THE FOOD-HABITS OF MEGARHINUS.[1]

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In a previous paper discussing the food-habits of mosquitoes I have expressed the opinion that the species of *Megarhinus* do not suck blood but feed wholly upon the sweets of flowers.[2] I was fully aware of the statements of some authors that these mosquitoes bite, but for several reasons I was convinced that these assertions are based on faulty observation or misidentification. Indeed I have failed to find any record at first hand of *Megarhinus* biting. Thus Theobald quotes Captain James that *Megarhinus immisericors* "bites very severely in southern India, and that its bite is very poisonous. It is known to the natives as the 'Stinging Elephant Mosquito.' "[3] It is to be judged from this quotation that Capt. James obtained his information from natives; we can safely put aside such evidence for there is little reason to doubt that, if there is any truth in the statement at all, other large mosquitoes were the real culprits. Later, on information obtained from correspondents, Theobald states of *Megarhinus separatus:* "They are called 'carapaná' and bite very badly in the daytime and at night."[4] The truth is that in the Amazon region "carapaná" is the vulgar name for any mosquito. We have here, then, another error of like character with that of Capt. James. This same mosquito is also accused by Goeldi on information from his entomological preparator, Mr. Adolphus Ducke, who assured him that its sting was comparable in severity to that of a wasp.[5] On the other hand good observers have expressed their belief that these mosquitoes do not bite. Bancroft says of *Megarhinus speciosus:* "It is not a biting mosquito."[6]

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[1] In *Megarhinus* are included the species which have been placed in *Toxorhynchites* Theobald. I do not consider the character used in the separation of the two, the difference in the length of the palpi in one sex, as admissible for generic separation. Its introduction has only led to confusion and much needless synonymy. No attempt is here made to coördinate the specific names and they are used as given in the originals, *Worcesteria* Banks has already been disposed of by Professor Theobald (Monogr. Culic., vol. 5, 1910, p. 110).

[2] Journ. New York. Ent. Soc., vol. 15, p. 219 (1907).

[3] Monogr. Culic., vol. 1, p. 226 (1901).

[4] Monogr. Culic., vol. 3, p. 114 (1903).

[5] Os Mosquitos no Pará. Mem. Museu Goeldi, no. 4, p. 124 (1905).

[6] Ann. Queensland Mus., no. 8, p. 17 (1908).

E. E. Green controverts the idea that *Megarhinus immisericors*, the "stinging elephant mosquito" before mentioned, bites. "I have never experienced its bite, nor have I been able to induce it to bite me by method ssuccessful with other biting Culicidæ."[1] Very significant is the fact that within the last few years, when general attention has been directed to mosquitoes, no observations confirmatory of blood-sucking have appeared although *Megarhinus* have been recorded repeatedly as entering houses.

The most forcible evidence that *Megarhinus* does not suck blood lies in the structure of its proboscis. While all the parts found in the females of the blood-sucking species are present, the sheath, or labium, is strongly chitinized and rigid. This is not the case with the blood-sucking forms. The part played by the components of the proboscis when a mosquito pierces the skin has been common knowledge since the days of the immortal Réaumur and need not be discussed here at length. When the lancets are forced into the skin the sheath is pushed back and bent into a loop, and in this way the piercing parts are made to protrude beyond the tip of the proboscis to perforate the skin. It is therefore perfectly evident that *Megarhinus*, with its rigid proboscis sheath, cannot pierce the skin.

For those to whom the structure of the proboscis is not convincing it may be further stated that of a considerable number of *Megarhinus* which have come to hand not one shows traces of a blood-meal. Furthermore, in collections the males far outnumber the females, a goodly proportion of the species being known from the male alone, a condition the reverse of what obtains with the blood-sucking species.

Probably the first direct observation recorded, of a *Megarhinus* feeding, was that by the writer (l. c.) of a female *M. septentrionalis* sucking honey from the flowers of *Hydrangea arborescens*. Since then observations of *Megarhinus* visiting flowers for food have been made both in the eastern and the western hemisphere. I owe the following observations, which demonstrate very clearly that *Megarhinus* are honey-feeders, to the kindness of the well-known entomologist, F. W. Urich of the Board of Agriculture of Trinidad, British West Indies, sent under the dates of 1 Nov. and 6 Dec., 1910. "I had a rather good find a few days ago in

[1] Spolia Zeylanica, vol. 2, p. 159-160 (1905).

connection with *Megarhinus superbus*. At present there is a composite flowering called 'Christmas bush'; it attracts lots of insects of all orders and is very common near roads all over the island. What was my joy to see four *M. superbus* (2♂, 2♀) hard at work sucking its flowers! This particular plant was in the shade and it would appear as if these mosquitoes, although day flying, keep in the shade. I have repeatedly seen this species about during the day, but this is the first time that I actually found them feeding." In the second letter Prof. Urich informed me that the "Christmas bush" is the composite *Eupatorium odoratum* and added the following observation: "I re-visited the locality where I saw the *M. superbus* feeding and I was fortunate in again seeing and capturing, not only *M. superbus* (2♀, 1♂) but also *M. trinidadensis* (1♂). Time of feeding 10 a. m.; sun shining on flowers. Flowers growing on sides of road through cacao estate where there were many Bromeliæ on the shade trees."

From Africa we have the following observations, made by Dr. Graham in Ashanti and recorded in the last volume of Theobald's Monograph.[1] A female of *Megarhinus phytophygus* was "taken by Dr. Graham upon the flowers of a climbing plant." Of *Megarhinus marshallii* we read that it was found "on an umbelliferous flower in the bush at 12 noon (♂'s). Dr. Graham says 'Specimens were taken upon several occasions upon the flower of a climbing plant.' "

STRIDULATION OF THE SHIELD-BACKED GRASSHOPPERS OF THE GENERA *NEDUBA* AND *AGLAOTHORAX*.

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In many species of Decticinæ, the wings are so atrophied as to be almost completely gone, and the elytra are so reduced as to be almost wholly covered by the characteristic shield-like posterior extension of the pronotum. In some of these species the elytra of the males bear very highly developed organs for the production of sound.

[1] Vol. 5, p. 103, 105 (1910).