

MALARIA CONTROL IN WAR AREAS

MONTHLY REPORT

SEPTEMBER, 1943



FEDERAL SECURITY AGENCY

U. S. PUBLIC HEALTH SERVICE

ATLANTA, GEORGIA

TABLE I

MCWA LARVICIDE AND MINOR DRAINAGE PROJECTS

SEPTEMBER 1 - 30, 1943

| STATE | Areas in Operation | War Establishments Protected | LARVICIDAL WORK | | | OTHER WORK | | | | | Total Man Hours | Total Men Employed |
|--------------|--------------------|------------------------------|-----------------|------------------|------------------------|------------|---------|------------------|----------------|------------------------------|-----------------|--------------------|
| | | | Laricide Used | | Surfaces Treated Acres | Ditching | | Cleaning Lin.Ft. | Clearing Acres | Water Surf. Eliminated Acres | | |
| | | | Oil Gals. | Paris Green Lbs. | | Cu.Yds. | Lin.Ft. | | | | | |
| Alabama | 8 | 64 | 1,095 | 33 | 75.2 | 518 | 2,128 | 34,870 | 12.2 | 2.1 | 6,503 | 44 |
| Arkansas | 14 | 63 | 17,879 | 821 | 1,587.4 | 795 | 13,722 | 180,824 | 70.8 | 5.0 | 27,576 | 160 |
| California** | 3 | 11 | 4,026 | --- | 328.6 | * | --- | --- | 2.2 | 29.1 | 2,000 | 21 |
| D. C. | 1 | 23 | 200 | 8 | 15.3 | 455 | 3,433 | 2,835 | 0.9 | 0.7 | 2,896 | 18 |
| Florida | 17 | 91 | 6,643 | 99 | 563.5 | 8,152 | 68,842 | 365,217 | 45.4 | 63.5 | 40,886 | 209 |
| Georgia | 14 | 93 | 121 | 3,101 | 2,996.2 | 448 | 4,688 | 191,233 | 28.2 | 15.7 | 26,528 | 133 |
| Illinois | 2 | 54 | 4,459 | 3,444 | 3,536.0 | 63 | 320 | 6,150 | 0.6 | 1.0 | 7,048 | 33 |
| Indiana | 1 | 40 | 620 | 42 | 275.9 | --- | --- | --- | 0.8 | --- | 1,621 | 8 |
| Kentucky | 4 | 48 | 597 | 59 | 35.2 | 319 | 1,750 | 34,780 | 7.9 | 0.5 | 6,054 | 32 |
| Louisiana | 8 | 71 | 89,971 | 2,425 | 7,445.2 | 572 | 14,934 | 87,056 | 79.9 | 6.1 | 65,448 | 379 |
| Maryland | 2 | 21 | 162 | 16 | 20.2 | 966 | 2,500 | 23,600 | 3.3 | 3.9 | 4,876 | 17 |
| Michigan | 1 | --- | --- | 20 | 21.5 | --- | --- | --- | --- | --- | 145 | 2 |
| Mississippi | 12 | 50 | 8,915 | 96 | 390.5 | 357 | 5,315 | 204,161 | 85.1 | 0.5 | 18,839 | 109 |
| Missouri | 6 | 24 | 5,465 | 2,119 | 1,355.6 | 547 | 1,380 | 39,250 | 6.9 | 26.7 | 11,541 | 55 |
| No. Carolina | 10 | 69 | 10,446 | 77 | 604.7 | 608 | 4,578 | 496,636 | 146.9 | 1.2 | 36,463 | 179 |
| Oklahoma | 5 | 21 | 5,782 | 140 | 499.7 | --- | 665 | 106,525 | 13.4 | --- | 7,808 | 40 |
| Puerto Rico | 6 | 22 | 1,325 | 7,376 | 11,594.0 | * | 23,100 | 104,338 | 23.7 | 8.0 | 64,358 | 410 |
| So. Carolina | 19 | 101 | 13,273 | 851 | 1,545.1 | 1,463 | 15,687 | 315,957 | 362.3 | 7.8 | 51,023 | 260 |
| Tennessee | 7 | 69 | 20,742 | 203 | 959.7 | 366 | 4,624 | 18,577 | 26.1 | 0.4 | 13,690 | 71 |
| Texas | 14 | 119 | 11,832 | 179 | 725.3 | 1,247 | 15,540 | 478,706 | 151.7 | 29.2 | 45,041 | 231 |
| Virginia | 4 | 83 | 6,796 | 197 | 412.0 | * | 39,886 | 13,338 | 47.2 | --- | 24,657 | 148 |
| Total | 158 | 1,137 | 210,349 | 21,276 | 35,036.8 | 16,876 | 229,470 | 2,704,053 | 1,115.5 | 201.4 | 465,001 | 2,559 |
| August Total | 157 | 1,158 | 241,399 | 23,465 | 30,041.1 | 15,804 | 311,174 | 2,658,479 | 1,030.1 | 238.0 | 497,804 | 2,654 |

