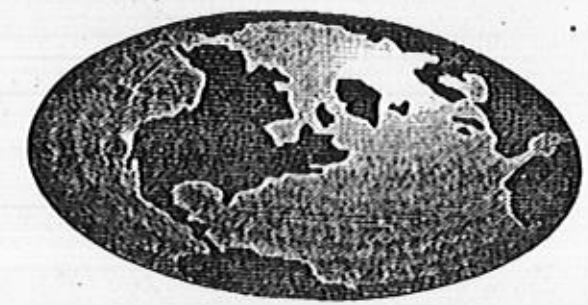


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A STUDY ON THE EFFICACY AND SAFETY OF IVERMECTIN AGAINST SARCOPTIC MANGE IN RABBIT BUCKS AND ITS EFFECT ON SEMEN QUALITY

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The study was done on 28 male white Newzeland rabbits classified into four groups each of seven rabbits. The first group was naturally infested with Sarcoptic mange caused by Sarcoptes Scabie. This group was given ivermectin subcutenously at 200 Ug / Kg b.w twice with one week interval. The second group included naturally infested rabbit housed with clinically mite free rabbit treated with Ivomec (200 Ug/Kg b.w onetime S/c) as a prophylactic dose. The third group included infested rabbit housed with clinically non infested rabbit without any previous treatment and the fourth group included rabbits infested with sarcoptic mite and treated with double dose 400 Ug /Kg b.wt twice with one week intervals. No clinical symptoms of toxicity have been recorded at any stage of experiment. Also reinfestation of treated animals have not been recorded up to 60 days of observation. The study proved that ivomec protected healthy rabbit from getting infestation by direct contact with infested animals. Also we found that the dose higher than therapeutic (200 Ug/Kg b.wt.) didn't accelerate the recovery but had many drawback on fertility. Semen was collected and evaluation was carried on where significant alteration have been recorded and was correlated with the injected dose of ivermectin.

INTRODUCTION

Rabbit production is a very important industry covering some shortage of animal protein for human consumption and has a very important economic value. However, rabbit production is threatened by several diseases due to viral, bacterial or parasitic causes. The most important parasitic diseases are coccidiosis (internal parasite) and mange as external parasite. The advent of broad spectrum anthelmintic treatment such as ivermectin (Ivomec) offer the potential of improving production efficiency through control of internal and external parasites. Avermectins (AVM) are a new family of insecticidal, acaricidal and anthelmintic agents that have been isolated from fermented products of *Streptomyces Avermitilis* (Ostlind et al., 1979).

Koopman et al., (1989) recommended treatment with ivermectin once every 6 months to suppress Psoroptic mange on rabbit farms. Similarly, Ferrero et al., (1994) found that treatment of adult rabbit naturally infested with *Psoroptes caniculi* with a single dose of 200 Ug /kg resulted in curing (95.45 %) within 14 days and the rest of animals required a second treatment.

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Papparella and Cringoli, (1993) observed that 200 Ug/kg ivermectin given twice at a 7-day interval was completely effective against Psoroptic and Sarcoptic mange in rabbit while a single treatment with 200 Ug/kg didn't totally eliminate Sarcoptes. Several other studies dealt with the efficacy of ivermectin in rabbit e.g. (Ali, 1990; Sirvastava et al., 1991; Rao et al., 1992; Tripathi et al., 1993; Akintund et al., 1994 and Yeatts, 1994).

The aim of this study was directed to study the efficacy of ivomec against mange in rabbit. Moreover, possibility of using prophylactic dose of ivomec protecting healthy animals from getting infestation during outbreak. Investigating the side effect of ivomec with special consideration to its effect on male reproductive efficacy was also carried out.

Material and Methods

A. Drug used:- Ivomec® (1% ivermectin) produced by Merck Sharp & Dohme (MSD AGVET, U.S.A.) and given subcutaneously at double doses with one week intervals in treated animals.

B. Animals, grouping and dosing:- The present study was carried out 28 male white Newzeland rabbits aged (9-12) months with an average body weight of 4.0 kg classified into four groups each of seven rabbits as follows :-

1. The first group (Group I): included seven naturally infested animals with Sarcoptic mange (Sarcoptes Scabie). This group was given ivermectin at 200 Ug/kg b.wt. (S/C) twice with one week interval and used for evaluation the efficacy of ivomec against Sarcoptic mange.

