



POPULATION DYNAMICS OF ORIENTAL HORNET (*Vespa orientalis* L.) DURING ITS ACTIVITY SEASON IN THE APIARY THROUGHOUT THE DAY PERIODS

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ABSTRACT

The current experiment was carried out in the Faculty of Agriculture, Ain Shams University, Shoubra El-Kheima, Qualubia governorate, during the oriental hornet active season extended from September 1st until end of December 31st, 2015, to estimate the daily counts of the oriental hornet (*Vespa orientalis* L.) as well as its population dynamics during its active season. The experimental apiary composed of twenty four honeybee colonies, each contained seven frames covered with adult bees and four frames of them contained brood. The wasp's traps were used for capturing the wasps during the day. The data summarized that, the average means of wasps captured for tested months were 8.79, 21.99, 13.42 and 1.10 wasp/trap for September, October, November and December 2015, respectively. The highest population of oriental hornet captured by the traps was recorded during October month, followed by November and September; meanwhile the population captured during December was the lowest, with significant differences between them. For daily count, the mean average numbers of wasps captured by the traps were 10.20, 17.55 and 6.22 wasp/trap for the three periods (9am – 12pm, 12pm – 3pm and 3pm – 9am of next day), respectively. The highest numbers of wasps captured by the traps were recorded during the noon period (12pm – 3pm) followed by morning period (9am – 12pm), meanwhile the afternoon and evening period (3pm – 9am of next day) recorded the lowest numbers of wasps captured by the traps, with significant differences between all the tested periods.

Overall the highest numbers of oriental hornet captured by wasp's traps were recorded in October month during the noon period, 12pm – 3pm and averaged (33.15 wasp/trap), followed by November month during the same period 12pm – 3pm (20.50 wasp/trap).

Keywords: Honeybee; Oriental hornet; *Vespa orientalis*; Controlling; Wasps; Traps.

INTRODUCTION

Vespa orientalis L. is one of the most dangerous pests that attack honeybee colonies in some parts of the world and considered a measure pest for beekeeping (Abou-Shaara, 2017). The population dynamics of oriental hornet in honeybees apiaries were studied by many authors, there active season extending from June to October with a peak invasion during July and September while there highest activity was at the noon then in the morning and evening periods (Chhuneja et al 2008).

The number of wasps reached the maximum values in October followed by September and November, then the population of wasps dropped until disappeared at the end of December (Sharkawi, 1964, Sharma and Raj, 1988, Sihag, 1992, Shoreit, 1998, El-Sherif, 2003, Goma and Abd El-Wahab, 2006, Abd Al-Fattah and Ibrahim, 2009, Ibrahim, 2009 and Omran et al 2011).

The activity of oriental hornet was more in the morning and noon as compared with in the evening, adult wasps activity started at 10.00 h but

ceased at 16.00 h during spring and autumn, with the highest activity at mid-day and the maximum number of wasps visited the apiaries during autumn as compared with summer and winter season (Thakur and Bagga, 2000 and Khater et al 2001).

Khater et al (2001) used sticky traps for recording the change in oriental hornet population seasonal activity. The number of wasp's workers comes out from the nest at the noon period more than the number of those comes out in the morning or evening period (Volynchik et al 2008).

MATERIAL AND METHODS

The current experiment was carried out in the Faculty of Agriculture, Ain Shams University's apiary, Shoubra El-Kheima, Qualubia governorate, during the oriental hornet active season extended from September 1st until end of December, 2015, to estimate the daily counts of the oriental hornet (*Vespa orientalis* L.) as well as its population dynamics during its activity season.

The experimental apiary composed of twenty four honeybee colonies, each contained seven frames covered with adult bees and four frames of them contained brood.

Three wasp's traps were setting in the experimental apiary and the numbers of oriental hornet caught were estimated three daily periods; in the morning (9am – 12pm), noon (12pm – 3pm) and the last one were from (3pm until 9am of next day).

Sugar solution (1:1) was used in the traps to attract the wasps and the syrup was changed every three day intervals.

The temperature and relative humidity of weather were recorded daily in the study area during the experimental period.

Obtained data were statistically analyzed by using a randomized complete block design in factorial arrangement according to (Snedecor and Cochran 1990). For separation between means, least significant difference at 5% probability was applied.

RESULTS AND DESSCSSION

The total and average number of oriental hornet (*Vespa orientalis* L.) caught by wasp's traps

throughout the day (9am – 12pm, 12pm – 3pm and 3pm until 9am of next day) during its activity in the experimental apiaries was estimated and recorded during September 1st until end of December 31st, 2015.

Data illustrated in Fig. (1) showed the total and average numbers of oriental hornet caught during the period extended from September 1st until September 27th. The total numbers of wasps caught were (204, 394 and 114 wasp/trap) with an average of (7.56, 14.59 and 4.22 wasp/trap) in the three periods, respectively. There were significant differences between all the tested periods where the highest population of wasps caught was during the noon period(12pm – 3pm) followed by the morning period (9am – 12pm), while the afternoon and evening period (3pm – 9am of next day) recorded the lowest population of wasps caught in the traps.

The same trend was recorded in October month where the highest numbers of oriental hornet caught were in noon period, (12pm – 3pm) with average of 33.15 wasp/trap and the lowest numbers were during evening period (3pm – 9am of next day) with an average of 12.52 wasp/trap. Significant differences were found between all the tested periods during October 1st until October 28th Fig. (2).

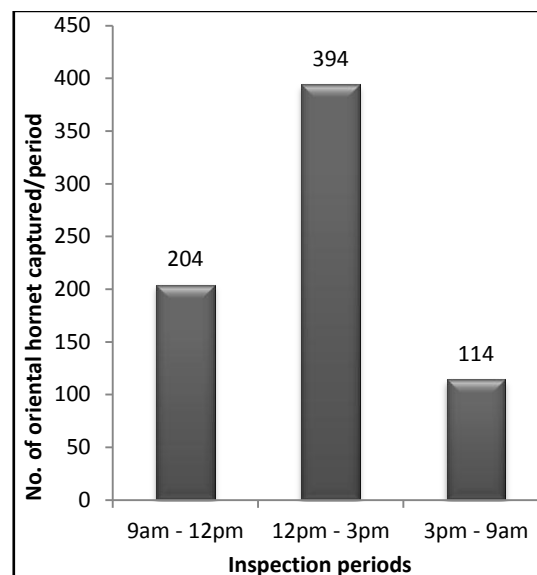


Fig. 1. Numbers of oriental hornet (*V. orientalis* L.) captured by the traps during September month, 2015 throughout the day.

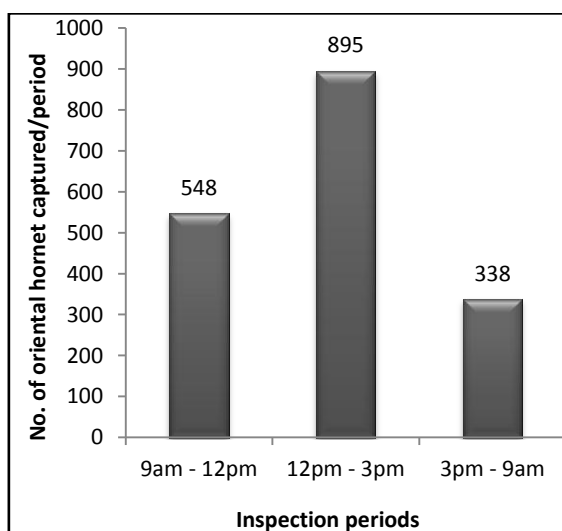


Fig. 2. Numbers of oriental hornet (*V. orientalis* L.) captured by the traps during October month, 2015 throughout the day.

