

Night and Early Morning Flying Insects in a Residence Backyard in Doha City, Qatar.

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الحشرات الطائرة ليلاً وفي الصباح الباكر في فناء أحد المنازل بمدينة الدوحة بدولة قطر

فيصل تاج الدين أبو شامة

قسم العلوم البيولوجية

كلية الآداب والعلوم

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الدوحة - دولة قطر

تم جمع وتسجيل الحشرات الطائرة ليلاً وفي الصباح الباكر في فناء أحد المنازل بمدينة الدوحة بدولة قطر يومياً
ولمدة عام كامل (فبراير 2004-فبراير 2005) باستخدام شرك ضوئي ماني .

تبين من الدراسة وجود قمتين لاعداد الحشرات ، أولاها في شهري مايو وأبريل والثانية في شهري سبتمبر
وأكتوبر . وقد سجلت أقل الأعداد في شهري يناير وأغسطس ، بينما لم تشر أعداد الأنواع إلى تغير كبير على مدار
أشهر العام .

هناك احتمال كبير بأن لدرجة حرارة الهواء تأثيراً على توالد وانتشار هذه الحشرات . تنتمي مجموعة الحشرات
التي تم جمعها إلى سبعة رتب من طائفة الحشرات تغلب عليها نصفية الأجنحة وغمدية الأجنحة وذات الجناحين وغشائية
الأجنحة ، بينما سادت فصيلة كايرونوميدي التابعة لرتبة ذات الجناحين وسايكاديليدي من نصفية الجناحين وفورميسيدي
من غشائية الأجنحة وستافيليدي من غمدية الأجنحة .

و غالبية المجموعة الحشرية التي تم جمعها في هذه الدراسة من الحشرات صغيرة الحجم والتي لا تتضمن أنواعاً
تشكل خطراً على الإنسان او الحيوانات المستأنسة ، بل أن لبعضها فوائد بيئية كناقلة للقاح النباتات وكجزء من
السلسلة الغذائية الطبيعية .

Key words: *Flying insects, Doha, Qatar.*

ABSTRACT

Night and early morning flying insects in Doha were recorded daily, for a complete year, using a light-water trap. Two peaks of insect numbers occurred in April-May and September-October periods respectively. The lowest numbers were collected in January and August. The number of species did not show any significant fluctuations. It is most probable that ambient temperature was the main determining factor in the development and dispersal of these insects.

The collected insect fauna comprised seven insect orders, with the orders; Hemiptera, Coleoptera, Diptera, and Hymenoptera being the most dominant. Insects belonging to the dipteran family Chironomidae, the hemipteran Cicadellidae, the hymenopteran Formicidae and the Coleopteran Staphalinidae were of high occurrence. The types encountered were assemblages of small insects, generally posing no harm to humans or domestic animals. However, some are ecologically beneficial as pollinators or constituents of natural food chains.

Introduction

Information on the insect fauna of Qatar is scanty. Few lists of identified species were published. The most extensive of these is that of Abdu and Shawmar [1], where 170 insect species, collected from different localities in Qatar are listed. Some butterflies of Qatar were identified by Pittaway [2]. Most recent studies by Abushama [3,4,5] have shown that insects comprised the majority of terrestrial Arthropoda in Qatar, with the tenebrionid beetles; *Adesmia cancellata* L. and *Trachyderma hespida* Forsk. the most dominant.

