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EPIDEMIOLOGICAL STUDIES OF EQUINE MANGE WITH SPECIAL REFERENCE TO DIFFERENT THERAPEUTIC PROTOCOLS FOR EFFECTIVE TREATMENT OF CHORIOPTIC MANGE

By

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ABSTRACT:

The present study was conducted on 120 working horses *(Equus ferus caballus*) and 260 donkeys *(Equus asinus asinus*) during the period from August 2011 to July 2012. These animals belong to different villages in Assiut Governorate, Upper Egypt. The age of these animals ranged from less than one year to above fifteen years old. Examination of diseased animals revealed that they suffered from itching, loss of patches of hair in different regions of the body with appearance of scales on the skin. The more common sites of infestation were the leg, base of the tail, neck and the head of animals.

In this study skin scrapings were examined microscopically revealed that chorioptic mange was identified from horses and donkeys in Upper Egypt in percentage of (13.33% & 15.38 %) , psoroptic mange (2.5 & 3.07%) and sarcoptic mange (1.66 &1.92), respectively, with overall percentage of 14.36 % in horses and donkeys. Infestation by chorioptic mange was recorded to be the most frequent isolated mite in the examined cases (90%), followed by psoroptic mange (8.6%). While only 1.4% of positive cases was infested by Sarcoptic mange. statistical analysis of some ecological parameters revealed that there is a significant relationship (p0.05) between the prevalence of mange mite infesting equines and season, age, housing management as well as regular or irregular use of acaricides.

Moreover, this study included using different methods of clinical therapeutic trails. The infested equines with chorioptic mange were classified into four groups. The first one received two doses of ivermectin (Ivomec, Merial), 14 days apart at dose rate of 200 Ug/kg oral paste. The second group received two doses of doramectin (Dectomax, Pfizer, Egypt), 14 days apart at dose rate of 200 Ug/kg subcutaneous injection. The third group received two doses of ivermectin (Ivomec, Merial), 14days apart at dose rate of 200 Ug/kg oral paste, Adjunct to this drug, deltamethrin (Butox-50, Intervet) was applied to the surrounding environment (bedding material, wall, fomites, etc….) twice at a 14 days interval. All cases were isolated in a separate place during treatment period. The fourth group received two doses of doramectin (Dectomax, Pfizer, Egypt), 14 days apart at dose rate of 200 Ug/kg subcutaneous injection, Adjunct to this drug, deltamethrin (Butox-50, Intervet) was applied to the surrounding environment twice at a 14 days interval. We found that administration of ivermectin or doramectin adjunct with treatment of animal environment is the best protocol for eradication and prevention of chorioptic mange from infested equine with mange and its environment.

Keyword: Mange – Charioptic - Psoroptic - Sarcoptes mange - Equine- Horse-Donkeys - Epidemiology –Environment- Ivermectin- Doramectin-Butox-50- Efficacy – Treatment- Protocols.

INTRODUCTION:

Dairy farmers face lots of new challenges today, one of those being to improve the health of their animals. In dealing with this objective, equine' mange is one of the major veterinary problems in most of the developed and under-developed countries of the world. The skin of equine represents one of its most important organs for defense against disease and many vectors of disease, both because of its location as the outer membrane of a complex biological machine, and because of the horse's size makes for a large surface area available for possible attack from microorganisms,

parasite or environmental toxins. Equine mange can provoke several responses in horse owners, from annoyance to frustration or alarm as well as adversely affect the value of equine by altering appearance or interfering with performance.

Mange in equine is an economically important and a highly contagious disease that can be transmitted between animals by direct contact with infested animal and indirect contact by fomites especially in tropical and subtropical area (Rose, 1940, Scott and Miller 2003).

The economical value of mange in an infested animal comes from, reduced daily weight gain, cost of treatments and damage to the hides due to perforation of the skin and intense pruritus as skin lesions may cover almost the entire body (Lonneux *et al.* 1998; Rehbein *et al.* 2002). Moreover, mange can severely reduce the well being of animals as reducing the vitality and increased susceptibility to other diseases due to secondary bacterial infection (Schoett *et al.*, 2002). Worldwide losses from mange mites on livestock production have been estimated to amount to US$14.4 million (Drummond *et al.*, 1981).

