

THE HOST RANGE AND OVERWINTERING SITES OF *NEZARA VIRIDULA* L. UNDER KAFR EL-SHEIKH CONDITIONS

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Abstract

In Egypt, *Nezara viridula* L. is widely spread all over the country attacking a wide varieties of agricultural crops and many weed species. Therefore, an experiment was carried out at Sakha Agric. Res. Station Farm, Kafr El-Sheikh to survey the host plants of the insect as well as overwintering sites during the period from March, 1999 to March, 2000.

The obtained results indicated that twelve field crops, ten vegetable crops and fourteen weed species were found harboring *N. viridula* during the period of study. Six summer field crops (cotton, corn, rice, sunflower, soybean and mungbean) and five summer vegetable crops (okra, egg-plant, pepper, tomato and cowpea) received both adults and nymphs from March to December. The insect passed the winter as adults on six winter field crops (clover, faba bean, wheat, barley, flax and sugar-beet) , five winter vegetable crops (cabbage, cauliflower, potato, bean and peas), seven annual winter weeds (wild peas, wild mustard, wild chicory, milk thistle, grundersel, burweed nettle goosefoot and chard) and four perennial weeds (balady grass, bermuda grass, typha and purslan) from November to March. The insect used these winter plant species as overwintering sites because the adults were only moving and feeding on these winter hosts without egg depositing . Chard and three annual summer weeds (hound's berry, burweed and Jew's mallow) received both adults and nymphs from May to November. However, the gained results are of importance, as they are taken into account in planning programs of integrated pest management .

INTRODUCTION

The green stink bug, *Nezara viridula* L.(Hemiptera: Pentatomidae) is one of the most economically important pentatomid pests in the world . The insect had a wide host range belonging to more than 30 families of plants including a wide varieties of agricultural crops and many weeds that can be used as host plants between cropping cycles(Ali & Ewies1977, Ali *et al.*1979,Todd 1989 and Velasco & Walter1992).

The study of the plant host range of pests is essential and to be value because it indicates what other cultivated plants may be at risk in an area when infestation develops on one kind of plant . Also , pests do not always confine themselves to cultivated plant, but the suitable weed species may also be attacked and can serve as reservoirs of infestation, particularly in bed grows or other uncultivated areas. However, adequate knowledge of host plant range of insect pest is required and taken into account when planning integrated pest management programs .

Therefore, the present work was carried out to survey the host plants of *N. viridula* as well as their overwintering sites at Kafr El – Sheikh region during the period from March 1999 to March 2000.

MATERIALS AND METHODS

An experiment was carried out to survey the host plants of *Nezara viridula* L. at the Experimental Farm of Sakha Agric. Res. Station, Kafr El – Sheikh during the period from March 1999 to March 2000. An area of about 200 fed. including cultivated field crops and vegetables as well as several weeds grown within the examined plant species and / or roadsides, canal banks, irrigation canals and neighbored locations were examined to detect the occurrence of *N. viridula* populations during the period from March 1st 1999 to March 31th ,2000. The weed species were identified by the aid of staff members of Weed Control Research Department at Sakha Agric. Res. Station.

RESULTS AND DISCUSSION

Data presented in Table 1 show the field crops surveyed as hosts of *N. viridula* during the period extended from March1999 to March 2000 . The results indicated that twelve field crops, six summer and six winter were surveyed harboring *N. viridula*. Both nymphs and adults started to appear on the summer field crops, cotton ,corn, rice, sunflower , soybean and mungbean from March and continued until November. These results were in agreement with those obtained by Ali *et al.*(1979) and Draz (1981) who mentioned that the activity of *N. viridula* started in early March after its hibernation and extended until November. Adults were the only stage existing on the six winter crops, clover, faba bean, wheat, barely ,flax and sugar beet during the period from December to early March. The adults used these plants as a temporary hosts as neither egg – masses or nymphs were found during this period . These

results agree with those of Abd El – Wahed (1977) who reported that *N. viridula* passed the winter as adults on winter crops.

Both nymphal and adults stages began to appear on the winter field crops during March and continued till the end of plant growing season when the weather factors became favorable . This result was in accordance with those obtained by Shaheen (1977) who reported that *N. viridula* migrated in great numbers to soybean from winter crops nearby when plants became dry and ready for harvest in late May.

Table 1. Summer and winter field crops surveyed as hosts of *Nezara viridula* L. at Kafr El Sheikh during the period from March, 1999 to March, 2000 .

