

## EVALUATION AND ESTIMATION OF *CAMELUS DROMEDARIUS* STATUS INFESTED WITH MANGE

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### ABSTRACT

One hundred fifty seven samples from one humped camel (*Camelus dromedarius*) were collected in three different areas (Draw, Gharb Aswan Village and Gharb Sohil Village) in Aswan Governorates from April 2014 to April 2015, eleven camels suffered from blood parasite *Trypanosoma evansi*, thirty one camels suffered from internal parasites *Tricuries Cameli*, ninety nine camels suffered from clinical mange infestation, free from internal and blood parasites and sixteen clinically healthy camel. Infected animals with mange were significant decreases in TEC, Hb, Basophil and Monocytes, while significant increases in TLC, Eosinophils, Lymphocytes and Neutrophil. There was a significant increased in Triglyceride and glucose concentrations in infected male than healthy, while it show a significant decreased in infected female than healthy, in addition to Albumin, ALT, HDL and Calcium levels had no significant different between infected and healthy, but AST, LDL and cholesterol levels show a significant increased in infected animals than healthy.

**Key words:** *Mange, Camelus dromedairus and Mange*

### INTRODUCTION

*Camelus dromedarius* is a multipurpose and preferable animal in Bedouin regions, it play an important role in national income as a source of meat and hides, in some area are potentially better milkier than tropical cattle breeds, it employed for many functions as a working animal and in transportation, in addition to its use in military and police services in borders and desert province, these animals are also used in racing, sports and serve as a wealth reserve forming the social structure of many Bedouin Tribes (Higgin 1985).

Mange is one of parasite that causing signs of itching, purities, loss of hair, dryness of the skin and restlessness. Lesions were concentrated mainly on trunk, tail, face and lips and frequently involved more than one area (Al-Saad *et al.*, 2000).

The percent of mange infection in camel in both hot and cold month was 6.67% and 3.19% respectively; also it noticed that the percent of infection with mange in both male and female camel was 4.97% and 4.21% respectively, from another side the highest percent of infection with mange was 7.4% at camels between the of 7-8 years (Hamed 2005). Haematological disorders in infected animals involved microcytic hypochromic anemia and leukocytosis (Egbe-Nwiyi *et al.*, 1996).

### MATERIALS and METHODS

#### Animals

157 *Camelus dromedarius* from three different areas (Draw, Gharb Aswan Village and Gharb Sohil Village) in Aswan Governorates were examined from April 2014 to April 2015 in this study, 11 camels suffered from blood parasite *Trypanosoma evansi*, 31 camels suffered from blood and internal parasites *Tricuries Cameli*, 99 camels suffered from clinical mange infestation, free from internal and blood parasites and 16 clinically healthy camels.

Animals were clinically inspected during the period from April 2014 to April 2015 and only 105 camels

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infested with mange were used for hematological and biochemical analysis included 92 males and 13 females.

Sixteen healthy camels were clinically normal and free from external, internal and blood parasites used as a control group.

Infected camel was naturally diseased with Sarcoptic mite showed symptoms of itching, purities, erythema, corrugation of the skin and alopecia.

### **Samples**

#### **Blood samples**

Blood samples were used in the same day for hematological examination and blood smear. The blood was allowed to flow from jugular vein puncture, with clean, dry sterile needle into dry clean sterile vials containing anticoagulant EDTA (ethylene diamine tetra acetic acid) in a concentration of 1 mg / 1ml blood. Another sample was taken in a dry, clean and sterile centrifuge tubes without anticoagulant. These samples were allowed to clot at room temperature, the clotted blood were centrifugated at 5000 rpm for 20 minutes to obtain clear, non haemolized sera and stored at -20°C until used.

#### **Skin samples**

Skin samples were taken from slaughtered camels naturally infected with sarcoptic mange from different parts of camel for histopathological examination. These were fixed in 10% neutral formalin till examination.

#### **Fecal samples**

Rectal fecal samples were collected individually in clean plastic covered cups for the detection of the gastrointestinal parasites.

