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The Epidemic of Dengue Fever in the Taiwan Area, 1988

In September 1987, an epidemic of dengue fever occurred suddenly in the southern part of Taiwan in Kaohsiung City and Kaohsiung and Pingtung counties. The situation relaxed at the end of the year when the temperature went down. The accumulated number of cases was 1,387.

Figure 1. No. of Reported and Confirmed Cases of Dengue Fever by Month, January-September 1988

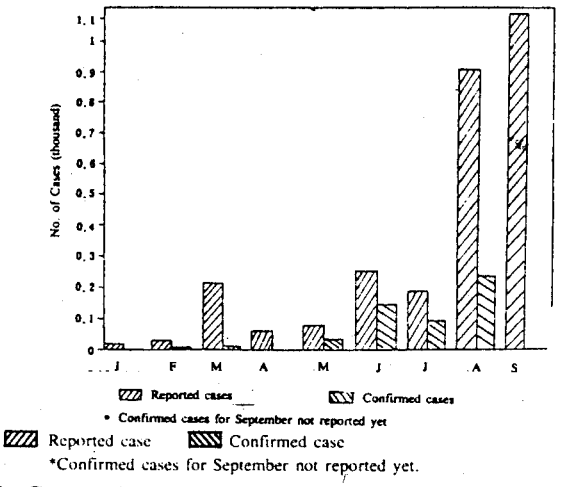


Figure 2. Cases of Dengue Fever by County and City, January-August 1988

County City	No. of Reported Cases	No. of Serologically or Virologically Confirmed Cases
Keelung City	2	
Taipei County	14	
Ilan County	6	
Taoyuan County	6	
Hsinchu City	1	
Hsinchu County	2	
Miaoli County	5	
Taichung City	11	
Taichung County	6	
Changhwa County	11	1
Nantou County	7	
Yunlin County	5	
Chaiyi City	6	
Chaiyi County	5	1
Tainan City	23	
Tainan County	64	31
Kaohsiung County	344	274
Pingtung County	107	25
Taitung County	8	
Hwalien County	7	
Penghu County		
Taiwan Province Total	640	332
Taipei City	19	
Kaohsiung City	844	155
Military	53	
Taiwan Area Total	1556	488

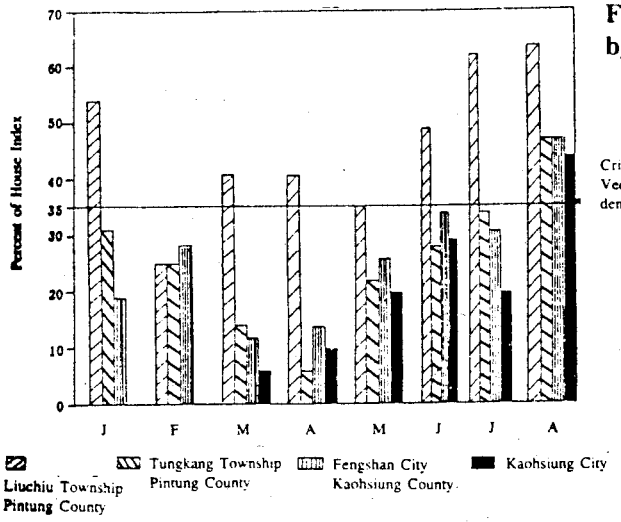


Figure 3. House Index of Aedes aegypti Larvage in Pingtung and Kaohsiung Counties and Kaohsiung City, January-August 1988

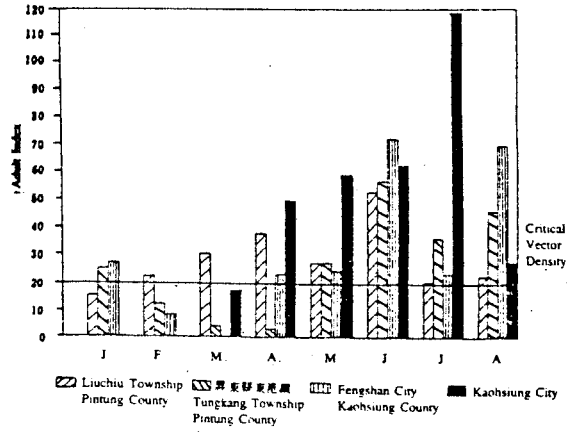
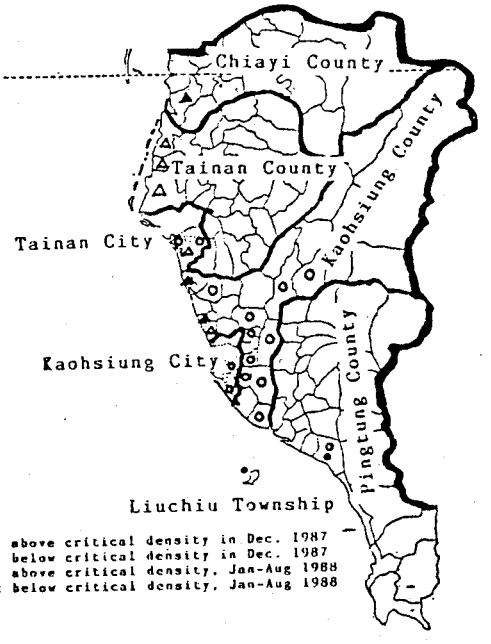


Figure 4. Aedes aegypti Adult Index by Month, Pingtung and, Kaohsiung Counties and Kaohsiung City, January-August 1988

Figure 5. Distribution of Aedes Aegypti Larvae by House Index, December 1987 and January-August 1988



Some sporadic cases of Dengue fever still occurred in the southern areas in the Spring of 1988. In early June, the number of cases in the Shan-wei area of Linyuan Township, Kaohsiung County, increased. Under the joint effort of health and environmental protection units, the situation relaxed. However, the flood brought about by heavy rain-fall on 14 August, and the high temperature made the number of cases increased in Kaohsiung, Pingtung, and Tainan counties and Kaohsiung City. Action has been taken to control the disease. Between January and September 1988, the accumulated number of reported cases was 3,607, with the most cases in September. The distribution of cases by month is shown in Figure 1, the distribution by county and city in Figure 2. Of them, 488 cases in January through August have been serologically confirmed. Fifty six percent of the total cases in the Taiwan Area are in Kaohsiung County.

To effectively survey the occurrence of the disease, the Taiwan Provincial Institute of Infectious Diseases has conducted the surveillance of vectors in several counties and cities in the southern area. Figure 3 shows the house indices of Aedes aegypti larvae in Liuchiu and Tungkang townships of Pingtung County, Fengshan City of Kaohsiung County, and Sanmin District of Kaohsiung City. