pected focus did not reveal the presence of raccoons, thus reducing the chance that *D. tenuis* was present. A single infected mosquito does not allow any definitive statements to be made, but *Ae. trivittatus* should be considered a potential vector of dog heartworm in Knox Co., Tennessee.

We wish to thank E. C. Bernard, R. G. Breene, L. F. Johnson, and P. L. Lambdin for reviewing the manuscript.

References Cited

Christensen, B. M. and W. N. Andrews. 1976. Natural infection of *Aedes trivittatus* (Coq.) with *Dirofilaria immitis* in central Iowa. J. Parasitol. 62:276–280.

Magoon, E. H. 1935. A portable stable trap for capturing mosquitoes. Bull. Entomol. Res. 26:363–369.

Pinger, R. R. 1982. Presumed *Dirofilaria immitis* infections in mosquitoes (Diptera: Culicidae) in Indiana, USA. J. Med. Entomol. 19:553–555.

Shemanchuk, J. A. 1978. A bait trap for sampling the feeding populations of blood-sucking Diptera on cattle. Quaest. Entomol. 14:433–439.

Taylor, A. E. R. 1960. The development of *Dirofilaria immitis* in the mosquito *Aedes aegypti*. J. Helminthol. 34:27–38.

AEDES THIBAULTI: A NEW ADULT RECORD FROM RHODE ISLAND[1]

J. E. COOKMAN[2], N. E. SCARDUZIO[2] AND R. A. LEBRUN[3]

The first recorded capture of *Aedes (Ochlerotatus) thibaulti* Dyar and Knab occurred at South Kingstown, Washington County, Rhode Island on August 16, 1984. The adult female was trapped in a CO_2-baited CDC light trap during a state-wide survey for mosquitoes infected with Eastern equine encephalitis virus. Three more adult females were captured at the same site on August 22, 1984, and another adult female was trapped on September 7 in Warwick, Kent County at a site about 30 miles north of the South Kingstown site. This record now brings to 38 the total number of mosquito species reported from Rhode Island (LeBrun et al. 1983). Prior to this, Connecticut was the only New England state from which *Ae. thibaulti* had been reported (Darsie and Ward 1981).

Identification was made by Dr. Ronald A. Ward, Walter Reed Army Institute of Research, Washington, D. C. Voucher specimens are deposited in the University of Rhode Island reference collection.

References Cited

Darsie, R. F., Jr. and R. A. Ward. 1981. Identification and geographical distribution of the mosquitoes of North America, north of Mexico. Mosq. Syst. Suppl. 1:1–313.

LeBrun, R. A., D. Boyes, P. Capostosto and J. Marques. 1983. Annotated list of the mosquitoes of Rhode Island. Mosq. News 43:435–437.

[1] Rhode Island Agricultural Experiment Station Journal Article No. 2265.

[2] Rhode Island Department of Environmental Management, Government Center, Wakefield, RI 02879.

[3] Department of Plant Pathology and Entomology, University of Rhode Island, Kingston, RI 02881.

TWO BASIC PROGRAMS FOR STATISTICAL ANALYSIS OF PERIODICITY DATA, BASED ON THE SINE-WAVE FUNCTION[1]

J. R. LINLEY

Florida Medical Entomology Laboratory, Institute of Food and Agricultural Sciences, University of Florida, 200 9th Street, S.E., Vero Beach, FL 32962.

To provide a simplified statistical approach to the analysis of microfiliarial periodicity in human filariasis, Aikat and Das (1976) developed a modified form of the harmonic (sine-wave) equation first applied to such data by Sasa and Tanaka (1972, 1974). Several examples of the method as applied to microfilarial periodicity of the mosquito-borne human parasite *Wuchereria bancrofti* are given by Aikat and Das (1976). Similarly, Pichon (1983) has recently tested the periodicities of *Mansonella ozzardi* microfilariae in individual human infections. Since *Culicoides* spp. are involved in the transmission of *M. ozzardi,* I became interested in a better understanding of the method and developed two BASIC programs, SINFIT and SINCOM, which will plot the data and perform the required calculations. Personal computers are now in common use and it was felt that the programs might be useful to other workers. SINFIT fits the data to the sine-wave function, performs a test for significant periodicity,

[1] University of Florida, Institute of Food and Agricultural Sciences Experiment Station Journal Series No. 6145.

