Effects of oocyst number of *Plasmodium yoelii nigeriensis* on activities of infected mosquitoes

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Previous investigations demonstrated that mosquitoes in which oocysts were present were impaired in their ability to access a blood source (Kurihara et al., 1991). Further examination of the same experimental data revealed that mosquito activity was also affected by the parasite load or the number of oocysts. The experimental methods and materials were as described previously. Briefly, a piece of wide-mesh net was interposed between two wire cages (30×30×30 cm), one of which housed hungry mosquitoes and the other a bait mouse. Mosquitoes were able to pass through the net and feed on the bait animal. The mosquitoes were *Anopheles stephensi*, which had fed on mice parasitized by *Plasmodium yoelii nigeriensis* 10 days earlier.

Positioning of apparatus was tested in four different ways: in the first series the release cage was placed in a side-wind position, and in the second it was placed in an upwind position. In the third series, the apparatus was covered with plastic sheeting to eliminate air-flow, and in the fourth it was partially covered so that the mosquitoes were exposed to an upwind.

The released mosquitoes were left overnight and recovered the next day. The mid-gut was then dissected, the number of oocysts counted and the mosquitoes were classified into four groups according to the number found.

The rate of passing through the net and entering the bait cage was calculated for each group and each series. The rate was highest in the group with no oocysts, and decreased with increase in the number of oocysts in the gut. Differences were statistically significant when the test apparatus was completely covered with the plastic sheet to prevent air-flow. No significant difference was observed, however, when the mosquitoes were exposed to an upwind air-flow (Fig. 1). The rate of blood feeding was also studied in experiments without a net. Again the rate was highest in the group with no oocysts, and lower with higher oocyst count when there was no exposure to air-flow. But the rate was unrelated to parasite load when the mosquitoes were exposed to an upwind flow (Fig. 2).

Klein et al. (1986) reported that decreases in the survival rate of *An. dirus* A mosquitoes infected with *P. cynomolgi* correlated strongly with increases in the number of oocysts in the gut. Our observations also showed that the reduction of the rate of passage through the net and blood feeding was negatively correlated to parasite load, particularly under the conditions of less movement of air.

**References**


**摘要**

マラリア病原体のオーシスト
保存の数が宿主である蚊の行動に及ぼす影響

本誌前報の実験結果にもとづき、ネズミマラリア*Plasmodium yoelii nigeriensis*感染マウスから吸血した*Anopheles stephensi*の胃巣に形成された、オーシスト数の多少が蚊の行動に及ぼす影響を調べた。
Fig. 1 Effects of oocyst density in *An. stephensi* on their rate of passage through the net.  
A: Cages placed in side-wind position.  B: Release cage was placed in upwind position.  
C: Cages were covered with plastic sheeting to eliminate air-flow.  D: Cages were covered partially, and the mosquitoes were exposed to upwind.  The bars represent 95% confidence levels.

Fig. 2 Effects of oocyst density of *An. stephensi* on the rate of blood feeding, examined by cage-test without the net.  
Explanations of A–D same as Fig. 1.  The bars represent 95% confidence levels.

供試蚊中で実験装置内の障害を越えてベイトのそばに侵入できえた蚊数の比率（侵入率）では、オーシスト数ゼロの蚊の侵入率が常に高率で、オーシストの数が増えるほどに低率となった。とくに装置内の風をさえぎると顕著に低下した。また装置内の障害を除去した場合で、ベイトを吸血した蚊の率に及ぼす影響についても同様で、風をさえぎるとオーシスト数の増加に逆行して吸血率が低下した。マラリア原虫の寄生、とくに過大な寄生密度に応じて、蚊の行動上にも影響が現しうることが明らかになった。