


References


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

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Introduction

Benzyl benzoate BP emulsion (Lead Pharmacy, Nigeria), also known as Ascabiol, is a parasiticide still used in veterinary medical practice for the treatment of sarcoptic or demodicetic 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 breeders using the in vivo feeding technique is interested in both the health of the animal hosts and the performance of the flies.


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 control group. The increased tolerance to the drug presented by the flies 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 JORDAN (7).

Although serving a very useful purpose in veterinary practice, the results from this study indicate that benzyl benzoate is a potentiel 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 JODUAN (5). Detrimental effects of insecticides on the productivity of tsetse species even at sublethal doses are well documented (1, 2).

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 JORDAN (7).

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

<table>
<thead>
<tr>
<th>Animal group/time used post drug application</th>
<th>No. flies</th>
<th>Fly survival rates (%)</th>
<th>Puparial Weight mg* (%)</th>
<th>Fecundity Pupae/Female</th>
<th>Feeding Response (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A/30 minutes</td>
<td>50</td>
<td>69 60 48</td>
<td>75.0 25.0 0</td>
<td>0 0 0</td>
<td>0.24**</td>
</tr>
<tr>
<td>B/2 days</td>
<td>50</td>
<td>64 60 48</td>
<td>52.8 42.1 5.3</td>
<td>0 0</td>
<td>0.38**</td>
</tr>
<tr>
<td>C/5 days</td>
<td>50</td>
<td>84 78 70</td>
<td>52.9 32.4 14.7</td>
<td>0 0</td>
<td>0.68**</td>
</tr>
<tr>
<td>D/7 days</td>
<td>50</td>
<td>88 96 82</td>
<td>25.9 57.4 9.3</td>
<td>5.3 1.9</td>
<td>1.06</td>
</tr>
<tr>
<td>E/14 days</td>
<td>50</td>
<td>90 90 84</td>
<td>19.8 38.0 19.8</td>
<td>15.5 7.0</td>
<td>1.42</td>
</tr>
<tr>
<td>Control</td>
<td>50</td>
<td>98 96 86</td>
<td>18.4 28.9 21.1</td>
<td>22.4 9.2</td>
<td>1.52</td>
</tr>
</tbody>
</table>

* 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.
Communication

Acknowledgements

The technical assistance of Mrs. A. GAYA and A. LAWYE is acknowledged. We thank the Director of NITR, Dr. I. KHALID for permission to publish.

References


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.