reduction percentages in feeding.

RESULTS AND DISCUSSION

Antifeeding effects of water and acetone extracts of *V. rosa* against *S. gregaria*

Table 1 shows that acetone crude extract was more potent against the nymphal instars of *S. gregaria* than the adult stage. The percentages of feeding reduction were 100% against the nymphal instars and 81.97% against the adult stage, while these percentages with water extract were 100.00, 95.89, 97.35, 100.00 and 96.29% against the 2nd, 3rd, 4th, 5th instar nymphs and the adult stage, respectively. These results are in agreement with Narayan et al., (1980) who indicated that total extracts of alcohol and acetone of neem leaves had a strong antifeedant effect against the immature adults of *S. gregaria*. Also, El-Gammal et al., (1988) studied the antifeedant effects of several wild plants against *S. gregaria*. They showed that distilled water, diethyl ether and hexane extracts of *Zygophyllum simplex*, *Calotropis procera*, *Withania somnifera*, *Solanum dubium* and *Argemone mexicana* exhibited these properties against the immature adults of *S. gregaria*.

The antifeedant effects of different dilutions of *V. rosa* water extract

Table 2 indicates a positive correlation between the weights of consumed parts of treated water dilutions and the progress in stages of *S. gregaria*, this criterion increased by the decrease in dilution percentages.

During the second nymphal instar, the feeding reduction percentages were; 100.0, 90.0, 100.0, 100.0, 100.0, 100.0 and 55.6 by the dilution percentages 1.0, 0.5, 0.25, 0.125, 0.062, 0.031 and 0.015, respectively. The same dilution percentages induced 100.0, 100.0, 100.0, 100.0, 89.17, 81.67 and 75.00% feeding reduction, respectively, against the 3rd nymphal instars. Against the 4th nymphal instar they produced 100.0, 99.51, 95.71, 100.0, 92.62, 83.33 and 98.10% feeding reduction corresponding to 100.0, 99.38, 95.68, 58.13, 55.0, 72.50 and 31.25% for the 5th instar nymph and 100.0, 100.0, 100.0, 98.99, 81.61, 100.0 and 89.79% for the adult stage. These results go in line with those of Rao (1982) who tested chloroform and methanol extracts prepared from the dry powder of

Table 1. Antifeeding effects of *Venka rosa* against *Schistocerca gregaria*.

Treated instars	Water extract			Acetone extract			
	Wt. consumed part of wafer (gm)		Treated instars	Wt. consumed part of wafer (gm)		Reduction in feeding %	Values of calculated "t"
	Treated	Control		Treated	Control		
2 nd	0.00 (4)	0.03 (4)	100.00	0.00 (4)	0.00 (4)	0.00	0.00
3 rd	0.01 (4)	0.17 (4)	95.89	0.01 (4)	0.14 (4)	100.00	2.89*
4 th	0.01 (2)	0.45 (2)	97.35	0.01 (2)	0.02 (2)	100.00	1.56*
5 th	0.00 (2)	0.17 (2)	100.00	0.00 (2)	0.50 (2)	100.00	2.53*
Adult	0.03 (2)	0.67 (2)	96.26	0.64 (2)	0.36 (2)	81.97	1.45

- Figures in parenthesis indicate the number of insects used per each replicate (each treatment was repeated 5 times.)

- Significance was calculated using t-test on two levels of probability (** = P 0.01 & * = P 0.05)

Table 2. Antifeeding effects of *Venka rosa* water extract with different percentages of dilution.

Dilution Percentages (%)	Water extract					Water extract					Water extract					Water extract				
	Consumed % weight (gm)			Feeding reduction%		Consumed % weight (gm)			Feeding reduction%		Consumed % weight (gm)			Feeding reduction%		Consumed % weight (gm)			Feeding reduction%	
	Treated	Control	t value	Contrl	Reduction	Treated	Control	t value	Contrl	Reduction	Treated	Control	t value	Contrl	Reduction	Treated	Control	t value	Contrl	Reduction
1.5	0.000	0.020	100.0	1.93	0.000	0.12	100.0	3.05	0.000	0.42	100.0	5.6	0.000	0.16	100.0	0.000	0.598	100.0	5.22	5.22
0.5	0.002	0.020	90.0	1.85	0.000	0.12	100.0	3.05	0.002	0.41	99.38	5.6	0.001	0.16	99.38	0.000	0.603	100.0	5.22	5.22
0.25	0.000	0.020	100.0	1.93	0.000	0.12	100.0	3.05	0.018	0.42	85.68	5.03	0.007	0.16	95.68	0.000	0.592	100.0	5.22	5.22
0.125	0.000	0.018	100.0	1.85	0.000	0.12	100.0	3.05	0.000	0.42	58.13	5.6	0.067	0.16	58.13	0.006	0.598	98.99	5.06	5.06
0.062	0.000	0.020	100.0	1.93	0.013	0.12	89.17	1.36	0.031	0.42	55.00	7.07	0.072	0.16	55.00	0.110	0.598	81.61	4.26	4.26
0.031	0.000	0.020	100.0	1.93	0.022	0.12	81.67	8.00	0.070	0.42	72.50	3.8	0.44	0.16	72.50	0.000	0.598	100.0	5.22	5.22
0.015	0.008	0.018	55.6	1.66	0.030	0.12	75.00	8.00	0.008	0.42	31.25	6.2	0.110	0.16	31.25	0.061	0.598	87.79	3.46	3.46

* These weights were calculated for individual insect, the numbers of the utilized insects were 4 from the 2nd and 3rd instars and 2 from the 5th instar and adult stage. The analysis of variance was calculated by t-test and denoted by asterisks (*p=5% and ** P= 1%).

leaves, flowers, fruits, and root bark of *Calotropis gigantea* against 1st, 2nd, 3rd, and 4th instar nymphs and adults of *S. gregaria*. Methanol extracts from root bark were the most potent at the low concentration 1gm dried powder /100ml.

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الصفات المانعة للتغذية للونكا روزا ضد الجراد الصحراوي شيسستوسيركا جريجاريا

عبد العظيم الجمال^١، محمد توفيق محمد^١، ناجي ثابت حسن بدوي^١
منير صالح عامر^٢، مصطفى أمين طه^٣

١ - قسم بحوث الجراد - معهد بحوث وقاية النباتات - مركز البحوث الزراعية.

٢ - كلية العلوم - جامعة الأزهر.

٣ - كلية العلوم - جامعة المنوفية.

تم اختبار الصفات المانعة للتغذية لمستخلص الأسيتون والماء للنبات ونكا روزا ضد حوريات
الجراد الصحراوي وأطواره اليرقية.

اتضح من النتائج أن مستخلص الأسيتون له فعل مانع للتغذية كذلك مستخلص الماء ، ولقد
أدى مستخلص الأسيتون الي نسبة ١٠٠٪ منع لتغذية الحوريات من الأعمار الثاني والثالث والرابع
والخامس ، ٨١,٩٧٪ منع لتغذية الحشرات الكاملة وتراوحت هذه النسبة بين ٩٥,٨٩ الي ١٠٠٪ منع
لتغذية الحوريات في حاله المستخلص المائي، الذي أدى الي منع تغذية الحشرات الكامله بنسبه
٩٦,٢٩٪.

وباختبار تخفيفات من المستخلص المائي ضد هذه الحشرات، اتضح أنه قد خفض من نسبة
منع التغذية نسبيا حتي ٢١,٢٥٪ بالنسبة للحوريات والحشرات الكاملة.