THE EFFECTS OF DITCHING ON THE MOSQUITO POPULATIONS IN SOME SECTIONS OF JUNCUS SALT MARSH IN CARTERET COUNTY, NORTH CAROLINA

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TO: WHOM IT MAY CONCERN

FROM: James M. Stewart
Assistant Director for Research Application

SUBJECT: Institute Report No. 82 - "The Effects of Ditching on the Mosquito Populations in Some Sections of Juncus Salt Marsh in Carteret County, North Carolina" by Mr. Richard N. LaSalle and Dr. Kenneth L. Knight, Department of Entomology, North Carolina State University

This report presents research findings on the effectiveness of ditching for the control of mosquito populations in five areas of irregularly flooded salt marshes in Carteret County, North Carolina. The principal species of mosquitoes, their location, and the relative numbers of each are a part of the data provided. Comparisons are made for both plant cover and the abundance of mosquito larvae in ditched and unditched sections of the marsh.

Your attention is called to the summary and the recommendations sections for their implications to mosquito control programs. Information contained here should be useful to state and county health officials, County Board of Commissioners, and State regulatory agencies.

Another related study by Dr. Edward J. Kuenzler, Professor of Environmental Biology, and Mr. Howard T. Marshall, Graduate Assistant of the University of North Carolina at Chapel Hill, covers the ecological effects of mosquito control ditching, including a comprehensive description of the aquatic organisms, plant species and growth, and general vegetative cover for ditched and unditched marsh areas in Carteret County. This information is provided in Institute Report No. 81.

JMS:jj

Attachment

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THE EFFECTS OF DITCHING ON THE MOSQUITO POPULATIONS IN SOME SECTIONS OF *JUNCUS* SALT MARSH IN CARTERET COUNTY, NORTH CAROLINA

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TABLE OF CONTENTS

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ABSTRACT

Five areas of irregularly flooded salt marsh in Carteret County, North Carolina were studied to determine the effects of ditching on mosquito populations inhabiting the areas. The principal species of mosquitoes present were *Anopheles atropos* Dyar and Knab, *Anopheles bradleyi* King, *Aedes sollicitans* (Walker) and *Aedes taeniorhynchus* (Weidemann). Present in lesser numbers were *Culex salinarius* Coquillett and *Psorophora confinnis* (Lynch Arribalzaga).

Data on both plant cover and on the abundance of mosquito larvae of each species showed such wide variation in both ditched and unditched sections that no significant differences between sections could be detected. However, data from weekly field observations of mosquito breeding sites and ground water levels showed that ditched sections had shorter wet intervals than unditched sections. Despite this reduction, the potential survival of the mosquitoes did not significantly differ from the unditched sections, since, according to tide gauge data the ditched sections, on the average, were completely flooded from 14 to 21 times per month, producing conditions in which the wet intervals were often long enough for mosquitoes to complete their development. On the other hand, this high frequency of flooding created microenvironments in some sections on the marsh incompatible with heavy larval breeding.

Aedes and *Psorophora* larvae were more commonly collected from sites marginal to the marsh, whereas those of *Anopheles* and *Culex* were found to be more evenly distributed throughout the study areas.

In general, the percentage of Aedes and Psorophora larvae taken in samples (i.e. their relative abundance) tended to be directly proportional to the mean slope of the breeding depression and inversely proportional to its frequency of flooding. Conversely, the relative abundance of Anopheles and Culex species, although not as highly affected by the mean slope as Aedes and Psorophora, was, up to a point, directly proportional to the frequency of flooding. According to statistical analysis, the relative abundance of species in the ditched sites was more affected by the mean slope, frequency of flooding and the ratio of frequency of flooding/mean slope (Suitability Index) than in the unditched sites, where the additive effect of the frequency of standing water, the number of days per wet period and the Suitability Index were found to be more significant.

Light trap and biting count data collected for the principal salt marsh species showed that the Anopheles and, at times, Culex species could be as numerous and annoying as the Aedes and Psorophora species.

LIST OF FIGURES IN TEXT

LIST OF FIGURES IN APPENDIX

LIST OF TABLES IN TEXT

LIST OF APPENDIX TABLES

Page

SUMMARY

Approximately 60,000 acres of the coastal wetlands of North Carolina are regularly flooded and do not produce mosquitoes. However, another 100,000 acres, dominated by the black needle rush (*Juncus roemerianus*), are irregularly flooded by tidal waters and are capable of producing important man-annoying species of mosquitoes. Since 1960, a ditching program designed to reduce mosquito production, has been carried out on these irregularly flooded marshes. The present study was conducted to determine the effectiveness of this control effort and to provide guidance for its improvement.

Five areas of irregularly flooded salt marsh in Carteret County, North Carolina were utilized for the study. Since before and after ditching evaluations were not possible, comparisons were made on adjoining tracts of ditched and unditched marshes.

The principal species of mosquitoes present were *Anopheles atropos*, *Anopheles bradleyi*, *Aedes sollicitans* and *Aedes taeniorhynchus*. Present in lesser numbers were *Culex salinarius* and *Psorophora confinnis*. Although all of these are coastal pest mosquitoes, the two *Aedes* species constitute the principal problem, since they are capable both of occurring in tremendous numbers and of dispersing many miles from their breeding sites. The *Anopheles* and *Culex* species are produced in lesser numbers and are only locally annoying. *Psorophora* have habits and capabilities similar to

Aedes but fortunately, since they are principally fresh water breeders, are not that abundant in our coastal areas.

Necessary to an understanding of the mosquito-breeding potential of marshlands, is the knowledge that Anopheles and Culex mosquitoes are permanent pool breeders and are more consistent and numerous in their presence when there is an extended availability of water. Conversely, Aedes and Psorophora are produced only in temporary or intermittent pools since their eggs are laid on wet soil and must undergo a dry period and a subsequent flooding before they will hatch.

Based upon the diverse marsh areas studied, the research reported on here disclosed that the Juncus marshes in Carteret County were subject to a high rate of tidal flooding for most of the mosquito breeding season, which presumably accounts for the relatively low level of Aedes breeding found to occur. This would also account for the finding that the permanent pool breeders, Anopheles-Culex, were as abundant or more so than the Aedes. The relatively high abundance of Anopheles-Culex mosquitoes collected was further demonstrated by the light-trap and biting-count data for the study areas.

Concerning the question of whether ditching controlled mosquito breeding in the Juncus marshes of Carteret County, even though ditched sections of the study areas generally had shorter wet periods than the unditched sections, these periods were usually not of sufficient brevity to prevent a significant number of larvae from completing development. An additional contributing factor was the frequent replenishment of water because of the high flooding frequency which occurred. Also contributing to mosquito survival was the finding that crabholes serve as water-holding refuges for the larvae, enabling them to complete development even if the breeding depression itself became dry.

If, as was the case in this study, field observations show that most sections of the marshes surveyed were flooded at a frequency sufficiently high to preclude the production of serious numbers of Aedes-Psorophora mosquitoes, an area-wide gridded pattern of ditching is not advised. Since our work showed that prolific breeding of Aedes-Psorophora species was confined to the less frequently flooded upper marginal areas of the marsh, any ditching done for their control should be concentrated in that section. The relatively unproductive outer Juncus marshes can in most cases be bypassed.

Where control of Anopheles-Culex mosquitoes is considered necessary (because of closely adjacent human concentrations), a 150-200 foot grid ditching pattern will not significantly reduce the populations of these species. The only potentially adequate method for their control known to us at present is the use of appropriately-managed impoundments.

In view of the finding that large areas of Juncus marsh can exist in a natural condition without producing significant numbers of Aedes, the importance of conducting intensive season-long surveys in salt marshes to accurately determine mosquito productivity cannot be over emphasized. Unfortunately, however, surveys may be neglected because of the apparent magnitude of the task. In cases such as these, a method enabling one to predict the relative abundance of Aedes-Psorophora and Anopheles-Culex breeding in salt marshes, using only a few key factors, would be most helpful.

Observations and measurements made during the study disclosed that significant correlation existed between the relative abundance of Aedes-Psorophora and Anopheles-Culex and the slope and frequency of flooding of the breeding depression. A statistical study of the data collected showed that the relative abundance of Aedes-Psorophora tended to be directly proportional to the mean slope of the site and inversely proportional to its frequency of flooding. Conversely, the relative abundance of Anopheles-Culex larvae, although not as highly affected by the mean slope as Aedes-Psorophora, was, up to a point, directly proportional to the frequency of flooding. Preliminary procedures and predictive tables for using this relationship in larval breeding surveys were developed.

RECOMMENDATIONS

1. To accomplish the most effective source reduction of salt marsh mosquitoes with the least disturbance to the marsh ecosystem, habitat modification procedures such as ditching should be attempted only after intensive season-long larval surveys have been made. The survey program should include some or all of the following procedures:

   a. Areas subject to flooding should be delineated and then visited at such intervals as required to locate all specific breeding sites occurring within each area.

   b. Once located, each site should be examined frequently during at least one entire season to determine its full mosquito breeding potential.

   c. The burden of this initial survey work can be considerably lightened by installing tide gauges at strategic points in the survey areas to determine the frequency of flooding. This information will help to eliminate from serious consideration those sections flooding too frequently to be a serious source of mosquito breeding. Additionally, data from tide gauge readings can be used as a basis for predicting the relative abundance of the mosquito species breeding on the marsh. With such information, it could develop that under certain conditions, control of one or more species present may not be necessary.

d. Marsh levels along random transects from the tide gauges to high ground should be determined. Combining marsh elevations with tide gauge data makes it possible to estimate the duration and extent of flooding for each breeding site.

e. Assessment of adult mosquito populations by light trap or other means must be carried out on a regular basis in and adjacent to areas under survey. Additionally, biting and/or landing counts should also regularly be taken to assess the nuisance value of the mosquito species present.

2. If survey and larval-pupal monitoring data show a definite need for mosquito control in a particular area and ditching is decided upon, then extensive testing should first be undertaken to determine the porosity and drainage potential of the soil.

3. If ditching is to be done, care should be taken to tailor the ditching design to local conditions in such a manner as to obtain maximum control of mosquito breeding with minimum disturbance to the marsh ecosystem.

INTRODUCTION

About one-half of the 200,000 acres of coastal wetlands in North Carolina consists of irregularly flooded salt marsh dominated by the plant species _Juncus roemerianus_ Scheele (black needle rush). _Juncus_ marshes occur primarily north and east of Beaufort in Carteret, Pamlico, Hyde and Dare counties, as well as along the outer banks (Adams 1967). Six species of mosquitoes breed in these areas of salt marsh.

In the mid-fifties a series of hurricanes hit the North Carolina coast and the accompanying high tides and rain caused the production of intolerable numbers of mosquitoes. This led to the establishment of the North Carolina Salt Marsh Mosquito Study Commission (White 1956). The purpose of this Commission was to assess the mosquito problems in eastern North Carolina and to suggest means for alleviating them. One result of the work done by the Commission was the initiation in 1960 by the North Carolina State Board of Health of a salt marsh ditching program for mosquito control. To date, areas in Carteret, Craven, Dare, Onslow and Pamlico counties have been ditched. As a result, at least 30% of all irregularly flooded salt marsh in the State has now been altered for mosquito control (Adams 1967).

In this work a dragline was used to excavate a pattern of parallel ditches approximately 100-400 feet apart, 3 feet in depth and 8-10 feet in width through tracts of _Juncus_ marsh. Beginning in tidal water, the ditches usually ended at the wooded high ground marginal to the marsh and were connected to perimeter ditches parallel to the high ground.

In recent years, growing concern for the welfare of coastal wetlands has caused a questioning of the effects of such ditching on marsh and estuarine ecosystems. To provide some information on this subject in North Carolina, a cooperative research program was conducted during the years 1970, 1971 and 1972 by personnel of the University of North Carolina at Chapel Hill and North Carolina State University at Raleigh. Consisting of two phases, the first was an evaluation of the effects of the mosquito control ditching on the marsh ecosystem itself and the second a determination of the effectiveness of the ditching in controlling mosquito populations. The results of the first phase have been published by Kuenzler and Marshall (1973). Phase 2 is reported on here.

Following the publication of a comprehensive report by Smith (1904) advocating filling and drainage as the most satisfactory methods of eliminating salt marsh mosquito breeding, extensive uses of these practices developed in several coastal states and continue to the present. For evaluative information on salt marsh ditching, see MacCreary and Stearns (1935), Richards (1938), Reiley (1951), Carmichael (1957), Smith (1962) and Helm, et al (1963). However, no previous reports have been published dealing with ditching for mosquito control in marshes similar to those which occur in North Carolina.

Specific objectives of this study included determining the temporal and spatial distribution of each mosquito species breeding on ditched and unditched sections of _Juncus_ marsh and the correlating to each breeding site of such factors as frequency of flooding, mean depression slope, plant cover, and distance from ditches and maximum high tide level.

EXPERIMENTAL PROCEDURE

This research project was conducted in five areas of irregularly flooded salt marsh located in Carteret County, N. C. (fig. 1, p. 33). These areas were specifically located at : North River, 5 miles north of Beaufort; Ward's Creedk, about 1 mile east of Bettie; Davis; King's Point, 1 mile north of Davis; and Newport River near Morehead City (fig. 2, p.34).

The North River and Newport River study areas were selected principally because each had a ditched section of marsh adjacent to an unditched section. In the case of the Davis study area, which was entirely ditched, King's Point was selected to represent the nearest appropriate tract of unditched marsh. The Ward's Creek area was an additional unditched area, selected because of its known high mosquito breeding potential. These areas were also selected because they represented differing types of salt marsh conditions. This was of importance if a worthwhile evaluation was to be made of the usefulness of ditching as a method of mosquito control.

The vegetation of all study areas except Ward's Creek was predominantly Juncus roemerianus, interspersed with large patches of Distichlis spicata (Linnaeus) and Spartina patens (Aiton). The Ward's Creek area was predominantly covered with D. spicata, with scattered stands of J. roemerianus and Scirpus robustus Pursh. The Newport River area was also distinctive in having a rather high percentage of short Spartina alterniflora Loisel.

In order to compare the mosquito populations occurring in ditched and unditched areas, an extensive larval-pupal monitoring routine was established. Collections were made at the North River and Ward's Creek areas from March 1st to August 17, 1971, and at Davis, King's Point and Newport River from March 1st to September 30, 1972.

The study areas were surveyed on foot for breeding. A representative number of the sites found were numbered and marked with a 3-foot stake. Additionally, the maximum area of each was determined. Each site's precise location was determined by measuring to it from the nearest ditch. These locations are represented by an encircled "X" in the study area drawings reproduced in figures 3, 4, 5, 6 and 7, pages 35-39. For monitoring purposes each site was visited 2 to 4 times a week. At each visit, the mean water depth was determined and a breeding index was calculated. These data served as a basis for comparing the frequency of standing water and numbers of mosquitoes produced in ditched and unditched sites.

The North River study area contained 41 of these marked breeding sites, all occurring in an area of about 50 acres. Of this number, 26 were located in the unditched section (numbers 16, 18-42, see fig. 3), and 15 in the ditched section (numbers 2-15 and 17, see fig.3). Another 50 sites occurring in a contiguous unditched area were visited at least once a week to obtain a general impression of the mosquito breeding occurring over a wider area. The ditched portion was crossed by a series of straight parallel ditches, excavated in 1968, which extended from the wooded high ground across the marsh to the river. These ditches were approximately 150 feet apart.

The Davis study area contained 26 marked sites occurring in an area of about 50 acres. Of this number, 23 were located in the ditched section (see fig. 4, p. 36). The remaining 3 sites (Sites A, B and C in fig. 4) were located in the pine woods and were considered un-ditched. These sites were routinely checked for larvae and pupae in order to compare their mosquito productivity with that of the outer marsh. The ditches in this area, which were excavated in 1965, were approximately 200 feet apart.

The King's Point area contained 21 unditched sites occurring in an area of 50 acres. Twenty of these sites were arranged along two transects beginning at the same point 500 feet from Route 70 and diverging across the marsh to Core Sound. One transect ended at a tide gauge, the other at a berm area (see fig. 5).

The one remaining site, number 21, was located in brushy high ground near the highway. The transect method was used in this case principally as a convenient sampling procedure to locate sites at various distances from maximum high tide.

The two remaining study areas were Ward's Creek, an unditched site of approximately 600 square feet adjacent to Core Sound (see fig. 6), and the Newport River Study area located near Morehead City. The latter study area contained 13 sites, all occurring in a ditched section of marsh about 10 acres, and 1 large unditched site (site 10) of about 1 acre (see fig. 7).

Larval-pupal numbers were determined at the study sites by means of the sampling procedure reported by Belkin (1954). Representative samples of the larvae and pupae collected at each site during this sampling procedure were brought into the laboratory. Most of the specimens were killed in boiling water and preserved in 80% alcohol for subsequent identification. The remainder were held alive in the laboratory at room temperature and allowed to complete development. If the collection sites did not dry up before the most immature of the larvae completed development, it was assumed that emergence could have occurred in the field. This information is the basis for the survival percentages given later in this report. As a further measure of mosquito population, standard New Jersey light traps were operated and biting catches (for explanation see below) were made adjacent to the study areas. This latter procedure helped assess the pest potential of the species coming from the marsh.

Two light traps were in operation in 1970 and 1971, one at Williston 19 miles east of Beaufort, and one at North River. Three traps were in operation during the 1972 season, one each at Atlantic Beach, Newport River and Davis. Each light trap operated from 7 p.m. to 7 a.m. and the collections were picked up at least 3 times a week.

Biting catches were taken twice a week at North River from June 1 to August 17, 1971, and at Davis and Newport River from June 1 to September 30, 1972. The adults were collected off the arms and legs of the author by means of an aspirator tube. Twenty-minute catches were made every half hour from sunset to at least 10 p.m..

The temperature and rainfall data needed for this research was obtained from <u>Climatological Data</u>, published by the U. S. Department of Commerce. Stations at Morehead City and Cedar Island were used as representative of the study areas.

In the belief that the interaction of mean slope and the mean frequency, duration and extent of flooding of breeding depressions has an influence on species composition and abundance, appropriate measurements were made at each site.

The mean frequency of flooding on the marsh was determined by a series of Leupold-Stevens Type-F tide gauge recorders which were set up, one each, at North River, Davis, King's Point and Newport River. To facilitate the collection of data on flooding frequency at the sites, site levels within study areas were determined by use of a surveyor's transit.

Estimation of mean slope was made by determining the deepest point at each site and the average distance from this point to the edge of the depression or to vegetation surrounding the water in depressions with little slope.

In order to determine the significance and usefulness of the mean frequency, duration and extent of flooding and the mean slope values for predicting the relative percentages of Aedes-Psorophora and Anopheles-Culex breeding on a salt marsh, all data collected during the study were analyzed by multiple regression, using a standard statistical program (Barr and Goodnight 1971) on the Research Triangle IBM 360/165 computer. The arcsin transformation was used on the dependent variable (Aedes-Psorophora) to stabilize the variance. Tables 10 and 11 contain all parameters (independent variables) used in the analysis and in the final regression model. These variables were selected because it is believed that their relationships, according to field observations and information already available, are non-linear, that is their interactions produce optimum conditions for both Aedes-Psorophora and Anopheles-Culex breeding. Above and below this optimum the percent relative abundance for the species decrease.

In order to determine and compare ground water levels and rate of subsurface drainage on ditched and unditched portions of the study areas, 14 series of holes, 36 inches deep by 6 inches wide, were dug at the North River, Davis, and Newport River Study areas. Water levels in these holes were checked during each area visit by means of a graduated dipstick and expressed in inches from the surface. The first hole of each series was excavated approximately 3 feet from a ditch, with subsequent holes being located at 20 foot intervals along a line perpendicular to the ditch. In some cases, these lines were between two ditches and in others they extended from a ditch into an adjacent unditched control area.

A survey of vegetation was made at each breeding site in an attempt to correlate the plant cover with the numbers and kinds of mosquitoes present. At each site the number of square feet occupied by each plant species in a 100 square foot plot was estimated. In the case of mixed stands, 10 samples were selected at random from each stand and the ratio of the mean number of stems of each plant species to the total number in the 10 samples, was determined.

The following is an explanation of the various types of values given in the text, tables and graphs.

Mean frequency of flooding/month at tide gauge.

This was determined by dividing the total number of floodings for an area by the number of months the tide gauge was in operation.

Mean frequency of flooding/month at each site.

Since the floodings at the tide gauge did not necessarily mean that sites located at various distances from the gauge were also flooded, a separate determination of the frequency of flooding/month was obtained for each site. A surveyor's transit was used to determine the site's height in relation to the tide gauge. The number of times the tide reached higher than the height of the site was divided by the number of months the tide gauge was in operation.

Frequency of standing water/site (FOSW).

Determined by dividing the number of days when water was present at each site by the number of days during the research interval.

Mean frequency of standing water/area.

Determined by totalling up all frequency of standing water values for the sites of an area and dividing by the number of sites in the area.

Suitability Index (S.I.).

Determined by dividing the frequency of flooding of a site by its mean slope. It is a measure of the amount of soil exposure made available during the mosquito breeding season for the deposition of *Aedes* and *Psorophora* eggs. An inverse relationship exists here. Higher suitability indices represent smaller amounts of soil exposure.

Breeding index.

This value was determined by the method and formula developed by Belkin (1954), where Breeding Index (B.I.) = $\frac{SA \times PD \times TLP}{ND \times ND \times 10}$

SA = Surface area of body of water serving as effective breeding site in square feet.

PD = Positive dips obtained (those dips in which mosquito larvae and pupae are found).

TLP = Total number of larvae and pupae obtained.

ND = Total number of dips taken, disregarding all negative dips prior to the first positive dip.

Mean number of specimens taken/site.

Determined by dividing the total number of mosquito larvae and pupae from each separate ditched and unditched area by the number of sites in each area.

Percent specimens taken/area.

Determined by dividing the number of specimens taken from each separate ditched and unditched area by the total taken from the combined ditched and unditched areas.

Percent relative abundance of species/site.

Determined by dividing the number of specimens of each species identified from a site by the total number of specimens identified from that site.

Mean percent relative abundance of species/site for ditched and unditched sections.

Determined by totalling up the percent relative abundance values for all sites of ditched and unditched areas separately and dividing by the number of sites in each section.

Percent relative abundance of species for ditched and unditched sections.

Determined by dividing the number of specimens of a particular species taken from the ditched and unditched sections separately by the total number of specimens of that species taken from the entire study area.

Percent survival.

Determined by dividing the number of larvae estimated to have survived (see procedure p. 7) in each site by the total number collected at each site.

Mean number of mosquitoes taken per light trap night.

Determined by dividing the total number of specimens taken/week by the number of nights the light trap was in operation that week.

Mean number of mosquitoes taken biting per 30-minute interval.

Determined by dividing the total number of specimens taken each night in biting counts by the number of 30-minute intervals in each collecting period.

RESULTS

Data on the frequency, duration and extent of flooding for the study areas (summarized in table 1, p. 78 , detailed in appendix tables 1-4, pages 90-94) demonstrate the variability which occurred between the areas. North River and Ward's Creek were similar in averaging 15 floodings per month at the tide gauge, whereas the other study areas averaged from 24-30 floodings. This probably indicates that the former two areas are at higher elevations than the latter three.

These data also show that, as compared with the unditched areas, the ditched areas all had a reduced frequency of standing water, an equal or slightly higher number of wet intervals of shorter duration and a higher number of dry intervals of longer duration.

The vegetation of marsh breeding sites consisted primarily of varying proportions of *Juncus roemerianus*, *Distichlis spicata* and *Spartina patens* (table 2, p. 79 , appendix tables 5-8, pages 95-99, and appendix figures 6, 4 and 12). Rather wide variation in the relative abundance of these plant species was found to occur between ditched and unditched areas. Unfortunately, the significance of this variation is unclear because plant surveys are not available for the areas prior to ditching. However, it does seem safe to conclude that there has been a significant invasion of *Baccharis halimifolia* into the ditched sections of the study areas.

Mosquito populations found occurring in marsh breeding sites consisted principally of Aedes sollicitans, A. taeniorhynchus, Anopheles atropos and An. bradleyi. Additionally, small numbers of Culex salinarius were taken from time to time. Aedes atlanticus and Psorophora confinnis were found breeding in wooded sites around the marsh. The relative abundance of the larvae and pupae of these species for each study area is summarized in table 3, p. 80, detailed in appendix tables 9-12, pages 100-106. Rather wide variations between populations within a species was found to occur between sites of ditched and unditched sections. As with plant cover, the significance of this variation cannot be determined because surveys for larvae were not made prior to ditching.

Despite this variation, when relative species abundance is compared between ditched and unditched sections rather than just between sites, it becomes apparent that a higher percentage of combinations of Aedes sollicitans and A. taeniorhynchus occurred on ditched rather than unditched areas. These two species, as well as Psorophora confinnis, deposit their eggs on drying soil and are considered temporary pool breeders.

Another generalization that can be developed from the data collected is that the larvae of the temporary pool breeders were more often collected from marsh sites situated in or near high ground than in the marsh proper (for example, see figs. 8, 9, 10 and 11, pages 40-43). In contrast, the permanent pool breeders were more evenly distributed over the marsh.

Aedes and *Psorophora* species were more commonly collected during the months of June, July and August. However, a few major peaks of abundance occurred at the North River and Ward's Creek study areas during the months of March and April (see fig. 13-16, pages 45-48). Although not occurring to any marked degree during the study period itself, peaks of abundance for these species can also occur in September and even into early October.

Within the above time scale, larvae and pupae of these species were most abundant during the few instances when dry periods were followed by heavy rains and/or excessive tidal floodings (see fig. 13-16). During 1971, these periods occurred during the weeks of April 8, June 3 and July 29. In 1972, they occurred in the weeks of April 29 and July 15. Because of this marked response of *Aedes* and *Psorophora* to alternate dry-wet intervals, their seasonal distribution pattern was characterized by a number of sharp transient peaks of larval activity (see figs. 13-15).

In contrast to the above, *Anopheles* and *Culex* larvae were more consistently present, producing in some instances a long term build-up in numbers (figs. 13 and 14). This is due to the continuous development which occurs in these species and to the high frequency of tidal flooding in the areas under study. The seasonal distribution pattern alluded to above for *Aedes* and *Psorophora* differs from that of *Anopheles* and *Culex* species because the eggs of the former must undergo alternate periods of drying and flooding before they will hatch.

Using larval abundance data from unditched marsh as a check, the ditched marsh at North River and Davis supported lower populations of *Anopheles* and *Culex* (figs. 13 and 14; appendix tables 9-17, pages 100-116), but ditching did not markedly affect the population numbers of *Aedes* and *Psorophora*. However, at Newport River, as seen in figure 16, the population levels for all species were higher in the ditched section than in the unditched section because of the presence of two comparatively productive mosquito breeding sites, sites 3 and 8 (see fig. 12, p. 44). Together they yielded 583 mosquito larvae. This represented 83% of all larvae taken from the ditched section. Considered separately, site 8 yielded only *Aedes* and *Psorophora* larvae, all species of which, except for *Aedes taeniorhynchus*, had high survival values, ranging from 73% for *Aedes sollicitans* to 100% for *Psorophora confinnis*. In contrast, about 70% of all larvae taken from site 3 were *Anopheles*. Survival values for this site ranged from 66% for *A. taeniorhynchus* to 100% for *Culex salinarius*. Although the average distance of these sites from the nearest ditch was only 60 feet, both had high water availability values, ranging from 61% at site 8 to 95% at site 3. Additionally, both possessed deep pockets of water with thick clumps of *Spartina alterniflora*, *Sp. patens*, and *Distichlis spicata*.

Although the ditched marsh at North River and Davis supported fewer *Anopheles* and *Culex* than did the unditched marsh, differences in survival values between these areas were not significant (tables 3 and 6, p. 80,83 and appendix tables 18-21, pages 118-122). Based upon the survival data collected, at least half of the larvae could have completed development in either ditched or unditched marsh (Table 3). With the exception of A. sollicitans at North River, this was also true for the Aedes and Psorophora species (see table 3).

According to the ground water level data found in tables 8 and 9 (pages 85 and 86), the ditches at Davis and Newport River sufficiently drained most sections of salt marsh within two days. Fewer sections of North River ditched marsh were drained as fast. In this area, water usually remained on the marsh for as long as three days after the subsidence of tidal floodings (see table 7, p. 84 and fig. 35, p. 67). All control sections drained somewhat more slowly. Water in most inner ground water holes (holes 3-5 at North River and holes 6-10 at Newport River) remained at marsh level for most of the breeding season, draining only during the relatively few long periods of dryness.

Despite the adequate rate of drainage in most sections of the ditched areas, long intervals of marsh flooding by tides, occasionally combined with heavy rains, replenished breeding sites. Despite this replenishment of water, however, the sites in these areas still produced low numbers of both temporary and permanent pool breeders when compared with the Ward's Creek area, where 13,886 Aedes were collected (see table 3).

Additional information on the mosquito populations at the study areas, obtained from light trap and biting count data, is found in figures 17-34 (pages 49-66) and appendix tables 22-41 (pp. 123-146).

According to these data, Anopheles atropos and An. bradleyi combined were the most commonly collected species in light traps at North River, Williston, and Atlantic Beach and were the most commonly collected species during the biting counts at North River. The interval of highest abundance was from June through October. During this time, the number of adults taken in light traps ranged from 45 adults in August at Atlantic Beach to over 20,000 collected at North River in July. These species were most often taken biting during the months of June and July at North River when over 600 and 400 were taken respectively (see fig. 17-26 and appendix tables 22-31, 40 and 41). At Davis, the Anopheles species were among those most commonly collected from the light trap, ranging in abundance from 637 taken in June to 969 taken in September. Numbers collected during biting counts were highest in June and August when 65 and 100 adults were taken respectively (see fig. 27, 30 and 31 and appendix tables 32-35). Comparatively low numbers of these species were collected at Newport River. Light trap data for this area are not available for July and August. The highest number of adults taken biting there were in the months of June and August when only 80 and 48 were collected, respectively (see fig. 32-34 and appendix tables 36-39).

The highest numbers of Culex salinarius were taken in light traps during the months of June, July and August at North River, Davis, and Williston, ranging from 160 at North River in August to 594 at Williston in July (appendix tables 22-31). This species was most commonly collected from biting counts during June and July at Newport River (1972) and North River (1971). During the former month, 80 specimens were collected at Newport River and during the latter month approximately 170 were collected at North River (see fig. 17 and 22 and 32-34, and appendix tables 32-35).

The Aedes and Psorophora species were the most commonly taken mosquitoes at Davis, and were among those most commonly taken at North River. At Davis, they ranged in abundance from 1123 taken in the light trap in June to over 2,000 collected in August (see fig. 27 and 30, and appendix tables 22-27 and 32-35). At North River their combined peak of abundance was approximately 1300 for both July and August (see fig. 17 and 21 and appendix table 22-27). Large numbers of these species were also taken in the North River light trap in September, but only the Aedes species were in any abundance in October and few of either genus were taken in November (see fig. 17 and appendix tables 22 and 23). Very few P. confinnis were taken biting, while Aedes were, in most cases, among the most commonly collected species. Comparatively high numbers of Aedes adults were taken biting from June through September, particularly at Davis, where they ranged from approximately 100 in June to over 500 in August (see fig. 27 and 31 and table 34 and 35).

Tables 10 and 11 give the results of the statistical analysis. The additive effect of the mean slope index, the frequency of flooding and the ratio frequency of flooding/mean slope (represented as

Suitability index (S.I.) in table 10, see also p. 10, Suitability Index) was highly significant in the ditched sections influencing considerably the relative abundance of Aedes-Psorophora and Anopheles-Culex species. In the unditched sections, however, the frequency of standing water and the number of days per wet period were found to be more significant than the mean slope and frequency of flooding when combined with the Suitability Index (see table 11).

Figures 36-45 (pages 68-77) and appendix tables 42 and 43 (pages 147,149) illustrate the influence of these factors on the relative abundance of the above species in unditched and ditched sections. The corresponding S.I. values for each point on the graphs are found in appendix tables 42 and 43. These graphs describe the general trends in the changes of the relative abundance of the above species within certain limits. Naturally, for instance, when the frequency of flooding per month becomes too high, the resulting disturbance precludes the existence of mosquito larvae. Therefore, only flooding rates which produced conditions in which mosquito larvae were found, were considered.

Figures 42-45 and table 43 show the influence of the change in number of days per wet period at selected S.I. and frequency of standing water values on the relative abundance of the above species. The frequency of standing water values in the graphs were chosen because they best represented actual conditions in the unditched study sections.

At each of the standing water values, the relative abundance of Anopheles and Culex species increased as the number of days per wet period increased. The greatest change in the relative abundance of these species, for each increase in the number of days wet, occurred at the S.I. of 1.0. Smaller changes occurred at a S.I. of 3.0 and no change occurred at a S.I. of 5.0. At the latter index, the abundance of Anopheles and Culex was 100% for the entire range of days per wet period values.

Figures 43 and 45 show the corresponding decreases in the relative abundance of the Aedes and Psorophora species under the same conditions.

Figures 36-39 show the change in the relative abundance of Aedes-Psorophora and Anopheles-Culex species in ditched sections with increase in frequency of flooding at selected mean slope values. The maximum relative abundance predicted for Aedes and Psorophora occurred at sites with 1-5 floodings per month and with mean slope values ranging between .25 and .35. As the frequency of flooding increased for any given mean slope, the proportion of Aedes found in larval samples decreased. The rate of decrease was highest when the mean slope was .05, and more gradual when they ranged from .55 to 1.25.

Conversely, the maximum relative abundance predicted for the Anopheles and Culex species occurred in sites flooded 25 to 35 times per month and with mean slope values of .05. The relative abundance for these species increased when the frequency of flooding at any given mean slope increased. This rate of increase in relative abundance was highest in sites with mean slope values of .05. At high frequencies of flooding (i.e. 30/month or over), the relative abundance decreased in sites with mean slope values ranging from .15 to .45, but increased in sites with mean slopes of .55 and over.

Figures 40 and 41 show the change in the relative abundance of the above species with increase in mean slope at selected values of frequency of flooding. The maximum relative abundance predicted for Aedes and Psorophora at any given frequency of flooding occurred in sites with mean slope values ranging between .25 and .35. The highest maximum predicted for these species was at a frequency of flooding of 5/month, and the lowest was at a frequency of flooding of 35/month. In sites where the frequency of flooding ranged from 10-35 floodings per month, the relative abundance for Aedes and Psorophora species increased rapidly as the mean slope increased from .05 to .15 and decreased gradually as the mean slopes increased beyond .45. Change in mean slope had little or no effect on the relative abundance of these species in sites flooded 5 or less times a month. In contrast, the maximum relative abundance predicted for the Anopheles and Culex species at any frequency of flooding value between 10 and 35 times per month occurred in sites with mean slope values of .05 or less or 1.15 or more. Within this range of flooding, the abundance of Anopheles and Culex species dropped rapidly as the mean slope values increased from .15 to .45 and gradually increased as the mean slope values increased from .45 on. In sites where the frequency of flooding was 5 or less, the relative abundance for these species always remained very low.

DISCUSSION AND CONCLUSIONS

According to the results of this research, areas of marsh under study were subjected to a high rate of flooding for most of the mosquito breeding season. Though the frequency of flooding ranged widely between study areas, none on the average were flooded less than 14 times per month. This strongly affected the drainage performance of the ditches and the nature of the mosquito populations found in these marshes.

Although ditched sections of the study areas generally had shorter wet periods than the unditched sections, these periods were, in many cases, not short enough to prevent a significant number of larvae from completing development. In other cases, completed larval development occurred because of the relatively high flooding frequency of these areas and the consequent replenishment of water.

In some places, due to their comparatively lower elevations, and at certain times during storm and spring tides, tidal flooding was so disturbing that it prevented prolific larval breeding.

As seen in table 3, all of the study areas except Ward's Creek yielded comparatively small numbers of mosquito larvae, with *Anopheles* and *Culex* often being more abundant than *Aedes* and *Psorophora*. This abundance is not so unexpected, since the former genera are permanent pool breeders and are more consistent and numerous in their presence when there is an extended availability of water. Conversely, the often lower numbers of *Aedes* and *Psorophora* taken were probably due to the relatively few long periods of soil exposure needed by these species for oviposition and proper egg development.

The site at Ward's Creek, despite its high availability of water, yielded a large number of Aedes larvae. This was probably due to a high percentage of soil exposure being available because of the comparatively high mean slope value of this site. The periods of soil exposure were long enough for the accumulation and proper development of large numbers of Aedes eggs. Sites with lower mean slope values, had, in many cases, shorter periods of soil exposure, since in these more level areas, the loss of water was slower, keeping the soil in the site covered for a longer period of time.

The relatively high abundance of Anopheles-Culex species collected is further demonstrated by light trap and biting count data. These data demonstrate that, in some situations, these species can be important as pests as the Aedes-Psorophora species. Furthermore, their period of annoyance can be longer, since they overwinter as adults (in contrast to Aedes-Psorophora, which overwinter as eggs) and may become active in any period of unusually warm weather during the winter months.

Despite the fact that the coastal Anopheles-Culex species can create as great a nuisance as Aedes-Psorophora species, most control efforts are directed towards the latter genera. This is principally due to the greater numbers that can be produced of these species and because of their ability to fly great distances from where they emerged.

If light traps and biting counts show populations of mosquitoes large enough to seriously annoy residents of adjacent settled areas, it is essential that intensive surveys be made in and around these areas to locate the most productive breeding sources before drastic control measures are begun. This work has shown that such surveys must be extended through at least one full breeding season.

An area wide gridded pattern of ditching is not advised if, as was the case in this study, field observations show that most sections of the marshes surveyed were flooded at a frequency sufficiently high to preclude the production of serious numbers of Aedes-Psorophora species. Since this work shows that prolific breeding of Aedes-Psorophora species occurs more frequently in the upper marginal areas of the marsh, any ditching done for their control should be concentrated in that section. The outer, relatively low mosquito-producing Juncus marshes can in most cases be bypassed.

Where control of Anopheles-Culex is considered necessary, field data indicate that, at least for the areas studied, a 150-200 foot grid ditching pattern will not significantly reduce the populations of these species. The only adequate method for their control known at present is the use of appropriately-managed impoundments.

The existence of sites 4 at North River, site 16 at Davis and sites 3 and 8 at Newport River, points out the fact that despite the proximity of a ditch, physical and biological characteristics such as height above sea level, depth of depression, underlying soil texture and plant cover can often help to create conditions that can maintain a substantial number of mosquito larvae. Close checks for these exceptional sites during breeding-source surveys should be made.

Another factor to be considered and watched for, and one that may influence the survival of mosquito larvae, is the incidence of crab-hole breeding on the marsh. This was particularly noted at the North River study area. According to appendix table 44, 10 sites located in both ditched and unditched sections contained crabholes from which larvae and pupae were collected after all water in the sites drained off or evaporated. The presence of many pupal skins in the siphoned water from the crabholes showed that adults had emerged from these locations. Crabholes seem to serve as water-holding refuges for the mosquito larvae, enabling them to survive a few extra days during long periods of dryness, and thereby increasing their chances to complete development.

The importance of conducting intensive surveys in salt marshes to determine accurately their mosquito productivity cannot be overstated. Unfortunately, however, in some situations surveys may be neglected because of the extent of the area to be covered. In cases such as these, a method enabling one to predict the relative abundance of *Aedes*-*Psorophora* and *Anopheles*-*Culex* species in salt marshes using only a few key factors would be helpful. The results of the statistical analysis of the independent variables and their influence on the relative abundance of *Aedes*-*Psorophora* and *Anopheles*-*Culex* species show that such a method could be developed.

According to the results of the analysis, the high frequency of standing water values (70% and over) in unditched sections seemed to mask the direct influence of the mean slope and frequency of flooding on the relative abundance of the above species. Apparently, the degree of mean slope and change in flooding rate mattered little in situations more suitable for Anopheles and Culex species, where the frequency of standing water was generally high and where available soil exposure was normally low. Instead, the relative abundance of Anopheles and Culex was significantly affected by a change in the number of days per wet period.

According to graphs 42-45 for each frequency of standing water given, there is a fixed number of wet days that could be grouped into a number of periods of varying lengths. It was found that fewer wet intervals of longer duration made conditions more suitable for the Anopheles and Culex species, than many short wet intervals interspersed between many short dry intervals. For example, the frequency of standing water for a section of marsh was 70% for the entire breeding season (240 days). This resulted in 240 x .70 = 168 wet days and 240 - 168 = 72 dry days. Two possible combinations during the breeding season could occur: one consisting of 20 wet intervals each averaging 8.4 days in length, the other consisting of 3 wet intervals, each averaging 55 days. The latter would be much more conducive for the longer developing Anopheles and Culex species.

Another variable exerting significant influence on the relative abundance of Anopheles and Culex species was the Suitability Index (S.I.) which represented the ratio of frequency of flooding/mean slope (see page 16). As this index increased for each of the given frequency of standing water and number of days wet values, the relative abundance for _Anopheles_ and _Culex_ species increased. This was because an increase in the S.I. represented an increase in either the frequency of flooding or a decrease in the mean slope which in both cases produced conditions more suitable for _Anopheles_ and _Culex_ species (see graphs 42 and 44).

Conversely, since there were already enough dry periods of sufficient length in the ditched sections, (a condition more suitable for _Aedes_ and _Psorophora_) due to the reduced standing water values, a change in the number of days per dry period which would vary as the number of days/wet period varied, did not seem to play as important a role in changing the relative abundance of the above species as did the mean slope and a change in the frequency of flooding caused by lunar and/or storm tides. As seen in graph 41, as the mean slope increased up to a certain value, such as .35 for a given flooding rate, the loss of water became more rapid and increased the amount of soil exposed, making conditions more suitable for _Aedes_ and _Psorophora_ and increasing their relative abundance. Beyond this optimum mean slope value, their relative abundance gradually decreased, due to the fact that sites with mean slope values of .55 or over often contain pockets deep enough to hold larger amounts of water which would take longer to drain. This would create longer wet periods which would produce conditions more suitable for _Anopheles_ and _Culex_, increasing their relative abundance and decreasing the relative abundance of _Aedes_ and _Psorophora_. A similar change in relative abundance will occur, if at any given mean slope, the frequency of flooding increases, resulting in less soil exposure.

The results and the above discussion of the statistical analysis have revealed certain relationships between the physical characteristics and the degree of flooding and their combined influence on the mosquito populations in a salt marsh. By determining the mean slope and the frequency of flooding for a ditched marsh and by obtaining information on the frequency of flooding to estimate the frequency of standing water and the number of days per wet period for unditched marsh, a rough prediction, using the information found in appendix tables 1-4, 9-12 and 42 and 43, could be made about the potential relative abundance of salt marsh mosquitoes in both types of conditions. For all independent variables falling between the values listed in these tables, the following regression formulae, based on the standard multiple regression formula (Snedecor and Cochran, 1968), could be used to obtain potential relative abundance values:

For ditched marsh:

$$\hat{y}_{\underline{Aedes}} = \sin(b_o + b_1 ms + b_2 ffl + b_3 S.I. + b_4 (S.I.)^2)100$$

where: $\hat{y}_{\underline{Aedes}}$ = the % relative species abundance

$$\hat{y}_{\underline{Anopheles}} = 1 - y_{\underline{Aedes}}$$

ms = mean slope

ffl = 1/frequency of flooding

S.I.= ff/ms

b_o = 0.78284

b_1 =-0.00494

b_2 = 5.20616

b_3 =-0.33915

b_4 = 0.02399

For unditched marsh:

$$\hat{y}_{\underline{Aedes}} = \sin(b_o + b_1 foswl + b_2 nwet + b_3 S.I. + b_4 (S.I.)^2)100$$

$$\hat{y}_{\underline{Anopheles}} = 1 - y_{\underline{Aedes}}$$

where: foswl = 1/frequency of standing water

nwet = number of days per wet period

S.I. = ff/ms b_o = 0.61028

b_1 = 30.43958 b_2 = -0.03892

b_3 = -0.23687 b_4 = 0.01253

The values obtained from the above formulae represent that proportion of the total number of larvae taken in a sample that would be a particular species. For example, a value of 50% for Aedes means that 50% of the total number of larvae taken in a sample would be Aedes. The above formulae do not give the potential number of mosquito larvae that would emerge from a site during the breeding season. Furthermore, the independent variables used in the regression formulae account for about 70% of the variation in the data. Further study should continue on the relationships of the physical characteristics of the marsh to the relative abundance of salt marsh mosquitoes. This information would be most helpful in improving the formulae and the accuracy of the predictions.

