



A preliminary identification of insect successive wave in Egypt on control and zinc phosphide-intoxicated animals in different seasons



Marah Mohammad Abd El-Bar*, Rabab Fathy Sawaby, Hayam El-Hamouly, Reham Hamdy

Department of Entomology, Faculty of Science, Ain Shams University, Abbassya, Cairo, Egypt

Received 19 September 2015; revised 30 March 2016; accepted 10 May 2016

Available online 11 June 2016

KEYWORDS

Forensic entomology;
Decomposition;
Calliphoridae;
Zinc phosphide;
Chrysomya albiceps;
Egypt

Abstract The presented study aimed primarily to document a baseline data of the decay process of rabbits and guinea pigs and their associated arthropod fauna, which are placed in an urban city: El Abbassya, Cairo Governorate, Egypt, during winter and summer seasons, and to compare these data with the corresponding figure for zinc phosphide-intoxicated carrions. Generally, control rabbits and control guinea pigs were faster in their decay comparing the corresponding figure of the zinc phosphide-intoxicated group. A delay in colonization of insects was noticed either in the winter season for both groups, or additionally for the zinc phosphide groups. The associated insect fauna was represented in 6 orders, 20 families, and 36 genera and species. Necrophagous arthropods that supported decomposition of carcasses were mainly of orders Diptera and Coleoptera. Calliphoridae was the first insect family that colonized the different carcasses. The mean numbers of control immature dipterous maggots and similarly, the control coleopteran larvae significantly exceeded the corresponding mean numbers for the zinc phosphide-intoxicated groups in both winter and summer seasons in either rabbits or guinea pig groups. Moreover, the mean numbers of dipterous maggots or coleopteran larvae of rabbits significantly surpassed the corresponding figures for guinea pigs in both seasons. This study may add as a reference for the succession wave arthropod fauna in Cairo Governorate in winter and summer seasons. Moreover, it is the first record of the arthropod successive wave on zinc phosphide-intoxicated remains.

© 2016 The International Association of Law and Forensic Sciences (IALFS). Production and hosting by Elsevier B.V. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

* Corresponding author at: 28 Sakalya St. from Makram Ebid, Nasr City, Cairo, Egypt. Mobile: +20 1005749590.

E-mail addresses: marah_elnagar@yahoo.com (M.M. Abd El-Bar), rabab_sawaby@yahoo.com (R.F. Sawaby), elhamouly@hotmail.com (H. El-Hamouly), ho1_ah2@yahoo.com (R. Hamdy).

Peer review under responsibility of The International Association of Law and Forensic Sciences (IALFS).

<http://dx.doi.org/10.1016/j.ejfs.2016.05.004>

2090-536X © 2016 The International Association of Law and Forensic Sciences (IALFS). Production and hosting by Elsevier B.V. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

1. Introduction

Forensic entomology is the science in which the biological and ecological aspects of the colonizing arthropod fauna are studied. It is a branch of forensic science.¹ In the absence of vertebrate scavengers, animal carcasses provide us with a rich

complex of insects that aid, in combination with anaerobic bacteria in driving the decomposition process.² This branch of study is a useful tool to estimate the time interval between death and the discovery of body, and hence, in determining the post mortem interval (PMI). For intervals more than 72 h, forensic entomology would be more precise (if not the only tool) in determining PMI than traditional methods.³

Insects are attracted in a succession manner by chemicals released during the decay process and /or other organisms visiting the remains.^{4,5} The dead remains are an ephemeral habitat; a source of food and a shelter as well to large types of insects. The usual classification of arthropod fauna separates them into: necrophagous; necrophilous; omnivorous; opportunists; and accidentals. Diptera and Coleoptera are considered the most important orders in the process of decomposition as their immature stages use carrions to develop. The presence of eggs and larvae of these insects subsequently attracts other insect predator species.^{6,7} Decay process, faunal composition and succession, development time of insects, are affected by some factors such as temperature, wind, rainfall, and geographical locality. Hence, when local climatological data are available, the sequence of colonizing fauna can be used to detect the PMI.⁸ A carrion-related arthropod database is important for each locality especially temperate ecosystems.⁹

After certain elapsed time and when the traditional specimens (blood, urine, organs) are not available for the corpses, the carrion-feeding insects may provide a potential alternative for toxicological specimens. Moreover, recent studies had proven that the presence of drugs/toxins in decomposing tissues may alter the colonization pattern and rate, a branch of investigation; entomotoxicology.¹⁰