Most types of mange are forms of allergic dermatitis, characterized by encrustation, alopecia, and pruritus, initiated and maintained by a number of mite species. All the major mange mite species are contained within the orders astigmata and prostigmata. The astigmata are a well-defined group of slow-moving, weakly sclerotised mites, including the medical or veterinary important families Sarcoptidae and psoroptidae (Drummond *et al.*, 1981).

Mites in the family sarcoptidae are obligate parasites, burrowing into the skin of mammals. The itch mite (*Sarcoptes scabiei*) is the cause of scabies in humans and mange in a wide range of domestic and wild mammals throughout the world, generally affecting the sparsely haired parts of the body. *Sarcoptes scabiei* var equi is the most severe type of mange in horses. The first sign is intense pruritus due to hypersensitivity to mite products. Early lesions appear on the head, neck, and shoulders. Regions protected by

long hair and lower parts of the extremities are usually not involved. Lesions start as small papules and vesicles that later develop into crusts. Alopecia and crusting spread and the skin becomes lichenified, forming folds. If untreated, lesions may extend over the whole body, leading to emaciation, general weakness, and anorexia (Bertrand, 2010).

Mites in the family psoroptidae are oval, non-burrowing mites, parasitic on mammalian skin. Three genera, psoroptes, chorioptes and otodectes are of veterinary importance, although the latter (being a parasite of the ears of carnivores) is of no direct significance to livestock production.

***Psoroptes equi* is rare in horses; it produces lesions on thickly haired regions of the body, such as under the forelock and mane, at the base of the tail, under the chin, between the hind legs, and in the axillae. *P. cuniculi* can sometimes cause otitis externa in horses and may cause head shaking (Bertrand, 2010).**

Chorioptic mange (Leg Mange) is common in heavy breeds of horses. Lesions caused by *Chorioptes equi* start as a pruritic dermatitis affecting the distal limbs around the foot and fetlock. Papules are seen first, followed by alopecia, crusting, and thickening of the skin. A moist dermatitis of the fetlock develops in chronic cases. It is a differential diagnosis for "greasy heel" in draft horses. The signs subside in summer but recur with the return of cold weather. The disease course is usually chronic without treatment, but the prognosis is favorable when treated (Bertrand, 2010).

Knowledge of ecological parameters (bad management, housing and care of the animal which include feeding, handling and disposal of manure, general sanitation in the stable, overcrowding, separation between susceptible and infested) is considered an extrinsic secondary determinant and probably the key for controlling and eradicating mange in equine (Liebisch *et al*., 1985).

The currently available tools for mange control consist of chemical technology, relying on treatments with different protocols incorporating different formulations of acaricides. These can be used with the benefit of local epidemiological knowledge. Farmers and veterinarians implement treatments against mange most commonly when the disease is evident. Highly effective treatments such as those given during the "cryptic phase" using macrocyclic lactones (largely doramectin), are a very good strategy for eradicating mange because they eliminate the source of infection for the next season (Bates, 1998; Bisdorff and Wall, 2008).

Over the past 20 years, ivermectin (0.2 mg/kg) given twice at 7 days interval (Campbell, 1985; Şuteu, 1995; Radostits *et al*., 1994) has been used as treatment for outbreaks of mange in bovine. In recent years, doramectin (Dectomax, Pfizer) has also been used at a dosage of 0.2 mg/kg b.w., repeated after 7 days to control mange population (Şuteu and Cozma, 2004). This latter drug has also been used successfully as a single injection at 300 µg/kg b.w. (*Bates et al., 1995*). The efficacy of these acaricides often relies on parasitological and clinical improvement (Logan *et al*. 1993). Doramectin and ivermectin were recorded to provide rapid and high efficacy on animal mange compared with Amitraz (Bala and Rath, 2006).

Despite its importance, equine mange has not been given due attention and its prevalence is still unknown in many areas of Upper Egypt. Keeping in view the importance of mange mites, this study was planned to determine the prevalence and risk factors associated with spread of mange mites in equines as well as some clinical therapeutic trials on Chorioptic equine mange.

2. MATERIALS AND METHODS:

2.1. *Animals and data collection*:

A total of 120 working horses and 260 donkeys at different localities of villages from Assiut governorate, Egypt were studied from June 2011 to July 2012. The animals' identification, age and sex were recorded. A questionnaire was done about the man-

agement of the animals, their general health, skin lesions, presence of other animals in contact, using of acaricides, and time interval to last ectoparasite treatment. All animals were examined clinically.