2. The second group (Group II): consists of three naturally infested non treated rabbits (subgroup A) housed with four clinically non infested animals treated with ivomec (200 Ug/kg b.wt. S/C) twice with one week interval (subgroup B) and used for evaluation the prophylactic potency of ivomec.

3. The third group (Group III): included three naturally infested non treated rabbits (subgroup A) housed with four clinically non infested animals without ivomec treatment (subgroup B) and used as a control for the second group.

4. The fourth group (Group IV): included seven rabbits naturally infested with Sarcoptic mite and treated with double therapeutic doses (400 Ug/kg b.wt. S/C) twice with one week interval and used for evaluation the possible toxic effect of ivomec on treated rabbits.

All rabbits were subjected for daily observations and offered feed and water. Daily observation was carried out for detection of any clinical symptoms or signs of toxicity and for detection the possibility of reinfestation after clinical recovery.

Parasitic Examination:-

Each rabbit was subjected for clinical and microscopical examination for mange infestation. Skin scraping were taken from affected animals for microscopic examination after preparation in KOH 10% solution where the type of mite were identified according to Soulsby (1982).

Haematological investigations and Semen evaluation:-

Blood and semen samples were collected after one week from last injection from all infested ivomec treated animals at various doses (from first group given 200 Ug/kg b.wt and fourth group given 400 Ug/kg b.wt.) beside a control infested non treated group (second and third groups). Haematological studies were carried out according to Schalm, (1986) and semen samples were collected from treated animals by artificial vagina and semen evaluation was carried out after Zemjanis (1962).

Statistical analysis was adopted after Snedecor and Cochran (1973).

RESULTS & DISCUSSIONS

Mange is a highly contagious and debilitating skin disease. It represents together with coccidia the most important parasitic diseases affecting rabbit production. Ivermectin has an impressive spectrum of activity against endo and ectoparasites (Campbell et al., 1983).

In our study, the most prevalent clinical manifestation in mite infested rabbit were itching, erythema, scaling and crusting dermatitis. The ears, face and hind legs were the worst affected areas. Animals of first group infested with Sarcoptes and treated with ivomec (200 Ug/kg b.wt) twice with one week interval showed signs of clinical recovery within three days of first injection and complete recovery and healing of the lesions was achieved after days of first infection. Similar results were recorded by Ferreo, et al., (1994); Papparella and Cringoli, (1993) while Ramesh et al., (1990) found that this dose was insufficient for mite elimination. Also Tripathi et al., (1993) recommended a higher dose (400 Ug/kg b.wt.) given at a single S/C dose.

Animals of fourth group given double therapeutic dose (400 Ug/kg b.wt.) twice with one week interval showed clinical recovery within the same period as the previous group (3 - 10) days from first infection, however slight haematological changes and reduced semen quality has noticed (table 1 & 2).

Concerning the haematological studies table (1) shows that ivomec improved the blood picture of mite infested animals, however this improvement was more pronounced when used at its therapeutic dose (200 Ug/kg b.wt.). In this aspect our data coincided with Shobhamani et al., (1994). However Remez et al., (1989) found that sheep injected with up to 25 times therapeutic dose of ivomec showed no important changes in blood count.

Table (2) shows the semen quality of rabbit either naturally infested or after treatment with different doses of ivomec. It is quiet clear that ivomec treatment disturbed semen quality at both doses under investigation. Higher doses (400 Ug/kg b.wt.) had more drastic effect on percentages of progressive motility, live sperm, total sperm abnormalities together with reduction in sperm cell concentrations.

In contrast to our study, Schroder et al., 1986 recorded that semen picture in Merino ram was similar before the first and after last ivomec treatment. This variation may be due to species variation. Anyhow our results are in complete agreement with the study of Mervat Ghoniem and Mansour, (1992). They concluded that this alteration in semen picture in rabbit after ivomec treatment coincided with testicular lesions recorded in their study.

Also we noticed that the prophylactic dose of ivermectin protected healthy rabbit from getting infestation from infested animals in contact (second group) while non treated animals developed clinical symptoms of infestation within three weeks of direct contact with infested animals (Gp III). We coincided with Tripathi et al., (1993) who found that ivomec treated animals didn't encounter experimental infestation with *P.Cuniculi* while untreated control showed development of lesions.