### **Methods**

#### **Haematological examination**

Total erythrocytes count (TEC), total leukocytes count (TLC) were done according to (Feldman *et al.*, 2000), and hemoglobin (Hb) was done automatically using Drabkin's Solution by colorimetric method using the biochemical analyzer model AE-600N. For the differential leukocyte count, three blood smears were taken from each blood sample and stained with Geimsa (Bancroft *et al.*, 1996).

#### **Biochemical examination**

All biochemical analysis was carried out using the test kits obtained commercially and the results were read at appropriate wavelength using the biochemical analyzer model AE-600N.

The concentrations of serum total protein, glucose, Zinc, Copper, Bilirubin, Cholesterol, Magnesium and albumin were determined spectrophotometrically according to (Tietz 1994), Calcium and HDL levels

concentration were estimated according to (Young 1995), AST and ALT levels in blood sera according to (Reitman *et al.*, 1957) and Triglycerides (Bucolo and Divad 1973). Kits obtained from Biodiagnostic Co., Giza, Egypt and HEMOBIO Co., Cairo.

Globulin concentration was calculated by subtracting the obtained value of albumin from the total proteins. It was expressed in g/dl. Also, Albumin/Globulin (A/G) ratio was obtained by dividing value of albumin on globulin.

#### **Fecal samples**

Fecal samples were examined by the concentration flotation technique using saturated salt solution according to (Coles 1986).

#### **Histopathological examination**

Skin Specimens from different parts of slaughtered camel were taken from the infected mangy areas for studying histopathological changes. These materials were fixed immediately in 10% formal saline, dehydrated, cleared, embedded in paraffin, sectioned at 4µm and stained with Hematoxylin and Eosin (Carleton *et al.*, 1967).

#### **Statistical Analysis**

The result was evaluated using Analysis of variance (ANOVA) and Duncan using Statistical Package for Social Science (SPSS) computer programs (2002).

### **RESULTS**

Examination of camels by blood smear and fecal analysis show, eleven camels suffered from blood parasite *Trypanosoma evansi*, thirty one camels suffered from internal parasite *Tricurius Cameli*, these animals were excluded from the hematological and biochemical analysis.

#### **Hematological parameters**

Total erythrocyte count (TEC) and hemoglobin (Hb) concentrations were decreased significantly in the infected camel compare to apparently healthy. Total leukocyte count (TLC), Neutrophils and Eosinophils were increased significantly in infected camel compare to the healthy, while Monocytes and Lymphocytes were decreased significantly in the infected camel, in addition to there no significant changes in the Basophils (Table 1).

#### **Biochemical parameters**

Biochemical parameters show no significantly different in Albumin, ALT, HDL and Calcium levels between healthy and infected camel. There was a significant increase in Cholesterol, AST and LDL concentrations in infected animals than healthy, while it show a significant decrease in Total protein, globulin, bilirubin, Zinc, Copper and Magnesium. Triglyceride and glucose concentrations increased in

male infected camel significantly than healthy, while it shows significantly decreased in female animals (Table 2).

#### Histopathological examination

Sever hyperplasia of epidermis with hyper keratosis and degeneration, hyalinization in prickle cell layers

(hyalinized focally), with inflammatory cells infiltration and hyperkeratosis forming homogenous eosinophilic structure with mononuclear inflammatory cells infiltration (Figure 1.).