* Figures not available

** Figures shown are for two weeks.

TABLE II

MCWA MAJOR DRAINAGE PROJECTS

| STATE | No. of Projects | Clearing Brushing Acres | Channel or Ditch Clearing Lin.Ft. | New Ditching | | | Total Cu.Yds. | Fill Cu.Yds. | Ditch Lining Placed | | Underground Drains Lin.Ft. | Water Surf. Eliminated Acres | Total Man Hours |
|----------------|-----------------|-------------------------|-----------------------------------|--------------|---------------|----------|---------------|--------------|---------------------|---------|----------------------------|------------------------------|-----------------|
| | | | | Hand | Lin.Ft. Mach. | Dynamite | | | Sq.Ft. | Lin.Ft. | | | |
| Alabama | 2 | 7.0 | 12,200 | 825 | --- | --- | 507 | --- | --- | --- | --- | --- | 4,789 |
| Arkansas | 1 | --- | --- | --- | 1,660 | --- | 12,499 | --- | --- | --- | --- | --- | 668 |
| Florida | 1 | 1.3 | 2,600 | --- | --- | 1,800 | 5,500 | --- | --- | --- | --- | --- | 1,305 |
| North Carolina | 4 | 12.8 | 5,865 | 16,031 | 1,290 | --- | 6,281 | 62 | --- | --- | 30 | 10.7 | 11,401 |
| Puerto Rico | 3 | 8.8 | 900 | 2,525 | --- | --- | 4,599 | 297 | 2,535 | --- | --- | --- | 45,652 |
| South Carolina | 1 | 6.6 | 2,700 | --- | 900 | --- | 1,616 | 75 | 1,200 | 800 | --- | --- | 1,694 |
| Texas | 1 | 0.5 | --- | 2,497 | --- | --- | 405 | --- | --- | --- | --- | 5.3 | 2,108 |
| Virginia | 1 | 0.4 | 6,056 | 129 | --- | --- | 36 | --- | 2,814 | --- | --- | --- | 3,130 |
| Total | 13 | 37.4 | 30,321 | 22,007 | 3,850 | 1,800 | 31,443 | 434 | 6,549 | 800 | 30 | 16.0 | 70,745 |
| August Total | 15 | 55.9 | 51,334 | 22,336 | 3,000 | 15,975 | 26,977 | 562 | 3,074 | 2,933 | --- | 503.0 | 66,584 |

TABLE III

MCWA PERSONNEL ON DUTY ON SEPTEMBER 30, 1943 AND TOTAL PAYROLL FOR MONTH OF SEPTEMBER

SEPTEMBER 1 - 30, 1943

| STATE | Commissioned | | Prof. & Sci. | | Sub-Prof. (1) | | C. A. F. | | Custodial | | Total | | Percent of Total | |
|----------------------|--------------|--------|--------------|--------|---------------|--------|----------|--------|-----------|---------|-------|---------|------------------|-------|
| | No. | Pay | No. | Pay | No. | Pay | No. | Pay | No. | Pay | No. | Pay | No. | Pay |
| Alabama | 4 | 1,021 | 2 | 659 | 2 | 365 | 2 | 410 | 53 | 6,716 | 63 | 9,171 | 1.8 | 2.0 |
| Arkansas | 5 | 1,435 | 2 | 633 | 24 | 4,796 | 5 | 411 | 126 | 16,635 | 162 | 23,910 | 4.7 | 5.2 |
| California* | 1 | 332 | 1 | 319 | 3 | 550 | 2 | 367 | 13 | 1,879 | 20 | 3,447 | 0.6 | 0.8 |
| D. C. | 5 | 1,533 | 7 | 1,880 | 45 | 9,453 | 5 | 1,088 | 230 | 29,639 | 292 | 43,595 | 8.4 | 9.6 |
| Florida | 3 | 851 | 4 | 654 | 36 | 5,885 | 7 | 1,376 | 93 | 11,708 | 143 | 20,474 | 4.1 | 4.5 |
| Illinois | 3 | 690 | 5 | 1,146 | 2 | 416 | 4 | 696 | 27 | 4,391 | 41 | 7,339 | 1.2 | 1.7 |
| Indiana | 1 | 284 | --- | --- | 1 | 183 | --- | --- | 7 | 920 | 9 | 1,387 | 0.1 | 0.3 |
| Kentucky | 2 | 690 | 4 | 1,110 | 5 | 1,495 | 3 | 556 | 23 | 3,171 | 37 | 7,022 | 1.1 | 1.6 |
| Louisiana | 9 | 2,529 | 6 | 2,160 | 42 | 9,766 | 6 | 1,147 | 336 | 43,913 | 399 | 59,515 | 11.5 | 13.0 |
| Maryland | --- | --- | --- | --- | 3 | 537 | 2 | 410 | 18 | 2,463 | 23 | 3,410 | 0.7 | 0.7 |
| Mississippi | 4 | 1,183 | 1 | 264 | 15 | 3,068 | 3 | 410 | 88 | 11,614 | 111 | 16,539 | 3.2 | 3.6 |
| Missouri | 6 | 567 | 1 | 264 | 13 | 2,393 | 4 | 726 | 42 | 5,627 | 62 | 9,577 | 1.8 | 2.1 |
| No. Carolina | 6 | 1,710 | 8 | 1,226 | 10 | 1,753 | 3 | 287 | 242 | 31,689 | 269 | 36,665 | 7.8 | 8.0 |
| Oklahoma | 3 | 918 | 4 | 1,049 | 7 | 1,343 | 1 | 146 | 33 | 4,439 | 48 | 7,895 | 1.4 | 1.7 |
| Puerto Rico | 6 | 2,007 | --- | --- | 11 | 2,072 | 5 | 951 | 710 | 31,613 | 732 | 36,643 | 21.1 | 8.0 |
| So. Carolina | 4 | 1,070 | --- | --- | 25 | 6,293 | 6 | 870 | 272 | 34,330 | 312 | 43,910 | 9.0 | 9.6 |
| Tennessee | 4 | 1,135 | --- | --- | 7 | 1,592 | 2 | 410 | 63 | 8,143 | 78 | 11,757 | 2.2 | 2.6 |
| Texas | 7 | 1,950 | 6 | 1,708 | 30 | 6,252 | 4 | 798 | 217 | 29,187 | 264 | 39,825 | 7.6 | 8.8 |
| Virginia | 2 | 567 | 2 | 689 | 11 | 2,468 | 2 | 559 | 158 | 19,554 | 175 | 23,857 | 5.0 | 5.2 |
| AEDES AEGYPTI | | | | | | | | | | | | | | |
| Florida | --- | --- | --- | --- | 2 | 222 | 1 | 102 | --- | 121 | 3 | 445 | 0.1 | 0.1 |
| Georgia | --- | --- | 1 | 319 | 11 | 2,133 | 1 | 164 | --- | --- | 13 | 2,616 | 0.4 | 0.6 |
| Louisiana | --- | --- | --- | --- | 20 | 1,800 | 1 | 73 | --- | --- | 21 | 1,873 | 0.6 | 0.4 |
| So. Carolina | 1 | 284 | --- | --- | --- | 1,005 | --- | 73 | --- | 125 | 1 | 1,487 | 0.1 | 0.3 |
| Texas | 2 | 567 | 1 | 448 | 9 | 1,750 | 1 | 146 | 21 | 3,380 | 34 | 5,991 | 1.0 | 1.3 |
| H.Q. & Dist. (2) | 44 | 13,185 | 11 | 3,304 | 14 | 6,019 | 79 | 13,926 | 10 | 1,135 | 158 | 37,569 | 4.5 | 8.3 |
| Total | 118 | 34,508 | 73 | 19,446 | 348 | 73,609 | 149 | 26,042 | 2,782 | 302,392 | 3,470 | 455,997 | 100.0 | 100.0 |
| Percent of Total | 3.4 | 7.6 | 2.1 | 4.3 | 10.0 | 16.1 | 4.3 | 5.7 | 80.2 | 66.3 | 100.0 | 100.0 | | |

