Table 1. Effectiveness of DEET impregnated jackets against *Leptoconops carteri*.

Subjects	Freshly treated jackets			Controls		
	Treat 1 # bites/ 15 min	Treat 2 # bites/ 15 min	Treat 3 # bites/ 15 min	Untreated # bites/ 15 min	T-shirt * # bites/ 15 min	% Reduction in number of bites
A	0	1	0	15	6	97.1
B	5	9	7	87	99	92.5
C	0	4	1	54	60	97.1
D	0	0	0	27	69	100.0
			Aged Jackets (14 days)			
E**	2	7	16	31	12	61.3
F**	2	14	0	7	18	57.4
C	5	28	37	72	60	64.7
D	0	13	0	40	63	91.6

* Counts taken for 5 minutes and totals multiplied by 3.
** Subject not used with freshly treated jackets.

after each use, would be somewhat less than 325 hours.

Acknowledgments. The assistance of HMC C. E. Adams, HM2 K. L. Roden, HM2 M. J. Matthews and ENS R. J. Pariseau is gratefully acknowledged.

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DRAGONFLY NYMPHS AS ACTIVE PREDATORS OF MOSQUITO LARVAE

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The significance of dragonfly nymphs as active predators of mosquito larvae was investigated using the dragonfly *Trithemis annulata scortecii* Nielsen. Nymphs were collected from various ponds in the grounds of the University of Khartoum. They were all full-grown individuals (1.6 to 1.8 cm in length).

Field work was carried out in irrigation channels surrounding the village of Tayiba (14° 29'N; 33° 25'E) in the cotton and dura growing region of Gezira Province, Sudan. Each channel is 280 m in length. Mosquitoes, most commonly *Anopheles pharoensis* Theo., breed in these channels where water stagnates as a result of blocking water flow during irrigation. Mosquito larvae were found to be evenly distributed along each channel. Some of these channels had rich vegetation.

Experiments were carried out in these channels which were divided so that each half measured 140 m (width of water 50–80; depth in middle 10–20 cm). The water was clear (turbidity 80–100 J.T.J.). One half of each channel, acting as a control, was left without predators, while the other was divided into sections, each approximately 1 m long. One dragonfly nymph was

Table 1. Numbers of mosquito larvae collected from field channels after the introduction of predators.

Date of Experiment	Mosquito larvae caught after 24 hrs		Mosquito larvae caught after 48 hrs	
	Experimental	Control	Experimental	Control
6 Aug. 71	No larvae* (17 pupae)	387	No larvae	23
24 Aug. 71	No larvae (33 pupae)	414	No larvae	11 (66 pupae)
27 Aug. 71	44	295	No larvae (14 pupae)	16
4 Sept. 71	No larvae (33 pupae)	403	No larvae	6
7 Sept. 71	20 larvae	384	No larvae	15
15 Sept. 71	No larvae (85 pupae)	361	No larvae	23 (36 pupae)
10 Aug. 72	14 larvae	401	No larvae	6
16 Oct. 72	No larvae	318	No larvae	23 (18 pupae)

* Laboratory experiments showed that the predators exhibited a clear preference for larvae rather than pupae.

introduced into each of these sections. Larvae were sampled after 24 hrs and again after 48 hrs. Only 3rd or 4th stage larvae were counted. The experiment was repeated 8 times. A slightly different procedure was adopted in the 6th experiment when 1000 *Anopheles gambiae* Giles larvae were evenly distributed along the channel (which was previously free of mosquito larvae) and 170 dragonfly nymphs were introduced.

The results are summarized in Table 1. These indicate intense and active predation by dragonfly nymphs on mosquito larvae and suggest that they could be significant factors in natural control of mosquito larvae.

ACKNOWLEDGMENT. Grateful thanks are due to Dr. F. T. Abu Shama for his continuous encouragement, supervision of the work and critical review of the manuscript.

REDUCED TEMPERATURE AND EMBRYONATION DELAY IN *CULEX TARSALIS* [1]

S. MONICA ASMAN [2]

One disadvantage in using *Culex* species for research purposes is the inability to control egg hatch, especially in autogenous strains where blood meals are not required. The lack of a "holding stage" is also an important factor in considering production of large numbers of individuals for release programs. While it is known that in nature female adults of *Culex tarsalis* go into diapause in the late fall where climatic conditions initiate such an over-wintering phase, the environmental factors for duplicating this mechanism in the laboratory are not yet understood. Thus for the present, other holding stages to prevent uncontrolled development in this particular species would be useful. It seemed reasonable to attempt to store eggs at a reduced temperature to delay embryonation and hatch.

Single egg rafts of similar age (5–10 hrs.) and from the same laboratory strain were allowed to embryonate 5–10, 29–34, and 53–58 hrs. at approximately 72° F before being refrigerated at 45° F. In each test, three egg batches were kept at normal rearing temperature (72° F) as controls. Every 24 hrs. for 6 consecutive days, three isolated egg rafts were removed from the colder environment to 72°. The percent hatch of each raft was recorded. After hatching, a specified number of

[1] This research was supported in part by a U. S. Army Contract/Grant No. DAMD-74-C-4128 U. S. Army Medical Research and Development Command, Wash., D.C., 20314.

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