In a conclusions we can advise the use of ivomec for prophylactic purposes or as an emergency treatment for parasitic infection and during outbreaks of mange in rabbit bucks used for meat production and not for breeding because of its interference with the fertility as recorded in this study table (2) and keep in mind a suitable time for withdrawal from edible tissue as suggested previously by Ferrero et al., (1994). Also from the present work we concluded that ivomec is a very effective drug for control of mange in rabbit and should used within the dose of (200 Ug/kg b.wt.) twice and over doses didn't accelerate the clinical recovery but have different drawback on animal health and fertility.

Table (1) :- Blood picture of male Newzeland rabbit naturally infested with Sarcoptic mite (Non treated or treated with ivomec at different dose level).

Groups	Dose	R.b.Cs	W.b.Cs	Hb gm%	P.C.V%
Group I	200 Ug/kg b.wt	6.1 ± 0.72*	6.5 ± 0.71**	13.8 ± 1.5**	37 ± 2.7**
Group IV	400 Ug/kg b.wt.	5.9 ± 0.81*	6.1 ± 0.63*	12.4 ± 1.6**	32 ± 1.9**
Group II (subgroup A) & Group III (subgroup A)	Non treated (As a control)	5.1 ± 0.52	5.4 ± 0.60	9.4 ± 1.2	25 ± 1.6

- * Significant different from control at P < 0.05
- **Highly significant different from control at < 0.01

Table (2):- Semen picture of male Newzeland rabbit infested with Sarcoptic mite non treated or treated with ivomec at different doses of ivomec.

Groups	Dose	Progressive motility %	Live sperm %	Sperm cell conc X 10 ⁶ /ml	Total sperm abnormalities %
Group I	200 Ug/kg b.wt	62 ± 1.90**	61 ± 2.11**	296.56 ± 8.22**	13.15 ± 0.42**
Group IV	400 Ug/kg b.wt.	42.12 ± 0.8**	46.22 ± 1.92**	277.12 ± 7.12**	16.12 ± 0.61**
Group II (subgroup A) & Group III (subgroup A)	Non treated (As a control)	73 ± 1.20	75 ± 2.12	362.51 ± 12.52	10.21 ± 0.15

- **Highly significant different from control at < 0.01

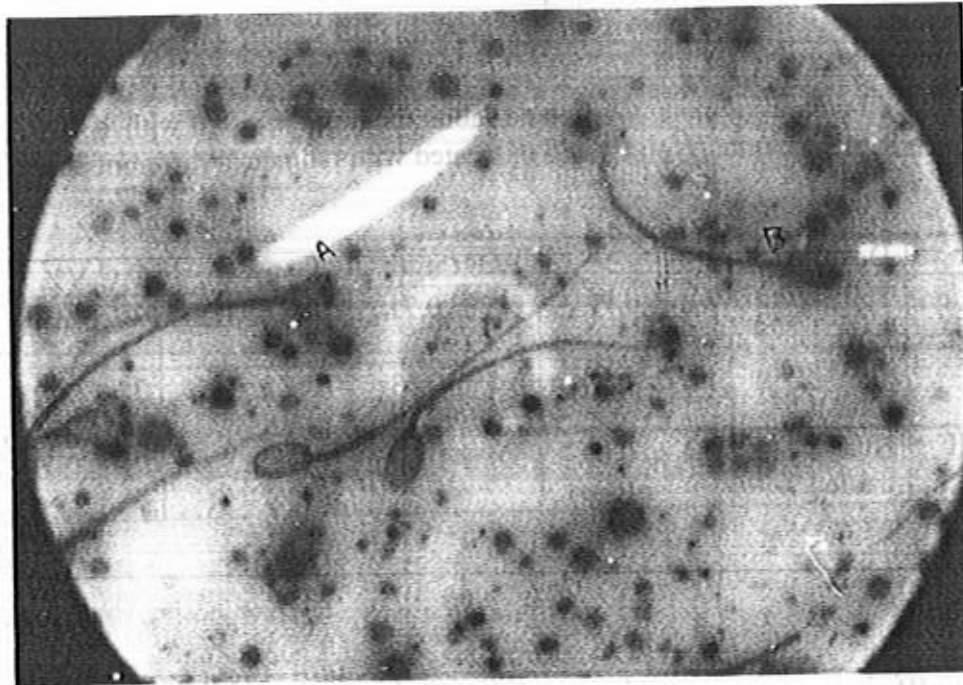


Fig. (1): Rabbit spermatozoa treated by ivermectin (400 Ug/kg b.wt.) showed detached acrosome (a) and thin middle piece (b).

