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PLANT PROTECTION

Seasonal Abundance and Activity of Coccinellid Beetles (Coleoptera, Coccinellidae) in Alfalfa in Riyadh, Saudi Arabia

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Abstract. Population fluctuation and abundance of the coccinellid beetles inhabiting alfalfa in Riyadh, Saudi Arabia, were carried out during two successive years; from October, 1990 until September, 1992. Five species of coccinellid beetles were found in alfalfa in Riyadh, these are: *Adonia variegata* (Goeze), *Coccinella novempunctata* L., *C. septempunctata* L., *C. undecimpunctata* L. and *Scymnus interruptus* (Goeze). The annual numbers in the two years of study, were 1428 and 847 beetles respectively. The beetles were found most active and relatively in large numbers during March and April, attained their highest peak in the last week of March of the first year and in the third week of April of the second year. Beetles were in their minimum activity during May and from July to February in the first year and from September to February in the second year. Monitoring coccinellid beetles populations in alfalfa is important for protecting these beneficial insects from the detrimental effects of insecticides and for the appropriate timing of pest management decisions.

Introduction

Recently considerable efforts were directed toward studying the activity and abundance of predatory insects. More attention was given to the widely distributed and well known species. Predacious coccinellids are known to play an important role in aphid population regulation and the strongest impact of all aphidophagous insects in field crops [1-5].

In Saudi Arabia, many investigators were concerned with the survey of such beneficial species, but they did not pay attention for studying their seasonal abundance and activity [6-12].

Owing to the lack of thorough investigations concerning the population density of coccinellid beetles, it is the aim of the present work to shed some light on their activity and population fluctuations in alfalfa fields in Riyadh, Saudi Arabia.

Material and Methods

For studying the activity and seasonal abundance of coccinellid beetles in alfalfa, a sampling area of 0.025 hectare was chosen in alfalfa field at the Agricultural Research and Experimental Station of Derab, College of Agriculture, King Saud University, Riyadh, Saudi Arabia.

Collection of coccinellid beetles was undertaken periodically at weekly intervals during two consecutive and successive years, from October 1990 up to September 1992. Each sample was represented by 50 double strokes using a standard 15-inch sweeping net made at random throughout the sampling area. Alfalfa was cut, not very deeply, immediately after sampling to allow some vegetative growth for existing insects. The collected samples were transferred to the laboratory in plastic bags where the insect samples were kept frozen till time of sorting and identification. The collected coccinellid beetles (larvae and adults) were sorted out, counted and recorded.

Data of monthly and annual catches of coccinellid beetles were presented in graphs. The data of the two main weather factors (temperature and relative humidity) prevailing in the area during the period of study are shown on the same graphs (Figs. 1 and 2). Data were obtained from the meteorological section of the experimental station.

Results and Discussion

During the period of study, five species of coccinellid beetles, *Adonia variegata* (Goeze), *Coccinella septempunctata* L., *C. novempunctata* L., *C. undecimpunctata* L. and *Scymnus interruptus* (Goeze) were found on the alfalfa plantations.

To give an overall picture, the basic catch data with mean temperature and relative humidity of the two years of study are graphically illustrated in (Fig. 1 and 2). From which, the population level was relatively larger in the first year (1428 beetles) than in the second year (847 beetles). It was also noticed that, the pupulation trend of activity was quite different in the two years of investigation.

In the first year, coccinellids were found in alfalfa plantation all over the year. Low level of population was observed during the period from October up to February. Gradual increase in the population of coccinellids with relatively large numbers occurred during March and the beginning of April, reaching their maximum activity and peak of abundance during the last week of March (the mean temperature was 20.4 ^{o}C and mean relative humidity was 30.7 %). Then the population sharply declined towards the second week of April, and fluctuating in very small numbers to the end of September (Fig. 1).

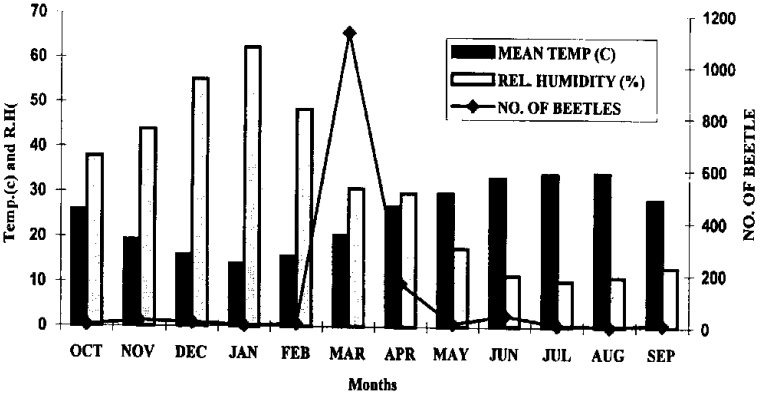

Fig. 1. Total monthly catches of coccinellid beetles in an alfalfa field in Riyadh, Saudi Arabia during 1990-1991.