No.	Plant spp.		Family	Growth season	Economic status	<i>N. viridula</i>		
	Common name	Scientific name				Stage	Occurring period	
							From	To
1	Clover	<i>Trifolium</i> spp.	Leguminosae	Winter	Forage crop	A	Nov.	Mar.
						A + N	Mar.	May
2	Faba bean	<i>Vicia faba</i>	Leguminosae	Winter	Legumes crop	A	Nov.	Mar.
						A + N	Mar.	Apr.
3	Soybean	<i>Glycine max</i>	Leguminosae	Summer	Legumes crop	A + N	June	Oct.
4	Mungbean	<i>Vigna radiata</i>	Leguminosae	Summer	Legumes crop	A + N	May	Sept.
5	Cotton	<i>Gossypium hirsutum</i>	Malvaceae	Summer	Fiber crop	A + N	May	Oct.
6	Wheat	<i>Triticum aestivum</i>	Gramineae	Winter	Grain crop	A	Dec.	Mar.
						A + N	Mar.	May.
7	Barley	<i>Hordeum vulgare</i>	Gramineae	Winter	Grain crop	A	Dec.	Apr.
						A + N	May	Nov.
8	Corn	<i>Zea mays</i>	Gramineae	Summer	Grain crop	A + N	June	Oct.
9	Rice	<i>Oryza sativa</i>	Gramineae	Summer	Grain crop	A	July	Oct.
10	Flax	<i>Linum usitatissimum</i>	Linaceae	Winter	Fiber crop	A + N	Mar.	Apr.
11	Sunflower	<i>Helianthum</i> spp.	Composite	Summer	Oil crop	A + N	May	Sept.
12	Sugar-beet	<i>Beta vulgaris</i>	Chenopodiaceae	Winter	Sugar crop	A	Nov.	Mar.
						A + N	Mar.	May

A = Adults. N = Nymphs.

Table 2 clear the surveyed vegetable crops that harbored *N. viridula* during the study period. The results showed five summer vegetable crops, okra, egg – plant, pepper , tomato and cowpea harboring both adults and nymphs during the period from April to October. Only adults were observed on five winter vegetables, cabbage, cauliflowers, potato, bean and peas from October to early March. Both adult and nymphal stage started to appear on bean and potato from March to May.

Table 2 . Summer and winter vegetables surveyed as hosts of *Nezara viridula* L. at Kafr El Sheikh during the period from March, 1999 to March, 2000.

No.	Plant spp.		Family	Growth season	Economic status	<i>N. viridula</i>		
	Common name	Scientific name				Stage	Occurring period	
							From	To
1	Bean	<i>Phaseolus vulgaris</i>	Leguminosae	Winter	Legumes vegetable	A	Feb.	Mar.
2	Peas	<i>Pisum sativum</i>	Leguminosae	Winter	Legumes vegetable	A + N	Mar.	May
3	Cowpea	<i>Vigna sinensis</i>	Leguminosae	Summer	Legumes vegetable	A + N	Apr.	Sept.
4	Okra	<i>Hibiscus esculentus</i>	Malvaceae	Summer	Fruit vegetable	A + N	Apr.	Oct.
5	Egg-plant	<i>Solanum melongena</i>	Solanaceae	Summer	Fruit vegetable	A + N	May	Oct.
6	Pepper	<i>Capsicum</i> spp.	Solanaceae	Summer	Fruit vegetable	A + N	May	Oct.
7	Tomato	<i>Lycopersicon esculentum</i>	Solanaceae	Summer	Fruit vegetable	A + N	Apr.	Aug.
8	Potato	<i>Solanum tuberosum</i>	Solanaceae	Winter	Tuber vegetable	A	Nov.	Mar.
9	Cabbage	<i>Brassica oleracea</i>	Cruciferae	Winter	Foliage vegetable	A + N	Mar.	May
10	Cauliflower	<i>Brassica oleracea</i>	Cruciferae	Winter	Flower vegetable	A	Oct.	Feb.

A = Adults. N = Nymphs.

The results in Table 3 showed that ten annuals and four perennial weeds were observed harboring *N. viridula*. Seven annuals winter weeds (wild peas, wild mustard, wild chicory, milk thistle, grindsel, nettle goose foot and chard) harbored *N. viridula* as adults from November to March.

Table 3. Summer and winter weed plant species surveyed as hosts of *Nezara viridula* L. at Kafr El-Sheikh during the period from March, 1999 to March, 2000

No.	Plant spp.		Family	Growth season	Economic status	<i>N. viridula</i>		
	Common name	Scientific name				Stage	Occurring period	
							From	To
1	Wild peas	<i>Pisum sativum</i>	Leguminosae	Winter	Annual weed *	A	Nov.	Mar.
2	Blady grass	<i>Eragrostis popinurta</i>	Gramineae	Summer + win.	Perennial **	A	Nov.	Mar.
3	Bermuda grass	<i>Cynodon dactylon</i>	Gramineae	Summer + win.	Perennial **	A	Nov.	Mar.
4	Hound's berry	<i>Solanum nigrum</i>	Solanaceae	Summer	Annual *	A + N	May	Nov.
5	Wild mustard	<i>Brassica nigra</i>	Cruciferae	Winter	Annual *	A	Nov.	May
6	Wild chicory	<i>Chichorium intybus</i>	Composite	Winter	Annual *	A	Nov.	Apr.
7	Milk thistle	<i>Sonchus oleraceus</i>	Composite	Winter	Annual *	A	Nov.	Mar.
8	Grundsel	<i>Senecio vulgaris</i>	Composite	Winter	Annual *	A	Nov.	Mar.
9	Burnweed	<i>Xanthium strumarium</i>	Composite	Summer	Annual *	A + N	May	Nov.
10	Nettle goosefoot	<i>Chenopodium murale</i>	Chenopodiaceae	Winter	Annual *	A	Nov.	Mar.
11	Chard	<i>Beta vulgaris</i> var <i>cicla</i>	Chenopodiaceae	Winter	Annual *	A	Nov.	Mar.
12	Typha (cattail)	<i>Typha sngustata</i>	Chenopodiaceae	Summer + win.	Perennial **	A + N	Mar.	May
13	Jew's mallow	<i>Corchorus oltorius</i>	Tiliaceae	Summer	Annual *	A + N	May	Nov.
14	Pursian	<i>Portulaca oleraceae</i>	Portulacapeae	Winter	Perennial **	A	Nov.	Mar.