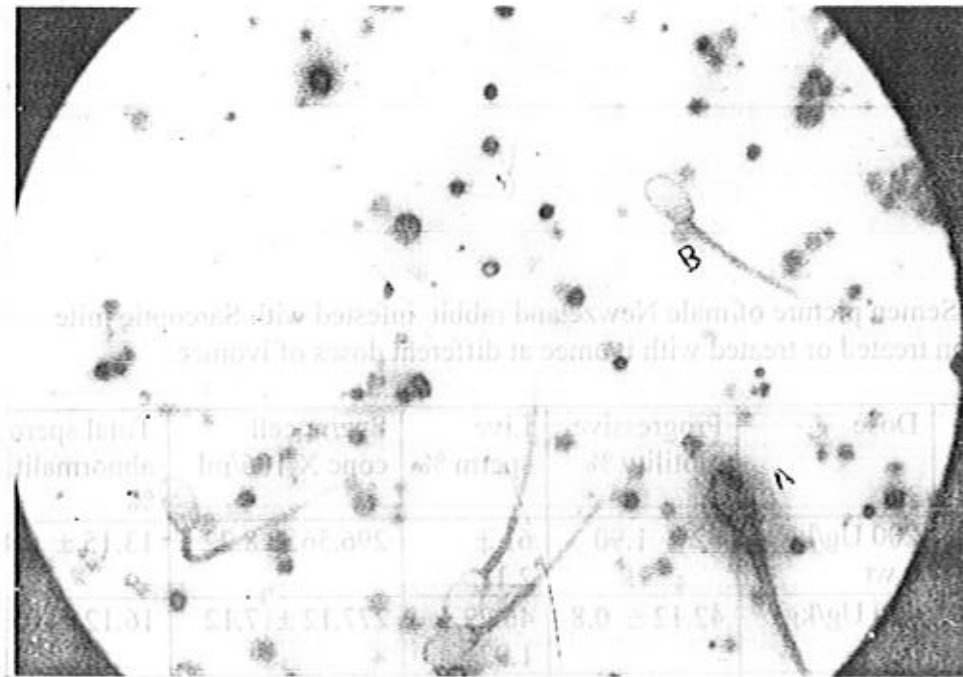


Fig.(2): Rabbit spermatozoa treated by ivermectin (400 Ug/kg b.wt.) showed elliptical head (a) and Abaxial tail displacement.

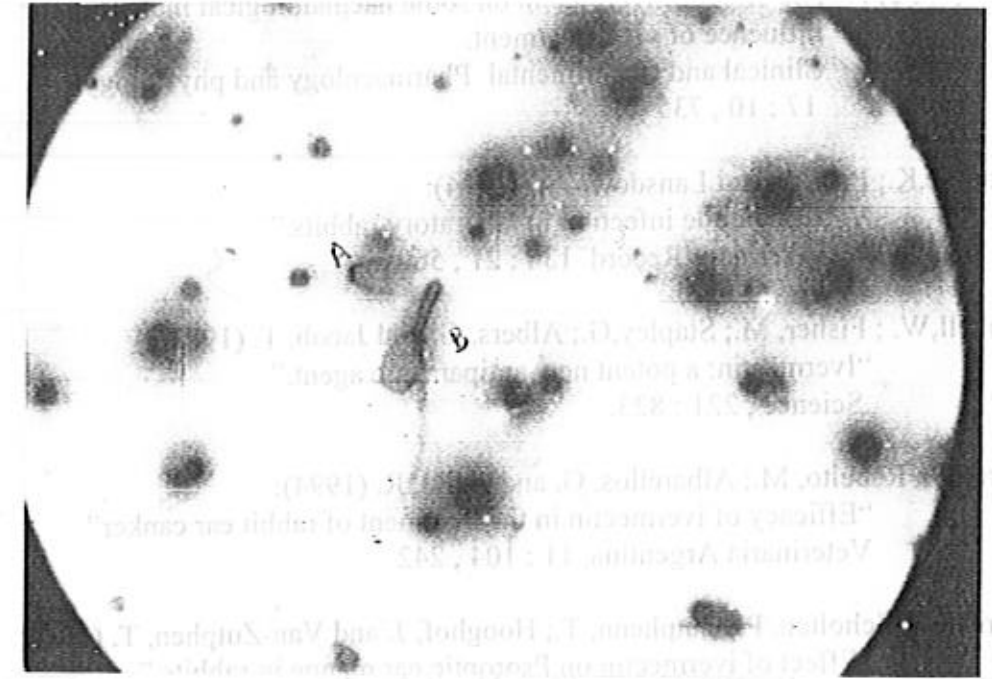


Fig.(3): Rabbit spermatozoa treated by ivermectin (400 Ug/kg b.wt) showed broken head (a) and bent tail (b).