SINE-WAVE FIT TO PERIODICITY DATA

HOUR	COUNT
17.00	29.00
19.00	49.00
21.00	21.00
23.00	33.00
1.00	22.00
3.00	10.00
5.00	15.00
7.00	11.00
9.00	23.00
11.00	10.00
13.00	30.00
15.00	22.00

HOUR	THEOR.COUNT
17.00	32.97
19.00	33.90
21.00	31.89
23.00	27.47
1.00	21.84
3.00	16.49
5.00	12.87
7.00	11.93
9.00	13.95
11.0v	18.36
13.00	24.00
15.00	29.34

F = 9.6374 d.f.= 2 and 9

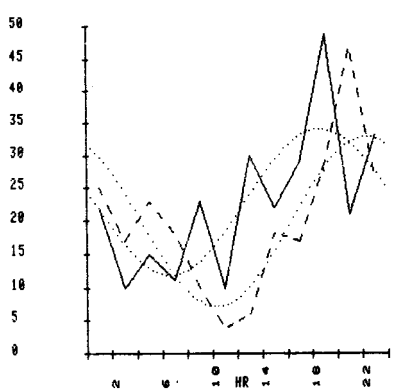
MEAN COUNT (M)	=	22.917
ST. DEV. (COUNT)	=	11.333
AMPLITUDE (A)	=	11.035
PERIOD. INDEX	=	49.455
RELATIVE AMPL.	=	48.152
ACROPHASE (K)	=	18.626
SUM (COUNT)	=	275.000
SUM (COUNT^2)	=	7715.000
B	=	1.8002
C	=	-10.8871

Fig. 1. Print-out from running SINFIT.

prints out parameters of the fitted harmonic curve, and plots the data with superimposed fitted curve. SINCOM requires inputs from SINFIT, then calculates and prints an analysis of variance which tests for a significant difference between two sets of periodicity data.

The programs are written for a Hewlett-Packard 86B personal computer (a fully developed version for the HP-85A or B is also available on request). Consequently, some statements and commands "native" to the HP system are used. Transcription of these statements to any other variant of BASIC should be relatively simple, even for individuals having a minimal knowledge of programming. In addition to analysis of microfilarial periodicity, the programs are applicable to any periodic data which can be assumed to fit the harmonic curve reasonably closely. Readers interested in the math-

POINT NO.	HOUR	CALC. VALUE
1	0.00	24.72
2	2.40	17.97
3	4.80	13.12
4	7.20	12.01
5	9.60	15.06
6	12.00	21.12
7	14.40	27.86
8	16.80	32.71
9	19.20	33.83
10	21.60	30.77



TEST FOR EQUALITY BETWEEN TWO SETS OF PERIODICITY DATA

ANOVA

RESIDUAL DUE TO	D.F.	SUM SQUARES	MEAN SQUARE	F
Dev. fr. hypothesis	3	427.4997	142.4999	2.2106
Separate regression	18	1160.3189	64.4622	
Combined regression	21	1587.8186		

Fig. 2. Continued print-out from running SINFIT and plotted data, with superimposed curves. Anova table (lower) is print-out obtained from running SINCOM.

ematics are referred to Aikat and Das (1976) and Pichon (1983).

Owing to space limitations the full program listings cannot be given here (SINFIT is 219 lines, SINCOM is 108 lines), but the print-outs obtained are shown in Figs. 1 and 2 (the printer was set to compressed print mode). The data used are for microfilarial periodicities by Harinasuta et al., cited in full by Aikat and Das (1976). Note that results from only one of the data sets are printed out to illustrate SINFIT (Fig. 1), but both data sets have been plotted to show how plots can be superimposed (Fig. 2). The analysis of variance performed by SINCOM appears at the bottom of Fig. 2.