Nearly all the above-mentioned records were based on diurnal collections, with no mention to nocturnal insect fauna. However, urban inhabitants have voiced frequent complaints from bites and annoyance by night flying insects. Such an alarm seems to be strengthened by a popular belief that insects are generally harmful, incriminated as being unhygienic, disease transmitters or a source of allergy and annoyance. The immediate reaction to any insect presence is calling the health authorities for spraying houses, gardens and other dwellings with chemical insecticides. Such treatment, of course, does not discriminate between useful, harmful or neutral elements. The objective of this study is to investigate the occurrence and diversity of night and early morning flying insects in an urban area in Qatar, with emphasis on community composition and the extent of possible harm inflicted by these insects. The locality chosen to conduct the study is in the center of Doha, the capital city of Qatar. Doha lies in the mid-eastern coast of Qatar peninsula, between latitude 25°--25° 30' N and 51° 30' E longitude. Doha is the main urban area in Qatar, inhabited by more than 60% of the population of the country. The average rainfall in Doha is 78 mm confined to eight months of the year, extending from October to May while the period June to September is practically rainless [6]. Records show that January is the rainiest month of the year. Generally speaking, Qatar has a hot desert climate, with mild winters and very hot summers. Temperature records in Doha show that not a single month has a mean temperature below 17.1°C, [6], and the mean minimum temperature does not drop below 12.7 °C. The maximum temperature of about 41 °C is reached in July and August. The relative humidity records at Doha airport show that the mean annual R.H is 61.7%, indicating high humidity throughout the year, [6].

As described by Batanouny, [6], many trees have been cultivated in Doha streets and house gardens. Ornamental shrubs and herbs are also widely grown.

Materials And Method

An experiment has been conducted in the backyard of my residence in the north-central section of Doha city. The Backyard is not used for any domestic purpose, and surrounded by trees of *Ziziphus spina-christi*, *Lowsonia inermis* and the ornamental shrub *Bougainvillea glabra*. A light-water insect trap was set, using a red plastic trough of 34cm diameter and 14cm height. The trough was half-filled with tap water and placed on a table 50cm above ground. A florescent electrical lamp was hoisted 30cm above the water level, in a

manner that the light rays fell on the water surface when the light was put on, from sunset (18 hours, local time) to 6 hours in the early morning of the next day. Air temperature and relative humidity were recorded at 21 hours using a thermohygrograph placed in the vicinity of the insect trap. Flying insects attracted by the florescent light mostly fell in water and drowned. Those trapped were collected twice every day; at 21 hours and at 6 o'clock next morning. The collected samples were preserved in 70% ethyl alcohol in small plastic bottles. In the laboratory, the samples were examined under a dissecting microscope and the number of individuals and their identification recorded. Permanent slides of the sampled insects were then prepared. The samples were dehydrated in 90% followed by 100% ethyl alcohol, respectively, cleared in xylol and mounted in Canada balsam. After drying on a hot plate, the slides were investigated under the lowest power (2.5x 10 magnification) of a microscope (Zeiss, Axioplan), and photographed by an attached camera, (M 35 W). Photograph indices were printed and used for preliminary classification to the family and, in some cases to the genus level. Complete identification awaits consultation with specialists. The experiment described above was conducted every day, for a complete year, starting on 10.2.2004 and ending on 9.2.2005. Collected samples of insects were provisionally identified using common references and available identification keys, [7,8,9].

Results

The day-average number of individuals and species for each month, with corresponding mean relative humidity and air temperature are plotted in Fig.1. This shows two peaks of number of individuals; one in April to May and the other from September to October. The former peak corresponded to 56% R.H and 28 °C, while the latter occurred at 75% R.H and 38 °C. The lowest record in the number of individuals was in January at a low air temperature of 17 °C and 70% R.H. The number was also low in August at 40 °C mean air temperature and 70% R.H. However, the number of species did not show any significant fluctuation, being always below 10. Nevertheless, a limited increase was exhibited during the periods from April to June and from September to October, respectively. This increase in species number corresponded to peaks of number of insects. It is thus most probable that ambient temperature, rather than air relative humidity, was the determining environmental factor affecting the numbers of individuals and species of night and early morning flying insects in Doha city. Few or no insects were collected in windy or rainy nights, or when the air temperature fell below 15 °C.