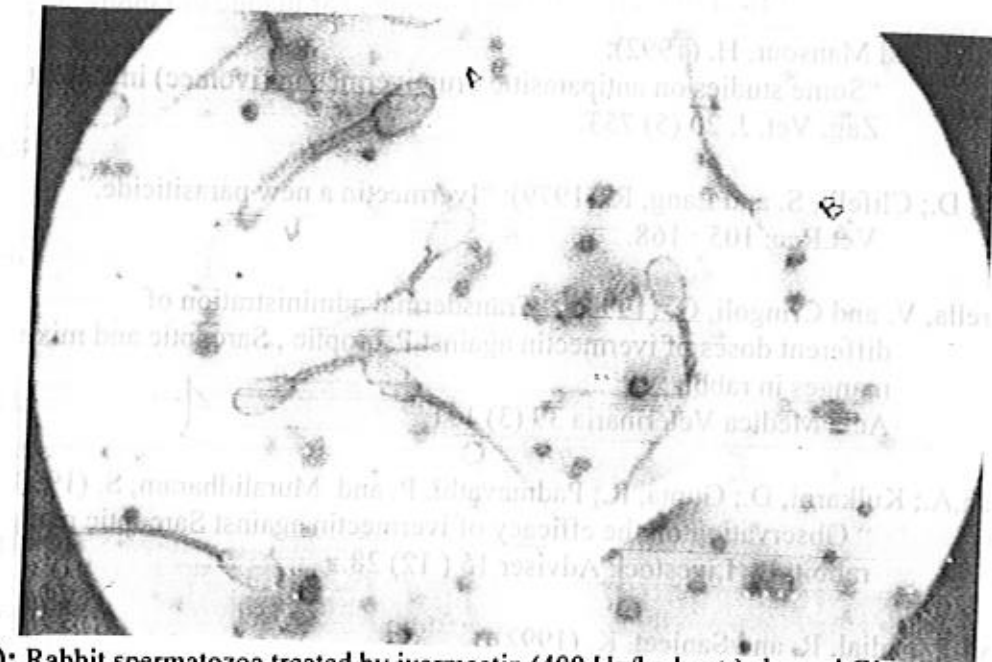


Fig.(4): Rabbit spermatozoa treated by ivermectin (400 Ug/kg b.wt.) showed Giant head with bent tail (a) and lancet head (b).

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الملخص العربي

((دراسة عن مدى كفاءة وأمان الأفرمكتين ضد الجرب في ذكور الأرانب و
تأثيرها على جودة السائل المنوي))

د.منى عشوب د.عبدالكريم السيد

اجريت الدراسة على 28 من ذكور الأرانب النيوزيلندي الأبيض قسمت إلى أربع مجموعات بكل مجموعة سبعة أرانب المجموعة الأولى كانت مصابة طبيعيا بالجرب الساركوبتي وأعطيت عقار الأفرمكتين بمعدل 200 ميكروجرام لكل كيلو جرام من وزن الجسم مرتين بينهما أسبوع. والمجموعة الثانية ضمت أرانب مصابة بالجرب وضعت مع الأرانب السليمة وسبق إعطائها الأفرمكتين كجرعة وقائية. المجموعة الثالثة ضمت أرانب مصابة ووضعت مع أرانب سليمة ولم يسبق إعطائها الأفرمكتين. أما المجموعة الرابعة فكانت أرانب مصابة بالجرب وتم علاجها بضعف الجرعة العلاجية المستخدمة في الجرعة الأولى. أثبتت الدراسة أن الأفرمكتين منع الأرانب السليمة من العدوى عند وجودها مع الأرانب المصابة. كما لوحظ أن الجرعة ضعف العلاجية لم تؤدي إلى سرعة شفاء الأرانب المصابة بل على العكس كان لها تأثير سيئ على صورة الدم وعلى خصوبة ذكور الأرانب حيث لوحظ زيادة في نشوات الحيوانات المنوية مع انخفاض في تركيزها وحركتها بالمقارنة بالأرانب التي حقنت الأفرمكتين بجرعات أقل والتي لم تتعاطى العقار.