2.2. *Clinical examination*:

Animals under investigation were clinically examined on the day of the first visit. Equine (working horses and donkeys) with skin lesions were examined for lesions, body condition and appetite.

2.3. *Parasitological examination:*

One hundred and twenty working horse and two hundred and sixty donkeys were selected randomly for parasitological examination after clinical investigation. Skin scrapings from the edges of the clinical lesions were collected in labeled Petri dishes according to Fathenakis *et al.* (2000). The edges of which were smeared with vaseline so as to prevent the mites from escaping. The dishes containing scrapings were transferred to test tubes containing 5 ml of distilled water and KOH (10%) and heated for five minute to dissolve hair and epidermal scales; later the tubes were centrifuged for three minutes at 2,000 rpm and the supernatant fluid was discarded. About 5 ml of water was added to the sediment and the tubes were again centrifuged. The supernatant fluid was again discarded and the sediment was suspended in saturated sucrose solution and centrifuge again. Mites were removed from the top of the solution and examined under a stereoscope for the presence of mites and their eggs. Mites were identified according to Bowman (1995).

2.4 .Therapeutic trial of infested animals:

Sixteen working horses with typical lesions of mange, harboring chorioptic mange were allocated randomly into four groups (4 horses each). The first group (Group I) received two doses of ivermectin oral paste (Ivomec, Merial), 10 days apart at dose rate of 200 Ug/kg. The second group (Group II) received two doses of doramectin (Dectomax, Pfizer, Egypt), 10 days apart at dose rate of 200 Ug/kg subcutaneous injection. The third group (group III) received two doses of ivermectin (Ivo-

mec, Merial), 10 days apart at dose rate of 200 Ug/kg oral paste, adjunct to this drug, deltamethrin (Butox-50, Intervet) was sprayed to the surrounding environment (bedding material, wall, fomites, etc….) twice at 10 days interval in concentration of 50 ppm. All cases were isolated in a separate place during the treatment periods. The fourth group received two doses of doramectin (Dectomax, Pfizer, Egypt), 10 days apart at dose rate of 200 Ug/kg subcutaneous injection, Adjunct to this drug, deltamethrin (Butox-50, Intervet) was sprayed to the surrounding environment twice at a 10 days interval at concentration of 50 ppm. The efficacy of each regimen was evaluated on the basis of clinical and parasitological demonstration of mange mites on day zero of treatment and on days 7, 14, 21, 28 and 56, 90 post-treatment. Moreover, forty donkeys with typical lesions of mange, harboring *Chorioptic sp*, were allocated randomly into four groups (10 donkeys each) and treated as the draft horses.

2.5. Statistical analysis:

Data on the influence of sex, age, season, related communities, housing management and acracides use were analyzed statistically using the chi- square test using software program (SPPS for window, Version 15).

3. Results and Discussion

Table (1) parasitological examination of skin scraping samples.

Mite species/animal species		*Positive cases*	*Negative cases*	*Percentage of positive cases in relation to all examined animal*	*Percentage in relation to only positive animal*
Chorioptic mange	*working horse (120)*	16	104	13.33%	76.19%
	Donkey (260)	40	220	15.38%	75.47%
Psoroptic mange	*working horse (120)*	3	117	2.5%	14.28%
	Donkey (260)	8	252	3.07%	15.09%
Sarcoptic mange	*working horse (120)*	2	118	1.66%	9.52%
	Donkey (260)	5	255	1.92%	9.43%
Overall infes-tation	*Draft horse (120)*	21	99	17.5%	100%
	Donkey (260)	53	207	20.38%	100%

Table (2): Effect of animal age and sex on prevalence of mange in equines.

Isolated mites				*overall Percentage*
Animal sp.		*Horse*	*Donkey*	
Sex	*Female*	*11*	*24*	*47.29%*
	Male	*10*	*29*	*52.70%*
Age	*Less than 5 year*	*14*	*35*	*60.81%*
	More than 5 year	*7*	*18*	*39.18%*

Table (3): Effect of ecological systems on prevalence of mange in equines.