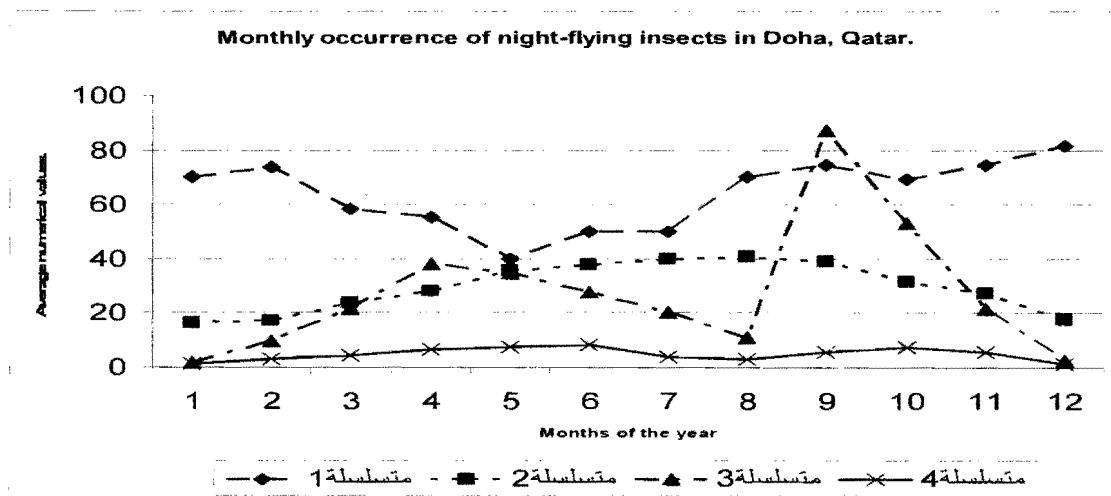


Fig.1: Monthly occurrence of night and early morning flying insects in Doha city, State of Qatar: Series1; % Relative Humidity. Series2; Air temperature in °C. Series3; Monthly average of insect number. Series4; Monthly average of species number

The collected insects belong to eleven insect orders as shown in Fig.2. Seven of these orders: Collembola, Odonata, Psocoptera, Thysanoptera, Mecoptera and Lepidoptera were represented by lower number of individuals than the orders Hemiptera, Coleoptera, Diptera or Hymenoptera, respectively.

The latter four orders showed significantly higher occurrence, and among them dipterans were the most numerous, followed by hemipterans, hymenopterans and then coleopterans.

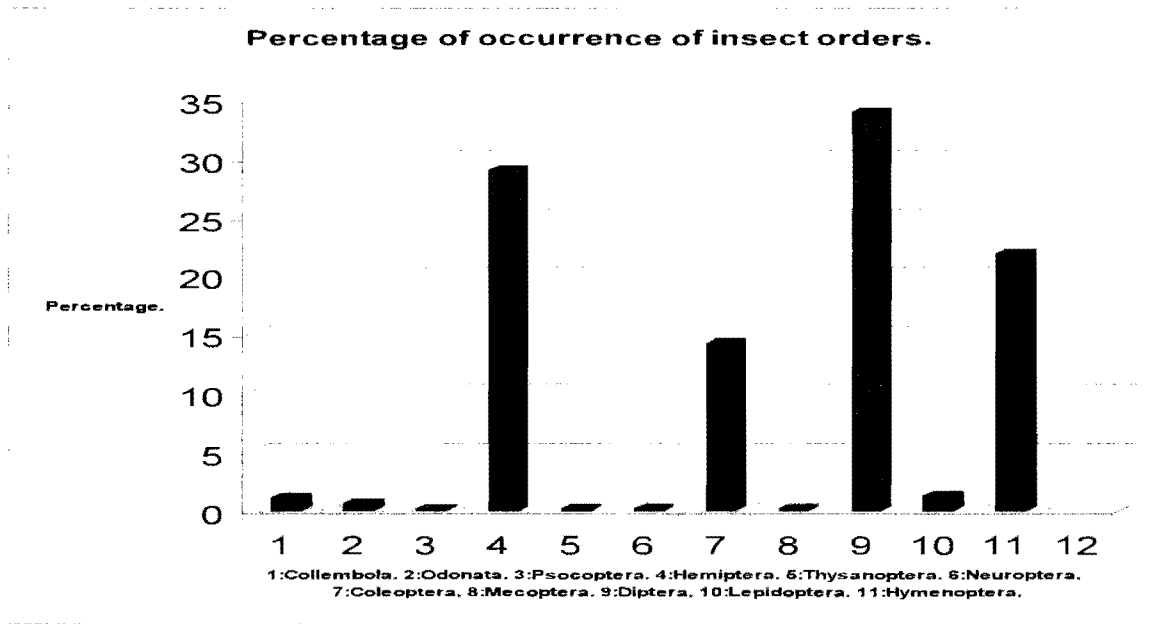


Fig.2: Percent occurrence of orders of night and early morning flying insects in Doha city.

