AGE STRUCTURE OF SOME MOSQUITO POPULATIONS IN A COASTAL AREA IN SURINAM

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ABSTRACT. From the beginning of January till mid December 1973 weekly collections of adult mosquitoes were made in the "Fernandesweg" area, bordering the Atlantic Ocean. Four mosquito species were abundant enough to permit regular determinations of the age structure of the populations. Some 11,081 specimens were dissected, 1,377 of *Anopheles aquasalis*, 3,350 of *Coquillettidia venezuelensis*, 2,726 of *Culex taeniopus* and 3,628 of *C. virgultus*. With the exception of a short period, *A. aquasalis* did not constitute a serious threat to the health of man, nor did *Coquillettidia venezuelensis*. On the other hand *C. taeniopus* may very well serve as a vector throughout the year, and *C. virgultus* might be dangerous before June.

INTRODUCTION

To determine the vector capacity of a number of mosquito species occurring in the coastal area of Surinam, weekly collections of adult mosquitoes were made from the beginning of January till mid December 1973. Four mosquito species were abundant enough to permit regular determinations of the age structure of the populations.

MATERIALS AND METHODS

THE STUDY AREA. The catching station in the "Fernandesweg" area was situated near the Atlantic Ocean, some 10 km west of Paramaribo, at the edge of the 2nd sand ridge (the beach is considered the 1st sand ridge). The swamp between the 2 sand ridges is characterized as a brackish *Typha angustifolia—Cyperus articulatus* swamp, while *Typha angustifolia* L. is dominant. In the dry season only small, very shallow pools are left; in the greater portion of the swamp the mesohalinous groundwater stands a few cm below the surface of the wet clay (Lindeman, 1953). After the 2nd sand ridge the water becomes fresh and the vegetation type changes to a *Cyperus giganteus—Typha—Scleria* swamp. A more detailed description of this study area is found elsewhere (Panday, 1974).

TRAPPING METHOD. For collecting adult mosquitoes the CDC miniature light trap was used (Sudia and Chamberlain, 1962).

AGE DETERMINATION. The captured mosquitoes were first identified and separated according to species. A representative sample (about 100 females) of each species, which occurred in large enough numbers, was dissected weekly in a drop of distilled water. The ovaries were carefully transferred to a separate drop of distilled water, where they dried out, after which time the parousrate was determined (Detinova, 1962). Less than 1% of the dissected mosquitoes had ovaries in the third Christophers' stage or beyond and these were excluded from examination.

RESULTS AND DISCUSSION

Anopheles aquasalis (Table 1). *Anopheles aquasalis* is present around Paramaribo in small pools, meadows and the edge of marshes and swamps. This species can live in temporary rainpools and semipermanent pools and is present in the "Fernandesweg" area throughout the year, although not in very large numbers. In general the parousrate is very low. Only at the end of July and the beginning of August (July 27, August 2 and August 10) the parousrate reached a rather high level. The mean parousrate for that period is 0.46. For the rest of the year the mean parousrate is 0.11. With the exception of a short period we may expect that

A. aquasalis in the "Fernandesweg" area will not constitute a serious threat to the health of man, as we are dealing with a very young moderate-sized population. This species feeds readily on man.

Coquillettidia venezuelensis (Table 2). The larvae of *Coquillettidia venezuelensis* are attached to roots of grassy vegetation in permanent or semipermanent groundwaters (Forattini, 1965). Therefore they are relatively independent of rainfall and in the "Fernandesweg" area this species occurs in considerable numbers throughout the year. In general the parousrate is very low, the mean parousrate being 0.15.

Table 1. Parousrate of *Anopheles aquasalis.*

Date	Number of specimens dissected	Parousrate
Jan. 3	50	0.22
Jan. 10	39	0.08
Jan. 18	14*	0.15
Jan. 25	38	0.00
Febr. 1	14*	0.00
Febr. 6	54	0.02
Febr. 14	11*	0.00
Febr. 22	64	0.16
March 1	68	0.02
March 9	17*	0.00
March 15	13*	0.00
April 12	49	0.04
April 27	12*	0.40
May 4	78	0.08
May 14	28*	0.32
May 22	101	0.25
June 1	118	0.11
June 13	11*	0.28
June 21	85	0.25
June 26	46	0.05
July 6	43	0.12
July 13	68	0.08
July 19	46	0.02
July 27	58	0.48
Aug. 2	50	0.50
Aug. 10	17*	0.36
Aug. 17	20*	0.15
Sept. 20	27*	0.12
Sept. 27	28*	0.07
Oct. 9	24*	0.13
Oct. 24	24*	0.05
Oct. 30	11*	0.19
Nov. 14	28*	0.00
Nov. 29	23*	0.05

* The figures marked with an asterisk are too low to permit valid determinations of parousrate.

If only the parousrate is considered, we may expect that *C. venezuelensis* in the "Fernandesweg" area will not be a good vector of pathogenic organisms. We must keep in mind, however, that this mosquito is an aggressive bloodsucker, active during day and night, and that enormous numbers occur in this area.