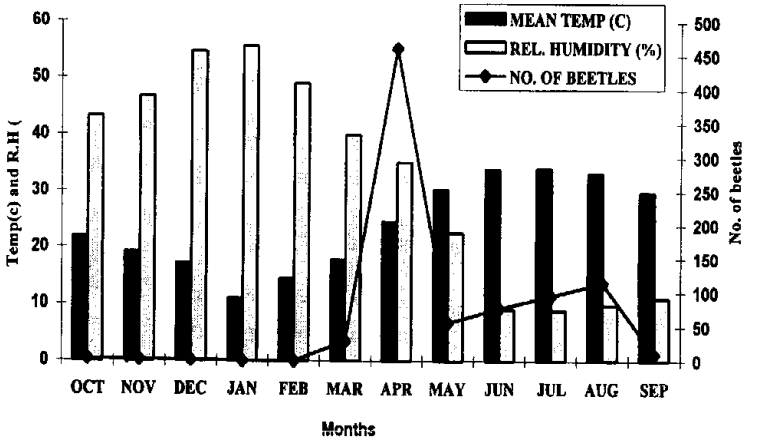

Fig.2.Total monthly catches of coccinellid beetles in an alfalfa field in Riyadh, Saudi Arabia during 1991-1992

Fig. 2. Total monthly catches of coccinellid beetles in an alfalfa field in Riyadh, Saudi Arabia during 1991-1992.

In the second year, small number of beetles were observed during October, November and December, and completely disappeared during most winter months (January and February). The population of coccinellids began to reappear in the second week of March, increasing gradually and steadily to reach its peak of abundance throughout the third week of April (the mean temperature and mean relative humidity were 24.6 °C and 35.2 % respectively). The population of beetles started to decline thereafter fluctuating up and down during the period from May to September (summer months). During the third week of May and the beginning of June, July and August, low population densities of the predacious coccinellids were observed in the field (Fig. 2).

The results clearly showed that the population of coccinellid beetles in alfalfa was found in varying numbers during most periods of the year, but in very low numbers and or no existence during autumn and winter months. The peaks of abundance and activity were found during spring (March - April) and this could be attributed to the existence of their natural hosts (mainly aphids that predacious coccinellids prey upon) during this period in large numbers in alfalfa plantation. Talhouk [10] reported that several species of coccinellid beetles are found in the Kingdom of Saudi Arabia and are abundant in spring and autumn, decreasing during summer as a result of high temperature and low relative humidity. He also stated that beetles immigrate fields in winter when their hosts found in very low densities. Also, some investigators [6, 11, 13] reported during their survey studies that the periods of activities of some coccinellid species in alfalfa fields in the central region of Saudi Arabia was March to April for *Coccinella septempunctata,* June and December for *C. novempunctata,* March and December for *C. undecimpunctata* and May for *Scymnus ebneri.* Finally, in a preliminary unpublished study by authors, it was found that the peak of abundance of predacious coccinellids was almost synchronized with the peak of abundance of aphids [*Aphis craccivora* koch, *Acyrthosiphon kondoi* Shinji and *Therioaphis trifolii* (Monell)] that the predacious beetles prey upon in alfalfa field.

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الوفره العددية والنشاط الموسمي لخنافس ابي العيد المفترسة (رتبة: غمدية الأجنة ، فصيلة : خنافس ابي العيد) في البرسيم في الرياض المملكة العربية السعودية

علي بن محمد السحيباني ، محمد عبدالرحمن عمرو، و مجدي محمد سالم

قسم وقاية النبات ، كلية الزراعة ص ب ٢٤٦٠ الرياض ١١٤٥١

المملكة العربية السعودية

ملخص البحث . اجري هذا البحث بهدف دراسة الوفره العددية والنشاط الموسمي لخنافس ابي العيد المفترسة (رتبة غمدية الأجنحة ، فصيلة خنافس ابي العيد) خلال فترة سنتين متعاقبتين من أكتوبر (تشرين أول) ١٩٩٠م حتى سبتمبر (أيلول) ١٩٩٢م.

وجدت خمسة أنواع من خنافس ابي العيد المفترسة نشطة في حقل البرسيم وهي : خنفساء ابو العيد ادونيا ، ابو العيد ذو التسع نقط ، ابو العيد ذو السبع نقط ، ابو العيد ذو الأحد عشر نقطه وابو العيد اسكمناس . الاعداد الاجمالية لهذه الخنافس كانت ١٤٢٨ و ٨٤٧ لسنتي الدراسة الاولى والثانية على الترتيب . وقد وجدت هذه الخنافس عند اقصى نشاط موسمي لها حيث جمعت أعداد كبيرة منها خلال شهري مارس (أذار) وابريل (نيسان) ، وبلغ أعلى تعداد لها في الاسبوع الأخير من مارس في السنة الاولى وفي الاسبوع الثالث من ابريل في السنة الثانية لهذه الدراسة . كما كانت اعداد هذه الخنافس عند حدها الادنى خلال شهر مايو (ايار) ومن يوليو (تموز) حتى فبراير (شباط) في السنة الأولى ومن شهر سبتمبر حتى فبراير في السنة الثانية . أن مراقبة أعداد مجاميع خنافس ابي العيد المفترسة في البرسيم ومتابعة نشاطها مهم لحماية هذه الحشرات النافعة من التأثير الضار للمبيدات الحشرية وكذلك لتحديد الوقت المناسب لأتخاذ القرارات المتعلقة بأدارة آفات البرسيم .