As showed in Fig. (3), the same trend was found, where the total and average numbers of wasps caught during November 4th until 29th, 2015, were (289, 492 and 185 wasp/trap) with an average of (12.04, 20.50 and 7.71 wasp/trap) for (9am – 12pm, 12pm – 3pm and 3pm until 9am of next day), respectively. Significant differences were found between all the tested periods, where the highest population of wasps in the traps was recorded in noon period (12pm – 3pm) and the lowest population was recorded in the last period (3pm until 9am of next day).

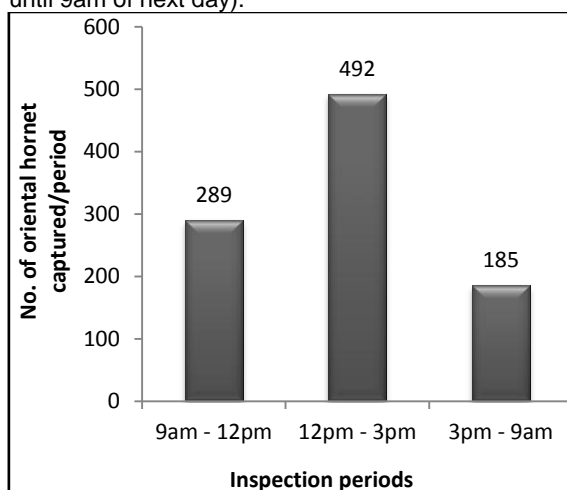


Fig. 3. Numbers of oriental hornet (*V. orientalis* L.) captured by the traps during November month, 2015 throughout the day.

During December 2nd until December 31st the population of oriental wasps captured in the traps recorded the lowest numbers among the other tested months, where the total and the average of wasps captured were (24, 53 and 12 wasp/trap) with an average of (0.89, 1.96 and 0.44 wasp/trap). No significant differences were found between the tested periods Fig. (4).

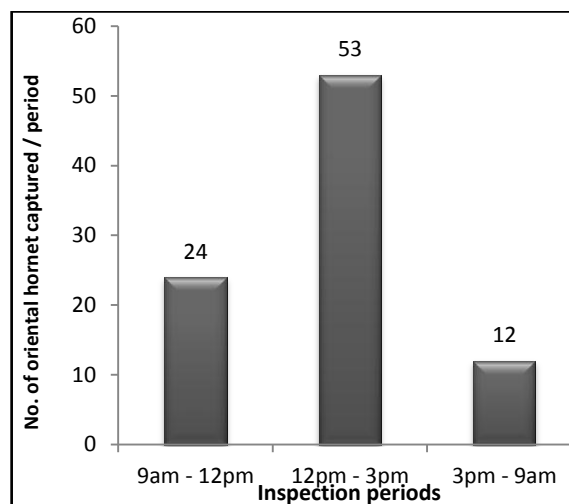


Fig. 4. Numbers of oriental hornet (*V. orientalis* L.) captured by the traps during December month, 2015 throughout the day.

Regardless the tested daily periods, the general means of tested months was (8.79, 21.99, 13.42 and 1.10 wasp/trap) for September, October, November and December, 2015, respectively. The highest population of oriental hornet captured by the traps was recorded during October month, followed by those in November and September months, meanwhile the population captured during December month was the lowest, with significant differences between them.

Regardless the inspected month, the average number of wasps captured by the traps was (10.20, 17.55 and 6.22 wasp/trap) for the three periods (9am – 12pm, 12pm – 3pm and 3pm – 9am of the next day), respectively. The highest number of wasps captured by the traps was recorded during the noon period (12pm – 3pm) followed by morning period (9am – 12pm), meanwhile the afternoon and evening period (3pm – 9am of next day) recorded the lowest number of wasps captured by the traps, with significant differences between all the tested periods.

Overall the highest numbers of oriental hornet captured by wasp's traps were recorded in October month during the noon period, 12pm – 3pm with an average of 33.15 wasp/trap, followed by November month during the same period, 12pm – 3pm (20.50 wasp/trap).