* Figures not available

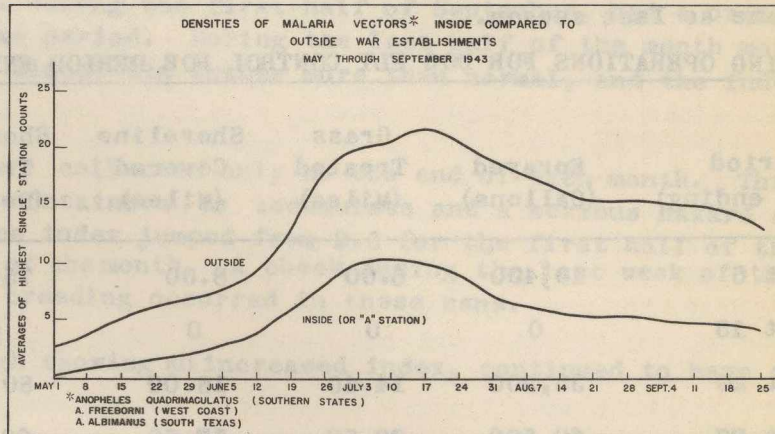
(1) Includes Entomological Inspectors

(2) Includes Headquarters and District Offices, malaria survey, special investigations and employees temporarily attached to Headquarters pending assignment to States.

MONTHLY REPORT
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QUAD DENSITIES CONTINUE DECREASE

The decrease in *Anopheles quadrimaculatus* prevalence, which began in late July, continued generally through September. This is shown graphically by the accompanying chart. Drought and the advent of cooler weather tended to diminish breeding in some of the areas; in others the pooling of streams and the stabilization of pond and lake surfaces have increased the control problem. Entomological reports (M-7) received during the month show that in a total of 480 or 92 percent of the zones, *quadrimaculatus* densities were satisfactorily low. This compares with 91 percent in this category



during August. The number of satisfactory zones had increased to 94 percent by the last week in September. Inspectional and control work was discontinued in several of the more northerly zones during the month.

Cooperation with Army

The status of malaria vectors in the vicinity of a large number of Army general hospitals and prisoner of war camps was reported to the Army authorities during September. By means of a condensed reporting system, reports on changing conditions will be made periodically. Preliminary work to determine the abundance of malaria vectors around these general hospitals and prisoner of war camps not yet surveyed is continuing. Because of the advanced season further observations next year will be necessary before reliable data can be obtained on these.

Exotic Disease Vectors

With the danger of exotic disease vectors entering the United States becoming more real with the ever-increasing air travel from foreign countries, it is planned to keep a close watch over the more important ports of entry. Four additional entomologists are being trained for this work at the U. S. Public Health Service Quarantine Station at Miami, Florida. Upon completion of their training these men will be assigned to duty at selected ports of entry.

DOG FLY CONTROL MEASURES RESUMED

For the third successive season, the U. S. Public Health Service, operating jointly with the Department of Agriculture, Bureau of Entomology and Plant

Quarantine, is conducting a program for the control of the dog fly pest at Panama City, Florida. Designed to protect military installations and war activities in northwestern Florida, this program has made possible uninterrupted training and war production in areas along the Gulf Coast infested by the pest.

The following tabular account of dog fly operations was submitted by Dr. S. W. Simmons, entomologist, who is in charge of the project. The spraying shown for the period ending August 6 was of a preliminary nature, during which improvements in equipment and procedures were adopted. Actual control spraying was initiated during the week ending August 20th. Except during the preliminary work, the spray used consisted of 25 percent creosote in bay water, the same as last season.

SPRAYING OPERATIONS FOR DOG FLY CONTROL FOR PERIOD ENDING SEPTEMBER 10, 1943

| Period (Week ending) | Sprayed (Gallons) | Grass Treated (Miles) | Shoreline Covered (Miles) | Shoreline Treated (Percent) | Material used per mile of grass treated (Gallons) |
|-------------------------|----------------------|-----------------------------|---------------------------------|-----------------------------------|--|
| August 6 | 10,400 | 6.00 | 8.00 | 75.00 | 1733.2 |
| August 13 | 0 | 0 | 0 | 0 | 0 |
| August 20 | 35,200 | 14.40 | 18.00 | 80.00 | 2444.64 |
| August 27 | 69,500 | 39.58 | 57.50 | 68.83 | 1755.37 |
| September 3 | 105,900 | 38.12 | 57.75 | 66.00 | 2778.26 |
| September 10 | 100,750 | 26.73 | 43.57 | 61.35 | 3769.46 |
| Totals and Averages | 321,750 | 124.83 | 184.82 | 67.54 | 2577.63 |

Ten spray units were in operation during August in the area from Pensacola to Port St. Joe. Other units were in readiness for initiation of work in the Apalachicola area as soon as needed. No grass deposits, the breeding medium used by the flies, had appeared on the shore in this area by September 10th.