**Table 1:** Hematological parameters in Healthy and mange infected camel

Parameters NO.	Healthy		Mange infected	
	Males 12	Females 4	Males 80	Females 9
TEC	5.9 ± 1.26 <sup>a</sup>	3.83 ± 0.1 <sup>b</sup>	4.28 ± 0.98 <sup>b</sup>	3.22 ± 0.15 <sup>c*</sup>
TLC	7.42 ± 2.04 <sup>b</sup>	7.68 ± 0.15 <sup>b</sup>	10.23 ± 4.08 <sup>a</sup>	11.65 ± 1.29 <sup>a*</sup>
Hemoglobin (g/dl)	10.95 ± 1.01 <sup>b</sup>	12.55 ± 0.13 <sup>a</sup>	10.38 ± 0.57 <sup>b</sup>	10.7 ± 0.28 <sup>b*</sup>
Neutrophils %	52.33 ± 9.48 <sup>b</sup>	57.0 ± 0.82 <sup>a</sup>	57.9 ± 10.73 <sup>b</sup>	62.81 ± 2.17 <sup>a**</sup>
Basophils %	0.18 ± 0.08	0.25 ± 0.06	0.16 ± 0.07	0.14 ± 0.05 <sup>NS</sup>
Eosinophils %	8.33 ± 2.5 <sup>ab</sup>	6.50 ± 0.58 <sup>b</sup>	11.14 ± 4.03 <sup>a</sup>	12.18 ± 3.71 <sup>a*</sup>
Lymphocytes %	35.5 ± 5.58 <sup>b</sup>	36.0 ± 0.82 <sup>a</sup>	29.46 ± 4.17 <sup>b</sup>	23.18 ± 2.99 <sup>b**</sup>
Monocytes %	1.67 ± 0.05 <sup>a</sup>	1.15 ± 0.06 <sup>a</sup>	1.1 ± 0.09 <sup>b</sup>	1.05 ± 0.07 <sup>b*</sup>

All data expressed as Mean ± SD.

\* Significant differences at P < 0.05

\*\* Significant differences at P < 0.001

The different letters after mean (a, b and c) indicated significance but same letters indicated no significance