For any readers interested in having the programs, full listings will be provided on request (please specify whether for HP85 or HP86). Readers wishing to obtain programs already recorded should send appropriate media (tape cassette for HP85, 3½" micro-flexible disc for HP86).

Aikat and Das (1976) and Pichon (1983) provide considerably more information on the details of the calculations and interpretation.

I am grateful to Dr. G. Pichon who kindly sent explanatory notes and a full set of tabulated calculations from which I was able to write SINFIT.

References Cited

Aikat, T. K. and M. Das. 1976. A modified statistical method for analysis of periodicity of microfilariae. WHO/FIL/76.142, 12 pp. (mimeographed document).

Pichon, G. 1983. Crypto-periodicity in *Mansonella ozzardi*. Trans. R. Soc. Trop. Med. Hyg. 77:331–333.

Sasa, M. and H. Tanaka. 1972. Studies on the methods for statistical analysis of the microfilarial periodicity data. S. E. Asian J. Trop. Med. Publ. Hlth. 3:518–536.

Sasa, M. and H. Tanaka. 1974. A statistical method for comparison and classification of the microfilarial periodicity. Jap. J. Exp. Med. 44:321–346.

SUSCEPTIBILITY OF *CULEX NIGRIPALPUS* TO SEVERAL ISOLATES OF *PLASMODIUM HERMANI* FROM WILD TURKEYS IN FLORIDA[1]

JAI K. NAYAR[2] AND DONALD J. FORRESTER[3]

Wild turkeys (*Meleagris gallopavo*) in Florida have been found to be infected with a malarial parasite, *Plasmodium hermani* (Forrester et al. 1974, Telford and Forrester 1975). Four species of Florida mosquitoes (*Culex nigripalpus* Theobald, *Cx. salinarius* Coquillett, *Cx. restuans* Theobald and *Wyeomyia vanduzeei* Dyar and Knab) have been shown to be susceptible to infection to the Fisheating Creek isolates (P-27 and P-41) of *P. hermani* (Young et al. 1977; Nayar et al. 1980, 1981a, 1981b). Additionally, two of these mosquito species (*Cx. nigripalpus* and *Wy. vanduzeei*) were found susceptible to the Lochloosa isolate (L-5) of this parasite (Nayar et al. 1980). Only slight differences were observed in the rate of infection between isolates P-27 and P-41, but no significant differences were observed in the number of oocysts per midgut of *Cx. nigripalpus*, fed on poults infected with three isolates (P-27, P-41 and L-5) (Table 1). Recently, two new isolates of *P. hermani* (W-1 and Le-1) have been obtained from wild turkeys from other areas of Florida. Distinct differences were observed in their infectivity to *Cx. nigripalpus*. We now report the differences between these two isolates in the rate of infection and in the number of oocysts per midgut and compare them with that of the Lochloosa isolate (L-5).

Three-to-five-day-old females of colonized *Cx. nigripalpus* (Vero Beach) were tested for susceptibility to *P. hermani*. Larval mosquitoes were reared and adults maintained as described by Nayar and Pierce (1977). The various isolates of *P. hermani* were obtained from wild turkeys by subinoculation of heparinized blood into 2 to 3-week-old domestic turkey poults following the method of Forrester et al. (1974). Isolates P-27 and P-41 were obtained from an adult female turkey on July 29, 1975 and from an adult male on August 2, 1979, respectively, from Fisheating Creek near Palmdale, Glades County, isolate L-5 was obtained from a juve-

[1] Florida Agricultural Experimental Stations Journal Series No. 6153.

[2] Florida Medical Entomology Laboratory, University of Florida, 200 9th Street, S.E., Vero Beach, FL 32962.

[3] Department of Infectious Diseases, College of Veterinary Medicine, University of Florida, Gainesville, FL. 32610.