The highest diversity, family wise, was also exhibited by the order Diptera, where 18 families were identified, (Fig.3). Dominant among these were the families; Chironomidae (non-biting midges), Cecidomyiidae (gall-midges) and Agromyzidae (leaf mining flies). The latter, most probably, use the surrounding vegetation as refuge and become active in the early morning, and can turn as pests wherever their host plants occur as crops.

Few *Aedes* or *Culex* mosquitoes of the family Culicidae were encountered. Their collective number comprised 3.6% of the dipteran flies, while no other biting dipterans were recorded. . The chironomid midges, on the other hand, are usually attracted by florescent light to houses and can be a source of nuisance.

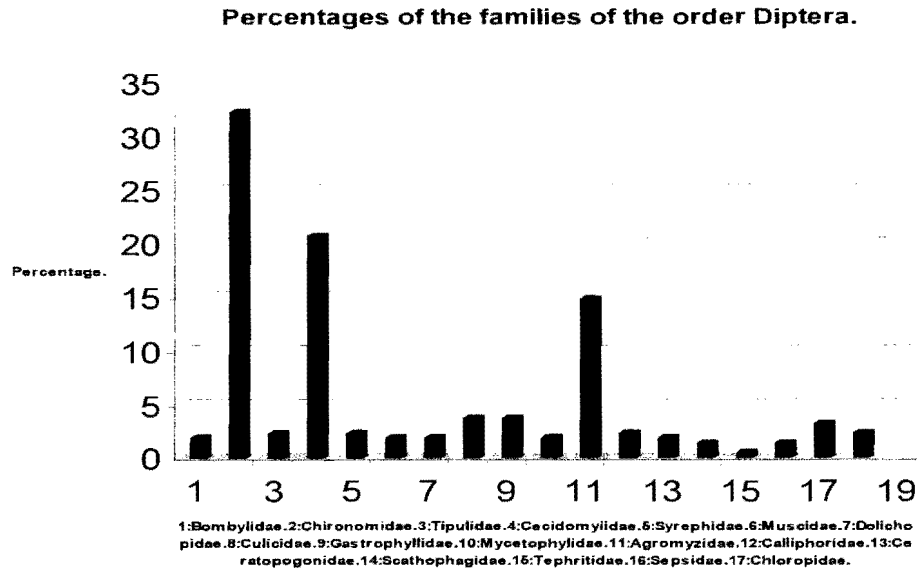


Fig.3: Percentages of the families of the order Diptera, collected at night and early morning in Doha city.

Of the six hemipteran families, (Fig.4), Cicadellidae (leaf-hoppers), Aphididae (aphids), Psyllidae (jumping plant lice) and Anthochoridae (flower bugs) were the commonest. This was expected due to the close association of these insects with plants, which are plenty in the house gardens in Doha.

