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AHMED (A.B.), ONYIAH (J.A.). Observations on the effects of antibiotics in the blood meal of *Glossina* species. *Revue Élev. Méd. vét. Pays trop.*, 1994, **47** (1) : 103-104

Reduced productivity of two self-producing colonies of *Glossina palpalis palpalis* and *G. tachinoides* maintained *in vivo* on rabbits whose diets contained oxytetracycline and salinomycin antibiotics, was observed. Fecundity of both of the species declined, but not their survival rates. Examination of their reproductive systems revealed a high proportion of *G. p. palpalis* females in a less advanced reproductive cycle with few abnormalities, while *G. tachinoides* females showed a deep degeneration of developing follicles. A considerable reduction in the number of mycetocytes of *G. tachinoides* was observed, while *G. p. palpalis* was only slightly damaged. Use of animal hosts on additive-free diets resulted in an improved productivity of *G. p. palpalis*, but not *G. tachinoides*. It is recommended that the use of additives in the diet of animals used for feeding tsetse colonies must be avoided. The attempt to use a locally formulated diet based on soyabeans and zea mays supplemented with vitamin C gave excellent results.

Key words : *Glossina* - Insect rearing - Survival - Reproductive performance - Animal feeding - Antibiotics - Nigeria.

Residual effects of benzyl benzoate parasiticide tested on *Glossina p. palpalis* Robineau Desvoidy (*Diptera : Glossinidae*)

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AHMED (A.B.), ONYIAH (J.A.). Effets résiduels d'un antiparasitiaire, le benzoate de benzyle testé sur *Glossina p.palpalis* Robineau Desvoidy (*Diptera : Glossinidae*). *Revue Élev. Méd. vét. Pays trop.*, 1994, **47** (1) :104-106

Les effets d'un antiparasitaire, le benzoate de benzyle (BP), ont été évalués en laboratoire sur la survie et les performances de reproduction de *Glossina p. palpalis* en utilisant des lapins comme hôtes nourriciers, afin de déterminer la marge de sécurité post-thérapeutique. Aucune des mouches nourries sur les animaux présentés 30 min (groupe A) après l'application du médicament ne s'est alimentée pendant les 2 premiers jours. Dans ce lot, la survie a été médiocre en ce sens que la mortalité a atteint 40 p. 100 au 35e jour, avec une production totale de pupes de 12. A l'exception d'une légère amélioration de leur réponse alimentaire et de leur fécondité, les performances du lot nourri sur des sujets à 2 et 5 jours (groupes B et C) ont été faibles, et comparables à celles du groupe A. La survie et la productivité des glossines nourries 7 jours après traitement (groupe D) étaient bonnes, mais celles des mouches nourries 14 jours après traitement (groupe E) étaient meilleures et semblables ($p > 0,05$) à celles du groupe témoin. La qualité des pupes produites par les glossines dans les groupes A à C était faible, la moyenne étant de 19,6 + 1,1 mg contre 26,8 + 1,4 mg et 28,1 + 0,9 mg respectivement, chez les glossines des groupes D et E. Ces résultats montrent une amélioration avec le temps de la réponse alimentaire et de la productivité des glossines après application du traitement. Ainsi, il convient d'observer la durée minimale de sécurité de 3 semaines avant de nourrir les glossines sur des animaux traités au benzoate de benzyle sans craindre d'effets résiduels.

Mots clés : *Glossina palpalis palpalis* - Elevage d'insectes - Survie - Performance de reproduction - Antiparasitaire - Lapin - Hôte - Nigeria.

Introduction

Benzyl benzoate BP emulsion (Leady Pharmacy, Nigeria), also known as Ascabiol, is a parasiticide still used in veterinary medical practice for the treatment of sarcoptic or demodectic mange. The morbidity rate due to scabies in the rabbit colony of the Nigerian Institute for Trypanosomiasis Research (NITR), which serves solely to provide hosts for feeding laboratory bred tsetse flies, has been consistently high, a situation that necessitates frequent application of the drug. In the light of this, the present study was conducted to evaluate the effect of the drug on the survival and reproductive performance of the tsetse fly *Glossina palpalis palpalis* with the aim of determining the safety margin post treatment, since the tsetse breeder using the *in vivo* feeding technique is interested in both the health of the animal hosts and the performance of the flies.

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Materials and Methods

Tsetse flies for the test were obtained from the Institute's *G. p. palpalis* self producing colony previously described by ONYIAH *et al* (6). Twelve healthy rabbits were divided into five groups (A-E) of 2 animals each and treated with the drug according to prescription, with 2 remaining animals serving as controls. The drug was applied topically once on the pinnae of the animals and groups of 50 mated day + 2 female *G. p. palpalis* were allowed to feed using the method of NASH *et al.* (4). Group A animals were offered for feeding 30 min post application of the drug, while flies feeding on animals in groups B-E began after 2, 5, 7 and 14 days post drug application and continued daily for 35 days except on week-ends. For comparative purposes, a similar experimental protocol was set up for male flies.