The results in agreement with data obtained by (Sharkawi, 1964, Sharma and Raj, 1988, Sihag, 1992, Shoreit, 1998, Gomaa and Abd El-Wahab, 2006, Abd Al-Fattah and Ibrahim, 2009, Ibrahim, 2009 and Omran et al 2011), whom found that the population of oriental hornet reached the highest value in October followed by September and November and the data obtained by (Thakur and Bagga, 2000 and Khater et al 2001), whom recorded that, the activity of oriental hornet were more in the morning and noon periods as compared with in the evening, and added that adult wasps activity started at 10.00 h but ceased at 16.00 h during spring and autumn, with the highest activity at mid-day and the maximum number of wasps visited the apiaries during autumn as compared with summer and winter seasons.

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ديناميكية التعداد للدبور الشرقي *Vespa orientalis* L. أثناء موسم نشاطه في المنحل خلال فترات اليوم

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الموجز

كما كان متوسط التعداد اليومي للدبابير التي تم جمعها بواسطة المصائد 10.20، 17.55 و 6.22 دبور/مصيدة للفترات الثلاثة (من التاسعة صباحاً حتى الثانية عشرة ظهراً ومن الثانية عشرة ظهراً حتى الثالثة عصراً ومن الثالثة عصراً حتى التاسعة صباح اليوم التالي) على التوالي. كما تم تسجيل أكبر عدد من الدبابير التي تم جمعها بواسطة المصائد خلال الفترة بعد الظهرية (الثانية عشرة ظهراً حتى الثالثة عصراً)، يليها فترة الصباح (التاسعة صباحاً حتى الثانية عشرة ظهراً)، في حين سجلت فترة المساء (من الثالثة عصراً حتى التاسعة صباح اليوم التالي) أقل عدد من الدبابير التي تم جمعها بواسطة المصائد مع وجود فروق معنوية بين الفترات التي تم اختبارها. وبوجه عام سُجلت أعلى أعداد للدبور الشرقي التي تم جمعه بواسطة مصائد الدبابير في شهر أكتوبر خلال فترة الظهرية (الثانية عشرة ظهراً حتى الثالثة عصراً) وبمتوسط 33.15 دبور/مصيدة، يليها شهر نوفمبر خلال نفس الفترة وبمتوسط 20.50 دبور/مصيدة

الكلمات الدالة: نحل العسل، الدبور الشرقي، المكافحة، مصائد الدبابير

أجريت التجربة في منحل كلية الزراعة، جامعة عين شمس، شبرا الخيمة، محافظة القليوبية، أثناء موسم نشاط الدبور الشرقي خلال الفترة من بداية سبتمبر حتى نهاية ديسمبر 2015، لتقدير الأعداد اليومية للدبور الشرقي (*Vespa orientalis* L.) وكذلك ديناميكية تعده خلال موسم النشاط. يحتوي منحل التجربة على أربعة وعشرين طائفة نحل كل منها يحتوي على سبعة إطارات مغطاة بالنحل البالغ ومنهم أربعة إطارات حضنة، استخدمت مصائد الدبور لجمع الدبابير خلال فترات اليوم. وقد لخصت البيانات أن متوسط أعداد الدبابير التي تم جمعها للأشهر التي تم اختبارها 8.79، 21.99، 13.42 و 1.10 دبور/مصيدة لشهر سبتمبر وأكتوبر ونوفمبر وديسمبر 2015، على التوالي. كما أشارت النتائج أن أعلى تعداد للدبابير التي تم جمعها بواسطة المصائد خلال شهر أكتوبر يليها شهري نوفمبر وديسمبر، بينما كل أقل تعداد للدبابير في المصائد تم تسجيله في شهر ديسمبر مع وجود فروق معنوية بين الأشهر المختبرة.

تحكيم: ا.د عادل بسيوني

ا.د سعد مصطفى أبوليلة