**Table 2:** Biochemical parameters in Healthy and mange infected camel

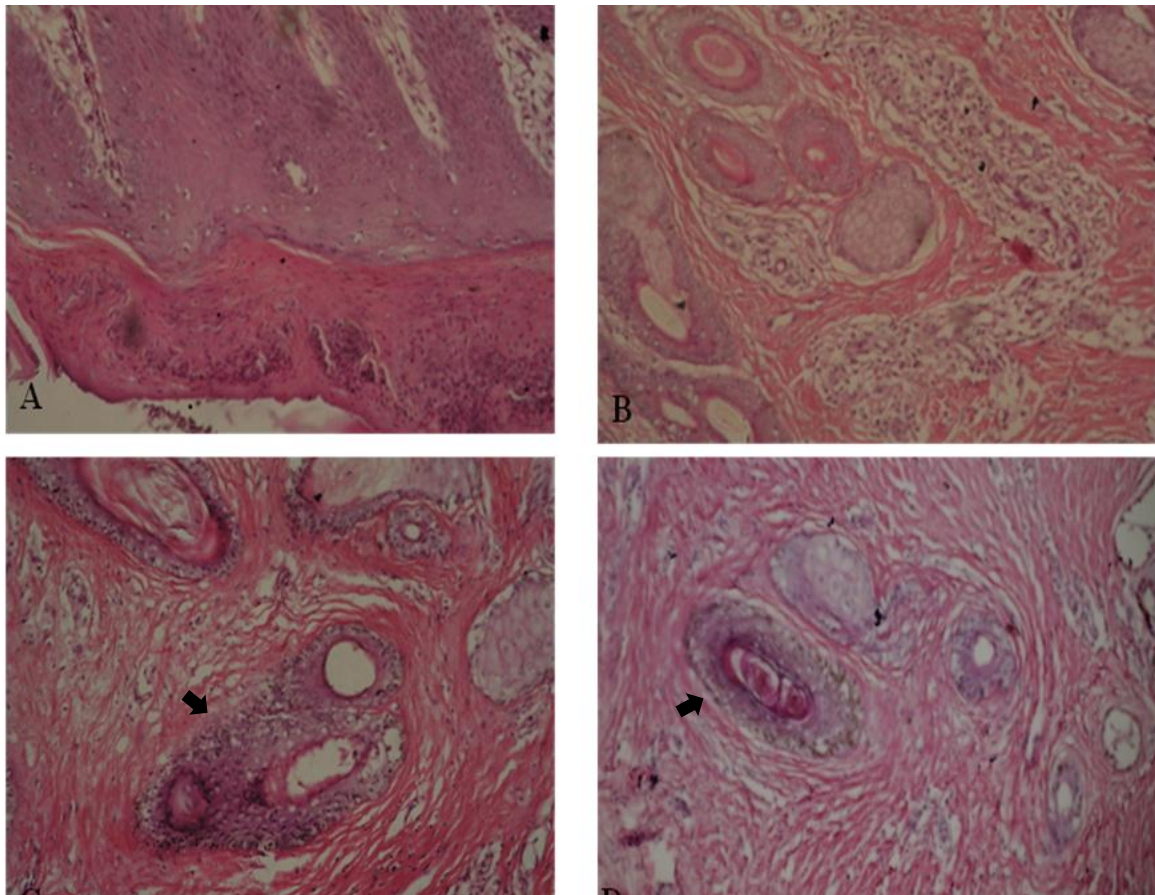
Parameters NO.	Healthy		Mange infected	
	Males 12	Females 4	Males 80	Females 9
Total protein (g/dl)	7.75 ± 2.06 <sup>a</sup>	6.4 ± 0.92 <sup>b</sup>	6.4 ± 0.92 <sup>b</sup>	4.57 ± 0.55 <sup>c**</sup>
Albumin (g/dl)	2.94 ± 0.49	2.93 ± 0.15	2.75 ± 0.54	2.46 ± 0.67 <sup>NS</sup>
Globulin (g/dl)	4.81 ± 1.99 <sup>a</sup>	3.48 ± 0.83 <sup>b</sup>	1.89 ± 0.95 <sup>c</sup>	2.11 ± 0.57 <sup>c**</sup>
A/G ratio	0.72 ± 0.34 <sup>b</sup>	1.89 ± 1.17 <sup>a</sup>	0.87 ± 0.18 <sup>ab</sup>	1.33 ± 0.82 <sup>ab*</sup>
Glucose (mg/dl)	54.92 ± 8.56 <sup>b</sup>	86.75 ± 12.28 <sup>a</sup>	77.14 ± 21.94 <sup>a</sup>	72 ± 12.84 <sup>ab*</sup>
ALT (GPT)(U/L)	30.17 ± 10.4	32.25 ± 10.4	35.7 ± 13.39	41.1 ± 7.15 <sup>NS</sup>
AST (GOT)(U/L)	26.6 ± 15.4 <sup>b</sup>	35.5 ± 8.39 <sup>ab</sup>	37.2 ± 10.2 <sup>ab</sup>	53.68 ± 10.1 <sup>a**</sup>
LDL (mg/dl)	26.74 ± 20.53 <sup>b</sup>	49.03 ± 2.6 <sup>ab</sup>	66.97 ± 38.7 <sup>a</sup>	73.11 ± 8.33 <sup>a*</sup>
HDL (mg/dl)	23.75 ± 10.56	12.8 ± 1.75	21.9 ± 24.56	12.56 ± 2.13 <sup>NS</sup>
Triglycerides	39.08 ± 33.16 <sup>b</sup>	147 ± 17.72 <sup>a</sup>	114.8 ± 45.18 <sup>a</sup>	133 ± 12.81 <sup>a**</sup>
Cholesterol (mg/dl)	64.67 ± 18.5 <sup>c</sup>	73.03 ± 47.96 <sup>bc</sup>	99.29 ± 32.86 <sup>a</sup>	119.78 ± 7.63 <sup>a**</sup>
Bilirubin (mg/dl)	5.08 ± 1.38 <sup>a</sup>	0.85 ± 0.06 <sup>b</sup>	2.0 ± 1.9 <sup>b</sup>	0.74 ± 0.14 <sup>b**</sup>
Zinc(mg/dl)	3.41 ± 0.4 <sup>a</sup>	3.65 ± 0.13 <sup>a</sup>	1.8 ± 0.4 <sup>b</sup>	1.46 ± 0.27 <sup>b**</sup>
Copper (mg/dl)	6.81 ± 0.4 <sup>a</sup>	5.53 ± 0.39 <sup>b</sup>	4.84 ± 0.47 <sup>c</sup>	4.80 ± 0.07 <sup>c**</sup>
Magnesium(mg/dl)	2.74 ± 0.14 <sup>a</sup>	2.6 ± 0.14 <sup>ab</sup>	1.75 ± 0.59 <sup>c</sup>	2.16 ± 0.21 <sup>bc**</sup>
Calcium(mg/dl)	10.63 ± 2.03	9.08 ± 0.13	10.02 ± 2.46	8.82 ± 0.9 <sup>NS</sup>