Ecological parameters		*Isolated mites*		*overall Percentage*
		Horse	*Donkey*	
Season	*Summer*	*3*	*4*	*9.45%*
	Autumn	*2*	*6*	*10.81%*
	Spring	*4*	*5*	*12.6%*
	Winter	*12*	*38*	*67.56%*
Related communities	*Separate- rearing*	*5*	*15*	*27.02%*
	Mixed -rearing	*16*	*38*	*74.32%*
Housing Management	*Muddy- land*	*16*	*39*	*74.32%*
	Dryland	*5*	*14*	*25.67%*
Acaricides use	*Regular -use*	*3*	*6*	*13.51%*
	Irregular- use	*9*	*25*	*47.29%*
	Not used	*9*	*22*	*39.18%*

Table (4): Efficacy of therapeutic treatment on chorioptic mange in working horses.

Group	*Treatment*	*No.*	*Clinical Examination and parasitological examination*	*Day of examination*						
				0	*7*	*14*	*28*	*42*	*56*	*90*
I	*Ivermectin*	*8*	*Positive clinical lesion*	*4 (100%)*	*4 (100%)*	*2 (50%)*	*0 (0%)*	*1 (25%)*	*2 (50%)*	*3 (75%)*
			Positive skin scraping	*4 (100%)*	*3 (75%)*	*2 (505%)*	*0 (0%)*	*1 (25%)*	*2 (50%)*	*4 (100%)*
II	*Doramectin*	*8*	*Positive clinical lesion*	*4 (100%)*	*3 (75%)*	*2 (50%)*	*0 (0%)*	*1 (25%)*	*2 (50%)*	*2 (50%)*
			Positive skin scraping	*4 (100%)*	*3 (75%)*	*1 (25%)*	*0 (0%)*	*1 (25%)*	*2 (50%)*	*2 (50%)*
III	*Ivermectin plus Butox-50*	*8*	*Positive clinical lesion*	*4 (100%)*	*3 (75%)*	*2 (50%)*	*0 (0%)*	*0 (0%)*	*0 (0%)*	*0 (0%)*
			Positive skin scraping	*4 (100%)*	*3 (75%)*	*1 (25%)*	*0 (0%)*	*0 (0%)*	*0 (0%)*	*0 (0%)*
VI	*Doramectin plus Butox-50*	*8*	*Positive clinical lesion*	*4 (100%)*	*2 (50%)*	*1 (25%)*	*0 (0%)*	*0 (0%)*	*0 (0%)*	*0 (0%)*
			Positive skin scraping	*4 (100%)*	*2 (50%)*	*1 (25%)*	*0 (0%)*	*0 (0%)*	*0 (0%)*	*0 (0%)*

Table (5): Efficacy of therapeutic treatment on chorioptic mange in donkeys

Group	*Treatment*	*No.*	*Clinical Examination and parasitological examination*	*Day of examination*						
				0	*7*	*14*	*28*	*42*	*56*	*90*
I	*Ivermec-tin*	*6*	*Positive clinical lesion*	*10 (100%)*	*10 (100%)*	*5 (50%)*	*1 (10%)*	*2 (20%)*	*2 (20%)*	*5 (50%)*
			Positive skin scraping	*10 (100%)*	*9 (90%)*	*4 (40%)*	*1 (10%)*	*2 (20%)*	*3 (30%)*	*6 (60%)*
II	*Doramec-tin*	*6*	*Positive clinical lesion*	*10 (100%)*	*8 (80%)*	*4 (40%)*	*0 (0%)*	*1 (10%)*	*2 (20%)*	*3 (30%)*
			Positive skin scraping	*10 (100%)*	*7 (70.%)*	*3 (30%)*	*0 (0%)*	*1 (10%)*	*3 (30%)*	*4 (40%)*
III	*Ivermec-tin plus Butox-50*	*6*	*Positive clinical lesion*	*10 (100%)*	*7 (70.%)*	*5 (50%)*	*0 (0%)*	*0 (0%)*	*0 (0%)*	*0 (0%)*
			Positive skin scraping	*10 (100%)*	*6 (60%)*	*4 (40%)*	*0 (0%)*	*0 (0%)*	*0 (0%)*	*0 (0%)*
VI	*Doramec-tin plus Butox-50*	*6*	*Positive clinical lesion*	*10 (100%)*	*6 (60%)*	*1 (10%)*	*0 (0%)*	*0 (0%)*	*0 (0%)*	*0 (0%)*
			Positive skin scraping	*10 (100%)*	*5 (50%)*	*2 (20%)*	*0 (0%)*	*0 (0%)*	*0 (0%)*	*0 (0%)*

Figure (1): Donkey showing mange lesion on the leg

Figure (2): Donkey showing mange lesion on the legs, abdomen and breast.