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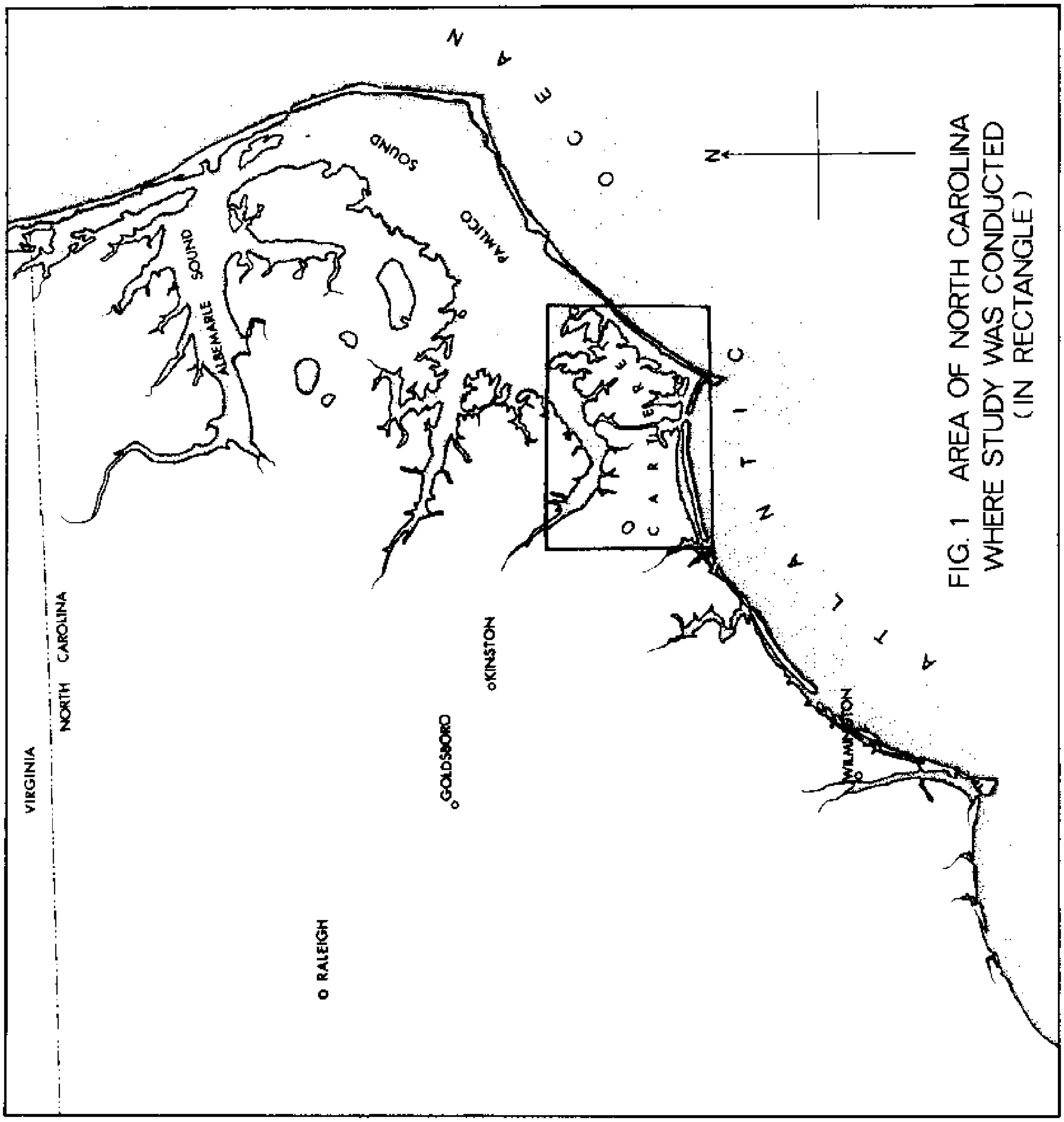


FIG. 1 AREA OF NORTH CAROLINA WHERE STUDY WAS CONDUCTED (IN RECTANGLE)

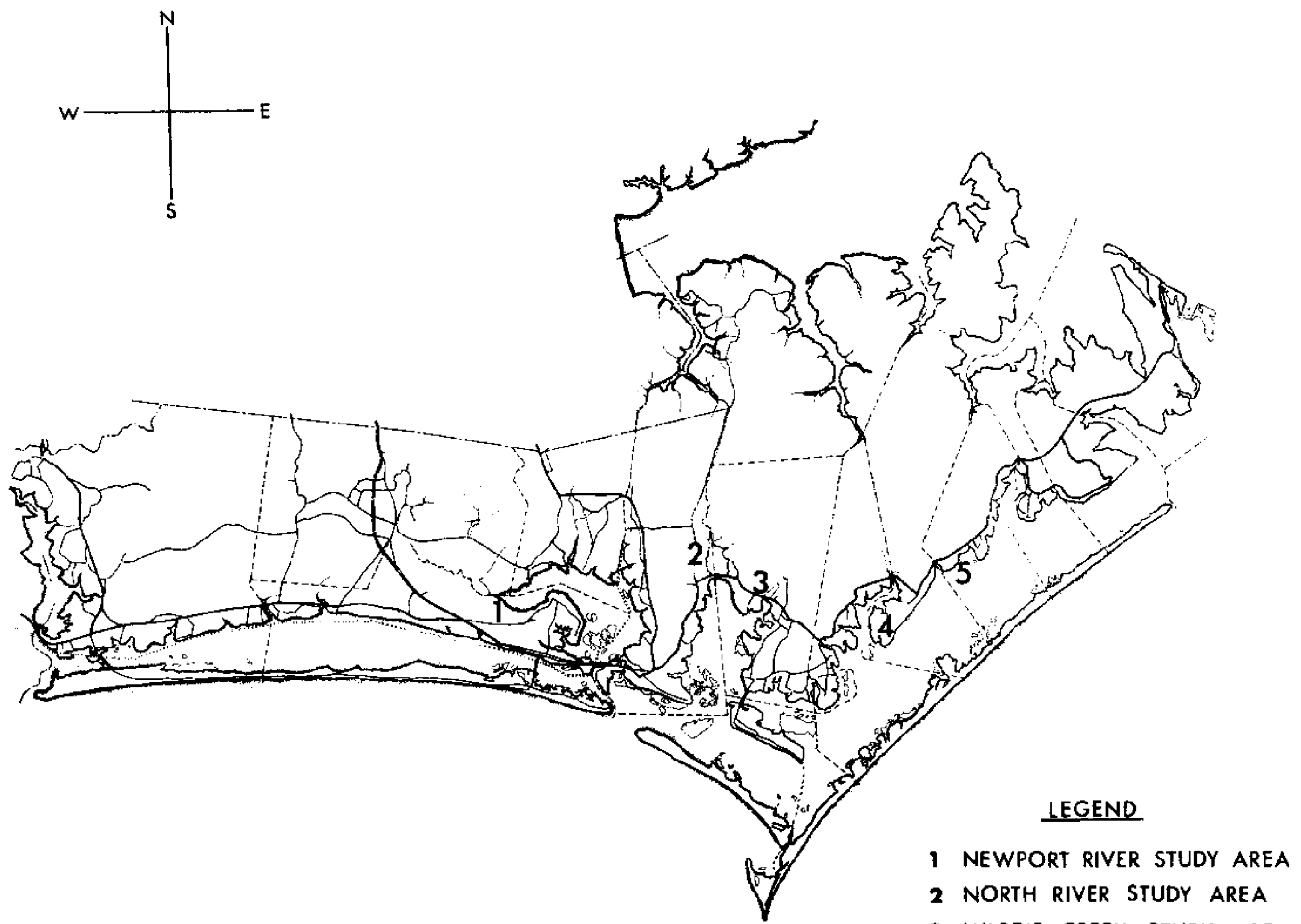
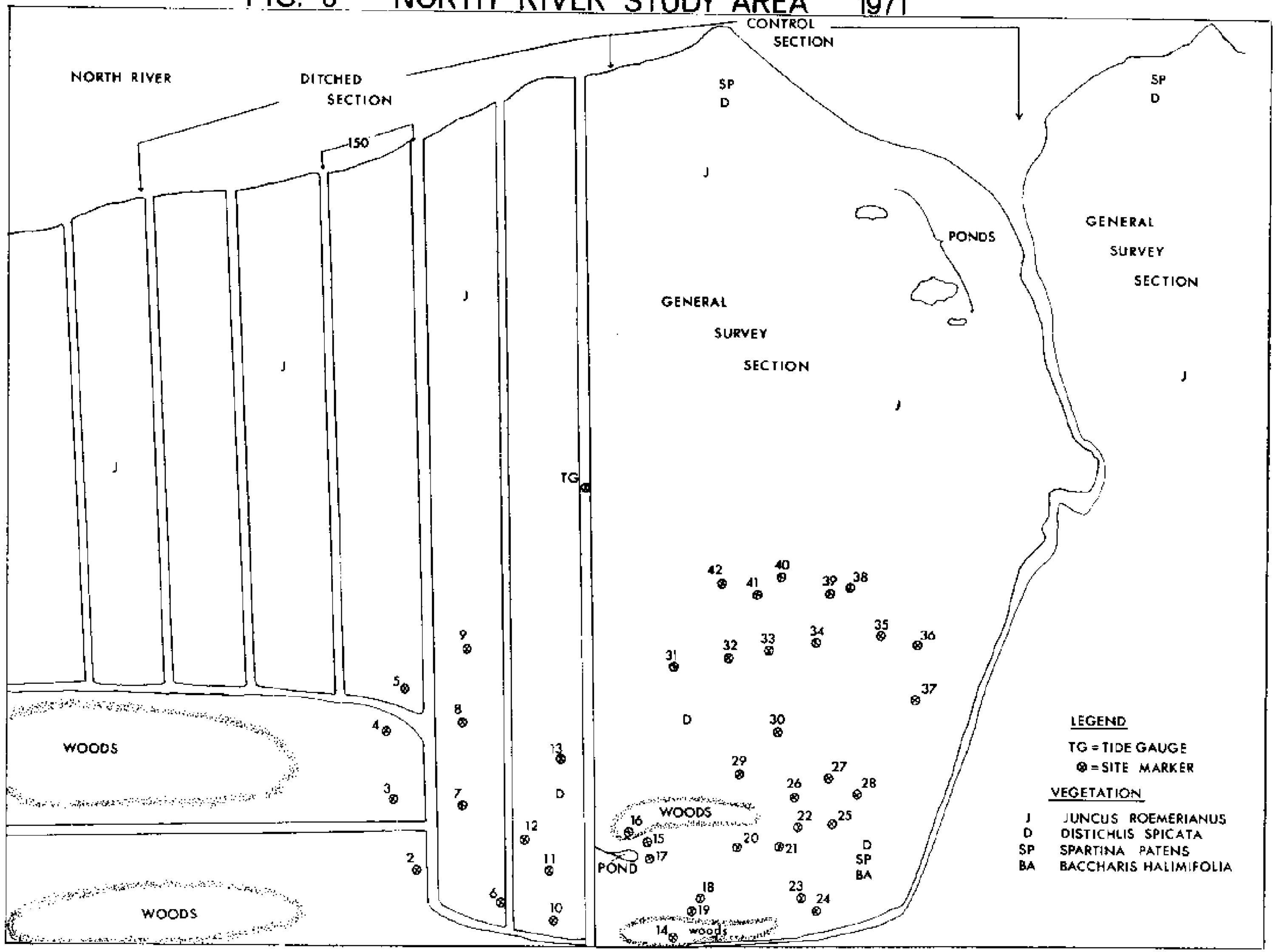


FIG. 2 CARTERET COUNTY, N. C.

FIG. 3 NORTH RIVER STUDY AREA 1971



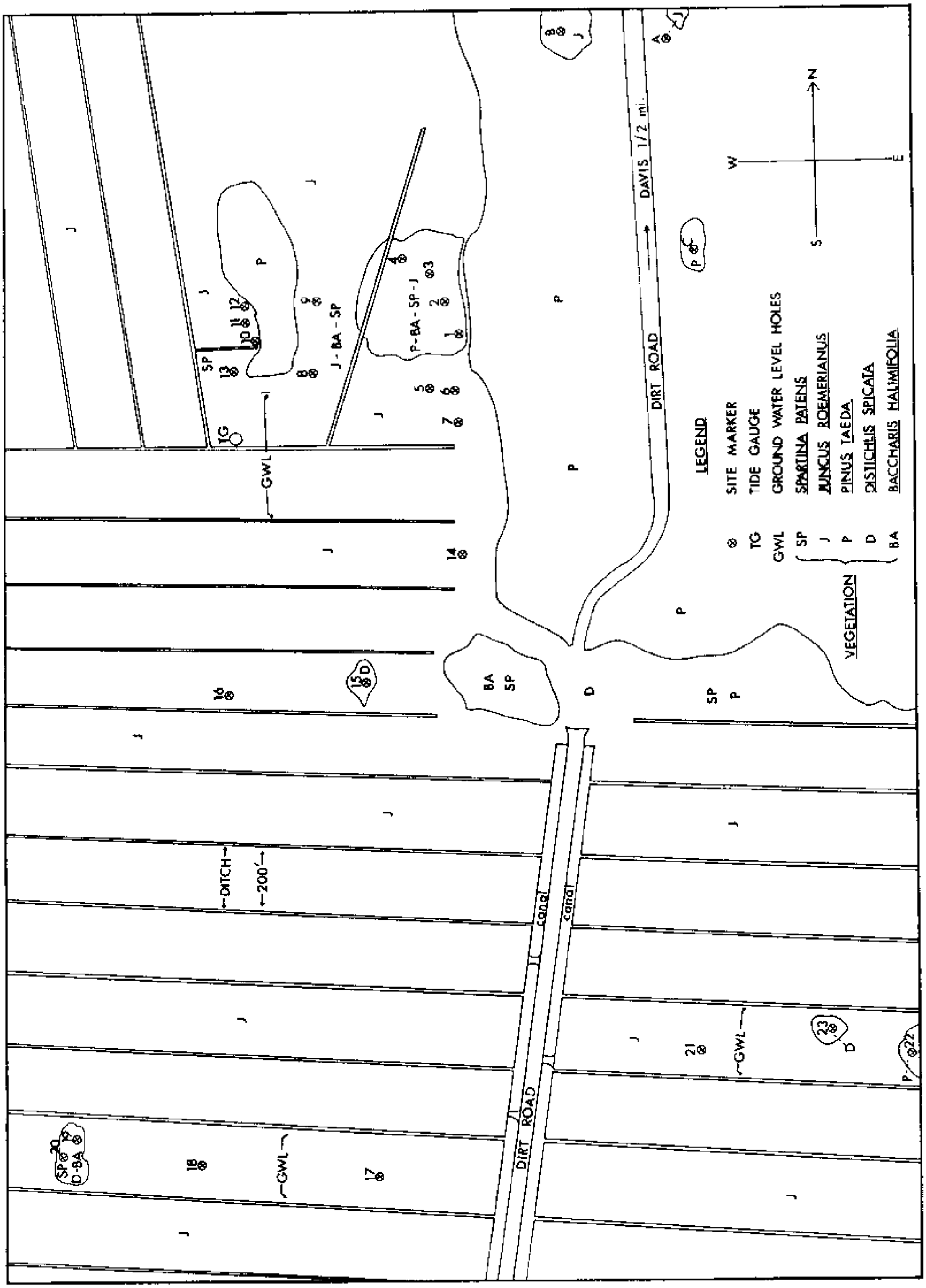
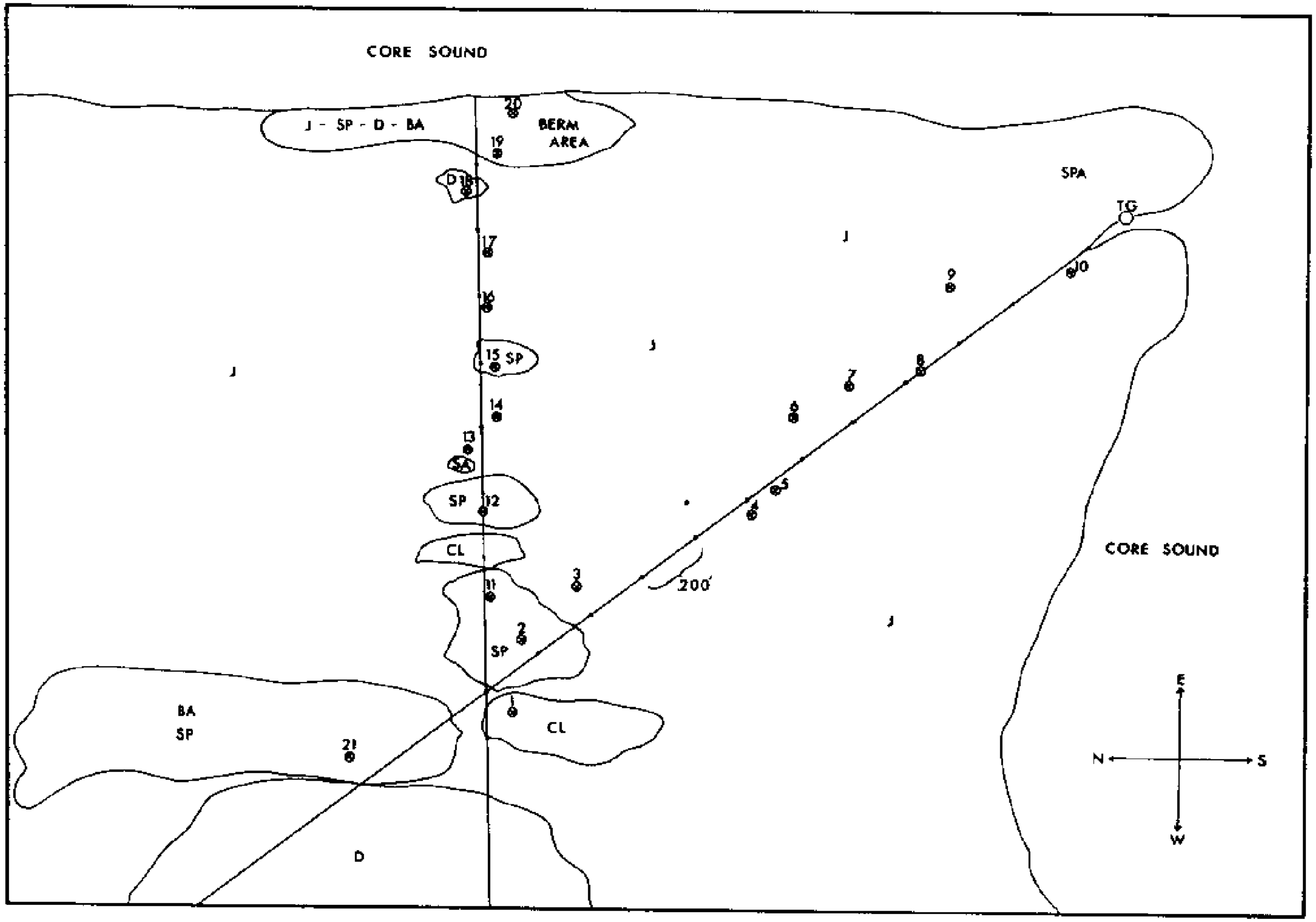


FIG. 4 DAVIS STUDY AREA, 1972



LEGEND

⊗	SITE MARKER	TG	TIDE GAUGE
•—•	STAKES ALONG TRANSECT		
VEGETATION J	JUNCUS ROEMERIANUS	D	DISTICHLIS SPICATA
SP	SPARTINA PATENS	SA	SALICORNIA VIRGINICA
CL	CLADIUM JAMAICENSE	SPA	SPARTINA ALTERNIFLORA
BA	BACCHARIS HALIMIFOLIA		

FIG. 5 KING'S POINT STUDY AREA
1972

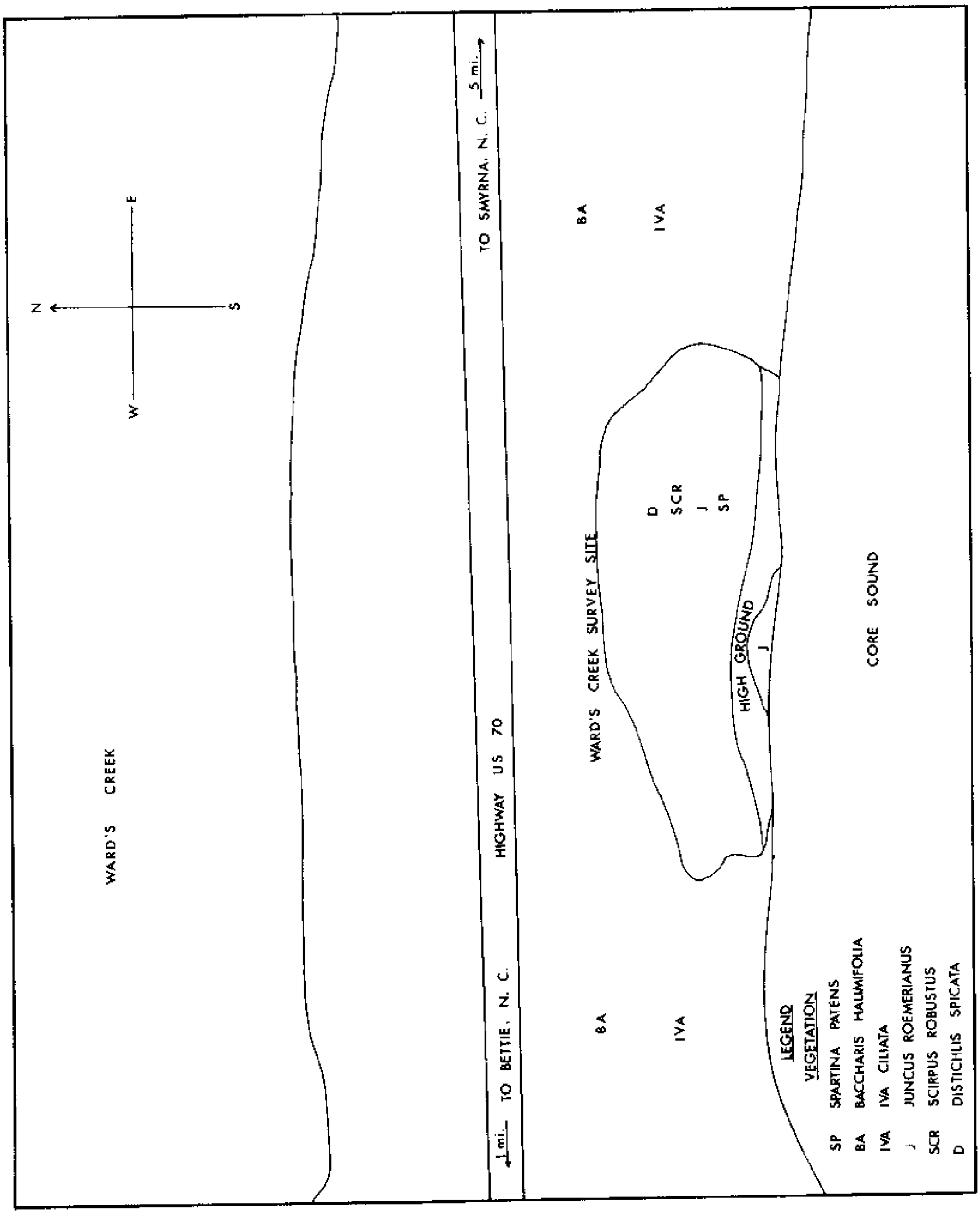


FIG. 6 WARD'S CREEK STUDY AREA. 1972

FIG. 7 NEWPORT RIVER STUDY AREA, 1972

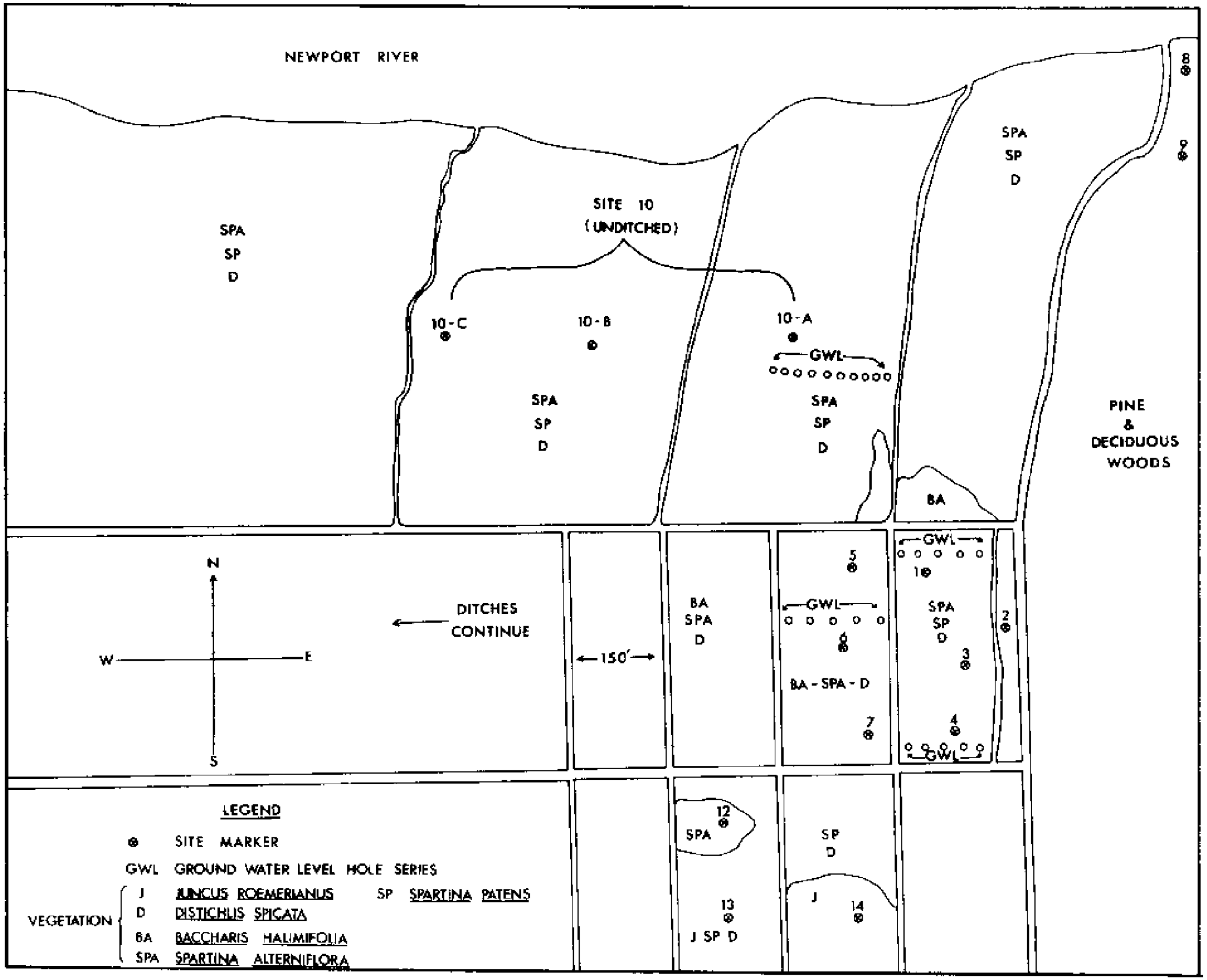
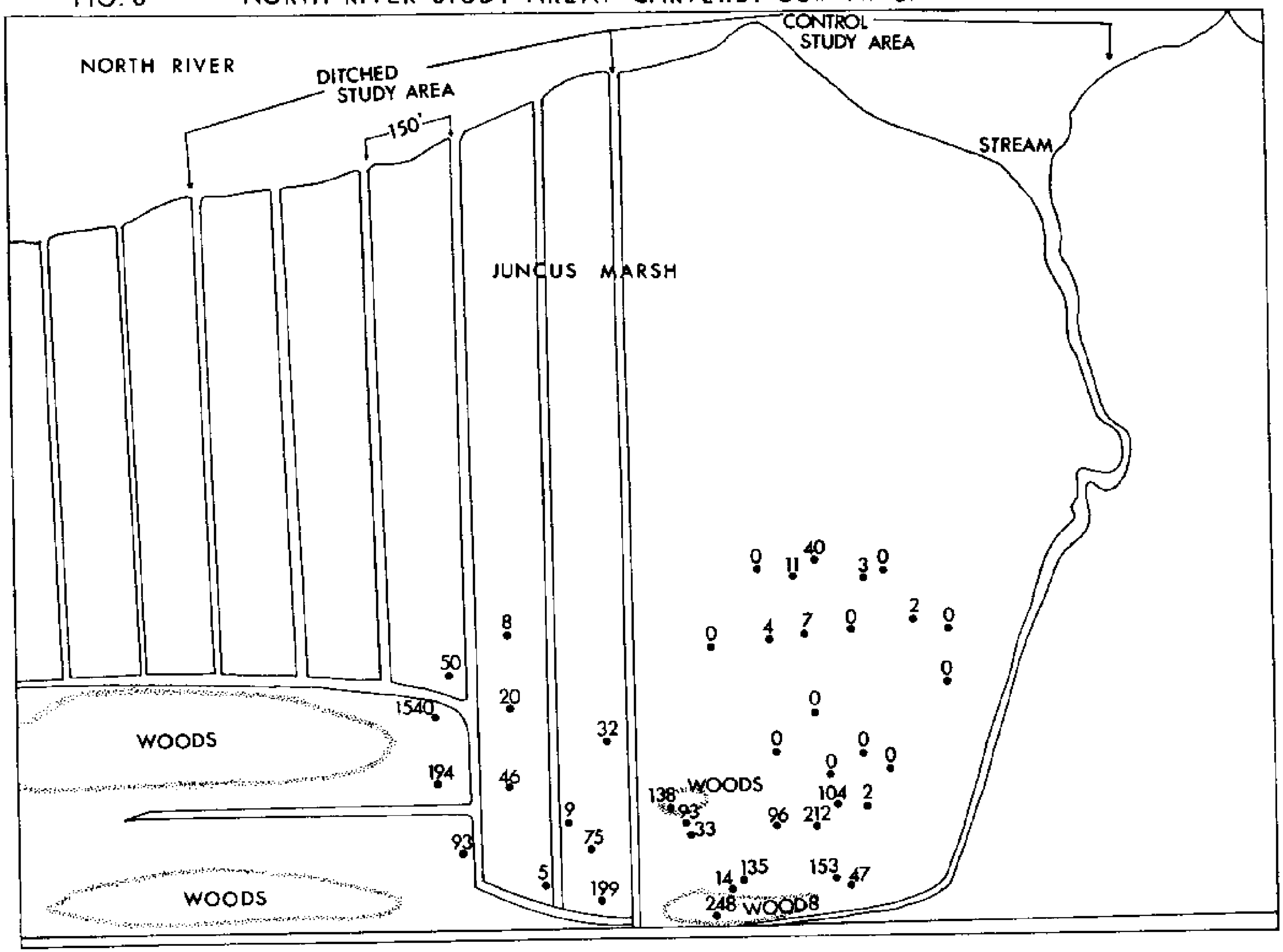
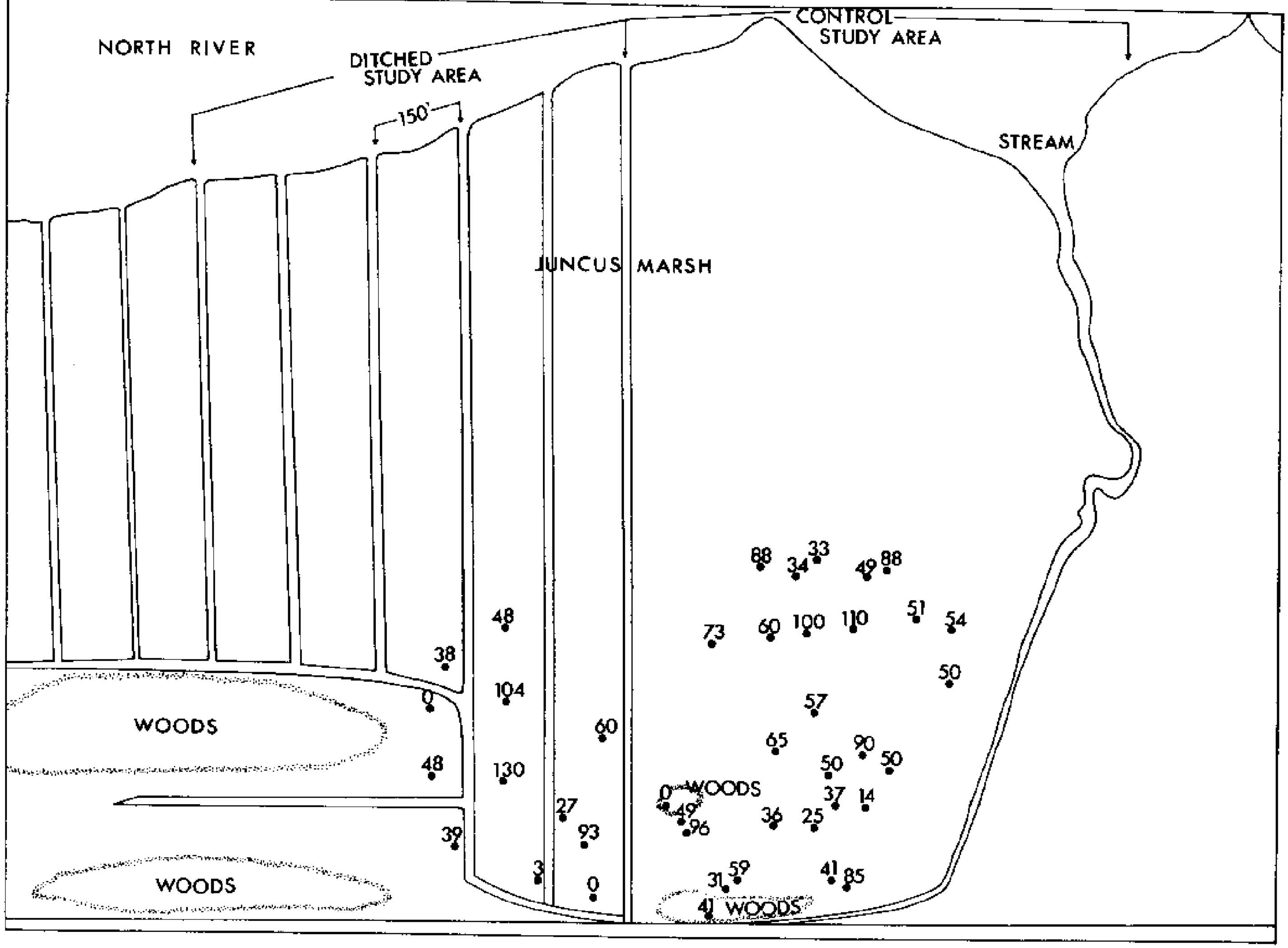


FIG. 8 NORTH RIVER STUDY AREA. CARTERET CO., N. C.



AEDES BREEDING SITES AND NUMBERS OF SPECIMENS
MAR. - AUG. 1971

FIG. 9 NORTH RIVER STUDY AREA, CARTERET CO., N. C.



ANOPHELES BREEDING SITES AND NUMBERS OF SPECIMENS
MAR. - AUG. 1971

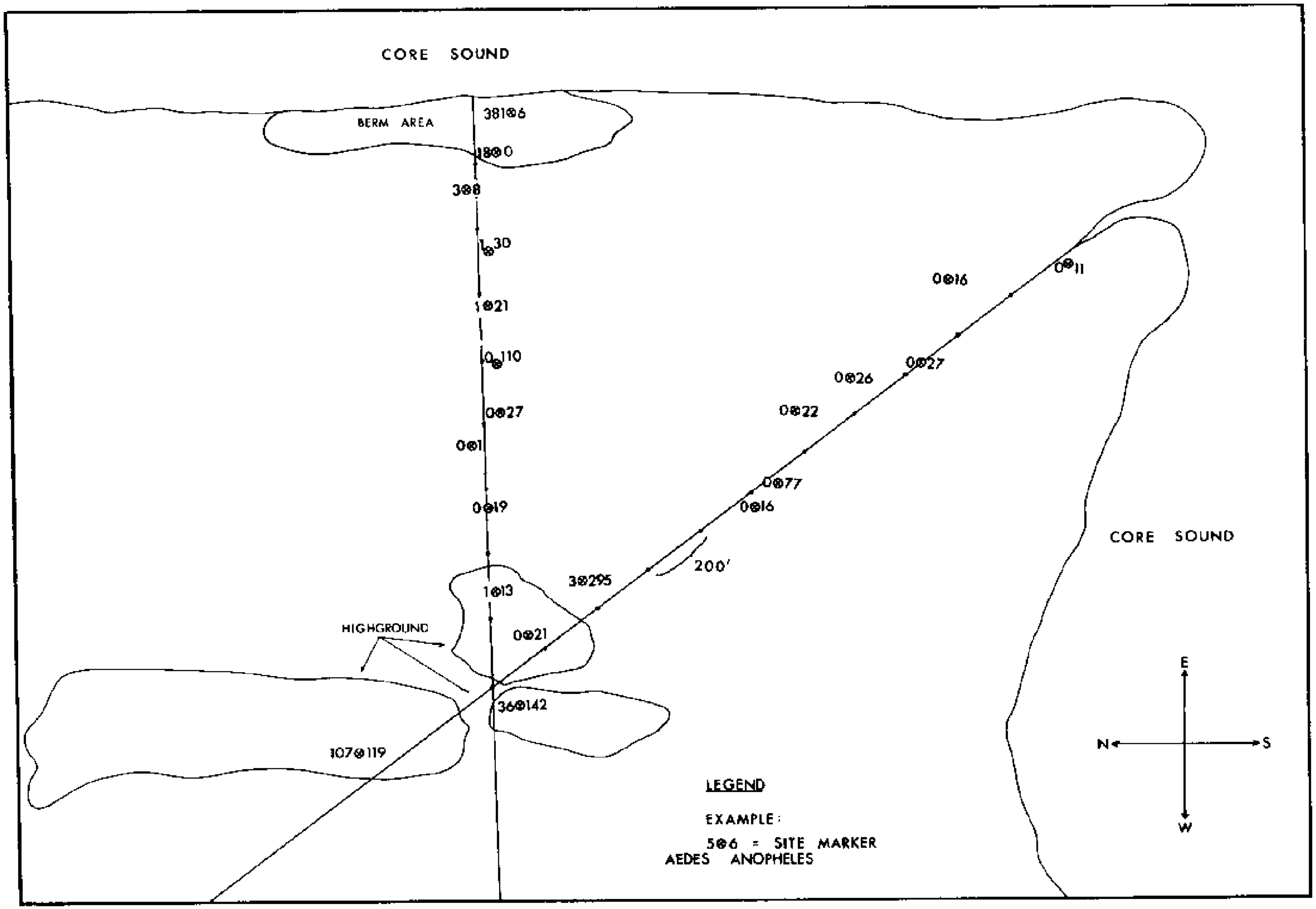


FIG. 10 KING'S POINT STUDY AREA. 1972

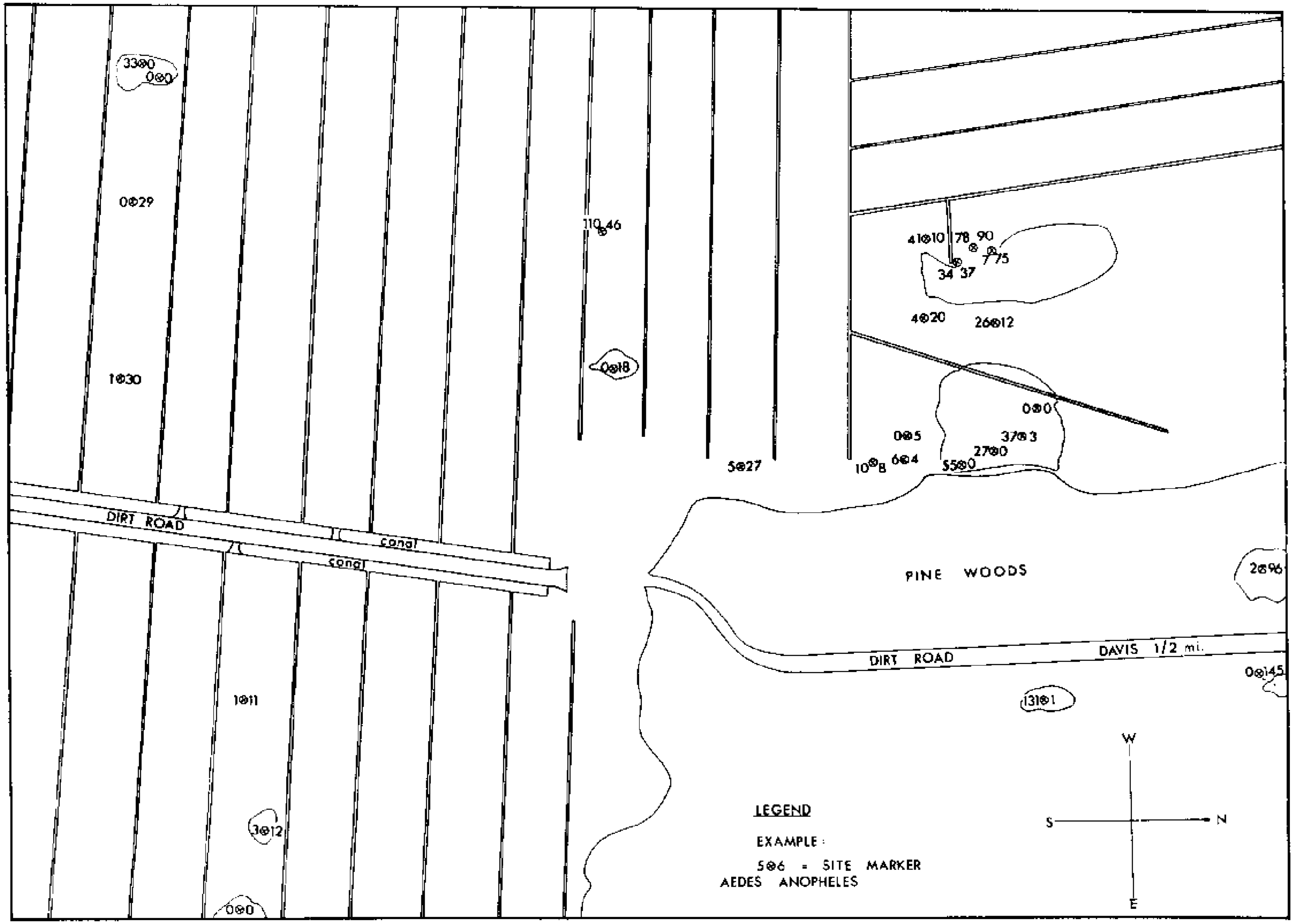
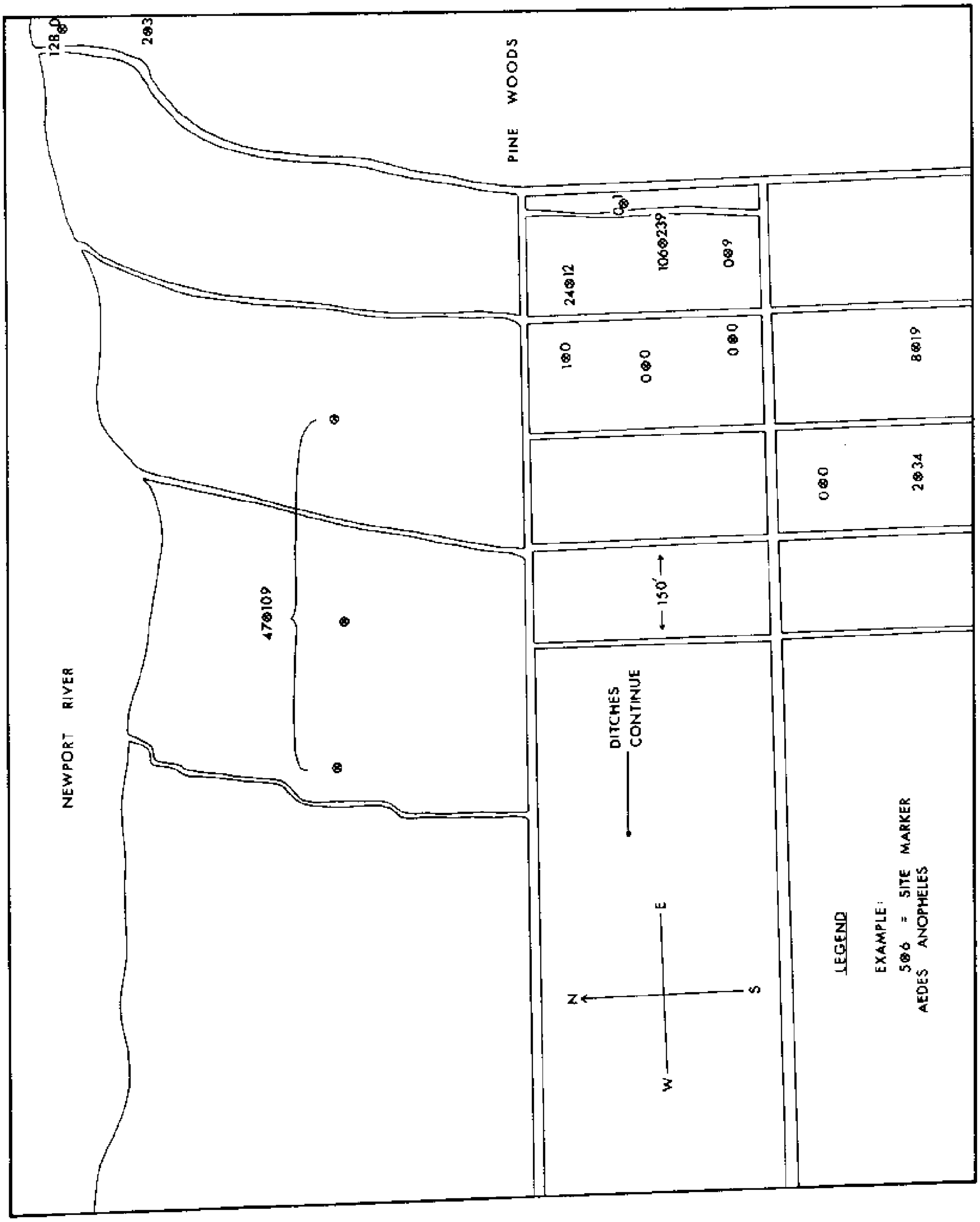


