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Degree: **B. SC. Faculty of Agriculture, Cairo University**
Title of Thesis: **Application of Recent Technology in the taxonomy of Certain Acarines in Egypt**
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Department: **Agricultural Zoology and Nematology**
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ABSTRACT

Ticks and mites are responsible for serious economic loss, its parasitic on the animals and birds, identification of ticks and mites species has always been based on morphological characters, this method does not applied in cause of any damage in any specimen or engorged female, Recently, molecular genetics studies were introduced to differentiate among different genera and/or species depending on DNA analysis.

- Collected ticks (Rhipicephalus sanguineus, Argas persicus and A. arboreus) from (dogs, fowl houses and inhabited herons), respectively.
- Collected mites (Psoroptes natalensis, P. ovis, P. cuniculi and Dermanyssus gallinae) from (buffalos, sheep, rabbits and fowl houses), respectively.
- Microscopic morphological characters to differentiate between the three species *Psoroptes cuniculi* (Delafond, 1859). *P.ovis* (Hering, 1838) and *P. natalensis* (Hirst, 1919).
- Effects of *P. cuniculi* infection on host histopathological changes cause dematites to rabbits.
- To assess the possibility of using molecular markers and five primers to identify the tick species: *Argas arboreus* (Hoogstroal&Kohls), *Argas persicus* (Oken), and *Rhipicephalus sanguineus* (Larteill), and the mites species: *Psoroptes cuniculi*, *P. natalensis*, and *Dermanyssis gallinae* based on RAPD-PCR and to estimate the genetic distances between them.
- The similarity coefficient percentage of three species of ticks was strangest relationship was scored between *A. arboreus* and *A. persicus* at the similarity of 52% while the lowest one was scored between *R. sanguineus* and *A. arboreus* at the similarity of 48%.
- The similarity coefficient percentage were strongest relationship was scored between *P. natalensis* and *P. cuniculi* at similarity of 46 %, while, the lowest was scored between *D. gallinae* and *P. natalensis*. The similarity of 42 % showed between the *P. cuniculi* and *D. gallinae*.

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الدرجة : بكالوريوس في العلوم الزراعية- قسم مبيدات – كلية الزراعة جامعة القاهرة
عنوان الرسالة: استخدام التقنيات الحديثة في تقسيم بعض أكاروسات الحيوان في مصر
المشرفون : أ.د. كوثر محمد القماح - أ.د. شهيرة محمد أنسي البشلاوي
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,فرع: الأكاروس
تاريخ منح الدرجة :

الموجز العربى

يعتبر القراد و الحلم المتطفل من أهم الآفات التي تسبب خسائر اقتصادية كبيرة لأنها تتطفل علي حيوانات المزرعة و الطيور الداجنة.
تقسيم القراد و الحلم المتطفل يعتمد علي الشكل المورفولوجي باستخدام الميكروسكوب و أضيف إلية استخدام الهندسة الوراثية باستخدام طريقة RAPD-PCR.
- تم جمع أنواع القراد من الحقل, النوع (ريبيسفالس سانجونيس- أرجس بيرسيكس- أرجس أربوريس) من (الكلاب- مزارع الدواجن- أبو قردان) علي التوالي.
- تم جمع أنواع الحلم من الحقل, النوع (زوروبتس ناتالنسيس- زوروبتس أوفيس- زوروبتس كونيكيولاي- درمانيسيس جالنيا) من (الجاموس- الأغنام و الماعز- الأرانب- مزارع الدواجن) علي التوالي.
- تم استخدام الميكروسكوب في تحديد الاختلافات المورفولوجية فيما بين ثلاثة أنواع من جنس *Psoroptes* (*Psoroptes cuniculi - P. natalensis – P. ovis*) و أثبتت الدراسات اختلافات الشكل المورفولوجي بين الأنواع الثلاثة.
- تم إصابة عدد من الأرانب السليمة في المعمل بالنوع *Psoroptes cuniculi* و التعرف علي مقدار الإصابة التي يسببها الجرب لجلد الحيوان.
- إيجاد علاقة القرابة بين ثلاثة أنواع من القراد و علاقة القرابة بين نوعين من أنواع الحلم و دراسة نوع ثالث من الحلم و ذلك بالاعتماد على RAPD–PCR . فوجد أن:
- أعلي صلة قرابة بين أنواع القراد كانت فيما بين أفراد الجنس الواحد(*Argas persicus* و *Argas arboreus* كانت 52%)
- أقل صلة قرابة بين أنواع القراد كانت فيما بين (*Rhipicephalus sanguineus* و *Argas arboreus* كانت 48%)
- أعلي صلة قرابة بين أنواع الحلم كانت فيما بين أفراد الجنس الواحد(*Psoroptes natalensis* و *Psoroptes cuniculi* كانت 46 %)
- أقل صلة قرابة بين أنواع الحلم كانت فيما بين(*Psoroptes natalensis* و *Dermnyssus gllinaae* كانت41 %)
- - كما أثبتت النتائج أمكانية الاعتماد علي تقنيات البيولوجيا الجزيئية في تصنيف الأكاروسات المختلفة المعروفة و الغير معروفة.