A = Adults. N = Nymphs.

* Weeds grown within plants & roadsides.

** Weeds in canal banks & irrigation canals

Each chard and three annual summer weeds (hound's berry, burr weed and jew's mallow) received both adults and nymphs during the period from May to November. Only adults were observed on four perennial weeds (balady grass, bermadua grass, typha and purslan) from December to March. Both perennial and annual weeds were served as food source, consequently they may be serve as alternative host plants between cropping cycles in different agroecosystem, while the summer weeds were suitable for the reproduction of *N. viridula*.

From the fore-mentioned results, it clears that *N. viridula* was found as adult stage during the period from November to March on the surveyed winter field crops, winter vegetable crops and both winter and perennial weeds. No egg – masses or nymphs were detected during this period because the adults were only moving and feeding on these winter hosts. This emphasized that *N. viridula* hibernated from November to march on the winter hosts

These results agreed with those of Nilakhe (1976), Jone & Sullivan (1981) and Panizzi & Niva (1994) who reported that, when food plants are not available and the biotic factors as temperature and photo period became unfavorable, *N. viridula* will show different overwintering strategies (Ali and Ewies 1977). In more temperate zones, adults will overwintering in deciduous woods, above ground habitats, underneath dead leaves and elsewhere. Also, Kiritani *et al.* (1965) reported that wheat was primary site for feeding and mating of *N. viridula*.

Finally, it can be stated that a total thirty six plant species (twelve field crops, ten vegetable crops and fourteen weed species) were found harboring *N. viridula* during the study period extended March 1999 March 2000. The summer field crops, summer vegetable crops and annual summer weeds as well as chard received both adults and nymphs, while the insect passed the winter as adults on the winter field crops, winter vegetable crops and winter perennial weeds. Thus, these winter plant species may be serve as alternative host plants between cropping cycles in different agroecosystem, while the summer plant species were suitable for *N. viridula* reproduction.

However, the gained results are of importance, as they are required in planning programs of integrated pest management.

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المدى العوائلى وأماكن البيات الشتوي للبقعة الخضراء تحت ظروف محافظة كفر الشيخ

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تنتشر حشرة البقعة الخضراء في كل أنحاء جمهورية مصر العربية مهاجمة مدى واسع من المحاصيل الزراعية والحشائش . ولذا أجريت تجربة في مزرعة محطة البحوث الزراعية بسخا ، كفر الشيخ لحصر العوائل النباتية للحشرة وكذا أماكن البيات الشتوي لها خلال الفترة من مارس ١٩٩٩ م وحتى مارس ٢٠٠٠ م .

أوضحت النتائج المتحصل عليها أن الحشرة وجدت علي ١٢ من المحاصيل الحقلية ، ١٠ من الخضر ، ١٤ من الحشائش خلال فترة الدراسة . وقد وجدت كل من الحشرات الكاملة والحوريات علي ستة من محاصيل الحقل الصيفية (القطن ، الأذرة ، الأرز ، عباد الشمس ، فول الصويا ، فول المانج) وخمسة من الخضر الصيفية (الباميا ، الباذنجان ، الفلفل ، الطماطم و اللوبيا) خلال الفترة من مارس إلى ديسمبر . وأمضت الشتاء كحشرات كاملة فقط علي ستة من محاصيل الحقل الشتوية (البرسيم ، الفول البلدي ، القمح ، الشعير ، الكتان ، بنجر السكر) وخمسة من الخضر الشتوية (الكرنب ، القرنبيط ، البطاطس ، الفاصوليا ، البسلة) وسبعة أنواع من الحشائش الحولية الشتوية (البسلة الشيطاني ، الكبر ، السريس ، الجعضيض ، القريص ، الزربيج ، السلق) وأربعة أنواع من الحشائش المعمرة (الحلفا ، النجيل البلدى ، البردى ، الرجلة) خلال الفترة من نوفمبر وحتى مارس . وتستخدم الحشرة هذه العوائل الشتوية كأماكن للبيات الشتوي حيث وجدت الحشرات الكاملة فقط تتحرك وتتغذى ولكنها لا تتكاثر . وقد ظهرت الحشرات الكاملة والحوريات علي السلق وثلاثة أنواع من الحشائش الحولية الصيفية (عنب الديب ، الشبيط ، الملوخية) خلال الفترة من مايو حتى نوفمبر .

وعلى أية حال فان هذه النتائج مهمة حيث تؤخذ في الاعتبار عند تصميم برامج الإدارة المتكاملة للآفات.