

*A. gambiae* strains. It has been suggested<sup>4</sup> that the inhibition of multiple insemination by the female mosquito could operate as an effective isolating mechanism, barring hybridization between closely related sympatric species, races or strains. On the other hand, having once mated with a 'foreign' male, the potentiality of the particular female to contribute to the next generation of her own kind will be inhibited.

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### Function of the Areae Porosae of Ixodid Ticks

THE function of the areae porosae of the dorsal side of the basis capituli of the female ixodid tick was unknown for a long time. The tradition of considering it as an organ of unknown function has apparently been so well accepted by acarologists that, for at least the past 50 years, no attempt seems to have been made to elucidate the function. The interest of most acarologists in the porose area seems to be restricted to using its size and shape as an auxiliary character for specific diagnosis.

It can now be shown that the areae porosae are the outlets of the glands recently discovered and described<sup>1</sup>.

Feldman-Muhsam and Havivi reported on two previously undescribed groups of accessory glands in the vicinity of Gené's organ, in gorged females of *Hyalomma excavatum*, *Rhipicephalus sanguineus* s.l. and *Boophilus annulatus*. The glands become evident soon after the onset of feeding, and attain full development by the time oviposition begins. It was also noted that these glands were not found in *Ornithodoros tholozani*.

It should be added that the glands were also found in *Ixodes ricinus* and *Dermacentor albipictus*. These additional observations suggest that these glands are present in all Ixodidae, and are absent in Argasidae.

Further examination of the morphology and development of these glands showed that the very thin and elongated ducts of these glands terminate in the areae porosae. Each gland is apparently connected to a separate pore of the areae porosa; the number of glands corresponds to the number of pores. The relationship between the areae porosae and these glands explains why there are no areae porosae in Argasidae.

Experimental interception of the flow of the glandular secretion by obstruction of the orifices of the areae porosae interfered with the normal functioning of Gené's organ and consequently with oviposition.

During oviposition Gené's organ comes in close contact with the basis capituli; it is protruded and retracted for the laying of each egg. Thus, during oviposition Gené's organ is protruded and retracted on the average about 2,000 times in *Boophilus annulatus*, about 3,000 times in *R. sanguineus* s.l., about 5,000 times in *D. andersoni*, and 8,000-15,000 times in some species of *Hyalomma*. It is quite obvious that such a mechanism needs a lubricating system to function smoothly.

The obliteration of the areae porosae showed clearly that Gené's organ is incapable of functioning without the secretion of the recently described glands.

When the orifices of the areae porosae are destroyed, Gené's organ stops its movements and often remains

wholly or partly stuck to the basis capituli. It is therefore assumed that the main function of the glands is most probably the lubrication of the evagination-invasion mechanism of Gené's organ.

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### MICROBIOLOGY

#### 'Endogenous Factor' in Sporogenesis in Bacteria

EXTENSIVE investigations on the morphological changes during sporogenesis have afforded valuable information about this phenomenon<sup>1</sup>. The initiation of sporulation can be better understood if the metabolic events during the transition from a vegetative cell to its sporulating phase are known. Several attempts have been made to investigate the physiology of growth distinct from sporulation. Foster *et al.*<sup>2</sup> found that when vegetative cells of *B. mycoides* were removed from the complex growth media before the point of maximal growth and transferred to distilled water, they formed spores. This was termed 'endotrophic sporulation'. But experiments with *B. cereus* strain *T* (phage-resistant organisms) showed that 'endotrophic sporulation' can be observed only when granulated cells were suspended in a medium containing sufficient calcium ions<sup>3</sup>. (The shortening and granulation of cells are usually noticed only long after the cessation of growth.) Non-granulated vegetative cells lysed on transfer into a non-growth supporting medium. In this communication, we report observations which lend evidence to the presence of an 'endogenous factor' involved in the initiation of the morphogenesis in the vegetative cell leading to the formation of a granulated cell (Fig. 1) possessing the ability to sporulate in a medium which does not support growth.

*B. cereus* strain *T* (phage-sensitive) was used throughout these investigations. The cells were grown by the active culture technique<sup>4</sup> from a heat-shocked spore inoculum in *G* medium (see legend for Table 1) and collected when they appeared granular under the phase contrast microscope (Fig. 1*b*). They were washed with 0.01 M *tris* pH 7.4 suspended in 0.01 M potassium phosphate pH 6.8 (1/50 vol. of original medium) and sonicated in the Raytheon sonicator for 10-12 min. The broken cells and cell debris were removed by centrifugation at 15,000*g* for 15 min. Most of the protein in the clear supernatant was removed by acidifying with 1 N hydrochloric acid and centrifuging off the precipitate. The 'active principle' was

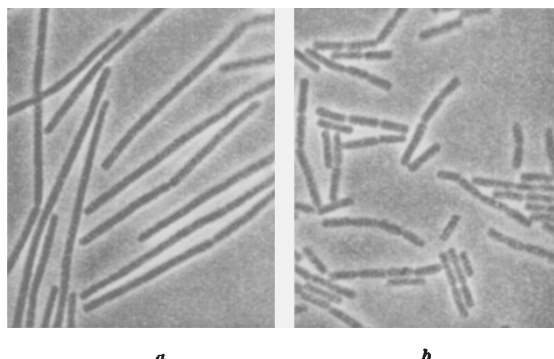


Fig. 1. Phase contrast micrograph of (a) vegetative cells; (b) granular cells