OBSERVATIONS ON THE RELATION OF LIGHT TO THE DROPPING OF THE TICK *IXODES TEXANUS* BANKS

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ABSTRACT

Six ferrets were infested with large numbers of nymphs or larvae of the tick **Ixodes texanus** Banks. The animals were caged separately and subjected to various regimes of continuous light and darkness, from 9 days to 5, 4, and 2 days, and normal photoperiods. Nearly all the engorged ticks dropped from the hosts in the dark.

Introduction

When lights were unavoidably left on continuously for six days in a room where adult ticks, *Ixodes texanus* Banks, were feeding on a ferret, none detached itself. Previously four females had done so. In the 24 hrs. following a return to the normal photoperiod the remaining nine females dropped from their host. To supplement this observation tests were set up using larvae and nymphs of *I. texanus*.

Materials and Methods

Two ferrets (A & B) were infested with large numbers of larvae of *I. texanus* and placed in cloth covered cages (Kohls, 1937) under continuous artificial light. Three days later first one and later the other of these cages was enveloped in a black plastic cover (Table 1). At the end of each day when the ferrets were fed and the cloth bags were changed, the ticks that had dropped from their respective hosts were counted.

Next, two ferrets (C & D) were infested with 100 nymphs each and caged so as to eliminate differences resulting from different humidity. Both cages were covered with plastic, one clear and the other black, having light-tight baffles in the ventilation tubes. Both cages were left under continuous light, and the covers on the cages were interchanged four times at daily then at two-daily intervals (Table 1).

Finally, to minimize the possibility of leakage or sudden intrusion of light during feeding and changing the bags, a third experiment was set up. Two ferrets (E & F) were infested with larvae, caged uniformly as before, and one of them was kept in a photographic dark room. Each evening for 10 days its infesting bag was changed in total darkness, then examined in the light.

Results

Table 1 shows the changes that were made from darkness to light, and to normal photoperiod, with the numbers of ticks collected.

Ferrets A & B showed a clear pattern of a heavy drop of ticks in continuous darkness and in alternating light and darkness, but few dropped in continuous light.

Nearly all the ticks dropped from ferrets C & D in darkness rather than in the light.

From ferret E, 95% of the ticks dropped in darkness and from ferret F 80%, even following 14 days of continuous light.

Discussion

The effects of light on the engorgement and dropping of ticks have been observed by others, and also the

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TABLE 1. Numbers of nymphs and larvae of the tick **Ixodes texanus** dropping from ferrets caged separately and subjected to light (no underline), darkness (black underline), and normal photoperiod (dotted underline).

Ferret no.	Days after infestation 3	4	5	6	7	8	9	10	11	12	13	14	Total
A	1	7	8	3	159	191	90	88	77	3	421	65	1113
B	244	309	121	37	13	2	1	0	6	6	306	36	1081
C	0	45	4	13	0	15	3	0	0	3			83
D	37	0	39	1	0	11	1	0	0	0			89
E	3	92	123	71	45	28	12	22*	8**	15	0	0	419
F	0	0	0	0	1	1	4	16*	17**	138	6	2	185

*Days 10 to 12
**Days 13 to 14

effect of the host's movement. Hooker (1908) noted that whereas fowl ticks drop during the night, rabbit ticks drop during the day, when the respective hosts are resting. Balashov (1954) found that the daily rhythm of dropping of engorged female *Ixodes persulcatus* from cattle appeared to be related to the host's activity. While the host was at rest in the barn, the ticks fed; while moving in the pasture, they dropped. Kheisin and Lavrenenko (1956) also observed many engorged *I. ricinus* on cattle in the morning, but few in the evening. Those noted in the evening did not drop at night if the cows remained in the cattle-yard, but fell off during the day in the pastures. If the routine was reversed so that the cattle rested during the day, the ticks would drop in the pasture at night, again suggesting that the host's activity was the cause of release.

Kitaoka (1962) found that *Haemaphysalis bispinosa* infesting cattle fed actively around midnight and dropped in the morning, regardless of the host's activity. In this case, dropping was caused by the stimulus of light, hence it was supposed that the primary factor controlling feeding and dropping was the rhythmic 24-hour change between darkness and light. George (1963) demonstrated in the rabbit tick the existence of a circadian rhythm which could be entrained by a 24-hour light cycle. In the absence of a light cycle this rhythm could be altered by changing the feeding time of the host.

From the foregoing, it seems evident that different factors govern release from the host, according to the species of tick. It appears that ticks are adapted to survive by dropping in places where they will best be able to attach later to fresh hosts. Rabbit ticks drop chiefly in the daytime when the rabbits are lying in much frequented forms (George, 1963), whereas adults of *Ixodes* cattle ticks are scattered in the pasture where their progeny may encounter rodent hosts. The observations recorded here suggest that, since the feeding and dropping of *I. texanus* may be controlled by the presence or absence of light, this tick is probably adapted to drop in the confined space of the dark holes where its hosts, the weasels, spend their resting hours.

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SCIENTIFIC NOTE
THE IDENTITY OF THE BLACK-WIDOW SPIDER IN BRITISH COLUMBIA

For many years the black-widow spider throughout North America was thought to be *Latrodectus mactans* (Fabr.). Spiders of this worldwide genus are extremely variable, and both characters and ranges overlap in many cases. It has, therefore, been difficult to establish the correct identity of its members in many localities, including our own. In 1961, Spencer reported on a study by Levi which placed our northwestern specimens under *L. curacaviensis* (Muller).

This note is to report that Kaston (1968) after rearing cultures from all over North America, including British Columbia, has concluded that the black-widow of Western Canada and the Pacific States must be called *L. hesperus* Chamberlain & Ivie (1935), an opinion in which Dr. W. J. Gertsch of the American Museum of Natural History concurs.

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