All data expressed as Mean ± SD.

\* Significant differences at P < 0.05

\*\* Significant differences at P < 0.001

The different letters after mean (a, b and c) indicated significance but same letters indicated no significance



**Fig. 1: A and B.** Sever focal epidermal hyperplasia, hyperkeratosis and hyalinization with inflammatory cells infiltration H&E  $\times 10$ .

C and D. Mites are shown in dermis and epidermis with infiltration of dermis with mononuclear inflammatory cells infiltration and eosinophilia (arrows) H&E  $\times 40$ .

## DISCUSSION

According to the difference in blood and biochemical parameters in animals infected with mange than healthy animals, that is an indication for the serious problems in camel caused by mange, which had a negative reflected on animals health and production, specially camel work under very hard climate, that lead to loss in economic importance of camel as animals for hard climate. This difference may be due to the allergic reaction caused by mites or their products of inflammatory reactions and may be due to activation of immune system by the parasite.

We cannot deny that parasite shares the available nutrients in the plasma pool with animals themselves, and may be infections with sarcoptic mange responsible for compromised very change in hepatic function. (Mottelib 1993), (Egbe-Nwiyi *et al.*, 1996), (Sayed 1998), (Mahran *et al.*, 2004), (Parmar *et al.*, 2005), (Manisha *et al.*, 2005) and (Sena *et al.*, 1999). In addition to the difference between female and male in some parameters may be due to the differences in hormones between the female and male that can be reflect on blood and biochemical parameters, in this

filed we need more study for evaluation of infection mange in camel and the ways for treatment should be in focus in the next study.

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### تقييم وتقدير الحالة الصحية للجمال المصابة بالجرب

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أجريت هذه الدراسة على عدد ١٥٧ من الإبل واحدة السنم في محافظه اسوان خلال الفتره من ابريل ٢٠١٤ حتى ابريل ٢٠١٥ حيث انها شملت على عدد ١١ جمل يعانون من طفيليات الدم (التريبانوسوما) وعدد ٣١ جمل يعانون من الطفيليات الداخلية وعدد ١٦ جمل أصحاء ظاهريا وكان هناك عدد ٩٩ جمل يعانون من الجرب الظاهري ولا يعانون من طفيليات الدم أو الطفيليات الداخلية وكان هدف هذه الدراسة هو تقييم حاله الجمال المصابة بالجرب ومدى تأثيره على مؤشرات الدم والمؤشرات الكيميائية الحيوية حيث اظهرت الدراسة انخفاضاً معنوياً في العدد الكلى لكريات الدم الحمراء والهيموجلوبين والخلايا البيضاء القاعدية والخلايا البيضاء الوحيدة بينما كانت هناك زيادة معنوية في العدد الكلى لكريات الدم البيضاء. وأظهر تحليل مؤشرات الدم الكيميائية الحيوية زيادة معنوية في الدهون الثلاثية وتركيزات الجلوكوز في الذكور المصابة في حين ان هناك انخفاض معنوي في الإناث المصابة ولا يوجد اختلاف معنوي في مستويات الزلال وناقلة ألانين والبروتين الدهني عالي الكثافة والكالسيوم بين الجمال المصابه والسليمه وجد زيادة معنوية بمستوى الكوليسترول وناقلة أمين الأيسبارتات والبروتين الدهني منخفض الكثافة في الإبل المصابة عن السليمه.