

# دراسات تصنيفية جزئية لحشرات أسد المن (شبكة الأجنحة - كريزوبيدي) في مصر و تقييم دورها في المكافحة الحيوية للآفات الحشرية

رسالة مقدمة

للحصول علي درجة

دكتوراه الفلسفة في العلوم (علم الحشرات)

إلي

قسم علم الحشرات

كلية العلوم - جامعة عين شمس

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## رسالة دكتوراه

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## إهداء

إلي روح والدي

أ.د/ إبراهيم إمام إسماعيل

داعيا المولي عز و جل أن يتغمده بواسع رحمته و أن يتم عليه نعمته بالفردوس الأعلى فإنة

سبحانه مولي ذلك و القادر عليه.

## المستخلص

تعتبر عملية تعريف أفراد عائلة شبكية الأجنحة الخضراء عملية معقدة وذلك لأن الأصناف تعاني من العديد من المشاكل التصنيفية مثل تحديد الأجناس، والأنواع، ودراسة المترادفات و الأنواع الخفية. وقد تم التعرف عليها حتى الآن على أساس مورفولوجيا ، وسلوكي ، و بيانات الحمض النووي mitochondrial DNA . التحديد بمثل هذه الأساليب التقليدية، المورفولوجية، وسلوكية، يحتاج وقتا طويلا ويتطلب مهارات متخصصة . كما أن التحديد الصحيح هو الخطوة الأولى لاستخدام تلك المفترسات بنجاح في برنامج مكافحة البيولوجية . هذا العمل يعتبر تمديد لطرق فحص الحمض النووي لمختلف أفراد عائلة شبكية الأجنحة الخضراء في الصحراء الغربية في مصر. مع رفع التكاليف التعرف في الخارج والتي في معظم الحالات ليست دقيقة مما يؤدي إلى تعميق المشكلة. بهدف التوصل إلى ليست مجرد وسيلة بسيطة ورخيصة ولكن أيضا من أجل التعرف على السلالات والأنواع الإيكولوجية في الصحراء الغربية ، التي قد يكون لها سمات خاصة و التي يمكن استغلالها في تطبيق هذه الأعداء الطبيعية في برامج متكاملة لمكافحة الآفات. هذا الهدف لا سيما ما يبرره لأن الحشرات في مصر ليست لها دراستها على نحو شامل. الصحراء الغربية تمثل حوالي ثلثي مساحة مصر ، وتحتوي على العديد من الواحات. بعض الواحات الصغيرة لها السكان الأخرى غير مأهولة. في معظم الحالات ، هذه الواحات هي منطقة معزولة بدون اي تسجل لأنواع الحيوانات والنباتات.

**Molecular systematic studies of *Chrysoperla*  
species (Neuroptera: Chrysopidae) in Egypt and  
evaluation of their role in biological control of  
insect pests**

**A Thesis Submitted**

To

**The Department of Entomology  
Faculty of Science, Ain Shams University**

For the Award of the Degree of

**Doctor of Philosophy of Science  
In Entomology**

By

**Mohamed Ibrahim Imam Ismail**

Supervised by

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## Approval Sheet

### **Molecular systematic studies of *Chrysoperla* species (Neuroptera: Chrysopidae) in Egypt and evaluation of their role in biological control of insect pests**

Approved By

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Date:    /    /2009

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## Introduction

Species of Chrysopidae are used in biological control programs by growing rate particularly with the increasing preference for organic agriculture and awareness about side effects from indiscriminate use of insecticides. Using of such groups is encountered by problems that influence their potential as biocontrol agents.

The green lacewings are probably one of the most commonly encountered, but least known families of Neuroptera with over 1200 species in at least 80 genera. The genera *Chrysoperla* Steinmann and *Mallada* Navás are important genera used in integrated biological control in field and horticultural crops, because several species have proved easy to be cultured and their larvae are fierce predators of aphid and coccids (**Thierry et al. 1992; Wells and Henry 1992**).

Complications like high degree of similarity between species and synonymy make it hard to separate them by morphological traits. On the other hand, studies of *C. carnea* (the most important in the agriculture programs of biological control) suggested that, in fact, it is a group of

cryptic species generally referred to as *C. carnea sensu lato*, which represent further complication. Lacewing systematists now acknowledge the limited value of the traditional morphology for delimiting these species. Techniques for reliable identifications of the cryptic species are needed, as the importance of recognizing the best taxa for establishing biological control programs.

On the other hand, there is a lack of wide-ranging studies of Egyptian fauna and particularly of remote uninhabited areas. Of consequences of lacking such knowledge are the inability of complete identification of many of specimens collected and incurring high cost for the identification abroad. In most cases, the identification was insufficient and inaccurate.

The most important upshot from economic point of view is the problems encountered in newly cultivated regions, which in most cases are isolated regions with their fauna and flora having a balanced ecosystem that had been disrupted by man-made activities (The Siwa Oasis, Matrouh Governorate, close to the Libyan border to the west of Qattara, is isolated from the rest of Egypt but has

sustained life since ancient times, and many areas in Sinai Peninsula such as Ras Mohamed).

Studying the insect fauna, beneficial and harmful, will guard the agriculture investments from destruction by injurious pests and aid in exploitation of the advantageous ones. With so many species, ecotypes and strains available and very frequent exchange of culture material, correct identification is the first step for a successful control program (**Tauber et al. 2000**).

The exploitation of the different populations of *C. carnea* in control process depends on their potential to be mass reared in the laboratory at low cost. In addition their suitability to the new environment where they will be applied is of crucial importance.

This study demonstrates the value of a collaborative, multidisciplinary approach for the identification of *Chrysoperla carnea* populations. The field collections and observations coupled with molecular biology data provide insights into *Chrysoperla* biology and taxonomy of Egypt.

We plan to continue our collaborative multidisciplinary work to Egyptian population of *C. carnea* in order to add more knowledge to this important predator.

## Materials and Methods

### I- Study Sites:

Selection of study sites was based on habitats with relatively high richness in biodiversity, those with special scientific value *e.g.* sanctuaries, oases, and uninhabited areas (Siwa Oasis, Matrouh, Ras Mohamed, Baharia Oases, Farafra Oasis and Dakhla Oasis). Ecosystems subjected to development programs and exploitation features were on the list of habitat types eligible for consideration (Alexandria, Kafr El Sheikh, Qena, and Ismailia).

At each habitat, from the previously mentioned, monitoring or scouting processes for *Chrysoperla carnea* was performed. Sweeping net, plant inspection and light sheet trap were the sampling techniques used during this study. Individual insects collected by hand netting or light sheet traps were partially identified using morphological characters described by (**Brook 1994, Fadl and Shoukry 1995**).

#### 1- Siwa oasis:

Siwa sits in a depression, referred to as the Siwa depression. The depression is 82 km long and between 9 to 28 km wide. The southern parts of the Oasis have succumbed to dunes from the Great Sand Sea, which extends over 500 km