During the period covered by the report no large outbreaks of flies occurred. During optimum conditions, minor infestations were observed in a few localities, as is usual. It was concluded that the program has been entirely satisfactory to date.

AEGYPTI INDEX SHOWS RISE

As has been expected, the *Aedes aegypti* index for most of the projects showed a marked increase for September as the breeding season approached its climax.

A notable exception was Savannah, Georgia, which had an index of 10.5 for the last half of the month to continue its record of a constant decrease every semi-monthly period since July.

The Miami, Florida project continued to show an index of approximately 6.0.

Key West, Florida, operating on a greatly reduced scale during the last two weeks of September, had an index of 4.3 for the first half of the month and 6.8 for the last half.

Heavy rainfall in Louisiana and Texas occurring at a time when breeding is normally increasing, gave further impetus to the rising index. New Orleans, which had a subnormal rainfall during the first half of September, had a breeding index of 6.0 for the same period. During the last half of the month more than 12 inches of rain fell, almost ten inches more than normal, and the index for the period rose to 8.9.

In Houston, tin cans are collected only at the end of each month. This allows large piles of these containers to accumulate and a serious hazard as is shown by the fact that the index jumped from 2.6 for the first half of the month, to 7.1 for the last half of the month. A check during the last week of the month showed that 30% of the breeding occurred in these cans.

Corpus Christi, although showing an increased index, continued to have an incidence of less than 1%.

All other Texas projects remained below the 5% level except San Antonio which jumped to 6.6% for the period September 16-30.

The Charleston index for the month was less than 2.5%.

TABLE IV
MCWA ENCUMBRANCES AND LIQUIDATIONS BY MAJOR ITEMS
SEPTEMBER 1943

| | Continental U. S. | Puerto Rico |
|---|-------------------|-------------|
| .01 Personal Services | \$424,348 | \$36,642 |
| .02 Travel | 18,900 | 150 |
| .03 Transportation | 1,500 | ----- |
| .04 Communications Service | 1,242 | 25 |
| .05 Rent | 2,060 | ----- |
| .06 Printing and Binding | 450 | ----- |
| .07 Other Contractual Services | 19,941 | 1 |
| .08 Supplies and Materials | 34,838 | 4,156 |
| .09 Equipment | 10,256 | 30 |
| Sub-total other than Personal Services | 89,187 | 4,362 |
| Total | 513,535 | 41,004 |

ARKANSAS PROJECT ILLUSTRATES DRAINAGE ECONOMIES

Permanent elimination of breeding areas by drainage has long been recognized as sound procedure by MCWA. Drainage undertaken at this time which will eliminate future larviciding is particularly desirable in view of possible further decreases of manpower which seems imminent and which might at some future date make larviciding operations impossible in certain areas. In many instances drainage also has achieved more extensive control and despite its higher initial cost, proved more economical over a given period.

An outstanding example of this type project was the drainage of Round Pond which is located within flight range of Newport, Arkansas. This pond is a 200 acre circular swamp south of the city limits. Trees, vegetation, and debris had made larviciding difficult. At the beginning of the breeding season *Anopheles quadrimaculatus* mosquitoes were found throughout all of south Newport with one adult index station showing a count of 89 quads. The pond was consequently larvicided with Paris green from a power duster mounted on a motor boat. A heavy application was laid down and fair larval control was obtained for the first week; however, by this time the water level had dropped to such a point that a motor boat no longer could navigate the area because of trees and stumps. It was then decided to apply Paris green by airplane. Four applications were applied with effective control being achieved in only one instance. The area is not adaptable to airplane dusting because of the height of the trees which necessitates flying at an elevation of approximately 80 feet. At this elevation a very low wind velocity must prevail in order to obtain proper coverage. During the three weeks of ineffective control by airplane dusting, supplemental dusting was done using hand dusters. Such portions of the swamp as could be reached were dusted but with the water hip deep difficulties in wading made only partial control possible.

Estimated Cost of Larviciding for Season: The cost of the above larviciding from which effective control was not obtained, covering a period of approximately five weeks, was \$1,033.00. The acreage that would have remained covered with water during the remainder of the season is not definitely known, but it is estimated that it would have been necessary to larvicide approximately 60 acres of water during the remainder of the season. The cost of such larviciding for the season follows:

| | |
|---|----------------|
| Labor....60 acres @ 4 M.H. per acre = 240 M.H. at 70¢ | = \$168.00 |
| Paris green...60 acres @ 1 lb. per acre = 60# @ 20¢ | = 12.00 |
| Lime....60 acres @ 8 lbs. per acre = 480# @ 3/4¢ | = 3.60 |
| | TOTAL \$183.60 |
| 20 applications @ \$183.60 = | \$3672.00 |
| Five weeks actual cost (by plane and hand) | <u>1033.00</u> |
| Estimated cost for season | \$4705.00 |

In view of the fact that the results obtained from such a program would not justify the cost, it was decided to drain the area by using dynamite. In eight days 18,650 feet of drainage ditch had been constructed. This ditch had a cross-section three feet deep with a three foot bottom and a ten foot top. Seventeen thousand pounds of dynamite were used and the total cost of the project including labor and material was \$3,112.00. At a later date the ditch will be dressed, which will include the removal of the remaining roots and stumps. This additional cost is estimated at \$562.00, which will give a completed cost of \$3,674.00.