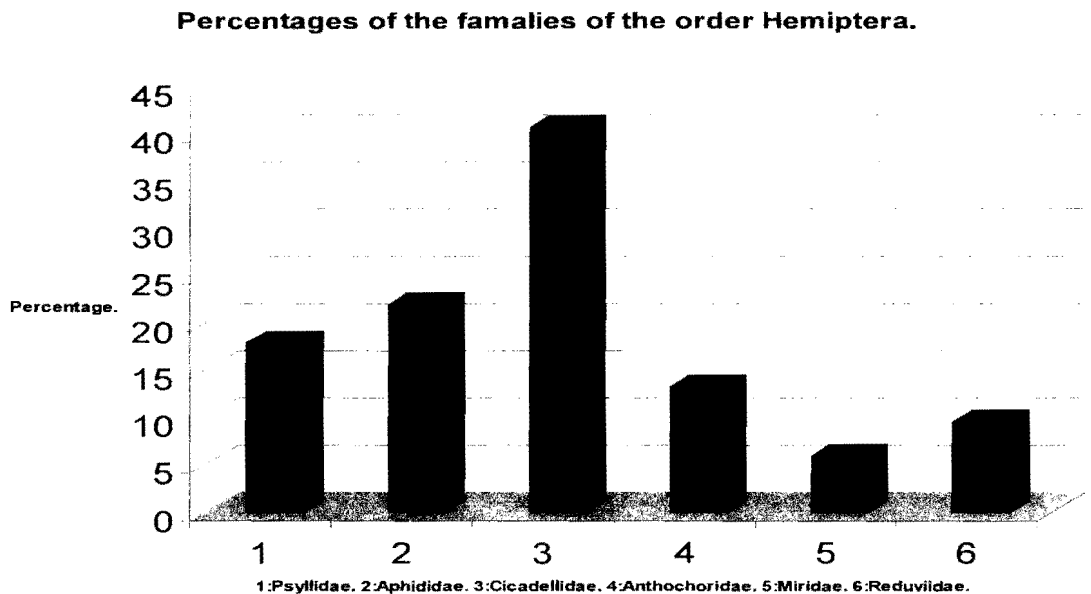


Fig.4: Percentages of the families of the order Hemiptera, collected at night and early morning in Doha city.

As shown in Fig.5, ants of the family Formicidae and mostly of the genera *Myrmecia* and *Formica* dominated the hymenopteran collection. These can also be encountered inside houses and their bites cause some alarm to inhabitants. Second to ants were the wild honeybees of the family Apidae, which forage in the early morning, attracted to the water trap mostly in summer, when the air temperature was high.

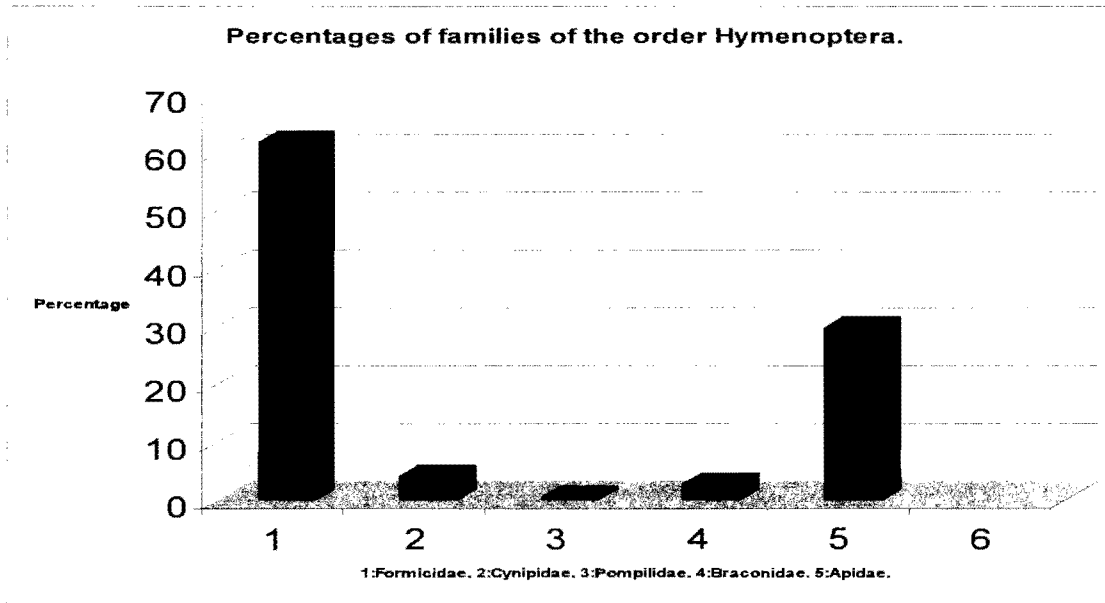


Fig.5: Percentages of the families of the order Hymenoptera, collected at night and early morning in Doha city.

