Mosquito Eggs V

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Genus Aedes. Introduction.

A recent publication on Aedes eggs[87] reveals some misapprehensions which it seems essential to correct before proceeding to any detailed account of this genus. I have therefore undertaken the following preliminary note as a prelude to a more detailed discussion later. Even this limited aim presents some difficulties as I am at present without access to my usual sources of literature and references. The following comments must therefore necessarily be incomplete. The statements chiefly concerned are the following:-

1. "Mosquitoes of the genera Aedes.....invariably lay their eggs not on the water surface of larval habitats but in damp niches at their edge."

There are several objections to this statement. In the first place we simply do not know enough about Aedes to say what they invariably do. Our "knowledge" (much of it inferential) is confined to about 100 species. For many of the subgenera, among them some of the potentially most interesting, even the eggs, let alone the oviposition behavior, are unknown. A second objection is that even the few species about which we do know something do not invariably behave in the manner indicated. Ae. (Skusea) pembaensis Theobald lays its eggs on the legs of crabs, presumably availing itself of phoresy as an aid to dispersal[88]. Regarding the other crab hole breeding subgenera we know nothing. Ground pool breeding species and pasture Aedes do, it seems, frequently lay their eggs at the edge of depressions but this is not invariably the case[89]. Among container breeding species we know almost nothing regarding those breeding in leaf axils. For the rest, the best studied species, Ae. aegypti (Linnaeus), does not invariably lay its eggs above the water line. On the contrary a proportion are commonly laid on the surface of the water and there are indications that genetic factors are involved[90].

This example raises a third objection of a more general kind which is that the one invariable characteristic of behavior is its variability[91]. This is true not only in the genetic context. The implications of genetic plasticity for assessment and control are surely too well known to call for comment. Another important practical consideration is that even the limited understanding of oviposition behavior which we may hope to gain in the laboratory will be denied us if we categorize behavior as "invariable" and so fail to provide suitable alternatives. As an example I would instance Aedes (Verrallina) carmenti Edwards. Belkin[20] describes the eggs of this species as "laid in a ribbonlike row on the sides of test tubes, cemented so thoroughly to the glass that they could not be dislodged except with a scalpel". In contrast to this Huang[92], to whose observations I was to some extent a party, describes them as "laid on the strips of" [moist] "filter paper in the individual rearing vials". If, as I think likely, this reflects a behavioral plasticity within the species then we clearly need to take account of the fact in any attempt to infer the probable oviposition substrates in nature.

2. "Species which breed in collections of ground water.....lay their eggs on damp mud.....These eggs can withstand desiccation". The distinctive feature of many Aedes (and, inter alia, Psorophora) seems to be the insertion of the eggs into small crevices. This applies both to ground pool and to container breeding species. A classic example of failure to appreciate this fact was the bewilderment caused by Psorophora ferox (Humboldt) which persisted in laying their eggs on filter paper placed on top of the gauze roof of the cage while ignoring similar paper placed on the floor[93]. This must surely have been a response to the broken surface afforded by the gauze. There is a promising field for study in the relation of the various types of female terminalia found in Aedes to the type of oviposition substrate favored[94]. The statement that the eggs are laid "on mud" entirely falsifies the situation. They may sometimes be laid in clay but a coarser type of soil, e.g. clay-loam, is likely to be preferred[95]. The statement that the eggs "can withstand desiccation" seems to be true of the majority of cases so far investigated but it is said not to be true of Ae. (Ochl.) fulvus (Wiedemann)[96] and there may be some interesting phylogenetic considerations involved.[97]

3. "The only method proposed for the extraction of Aedes eggs from oviposition sites necessitates the construction of a hand-cranked drum.....". This is untrue in two respects. In the first place the technique in question is not one for the collection of eggs from the oviposition site. It is a method for the subsequent separation of eggs from samples of substrate removed from the breeding place. The distinction is an important one because our knowledge of the distribution of eggs in the oviposition site or breeding place depends primarily on the method of obtaining samples of the substrate and only secondarily, if at all, on the way in which eggs are subsequently extracted from them.

In the second place a number of methods of taking samples from breeding places or oviposition sites have, in fact, been employed and several different methods have been used for extracting eggs from the samples. Among these is the technique employed by Husbands[98] and others for recovering eggs of pasture Aedes by mowing the pasture and extracting them with a vacuum cleaner. This has the advantage that irrelevant debris is excluded and the eggs can be picked out of the sample under a microscope. Smith[99] detected eggs of Ochlerotatus in grass sods by examining the cut edges with a hand lens. This has the potential advantage of revealing the position of the eggs in the substrate. There are indications that some species may make use of the breaches caused by emergent grass blades or other vegetation. Bodman and Gannon[95] studied the distribution of eggs of Ae. vexans (Meigen) at various depths in different types of soil by removing successive thin layers. The list could probably be extended but, as I said, I cannot under present circumstances make any pretence at completeness. It might be mentioned, however, that Corbet[100] has a technique for recovering eggs from natural container habitats while the same author[101] has some particularly interesting observations on the phenology of arctic Aedes based on the recovery of eggs from natural oviposition sites.

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