At the completion of this work, all water remaining in Round Pond was confined to the drainage ditch which can be larvicided without difficulty. It will be necessary to larvicide for a period of five weeks each spring during which the area is covered by flood waters. The cost of this is estimated at \$1,033.00. This figure should be added to the cost of drainage work in order that a fair comparison may be made between the cost of larviciding and drainage. The following shows this comparative cost, in which it is estimated that the cost for drainage plus five weeks of larviciding would be approximately the same as for larviciding for a period of 25 weeks. The drainage ditch, however, with a small amount of maintenance will provide adequate control over a period of several years, and consequently will prove not only more effective but also more economical.

Cost of Drainage

| | | |
|--|-------------------|-------------------|
| 17,000 lbs. of dynamite @ \$12.50 per cwt | | \$2,137.00 |
| Labor: | | |
| Clear right-of-way | \$495.00 | |
| Load and shoot | 480.00 | |
| Remove roots, etc. | 562.00 | |
| | <u>\$1,537.00</u> | 1,537.00 |
| Larviciding, necessary because of flood conditions | | <u>1,033.00</u> |
| | TOTAL | \$4,707.00 |

Cost of Larviciding

| | | |
|---|--------------|-------------------|
| Actual cost for five weeks including airplane cost, larvicide and labor | | \$1,033.00 |
| 20 applications by hand @ \$183.60 | | 3,672.00 |
| | <u>TOTAL</u> | <u>\$4,705.00</u> |

(From a report suggested by Porter A. Stephens and compiled by John E. Taylor)

MCNA AIRPLANE DUSTING PROGRAM

SEPTEMBER 1 - 30, 1943

| STATE | NO. OF AREAS DUSTED | ACREAGE DUSTED | PARIS GREEN USED LBS. | DILUENT USED LBS. | PARIS GREEN PER ACRE | DUSTING TIME HOURS | TOTAL MAN HOURS |
|---------------|---------------------|----------------|-----------------------|-------------------|----------------------|--------------------|-----------------|
| Arkansas | 2 | 2,325 | 1,745 | 8,370 | 0.7 | 11:22 | 224 |
| Louisiana | 3 | 3,200 | 6,800 | 14,600 | 2.1 | 9:04 | 504 |
| Potomac River | 1 | 4,450 | 6,565 | 21,995 | 1.4 | 35:29 | 1,432 |
| TOTAL | 6 | 9,975 | 15,110 | 44,965 | 1.5 | 55:55 | 2,160 |

MALARIA MORTALITY IN THE UNITED STATES, 1935 - 1942

Since 1936 there has been an uninterrupted decrease in the number of reported malaria deaths in the United States. For the 15 States listed in the table below, the total number of deaths reported as the result of malaria dropped from 4,345 in 1935 to 808 in 1942.

AVERAGE ANNUAL CRUDE MALARIA DEATH RATE PER 100,000 POPULATION AND PER CENT OF COUNTIES HAVING CRUDE MALARIA DEATH RATE OVER 30 IN 15 STATES, 1938 - 1942

| STATE | AVERAGE ANNUAL MALARIA DEATH RATE 1935 - 1942 | PER CENT OF COUNTIES HAVING AVERAGE ANNUAL MALARIA DEATH RATE OVER 30 | |
|----------------|--|---|-----------|
| | | 1935-1939 | 1938-1942 |
| 15 States | 4.7 | 6.3 | 1.0 |
| Arkansas | 15.8 | 23.9 | 1.3 |
| South Carolina | 12.5 | 28.2 | 8.7 |
| Mississippi | 12.0 | 9.8 | 1.2 |
| Florida | 9.4 | 28.4 | 6.0 |
| Alabama | 7.7 | 4.5 | 3.0 |
| Georgia | 7.3 | 11.3 | 0.6 |
| Louisiana | 7.1 | 3.1 | 0.0 |
| Texas | 4.6 | 2.8 | 0.4 |
| Tennessee | 3.6 | 2.1 | 0.0 |
| Oklahoma | 3.0 | 1.3 | 0.0 |
| North Carolina | 2.1 | 1.0 | 0.0 |
| Missouri | 2.0 | 3.5 | 0.0 |
| Kentucky | 1.2 | 0.0 | 0.0 |
| Illinois | 0.4 | 0.0 | 0.0 |
| Virginia | 0.3 | 0.0 | 0.0 |