Figure (3): Horse showing mange lesion on the head.

Figure (4): Horse showing mange lesion on the withers and neck.

Figure (5): Horse showing mange lesion on the withers and neck.

Figure (6): Horse showing mange lesion on the back and tail.

Mange is a highly contagious and debilitating skin disease of equine, which badly affects the health of these animals in our country. Besides the huge losses that mange is causing inflammatory reaction, restlessness, itching and loss of hair, loss of body condition, dull body coat, anemia and dermatitis (Little wood *et al*., 1995).

During the present study chorioptic, psoroptic and sarcoptic mange were identified from infesting working horses and donkeys population in Upper Egypt in percentage of (13.33% and 15.38 %), (2.5% and 3.07 %) & (1.66% and 1.92 %), respectively, with overall percentage of 17.5 % and 20.38% in working horses and donkeys, respectively. Infestation by chorioptic mange was recorded to be the most frequent isolated mites in examined horses and donkeys (76.19% and 75.47%), followed by psoroptic (14.28% and 15.09%) in horses and donkeys, respectively, while only 9.52% & 9.43% of horse and donkey were infested by sarcoptic mange, respectively (Table 1). This result was coincided more or less with Fadok and Mullowney (1983), Blasker and Joseph (1987), Curtis (1999), Scott and Miller (2003), Aftab *et al.*(2005), Osman *et al.* (2006), De Pennington and Colles

(2011). The differences in the prevalence may be attributed to the variation in the management and environment at the different localities, high stocking rate of the pasture, close contact and different in horse breeds (Qadoos *et al*., 1995 and Rufenacht *et. al.*, 2010). The high prevalence of mange in this study might be due to the poor management of animal by the owner (Abu-Samra *et al*., 1981).

As regards the effect of sex, out of total of 21 infested working horses by mange mite 11 females and 10 males were found to be positive. The infested donkeys, out of 53 positive cases for the mange 29 were male and 42 females. With overall prevalence rate was 47.29% female and 52.70% male (Table 3). Statistical analysis showed no significant relationship between genders. This result coincided with (Jabeen *et al*., 1998 and Osman *et al*., 2006) who mentioned that prevalence of mange has not been found significantly differ between males and females.

Animal age significantly (P<0.005) affected the prevalence of infestation by mange mites (Table 3). Thus, infested working horses and donkeys under five year of age were the most affected (60.81%) and animals older than five years showed the lowest infestation rate (39.18%). Our result was in accordance with Purohit *et al.* (1997). The higher prevalence of mange in young animals as compared to older animals may be due to unhygienic conditions, overcrowding and keeping young and adult animals together thus getting infection through direct contact between mothers to calves, while sucking as well as the high incidence in this age group, could be due to their tender skin and huddling tendency. Additionally, the farmers are not well acquainted with modern livestock management practices Schmidt (1994).

Significant association (P<0.005) between prevalence of infestation with mange mites and the season was observed (Table 3). The severity of infestation was observed during winter season. Thus, 67.56% of the cases were recorded in winter (Table 3), while the lowest infestation was recorded in summer season (9.45%). This result was agreed with Liebisch *et al.*(1978)

mentioned that chorioptic mange disappears almost completely during summer months, however, a latent infection persist in cattle and the disease flare up again during winter. Blood *et al.* (1983) who mentioned that mange mite is said to have seasonal occurrence, being active mainly during cold and wet weather. The effect of season on the prevalence may be due to great activity of the mange mites in the cool temperature seasons rather than hot. Moreover, Maske and Ruprah (1981) reported that 20°C was the optimum temperature for the maximum survival of Psoroptic mites and any significant deviation from this temperature adversely affects the period of survival. As well as Sarcoptic mites have been found to survive better at 20–27°C than at 31–39°C (Tikaram and Ruprah, 1986).

Regarding to related community, presence of other animal species (cows, buffaloes, sheep, goats and dogs) with equines was found to increase the prevalence of mange (P<0.005). Fifty four (74.32%) infested draft horses and donkeys were raised with other animal species, whereas 20 (27.02%) cases were raised alone (Table 3). Lack of strict species specificity lead to other animal species may harbor the mites and close contact of equine with such animals could help transmission of infection to equines. (Abu-Samara *et al.* 1985 & Qadoos *et al.*, 1995).