Culex taeniopus (Table 3). *Culex ta-*

Table 2. Parousrates of *Coquillettidia venezuelensis.*

Date	Number of specimens dissected	Parousrate
Jan. 3	76	0.12
Jan. 10	102	0.30
Jan. 17	119	0.11
Jan. 25	54	0.08
Febr. 1	37	0.03
Febr. 14	21*	0.34
Febr. 22	97	0.20
March 2	61	0.15
March 8	28*	0.05
April 4	27*	0.15
April 18	30	0.07
April 25	68	0.12
May 4	42	0.39
May 12	103	0.16
May 22	34	0.10
June 1	61	0.17
June 14	36	0.23
June 20	88	0.07
June 27	104	0.07
July 6	102	0.21
July 13	94	0.16
July 19	108	0.12
July 26	107	0.20
Aug. 2	92	0.29
Aug. 9	99	0.16
Aug. 17	99	0.03
Aug. 23	115	0.14
Sept. 7	98	0.14
Sept. 14	102	0.16
Sept. 20	101	0.13
Sept. 27	110	0.15
Oct. 3	102	0.10
Oct. 9	103	0.16
Oct. 18	86	0.11
Oct. 23	70	0.19
Oct. 30	109	0.17
Nov. 6	115	0.18
Nov. 14	53	0.08
Nov. 27	104	0.13
Dec. 4	107	0.17
Dec. 12	86	0.14

* The figures marked with an asterisk are too low to permit valuable determinations of parousrate.

Table 3. Parousrates of *Culex taeniopus*

Date	Number of specimens dissected	Parousrate
Jan. 17	64	0.31
Jan. 25	34	0.25
Febr. 1	88	0.47
Febr. 6	58	0.43
Febr. 22	106	0.29
April 4	96	0.52
April 25	82	0.17
May 4	37	0.30
May 12	98	0.64
June 1	97	0.26
June 13	34	0.38
June 20	101	0.48
June 27	91	0.65
July 7	97	0.49
July 14	93	0.51
July 19	100	0.40
July 27	56	0.40
Aug. 3	94	0.46
Aug. 17	35	0.51
Aug. 10	81	0.54
Aug. 23	95	0.43
Sept. 7	97	0.43
Sept. 14	105	0.53
Sept. 20	105	0.45
Sept. 27	48	0.23
Oct. 2	34	0.53
Oct. 9	94	0.54
Oct. 18	69	0.33
Oct. 24	16*	0.62
Oct. 30	100	0.23
Nov. 6	60	0.48
Nov. 14	37	0.49
Nov. 27	103	0.45
Dec. 4	104	0.40
Dec. 12	59	0.75

* The figures marked with an asterisk are too low to permit valuable determinations of parousrate.

eniopus is probably a rainpool breeder. In the "Fernandesweg" area this species is abundant. The parousrate is fairly constant, the mean parousrate being 0.44. This rather high parousrate means that *C. taeniopus*, in the "Fernandesweg" area, may very well act as a good vector because it feeds readily on man and occurs in large numbers.

Culex virgultus (Table 4). The larvae of *Culex virgultus* were collected in temporary rainpools and semipermanent waters (creeks). Therefore although this species was present throughout the year, rainfall can be expected to influence strongly population size. In general the age structure of the population was not stable, as the parousrates varied sharply within wide limits. Nevertheless the parousrates could be divided into two groups: one group before June 1, with a mean parousrate of 0.42 and another group

Table 4. Parousrates of *Culex virgultus*

Date	Number of specimens dissected	Parousrate
Jan. 3	61	0.41
Jan. 10	85	0.38
Jan. 17	103	0.27
Jan. 25	127	0.30
Febr. 1	98	0.37
Febr. 6	101	0.44
Febr. 22	109	0.63
March 1	55	0.49
March 8	95	0.40
March 15	34	0.76
April 4	108	0.71
April 12	102	0.06
April 18	25*	0.24
April 25	47	0.53
May 4	77	0.50
May 14	34	0.47
May 22	35	0.23
May 31	31	0.42
June 1	69	0.45
June 12	91	0.20
June 21	76	0.12
June 26	98	0.13
July 7	143	0.26
July 14	99	0.09
July 19	94	0.21
July 27	103	0.23
Aug. 2	114	0.24
Aug. 10	101	0.19
Aug. 17	57	0.12
Aug. 23	105	0.10
Sept. 7	103	0.11
Sept. 14	51	0.18
Sept. 20	95	0.09
Sept. 27	97	0.09
Oct. 3	107	0.08
Oct. 9	101	0.07
Oct. 18	46	0.22
Oct. 23	98	0.05
Oct. 31	101	0.07
Nov. 6	45	0.11
Nov. 14	76	0.24
Nov. 27	97	0.14
Dec. 4	97	0.14
Dec. 13	69	0.22

* The figures marked with an asterisk are too low to permit valuable determinations of parousrate.

after this date with a mean parousrate of 0.14. In the first dry months of the year the parousrate was apparently higher than in the next wet months. In the latter period newly formed rainpools supplied an additional amount of newly emerged individuals to the population. Why the parousrate did not rise afterwards till a steady state was reached is not quite clear. *C. virgultus* occurred in large numbers throughout the year in the "Fernandesweg" area, and also attacked humans. However, little is known about its host preference. It is quite possible that this population was a good vector before June 1, due to the rather high parousrate. After this date, however, the parousrate was low and it seems probable that the population did not constitute a serious threat to the health of man.

References Cited

Detinova, T. S. 1962. Age grouping methods in Diptera of medical importance with special reference to some vectors of malaria. Monogr. Wld. Hlth. Org. No. 47. 216 pp.

Forattini, O. P. 1965. Entomologia Medica III. Sao Paulo, Fac. Hyg. Saude Publ. 416 pp.

Lindeman, J. C. 1953. The vegetation of the coastal region in Surinam. Van Eedenfonds, Amsterdam. 135 pp.

Panday, R. S. 1974. Mosquito ecology in relation to the transmission of pathogens in Surinam. Thesis, Paramaribo. 203 pp.

Sudia, W. D. and R. W. Chamberlain. 1962. Battery-operated light trap, an improved model. Mosq. News 22:126–129.