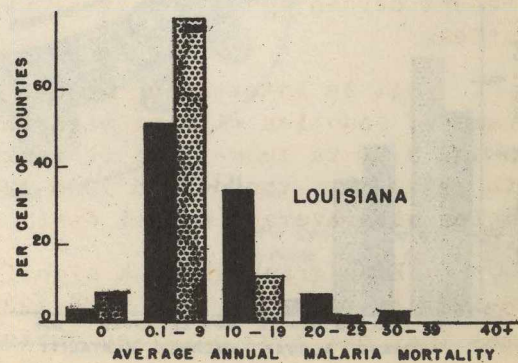
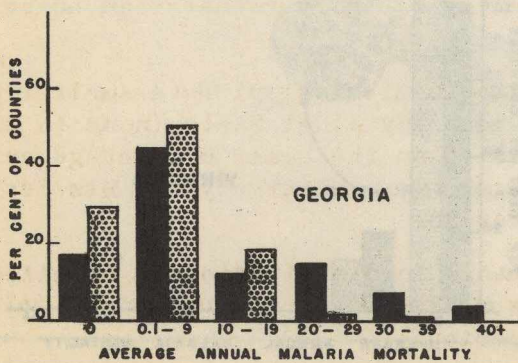
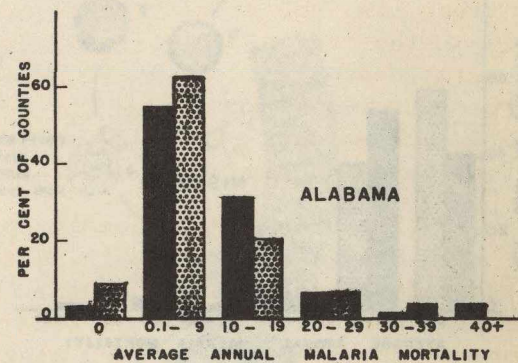
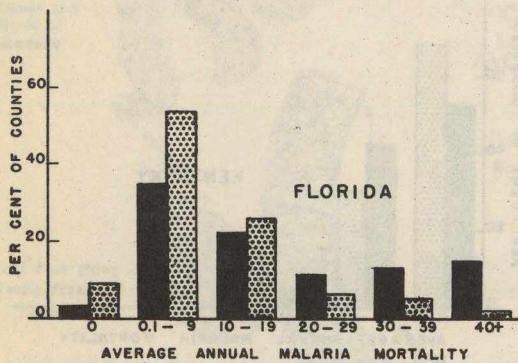
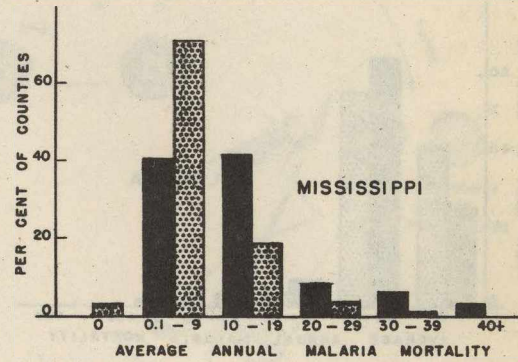
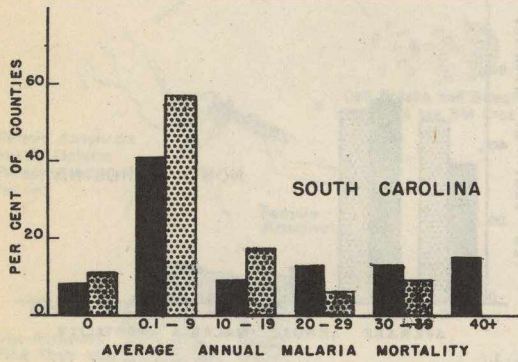
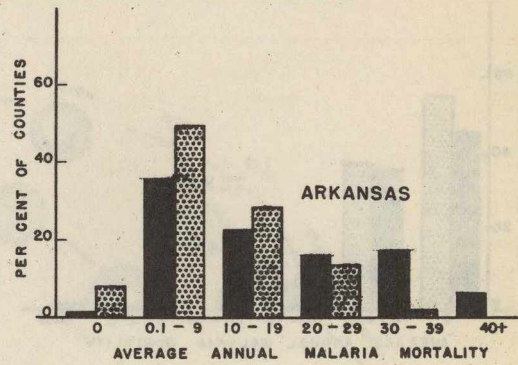
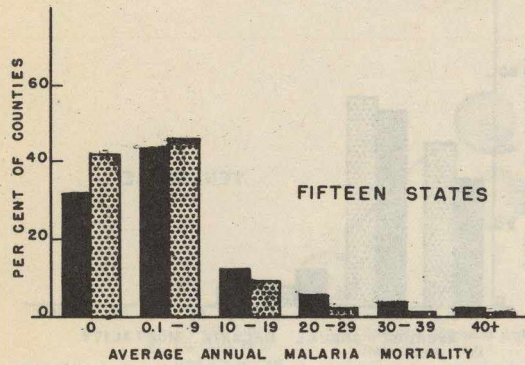
In no State is the malaria problem even approximately equal in all counties. In fact it is rarely uniform throughout an individual county. This is one of the reasons why State death rates alone are inadequate descriptions of the malaria problem. It would be desirable to use geographic areas considerably smaller than most counties in evaluating the malaria mortality and morbidity hazard, but the data required for such a study are usually not available. Statistics based on county populations are easily obtained.

The graphs on succeeding pages illustrate distribution of counties in each of 15 States and for the 15 States combined according to average annual reported malaria mortality for the two 5-year periods 1935-1939 and 1938-1942. Five-year periods were used to lend stability to the computed averages. The 16 graphs are comparable with each other because the height of the bars was made to represent percentage of counties in any mortality category rather than number of counties.