FIG. 11 DAVIS STUDY AREA. 1972

FIG.12 NEWPORT RIVER STUDY AREA. 1972



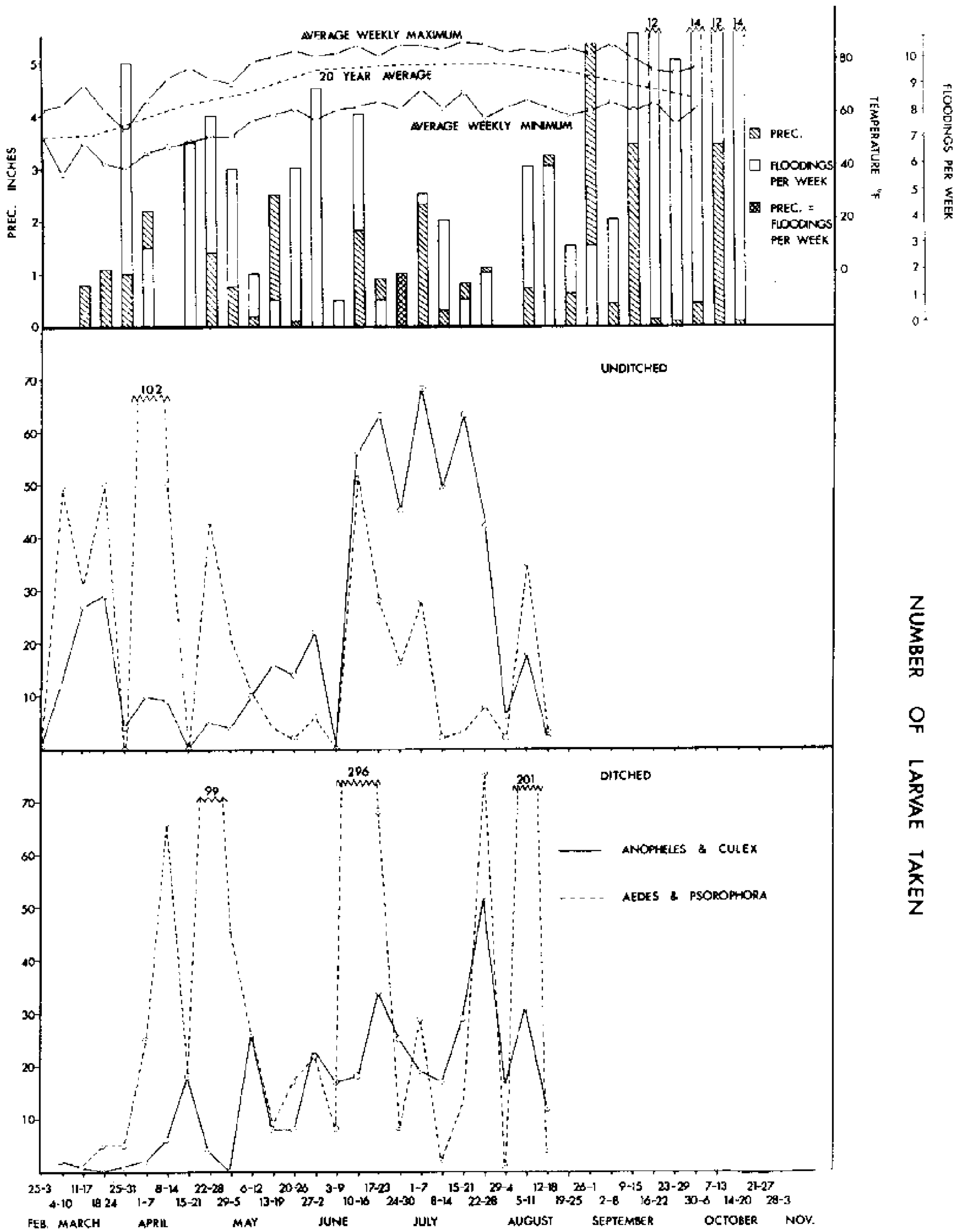


FIG. 13 A COMPARISON OF THE TOTAL NUMBER OF LARVAE TAKEN PER WEEK BETWEEN DITCHED & UNDITCHED AREAS AT NORTH RIVER, 1971

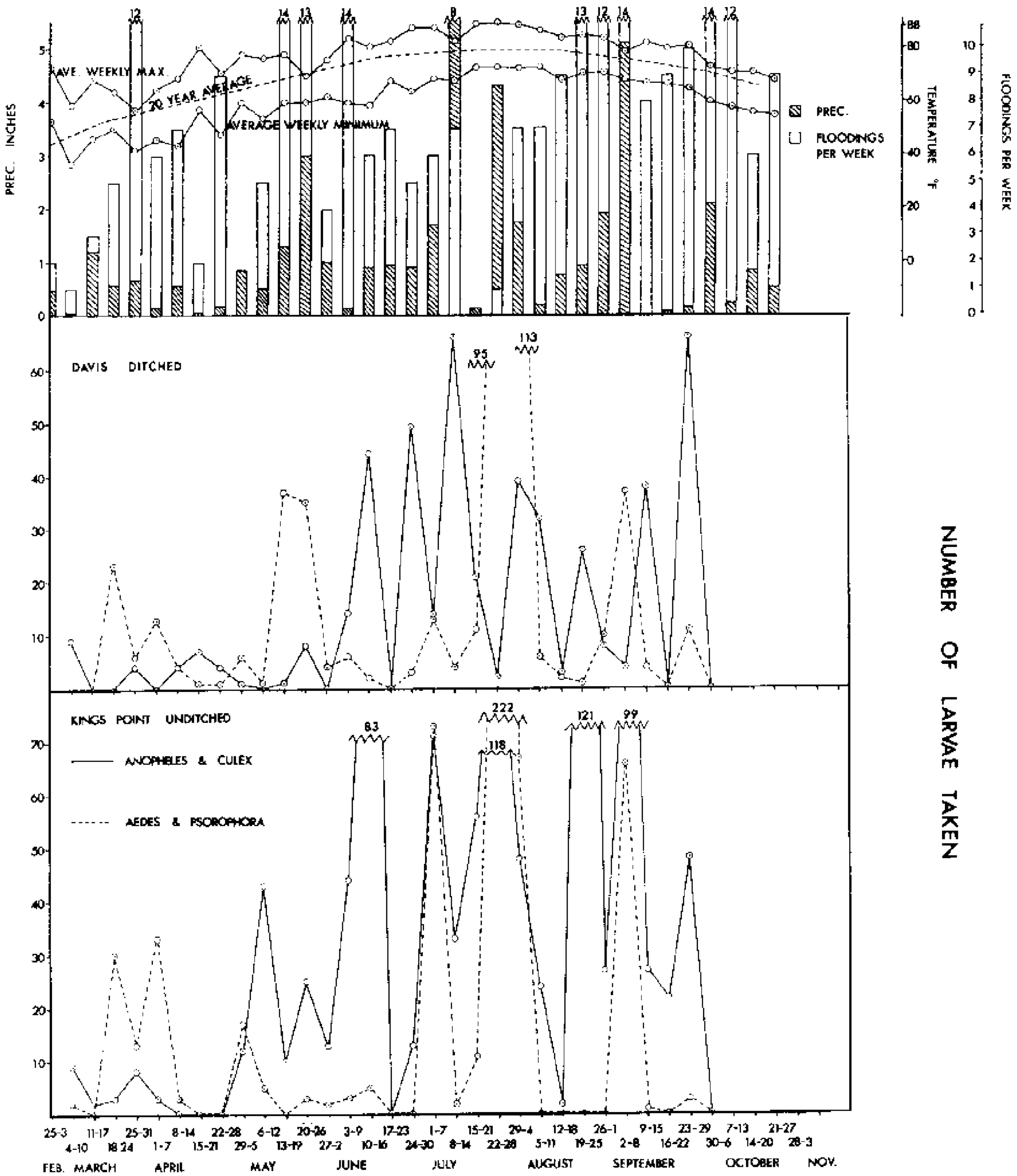


FIG. 14 A COMPARISON OF THE TOTAL NUMBER OF LARVAE TAKEN PER WEEK BETWEEN DITCHED & UNDITCHED AREAS AT DAVIS, KING'S POINT, 1972

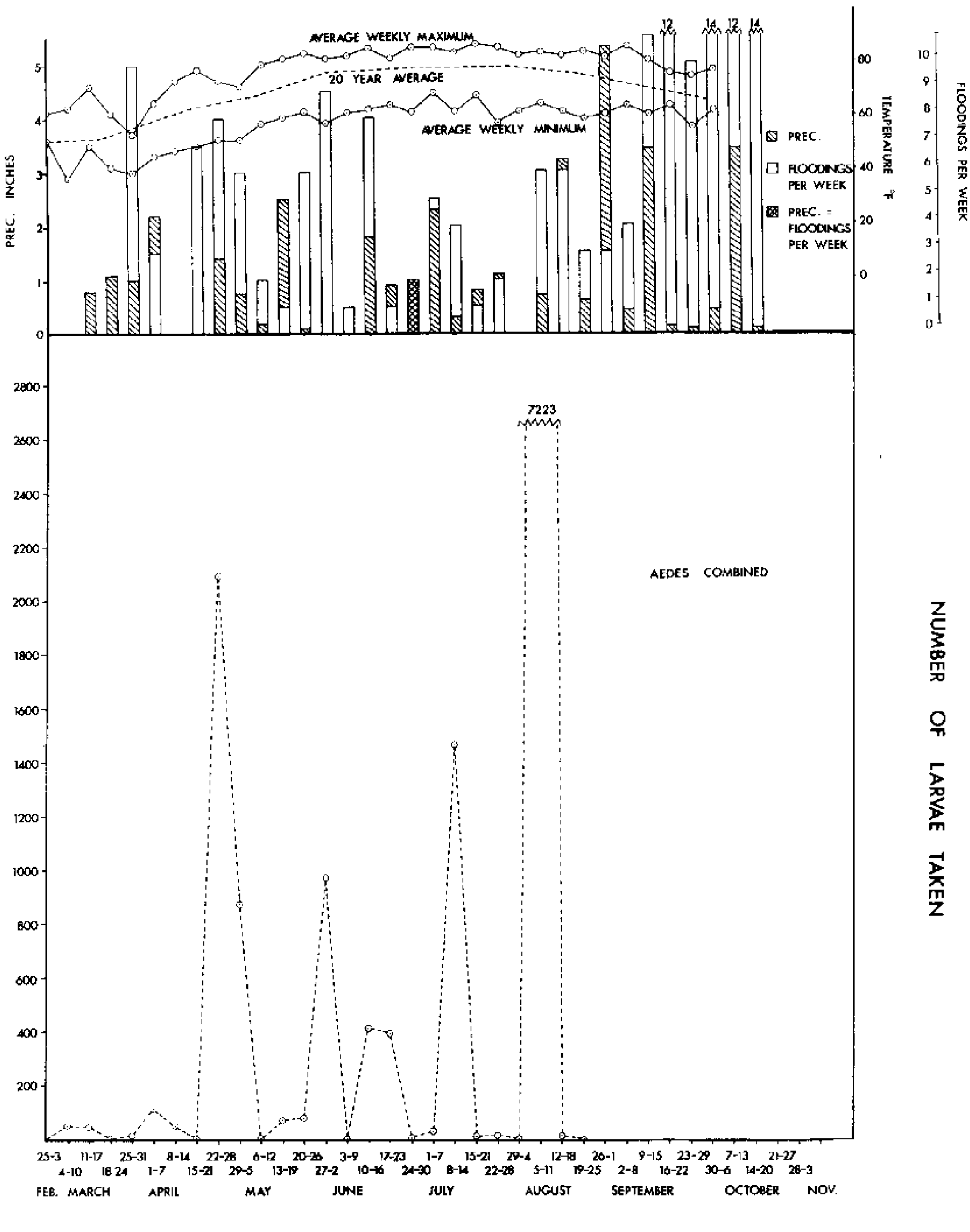


FIG. 15 TOTAL NUMBER OF LARVAE TAKEN PER WEEK AT WARD'S CREEK, 1971

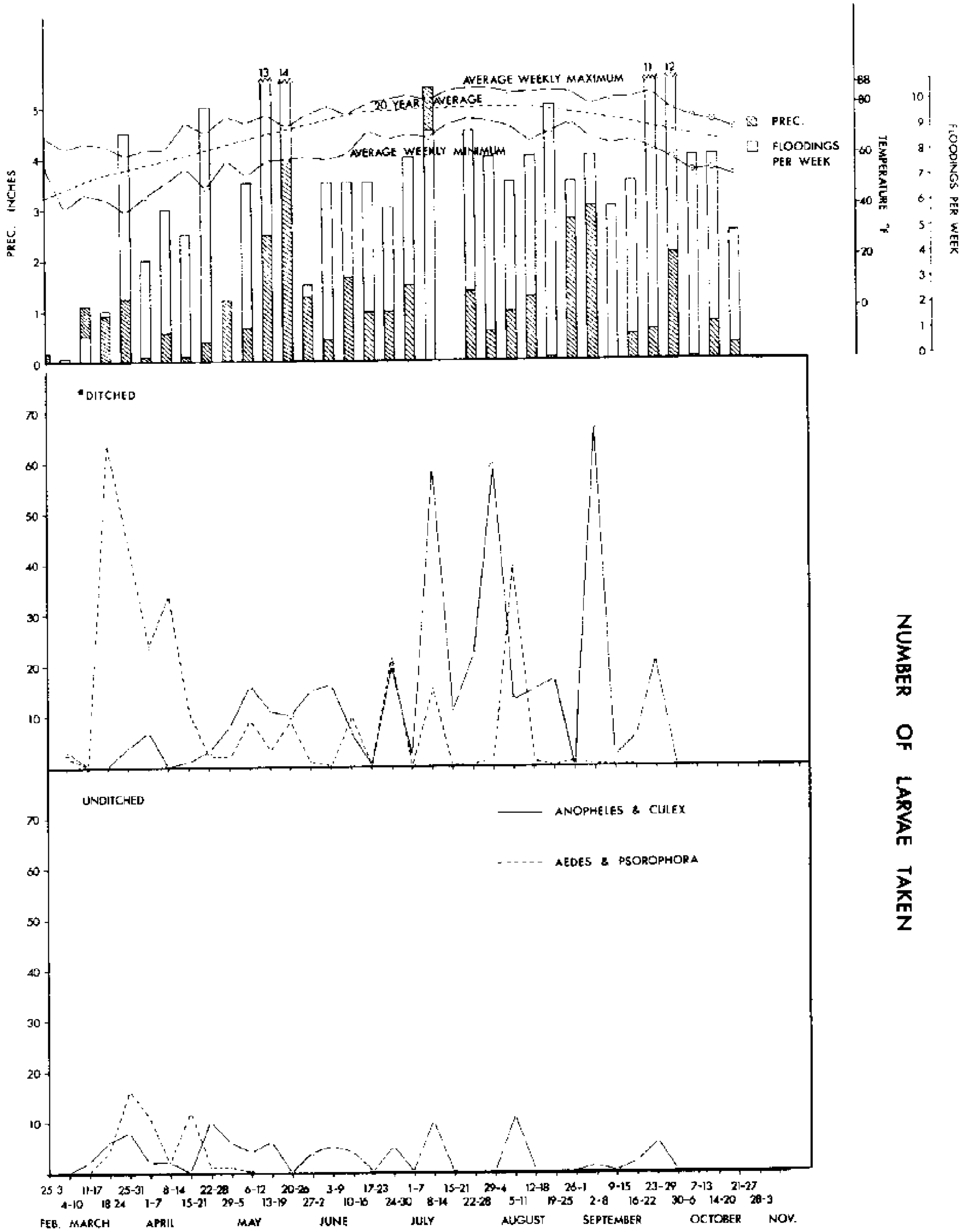


FIG. 16 A COMPARISON OF THE TOTAL NUMBER OF LARVAE TAKEN PER WEEK BETWEEN DITCHED & UNDITCHED AREAS AT NEWPORT RIVER, 1972

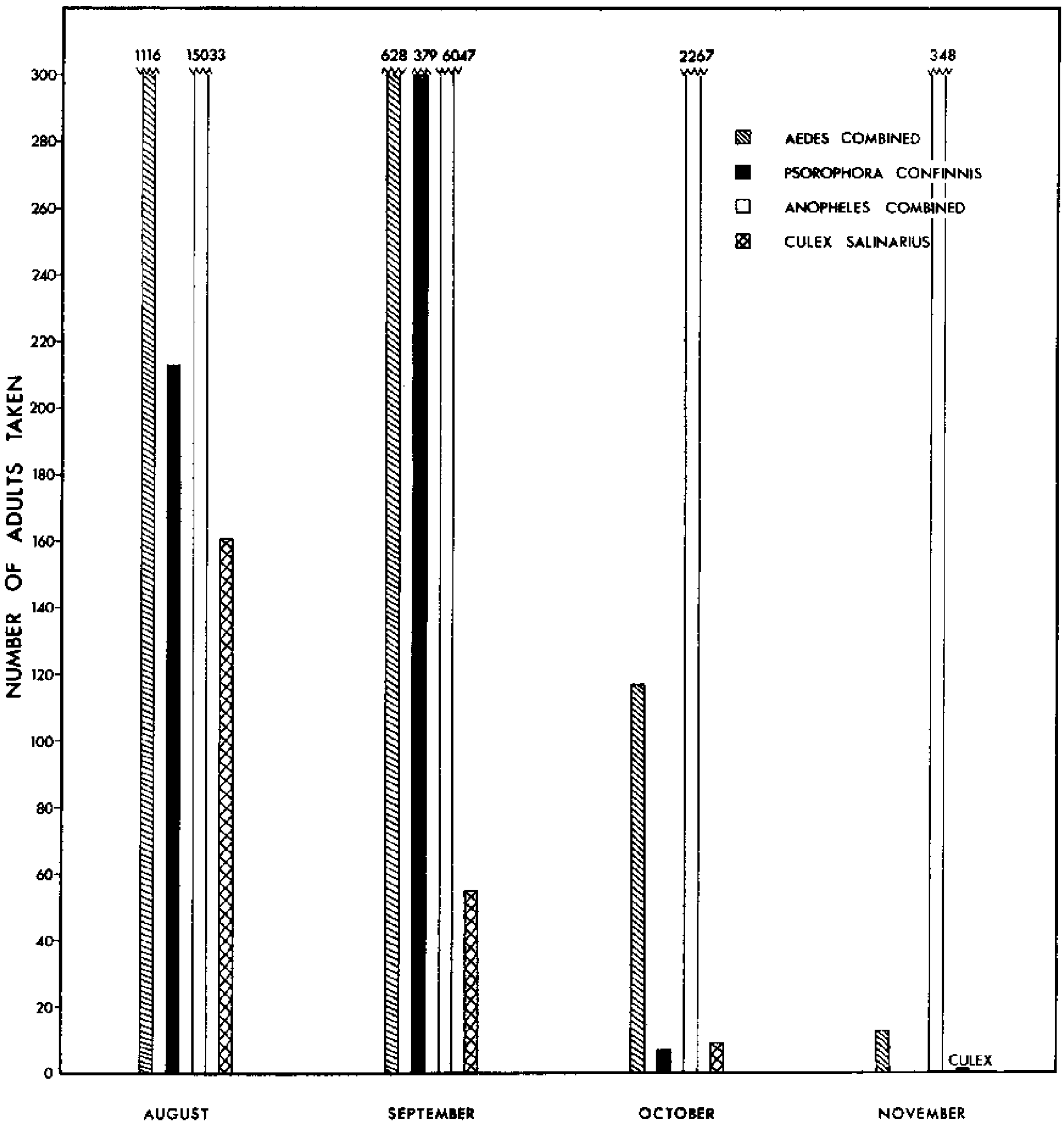


FIG. 17 TOTAL NUMBER OF ADULT MOSQUITOES TAKEN PER MONTH AT THE NORTH RIVER LIGHT TRAP (1970)

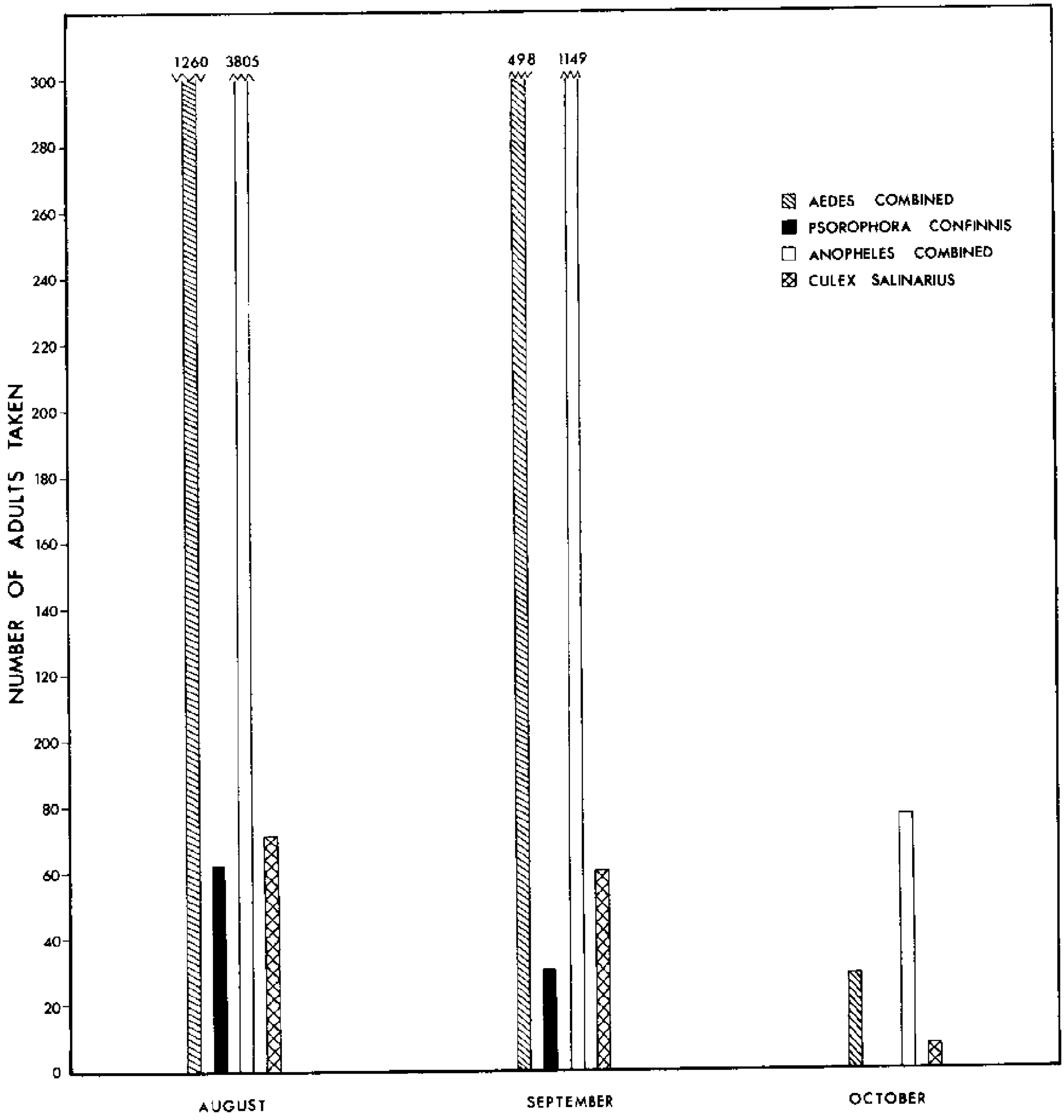


FIG. 18 TOTAL NUMBER OF ADULT MOSQUITOES TAKEN PER MONTH AT THE WILLISTON LIGHT TRAP (1970)

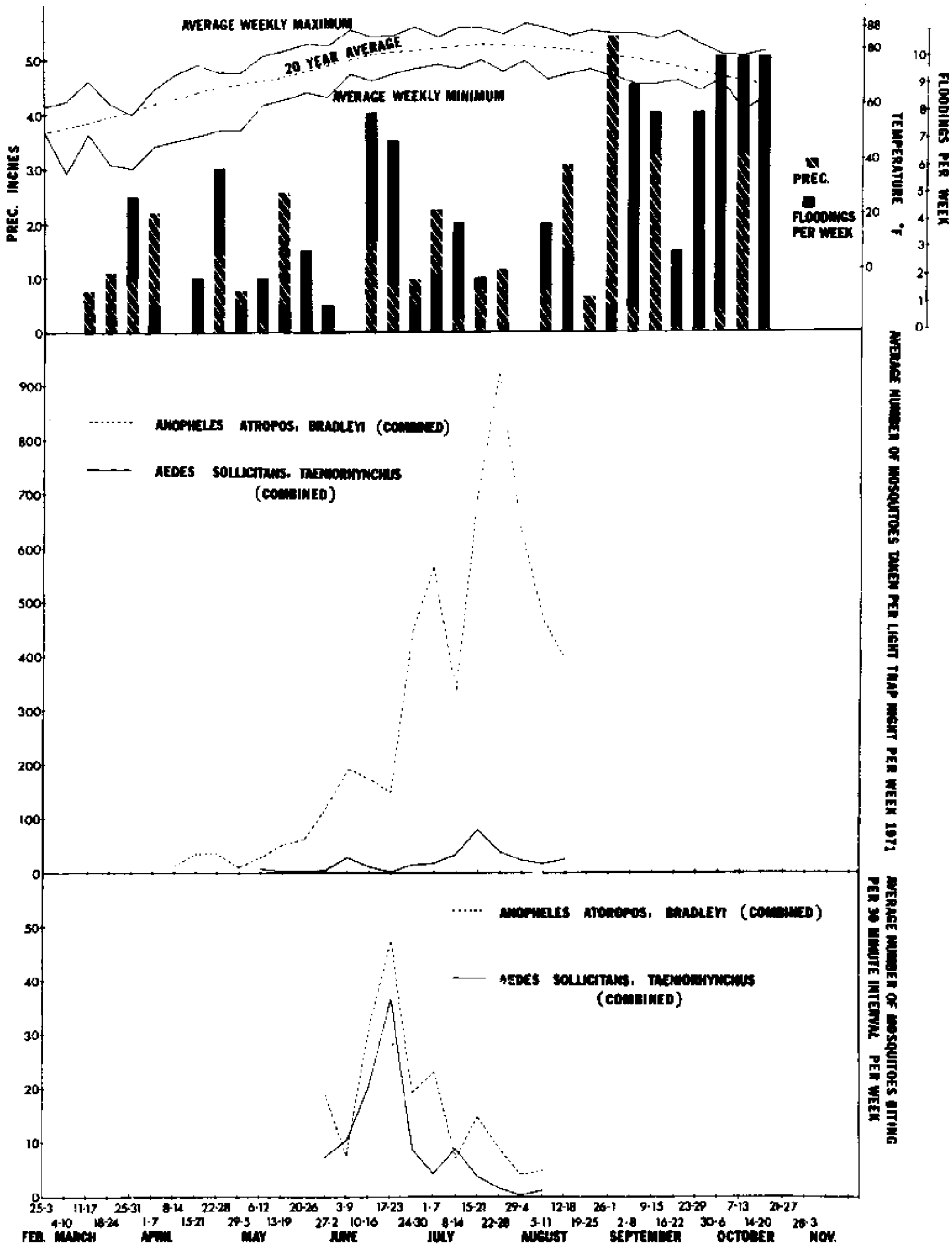


FIG. 19 ACCUMULATIVE DATA FOR THE INTERVAL MARCH 1st - AUGUST 17, 1971 NORTH RIVER CARTERET COUNTY, N. C.

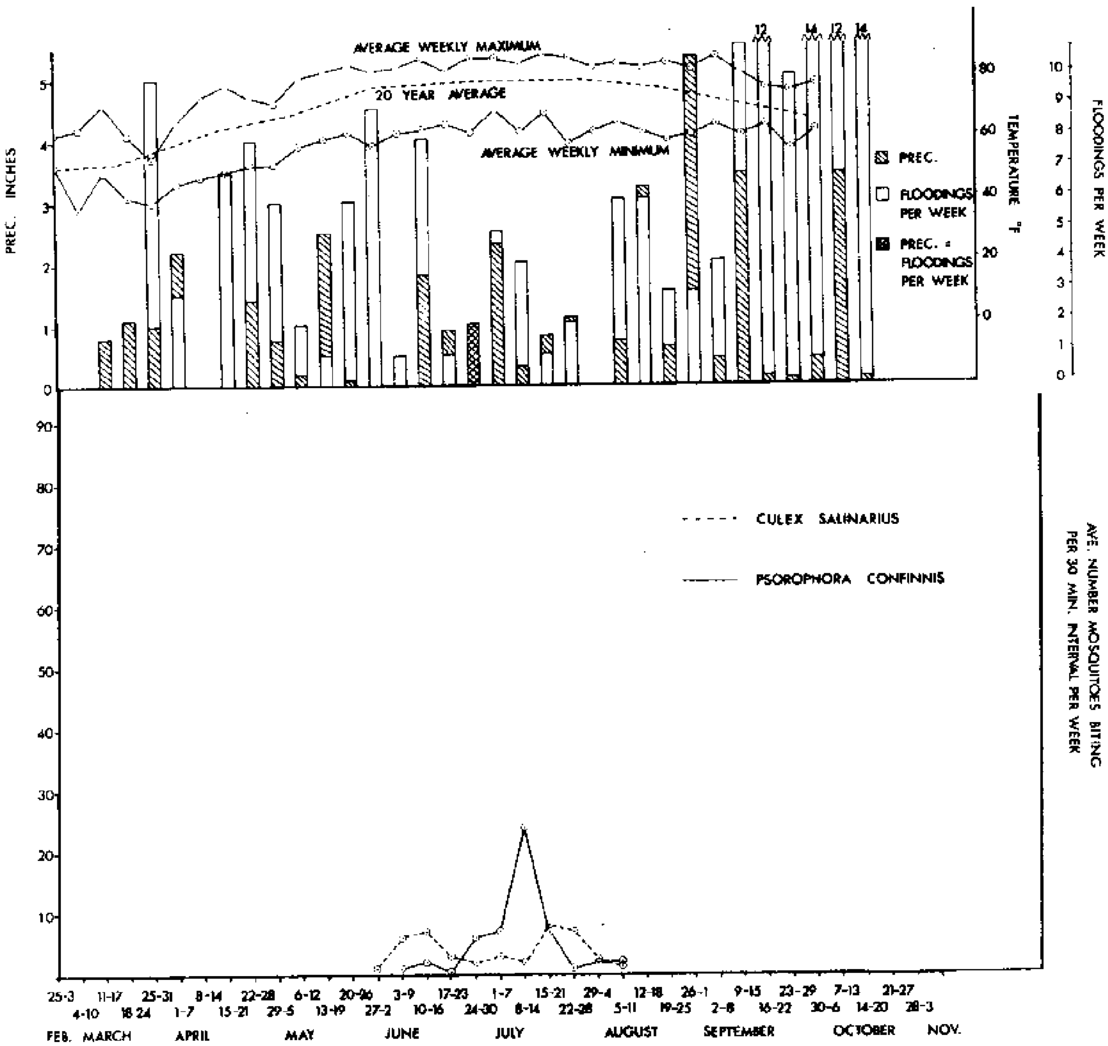


FIG. 20 ACCUMULATIVE DATA FOR THE INTERVAL MAR. 1st-OCT. 31, 1972
NORTH RIVER, 1971

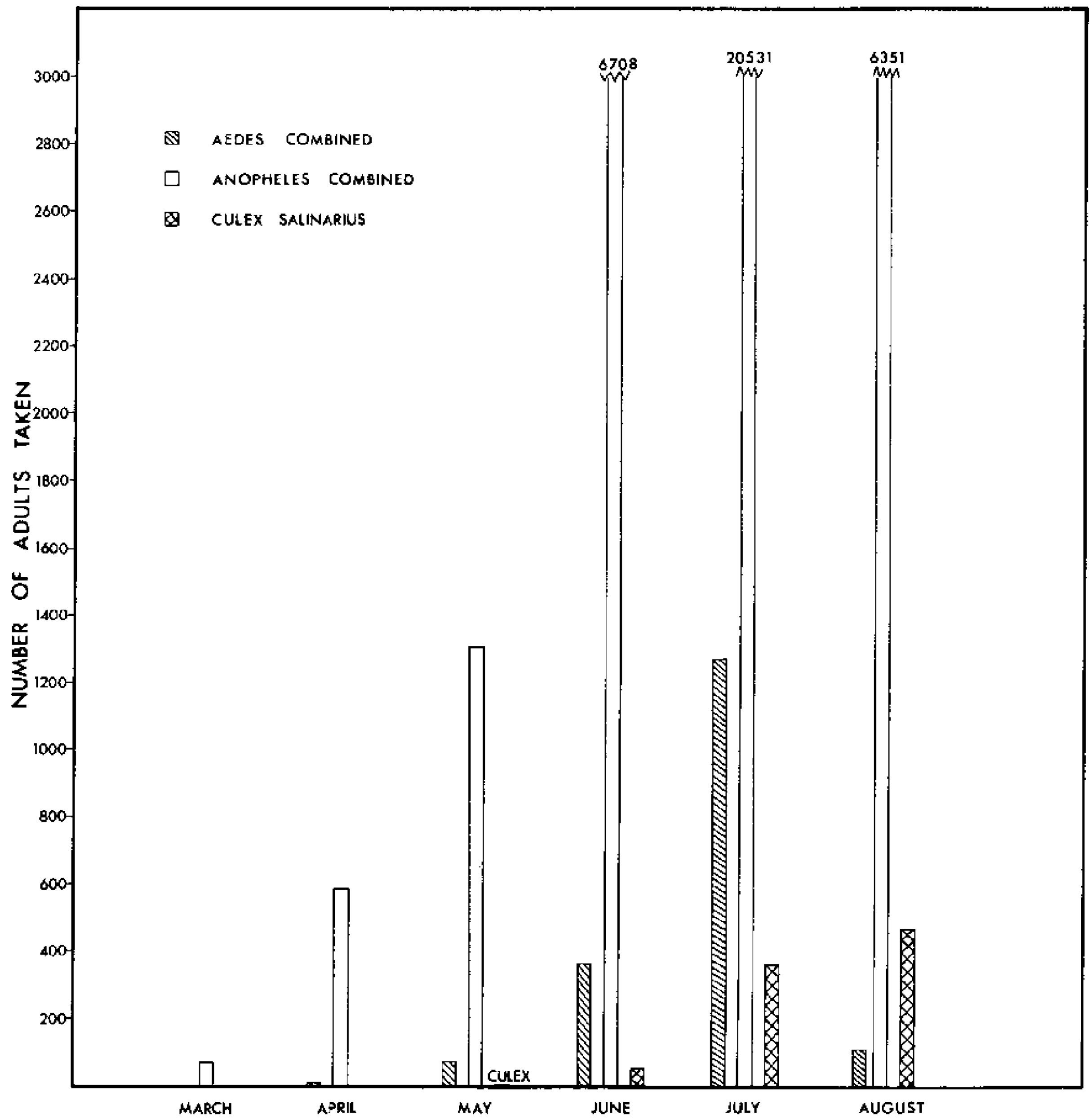


FIG. 21 TOTAL NUMBER OF ADULT MOSQUITOES TAKEN PER MONTH AT THE NORTH RIVER LIGHT TRAP (1971)

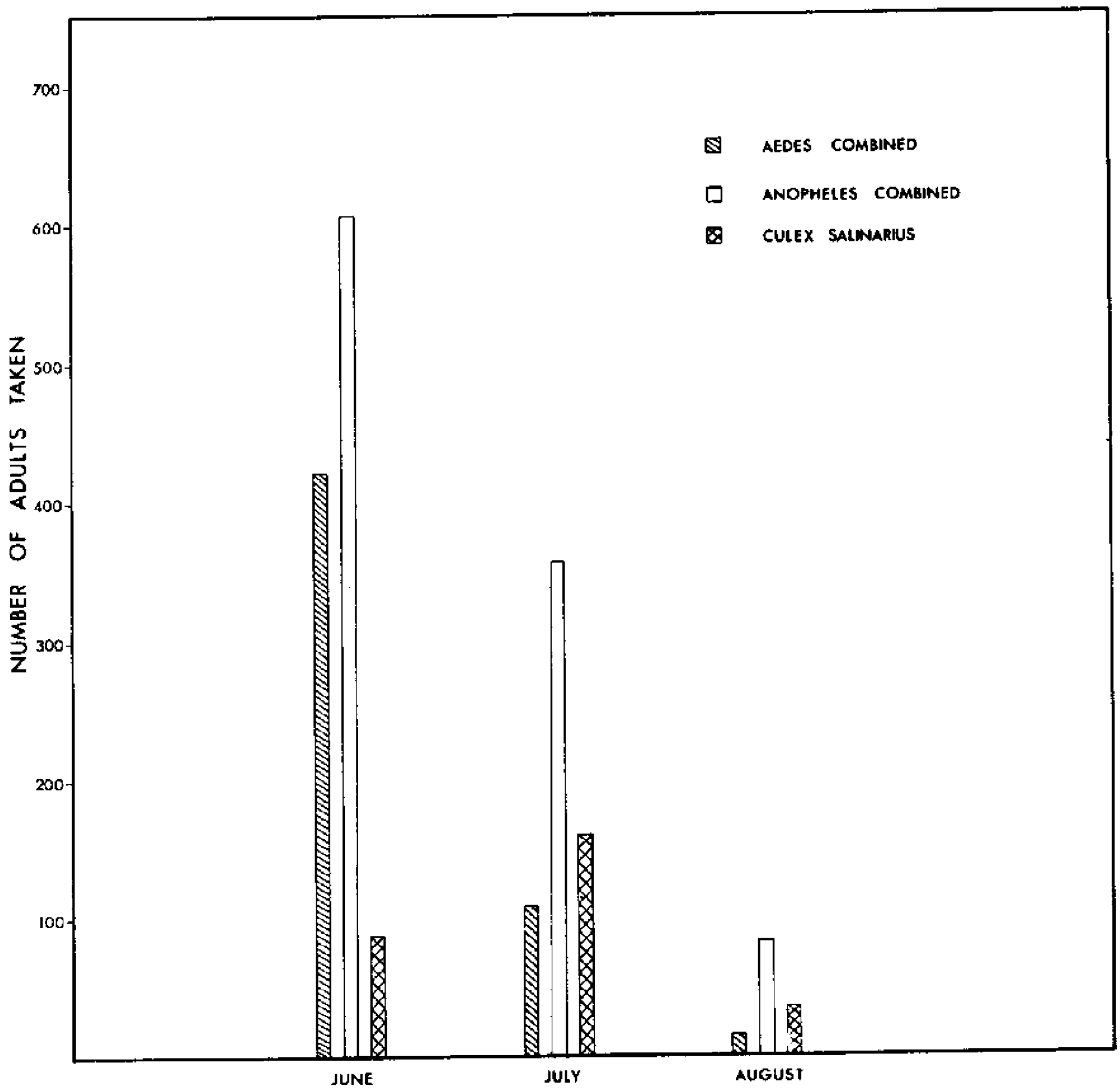


FIG. 22 TOTAL NUMBER OF ADULT MOSQUITOES TAKEN PER MONTH DURING BITING COUNTS AT NORTH RIVER (1971)

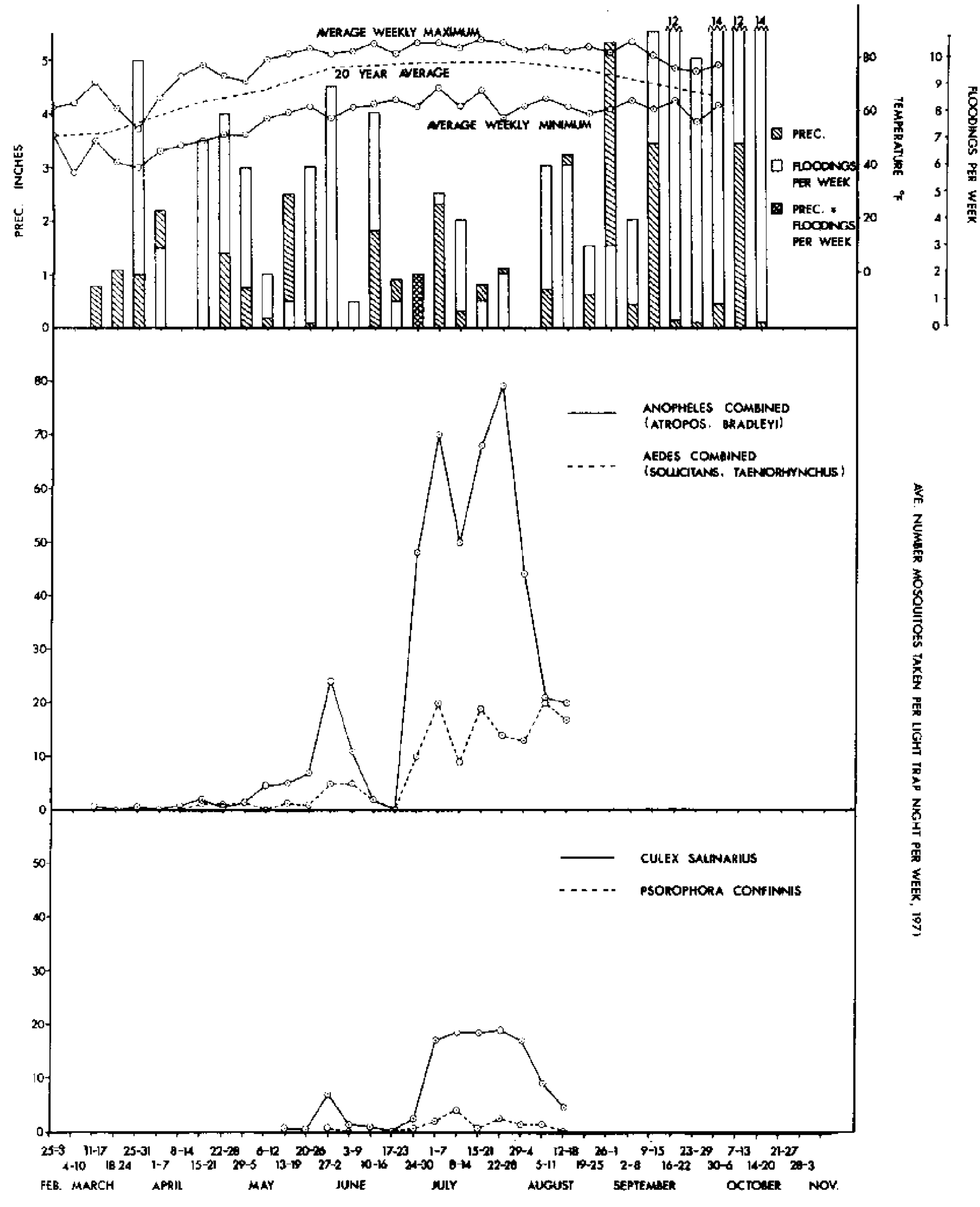


FIG. 23 ACCUMULATIVE DATA FOR THE INTERVAL MAR. 1st-AUG. 17, 1971
WILLISTON, N. C.