As well as significant association (P<0.005) between mange mites infestation and housing management was observed (Table 3). The prevalence of mange in working horses reared on muddy land (74.32%) was higher than those reared on dry land (25.67%). The higher prevalence of infestation recorded on animals reared on muddy floor may be attributed to the fact that the optimum condition for mite survival in the environment are relatively high moisture and relatively cool temperature. Mites are highly susceptible to drying (Steelman 1976, Fadok 1984, Blood *et al.*, 1990, Angarano & Parish, 1994).

From (Table 3), we observed that untreated or irregular treated animals by acaricides was found to affect significantly (P<0.005) the prevalence of mange in the examined cases. Thus, 39.18% and 47.29% of equines

infested with mange previously not and irregular treated with acaricides, respectively, while the lowest prevalence was found in animal regular treated with acaricides (13.51%). In spite of the high efficacy of many therapeutic agents against mites, the recurrence of infestation might be the main problem in the control of the disease as result of neglected environmental treatment as bedding and fomites. Moreover, resistance to drug as result of irregular treatment or misusing of drug has been recorded in vivo and in vitro (Currie *et al*., 2004). Acaricide resistance is mainly detected through field experience, after failure of a particular treatment. It must be understood that in the case of mites, proper treatment and control measures can only be implemented in conjunction with an accurate diagnosis (Bates, 2000b).

From figure (1, 2, 3, 4, 5 and 6), we observed that infested animal with mange mite revealed that they suffered from intense itching accompanied sometimes with rubbing on the wall or on any solid object, kicking and some animals tried biting affected skin, loss of patches of hair in different regions of the body with appearance of scales and crusts on the skin and lichenification of the affected area. The more common sites of infestation were the leg, the base of the tail, head, neck, shoulder, girth and back (Fadok and Maullowney, 1983, Perris, 1995, Curits, 1999, Little wood, 1999, Berriatua *et al*., 2001 and Scott and Miller, 2003).Itching is thought to develop as a result of histamine released from the destructed cells which are potent allergens (Greaves and Wall, 1996).

According to the severity and appetite of animals infested with mange (74 animals), 55 (74.32%) of infested cases showed inappetance, and 19 (25.67%) had normal appetite. Moreover, poor body condition was recorded in 41 (55.40%) equines infested with mange mite.

It is widely acknowledged that mites in animals are major constraints in farming, leading to low productivity and economic losses. As a disease is the ultimate consequence of animal-environment maladaptation, it also forms a crude indicator of animal

welfare (Radostits *et al*., 2007). Besides a lack of awareness concerning the possible use of modern therapeutic drugs for treating mange, the poor economic background of the rural population together with the relative difficult accessibility of some veterinary clinics, have most likely contributed to the increased percentage of farmers not using modern veterinary services. In this regard, it is crucial to carefully consider the actual field problems and then design an appropriate strategy that ensures equal access to modern drugs and veterinary services for all of the affected population.

On clinical level with regarding to draft horses infested with Chorioptic sp. (Table 4), improvement was observed rapidly in the group treated with ivermectin and doramectin adjunct with treatment of animal environment (group 3 and 4) compared with only injections of ivermectin and doramectin without treatment of animal environment (group 1 and 2). 100% of the working horses received either ivermectin or doramectin adjunct with treatment of environment have become clinically and parasitologically cure at 28 day post-administration without reinfestation versus 42 days for either only injection of ivermectin and doramectin which reinfestation was observed (group 1 and 2(. However, in the group were received only ivermectin oral paste, 1 (25%), 2 (50%) and 4 (100%) working horses were reinfested with mange at 42, 56 and 90 days post-administration, respectively. Nearly, the same result was observed during treatment of working horses with using doramectin alone which reinfestation was parasitologically observed at one 42 day (25%), 56 days (50%) and 90 day (50%) post-treatment.

Concerning the effect of therapeutic treatment of donkeys infested with Chorioptic mange mite (Table 5), we noticed that nearly similar results were detected as that in treatment of working horses' mange mite. Completely improvement without reinfestation was observed in the group treated with ivermectin and doramectin adjunct with treatment of animal environment (group 3 and 4) compared with only ivermectin or doramectin treatment

(group 1 and 2). 100% of the donkeys received either Ivermectin or doramectin adjunct with treatment of animal environment have become clinically and parasitologically cure at 28 day post-administration without reinfestation versus 42days for either ivermectin and doramectin injection reinfestation was observed (group 1 and 2).