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LIST OF FIGURES

Pages

LIST OF TABELS

Pages

CONTENTS

Introduction

All ticks and most parasitic mites are obligate ectoparasites of domestic animals and birds, They are found throughout the world mostly in the tropics and subtropics but certain groups are adapted to desert and semi desert areas. Ticks and mites are responsible for serious economic loss which is brought about either directly by local injury, blood loss, injecting toxins and disease transmission to their hosts or indirectly by reducing host efficiency and production (eggs, meat, milk and milk products) by its influence on their metabolism and enzyme balance (El-Kammah *et al*. 1982).

Of all ectoparasites, Ixodida are highly specialized obligate parasites of a wide variety of terrestrial and flying vertebrates. They cause great economic losses in livestock production which include the transmission of infectious disenses from animal to human (viruses, rickettsiae, spirochaetes and certain protozoans) (*Theileria* and *Babesia*) between animals.

The identification of tick and mite species has always been based on morphological characters. These methods can not be applied to damaged or engorged specimens. Recently, molecular genetic studies were introduced to differentiate among different tick genera and/or species (El Kammah and Sayed, 1999; Poucher *et al*., 1999). These methods depended upon protein and/or DNA finger prints.

We have applied a protocol for a simple, rapid and inexpensive method for DNA isolation from the eggs of three species of ticks, and three species of mites. The quantity and quality of extracted DNA were evaluated in comparison with a commercial kit, (and quality of DNA assessed by restriction endonuclease digestion and polymerase chain reaction (PCR) amplification).

The Genus *Psoroptes* Gravis, 1841 is a cosmopolitan obligate ectoparasite, which causes a debilitating dermatitis involving hair or wool loss and scab formation. The rabbit ear mite *P. cuniculi* (Delafond) is a parasite commonly found in a laboratory rabbit colonies. *P. ovis* (Hering) and *P. natalensis* (Hirst) cause a highly contagious disease of sheep and cattle, respectively. Lesions may occur on any part of the body but in badly affected animals they are most obvious on their sides. However it has been difficult to separate these species morphologically. This research is an attempt to report some morphological differences between these species, as well as DNA analysis to determine the phylogenetic origins of these species is done.

Objectives:

1 - Microscopic morphological characters to differentiate between the three species *Psoroptes cuniculi* (Delafond, 1859). *P.ovis* (Hering, 1838) and *P. natalensis* (Hirst, 1919).

2 - Effects of *P. cuniculi* infection on host histopathological changes.

3 - To assess the possibility of using molecular markers to identify the tick species: *Argas arboreus* (Hoogstroal&Kohls), *Argas persicus* (Oken), and *Rhipicephalus sanguineus* (Larteill), and the mites species: *Psoroptes cuniculi*, *P. natalensis*, and *Dermanyssis gallinae* (De Geer). based on RAPD-PCR and to estimate the genetic distances between them.

LITERTURE REVIEW

Tick

1- Economic importance:

The role of *Argas persicus* and *A. hermanni* in transmitting *Borrelia anserine* in chickens and pigeons respectively was observed by Madbouly *et al*. (1990).

Argas (*Persicargas*) *persicus* collected from chicken farms in Giza, Egypt was found to be more abundant in spring than summer, decreasing in the autumn. The lowest number of ticks collected was in winter. *A. persicus* was also found on turkeys, and *A. hermanni* on pigeons. The highest density of *A. persicus* and *A. hermanni* was found in spring and summer, respectively, Oyoun (1981), Oyoun *et al*.(1990).

Infested resident and migratory birds were examined and 400 ticks were collected. 8 tick species were identified, *Ixodes ricinus, I. Pari, I. arboricola, I. Caledonicus sculpturatus, Haemaphysalis punctata, H. erinacei erinacei* and *Hyalomma marginatum*. *Argas reflexus* was numerous in abandoned pigeon nests, Tovornik. (1990)

Parasite fauna in poltry farms was studied in Serbia. Of the total 6937 chickens, 4 geese and 6 turkeys examined, *Argas persicus* was the only tick found, Pavlovic and Nesic (1991).

The ticks on farm animals in Libya were surveyed, of which 13 species of ixodid ticks and two species of argasid ticks, *Argas persicus* and *Ornithodoros foleyi*, were collected, Gabaj et al. (1992).

Ixodid and argasid ticks were investigated on some mammals and birds in Belgrade. *Ixodes ricinus, Rhipicephalus sanguineus, R. bursa*,