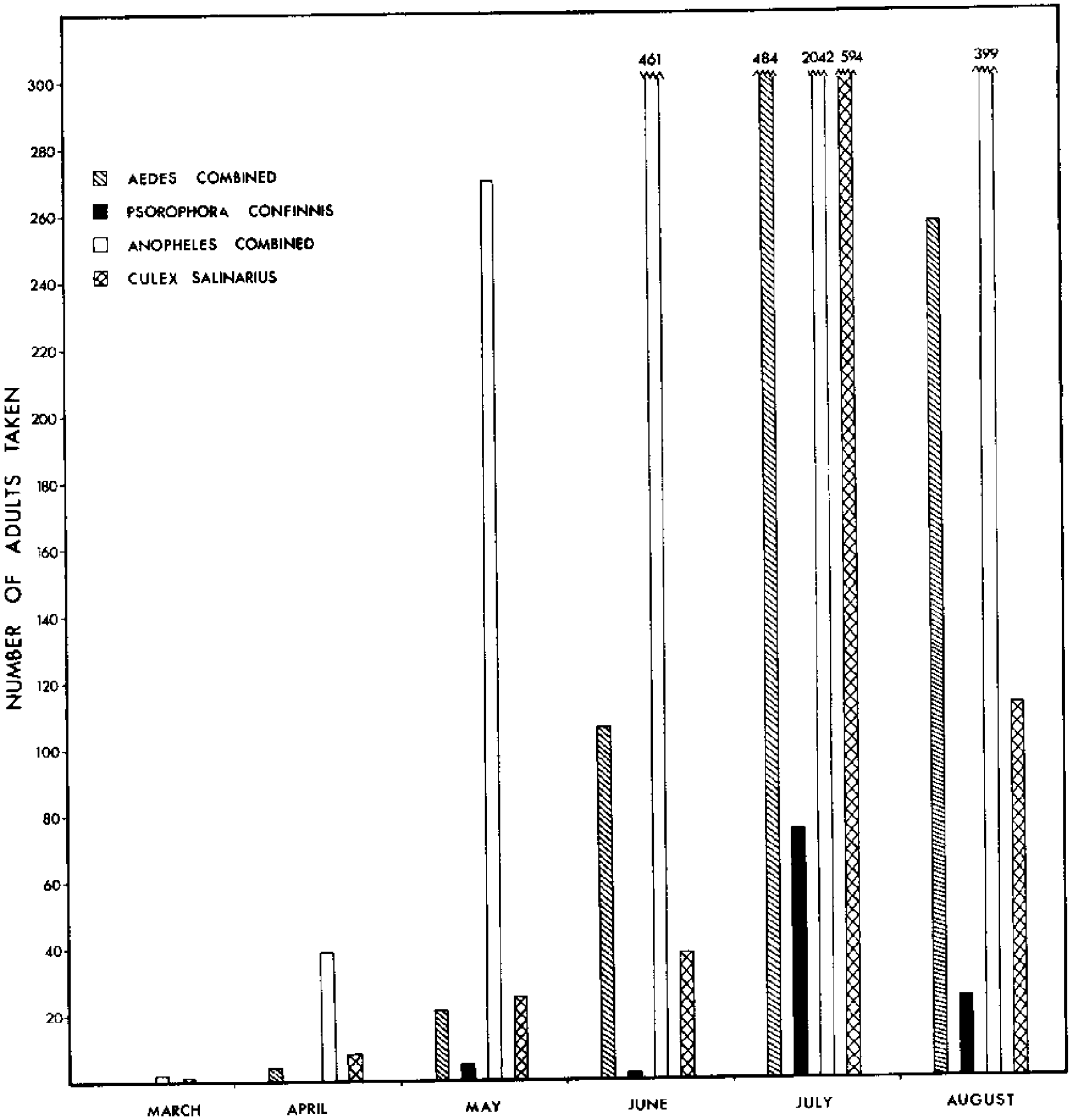


FIG. 24 TOTAL NUMBER OF ADULT MOSQUITOES TAKEN PER MONTH AT THE WILLISTON LIGHT TRAP (1971)

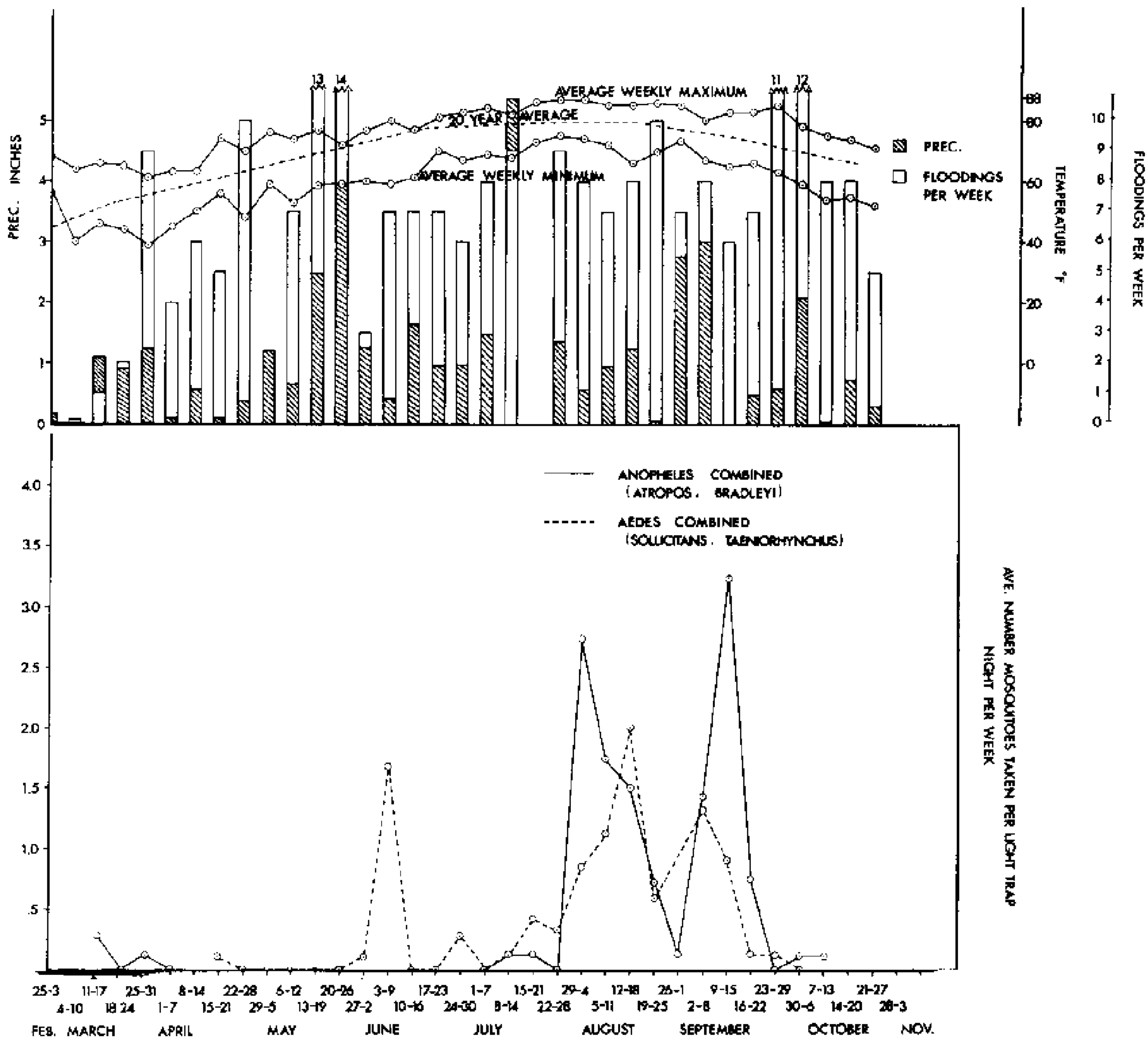


FIG. 25 ACCUMULATIVE DATA FOR THE INTERVAL MAR. 1st-OCT. 31, 1972
ATLANTIC BEACH, N. C.

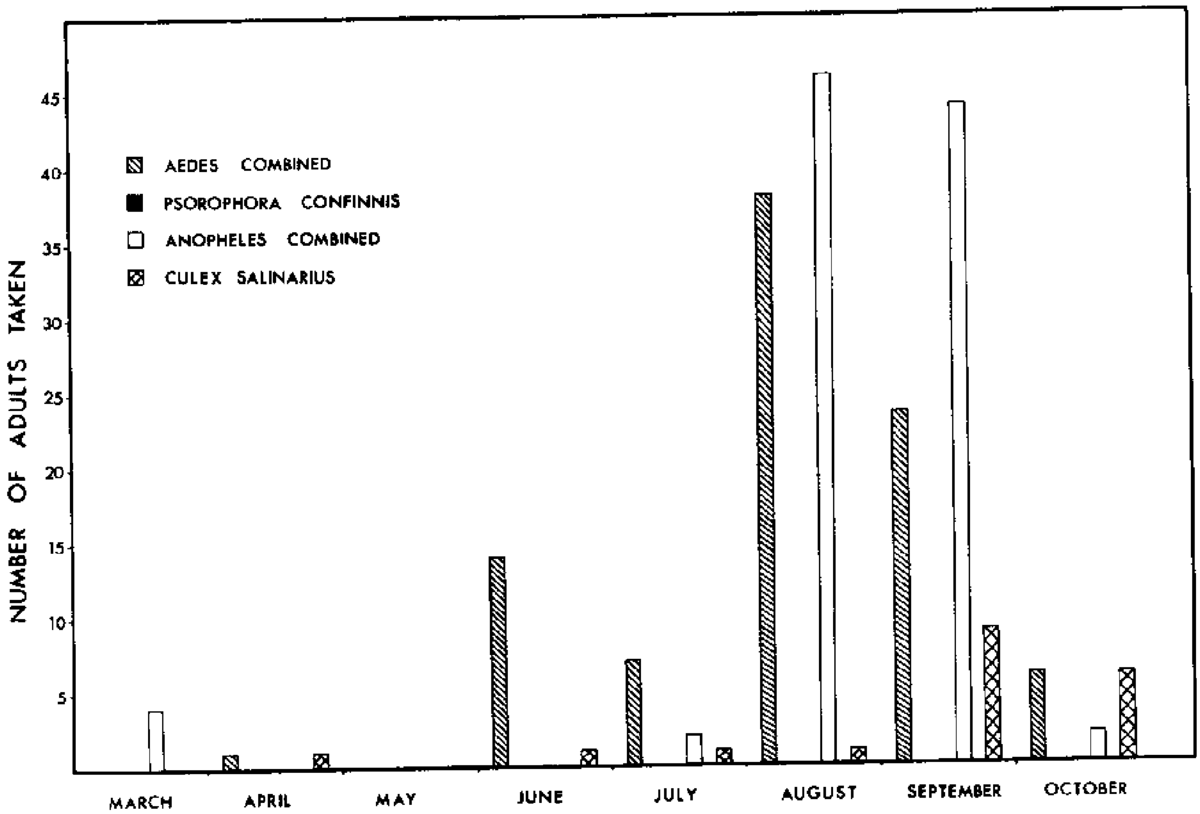


FIG. 26 TOTAL NUMBER OF ADULT MOSQUITOES TAKEN PER MONTH AT THE ATLANTIC BEACH LIGHT TRAP (1972)

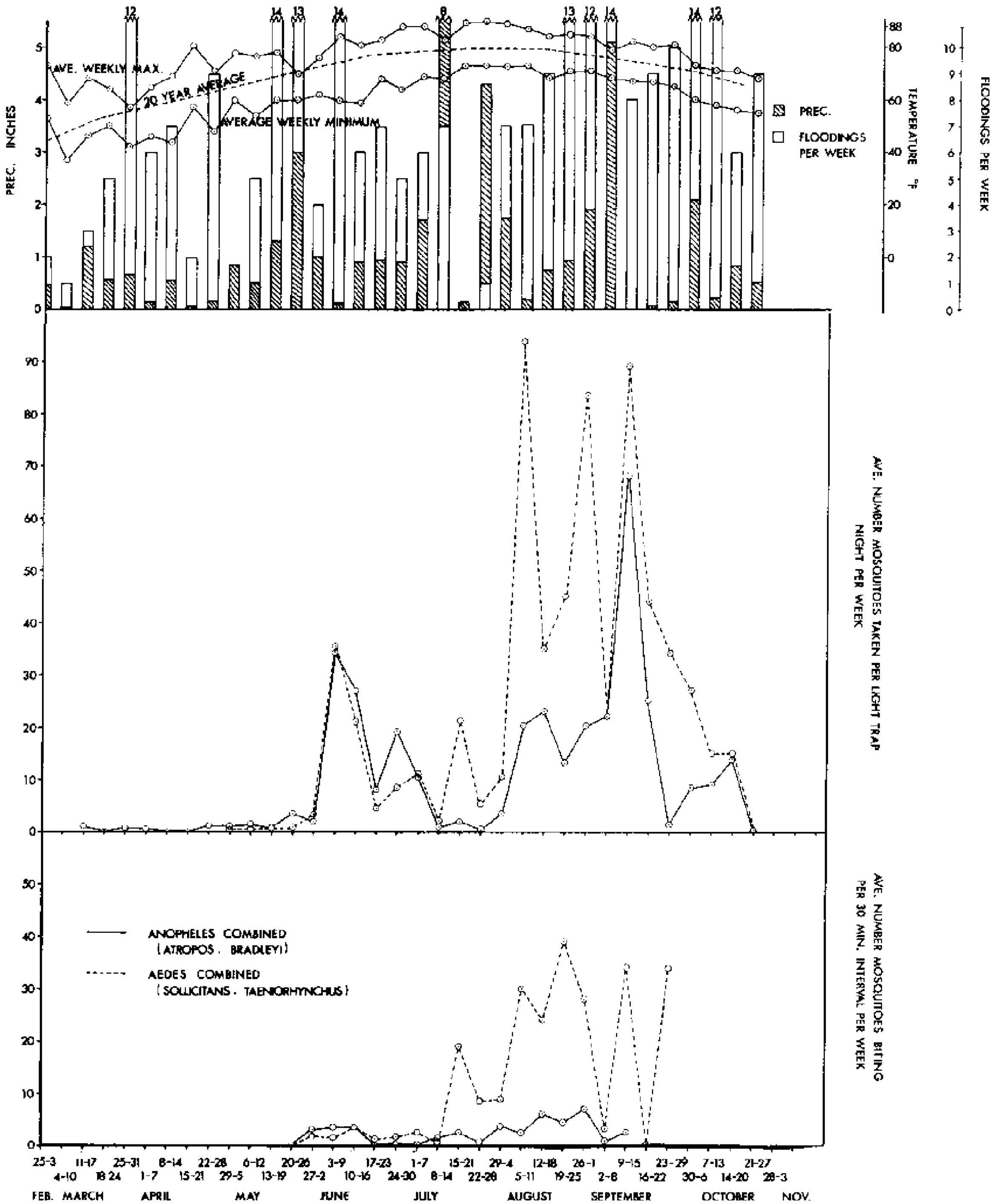


FIG. 27 ACCUMULATIVE DATA FOR THE INTERVAL MAR. 1st-OCT. 31, 1972
DAVIS, N. C.

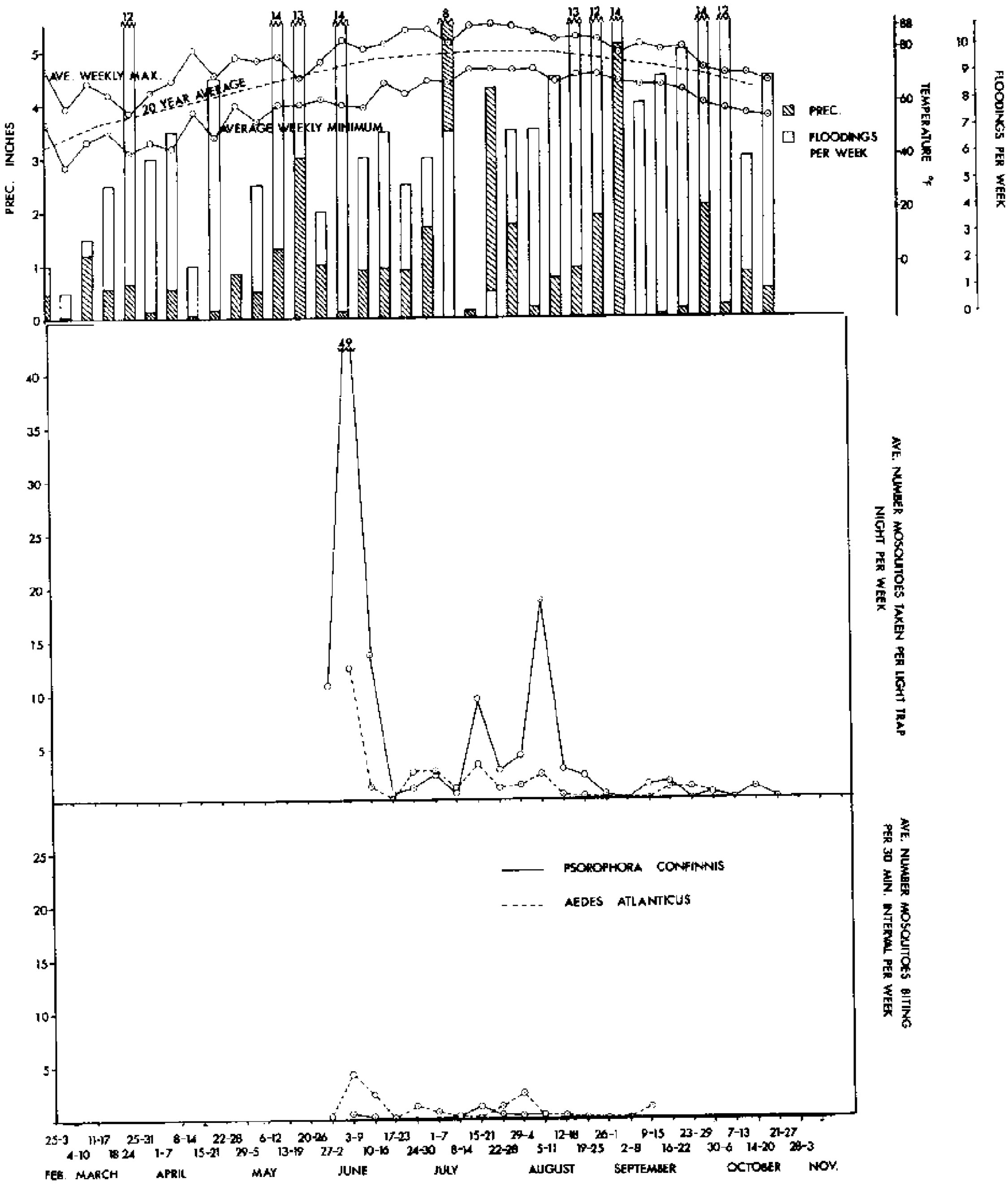


FIG. 28 ACCUMULATIVE DATA FOR THE INTERVAL MAR. 1st-OCT. 31, 1972
DAVIS, N. C.

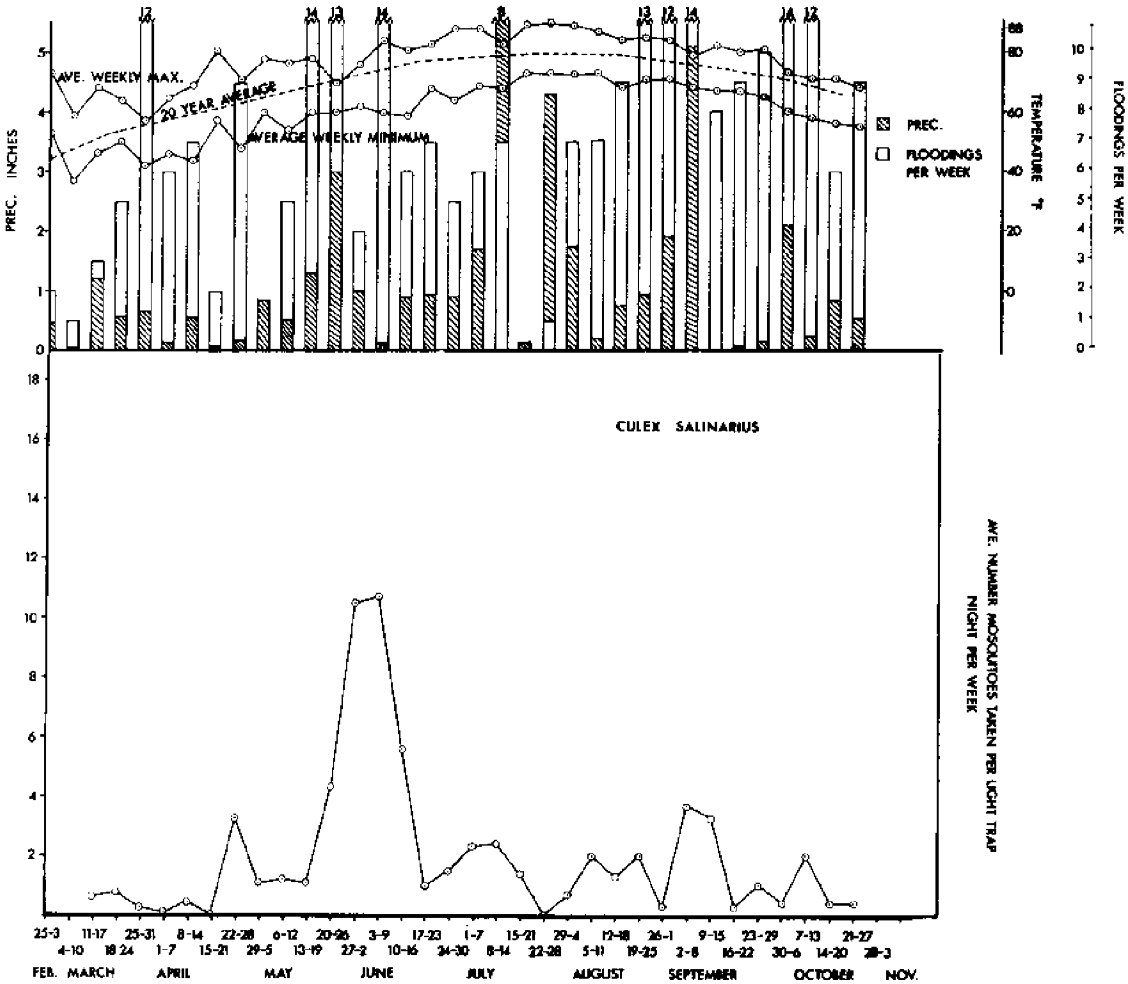


FIG. 29 ACCUMULATIVE DATA FOR THE INTERVAL MAR. 1st-OCT. 31, 1972 DAVIS, N. C.

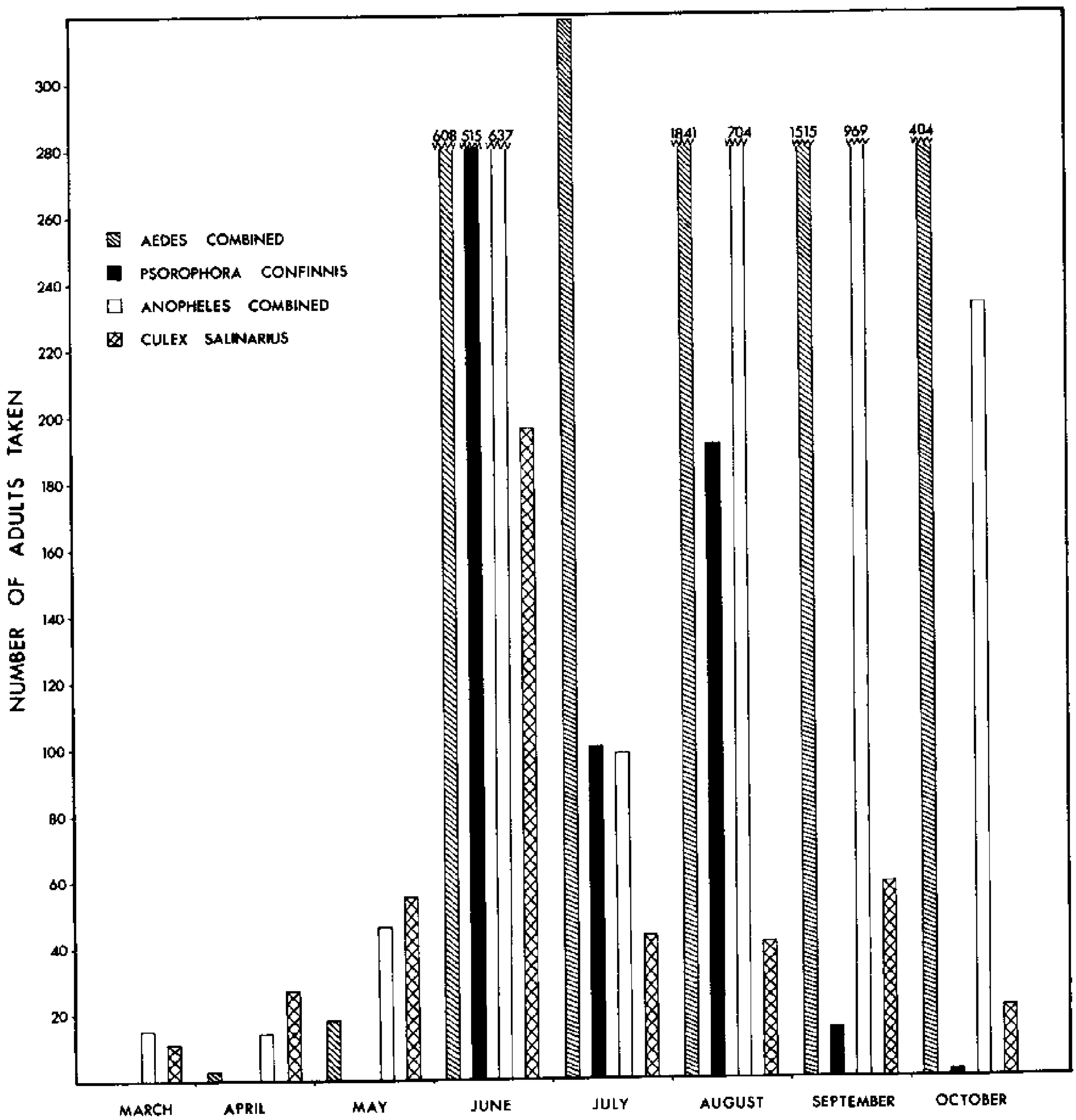


FIG. 30 TOTAL NUMBER OF ADULT MOSQUITOES TAKEN PER MONTH AT THE DAVIS LIGHT TRAP (1972)

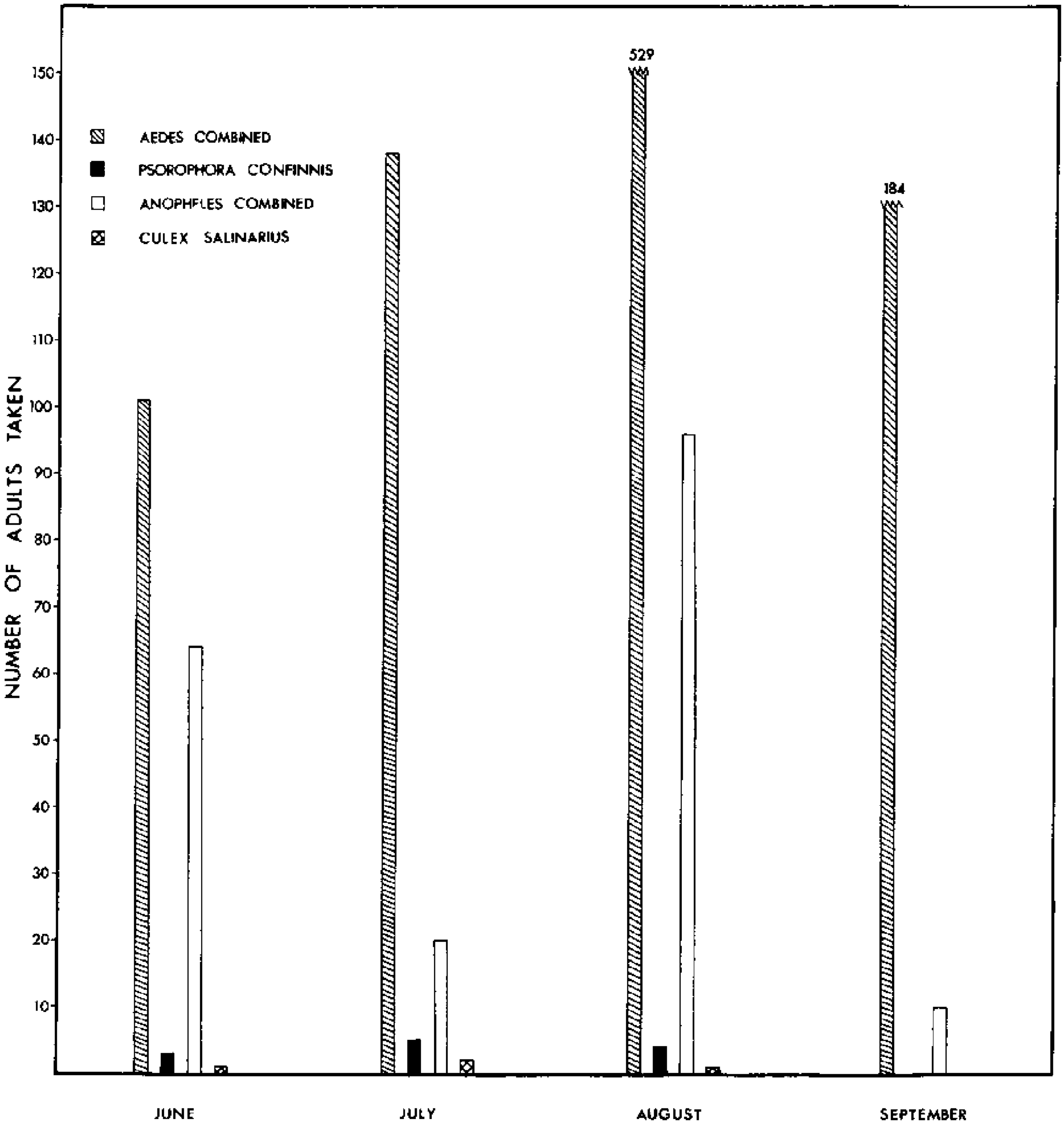


FIG. 31 TOTAL NUMBER OF ADULT MOSQUITOES TAKEN PER MONTH DURING BITING COUNTS AT DAVIS (1972)

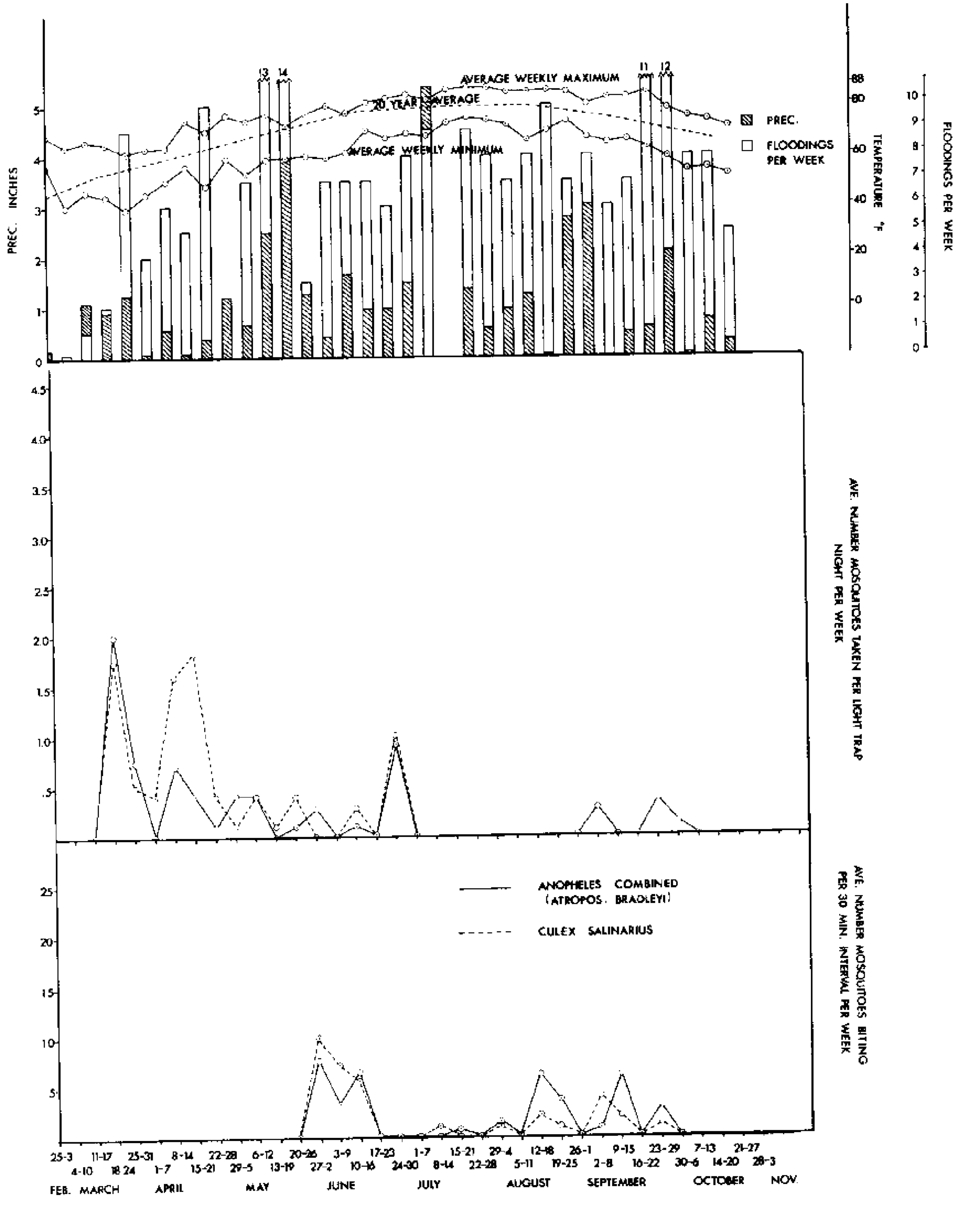


FIG. 32 ACCUMULATIVE DATA FOR THE INTERVAL MAR. 1st-OCT. 31, 1972
NEWPORT RIVER, 1972

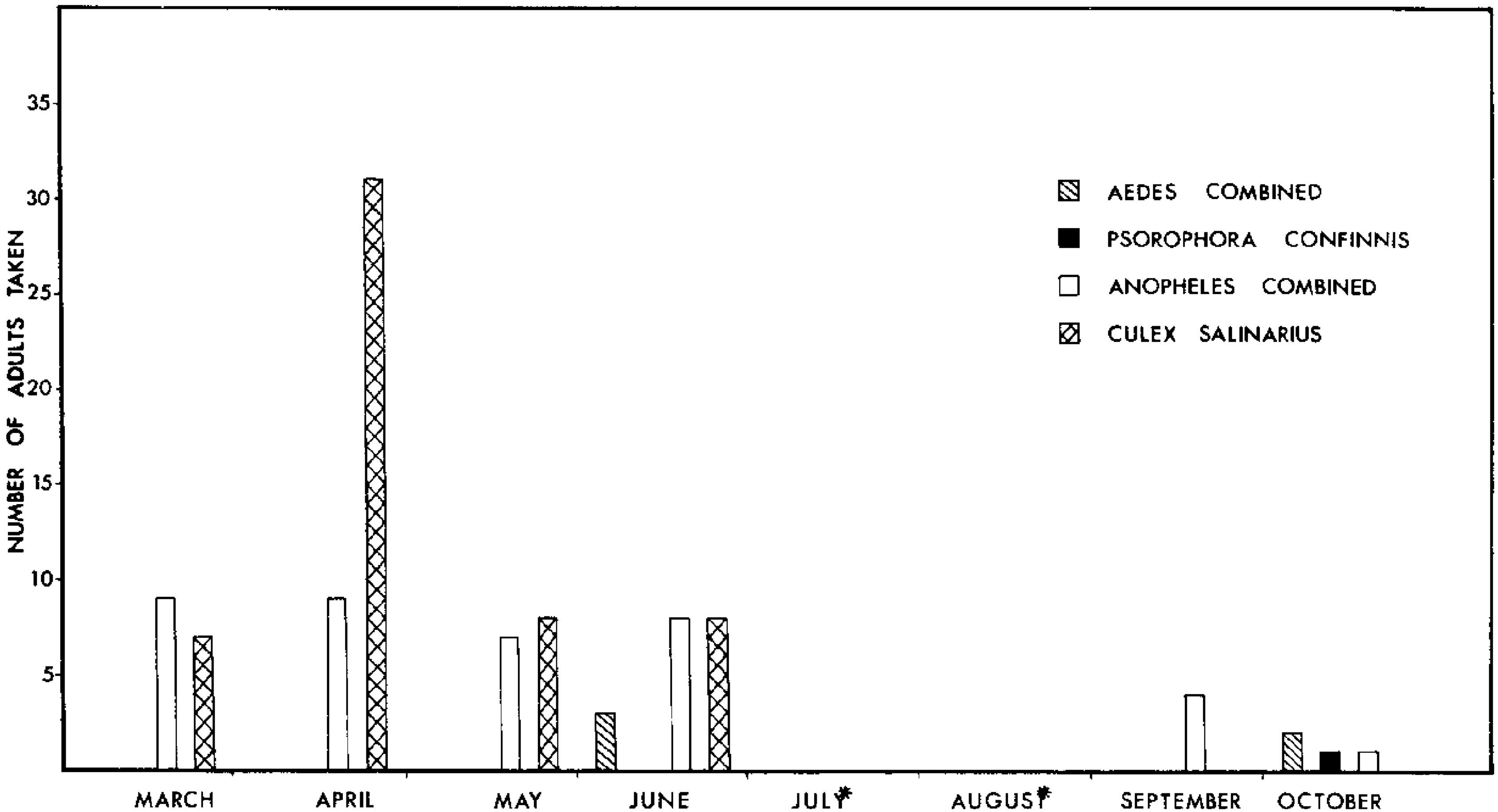


FIG. 33 TOTAL NUMBER OF ADULT MOSQUITOES TAKEN PER MONTH AT THE NEWPORT RIVER LIGHT TRAP (1972)