This result was agreed with Logan *et al.* (1993) and Bala and Rath (2006) who stated that ivermectin and doramectin have equally efficacy against mange mites. Deltamethrin spray (Butox-50) was used to clean the animal environment to be able to eliminate the risk of recurrent infestation from the environment (Arends *et al.*, 1999 and Cadiergues et al. 2004). It is important to note, however, that a great majority of the peasant population are considered to be aware of the advantages of using modern veterinary services in treating affected stock, but are also believed in most cases to be reluctant to adhere to the professional advice given to him to cover the full course of treatment required to bring complete recovery to his animals, due to the too high costs involved. This may necessitate the delivery of an appropriate animal health extension service to upgrade the level of understanding of the rural peasant population. Moreover, it is also very likely that treated animals will become reinfested by the disease, as there is every opportunity of contact with other sick animals and a contaminated environment. This stresses the importance of launching a mass treatment campaign to minimize the problem to the lowest possible level Blood *et al.* (1990).

In conclusion, the results of our investigation indicate that Charioptic sp. are the main cause of mange in equines in Upper Egypt. Using acaricides for treatment adjunct with spraying animal environment (bedding, buildings and fomites) by insecticides is a better protocol not only for controlling equine' mange but also, for prevention of reinfestation from the animal environment.

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دراسات وبائية عن الجرب في الفصيله الخيليه مع الاشارة الى كفاءة بعض المحاولات العلاجية المختلفة لعلاج الجرب الكوريوبتي (داء الحلم الناجم عن الادمات)

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أجريت هذه الدراسة علي عدد ١٢٠ من الخيول الثقيله و٢٦٠ من الحمير في عدة قرى من قرى محافظة أسيوط احدى محافظات الوجه القبلي في مصر. وكانت الدراسة في الفترة من أغسطس ٢٠١١ حتى يوليو ٢٠١٢ ويتراوح عمر هذه الحيوانات بين أقل من عام واحد حتى اكبر من خمسة عشر عاما. وبفحص الحيوانات إكلينيكيا تبين أنها تعاني من الحك وتساقط الشعر في أماكن مختلفة بالجسم وظهور قشور علي الجلد مع زيادة في طبقة الجلد واحمرار وأحيانا نزف من الجلد أثناء الحك الشديد وكانت بعض الحيوانات المصابة تعاني من نحافة وهزال. وكان أكثر الأماكن إصابة علي هذه الحيوانات هي الساق ومنطقة الذيل والعنق منطقة الرقبة والرأس. وفي هذه الدراسة تم اخذ عينات من أماكن الإصابة وفحصها مجهري وتبين أن نسبة الحيوانات المصابة بالجرب في كل من الخيول والحمير كانت ٢٠,٣٥% حيث كان عدد الحيوانات المصابه بالجرب الكوريوبتي هي (١٣,٣٣% & ١٥,٣٨%) والجرب السوروبتي (٢,٥%&٣,٧%) والجرب الساركوبتي (١,٦٦%& ١,٩٢%) في كل من الخيول والحمير كل على حده. كما تم دراسة دور بعض العوامل البيئية المحيطة بالحيوانات المصابة احصائيا ووجد أن نوع التربية و التربة و العمر و الانتظام في مكافحة المرض يلعب دورا معنويا في معدل حدوث الاصابة بالجرب. بالاضافة إلي ذلك هدفت هذه الدراسه الي استحدام بعض المحاولات العلاجية لمكافحة الجرب الكوريوبتي في الخيول و الحمير. لذلك تم علاج الحيوانات المصابة بعد تقسيمها إلي أربع مجموعات، المجموعة الأولي تم علاجها باستخدام الايفرمكتين عن طريق الفم، المجموعة الثانية تم علاجها بحقن الدورامكتين فقط تحت الجلد، المجموعة الثالثة تم استخدام اعطاء الايفرمكتين للحيوان المصاب بالفم بالاضافة إلي رش البيئة المحيطة للحيوانات المصابة بالبوتكس-٥٠ ، بينما المجموعة الرابعة تم علاجها بحقن الدورامكتين للحيوان المصاب تحت الجلد و رش البيئة المحيطة للحيوانات المصابة بالبوتكس-٥٠ أيضاً. لوحظ أن علاج الحيوانات المصابة بالجرب باستخدام الايفرمكتين أو الدورامكتين مع رش البيئة المحيطة هي أفضل الطرق للقضاء علي الجرب في الفصيلة الخيلية.