Mosquito Mysteries

Any GI who was in the tropics knows fully well that there was more to the war than killing time and Japs. There were many other things that had to be done away with before they did away with the enemy itself. The common mosquito not only bit hard and often, day and night, but sometimes left the victim a dose of malaria as a receipt.

Just as the typical American family sprays its front porch during hot summer evenings before going out to sit and talk, so the American Army acted to control the deadly pests before waging war. Teams of soldiers were trained and sent out to do this job, and in many instances, this control work was carried out under actual combat conditions. Throughout the day and night, mosquitoes were collected, where they gathered to feed, breed, or rest. Hardly a stone was left unturned as the men searched for the secret hiding places of the flying blood-suckers. The insects were *identified,* so that the control units knew exactly who *their* enemy was; *counted,* so as to determine the proportions of the various species present in the area and in order to learn something of their habits; and finally, *dissected,* in order to determine the species actually carrying malaria.

After the habits of the adults were known, the larval stage, living in water, was searched for. When repeated collections were made in the dozens of types of habitats—rain-barrels, mountain streams, lakes, ponds, rivers, and others—and the larvae identified, it was then decided where the worst mosquitoes were breeding and what could be done to control them.

Very often there would be forty or more different kinds of mosquitoes present in an area, but only one or two of these would be carrying malaria to the soldiers. Some could be found breeding in rain-barrels, others in road-side puddles, still others in the various other types of habitats. Oddly enough, for the most part, they seemed to select a definite type of breeding place and usually could be found only in that kind of water.

Because its dense foliage offered a place to hide from enemy planes, thick groves of bamboo, fifty feet high, were utilized as storage places for goods of war. However, almost immediately after the inner-most plants were cut down to make storage space, the hollow stumps, four inches or more in diameter, filled with water, and served as the breeding place for beautiful black and white mosquitoes whose constant daytime biting made the places uninhabitable. The problem was solved simply by plugging the holes with mud.

The reason for this selective breeding pattern of mosquitoes is one of the unsolved mysteries puzzling workers in the field. Do the insects actually select the type of habitat desired or do they distribute their eggs promiscously and let other factors in nature do the eliminating? If the latter is true, what are these factors?

Another mosquito mystery is why only one or two kinds of mosquitoes out of all those present in an area is capable of carrying malaria. Very often the mosquito which is most deadly in one area is absolutely harmless in another. In Assam, India, *Anopheles minimus* is a horribly dangerous species whereas, *Anopheles philippinensis,* which is equally as abundant, is practically harmless. Oddly enough, five hundred miles southward down the valley, in Bengal, *Anopheles philippinensis* is the principal carrier of malaria. "Over the Hump" in China, a variety of *Anopheles hyr-*

canus is the killer. In Assam, a variety of that species is the most common mosquito and absolutely harmless.

To solve these mysteries perhaps it will be necessary to do as a good malariologist once suggested to his students; "To become a good malariologist one has to learn to think like a mosquito."

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Growing Moss Protonemata

Moss protonemata were grown in our laboratory following the suggestions given by Johansen.* The medium used has ingredients as follows:

Distilled water	1 liter
Ammonium nitrate	1.0 g.
Potassium sulphate	0.5 g.
Magnesium sulphate	0.5 g.
Calcium sulphate	0.5 g.
Ammonium phosphate	0.5 g.
Ferric sulphate	0.01 g.
10% aqueous potassium hydroxide	A few drops

The medium was sterilized in an autoclave and poured into sterile Petri dishes. Spores from freshly opened capsules were scattered as evenly as possible over the surface of the liquid in the dishes. The cultures were kept in bright light at room temperature, in a Wardian case to conserve moisture. In the course of a week the spores germinated and began to grow into branching protonemata, but, as stated by the author, there was little tendency to produce gametophoric buds.

Results with the same medium to which 0.75% agar has been added were much better and in a few weeks, cultures with this medium were producing gametophoric buds.

Young plants taken from their native habitat and transferred to dishes with the agar medium were surrounded in a few weeks by a profuse growth of protonemata with developing gametophoric plants.

Typical prothallia were readily produced when dishes with the agar medium were sown with fern spores.

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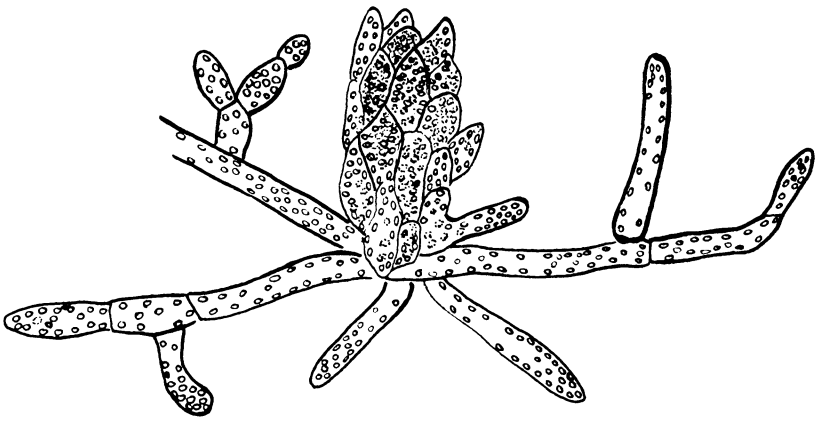
* JOHANSEN, DONALD A., *Plant Microtechnique*, McGraw-Hill Book Co., N. Y. 523 pp. Illus. 1940.



Protonemata with gametophoric bud.