* DATA NOT AVAILABLE

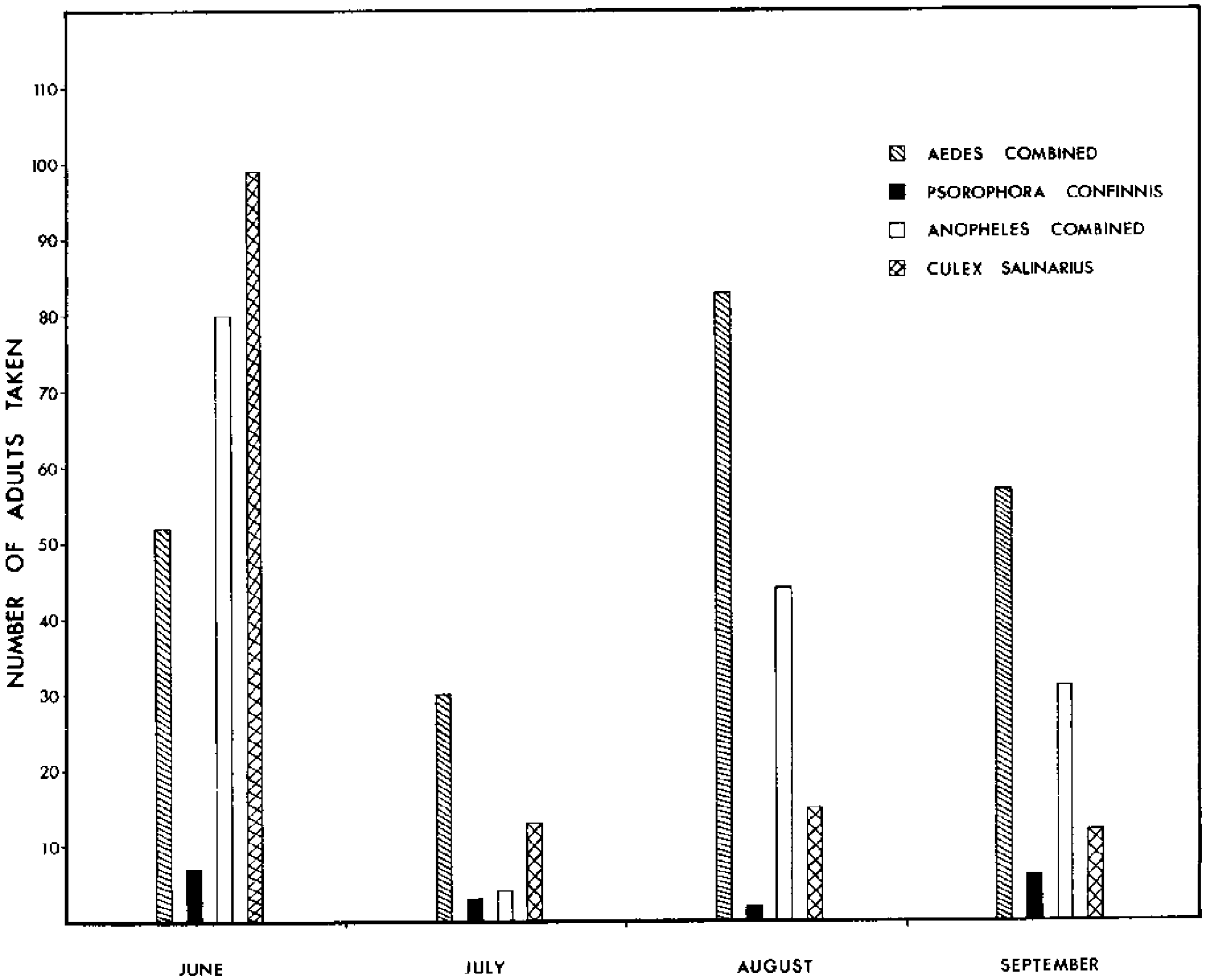
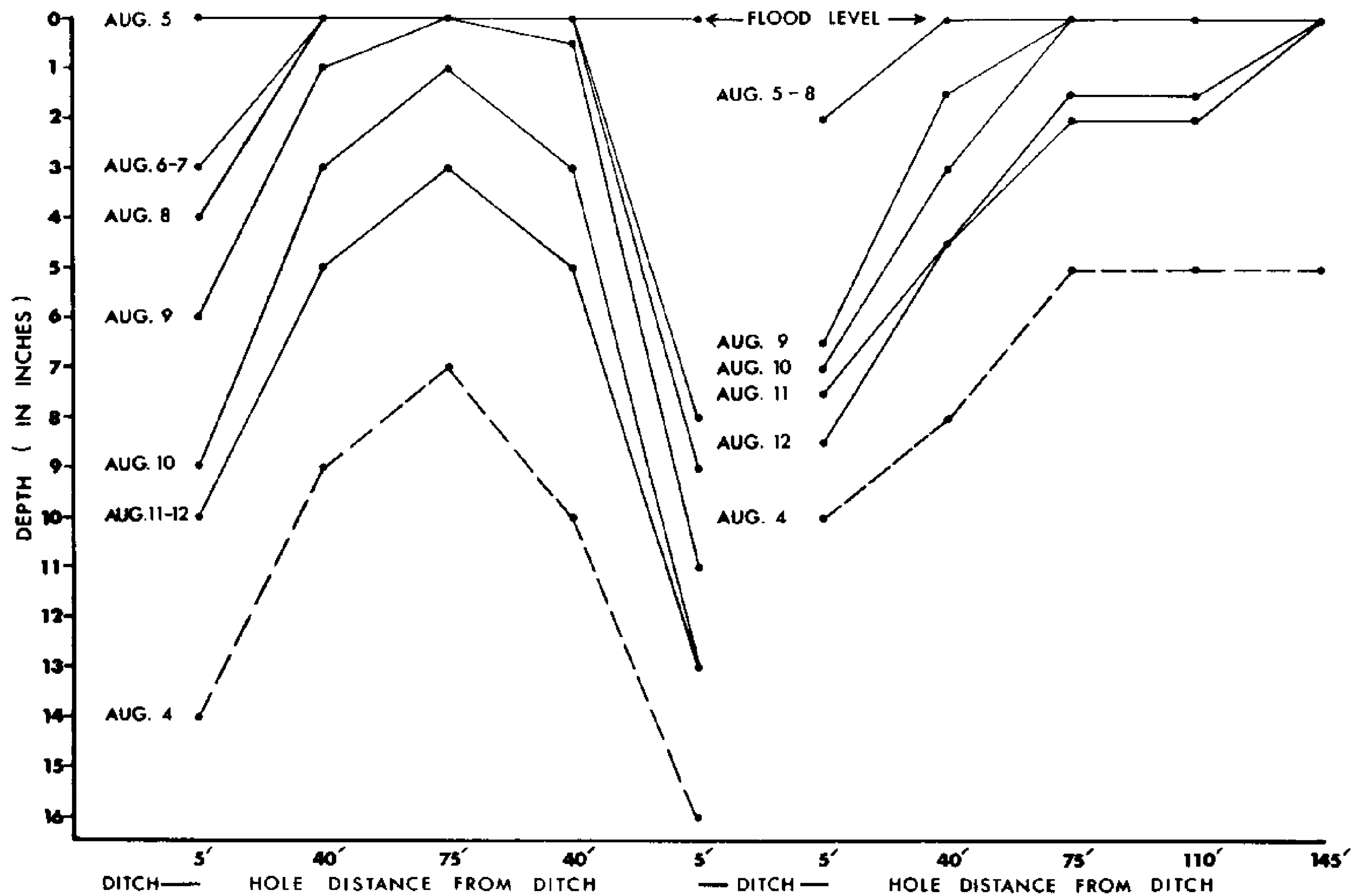


FIG. 34 TOTAL NUMBER OF ADULT MOSQUITOES TAKEN PER MONTH DURING BITING COUNTS AT NEWPORT RIVER (1972)

FIG. 35 NORTH RIVER STUDY AREA. CARTERET CO. N.C., AUG. 1971
EFFECT OF DITCHING ON GROUND WATER LEVEL



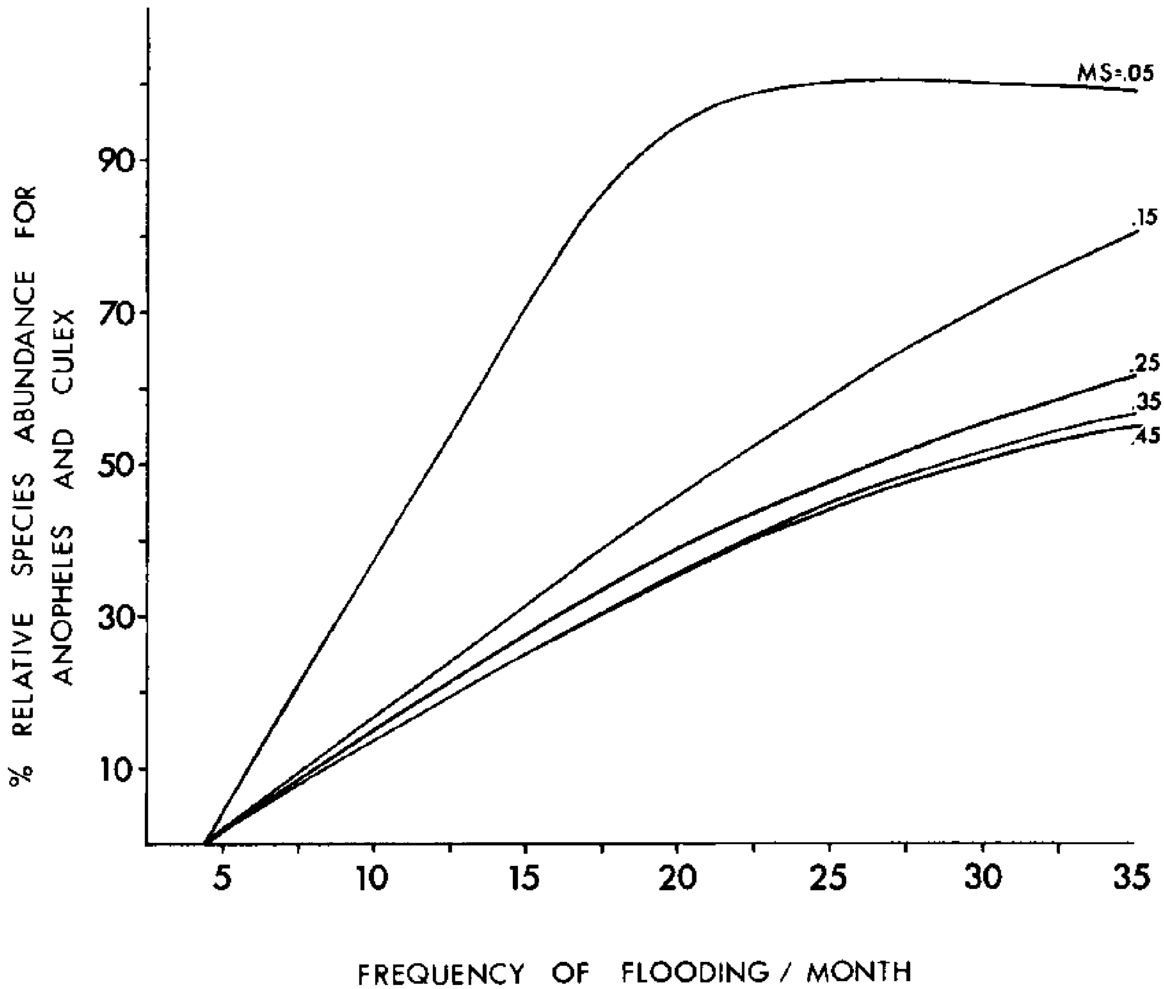


FIG. 36 RESPONSE TO FREQUENCY OF FLOODING AT 5 MEAN SLOPE VALUES (DITCHED SITES)

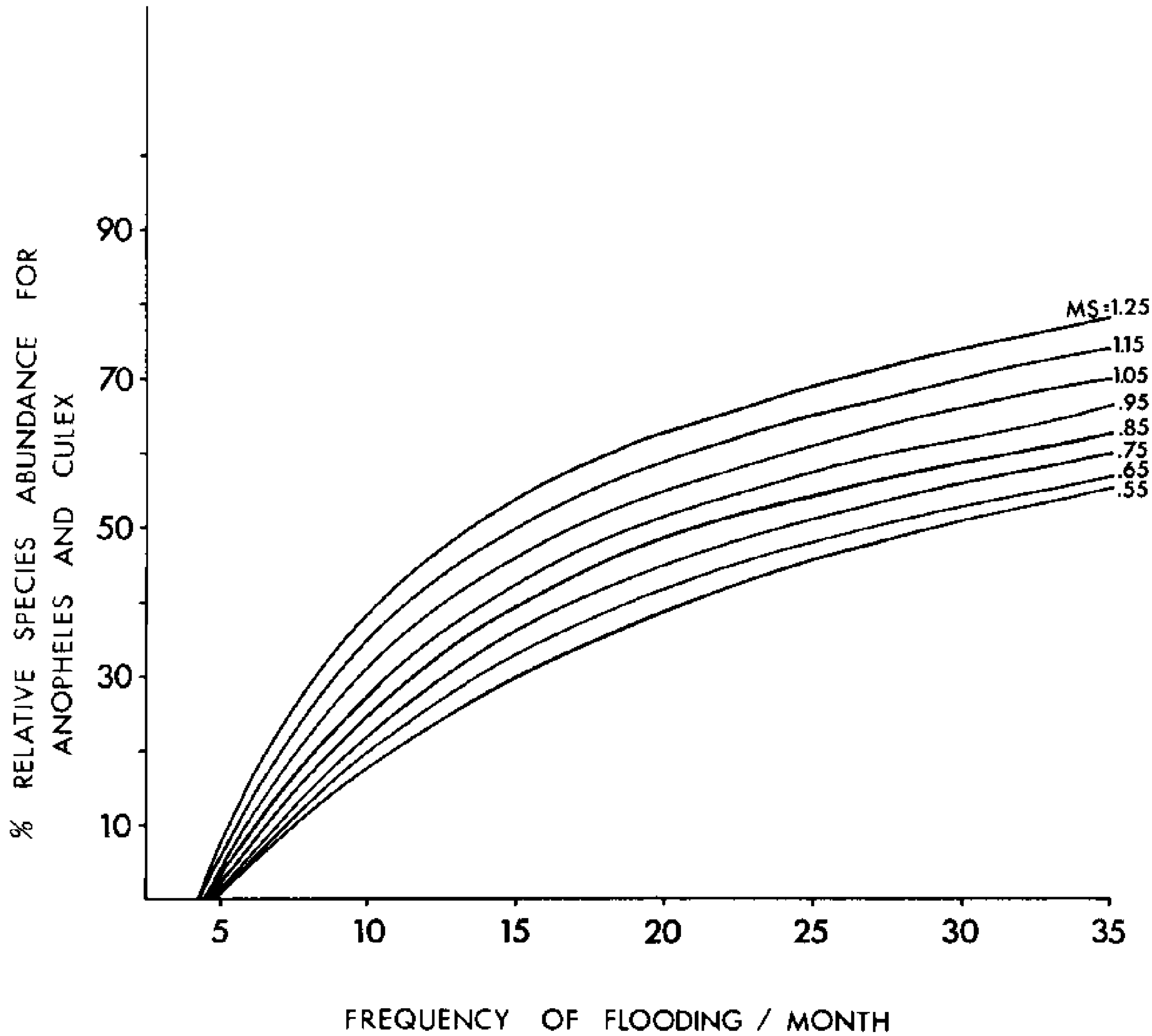


FIG. 37 RESPONSE TO FREQUENCY OF FLOODING AT 8 MEAN SLOPE VALUES (DITCHED SITES)

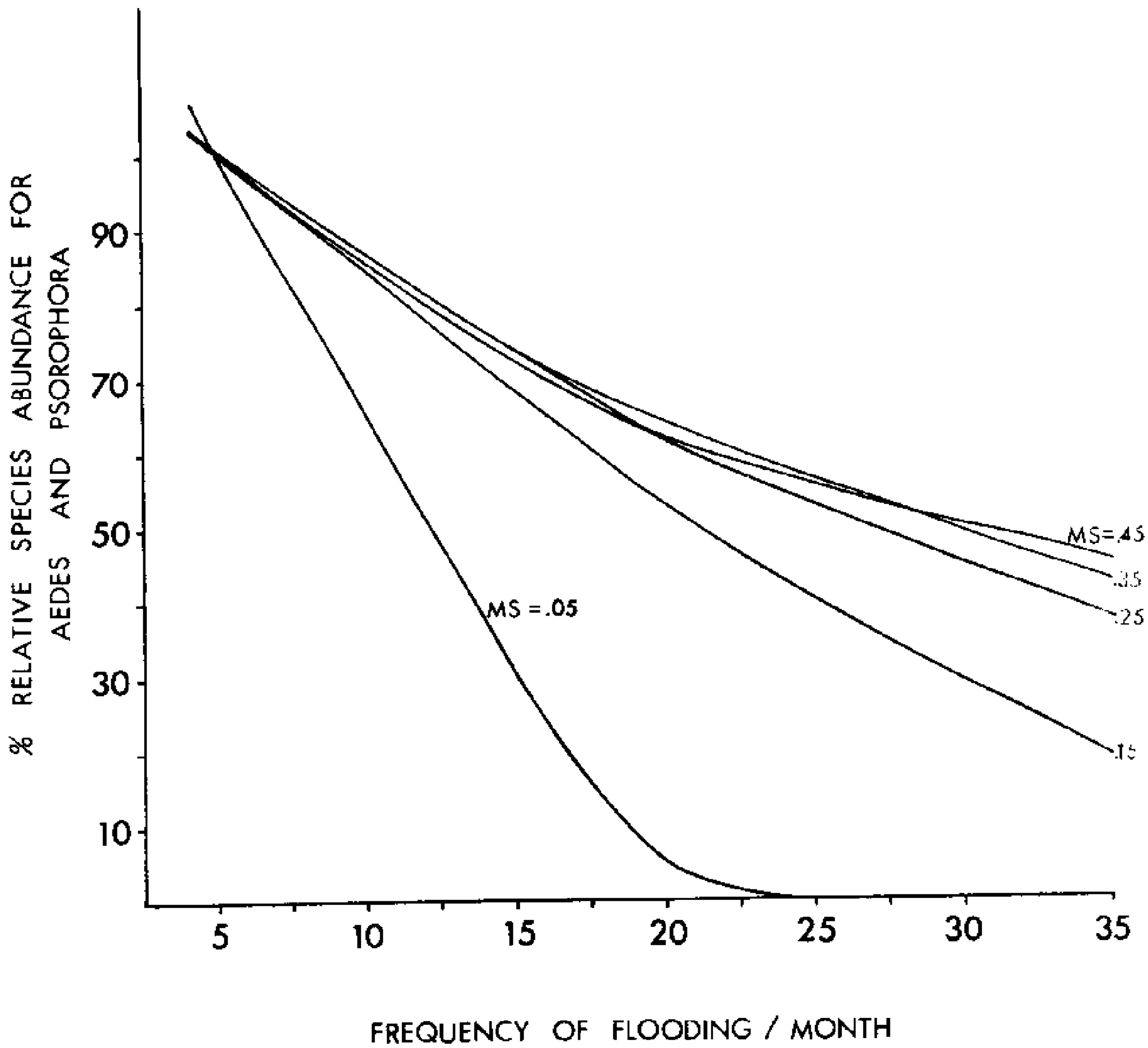


FIG. 38 RESPONSE TO FREQUENCY OF FLOODING AT 5 MEAN SLOPE VALUES (DITCHED SITES)

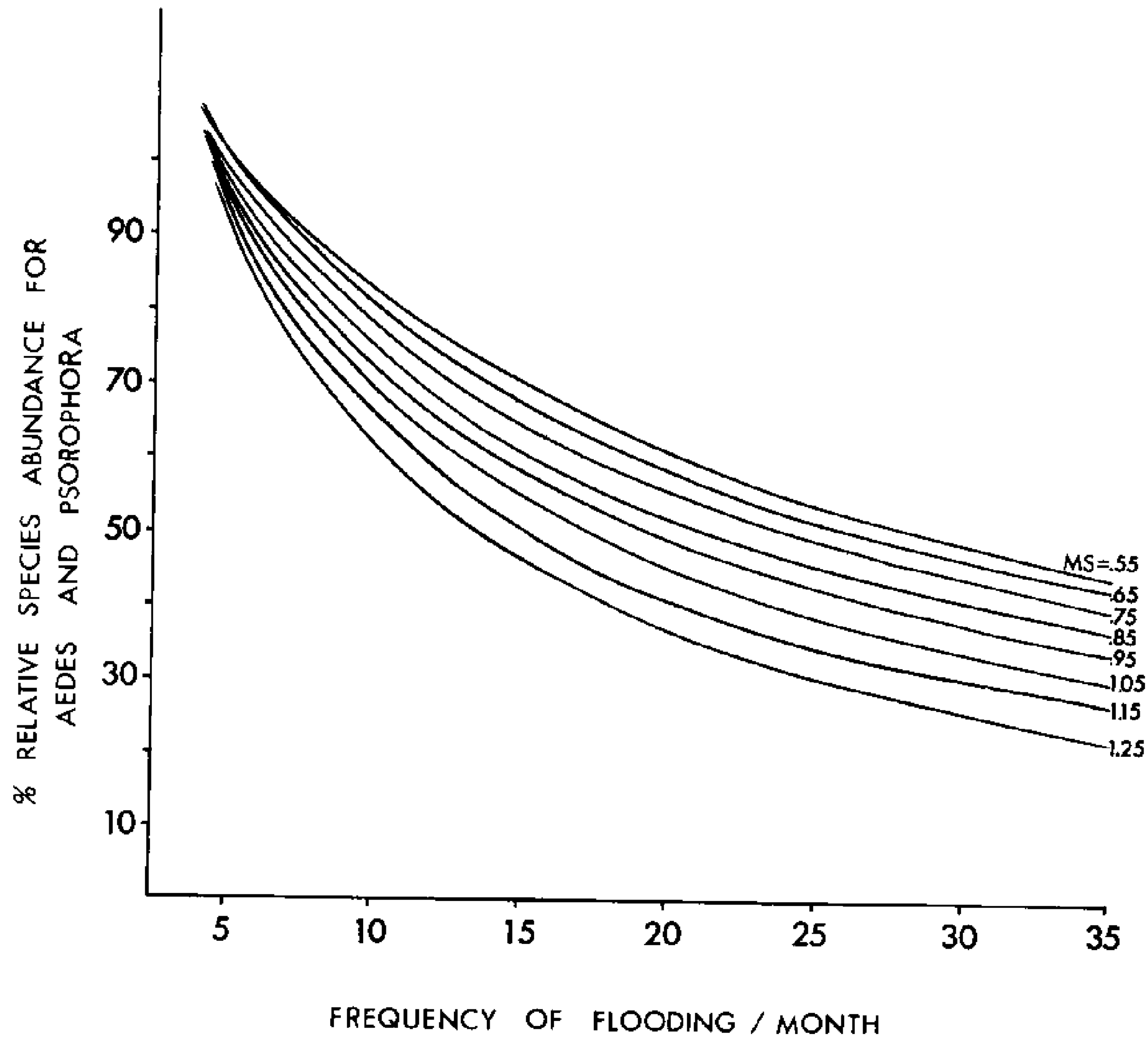


FIG. 39 RESPONSE TO FREQUENCY OF FLOODING AT 8 MEAN SLOPE VALUES (DITCHED SITES)

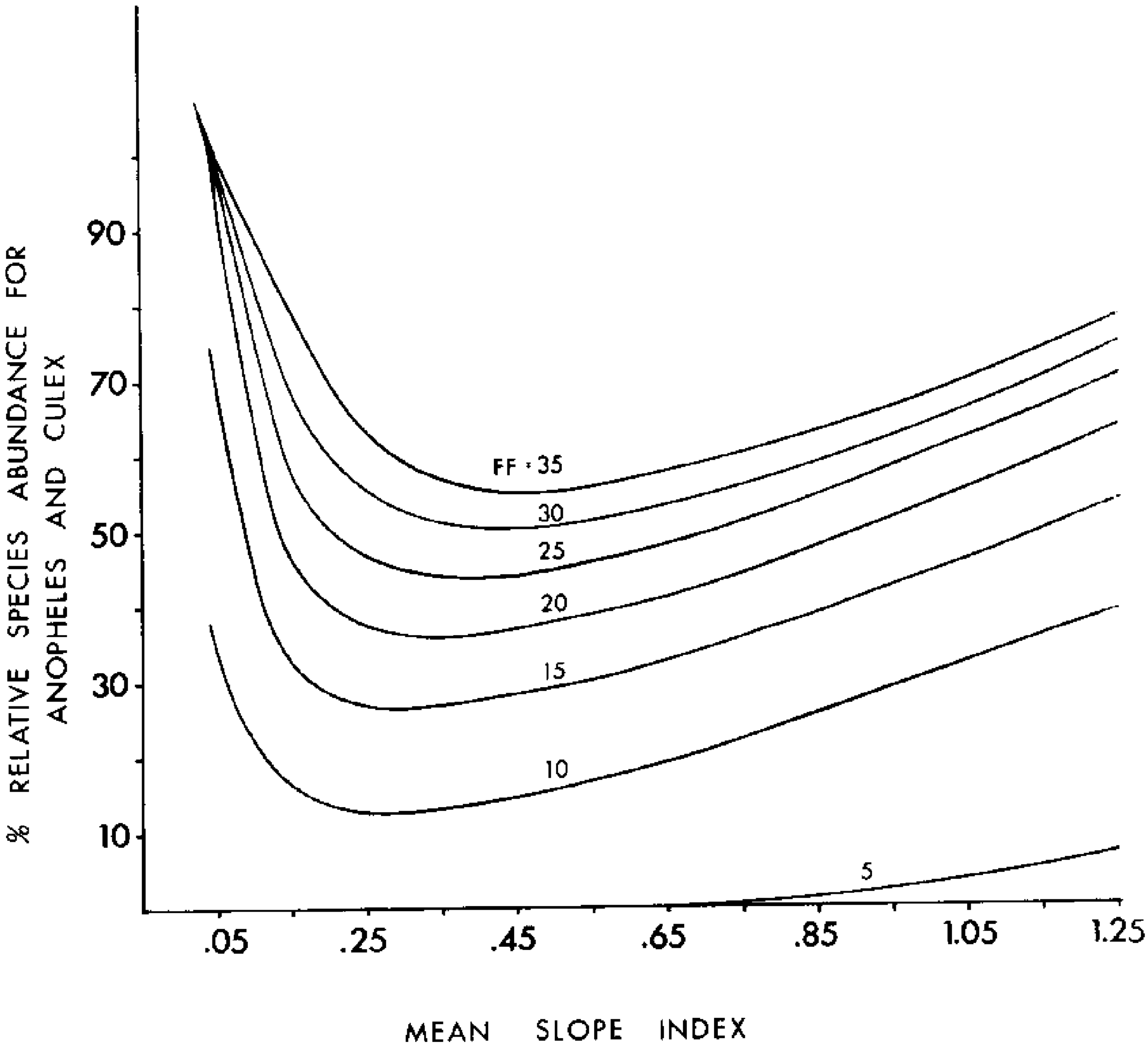


FIG. 40 **RESPONSE TO MEAN SLOPE AT 7 FREQUENCY OF FLOODING VALUES (DITCHED SITES)**

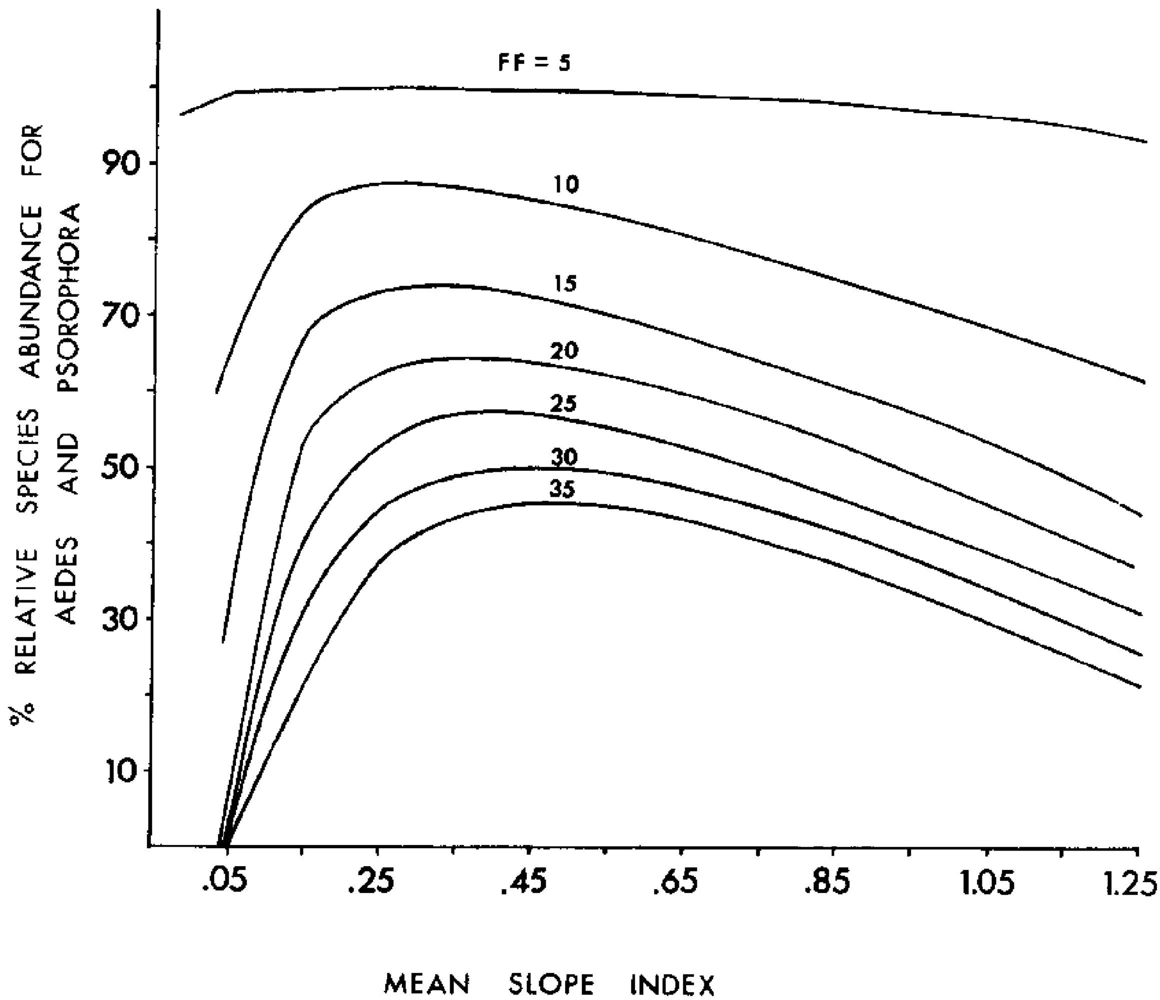


FIG. 41 RESPONSE TO MEAN SLOPE AT 7 FREQUENCY OF FLOODING VALUES (DITCHED SITES)

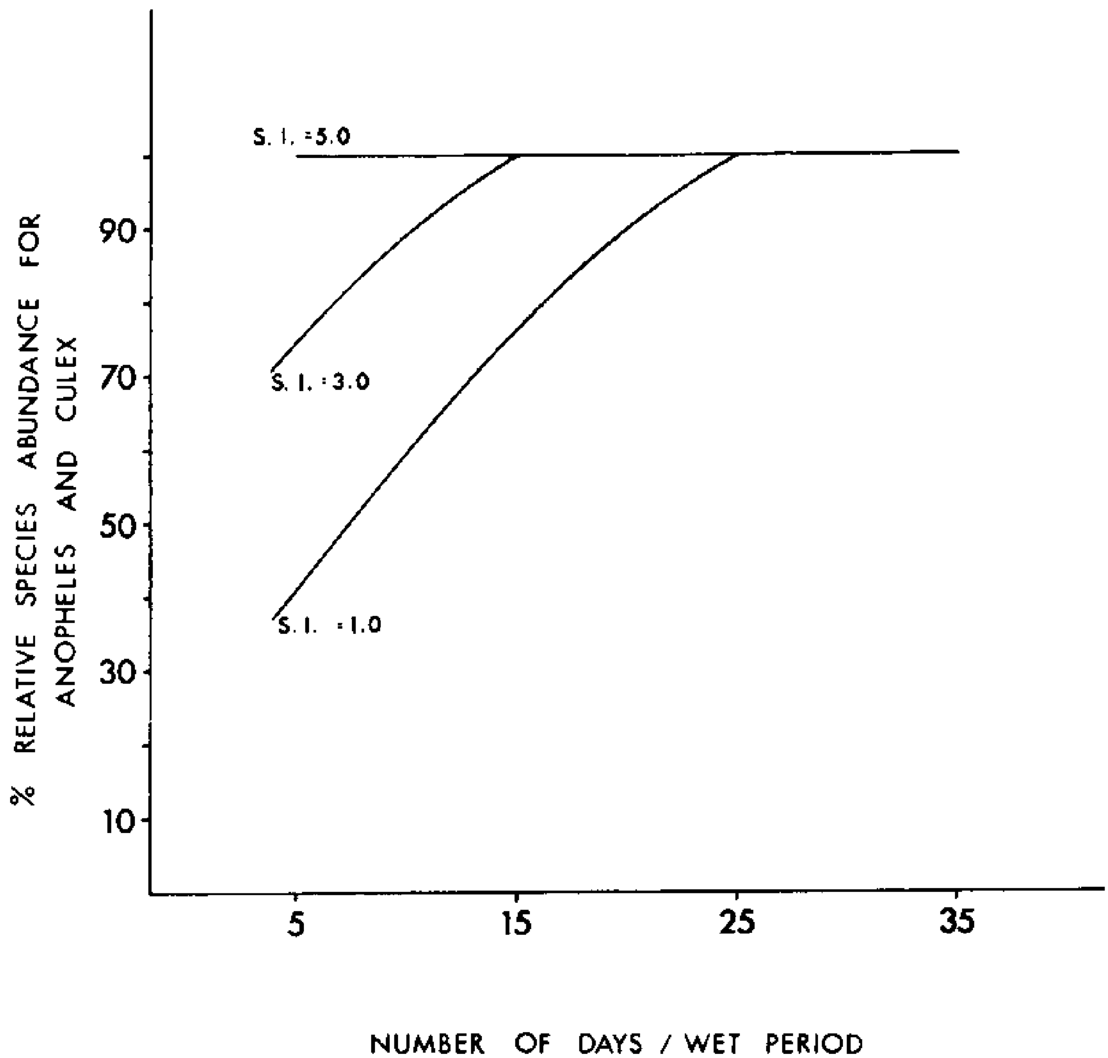


FIG. 42 RESPONSE TO NUMBER OF DAYS PER WET PERIOD AT A FREQUENCY OF STANDING WATER OF 70% AND AT 3 S. I. VALUES (UNDITCHED SITES)

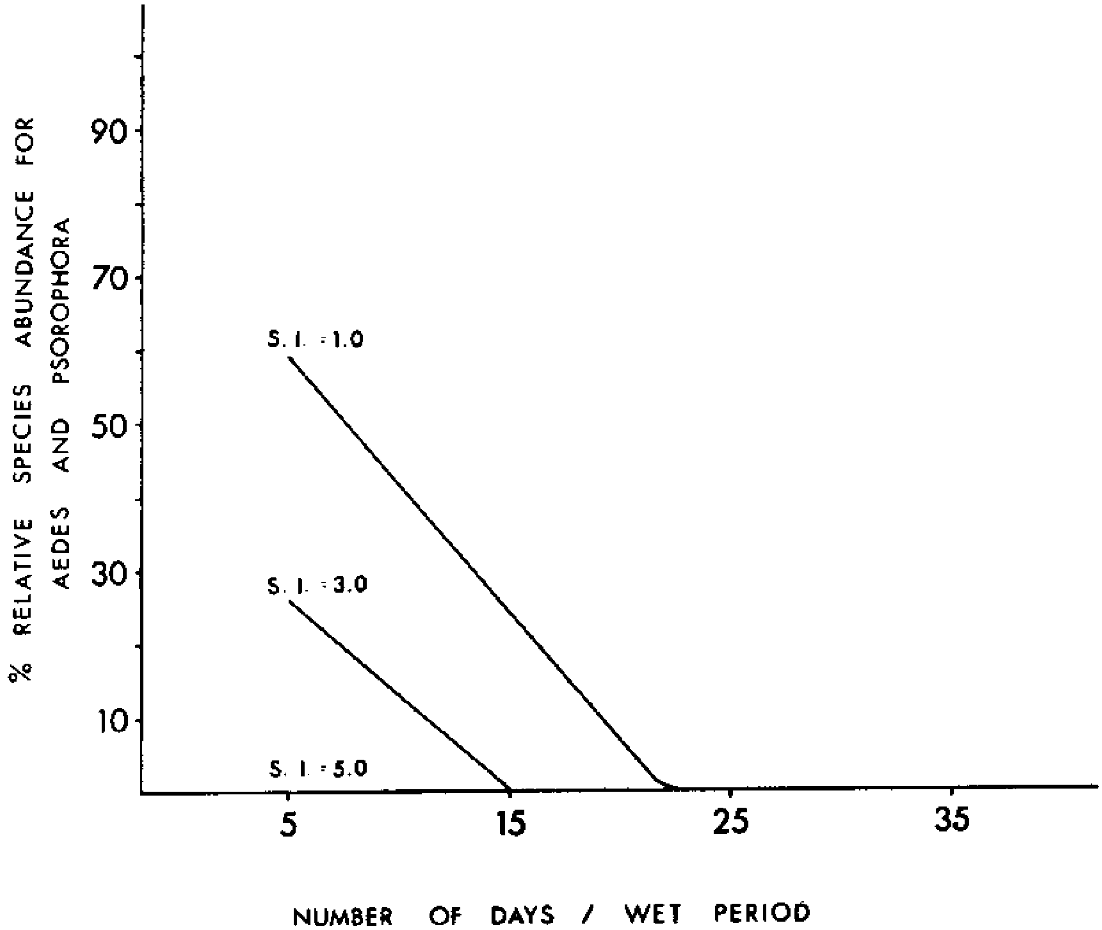


FIG.43 RESPONSE TO NUMBER OF DAYS PER WET PERIOD AT A FREQUENCY OF STANDING WATER OF 70% AND AT 3 S. I. VALUES (UNDITCHED SITES)

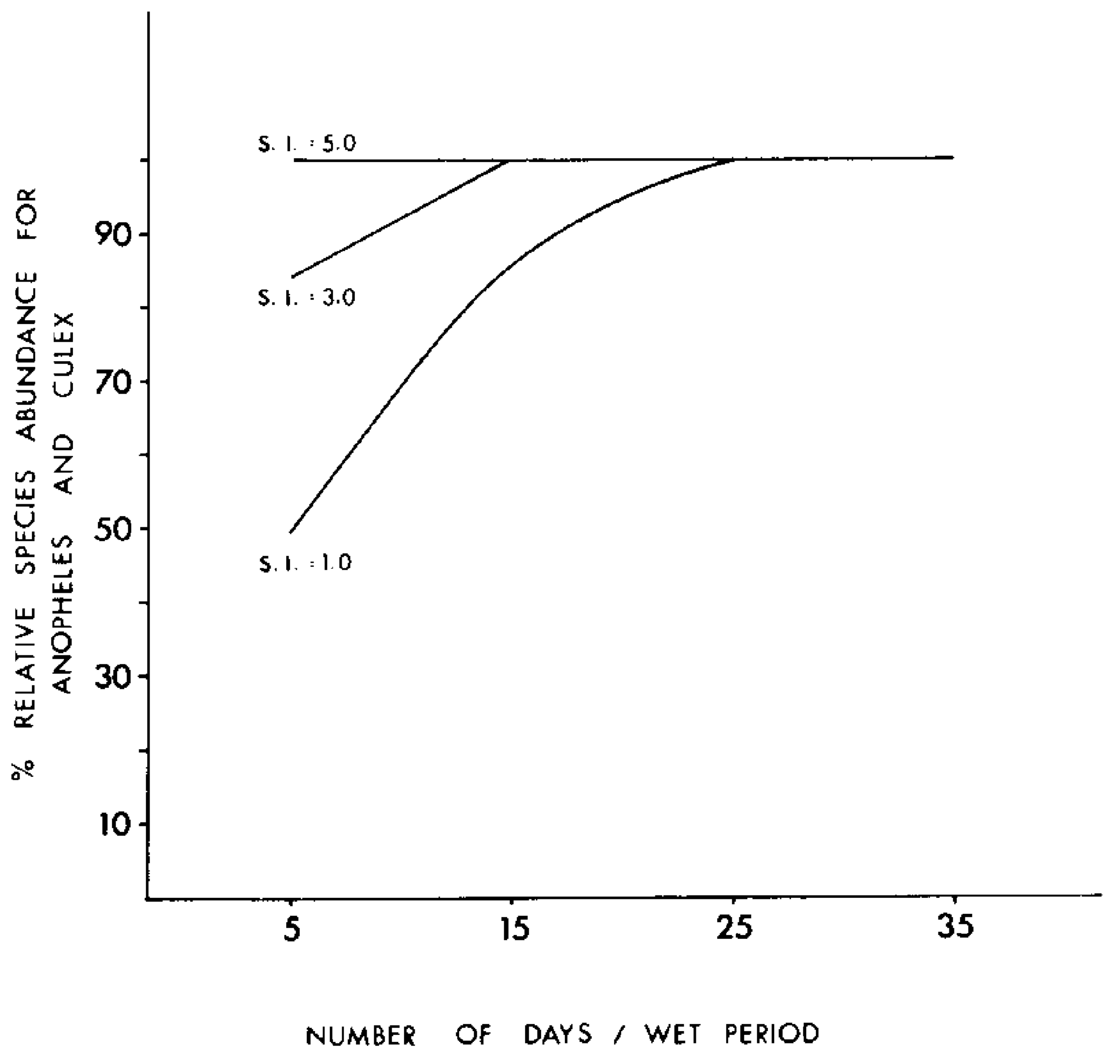


FIG.44 RESPONSE TO NUMBER OF DAYS PER WET PERIOD AT A FREQUENCY OF STANDING WATER OF 90% AND AT 3 S.I. VALUES (UNDITCHED SITES)

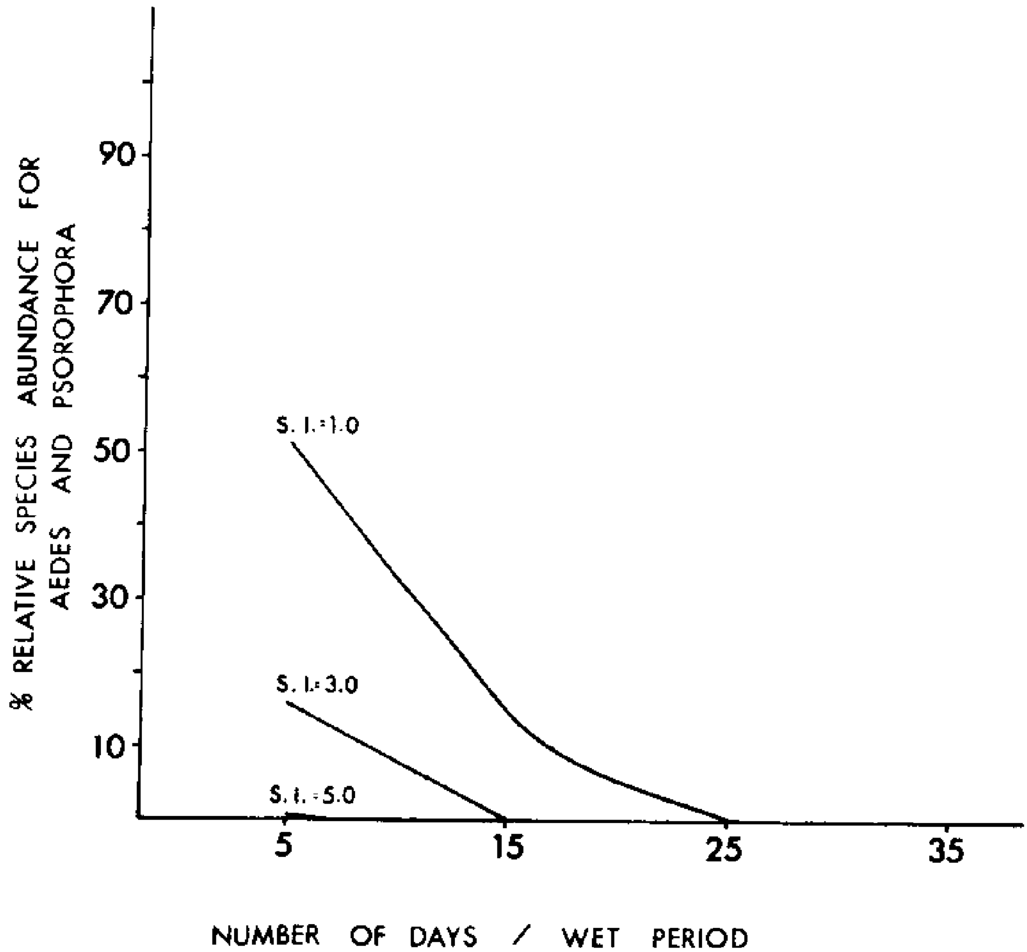


FIG.45 RESPONSE TO NUMBER OF DAYS PER WET PERIOD AT A FREQUENCY OF STANDING WATER OF 90% AND AT 3 S. I. VALUES (UNDITCHED SITES)

Table 1. Data on Frequency, Duration, and Extent of Flooding for Study Areas.