Feeding response was evaluated for the first 2 days while records of survival rates, abortions and puparial production were taken daily. All surviving female flies were dissected on day +35 and their ovarian configuration and uterine contents examined.

Results

None of the flies offered feeding opportunity on animals 30 min (group A) post drug application took a meal for the first 2 days, producing only 12 puparia and 40.0 % mortality by day + 35. Flies fed on animals 2 days (group B) post drug application showed a feeding response and fecundity of 7.4 and 0.38 % puparia per initial female, respectively. There was a marked improvement in both productivity and feeding response in flies fed on animals 5, 7 and 14 days (group C, D and E) post drug application in group A and B ; performances of flies fed on group E animals were not significantly different ($p > 0.05$) from those of the control group. Generally, flies fed on groups ABC animals produced fewer and lighter puparia than the other groups. No visible paralysis or knockdown effects were observed in any groups. Comparative studies with males showed that the males are less sensitive to the drug and survived better (table I).

Discussion

Some tsetse breeding laboratories in Africa including NITR still maintain their tsetse colonies *in vivo* on live hosts. This demands the keeping of a large number of healthy hosts as a source of blood.

Under the maintenance conditions of the authors (6), the inter-larval period of flies in this laboratory is between 9-11 days with the first larviposition occurring between day +18 and 20 post emergence. This means that by day + 35 the flies should have successfully completed the second reproductive cycle with the outer right ovariole being next in sequence of development. However, the flies fed on treated animals (groups ABC) exhibited a consistent variation in the ovarian configuration and uterine content. This was attributed to abortion (AHMED (A.B.), unpublished) which was quite considerable in these groups. However, the ovarian configuration of the surviving females in groups D and E showed no-clear indication of a consistent variation within themselves and the control group. The increased tolerance to the drug observed in female flies paralleled the observation of RIORDAN (7).

Although serving a very useful purpose in veterinary practice, the results from this study indicate that benzyl benzoate is a potential danger to tsetse flies. The much lower survival rate, poor feeding response and reduced reproductive performance of flies fed on groups A through C are without doubt an indication of the insecticidal activity of the drug. However, it is comforting to note that its toxicity is low and that the fly specific effects appear to be time-dependent.

Despite the encouraging performances shown by flies that had been fed on animals two weeks post drug application, the animals were always washed thoroughly with soap and water before put to use as a further precautionary measure suggested by JORDAN (3) and NASH and JORDAN (5). Detrimental effects of insecticides on the productivity of tsetse species even at sublethal doses are well documented (1, 2).

***TABLE I** Showing survival rates, feeding response and reproductive performance of female* **G.p. palpalis** *maintained* **in-vivo** *on benzyl benzoate treated rabbits.*

Animal group/time used post drug application	No. flies	Fly survival rates (%)			Puparial Weight mg* (%)					Fecundity Pupae/Female	Feeding Response (%)
		Day 10	Day 20	Day 35	A	B	C	D	E		
A/ 30 minutes	50	62	60	48	75.0	25.0	0	0	0	0.24**	0
B/ 2 days	50	64	60	48	52.8	42.1	5.3	0	0	0.38**	7.4
C/ 5 days	50	84	78	70	52.9	32.4	14.7	0	0	0.68**	33.0
D/ 7 days	50	88	86	82	25.9	57.4	9.3	5.3	1.9	1.08	46.7
E/ 14 days	50	90	90	84	19.8	38.0	19.8	15.5	7.0	1.42	72.0
Control	50	98	96	86	18.4	28.9	21.1	22.4	9.2	1.52	77.3

** Weight class distribution : A = 0-22 mg ; B = 22-28 mg ; C = 28-32 mg ; D = 32-36 mg ; E = > 36 mg.*
*** Variables significantly different ($p < 0.05$) from the control.*

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The effects of benzyl benzoate (BP) parasiticide were evaluated in the laboratory on the survival and reproductive performance of *Glossina p. palpalis* using rabbits as feeding host in order to determine the safety margin post drug application. None of the flies fed on animals offered 30 min (i.e. group A) post drug application took any meal during two days. The survival of the batch was poor in that 40.0 % died by day +35 with a total puparia production of 12. Except for a slight ($p > 0.05$) improvement in their feeding response and fecundity, the performance of batch of flies fed on animals 2 and 5 days (groups B and C) post drug application is poor, similar to that recorded for group A. The survival and productivity of flies fed 7 days (group D) post drug application were good, but those of flies fed 14 days (group E) post drug application were better and not different ($p > 0.05$) from the control group. The quality of puparia produced by flies fed on groups A-C animals was low, with a mean of 19.6 ± 1.1 mg compared to 26.8 ± 1.4 mg and 28.1 ± 0.9 mg for flies fed on groups D and E, respectively. The results indicate a gradual improvement in both feeding response and productivity with time post drug application. Minimum duration considered safe for feeding tsetse flies on benzyl benzoate treated animals without fear of residual effects is 3 weeks.

Key words : *Glossina palpalis palpalis* - Insect rearing - Survival - Reproductive performance - Antiparasitic agent - Rabbit - Host - Nigeria.