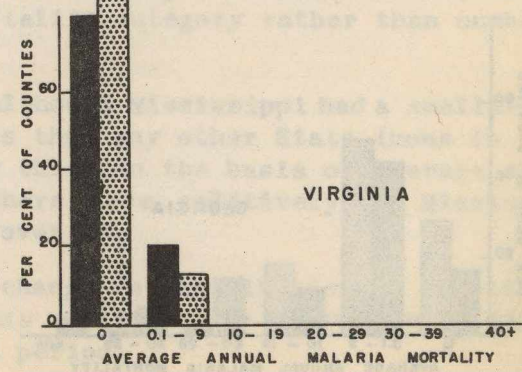
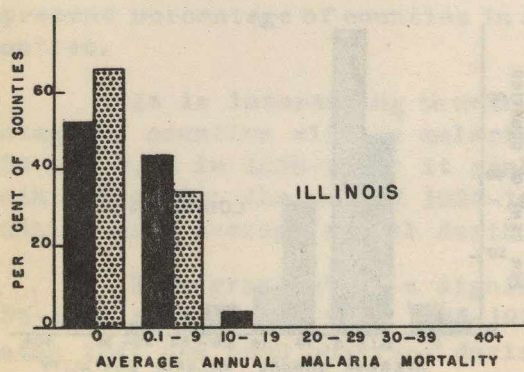
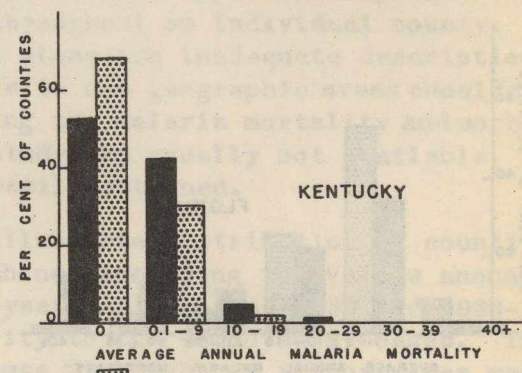
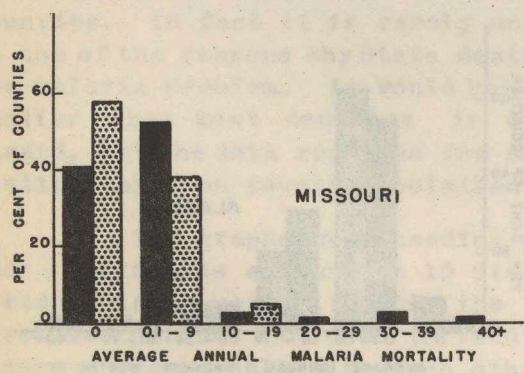
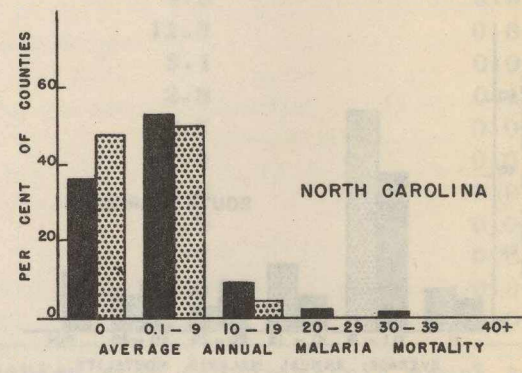
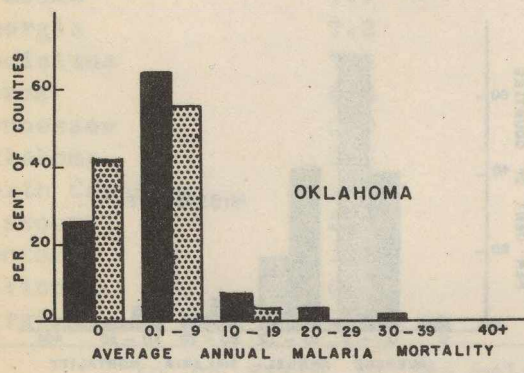
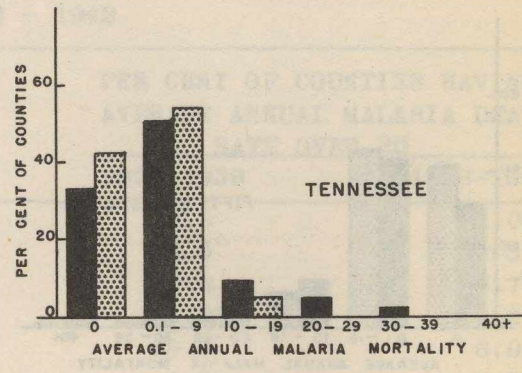
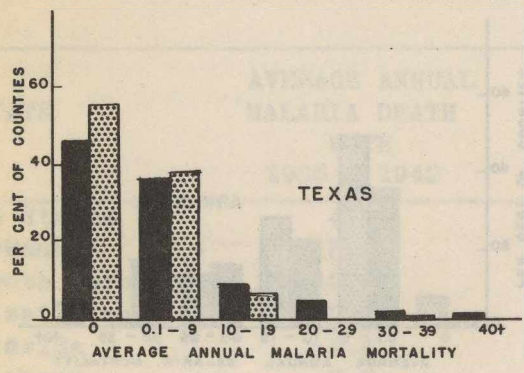
It is interesting to note that although Mississippi had a smaller percentage of counties with no malaria deaths than any other State (none in 1935-1939 and 3.7% in 1938-1942) it ranks only third on the basis of average annual death rates for the period 1935-1942. There were relatively few Mississippi counties with average annual death rates over 30.

Each graph shows a significant change in distribution of counties in 1938-1942 as compared with 1935-1939. This reflects the reduction in malaria deaths that has been observed during this period.