Study area	No. of sites	Frequency of flooding/month (at tide gauge)		Frequency of flooding/month /site		Frequency of standing water (in percentage)		No. of wet intervals /site		No. of days /wet interval		No. of dry intervals /site		No. of days /dry interval	
		Mean	Range	Mean	Range	Mean	Range	Mean	Range	Mean	Range	Mean	Range	Mean	Range
North River															
unditched	26	15	5-36	15.0	5-36	71.0	50-90	5.9	3-11	23.0	7.0-54.0	5.5	2-10	7.0	2.5-8.0
ditched	15	15	5-36	15.0	5-36	63.0	42-80	7.5	3-11	14.3	5.8-39.0	7.1	2-11	5.0	2.0-6.0
Newport River															
unditched	1	30	9-37	19.0	5-37	77.6	-	7.2	-	23.2	1.0-40.0	6.0	-	6.5	3.0-11.0
ditched	13	30	9-37	14.0	7-19	53.0	15-100	7.6	3-12	17.8	6.0-67.0	7.6	2-12	13.0	4.5-28.4
Kings Point															
unditched	21	24	11-43	20.8	1.27	80.0	14-100	4.4	1-11	88.4	3.0-240.0	3.7	0-11	8.4	0.0-32.3
Davis															
ditched	23	30	19-45	20.2	6-33	48.0	19-100	8.9	1-16	14.7	3.6-94.0	8.7	2-15	15.0	3.5-95.0
Wards Creek															
unditched	1	15	5-36	15.0	5-36	77.0	-	7.0	-	20.0	4.0-31.0	9.0	-	4.4	2.0-9.0

Table 2. Plant Cover Summary for Breeding Sites of Ditched and Unditched Sections of Study Areas (in percentage).

Study area	No. of sites	*Juncus roemerianus*	*Distichlis spicata*	*Spartina patens*	*Spartina alterniflora*	*Baccharis halimifolia*	*Borrichia frutescens*	*Panicum virgatum*	*Cladium jamaicense*	*Salicornia virginica*	Other
North River											
unditched	26	43	25.0	0.9	3.4	0.0	2.2	1.5	0.0	0.0	24.0
ditched	15	32	52.4	2.3	.3	24.0	1.0	9.6	0.0	0.0	0.4
Newport River											
unditched	1	0	25.0	25.0	50.0	0.0	0.0	0.0	0.0	0.0	0.0
ditched	13	21	40.0	6.0	27.0	5.4	0.0	0.0	0.0	0.0	0.6
Kings Point											
unditched	21	49	16.4	26.0	0.0	0.95	0.8	0.0	2.1	4.7	0.0
Davis											
ditched	23	63	6.6	19.0	0.0	2.1	0.0	0.0	0.0	0.0	9.3
Wards Creek											
unditched	1	15	80.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.0

Table 3. Abundance of Aedes - Psorophora and Anopheles - Culex in Ditched and Unditched Sections of Study Areas.

Study area	No. of sites	Breeding index		Specimens taken		Specimens taken /site		Percentage abundance		Percentage potential survival	
		Mean	Range	Total	%	Mean	Range	Aedes and Psorophora	Anopheles and Culex	Aedes and Psorophora	Anopheles and Culex
North River											
unditched	26	2.3	2-79	2475	41.5	93	18-237	48	52	57	54
ditched	15	23.8	.004-262.0	3420	58.5	228	8-1540	75	25	82	54
Newport River											
unditched	1	256.0	40-1600.0	141	19.0	141	-	30	70	96	86
ditched	13	3.2	.006-200.0	709	81.0	54	1-355	38	62	86	79
Kings Point											
unditched	21	6.5	0.0-276.0	1525	60.0	76	1-380	35	65	95	91
Davis											
ditched	23	2.6	.01-72.6	1011	40.0	43	5-198	53	47	86	73
Wards Creek											
unditched	1	300.0	0.0-4320.0	13,886	-	13,886	-	100	0	97	-

Table 4. Abundance of *Aedes* - *Psorophora* and *Anopheles* - *Culex* Species in Ditched and Unditched Sections of Study Areas (in percentage).

Study area	No. of sites	*Aedes sollicitans*	*Aedes taeniorhynchus*	*Aedes atlanticus*	Other *Aedes* Spp.	*Psorophora confinnis*	Other *Psorophora* Spp.	*Anopheles atropos*	*Anopheles bradleyi*	*Anopheles* 2nd instar	Other *Anopheles* Spp.	*Culex salinarius*	*Culex territans*	Other *Culex* Spp.
North River														
unditched	26	43.0	13.0	0.0	0.0	0.0	0.0	80.0	57.0	0.0	0.0	0.0	0.0	0.0
ditched	15	57.0	87.0	0.0	0.0	0.0	0.0	20.0	43.0	0.0	0.0	100.0	0.0	0.0
Newport River														
unditched	1	12.0	10.0	0.0	40.0	0.0	0.0	56.0	22.0	20.0	0.0	28.0	0.0	0.0
ditched	13	88.0	90.0	0.0	60.0	100.0	0.0	44.0	78.0	80.0	0.0	72.0	100.0	100.0
Kings Point														
unditched	21	75.0	63.0	2.0	20.0	0.0	1.0	55.0	77.0	67.0	0.0	100.0	0.0	0.0
Davis														
ditched	23	25.0	37.0	98.0	80.0	100.0	99.0	45.0	23.0	33.0	0.0	0.0	0.0	100.0
Wards Creek														
unditched	1	6.2	93.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Table 5. Abundance of *Aedes* - *Psorophora* and *Anopheles* - *Culex* Species in Sites of Ditched and Unditched Sections of Study Areas (in percentage).

Study area	No. of sites	*Aedes sollicitans*	*Aedes taeniorhynchus*	*Aedes atlanticus*	Other *Aedes* Spp.	*Psorophora confinnis*	Other *Psorophora* Spp.	*Anopheles atropos*	*Anopheles bradleyi*	*Anopheles* 2nd instar	Other *Anopheles* Spp.	*Culex salinarius*	*Culex territans*	Other *Culex* Spp.
North River														
unditched	26	20.0	5.0	0.0	0.0	0.0	0.0	24.0	50.0	0.0	0.0	0.0	0.0	0.0
ditched	15	34.0	17.0	0.0	0.0	0.0	0.0	8.0	37.0	0.0	0.0	2.0	0.0	0.0
Newport River														
unditched	1	22.0	0.1	0.0	8.0	0.0	0.0	21.0	19.0	29.0	0.0	1.0	0.0	0.0
ditched	13	35.0	1.0	0.0	2.0	0.0	0.0	5.0	40.0	10.4	0.0	1.4	5.0	0.0
Kings Point														
unditched	21	12.0	1.0	0.9	1.5	0.0	0.2	12.0	30.0	42.0	0.0	0.5	0.0	0.0
Davis														
ditched	23	12.0	0.9	16.0	10.4	0.5	0.1	11.0	13.0	35.0	0.0	0.0	0.0	0.0
Wards Creek														
unditched	1	6.2	93.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Table 6. Survival Summary for Species Breeding in Ditched and Unditched Sections of Study Areas (in percentage).

Study area	No. of sites	*Aedes sollicitans*	*Aedes taeniorhynchus*	*Aedes atlanticus*	Other *Aedes* Spp.	*Psorophora confinnis*	Other *Psorophora* Spp.	*Anopheles atropos*	*Anopheles bradleyi*	*Anopheles* 2nd instar	Other *Anopheles* Spp.	*Culex salinarius*	*Culex territans*	Other *Culex* Spp.
North River														
unditched	26	73	78	-	0	0	0	52	57	0	0	0	0	0
ditched	15	49	81	-	0	0	0	45	56	0	0	51	0	0
Newport River														
unditched	1	94	100	-	83	100	0	65	82	100	0	0	0	0
ditched	13	80	68	-	46	100	0	86	86	90	0	0	50	0
Kings Point														
unditched	21	92	100	100	100	0	100	95	87	77	0	0	50	0
Davis														
ditched	23	83	88	84	83	100	0	87	70	56	0	0	100	100
Wards Creek														
unditched	1	90	97	0	0	0	0	0	0	0	0	0	0	0

Table 7

GROUND WATER LEVELS

North River

Aug. 2-17, 1971

Date	Ditched Area: Hole nearest ditch 1	Ditched Area: 2	Ditched Area: 3	Ditched Area: 4	Ditched Area: 5	Control Area: Hole nearest ditch 1	Control Area: 2	Control Area: 3	Control Area: 4	Control Area: Inner-Most hole 5	Tide level: In tenths of feet (0 = marsh level)	Tide level	
Aug 2	14	6	6	7	15	10	7	4	3.5	3	-.2	-.3	
3	15	7	6	8	17	10.5	7	4	6	5	-.85	-.15	
4	14	9	7	10	16	10	8	5	5	5	-.85	-.15	
5	0	0	0	0	0	2	0	0	0	0	-.85	+.1	
6	3	0	0	0	8	2	0	0	0	0	-.25	+.4	flood period
7	3	0	0	0	8	0.5	0	0	0	0	-.1	+.2	
8	4	0	0	0	9	2	0	0	0	0	-.2	+.1	12 hrs. total
9	6	1	0	0.5	11	6.5	6.5	1.5	0	0	-.1	-.1	
10	9	3	1	3	13	7.5	3	0	0	0	-.1	-.1	
11	10	5	3	5	13	7	4.5	1.5	1.5	0	-.35	-.2	
12	10	5	3	5	14	8.5	4.5	2	2	0	-.5	-.2	
13	10	5	4	5	13	8.5	5	2	1.5	0	-.3	+.1	
14	6	4	3	5	12	6	1.5	0	0	0	0	+.4	
15	1	0	0	0	6	6	0.5	0	0	0	-.15	+.4	flood period
16	1	0	0	0	6	5	0	0	0	0	-.35	+.1	
17	0.5	0	0	0	3	4	0	0	0	0	-.5	+.2	(13 hrs. total)

Table 8

GROUND WATER LEVELS

Davis

Aug. 2-31, 1972

Date	Ditched Area — Hole nearest ditch 1	2	3	4	5	6	7	8	Hole nearest ditch 1	2	3	4	5	6	7	8	9 (Inner-most hole)	Tide level*	
Aug 2	14	9.5	7	5.5	3	3	3	7.5	7	5	4	3	2	2	2.5	3	7	-.45	0
4	8	6.5	2	0	0	0	0	4.5	0	0	0	0	0	0	0	0	0	-.15	+.4
6	6	4	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	+.45	+.6
7	5	1.5	0	0	0	0	0	4	3.5	0	0	0	0	0	0	0	3	+.1	+.1
9	11	8	5	2	2	2.5	3	6.5	6	3	0.5	0.5	0.5	1	0.5	1.5	5	-.4	-.3
11	7	7	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	+.3	+.35
13	7	6	4	1	2	2	3	4	0	0	0	0	0	0	0	0	0	+.08	+.1
14	13.5	11	7.5	5	3	3	3	6.5	6	3	2.5	2	2	1.5	3	2	6	0	+.1
16	8	8	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	-.1	+.55
18	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	+.3
20	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	+.6
21	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	+.4	+.7
23	7	4	2.5	0	0	0	0	5	5	1	0	0	0	0	0	0	5	+.1	+.2
25	6	9	6	1	1	0	0	3	1	0	0	0	0	0	0	0	1	+.2	+.15
27	6	8	5	0	0	0	0	3	0	0	0	0	0	0	0	0	0	+.1	+.3
29	11	7	4	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	+.4
31	9	0	0	0	0	0	0	0	0	0	0.5	0	0	0	0	0	0	+.45	+.85

*In tenths of feet (0 = Marsh level)

Table 9

GROUND WATER LEVELS

Newport River

Aug. 1-15, 1972

Date	Ditched Area: Hole nearest ditch 1	2	3	4	5	Control Area: Hole nearest ditch 1	2	3	4	5	6	7	8	9	Inner-most hole 10	Tide level*	
Aug 1	4	4	3.5	3.5	7	5	9	8	7	6	6	3	3	0	0	-.2	-.4
3	0	5	5	4	0	0	13	12	11	10	9	7.5	6	3	33	0	+.7
5	0	0	0	0	2	1.5	4	2	0	0	0	0	0	0	0	-	-**
7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	00	+.7	+.85
8	2	0	0	0	5	2	2	0	0.5	0.5	0	0	0	0	00	+.35	-
10	4.8	3.6	3.6	3.6	7.2	4	5	4	3	3	2	0	2	0	00	+.4	-
12	4	4	4	4	6	3	7	6	5	5.5	5	4	3.5	0	11	+.2	-.05
14	4	4	4	3	5	3	7	6	5	5	4	3	3	0	0		
15	4	3	3	3	2	2	6	6	4	4	3	2	2	0	00		

*In tenths of feet (0 = Marsh level)
**No data available

Table 10. Significant Parameters for Unditched Sites and Results of Statistical Analysis.

Parameter		Degrees of freedom	Regression coefficient	F-Test
FOSWI	(1/frequency of standing water)	1	30.43958	20.07329**
NWET	(Number of days/wet period)	1	- 0.03892	5.58918*
S.I.	(Suitability index, frequency of flooding x 1/mean slope)	1	- 0.23687	24.28418***
S.I.2	$(S.I.)^2$	1	0.01253	18.46232**
ERROR		33		

Multiple correlation coefficient (R^2) = 0.69267512***
***P > 0.0001
**P > 0.01
*P > 0.05

Table 11. Significant Parameters for Ditched Sites and Results of Statistical Analysis.

Parameter		Degrees of freedom	Regression coefficient	F-Test
MS	(Mean slope)	1	-0.00494471	3.66171°
FF1	(1/frequency of flooding)	1	5.20616128	15.97301**
S.I.	(Suitability Index, frequency of flooding x 1/mean slope	1	-0.33915241	21.16088**
S.I.2	$(S.I.)^2$	1	0.02399442	15.79464**
ERROR		31		

Multiple correlation coefficient (R^2) = 0.72889868***
***P > 0.0001
**P > 0.01
*P > 0.05
o > 0.10

APPENDIX

Table 1. Data on Physical Characteristics, Frequency, Duration and Extent of Flooding of Wards Creek and North River Study Sites, 1971.

	Site number	Depth of water (in inches)	Surface area (sq.ft.)	Mean slope index	Frequency of flood. /month	Frequency of standing water (%)	Number of wet periods	Mean No. of days/ wet period	Number of dry periods	Mean No. of days/ dry period	Distance from nearest ditch (in feet)
Wards Creek Study area	1	10.0	600	41.0	15	77	7	20.0	10.0	4.0	83.0
North River Study area	2	7.0	20	40.0	15	70	6	18.6	5.0	3.0	20.0
	3	4.5	50	15.0	15	80	3	39.0	2.0	7.0	55.0
	4	2.0	90	1.0	15	70	6	17.0	6.0	4.5	51.0
	5	2.0	300	6.0	15	57	8	11.0	10.0	4.1	67.0
	6	1.5	150	5.0	15	46	10	6.9	10.0	5.2	21.0
	7	2.5	150	4.0	15	67	8	12.6	8.0	4.0	63.0
	8	3.0	150	5.0	15	66	10	10.0	8.0	5.0	55.4
	9	1.5	150	2.5	15	42	11	5.8	11.0	4.5	71.4
	10	1.8	10	6.0	15	43	9	7.0	9.0	5.7	51.0
	11	2.0	50	3.0	15	76	5	23.0	4.0	5.0	51.0
	12	1.7	150	3.0	15	45	9	7.5	9.0	5.5	23.1
	13	2.8	500	4.0	15	63	9	10.5	8.0	4.5	48.5
	14	7.0	1500	11.0	15	73	6	8.0	5.0	6.0	30.0
	15	5.0	250	8.0	15	76	6	19.0	7.0	6.0	106.0
	16	4.1	150	7.0	15	65	8	12.0	8.0	7.0	74.0
	17	5.0	120	8.0	15	75	7	16.0	5.0	4.0	137.0
	18	4.1	50	6.0	15	70	8	12.8	7.0	6.0	236.0
	19	3.0	25	5.0	15	50	6	13.8	5.0	5.0	298.0
	20	3.0	50	10.0	15	50	11	7.0	10.0	7.6	254.0
	21	4.0	500	7.0	15	63	9	9.2	9.0	6.8	238.0
	22	3.0	330	10.0	15	75	7	16.0	6.0	7.0	272.0
	23	3.7	150	7.0	15	80	7	17.0	6.0	6.0	210.0
	24	4.0	460	7.0	15	70	7	15.0	6.0	6.0	108.0
	25	2.9	150	1.0	15	70	5	25.0	3.0	6.0	135.0
	26	2.9	40	2.0	15	90	4	34.0	2.0	2.5	315.0
	27	2.4	230	4.0	15	90	3	53.0	4.0	6.0	288.0

Table I. (Continued)

	Site number	Depth of water (in inches)	Surface area (sq.ft.)	Mean slope index	Frequency of flood. /month	Frequency of standing water (%)	Number of wet periods	Mean No. of days/ wet period	Number of dry periods	Mean No. of days/ dry period	Distance from nearest ditch (in feet)
North River Study area	28	3.2	300	5.0	15	90	4	34.0	4.5	8.0	185.0
	29	2.2	100	4.0	15	70	5	20.0	5.0	8.0	264.0
	30	1.5	150	2.0	15	60	5	18.0	4.0	5.0	350.0
(Cont.)	31	1.7	150	1.0	15	68	6	17.0	6.0	6.0	146.0
	32	2.6	150	4.0	15	72	5	21.0	5.0	5.0	247.0
	33	2.5	150	4.0	15	90	3	54.0	2.0	3.0	323.0
	34	3.5	150	6.0	15	88	3	53.0	2.0	3.0	256.0
	35	3.4	200	6.0	15	81	5	24.0	4.0	7.0	166.0
	36	3.0	100	5.0	15	64	5	23.0	5.0	7.0	136.0
	37	2.8	150	5.0	15	63	5	18.0	4.0	7.0	136.0
	38	2.8	150	5.0	15	67	5	24.0	4.0	6.0	339.0
	39	2.3	150	7.0	15	80	6	20.0	6.0	6.0	376.0
	40	2.3	100	4.0	15	66	8	12.5	7.0	6.0	319.0
	41	1.5	100	5.0	15	51	8	9.6	7.0	8.0	311.0
	42	2.4	100	4.0	15	68	8	12.0	8.0	6.0	242.0

Table 2. Data on the Physical Characteristics, Frequency, Duration and Extent of Flooding at Davis Study Sites, 1972.

Site No.	Depth of water (in inches)	Surface area (sq.ft.)	Mean slope index	Frequency of flood. /month	Frequency of standing water (%)	Number of wet periods	Mean number of days/wet period	Number of dry periods	Mean number of days/ dry period	Distance from nearest ditch (in feet)
A*	12.0	2300	8.00	0.00	100	1	240.0	0	0.0	0.0
B*	10.0	5000	5.00	0.00	100	1	240.0	0	0.0	0.0
C*	8.0	100	13.00	0.00	30	6	10.5	6	21.0	0.0
1	5.0	150	35.00	5.00	24	7	7.0	8	16.0	264.0
2	3.0	10	8.00	6.50	19	11	3.6	11	13.0	312.0
3	5.0	100	71.00	6.00	30	8	8.0	8	16.0	115.0
4	1.0	400	0.71	3.00	9	5	4.0	5	33.0	23.0
5	3.0	100	5.00	13.50	40	16	6.0	5	5.5	126.0
6	3.0	100	5.00	12.00	42	13	7.6	12	9.7	172.0
7	6.5	100	5.00	13.50	45	12	8.0	11	9.5	138.0
8	5.0	200	6.60	10.00	42	10	9.2	9	12.0	115.0
9	4.0	100	6.60	8.00	38	11	7.3	10	12.7	126.0
10	12.0	200	20.00	33.00	81	9	19.0	7	3.5	50.0
11	12.0	200	60.00	33.00	89	8	23.0	6	5.0	85.0
12	11.0	150	14.00	31.00	62	7	19.0	6	12.0	140.0
13	5.0	400	10.00	15.00	39	12	7.0	9	14.0	92.0
14	5.0	150	41.00	23.00	54	16	7.7	15	5.4	87.4
15	5.0	200	11.00	33.00	72	12	12.6	10	5.7	92.0
16	12.0	60	40.00	33.00	90	2	94.0	1	9.0	80.0
17	4.0	200	5.00	33.00	60	11	11.6	11	8.0	100.0
18	4.0	200	3.00	33.00	60	12	10.4	11	8.0	95.0
19	3.0	150	10.00	6.00	22	8	6.0	9	8.0	90.0
20	6.0	50	24.00	6.00	32	8	8.5	8	17.6	90.0
21	5.0	400	3.00	33.00	51	13	8.3	12	7.6	70.0
22	0.5	4000	3.00	0.12	3	1	7.0	2	95.0	100.0
23	10.0	150	100.00	33.00	81	6	28.5	5	5.6	50.0

*Unditched sites

Table 3. Data on the Physical Characteristics, Frequency, Duration and Extent of Flooding at Kings Point Study Sites, 1972.

Site No.	Depth of water (in inches)	Surface area (sq.ft.)	Mean slope index	Frequency of flood. /month	Frequency of standing water (%)	Number of wet periods	Mean number of days/wet period	Number of dry periods	Mean number of days/ dry period	Distance from nearest ditch (in feet)
1	6.0	50	83.00	17.6	75	6	26.0	5	10.0	2038
2	5.0	2500	5.00	22.00	70	7	21.0	6	11.0	1739
3	7.0	100	10.00	27.00	93	2	99.0	1	13.0	1509
4	6.0	400	5.00	19.60	77	7	23.0	6	7.0	1199
5	7.0	50	20.00	22.00	82	6	29.0	5	7.0	1174
6	7.0	200	10.00	23.20	100	1	240.0	0	0.0	899
7	9.0	25	10.00	27.00	100	1	240.0	0	0.0	775
8	8.0	100	13.00	27.00	100	1	240.0	0	0.0	667
9	10.5	150	17.00	27.00	100	1	240.0	0	0.0	368
10	3.0	200	5.00	27.00	98	3	68.0	2	2.0	92
11	5.0	150	8.00	15.20	63	5	26.4	5	15.0	1311
12	3.0	400	5.00	17.60	53	10	11.2	9	10.0	1168
13	4.0	150	5.00	17.60	38	11	7.3	11	12.1	802
14	7.0	50	15.00	23.20	95	3	66.3	2	8.5	644
15	6.0	1500	10.00	23.20	98	2	103.0	1	11.0	575
16	8.0	50	20.00	27.00	100	1	240.0	0	0.0	430
17	6.0	100	10.00	19.60	99	2	104.0	1	10.0	350
18	6.0	150	10.00	19.60	73	7	22.0	6	8.0	240
19	4.0	5	23.00	1.00	14	6	5.0	6	32.3	161
20	7.0	1500	15.00	12.20	67	8	18.0	7	9.6	46
21	6.5	100	54.00	13.60	76	6	27.0	5	8.0	2337

Table 4. Data on Physical Characteristics, Frequency, Duration and Extent of Flooding at Newport River Study Sites, 1972.

Site No.	Depth of water (in inches)	Surface area (sq.ft.)	Mean slope index	Frequency of flood. /month	Frequency of standing water (%)	Number of wet periods	Mean number of days/wet periods	Number of dry periods	Mean number of days/ dry periods	Distance from nearest ditch (in feet)
1	5	400	4	19	78.0	5	35.0	5	10.0	46.0
2	4	400	2	11	37.0	8	9.6	8	15.0	48.6
3	8	400	8	19	95.0	3	67.0	2	4.5	64.4
4	3	400	3	19	65.0	11	8.4	11	9.5	69.0
5	3	200	5	7	27.0	9	6.2	8	28.4	43.7
6	2	200	3	7	15.0	5	6.0	9	20.0	48.0
7	3	500	2	7	26.0	8	6.8	8	19.0	12.0
8	8	100	50	11	61.0	12	11.0	12	7.0	58.0
9	3	200	5	11	44.0	8	11.0	8	15.0	55.0
10*	6	40000	3	19	77.6	7	23.2	6	6.5	200.0
11	5	150	8	7	48.0	8	12.5	7	12.3	15.0
12	4	400	3	19	54.0	10	11.3	10	6.8	41.4
13	4	400	2	19	56.0	7	17.0	6	9.0	66.7
14	3	200	5	19	57.0	4	30.0	3	12.0	45.0

*Unditched site

Table 5. Plant Cover Summary for Ward's Creek and North River Study Sites, 1971 (in percentage).

	Site number	*Juncus roemerianus*	*Distichlis spicata*	*Spartina patens*	*Spartina alterniflora*	*Baccharis halimifolia*	*Borrichia frutescens*	*Panicum virgatum*	*Cladium jamaicense*	*Salicornia virginica*	*Scirpus robustus*	*Iva ciliata*	*Pinus taeda*	*Myrica cerifera*
Ward's Creek Study area	1	15	80	0	0	0	0	0	0	0	5	0	0	0
North River Study area	2	0	30	25	0	10	0	0	0	0	10	15	0	10
	3	0	65	10	0	5	0	20	0	0	0	0	0	0
	4	0	0	45	0	0	0	50	0	5	0	0	0	0
	5	45	50	0	0	0	5	0	0	0	0	0	0	0
	6	2	60	2	0	1	0	20	0	0	0	15	0	0
	7	40	60	0	0	0	0	0	0	0	0	0	0	0
	8	100	40	0	0	0	0	0	0	0	0	0	0	0
	9	60	40	0	0	0	0	0	0	0	0	0	0	0
	10	15	30	0	0	20	0	35	0	0	0	0	0	0
	11	40	60	0	0	0	0	0	0	0	0	0	0	0
	12	20	80	0	0	0	0	0	0	0	0	0	0	0
	13	40	60	0	0	0	0	0	0	0	0	0	0	0
	14	10	90	0	0	0	0	0	0	0	0	0	0	0
	15	50	50	0	0	0	0	0	0	0	0	0	0	0
	16	0	0	0	0	0	0	0	0	0	0	0	0	0
	17	50	50	0	0	0	0	0	0	0	0	0	0	0
	18	50	50	0	0	0	0	0	0	0	0	0	0	0
	19	0	0	0	0	0	0	0	0	0	0	0	0	0
	20	60	0	30	0	0	10	0	0	0	0	0	0	0
	21	40	60	0	0	0	0	0	0	0	0	0	0	0
	22	50	50	0	0	0	0	0	0	0	0	0	0	0
	23	80	20	0	0	0	0	0	0	0	0	0	0	0
	24	50	50	0	0	0	0	0	0	0	0	0	0	0
	25	0	70	0	0	0	30	0	0	0	0	0	0	0
	26	10	90	0	0	0	0	0	0	0	0	0	0	0
	27	90	10	0	0	0	0	0	0	0	0	0	0	0
	28	100	0	0	0	0	0	0	0	0	0	0	0	0

Table 5. (Continued)

	Site No.	*Juncus roemerianus*	*Distichlis spicata*	*Spartina patens*	*Spartina alterniflora*	*Baccharis halimifolia*	*Borrichia frutescens*	*Panicum virgatum*	*Cladium jamaicense*	*Salicornia virginica*	*Scirpus robustus*	*Iva cilata*	*Pinus taeda*	*Myrica cerifera*
North	29	20	80	0	0	0	0	0	0	0	0	0	0	0
River	30	30	65	0	0	0	5	0	0	0	0	0	0	0
	31	50	50	0	0	0	0	0	0	0	0	0	0	0
Study	32	100	0	0	0	0	0	0	0	0	0	0	0	0
area	33	100	0	0	0	0	0	0	0	0	0	0	0	0
(Cont.)	34	100	0	0	0	0	0	0	0	0	0	0	0	0
	35	100	0	0	0	0	0	0	0	0	0	0	0	0
	36	100	0	0	0	0	0	0	0	0	0	0	0	0
	37	100	0	0	0	0	0	0	0	0	0	0	0	0
	38	40	60	0	0	0	0	0	0	0	0	0	0	0
	39	100	0	0	0	0	0	0	0	0	0	0	0	0
	40	50	30	0	0	0	20	0	0	0	0	0	0	0
	41	100	0	0	0	0	0	0	0	0	0	0	0	0
	42	80	0	0	0	0	20	0	0	0	0	0	0	0

Table 6. Plant Cover Summary for Davis Study Sites, 1972 (in percentage).

Site No.	*Juncus roemerianus*	*Distichlis spicata*	*Spartina patens*	*Spartina alterniflora*	*Baccharis halimifolia*	*Borrichia frutescens*	*Panicum virgatum*	*Cladium jamaicense*	*Salicornia virginica*	*Scirpus robustus*	*Iva ciliata*	*Pinus taeda*	*Myrica cerifera*
A*	100	0	0	0	0	0	0	0	0	0	0	0	0
B*	100	0	0	0	0	0	0	0	0	0	0	0	0
C*	0	0	0	0	0	0	0	0	0	0	0	100	0
1	0	0	90	0	10	0	0	0	0	0	0	0	0
2	100	0	0	0	0	0	0	0	0	0	0	0	0
3	40	0	60	0	0	0	0	0	0	0	0	0	0
4	50	0	50	0	0	0	0	0	0	0	0	0	0
5	100	0	0	0	0	0	0	0	0	0	0	0	0
6	100	0	0	0	0	0	0	0	0	0	0	0	0
7	80	0	20	0	0	0	0	0	0	0	0	0	0
8	100	0	0	0	0	0	0	0	0	0	0	0	0
9	25	0	50	0	25	0	0	0	0	0	0	0	0
10	100	0	0	0	0	0	0	0	0	0	0	0	0
11	100	0	0	0	0	0	0	0	0	0	0	0	0
12	100	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	100	0	0	0	0	0	0	0	0	0	0
14	0	0	20	0	0	0	0	0	0	0	0	0	0
15	50	50	0	0	0	0	0	0	0	0	0	0	0
16	100	0	0	0	0	0	0	0	0	0	0	0	0
17	100	0	0	0	0	0	0	0	0	0	0	0	0
18	100	0	0	0	0	0	0	0	0	0	0	0	0
19	80	0	20	0	0	0	0	0	0	0	0	0	0
20	20	0	80	0	0	0	0	0	0	0	0	0	0
21	100	0	0	0	0	0	0	0	0	0	0	0	0
22	0	0	0	0	10	0	0	0	0	0	0	30	60
23	10	90	0	0	0	0	0	0	0	0	0	0	0

* Undltched

Table 7. Plant Cover Summary for King's Point Study Sites, 1972 (in percentage).

Site No.	*Juncus roemerianus*	*Distichlis spicata*	*Spartina patens*	*Spartina alterniflora*	*Baccharis halimifolia*	*Borrichia frutescens*	*Panicum virgatum*	*Cladium jamaicense*	*Salicornia virginica*	*Scirpus robustus*	*Iva ciliata*	*Pinus taeda*	*Myrica cerifera*
1	0	0	95	0	0	0	0	5	0	0	0	0	0
2	5	0	95	0	0	0	0	0	0	0	0	0	0
3	100	0	0	0	0	0	0	0	0	0	0	0	0
4	85	0	0	0	0	15	0	0	0	0	0	0	0
5	100	0	0	0	0	0	0	0	0	0	0	0	0
6	30	70	0	0	0	0	0	0	0	0	0	0	0
7	100	00	0	0	0	0	0	0	0	0	0	0	0
8	100	0	0	0	0	0	0	0	0	0	0	0	0
9	80	20	0	0	0	0	0	0	0	0	0	0	0
10	55	45	0	0	0	0	0	0	0	0	0	0	0
11	0	0	80	0	0	0	0	20	0	0	0	0	0
12	0	0	80	0	0	0	0	20	0	0	0	0	0
13	0	0	0	0	0	0	0	0	100	0	0	0	0
14	100	0	0	0	0	0	0	0	0	0	0	0	0
15	10	0	90	0	0	0	0	0	0	0	0	0	0
16	50	50	0	0	0	0	0	0	0	0	0	0	0
17	60	40	0	0	0	0	0	0	0	0	0	0	0
18	40	60	0	0	0	0	0	0	0	0	0	0	0
19	80	0	0	0	20	0	0	0	0	0	0	0	0
20	30	60	10	0	0	0	0	0	0	0	0	0	0
21	0	0	100	0	0	0	0	0	0	0	0	0	0

Table 8. Plant Cover Summary for Newport River Study Sites, 1972 (in percentage).

Site No.	*Juncus roemerianus*	*Distichlis spicata*	*Spartina patens*	*Spartina alterniflora*	*Baccharis halimifolia*	*Borrichia frutescens*	*Panicum virgatum*	*Cladium jamaicense*	*Salicornia virginica*	*Scirpus robustus*	*Iva ciliata*	*Pinus taeda*	*Myrica cerifera*
1	0	25	0	75	0	0	0	0	0	0	0	0	0
2	0	50	0	50	0	0	0	0	0	0	0	0	0
3	0	40	0	60	0	0	0	0	0	0	0	0	0
4	25	25	50	0	0	0	0	0	0	0	0	0	0
5	0	0	0	50	50	0	0	0	0	0	0	0	0
6	0	100	0	0	0	0	0	0	0	0	0	0	0
7	50	50	0	0	0	0	0	0	0	0	0	0	0
8	0	50	0	50	0	0	0	0	0	0	0	0	0
9	40	0	30	0	30	0	0	0	0	0	0	0	0
10*	0	25	25	50	0	0	0	0	0	0	0	0	0
11	10	90	0	0	0	0	0	0	0	0	0	0	0
12	0	25	0	75	0	0	0	0	0	0	0	0	0
13	70	25	5	0	0	0	0	0	0	0	0	0	0
14	80	20	0	0	0	0	0	0	0	0	0	0	0

*Unditched site

Table 9. Abundance of *Aedes* - *Psorophora* and *Anopheles* - *Culex* Species at Ward's Creek and North River Study Sites, 1971 (percentage/raw number).

	Site No.	Mean Breeding Index	Range	Total specimens taken/site	Total specimens identified	*Aedes* and *Psorophora*	*Anopheles* and *Culex*
Ward's Creek Study area	1	0.000	0-4320.0	13,886	11,157	100/ 13,886	0/0
North River Study area	2	2.000	0- 25.0	133	80	70/93	30/40
	3	0.440	0- 2.6	244	106	80/195	20/49
	4	262.400	0-3420.0	1540	433	100/1,540	
	5	14.000	0- 151.0	88	40	57/50	43/38
	6	0.004	0- 0.025	8	3	67/5	33/3
	7	6.100	0- 69.0	186	53	29/54	71/132
	8	2.100	0- 14.7	124	34	17/21	83/103
	9	0.550	0- 3.6	56	24	13/7	87/49
	10	3.000	0- 43.0	199	136	100/199	
	11	3.300	0- 43.0	175	74	43/75	57/100
	12	1.500	0- 20.0	36	20	25/9	75/27
	13	0.540	0- 5.6	98	53	35/34	65/54
	14	61.000	0- 445.5	289	242	86/248	14/41
	15	2.000	0- 17.3	183	73	46/85	54/98
	16	1,800	0- 18.0	138	103	100/138	0/0
	17	1.000	0- 4.2	131	39	25/32	75/99
	18	4.500	0- 28.0	194	48	70/136	30/58
	19	1.000	0- 9.6	45	27	30/14	70/31
	20	1.900	0- 13.0	132	57	78/103	22/29
	21	7.900	0- 35.2	237	116	90/213	10/24
	22	1.800	0- 5.6	141	66	75/106	25/35
	23	2.100	0- 47.0	194	90	80/155	20/39
	24	1,600	0- 19.2	132	48	35/46	65/86
	25	13.000	0- 80.0	18	10	10/2	90/16
	26	2.100	0- 16.0	50	12	0/0	100/50
	27	2.000	0- 12.0	90	37	0/0	100/90
	28	1.300	0- 13.0	50	23	0/0	100/50
	29	1.100	0- 8.3	65	25	0/0	100/65
	30	1,400	0- 13.0	57	20	0/0	100/57
	31	1.800	0- 12.0	73	22	0/0	100/73
	32	1,300	0- 11.0	64	17	6/4	94/60
	33	1.700	0- 21.6	107	44	5/5	95/102
	34	1.800	0- 17.6	110	47	0/0	100/110
	35	0 500	0- 4.2	53	35	3/2	97/51
	36	1.000	0- 7.5	54	16	0/0	100/54
	37	4.000	0- 33.0	53	22	0/0	100/53
	38	4.800	0- 72.0	88	29	0/0	100/88
	39	0.200	0- 1.25	52	22	5/3	95/49
	40	2.000	0- 23.0	73	42	55/40	45/33
	41	0.500	0- 5.4	49	22	23/11	77/38
	42	1.200	0- 18.0	86	28	0/0	100/86

Table 9. (Continued)

	Site No.	Aedes sollicitans	Aedes taeniorhynchus	Other Aedes Spp.	Psorophora confinnis	Anopheles atropos	Anopheles bradleyi	Other Anopheles	Culex salinarius
Ward's Creek Study area	1	6.2/860	93.8/13,052						
North River Study area	2	58.0/77	12.0/16			4/5	26/35		
	3	65.0/158	15.0/37			1/2	19/46		
	4	21.0/339	78.0/1201			0/0	0/0		
	5	47.0/41	10.0/9			23/20	20/18		
	6	67.0/58	0/0			0/0	33/3		
	7	17.0/32	8.0/15			9/16	62/115	3/6	
	8	17.0/21	0/0			13/16	70/87		
	9	13.0/7	0/0			20/11	67/38		
	10	60.0/119	40.0/80			0/0	0/0		
	11	39.0/68	4.0/7			0/0	53/93		4/7
	12	25.0/9	0/0			15/5	60/22		
	13	33.0/32	2.0/2			6/6	56/55		2/2
	14	16.0/46	70.0/202			2/6	12/35		
	15	38.0/69	8.0/15			10/18	17/31		25/46
	16	61.0/84	20.0/28	14/19	2/3	2/3	0/0		
	17	18.0/24	8.0/10			12/16	62/81		
	18	64.0/124	6.0/12			5/10	25/49		
	19	22.0/10	8.0/4			7/3	60/27	3/1	
	20	73.0/96	5.0/7			0/0	22/29		
	21	84.0/199	6.0/14			2/5	8/19		
	22	74.0/104	0.0/0			14/20	11/16		
	23	28.0/54	52.0/101			6/12	14/27		
	24	29.0/38	5.0/7			12/16	54/71	10/2	
	25	10.0/2	0.0/0			0/0	80/14		
	26	0/0	0/0			8/4	92/46		
	27	0/0	0/0			32/29	68/61		
	28	0/0	0/0			30/15	70/35		
	29	0/0	0/0			44/29	56/36		
	30	0/0	0/0			5/3	95/54		
	31	0/0	0/0			32/23	68/50		
	32	6.0/4	0/0			18/12	76/48		
	33	5.0/5	0/0			60/64	35/37		
	34	0/0	0/0			68/75	32/35		
	35	3.0/2	0/0			37/20	60/31		
	36	0/0	0/0			31/17	69/37		
	37	0/0	0/0			18/10	77/41	5/2	
	38	0/0	0/0			34/30	66/58		
	39	5.0/3	0/0			45/23	50/26		
	40	36.0/26	19.0/14			22/16	23/17		
	41	14.0/7	9.0/4			40/22	32/16	5/2	
	42	0/0	0/0			36/31	64/55		

Table 10. Abundance of _Aedes_ - _Psorophora_ and _Anopheles_ - _Culex_ Species at Davis Study Sites (percentage/raw number).

Site No.	Mean breeding index	Range	Total specimens taken/site	Total specimens identified	_Aedes_ and _Psorophora_	_Anopheles_ and _Culex_	_Aedes sollicitans_	_Aedes taeniorhynchus_
A*	57.30	2.30-234.0	177	145	0/0	100/145	0/0	
B*	96.00	5.00-450.0	114	98	2/2	98/96	0/0	2/2
C*	8.00	0.40- 31.0	132	132	99/131	1/1	25/32	
1	5.30	0.15- 12.6	55	55	100/55	0/0	2/1	
2	0.26	0.01- 0.9	27	27	100/27	0/0	0/0	
3	3.20	0.40- 7.7	49	37	91/37	9/3	13/5	
4	0.00	-	0	0	0/0	0/0	0/0	
5	0.65	0.10- 1.2	5	5	0/0	100/5	0/0	
6	2.30	0.10- 4.5	10	10	56/6	44/4	50/5	
7	2.10	0.10- 9.1	20	18	60/10	40/8	28/5	
8	3.90	0.20- 17.6	24	24	17/4	83/20	8/2	
9	1.90	0.40- 4.0	38	38	68/26	32/12	0/0	
10	2.60	0.20- 20.0	72	71	49/34	51/37	20/13	
11	8.10	0.20- 65.0	198	168	47/178	53/90	8/14	2/1
12	6.40	0.60- 18.9	93	82	19/7	81/75	5/4	
13	6.20	0.20- 20.0	53	51	81/41	19/10	41/22	
14	1.70	0.15- 6.75	33	32	15/5	85/27	9/3	6/2
15	1.10	0.20- 1.80	18	18	0/0	100/18	0/0	
16	6.60	0.06- 72.60	156	156	70/100	30/46	20/31	9/14
17	1.30	0.10- 1.80	31	31	3/1	97/30	3/1	
18	1.30	0.10- 1.80	29	29	0/0	100/29	0/0	
19	0.00	-	0	0	0/0	0/0	0/0	
20	0.84	0.05- 4.20	33	33	100/33	0/0	40/13	
21	6.30	0.40- 16.0	12	12	8/1	92/11	8/1	
22	0.00	-	0	0	0/0	0/0	0/0	
23	0.90	0.15- 4.5	15	15	20/3	80/12	20/3	

*Unditched Sites

Table 10. (Continued)

Site No.	Aedes atlanticus	Other Aedes Spp.	Psorophora confinnis	Other Psoro. Spp.	Anopheles atropos	An. bradleyi	An. 2nd instar	Culex territans	Other Culex Spp.
A*					2/4	44/64	46/68	6/9	
B*					8/8	44/42	31/30	14/14	2/2
C*	42/53	2/8		30/38					1/1
1	94/52		4/2						
2	100/27								
3	70/25	6/3		2/1			9/3		
4									
5						60/3	40/2		
6	10/1						40/2		
7.	28/5					16/3	28/5		
8	4/1		4/1		8/2	8/2	68/16		
9	30/11	37/14				22/5	10/7		
10		29/21			3/2	12/9	36/26		
11		37/62			11/19	9/16	33/55		
12	3/2				1/1	25/20	66/54		
13	6/3	30/16	4/2		9/5		9/5		
14					6/2	25/8	54/17		
15						12/2	88/16		
16		41/65			3/4	4/7	23/35		
17					40/12	16/5	41/13		
18					41/12	14/4	45/13		
19									
20	57/19	3/1							
21					42/5	8/1	42/5		
22									
23					34/5	6/1	40/6		

*Unditched Sites

Table 11. Abundance of _Aedes_ - _Psorophora_ and _Anopheles_ - _Culex_ Species at King's Point Study Sites, 1972 (percentage/raw number).