Zinc phosphide is a commonly used pesticide and an effective rodenticide, which has a non-specific toxicity.^{11,12} It is a gray-black finely ground crystalline that is non-soluble in water and alcohol. It was first synthesized in 1740 and was used for the first time as a rodenticide by the Italians in 1911. Zinc phosphide manifests its immediate toxic symptoms through production of phosphine gas. It is rapidly absorbed throughout the gastrointestinal tract and is loaded to the liver by the portal vein.¹² Upon ingestion, it reacts with the diluted acids in the gastrointestinal tract and produces phosphine which is carried to the blood stream. Chronic exposure to phosphine causes nausea; vomiting; diarrhea; cough; headache; and feeling cold. Its treatment is symptomatic by evacuating the intestinal tract and no antidote is known.¹¹ Deaths are directly related to cardiotoxicity.¹³

Zinc phosphide poisoning was a matter of study worldwide.^{12,14-18} In Egypt, Shreed et al. 19 recorded that 3.9% of parasuicide in the Governorate of Damietta was of zinc phosphide poisoning. While another study in Dakahlia²⁰ had shown that 5.56% of elderly unnatural deaths were of zinc phosphide poisoning. El Naggar and El Mahdy²¹ recorded that among 11.8% of poisoned cases that were admitted to the National Center of Clinical and Environmental Toxicological Research (NECTR), 15% of this percentage was because of zinc phosphide poisoning.

The presented study aimed primarily to document a baseline data of the decay process of two types of animals and their associated arthropod fauna, which are placed in an urban city: El Abbassya, Cairo Governorate, Egypt, during winter and summer seasons, and to compare these data with the corresponding figure for zinc phosphide-intoxicated carrions. The study aimed also to compare the insect wave succession pattern for both types of animals which differ in size.

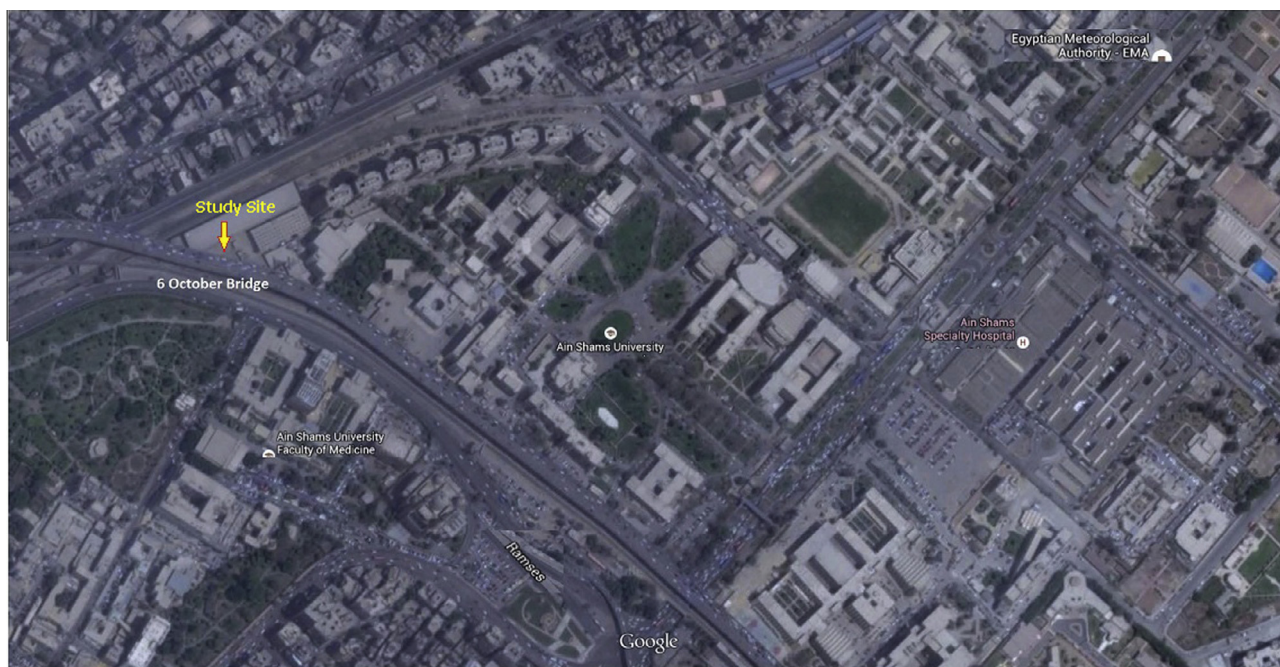


Figure 1 Map showing the study site in Abbassya Area Cairo Governorate Egypt.

Download English Version:

<https://daneshyari.com/en/article/5123794>

Download Persian Version:

<https://daneshyari.com/article/5123794>

[Daneshyari.com](https://daneshyari.com)