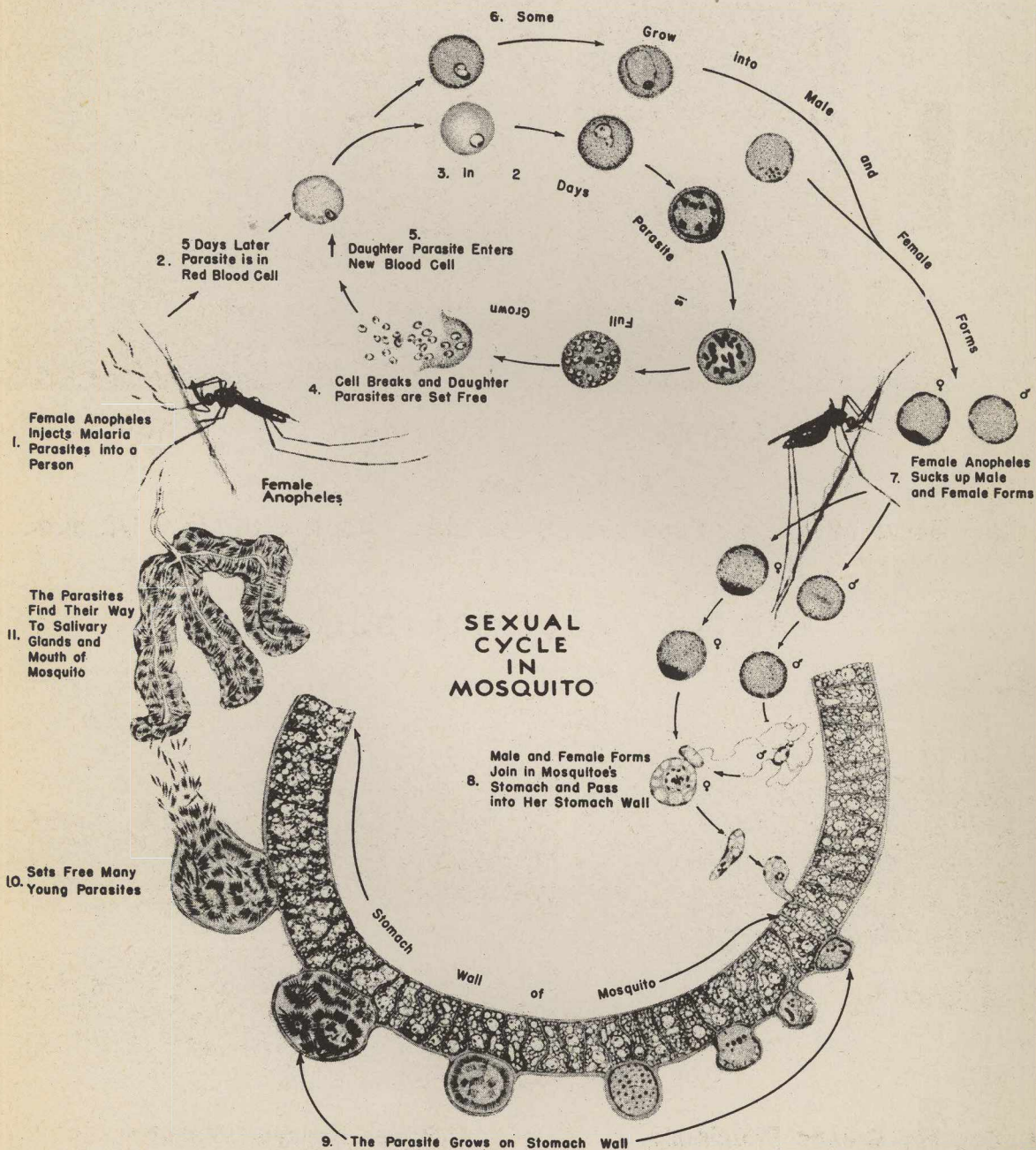
**DISTRIBUTION OF COUNTIES IN FIFTEEN STATES
ACCORDING TO
AVERAGE ANNUAL MALARIA DEATH RATE FOR FIVE YEAR PERIODS
1935 TO 1939 ■ 1938 TO 1942**



DISTRIBUTION OF COUNTIES IN FIFTEEN STATES ACCORDING TO AVERAGE ANNUAL MALARIA DEATH RATE FOR FIVE YEAR PERIODS 1935 TO 1939 ■ 1938 TO 1942 ▨



LIFE HISTORY OF THE MALARIA PARASITE (PLASMODIUM VIVAX) IN MAN AND THE ANOPHELES MOSQUITO

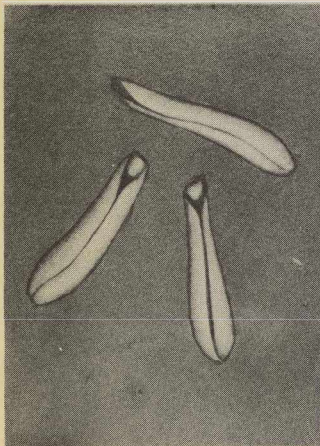


Malaria Control in War Areas
U. S. Public Health Service

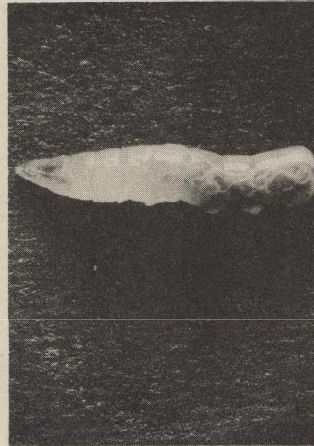


DOG FLY CONTROL

LIFE HISTORY STAGES OF THE DOG FLY (*Stomoxys calcitrans*)



EGGS



LARVA



PUPARIA



ADULT

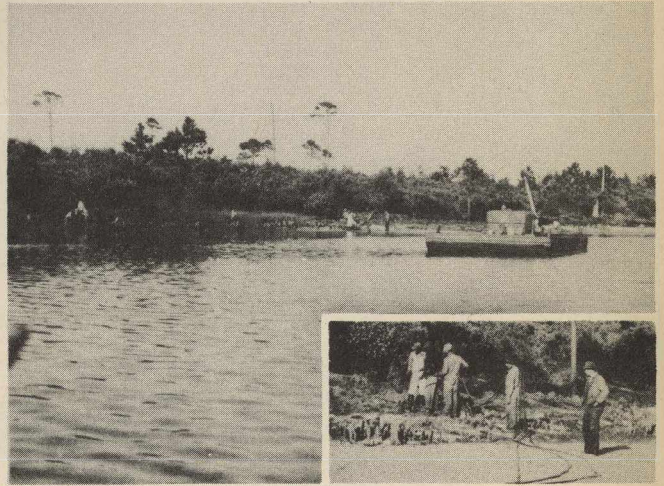
Actual Sizes

Egg, 1 m.m. ; Larva, 20 m.m. ; Puparium, 5 to 7 m.m. ; Adult 5 1/2 to 7 1/2 m.m.

HABITAT AND CONTROL



The Dog Fly Breeds Principally in Marine Grasses Deposited Along Shore Lines.



A Power Sprayer Mounted on a Barge and Towed By a Shallow Draft Boat is Used in Treating These Grass Deposits.