Site No.	Mean breeding index	Range	Total specimens taken/site	Total specimens identified	_Aedes_ and _Psorophora_	_Anopheles_ and _Culex_	_Aedes sollicitans_
1	2.80	.050-23.5	178	178	20/36	80/142	17/31
2	20.00	2.500-90.0	21	21		100/21	
3	10.00	.1 -63.0	298	298	1/3	99/295	1/2
4	2.50	.4 - 9.6	16	16		100/16	
5	1.20	.05 - 2.4	77	77		100/77	
6	0.61	.20 - 1.8	22	22		100/22	
7	0.18	.03 - 1.4	26	26		100/26	
8	1.10	.10 - 8.4	27	27		100/27	
9	0.28	.15 - 0.6	16	16		100/16	
10	0.80	.20 - 2.4	11	11		100/11	
11	1.10	.15 - 2.4	14	14	7/1	93/13	
12	3.40	.40 -16.0	19	19		100/19	
13	0.15	-	1	1		100/1	
14	0.40	.05 - 2.1	27	27		100/27	
15	10.70	.15 -55.3	110	110		100/110	
16	0.26	.05 - 1.25	22	22	5/1	95/21	5/1
17	0.68	.10 - 3.0	31	31	4/1	96/30	
18	0.45	.15 - 1.35	11	11	27/3	73/8	18/2
19	0.05	.005- .20	18	18	100/18		95/17
20	65.20	1.5 -276.0	387	387	98/38	2/6	92/357
21	12.80	.1 -69.0	273	226	49/107	51/119	26/60

Table II. (Continued)

Site No.	Aedes taeniorhynchus	Aedes atlanticus	Other Aedes Spp.	Other Psorophora Spp.	Anopheles atropos	Anopheles bradleyi	Anopheles 2nd instar	Culex salinarius
1	0.5/1		2/4		6/12	24/43	50/86	0.5/1
2						50/10	50/11	
3	1/1				1/2	24/72	73/198	
4					32/5	6/1	62/10	
5					24/18	40/31	36/28	
6					23/5	41/9	36/8	
7					27/7	27/7	46/12	
8					40/11	26/7	33/9	
9					31/5	13/2	56/9	
10					18/2	18/2	64/7	
11			7/1			15/2	78/11	
12						79/15	2/14	
13							100/1	
14					11/3	26/7	63/17	
15					8/9	18/20	74/81	
16					9/2	50/11	36/8	
17	4/1				6/2	61/19	29/9	
18			9/1		9/1	55/6	9/1	
19	5/1							
20	6/24				1/2	1/3	1/1	
21	1/2	2/4	17/40	3/1		12/25	31/71	8/23

Table 12. Abundance of *Aedes* - *Psorophora* and *Anopheles* - *Culex* Species at Newport River Study Sites, 1972 (percentage/raw number).

Site No.	Mean breeding index	Range	Total specimens taken/site	Total specimens identified	*Aedes* and *Psorophora*	*Anopheles* and *Culex*	*Aedes sollicitans*	*Aedes taeniorhynchus*
1	4.30	.4-0019.2	36	36	66/24	34/12	66/24	
2	0.40	-	1	1		100/1		
3	17.50	.4-0200.0	355	355	31/106	69/239	30/105	1/1
4	3.80	.4-0009.6	9	9		100/9	0/0	
5	0.20	-	1	1	100/1			
6	0.00	.0-	0	0				
7	0.00	.0-	0	0				
8	4.20	.1-0025.6	128	128	100/128		80/104	6/8
9	0.35	.2-0000.8	5	5	40/2	60/3	40/2	
10*	256.00	40.0-1600.0	156	156	30/47	70/109	22/35	0.07/1
11	0.00	.0-	0	0				
12	0.00	.0-	0	0				
13	8.00	.4- 14.0	36	36	6/2	94/34	7/2	
14	2.40	.2- 7.2	27	27	28/8	72/19	28/8	

*Unditched Site

Table 12. (Continued)

Site No.	Other Aedes Spp.	Psorophora confinnis	Anopheles atropos	Anopheles bradleyi	Anopheles 2nd instar	Culex salinarius	Culex territans	Other Culex Spp.
1			6/2	16/6	12/4			
2				100/1				
3			5/18	16/57	46/162	1/1		1/2
4				99/8	1/1			
5								
6								
7								
8	12/15	2/1						
9				20/1			40/2	
10	8/11		21/32	19/29	29/46	1/2		
11								
12								
13			8/3	58/21	16/6	55/2	55/2	
14			7/2	37/10	19/5	7/2		

Table 13. Total Number of Larvae Taken per Weekly Interval from Ward's Creek Study Area and North River Study Sites (Unditched) 1971. (Based on Total Number Identified)

Date	Aedes and Psorophora																										
Site No.	1*	16	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	Total
Mar. 4-10	46	22	0	4	5	7	5	4	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	49
11-17	42	12	0	0	0	6	6	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	31
18-24	0	23	13	0	0	7	5	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	50
25-31	18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Apr. 1- 7	112	8	13	0	30	41	11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	103
8-14	49	4	10	0	13	7	8	5	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	50
15-21	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
22-28	2062	0	16	2	5	10	4	1	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	43
29-May 5	873	2	4	0	0	2	5	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	17
May 6-12	0	2	2	0	0	0	2	2	2	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	11
13-19	74	1	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4
20-26	80	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
27-June 2	978	4	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6
3- 9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10-16	411	0	0	0	6	2	1	39	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	51
17-23	394	11	3	0	0	8	0	4	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	28
24-30	0	14	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	16
July 1- 7	35	15	2	0	0	6	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	28
8-14	1462	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
15-21	4	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	3
22-28	16	4	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8
29-Aug. 4	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
5-11	7223	13	0	0	1	2	1	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	15	1	0	35
12-18	6	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
																										Total		542

*Wards Creek

Table 13. (Continued)

Date														Anopheles and Culex													
Site No.	16	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	Total
Mar. 4-10	0	0	1	0	2	0	1	1	0	0	0	0	0	0	0	0	7	0	0	0	0	0	0	0	0	0	12
11-17	0	4	0	0	0	1	0	0	0	0	0	0	0	0	2	0	5	8	0	2	0	1	1	0	2	1	27
18-24	0	1	0	0	0	1	1	0	0	0	4	1	1	0	2	0	4	5	4	1	0	1	0	0	0	3	29
25-31	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	1	0	0	0	0	4
Apr. 1- 7	0	0	0	0	0	0	1	2	0	0	0	0	0	0	1	1	0	3	0	0	0	0	2	0	0	0	10
8-14	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	4	0	0	9
15-21	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
22-28	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	4	5
29-May 5	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	1	0	0	0	0	1	0	0	0	0	4
May 6-12	1	0	0	0	1	0	1	1	0	1	0	0	0	0	0	1	1	0	0	0	2	0	0	1	0	0	10
13-19	0	0	0	0	0	0	0	2	0	1	0	3	4	0	1	0	1	1	1	0	1	0	0	1	0	0	16
20-26	0	0	0	0	0	0	1	2	1	0	1	0	0	0	1	0	3	2	0	0	1	2	0	0	0	0	14
27-Jun 2	0	2	0	0	0	0	2	4	0	0	1	1	1	0	0	1	0	4	0	2	0	1	1	1	0	1	22
3- 9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10-16	0	7	2	2	1	0	5	1	0	1	4	1	1	1	0	3	3	5	1	2	2	4	3	2	3	2	56
17-23	0	3	0	0	1	0	2	3	0	1	5	5	5	1	5	0	3	1	6	0	3	1	5	5	1	7	63
24-30	0	0	2	3	2	0	1	2	0	1	4	3	0	1	0	0	4	2	4	2	1	4	1	3	1	4	45
July 1- 7	0	2	1	0	0	5	0	1	2	5	8	2	4	7	4	1	4	3	8	1	2	3	1	1	3	0	68
8-14	0	2	7	3	0	0	3	1	5	0	3	1	0	4	1	3	0	0	5	1	6	0	1	2	1	0	49
15-21	0	2	2	0	0	2	3	4	0	0	3	4	4	3	6	2	2	6	1	1	3	1	4	3	7	1	63
22-28	0	0	2	4	0	2	1	5	0	0	2	0	4	3	0	3	1	2	6	3	0	2	1	0	0	1	42
29-Aug 4	0	0	0	0	2	0	0	0	0	0	2	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	6
5-11	0	0	2	0	0	2	0	1	1	2	0	2	0	0	0	0	0	0	0	0	0	4	0	0	0	4	18
12-18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	2
																									Total		574

Table 14. Total Number of Larvae Taken per Weekly Interval from the North River (Ditched) Study Sites, 1971. (Based on Total Number Identified).

Date	Aedes and Psorophora															
Site No.	2	3	4	5	6	7	8	9	10	11	12	13	14	15	17	Total
Mar. 4-10	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	2
11-17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
18-24	0	0	0	0	0	0	0	0	0	0	0	0	4	1	0	5
25-31	1	0	0	0	1	0	0	0	0	2	0	0	1	0	0	5
Apr. 1- 7	1	6	11	1	0	1	0	0	0	0	0	2	0	3	0	25
8-14	11	8	24	0	1	0	0	0	0	1	0	3	7	11	0	66
15-21	18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	18
22-28	7	7	68	1	0	1	0	0	0	0	0	4	8	2	1	99
29-May 5	3	0	26	1	0	0	2	0	1	0	0	3	10	0	0	46
6-12	0	4	1	0	0	0	0	0	0	2	0	0	9	7	3	26
13-19	1	3	3	0	0	1	0	0	0	0	0	0	0	0	1	9
20-26	0	1	6	0	0	0	0	0	0	2	0	0	2	4	2	17
27-June 2	2	2	8	3	0	0	0	0	0	4	0	1	1	1	0	22
3- 9	2	0	2	0	0	0	0	0	0	4	0	0	0	0	0	8
10-16	5	30	235	4	0	0	3	1	0	8	0	4	6	0	0	296
17-23	3	2	33	2	0	0	0	0	11	1	1	0	15	0	0	68
24-30	1	0	2	0	0	1	0	0	1	1	1	0	1	0	0	8
July 1- 7	0	12	11	0	0	5	0	0	18	1	0	0	2	0	0	49
8-14	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	2
15-21	0	0	0	0	0	0	0	0	10	3	0	0	0	0	0	13
22-28	1	5	0	0	0	1	0	0	63	1	2	0	0	2	0	75
29-Aug 4	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
5-11	5	4	2	11	0	1	0	2	29	3	1	0	142	1	0	201
12-18	0	2	0	0	0	0	1	0	0	0	0	1	0	0	0	4
														Total		1066

Table 14. (Continued)

Date	Anopheles and Culex															
Site No.	2	3	4	5	6	7	8	9	10	11	12	13	14	15	17	Total
Mar. 4-10	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	2
11-17	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1
18-24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
25-31	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
Apr. 1- 7	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	2
8-14	0	0	0	0	0	0	0	0	0	0	0	0	6	0	0	6
15-21	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
22-28	0	0	0	0	0	1	0	1	0	0	0	2	0	0	0	4
29-May 5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6-12	0	0	0	0	0	0	0	4	0	0	0	2	0	17	4	27
13-19	0	0	0	2	0	3	0	0	0	0	0	0	0	0	3	8
20-26	4	0	0	0	0	0	0	0	0	2	0	0	0	1	1	8
27-Jun 2	0	1	0	4	0	3	2	0	0	0	0	3	5	2	3	23
3- 9	2	1	0	0	0	0	0	0	0	14	0	0	0	0	0	17
10-16	0	0	0	1	0	2	5	0	0	2	0	1	1	2	4	18
17-23	0	2	0	2	0	2	6	2	0	0	8	6	3	3	0	34
24-30	3	4	0	1	0	2	0	4	0	3	0	3	0	4	1	25
July 1- 7	1	1	0	0	0	9	0	1	0	2	0	0	3	0	2	19
8-14	0	3	0	3	1	0	0	3	0	2	1	4	0	0	0	17
15-21	6	1	0	1	0	5	0	1	0	4	4	4	2	1	0	29
22-28	3	3	0	3	0	13	4	1	0	7	2	4	5	4	3	52
29-Aug 4	0	6	0	0	0	5	4	0	0	0	0	0	1	0	0	16
5-11	3	1	0	0	0	2	4	5	0	5	0	4	2	2	3	31
12-18	0	2	0	0	0	0	4	0	0	0	0	2	4	0	0	12
															Total	352

Table 15. Total Number of Larvae Taken per Weekly Interval from The King's Point Study Sites (Unditched) 1972. (Based on Total Number Identified)

Date	Aedes and Psorophora																					
Site No.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	Total
Mar. 4-10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	2
11-17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18-24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	30	0	30
25-31	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	13	0	13
Apr. 1- 7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	32	1	33
8-14	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	3
15-21	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
22-28	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
29-May 5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	17	0	17
6-12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	0	5
13-19	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20-26	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	3
27-Jun 2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	2
3- 9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	3
10-16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	3	5
17-23	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24-30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
July 1- 7	15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	28	30	73
8-14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2
15-21	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7	1	3	11
22-28	13	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	195	12	224
29-Aug 4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	66	0	67
5-11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12-18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
19-25	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
26-Sep. 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2- 8	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	8	5	47	62
9-15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1
16-22	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1
23-29	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	3
30-Oct. 6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7-13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14-20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21-27	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	00	0	0	0	0
																				Total		560

Table 15. (Continued)

Date	Anopheles and Culex																					
Site No.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	Total
Mar. 4-10	4	0	0	0	0	1	1	0	0	0	0	2	0	0	0	0	1	0	0	0	0	9
11-17	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
18-24	2	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
25-31	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	1	8
Apr. 1- 7	0	0	0	0	1	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	3
8-14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-21	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
22-28	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
29-May 5	8	0	2	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	12
6-12	17	2	17	0	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	43
13-19	3	0	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10
20-26	0	0	4	1	11	0	1	0	1	0	0	0	0	2	4	0	1	0	0	0	0	25
27-Jun 2	4	0	3	0	1	0	1	1	0	0	0	0	0	1	0	1	0	1	0	0	0	13
3- 9	4	3	2	1	4	1	9	2	2	1	0	0	0	3	2	2	3	2	0	0	3	44
10-16	4	0	37	0	5	1	3	2	1	1	1	2	0	1	4	2	2	0	0	1	16	83
17-23	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24-30	0	0	6	0	0	1	0	1	2	0	0	0	0	0	1	0	2	0	0	0	0	13
July 1- 7	10	2	21	0		2	1	1	2	1	0	0	0	1	1	2	3	0	0	0	21	71
8-14	7	1	15	0	1	0	0	0	1	2	2	0	0	0	0	0	2	0	0	0	2	33
15-21	5	0	28	0	3	1	1	1	0	0	0	0	0	0	2	0	3	0	0	0	12	56
22-28	35	2	13	2	13	3	0	1	1	0	4	8	0	0	0	0	6	0	0	1	29	118
29-Aug 4	4	0	20	0	7	0	2	0	2	0	0	0	0	2	2	2	0	0	0	0	7	48
5-11	0	0	9	0	0	2	0	0	0	0	0	0	0	1	10	2	0	0	0	0	0	24
12-18	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
19-25	0	0	63	1	13	0	0	0	0	0	0	0	0	3	41	0	0	0	0	0	0	121
26-Sep 1	0	0	9	0	0	2	1	3	1	2	0	0	0	0	0	5	3	0	0	0	1	27
2- 8	9	0	9	6	6	3	4	12	1	0	1	2	1	7	32	0	0	2	0	0	4	99
9-15	0	2	0	2	0	1	0	1	0	0	0	2	0	1	11	1	3	0	0	0	4	28
16-22	7	0	5	0	2	0	0	0	2	0	0	00	0	0	0	0	0	0	0	0	6	22
23-29	0	9	0	3	0	3	0	2	0	4	0	2	0	5	0	3	1	3	0	0	13	48
30-Oct 6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7-13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14-20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21-27	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
																				Total		965

Table 16. Total Number of Larvae Taken per Weekly Interval from Davis Study Sites (Ditched) 1972. (Based on Total Number Identified)

Date	*Aedes* and *Psorophora*																					
Site No.	2	3	4	5	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	Total
Mar. 4-10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11-17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18-24	0	5	0	0	0	0	0	6	4	2	1	0	0	0	0	0	0	5	0	0	0	23
25-31	0	0	0	0	0	0	0	2	2	0	0	0	0	0	0	0	0	2	0	0	0	6
Apr. 1- 7	0	0	0	0	0	0	2	0	3	0	1	0	0	0	0	0	0	7	0	0	0	13
8-14	0	0	0	0	0	0	0	1	3	1	0	0	0	0	0	0	0	0	0	0	0	5
15-21	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
22-28	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1
29-May 5	0	0	0	0	0	1	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0	6
6-12	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
13-19	13	10	0	0	0	0	8	0	0	0	1	0	0	0	0	0	0	5	0	0	0	37
20-26	6	13	0	0	2	1	5	0	0	2	5	0	0	0	0	0	0	1	0	0	0	35
27-Jun 2	0	2	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4
3- 9	0	0	0	0	0	0	0	0	4	0	2	0	0	0	0	0	0	0	0	0	0	6
10-16	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	2
17-23	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24-30	0	0	0	0	0	0	0	0	2	0	0	1	0	0	0	0	0	0	0	0	0	3
July 1- 7	2	3	0	0	1	0	4	0	0	2	0	0	0	0	0	0	0	1	0	0	0	13
8-14	0	0	0	0	0	0	0	0	1	1	3	0	0	0	0	0	0	0	0	0	0	5
15-21	5	3	0	0	0	0	1	0	0	0	1	1	0	0	0	0	0	0	0	0	0	11
22-28	0	0	0	0	0	0	5	20	55	0	15	0	0	0	0	0	0	0	0	0	0	95
29-Aug 4	0	0	0	0	0	0	0	0	1	0	0	0	0	110	0	0	0	0	0	0	2	113
5-11	0	0	0	0	0	0	0	3	0	0	0	1	0	0	1	0	0	0	1	0	0	6
12-18	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	2
19-25	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1
26-Sep 1	0	0	0	0	0	0	0	0	8	0	0	2	0	0	0	0	0	0	0	0	0	10
2- 8	1	11	0	0	0	0	4	0	0	0	9	0	0	0	0	0	0	12	0	0	0	37
9-15	0	0	0	0	0	1	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	3
16-22	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
23-29	0	0	0	0	7	1	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	11
30-Oct 6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7-13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14-20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21-27	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
																				Total		450

Table 16. (Continued)

Date	Anopheles and Culex																					
Site No.	2	3	4	5	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	Total
Mar. 4-10	0	0	0	0	0	0	0	1	2	5	0	0	0	1	0	0	0	0	0	0	0	9
11-17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18-20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
25-31	0	0	0	0	0	0	0	3	1	0	0	0	0	0	0	0	0	0	0	0	0	4
Apr. 1- 7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8-14	0	0	0	0	0	0	0	1	1	2	0	0	0	0	0	0	0	0	0	0	0	4
15-21	0	0	0	0	0	0	0	3	4	0	0	0	0	0	0	0	0	0	0	0	0	7
22-28	0	0	0	0	0	0	0	1	0	0	0	3	0	0	0	0	0	0	0	0	0	4
29-May 5	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
6-12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13-19	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1
20-26	0	0	0	0	1	0	0	0	2	3	0	0	0	0	1	1	0	0	0	0	0	8
27-Jun 2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3- 9	0	0	0	0	0	0	0	2	4	7	0	0	0	0	1	0	0	0	0	0	0	14
10-16	0	3	0	0	0	1	5	0	7	15	0	0	2	2	4	4	0	0	0	0	1	44
17-23	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24-30	0	0	0	0	0	0	0	8	18	0	0	3	1	4	6	7	0	0	0	0	2	49
July 1- 7	0	0	0	0	0	0	0	0	3	9	1	3	0	1	0	00	0	0	0	0	0	17
8-14	0	0	0	0	0	0	0	3	18	13	0	1	3	4	9	7	0	0	8	0	0	66
15-21	0	0	0	0	1	2	1	2	11	3	0	1	0	0	0	0	0	0	0	0	0	21
22-28	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	2
29-Aug 4	0	0	0	0	0	0	0	4	19	5	0	0	0	11	0	0	0	0	0	0	0	39
5-11	0	0	0	4	0	0	0	6	1	5	0	1	3	12	0	0	0	0	0	0	0	32
12-18	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	3
19-25	0	0	0	0	0	0	0	2	4	0	0	1	2	3	6	6	0	0	0	0	2	26
26-Sep 1	0	0	0	0	0	0	0	0	0	0	0	2	0	2	2	2	0	0	0	0	0	8
2-8	0	0	0	0	0	1	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	4
9-15	0	0	0	0	0	11	2	0	2	12	2	4	1	2	1	1	0	0	0	0	1	39
16-22	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
23-29	0	0	0	0	6	6	9	4	7	8	7	9	3	4	3	0	0	0	3	0	6	66
30-Oct 6	0	0	0	1	0	0	0	0	7	0	0	0	0	0	0	0	0	0	0	0	0	8
7-13	0	0	0	1	0	0	0	0	7	0	0	0	0	0	0	0	0	0	0	0	0	8
14-20	0	0	0	1	0	0	0	0	7	0	0	0	0	0	0	0	0	0	0	0	0	8
21-27	0	0	0	1	0	0	0	0	7	0	0	0	0	0	0	0	0	0	0	0	0	8
																				Total		500

Table 17. Total Number of Larvae taken per Weekly Interval from Newport River Study Sites, 1972. (Based on Total Identified)

Date	Aedes and Psorophora														
Site No.	1	2	3	4	5	6	7	8	9	11	12	13	14	Total	10*
Mar. 4-10	0	0	2	0	0	0	0	0	0	0	0	0	0	2	0
11-17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18-24	4	0	20	5	1	0	0	33	1	0	0	0	0	64	4
25-31	13	0	27	0	0	0	0	5	1	0	0	0	0	46	16
Apr. 1- 7	3	0	17	0	0	0	0	4	0	0	0	0	0	24	11
8-14	5	0	27	1	0	0	0	1	0	0	0	0	0	34	2
15-21	0	0	10	0	0	0	0	0	0	0	0	1	0	11	12
22-28	0	0	2	0	0	0	0	0	0	0	0	0	0	2	1
29-May 5	0	0	1	0	0	0	0	1	0	0	0	0	0	2	1
6-12	0	0	0	0	0	0	0	9	0	0	0	0	0	9	0
13-19	0	0	0	0	0	0	0	3	0	0	0	0	0	3	0
20-26	0	0	0	0	0	0	0	8	0	0	0	1	0	9	0
27-Jun 2	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0
3- 9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10-16	0	0	0	0	0	0	0	10	0	0	0	0	0	10	0
17-23	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24-30	0	0	0	0	0	0	0	21	0	0	0	0	0	21	0
July 1- 7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8-14	0	0	0	0	0	0	0	15	0	0	0	0	0	15	0
15-21	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
22-28	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
29-Aug 4	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0
5-11	0	0	9	4	0	0	0	18	0	0	0	0	8	39	0
12-18	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0
19-25	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
26-Sep 1	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0
2- 8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9-15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16-22	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
23-29	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
30-Oct 6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7-13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14-20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21-27	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
												Total		294	47

*Unditched Site

Table 17. (Continued)

Date	Anopheles and Culex														
Site No.	1	2	3	4	5	6	7	8	9	11	12	13	14	Total	10
Mar 4-10	0	0	2	1	0	0	0	0	0	0	0	0	0	3	0
11-17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
18-24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6
25-31	1	0	1	0	0	0	0	0	2	0	0	0	0	4	8
Apr 1- 7	4	0	2	0	0	0	0	0	1	0	0	0	0	7	2
8-14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
15-21	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0
22-28	0	0	3	0	0	0	0	0	0	0	0	0	0	3	10
29-May 5	0	0	8	0	0	0	0	0	0	0	0	0	0	8	6
6-12	0	0	16	0	0	0	0	0	0	0	0	0	0	16	4
13-19	0	0	10	1	0	0	0	0	0	0	0	0	0	11	6
20-26	0	0	3	7	0	0	0	0	0	0	0	0	0	10	0
27-Jun 2	0	0	6	4	0	0	0	0	0	0	0	5	0	15	4
3- 9	0	0	10	5	0	0	0	0	0	0	0	0	1	16	5
10-16	0	0	3	2	0	0	0	0	0	0	0	2	0	7	4
17-23	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24-30	0	0	14	2	0	0	0	0	0	0	0	4	0	20	5
July 1- 7	0	0	0	2	0	0	0	0	0	0	0	0	0	2	0
8-14	1	0	26	23	0	0	0	0	0	0	0	3	5	58	10
15-21	0	0	8	3	0	0	0	0	0	0	0	0	0	11	0
22-28	0	0	21	1	0	0	0	0	0	0	0	0	0	22	0
29-Aug 4	0	0	50	9	0	0	0	0	0	0	0	0	0	59	0
5-11	0	0	2	8	0	0	0	0	0	0	0	3	0	13	11
12-18	0	0	7	8	0	0	0	0	0	0	0	0	0	15	0
19-25	6	0	2	8	0	0	0	0	0	0	0	1	0	17	0
26-Sep 1	0	1	40	10	0	0	0	0	0	0	0	12	4	67	1
9-15	0	0	0	0	0	0	0	0	0	0	0	2	0	2	0
16-22	0	0	3	3	0	0	0	0	0	0	0	0	0	6	2
23-29	1	0	6	3	0	0	0	0	0	0	0	2	9	21	6
30-Oct 6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7-13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14-20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21-27	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
												Total		414	97

*Unditched Site

Table 18. Survival Summary for Species Taken from Ward's Creek and North River Study Sites, 1971 (in percentage).

	Site No.	Aedes sollicitans	Aedes taeniorhynchus	Psorophora confinnis	Other Psoro.	Anopheles atropos	Anopheles bradleyi	Anopheles 2nd instar	Other Anopheles Spp.	Culex salinarius
Wards Creek Study area	1	90	97	-	-	-	-	-	-	-
North River Study area	2	32	60	-	-	33	50	-	-	-
	3	100	100	-	-	100	90	-	-	-
	4	65	96	-	-	-	-	-	-	-
	5	42	50	-	-	22	12	-	-	-
	6	0	-	-	-	-	100	-	-	-
	7	55	100	-	-	100	60	-	-	-
	8	50	-	-	-	75	62	-	-	-
	9	0	-	-	-	0	19	-	-	-
	10	54	30	-	-	-	-	-	-	-
	11	76	100	-	-	-	77	-	-	100
	12	20	-	-	-	0	9	-	-	-
	13	60	100	-	-	33	36	-	-	100
	14	92	98	-	-	60	70	-	-	-
	15	40	83	-	-	43	41	-	-	1
	16	92	60	100	100	100	-	-	-	-
	17	43	100	-	-	25	50	-	-	-
	18	76	100	-	-	50	58	-	-	-
	19	100	50	-	-	100	56	-	100	-
	20	13	0	-	-	-	0	-	-	-
	21	23	100	-	-	0	0	-	-	-
	22	60	-	-	-	80	43	-	-	-
	23	30	100	-	-	80	40	-	-	-
	24	100	100	-	-	40	46	-	-	-
	25	100	-	-	-	-	50	-	100	-
	26	-	-	-	-	100	100	-	-	-
	27	-	-	-	-	50	44	-	-	-
	28	-	-	-	-	20	37	-	-	-
	29	-	-	-	-	45	28	-	-	-
	30	-	-	-	-	100	68	-	-	-

Table 18. (Continued)

	Site No.	*Aedes sollicitans*	*Aedes taeniorhynchus*	*Psorophora confinnis*	Other *Psoro.* Spp.	*Anopheles atropos*	*Anopheles bradleyi*	*Anopheles* 2nd instar	Other *Anopheles* Spp.	*Culex salinarius*
North River Study area	31	-	-	-	-	28	100	-	-	-
	32	100	-	-	-	0	46	-	-	-
	33	100	-	-	-	20	93	-	-	-
	34	-	-	-	-	62	80	-	-	-
	35	0	-	-	-	85	57	-	-	-
	36	-	-	-	-	0	54	-	-	-
	37	-	-	-	-	75	70	-	-	-
	38	-	-	-	-	70	73	-	-	-
	39	-	-	-	-	50	50	-	-	-
	40	60	100	-	-	55	30	-	-	-
	41	100	100	-	-	33	85	-	-	-
	42	-	-	-	-	50	94	-	100	-

Table 19. Survival Summary for Species Taken From Davis Study Sites, 1972 (in percentage).

Site No.	Aedes sollicitans	Aedes taeniorhynchus	Aedes atlanticus	Other Aedes Spp.	Psorophora confinnis	Other Psoro. Spp.	Anopheles atropos	Anopheles bradleyi	Anopheles 2nd instar
A*							100	100	100
B*	-	100	-	-	-	-	100	100	100
C*	88	-	91	88	-	38	-	-	-
1	100	-	62	-	50	-	-	-	-
2	-	-	70	-	-	-	-	-	-
3	100	-	92	100	-	100	-	-	-
4	-	-	-	-	-	-	-	-	-
5	-	-	-	-	-	-	-	-	100
6	100	-	100	-	-	-	-	-	100
7	100	-	40	-	-	-	-	100	40
8	50	-	100	-	100	-	100	-	25
9	-	100	73	90	-	-	-	80	-
10	100	-	-	100	-	-	100	100	77
11	100	100	-	92	-	-	100	100	96
12	75	-	100	-	-	-	100	80	72
13	86	-	100	-	100	-	100	-	100
14	-	50	-	-	-	-	100	13	41
15	-	-	-	-	-	-	-	50	68
16	100	100	-	100	-	-	100	100	100
17	100	-	-	-	-	-	50	80	31
18	-	-	-	-	-	-	50	80	31
19	-	-	-	-	-	-	-	-	-
20	54	-	95	100	-	-	-	-	-
21	100	-	-	-	-	-	100	100	-
22	-	-	-	-	-	-	-	-	-
23	100	-	-	-	-	-	60	100	100

*Unditched Sites

Table 20. Survival Summary for Species Taken from King's Point Study Sites, 1972 (in percentage).

Site No.	Aedes sollicitans	Aedes taeniorhynchus	Aedes atlanticus	Other Aedes Spp.	Psorophora confinnis	Other Psoro. Spp.	Anopheles atropos	Anohpeles bradleyi	Anopheles 2nd instar	Other Anopheles Spp.	Culex salinarius
1	100	100	-	100	-	-	91	95	50	-	0
2	-	-	-	-	-	-	-	70	100	-	-
3	100	100	-	100	-	-	100	100	97	-	-
4	-	-	-	-	-	-	100	100	100	-	-
5	-	-	-	-	-	-	100	93	89	-	-
6	-	-	-	-	-	-	100	100	100	-	-
7	-	-	-	-	-	-	100	100	100	-	-
8	-	-	-	-	-	-	100	100	100	-	-
9	-	-	-	-	-	-	100	100	100	-	-
10	-	-	-	-	-	-	100	100	100	-	-
11	-	-	-	100	-	-	-	0	0	-	-
12	-	-	-	-	-	-	-	20	0	-	-
13	-	-	-	-	-	-	-	-	0	-	-
14	-	-	-	-	-	-	66	100	100	-	-
15	-	-	-	-	-	-	66	70	96	-	-
16	100	-	-	-	-	-	100	100	100	-	-
17	-	100	-	-	-	-	100	100	100	-	-
18	100	-	-	100	-	-	100	100	100	-	-
19	53	100	-	-	-	-	-	-	-	-	-
20	94	100	-	-	-	-	100	100	0	-	-

Table 21. Survival Summary for Species Taken from Newport River Study Sites, 1972 (in percentage).

Site No.	*Aedes sollicitans*	*Aedes taeniorhynchus*	*Aedes atlanticus*	Other *Aedes* Spp.	*Psorophora confinnis*	Other *Psoro.* Spp.	*Anopheles atropos*	*Anopheles bradleyi*	*Anopheles* 2nd instar	Other *Anopheles* Spp.	*Culex salinarius*	*Culex territans*	Other *Culex* Spp.
1	100	-	-	-	-	-	100	83	100	-	-	-	-
2	-	-	-	-	-	-	-	100	-	-	-	-	-
3	98	66	-	-	-	-	95	95	70	-	100	-	-
4	100	-	-	-	-	-	100	100	100	-	-	-	-
5	-	-	-	0	-	-	-	-	-	-	-	-	-
6	0	0	0	0	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0	0	0	0	0	0
8	73	38	-	93	100	-	-	-	-	-	-	-	-
9	50	-	-	-	-	-	-	100	-	-	-	50	-
10*	94	100	-	100	-	-	65	82	100	-	100	-	-
11	0	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	0	0	0
13	50	100	-	-	-	-	33	66	80	-	100	-	-
14	87	-	-	-	-	-	100	60	100	-	100	-	-

*Unditched Site

Table 22. Mean Number of Adults Taken per Light Trap Night per Weekly Interval at the North River Light Trap, 1970.

Date Light trap wk.	No. of Nights light trap in operation	*Aedes sollicitans*	*Aedes taeniorhynchus*	*Anopheles atropos*	*Anopheles bradleyi*	*Culex salinarius*	*Psorophora confinnis*
Aug. 5-11	6	29.0	16.0	912	33	6.0	14
12-18	5	43.0	90.0	1306	143	12.0	8
19-25	2	25.0	35.0	537	117	34.0	36
26-Sep 1	1	23.0	40.0	685	127	0.0	9
2- 8	5	23.0	39.0	680	118	0.0	62
9-15	3	4.0	10.0	213	66	6.0	4
16-22	4	38.0	19.0	125	127	8.0	12
23-29	3	8.0	8.0	50	20	2.0	4
30-Oct 6	3	22.0	12.0	523	30	3.0	2
7-13	3	0.7	0.33	36	5	0.0	0
14-20	3	1.0	0.33	9	5	0.0	0
21-27	4	1.0	0.5	102	10	0.25	0
28-Nov 3	1	12.0	1.0	294	54	1.0	0

Table 23. Total Number of Adults Taken per Month at the North River Light Trap, 1970.

Species		August	September	October	November	Four Month Total
Aedes	sollicitans	462	302	78	12	854
Aedes	taeniorhynchus	654	326	39	1	1,020
Aedes	atlanticus	0	0	0	0	0
Psorophora	confinnis	211	379	7	0	597
Anopheles	atropos	13,760	4,689	2,109	294	20,852
Anopheles	bradleyi	1,273	1,358	158	54	2,843
Culex	salinarius	161	55	9	1	226
Total for Each Month		16,521	7,109	2,400	362	26,392

Species		Relative Species Abundance %	Temporary Pool Breeders Aedes and Psorophora	Permanent Pool Breeders Anopheles and Culex
Aedes	sollicitans	3.2		
Aedes	taeniorhynchus	3.9		
Aedes	atlanticus	0.0		
Psorophora	confinnis	2.3	9.4	90.6
Anopheles	atropos	79.0		
Anopheles	bradleyi	10.8		
Culex	salinarius	0.8		
Total		100.0		

Table 24. Mean Number of Adults Taken per Light Trap Night per Week at the North River Light Trap, 1971.

Date Light trap week		No. of nights light trap in operation	*Aedes sollicitans*	*Aedes taeniorhynchus*	*Aedes atlanticus*	*Anopheles atropos*	*Anopheles bradleyi*	*Culex salinarius*	*Psorophora confinnis*
Feb	25-Mar 3	3				0.33			
Mar	4- 10						0.28		
	11- 17	7				3.10	3.70		
	18- 24	7				0.28	0.14		
	25- 31	7				3.60	2.30		
Apr	1- 7	7				0.57	0.71		
	8- 14	7				4.60	3.60		
	15- 21	7	0.85			21.00	14.30		
	22- 28	7	0.28			22.00	14.00		
	29-May 5	7	1.00			3.60	3.00		0.14
	6- 12	7	5.50	0.43		22.40	2.70		0.14
	13- 19	7	0.85	0.14		32.80	17.40		0.28
	20- 26	7	1.60	0.28		39.00	23.70		1.40
	27-Jun 2	7	1.30	1.10		81.00	37.00	0.85	10.50
	3- 9	7	7.80	19.40		145.00	45.00	2.30	6.30
	10- 16	7	5.00	5.00		117.00	58.00	3.60	0.71
	17- 23	7	0.28	1.00		97.00	50.00	0.43	6.00
	24- 30	7	7.00	7.00		360.00	85.00	1.70	3.60
July	1- 7	7	10.20	7.00		365.00	199.00	5.70	39.00
	8- 14	7	19.40	13.00		199.00	138.00	12.10	23.70
	15- 21	7	28.30	50.00		470.00	221.00	15.00	15.70
	22- 28	7	9.70	28.10		587.00	333.00	9.00	23.40
	29-Aug 4	7	7.50	15.40		380.00	253.00	13.50	19.00
	5- 11	7	3.20	12.40		273.00	194.50	35.00	11.50
	12- 18	6	8.00	15.50		226.00	168.00	31.00	

Table 25. Total Number of Adult Mosquitoes Taken per Month at the North River Light Trap, 1971.

Species		March	April	May	June	July	August	Six Month Total
Aedes	_sollicitans_	0	8	66	146	516	95	831
Aedes	_taeniorhynchus_	0	0	6	230	752	221	1,209
Anopheles	_atropos_	25	348	865	4,994	13,013	3,484	22,729
Anopheles	_bradleyi_	45	242	449	1,714	7,518	2,867	12,835
Culex	_salinarius_	0	0	4	58	365	466	893
Total for Each Month		70	598	1,390	7,142	22,164	7,133	38,497

Relative Species Abundance %

Species			Temporary Pool Breeders _Aedes_	Permanent Pool Breeders _Anopheles_ and _Culex_
Aedes	_sollicitans_	2.2		
Aedes	_taeniorhynchus_	3.1		
Anopheles	_atropos_	59.1	5.3	94.7
Anopheles	_bradleyi_	33.3		
Culex	_salinarius_	2.3		
Total		100.0		

Table 26. Total Number of Mosquitoes Taken Biting per Thirty Minute Interval at North River Study Area, 1971.

Date	Time (P.M.) of count	Aedes sollicitans	Aedes taeniorhynchus	Anopheles atropos	Anopheles bradleyi	Culex salinarius	Psorophora confinnis
June 2	8:30- 9:00	8	7	27	11	2	
4	8:30- 9:00	7	13	12	4	2	3
8	8:45- 9:15	2	20	8	7	20	1
10	8:30- 9:00	13	44	24	10	14	8
15	8:30- 9:15	7	9	42	17	11	1
	9:15- 9:45	4	6	22	9	4	2
17	9:30-10:00		2	25	2	2	
20	9:00- 9:30	74	48	36	13	5	1
	9:30-10:00	14	10	29	8	9	1
22	9:00- 9:30	21	7	33	12	1	
	9:30-10:00	3	4	55	23		
25	9:00- 9:30	8		29	10	6	4
	9:30-10:00	4	3	31	7	4	
	10:00-10:30	1	7	18	4	2	
27	9:00- 9:30			7			3
	9:30-10:00			5		1	
28	8:30- 9:00	1	3				
	9:00- 9:30	23	25	17	13		28
	9:30-10:00	4	8	6	4		12
	10:00-10:30	1	6	16	8	3	4
July 5	8:30- 9:00	2	3		6	1	2
	9:00- 9:30	4	4	23	11	6	13
	9:30-10:00	3	2	23	4	2	6
	10:00-10:30	2	2	16	4	4	9
	10:30-11:00			24	6	1	5
13	8:30- 9:00	10	7	1	3	1	14
	9:00- 9:30	5	9	4	1	4	56
	9:30-10:00	6	1	5	2	3	34
	10:00-10:30	2	1	5	2	3	14
	10:30-10:45			6	3		3
15	8:30- 9:00	1	10		10	3	5
	9:00- 9:30	13	3	21	2	14	38
	9:30-10:00			14	1	16	4
	10:00-10:30			6	1	9	2
21	8:30- 9:00	1	1	2	7	7	3
	9:00- 9:30	1		20		6	5
	9:30-10:00			14	7	7	
	10:00-10:30			22	4	2	1
23	8:00- 8:30	1			2	3	
	8:30- 9:00				3	1	
	9:00- 9:30	1	2	11	1	3	2
	9:30-10:00			3	2	6	
26	8:30- 9:00	2	2	1	4	4	
	9:00- 9:30	3		16	5	24	8
	9:30-10:00	2	1	12	4	13	
	10:00-10:30		1	4	5	6	
Aug 2	8:30- 9:00	1	1	1		1	
	9:00- 9:30			15		6	3
	9:30-10:00			4	1	5	1
	10:00-10:30			3			
	10:30-11:00	0	0	0	0	0	0
4	8:30- 9:00		2	2	2	1	
	9:00- 9:30			4		8	4
	9:30-10:00			2		3	6
	10:00-10:30			5			3
	10:30-11:00			3			2
9	8:30- 9:00	2	1	3		4	9
	9:00- 9:30			8	1	1	
	9:30-10:00			7	3	3	1
	10:00-10:30	1	1	1		2	2
11	8:30- 9:00		3	6		1	3
	9:00- 9:30			2			2
	9:30-10:00	1	1	7			1
	10:00-10:30			2			

Table 27. Total Number of Adult Mosquitoes Taken per Month During Biting Counts at North River, 1971.

Species		June	July	August	Three Month Total
Aedes	_sollicitans_	195	59	5	259
Aedes	_taemiorhynchus_	222	49	9	280
Anopheles	_atropos_	442	253	75	770
Anopheles	_bradleyi_	162	100	7	269
Culex	_salinarius_	86	161	35	282
Total for Each Month		1,107	622	131	1,860

Relative Species Abundance %

Species			Temporary Pool Breeders _Aedes_	Permanent Pool Breeders _Anopheles_ and _Culex_
Aedes	_sollicitans_	13.9		
Aedes	_taeniorhynchus_	15.0		
Anopheles	_atropos_	41.4		
Anopheles	_bradleyi_	14.5	28.9	71.1
Culex	_salinarius_	15.2		
Total		100.0		

Table 28. Mean Number of Adults Taken per Light Trap Night per Week at the Williston Light Trap, 1970.

Date Light Trap week	No. of nights light trap in operation	*Aedes sollicitans*	*Aedes taeniorhynchus*	*Anopheles atropos*	*Anopheles bradleyi*	*Culex salinarius*	*Psorophora confinnis*
Aug. 5-11	6	32	8	121	7	4	1
12-18	7	42	15	162	32	4	0.3
19-25	6	62	17	185	32	2	6
26-Sep 1	3	20	28	100	27	1	5
2- 8	5	20	18	83	7	2	1
9-15	6	6	7	23	20	7	2
16-22	6	15	7	29	10	1	2
23-29	6	10	8	32	2	0.8	0.5
30-Oct 6	2	0	2	3	0	0.5	0
7-13	2	0	0.5	11	0	0	0
14-20	3	1	0	4	0.67	0	0
21-27	1	13	7	35	0.5	6	0
28-Nov 3	0	-	-	-	-	-	-

Table 29. Total Number of Adults Taken per Month From the Williston Light Trap, 1970.

