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Some studies on external parasites of canines

Thesis presented by

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Abstract

Skin affections are reported to be the most common problem affecting pet animals. Hard ticks (Ixodidae) and fleas (Siphonaptera) are considered the most important external parasites infesting dogs. 117 dogs were naturally clinically infested with ticks and fleas from 514 dogs were examined. Fecal, ticks and fleas samples were collected. Ticks were identified as *Rhipicephalus sanguineus* and fleas as *Ctenocephalides felis felis*. The diseased dogs were grouped on the basis of their age, breed, sex and according to season. Dogs less than 1 year were more prone to the infection. Male dogs highly infested with fleas than females but females highly infested with ticks than male. The highest incidence of ectoparasites was recorded in German shepherd dogs and in spring then summer. The most common clinical signs recorded in dogs infested by ticks and fleas were emaciation, anaemia and pale mucous membrane, itching, biting of tail and lumbosacral region alopecia. The clinical signs of flea infestations were hair loss, flea allergic dermatitis (FAD) and flea excreta. Microscopical examination of fecal sample collected from dogs infested by ectoparasites, revealed Dipylidium caninum egg nest and Toxocara canis egg. In vitro and in vivo study of using natural product (parasidose shampoo) as a therapeutic study for control of ticks and fleas with active ingredient Biococidine applied on animal for 45 min and repeated after 3-5 days from the first treatment. It was proved that parasidose effective on males, females, eggs and larvae of *R. sanguineus* ticks and fleas. This was the first data recorded from Egypt. Evaluation of mixture of essential oils as a repellent of ticks and fleas, there were applied topically once evey 2-3 days on dogs after treated with parasidose, the study showed there was a significant between treated group and control. Using entomopathogenic fungi *(Beauveria bassiana* and *Metarhizium anisopliae)* in vitro for eggs, larvae, nymph, male and female *R. sanguineus* ticks with different concentrations. The most potent concentration of *M. anisopliae* was concentration 2 (M2) (10^7 spore/ml), the most potent concentration of *B.bassiana* was concentration 1 (B1) (10^8 spore/ml).

Keywords: *R. sanguineus,* Canine, Parasidose, Natural oils, Biological control, *Beauveria bassiana* , *Metarhizium anisopliae*.

DEDICATION

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CONTENTS

LIST OF TABLES

LIST OF CHARTS

LIST OF FIGURES

LIST OF ABBREVIATIONS

Abbreviation	Synonym
R. sanguineus	*Rhipicephalus sanguineus*
M1	Concentration 1 of *Metarhizium anisopliae* mold
M2	moldConcentration 2 of *Metarhizium anisopliae*
M3	moldConcentration 3 of *Metarhizium anisopliae*
mg	miligram
B1	Concentration 1 of *Beauverian bassiana* mold
B2	Concentration 2 of *Beauverian bassiana* mold
B3	Concentration 3 of *Beauverian bassiana* mold
SE	Standard error
C. canis	*Ctenocephalides* canis
C. felis	*Ctenocephalides felis*
D. caninum	*Dipylidium caninum*
G1	Group 1
G2	Group 2
G3	Group 3
R1	Replicate 1
R2	Replicate 2
h	Hour
cm	Centimeter
Nacl	Sodium Chloride

Introduction

Introduction

The skin is the largest and most visible organ of the body where skin, hair and subcut tissues of a newborn puppy represent 24% of its body weight and by the time of maturity, these structures constitute only 12% of body weight. It act as anatomical and physiological barrier between animal and environment by providing protection from physical, chemical and microbiologic injury, and its sensory components perceive heat, cold, pain, pruritus, touch and pressure. In addition, the skin is synergistic with internal organ systems and thus reflects pathologic processes that are either primary or shared with other tissues **(Scott *et al*., 1995)**.

In veterinary medicine, there is a very little available information concerning the demographics of canine skin disorders. It has been estimated that between 20% and 75% seen in the average of the small animals practice have skin problems as a chief or concurrent owner complaint **(Grant, 1986)**.

The most common canine skin disorder is infestation with ectoparasites. They have a worldwide distribution and are capable of disease transmission. Also cause life-threatening anemia and occasionally hypersensitivity disorders in young and debilitated animals **(Araujo *et al*., 1998).**

Some ectoparasites of pet animals, notably fleas, can infest humans and may lead to the development of dermatitis and transmit vector-borne diseases **(Scott *et al*., 2001)**. The economic impact of flea treatments is also high; it has been estimated globally that pet owners spend more than 2 billion USD annually on flea products alone **(Conniff, 1995 and Rust, 2005)**.

Ticks are the second most important arthropods that may transmit pathogens like viruses (Crimean-Congo hemorrhagic fever, Colorado tick fever and tick-borne encephalitis), bacteria including rickettsiae (Rocky Mountain spotted fever, Tularemia, Q fever, Ehrlichiosis and Lyme diseases), protozoa (Babesiosis) and filarial nematodes (Onchocerciasis) to other animals and humans **(Fournier *et al.*, 2003 and Chaligiannis *et al.*, 2009)**.

They are more than 900 species of ticks have been recorded globally, with two major families, namely Ixodidae and Argasidae, the former generally referred to as hard ticks and the later also known as soft ticks **(Barker and Murrell, 2004).**

Various treatment options were recommended for control of ectoparasites including chemical, natural and biological products. The use of chemical insecticide poses health risks and causes various environmental problems. Additionally, the use of chemicals alone leads to rapid development of resistance **(Krieg, 1968; Chapman and Penman, 1984 and Keena and Granelt, 1985)**. The pressing need to advocate safe methods for tick and flea control led to the use of natural as well as biological control agents.

Little data is available on biological control of ticks, especially on the use of tick pathogens. Entomopathogenic fungi have been investigated for their potential in the biological control of these arthropods due to their ability to penetrate the integument of ticks. In particular, *Beauveria bassiana* and *Metarhizium anisopliae* fungi were effective in controlling several tick species including *R. microplus*, *R. sanguineus, Dermacentor nitens* and *Amblyomma cajennense*. The susceptibility to fungi might vary according to tick species and population as well as to fungal strain **(Fernandes *et al.*, 2012).**

Certain plant essential oils, or their chemical constituents, are toxic to a broad spectrum of economic insect pests, with some selectivity favoring biocontrol agents **(Miresmailli *et al*. 2006)**. In addition to their acute toxicity to pests, deterrence and/or repellence may contribute to overall efficacy against some pests, both in agricultural contexts and in urban/domestic pest management. Most plant essential oils are chemically complex, which enhances their efficacy owing to synergy among constituents as recently demonstrated **(Isman *et al*. 2011)**.

<u>Therefore, the present study was aimed to:</u>

1- Study some epidemiological aspects regarding tick and flea infested dogs.
2- Identify different species of ticks and fleas affecting dogs.
3- Study the association of ectoparasitic infestation and animal managemental factors.

4- Study the effect of some natural products (essential oils and Parasidose shampoo) on ticks and fleas.
5- Study the effect of entomopathogenic fungi (*Beauveria bassiana* and *Metarhizium anisopliae*) in tick control.

Review of Literature