The beetles collected comprised six families (Fig.6). The commonest of these was Staphylinidae (rove beetles) and Lathridiidae (minute scavenger beetles). However, Pyrochoridae, Tenebrionidae, Cuculionidae and Chrysomelidae were encountered in smaller numbers.

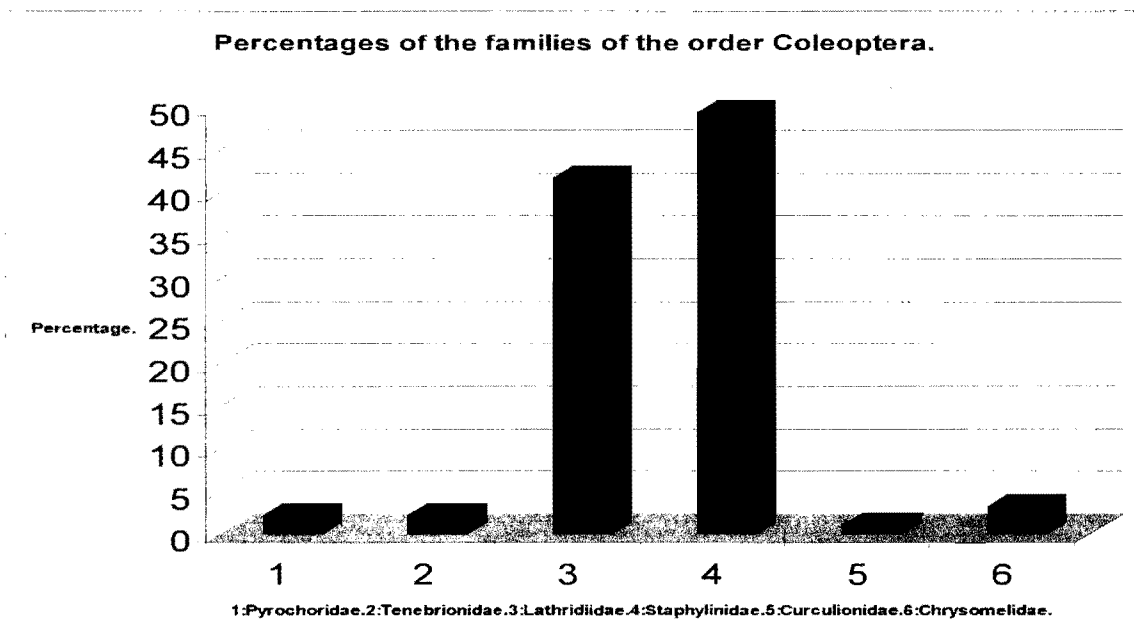


Fig.6: Percentages of the families of the order Coleoptera, collected at night and early morning in Doha city.

Discussion

The daily records of night and early morning flying insects in Doha city, exhibited low numbers of individual insects during most months of the year. The number ranged between 2 and 90, and exceeded the maximum only in September, October and few days in March and April. The diversity with reference to orders, families and genera was also limited to a maximum of ten different taxa in each catch.

Non-biting midges, gall midges, plant lice, plant hoppers, ants and rove beetles dominated the insect fauna. Few male *Aedes* and *Culex* mosquitoes were encountered. These seem to pose no significant harm to humans or domestic animals in Doha urban area. However, some of the assemblages might cause some alarm, annoyance and in few cases allergy. Few of the collected insects like leaf-mining flies are considered potential pests of crops, while flower flies, bees and moths are beneficial as pollinators.

March-April and September-October peaks of insect numbers have been expected as an outcome of favourable ambient temperatures. Similar findings related to desert Arthropoda in Qatar, were previously reported [3,4]. The temperature range 30 °C to 35 °C seems to be most suitable for development and dispersal of night and early morning flying insects in Doha. Relative humidity was of minor effect. Factors such as high wind speed, drizzle or rain as well as extreme temperatures, resulted in very low collections (2 to 5 individuals at best).

The light-water trap used though suitable for capturing targeted small flying insect, is not efficient in case of larger insects like moths, of which few were collected.

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