Species		August	September	October	Three Month Total
Aedes	_sollicitans_	920	276	17	1,213
Aedes	_taeniorhynchus_	340	222	12	574
Psorophora	_confinnis_	62	30	0	92
Anopheles	_atropos_	3,273	921	73	4,267
Anopheles	_bradleyi_	532	228	4	764
Culex	_salinarius_	71	60	7	138
Total for Each Month		5,198	1,737	113	7,048

Relative Species Abundance %

Species			Temporary Pool Breeders _Aedes_ and _Psorophora_	Permanent Pool Breeders _Anopheles_ and _Culex_
Aedes	_sollicitans_	17.2		
Aedes	_taeniorhynchus_	8.2		
Psorophora	_confinnis_	1.3		
Anopheles	_atropos_	60.5	26.7	73.3
Anopheles	_bradleyi_	10.8		
Culex	_salinarius_	2.0		
Total		100.0		

Table 30. Mean Number of Adult Mosquitoes Taken per Light Trap Night per Week at the Williston Light Trap, 1971.

Date Light trap week	No. of nights Light trap in operation	*Aedes sollicitans*	*Aedes taeniorhynchus*	*Anopheles atropos*	*Anopheles bradleyi*	*Culex salinarius*	*Psorophora confinnis*
Feb 25-Mar 3	3						
4-10	7						
11-17	7				0.14		
18-24	7						
25-31	7				0.14		
Apr 1- 7	7						
8-14	7				0.57		
15-21	7	0.14		1.00	2.00		
22-28	7	0.43		0.14	0.43		
29-May 5	7	0.28		1.00	1.70		
6-12	7	0.14		0.14	4.30		
13-19	7	0.14		0.71	5.00	0.28	
20-26	7	0.43	0.14	0.43	7.00	0.43	
27-Jun 2	7	1.00	1.00	4.00	19.40	7.00	0.71
3- 9	7	2.00	1.70	3.30	8.30	1.70	
10-16	7	1.00	0.14	0.85	1.70	1.00	
17-23	7						
24-30	7	6.00	3.60	27.30	21.00	2.60	0.28
Jul 1- 7	7	10.70	8.00	26.50	44.00	17.00	2.00
8-14	7	3.40	6.00	25.50	24.20	18.10	4.00
15-21	7	10.00	9.20	51.00	17.00	18.20	0.57
22-28	7	7.70	6.00	61.40	18.00	19.00	2.43
29-Aug 4	7	5.70	7.00	25.40	18.40	16.10	1.40
5-11	7	15.40	4.70	8.00	13.20	9.40	1.40
12-18	5	15.40	1.20	7.00	12.20	4.50	

Table 31. Total Number of Adult Mosquitoes Taken per Month from Williston Light Trap, 1971.

Species		March	April	May	June	July	August	September*	October*	Six Month Total
Aedes	*sollicitans*	0	4	11	68	249	200			532
Aedes	*taeniorhynchus*	0	0	10	38	235	57			340
Aedes	*atlanticus*	0	0	0	0	0	0			0
Psorophora	*confinnis*	0	0	5	2	75	24			106
Anopheles	*atropos*	0	14	32	227	1,265	172			1,710
Anopheles	*bradleyi*	2	25	238	234	777	227			1,503
Culex	*salinarius*	1	8	25	38	594	122			788
Total for Each Month		3	51	321	607	3,195	802			4,979

Relative Species Abundance %

Species			Temporary Pool Breeders *Aedes* and *Psorophora*	Permanent Pool Breeders *Anopheles* and *Culex*
Aedes	*sollicitans*	10.7		
Aedes	*taeniorhynchus*	6.8		
Aedes	*atlanticus*	0.0		
Psorophora	*confinnis*	2.1	19.6	80.4
Anopheles	*atropos*	34.4		
Anopheles	*bradleyi*	30.2		
Culex	*salinarius*	15.8		
Total		100.0		

*Light trap not in operation during these months

Table 32. Mean Number of Adult Mosquitoes Taken per Light Trap Night per Week at the Davis Light Trap, 1972.

Date Light trap week	No. of nights Light trap in operation	Aedes sollicitans	Aedes taeniorhynchus	Aedes atlanticus	Anopheles atropos	Anopheles bradleyi	Culex salinarius	Psorophora confinnis
Feb. 25-Mar 3	7							
4-10	7							
11-17	7				0.57	0.57	0.70	
18-24	5					0.20	0.80	
25-31	5				0.28	0.57	0.28	
Apr. 1-7	6					0.66	0.16	
8-14	7				0.14		0.43	
15-21	7	0.43						
22-28	7				0.14	1.10	3.30	
29-May 5	7	0.70			0.43	0.57	1.10	
6-12	7	0.59			0.28	0.85	1.30	
13-19	7	0.43	0.14		0.70	0.14	1.10	
20-26	7	0.43	0.28		0.28	3.30	4.30	
27-Jun 2	7							
3-9	7	2.70	0.43		0.28	1.70	10.50	10.40
10-16	7	27.00	8.30	12.40	9.00	25.00	10.70	49.00
17-23	7	13.70	7.40	1.70	10.80	16.50	5.60	13.50
24-30	7	2.70	1.40		4.10	4.30	1.00	0.28
July 1-7	7	4.00	4.70	2.00	4.10	15.30	1.50	0.43
8-14	7	5.00	6.00	2.00	2.00	8.70	2.30	2.00
15-21	7	0.57	1.50	0.43	0.28	0.70	2.40	0.28
22-28	7	16.00	5.40	3.10		2.00	1.40	9.40
29-Aug 4	7	2.30	3.00	0.43		0.43		2.70
5-11	7	6.30	4.30	1.00	1.10	2.50	0.70	4.00
12-18	7	30.00	64.00	2.10	6.00	14.30	2.00	18.40
19-25	7	15.00	20.00	0.28	9.00	14.00	1.30	2.70
26-Sep 1	7	12.70	33.00	0.28	10.50	2.60	2.00	2.00

Table 32. (Continued)

Date Light trap week	No. of nights light trap in operation	*Aedes sollicitans*	*Aedes taeniorhynchus*	*Aedes atlanticus*	*Anopheles atropos*	*Anopheles bradleyi*	*Culex salinarius*	*Psorophora confinnis*
Sep 2- 8	7	30.00	54.00		6.00	14.30	0.28	0.28
9-15	7	10.00	12.00		6.00	16.00	3.70	
16-22	7	27.00	62.00		39.00	29.00	3.30	1.40
23-29								
30-Oct 6								
7-13								
14-20								
21-27								
28-Nov 3								

Table 33. Total Number of Adult Mosquitoes Taken per Month at the Davis Light Trap, 1972.

Species		March	April	May	June	July	August	September	October	Eight Month Total
Aedes	sollicitans	0	3	15	340	167	646	445	76	1,692
Aedes	taeniorhynchus	0	0	3	156	110	1,169	1,066	327	2,831
Aedes	atlanticus	0	0	0	112	42	26	4	1	185
Psorophora	confinnis	0	0	0	515	100	191	15	2	823
Anopheles	atropos	6	2	12	198	16	216	500	99	1,049
Anopheles	bradleyi	9	12	34	439	82	488	469	134	1,667
Culex	salinarius	11	27	55	196	43	41	59	21	453
Total for Each Month		26	44	119	1,956	560	2,777	2,594	660	8,700

Species		Relative Species Abundance %	Temporary Pool Breeders Aedes and Psorophora	Permanent Pool Breeders Anopheles and Culex
Aedes	sollicitans	19.4		
Aedes	taeniorhynchus	32.5		
Aedes	atlanticus	2.1		
Psorophora	confinnis	9.5	63.5	36.5
Anopheles	atropos	12.1		
Anopheles	bradleyi	19.2		
Culex	salinarius	5.2		
Total		100.0		

Table 34. Total Number of Adult Mosquitoes Taken per Thirty Minute Interval During Biting Counts at Davis, 1972.

Date	Time (P.M.) of count	Aedes sollicitans	Aedes taeniorhynchus	Aedes atlanticus	Anopheles atropos	Anopheles bradleyi	Culex sal.	Psoro. con.
June 2	8:00- 8:30	1						
	8:30- 9:00	1	1	1		2		
	9:00- 9:30	2	2		1	9		
	9:30-10:00							
June 5	8:00- 8:30	1	1	19				1
	8:30- 9:00		2	3		4	1	
	9:00- 9:30		4	2	5	13		1
	9:30-10:00							
June 9	8:00- 8:30		1					
	8:30- 9:00							
June 12	8:00- 8:30			4				
	8:30- 9:00	1	1			1		
	9:00- 9:30	1	1		2	18		
	9:30-10:00							
June 16	8:00- 8:30		1	7				1
	8:30- 9:00	3	5	5				
	9:00- 9:30	10	4	1	2	1		
	9:30-10:00	2	1		3			
June 20	8:00- 8:30	0	0	0	0	0	0	0
	8:30- 9:00	1	1					
	9:00- 9:30	1	1					
	9:30-10:00							
June 28	8:00- 8:30		2	3				
	8:30- 9:00	1	1	1				
	9:00- 9:30	1	2			2		
	9:30-10:00	0	0	0	0	0	0	0
July 3	8:00- 8:30							
	8:30- 9:00	3		1				
	9:00- 9:30	10	6		1		1	
	9:30-10:00					1		
July 7	8:00- 8:30		2					
	8:30- 9:00			2				
	9:00- 9:30	0	0	0	0	0	0	0
	9:30-10:00	0	0	0	0	0	0	0
July 10	8:00- 8:30	0	0	0	0	0	0	0
	8:30- 9:00		1	1			1	
	9:00- 9:30			1	2	2		
	9:30-10:00		4			2		
July 17	8:00- 8:30	0	0	0	0	0	0	0
	8:30- 9:00	4	20		1			
	9:00- 9:30	12	23		6			4
	9:30-10:00	12	4		2			
July 26	8:00- 8:30		1	3				1
	8:30- 9:00	2	7	1		2		
	9:00- 9:30	8	10					
	9:30-10:00	4	2			1		
Aug. 2	8:00- 8:30	1	2	4				
	8:30- 9:00	4	22	7	1	2	1	1
	9:00- 9:30	2	7		1	2		
	9:30-10:00	1	4			7		1
	10:00-10:30				1	4		
Aug. 7	8:00- 8:30	1	7					
	8:30- 9:00	46	36			1		
	9:00- 9:30	18	6	1				2
	9:30-10:00	3	3		4	5		
Aug. 14	8:00- 8:30	5	27	1				
	8:30- 9:00	11	28					
	9:00- 9:30	4	15			16		
	9:30-10:00	4	3			7		

Table 34. (Continued)

Date	Time (P. M.) of count	*Aedes sollicitans*	*Aedes taeniorhynchus*	*Aedes atlanticus*	*Anopheles atropos*	*Anopheles bradleyi*	*Culex sal.*	*Psoro. con.*
Aug 25	8:00- 8:30	3	60		2			
	8:30- 9:00	1	45		8	1		
	9:00- 9:30		27		3			
	9:30-10:00	4	15		2	2		
Aug 30	8:00- 8:30	25	54		1	1		
	8:30- 9:00	4	17		9	1		
	9:00- 9:30		10		6	2		
	9:30-10:00		1		4	3		
Sep 8	7:30- 8:00		4					
	8:00- 8:30	1	4			2		
	8:30- 9:00					1		
Sep 12	7:30- 8:00	26	33	1		1		
	8:00- 8:30	7	20	1				
	8:30- 9:00	8	7		1	5		
Sep 26	7:00- 7:30	7	31					
	7:30- 8:00	3	22					
	8:00- 8:30	1	8					

Table 35. Total Number of Adult Mosquitoes Taken per Month During Biting Counts at Davis, 1972.

Species		June	July	August	September	Four Month Total
Aedes	*sollicitans*	26	55	137	53	271
Aedes	*taeniorhynchus*	30	74	379	129	612
Aedes	*atlanticus*	45	9	13	2	69
Psorophora	*confinnis*	3	5	4	0	12
Anopheles	*atropos*	13	12	42	1	68
Anopheles	*bradleyi*	51	8	54	9	122
Culex	*salinarius*	1	2	1	0	4
Total for Each Month		169	165	630	194	1,158

Relative Species Abundance %

Species			Temporary Pool Breeders *Aedes* and *Psorophora*	Permanent Pool Breeders *Anopheles* and *Culex*
Aedes	*sollicitans*	23.4		
Aedes	*taeniorhynchus*	52.8		
Aedes	*atlanticus*	6.0		
Psorophora	*confinnis*	1.0	83.2	16.8
Anopheles	*atropos*	5.9		
Anopheles	*bradleyi*	10.5		
Culex	*salinarius*	0.4		
Total		100.0		

Table 36. Mean Number of Adult Mosquitoes Taken per Light Trap Night per Week From the Newport River Light Trap, 1972.

Date Light trap week	No. of nights Light trap in operation	*Aedes atlanticus*	*Anopheles atropos*	*Anopheles bradleyi*	*Culex salinarius*
Feb. 25-Mar 3	3		1.00	1.00	1.70
4-10	4		0.50	0.25	0.50
11-17	7				0.43
18-24	7		0.28	0.43	1.60
25-31	7		0.14	0.28	1.80
Apr. 1-7	7		0.14		0.43
8-14	7		0.14	0.28	0.14
15-21	7		0.28	0.14	0.43
22-28	7				0.14
29-May 5	7			0.14	0.43
6-12	7		0.14	0.14	
13-19	7				
20-26	7	0.28		0.14	0.28
27-Jun 2	7				
3-9	6	0.17		0.83	1.00
10-16	5				
17-23	5				
24-30	7				
July 1-7	6				
8-14					
15-21	3				
22-28	2				
29-Aug 4					
5-11	7				
12-18	7		0.14	0.14	
19-25	7				
26-Sep 1	6				

Table 36. (Continued)

Date Light trap week	No. of nights Light trap in operation	Aedes atlanticus	Anopheles atropos	Anopheles bradleyi	Culex salinarius
Sep 2- 8	6		0.33		
9-15					
16-22					
23-29					
30-Oct 6					
7-13					
14-20					
21-27					
28-Nov 3					

Table 37. **Total Number of Adult Mosquitoes Taken per Month From the Newport River Light Trap, 1972.**

Species		March	April	May	June	July	August	September	October	Eight Month Total
Aedes	sollicitans	0	0	0	0	0	0	0	0	0
Aedes	taeniorhynchus	0	0	0	0	0	0	0	2	2
Aedes	atlanticus	0	0	0	3	0	0	0	0	3
Psorophora	confinnis	0	0	0	0	0	0	0	1	1
Anopheles	atropos	5	4	3	1	0	0	3	0	16
Anopheles	bradleyi	4	5	4	7	0	0	1	1	22
Culex	salinarius	7	31	8	8	0	0	0	0	54
Total for Each Month		16	40	15	19	0	0	4	4	98

Relative Species Abundance %

Species			Temporary Pool Breeders Aedes and Psorophora	Permanent Pool Breeders Anopheles and Culex
Aedes	sollicitans	0.0		
Aedes	taeniorhynchus	2.1		
Aedes	atlanticus	3.0		
Psorophora	confinnis	1.0	6.1	93.9
Anopheles	atropos	16.3		
Anopheles	bradleyi	22.5		
Culex	salinarius	55.1		
Total		100.0		

Table 38. Total Number of Adult Mosquitoes Taken per Thirty Minute Interval During Biting Counts at Newport River, 1972.

Date	Time (P.M.) of count	*Aedes sollicitans*	*Aedes taeniorhynchus*	*Aedes atlanticus*	*Anopheles atropos*	*Anopheles bradleyi*	*Culex sal.*	*Psoro. con.*
June 11	8:00- 8:30							1
	8:30- 9:00	4	1		5	8	15	1
	9:00- 9:30	1			4	6	15	
June 6	8:00- 8:30			1				
	8:30- 9:00		2	2	1	3	6	
	9:00- 9:30	1	2			7	19	2
	9:30-10:00					3	5	1
June 12	8:30- 9:00	1				19	8	1
	9:00- 9:30			1		21	21	1
June 15	7:30- 8:00			1				
	8:00- 8:30		1	7			1	
	8:30- 9:00		8	14			2	
	9:00- 9:30		2	1		3	3	
	9:30-10:00		2			4		
July 8	8:00- 8:30	0	0	0	0	0	0	0
	8:30- 9:00		3					
	9:00- 9:30	1					4	
	9:30-10:00	0	0	0	0	0	0	0
July 18	8:00- 8:30							
	8:30- 9:00	2	4			1	4	
	9:00- 9:30	3	6			3	3	1
July 31	8:00- 8:30	1	10				1	2
	8:30- 9:00						1	
Aug 3	8:00- 8:30			1				
	8:30- 9:00	1	11	2		1		
	9:00- 9:30	2	4	1		4	4	
	9:30-10:00		3			5		1
Aug 12	8:00- 8:30	8	2					
	8:30- 9:00	17	6			1	2	
	9:00- 9:30	4	1		1	6	1	
	9:30-10:30	7	2		5	10	5	1
Aug 24	8:00- 8:30	2	8		1	2	1	
	8:30- 9:00				3	2	2	
	9:00- 9:30		1			3		
Sep 2	7:30- 8:00					1	3	1
	8:00- 8:30						7	4
	8:30- 9:00				4		2	
Sep 11	7:30- 8:00	6	10	10		2	1	
	8:00- 8:30	3	1			1	4	
	8:30- 9:00				4	11	3	1
Sep 26	7:00- 7:30	6		11				
	7:30 8:00		3	6			1	
	8:00- 8:30				3	5	3	

Table 39. Total Number of Adult Mosquitoes Taken During Biting Counts per Month at Newport River, 1972.

Species		June	July	August	September	Four Month Total
Aedes	_sollicitans_	7	7	41	16	71
Aedes	_taeniorhynchus_	18	23	38	14	93
Aedes	_atlanticus_	27	0	4	27	58
Psorophora	_confinnis_	7	3	2	6	18
Anopheles	_atropos_	10	0	10	11	31
Anopheles	_bradleyi_	70	4	34	20	128
Culex	_salinarius_	99	13	15	12	139
Total for Each Month		238	50	144	106	538

Species		Relative Species Abundance %	Temporary Pool Breeders _Aedes_ and _Psorophora_	Permanent Pool Breeders _Anopheles_ and _Culex_
Aedes	_sollicitans_	13.2		
Aedes	_taeniorhynchus_	17.3		
Aedes	_atlanticus_	10.8		
Psorophora	_confinnis_	3.3	44.6	55.4
Anopheles	_atropos_	5.8		
Anopheles	_bradleyi_	23.8		
Culex	_salinarius_	25.8		
Total		100.0		

Table 40. Mean Number of Adult Mosquitoes Taken per Light Trap Night per Week at Atlantic Beach, N. C., 1972.

Date Light trap week		No. of nights Light trap in operation	Aedes sollicitans	Aedes taeniorhynchus	Anopheles atropos	Anopheles bradleyi	Culex salinarius	Psorophora confinnis
Feb	25-Mar 3	7						
Mar	4-10	7						
	11-17	7				0.28		
	18-24	7						
	25-31	7			0.14			
Apr	1- 7	7					0.14	
	8-14	7						
	15-21	7	0.14					
	22-28	7						
	29-May 5	7						
	6-12	7						
	13-19	7						
	20-26	7						
	27-Jun 2	7	0.14					
	3- 9	7	1.6					
	10-16	7						
	17-23	7						
	24-30	7		0.28			0.14	
Jul	1- 7	7						
	8-14	7		0.14		0.14		
	15-21	7	0.43		0.14			
	22-28	7	0.14	0.14			0.14	
	29-Aug 4	7	0.14	0.7	2.7			
	5-11	7	1.1		1.7		0.14	
	12-18	7	1.8	0.28	1.4	0.14		
	19-25	7	0.43	0.14	0.7			
	26-Sep 1	7		0.8	0.14			

Table 40. (Continued)

Date Light trap week	No. of nights Light trap in operation	Aedes sollicitans	Aedes taeniorhynchus	Anopheles atropos	Anopheles bradleyi	Culex salinarius	Psorophora confinnis
Sep 2- 8	7	1.1	0.28	1.3	0.14	0.14	
9-15	7	0.7	0.14	1.8	1.4		
16-22	7	0.14		0.43	0.28	0.14	
23-29	7		0.14		0.14		
30-Oct 6	7						
7-13	7						
14-20	7						
21-27	7						
28-Nov 3	7						

Table 41. Total Number of Adult Mosquitoes Taken per Month at the Atlantic Beach Light Trap, 1972.

Species		March	April	May	June	July	August	September	October	Eight Month Total
Aedes	sollicitans	0	1	0	12	4	25	14	3	59
Aedes	taeniorhynchus	0	0	0	2	3	13	4	3	25
Aedes	atlanticus	0	0	0	0	0	0	0	0	0
Psorophora	confinnis	0	0	0	0	0	0	0	0	0
Anopheles	atropos	1	0	0	0		45	25	0	72
Anopheles	bradleyi	3	0	0	0	1	1	14	2	21
Culex	salinarius	0	1	0	1	1	1	9	6	19
Total for Each Month		4	2	0	15	10	85	66	14	196

Species		Relative Species Abundance %	Temporary Pool Breeders Aedes and Psorophora	Permanent Pool Breeders Anopheles and Culex
Aedes	sollicitans	30		
Aedes	taeniorhynchus	13		
Aedes	atlanticus	0		
Psorophora	confinnis	0		
Anopheles	atropos	37		
Anopheles	bradleyi	11	43	57
Culex	salinarius	9		
Total		100		

Table 42. Predicted / Relative Abundance Values for Anopheles - Culex and Aedes - Psorophora Species at Representative MS, FF, S.I. Values (Ditched Sites).

MS (mean slope)	FF (frequency of flooding)	S.I. (Suit. Index)	Anopheles and Culex	Aedes and Psorophora
0.05	5	1.0000	0.37	99.63
0.05	10	2.0000	35.85	64.15
0.05	15	3.0000	70.09	29.91
0.05	20	4.0000	95.43	4.57
0.05	25	5.0000	100.00	0.00
0.05	30	6.0000	100.00	0.00
0.05	35	7.0000	100.00	0.00
0.15	5	0.3333	0.23	99.77
0.15	10	0.6667	15.11	84.89
0.15	15	1.0000	32.52	67.48
0.15	20	1.3333	46.93	53.07
0.15	25	1.6667	59.37	40.63
0.15	30	2.0000	70.46	29.54
0.15	35	2.3333	80.45	19.55
0.25	5	0.2000	0.19	99.81
0.25	10	0.4000	13.35	86.65
0.25	15	0.6000	27.47	72.53
0.25	20	0.8000	38.40	61.60
0.25	25	1.0000	47.53	52.47
0.25	30	1.2000	55.57	44.43
0.25	35	1.4000	62.89	37.11
0.35	5	0.1429	0.05	99.95
0.35	10	0.2857	13.99	86.01
0.35	15	0.4286	27.16	72.84
0.35	20	0.5714	36.80	63.20
0.35	25	0.7143	44.52	55.48
0.35	30	0.8571	51.16	48.84
0.35	35	1.0000	57.10	42.90
0.45	5	0.1111	0.00	100.00
0.45	10	0.2222	15.48	84.52
0.45	15	0.3333	28.47	71.53
0.45	20	0.4444	37.53	62.47
0.45	25	0.5556	44.56	55.44
0.45	30	0.6667	50.44	49.56
0.45	35	0.7778	55.63	44.37
0.55	5	0.0909	0.12	99.88
0.55	10	0.1818	17.47	82.53
0.55	15	0.2727	30.58	69.42
0.55	20	0.3636	39.40	60.60
0.55	25	0.4545	46.04	53.96
0.55	30	0.5455	51.48	48.52
0.55	35	0.6364	56.18	43.82
0.65	5	0.0769	0.44	99.56
0.65	10	0.1538	19.81	80.19
0.65	15	0.2308	33.20	66.80
0.65	20	0.3077	41.92	58.08
0.65	25	0.3846	48.34	51.66
0.65	30	0.4615	53.50	46.50
0.65	35	0.5385	57.90	42.10
0.75	5	0.0667	0.97	99.03
0.75	10	0.1333	22.43	77.57
0.75	15	0.2000	36.17	63.83
0.75	20	0.2667	44.90	55.10
0.75	25	0.3333	51.19	48.81
0.75	30	0.4000	56.17	43.83
0.75	35	0.4667	60.35	39.65
0.85	5	0.0588	1.74	98.26
0.85	10	0.1176	25.29	74.71
0.85	15	0.1765	39.44	60.56
0.85	20	0.2353	48.21	51.79
0.85	25	0.2941	54.43	45.57
0.85	30	0.3529	59.28	40.72

Table 42 (Continued)

MS (mean slope)	FF (frequency of flooding)	S.I.	Anopheles and Culex	Aedes and Psorophora
0.85	35	0.4118	63.30	36.70
0.95	5	0.0526	2.73	97.27
0.95	10	0.1053	28.38	71.62
0.95	15	0.1579	42.94	57.06
0.95	20	0.2105	51.79	48.21
0.95	25	0.2632	57.97	42.03
0.95	30	0.3158	62.73	37.27
0.95	35	0.3684	66.63	33.37
1.05	5	0.0476	3.95	96.05
1.05	10	0.0952	31.67	68.33
1.05	15	0.1429	46.64	53.36
1.05	20	0.1905	5.58	44.42
1.05	25	0.2381	61.75	38.25
1.05	30	0.2857	66.44	33.56
1.05	35	0.3333	70.25	29.75
1.15	5	0.0435	5.39	94.61
1.15	10	0.0870	35.16	64.84
1.15	15	0.1304	50.53	49.47
1.15	20	0.1739	59.56	40.44
1.15	25	0.2174	65.72	34.28
1.15	30	0.2609	70.36	29.64
1.15	35	0.3043	74.10	25.90
1.25	5	0.0400	7.07	92.93
1.25	10	0.0800	38.81	61.19
1.25	15	0.1200	54.58	45.42
1.25	20	0.1600	63.71	36.29
1.25	25	0.2000	69.86	30.14
1.25	30	0.2400	74.46	25.54
1.25	35	0.2800	78.13	21.87

Table 43. Predicted % Relative Abundance Values for *Anopheles* - *Culex* and *Aedes* - *Psorophora* Species at Representative FOSW, NWET and S.I. Values (Unditched Sites).

FOSW*	NWET*	S.I.	% *Anopheles* and *Culex*	% *Aedes* and *Psorophora*
70	5	1.000	41.39	58.61
70	5	3.000	74.99	25.01
70	5	5.000	100.00	0.00
70	15	1.000	76.52	23.48
70	15	3.000	100.00	0.00
70	15	5.000	100.00	0.00
70	25	1.000	100.00	0.00
70	25	3.000	100.00	0.00
70	25	5.000	100.00	0.00
70	35	1.000	100.00	0.00
70	35	3.000	100.00	0.00
70	35	5.000	100.00	0.00
90	5	1.000	49.48	50.52
90	5	3.000	84.45	15.55
90	5	5.000	100.00	0.00
90	15	1.000	86.01	13.99
90	15	3.000	100.00	0.00
90	15	5.000	100.00	0.00
90	25	1.000	100.00	0.00
90	25	3.000	100.00	0.00
90	25	5.000	100.00	0.00
90	35	1.000	100.00	0.00
90	35	3.000	100.00	0.00
90	35	5.000	100.00	0.00

*FOSW Frequency of standing water

*NWET Number of days/wet period.

Table 44.

INCIDENCE OF CRABHOLE BREEDING

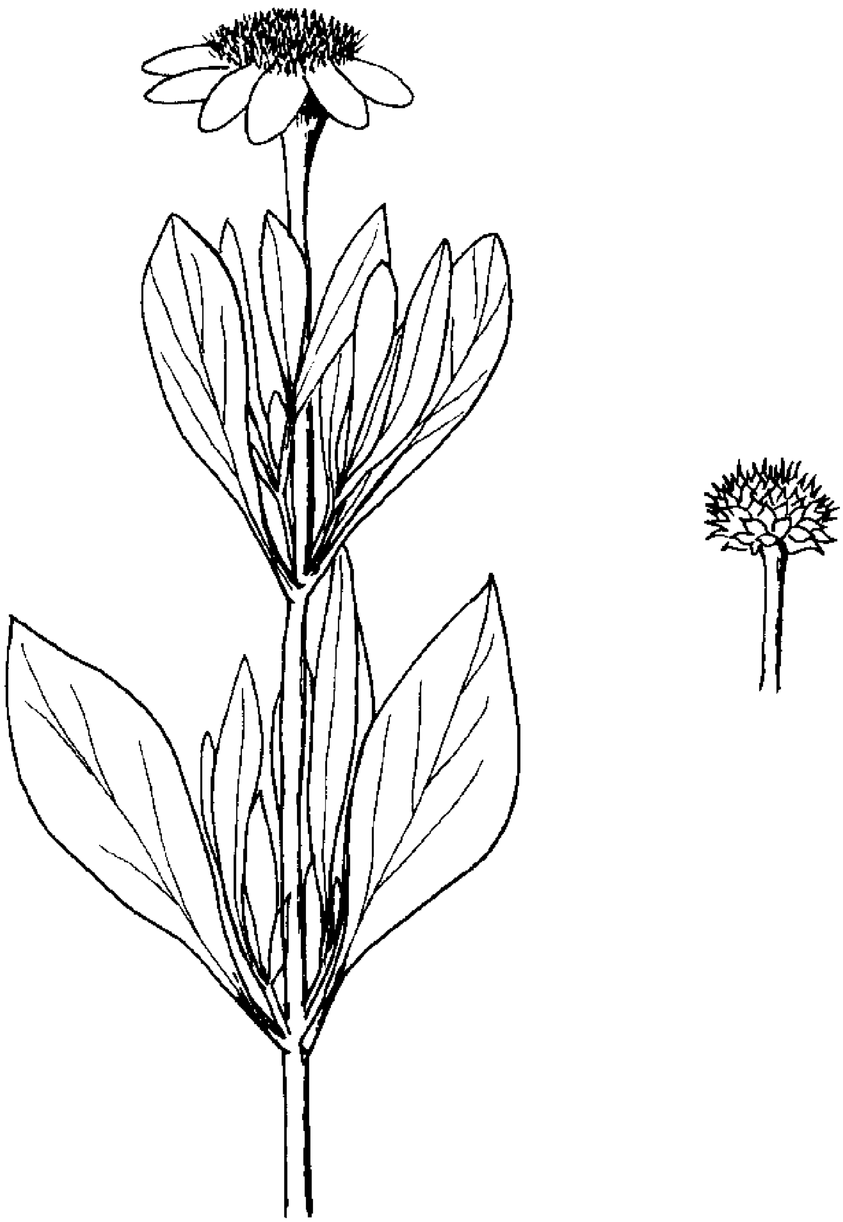
NORTH RIVER STUDY SITE, CARTERET CO., N. C.

Site	No. of holes	Total No. Larvae & Pupae		Total
		Aedes	Anopheles	
4	4 - 12	87	3	90
13	3 - 6	19	26	45
14	10 - 30	137	21	158
16	10 - 20	32	3	35
17	2 - 3	0	2	2
18	1 - 3	7	1	8
20	5 - 10	23	7	30
21	1	103	2	125
23	4 - 5	22	4	6
24	3 - 4	0	4	4
				503

FIG. 1

BACCHARIS HALIMIFOLIA

FIG. 2



BORRICHIA FRUTESCENS

FIG. 3

CLADIUM JAMAICENSE

FIG. 4

DISTICHLIS SPICATA

FIG. 5

IVA IMBRICATA

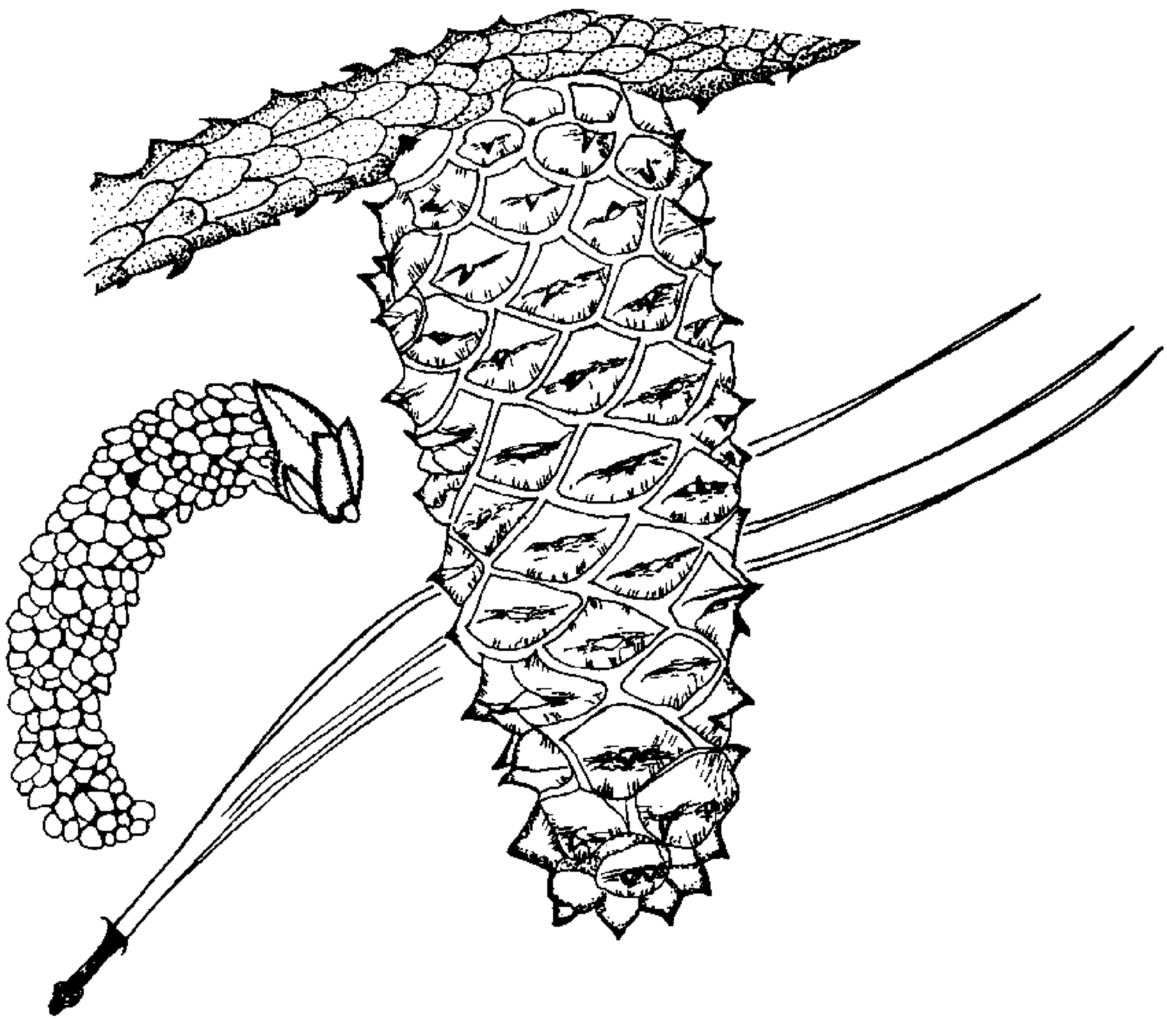
FIG. 6

JUNCUS ROEMERIANUS

FIG. 7

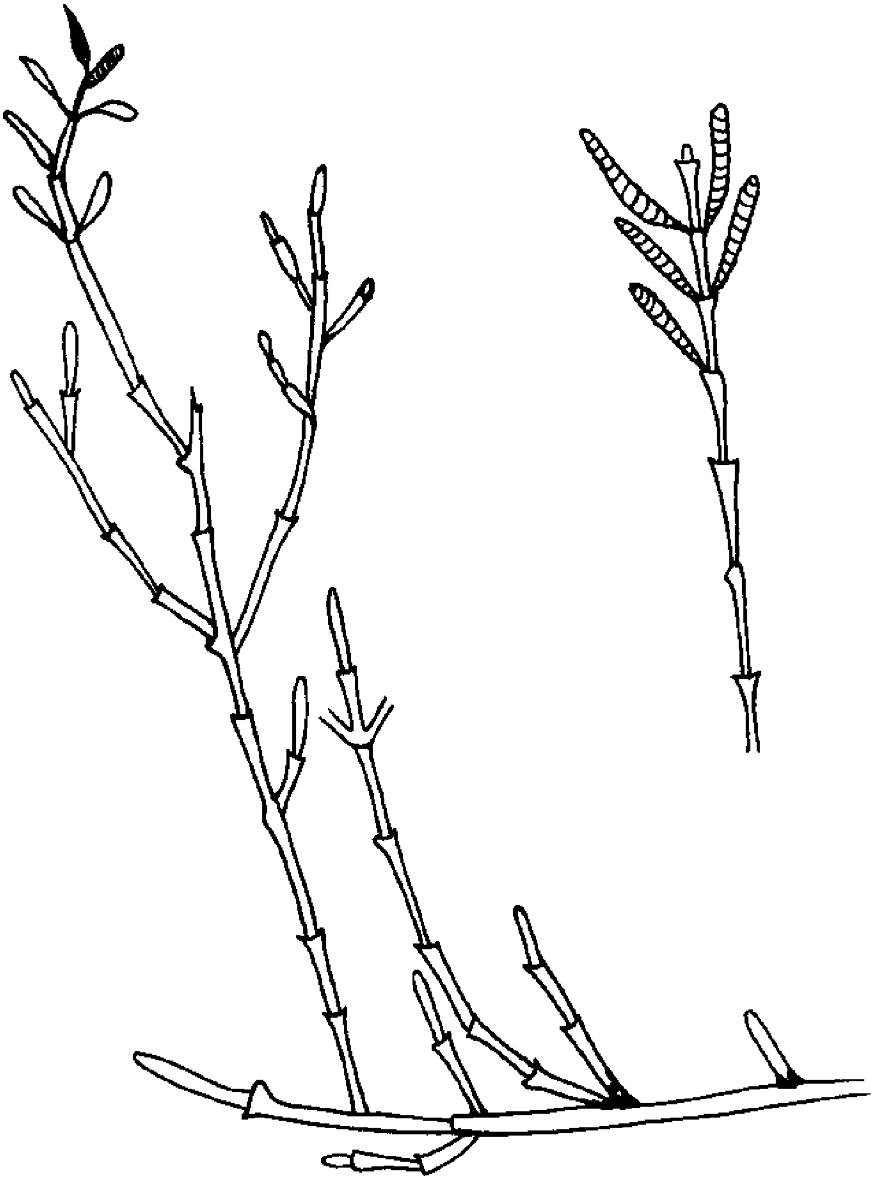
MYRICA CERIFERA

FIG. 8



PINUS TAEDA

FIG. 9

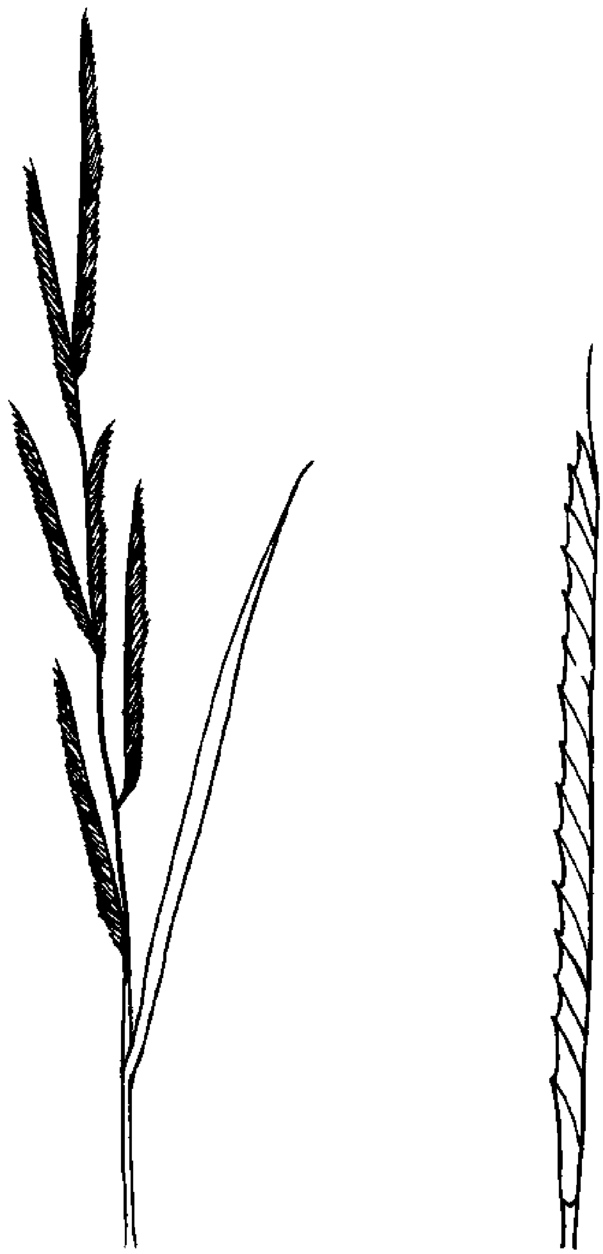


SALICORNIA VIRGINICA

FIG. 10

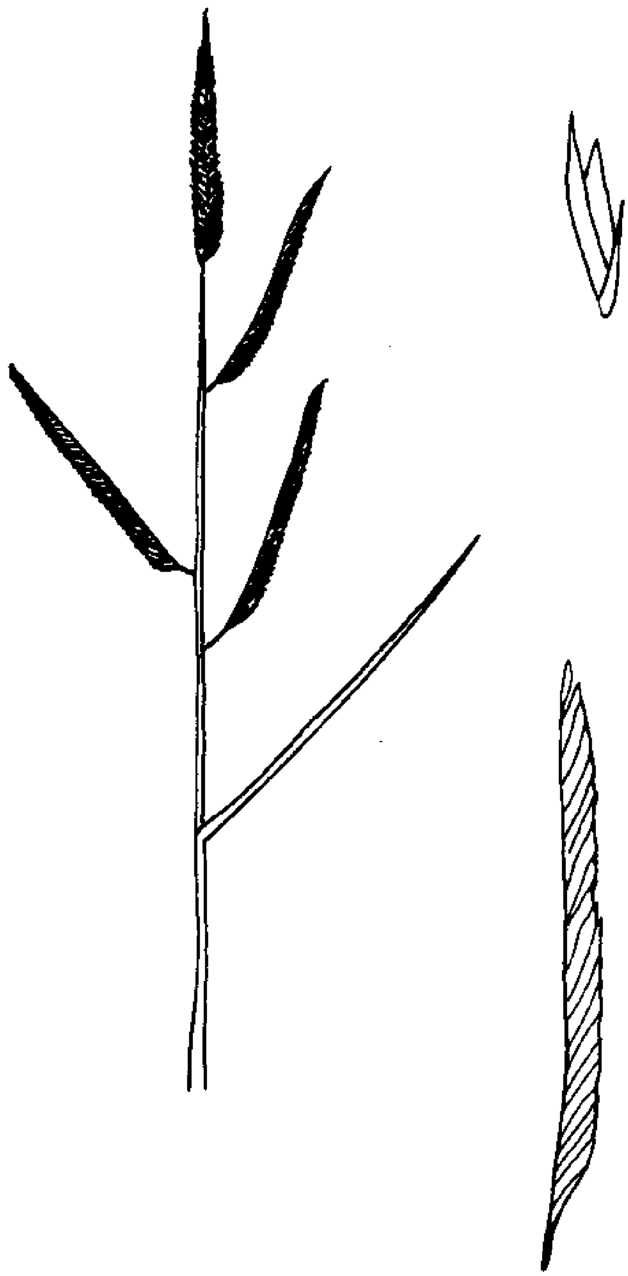
SCIRPUS ROBUSTUS

FIG. 11



SPARTINA ALTERNIFLORA

FIG. 12



SPARTINA PATENS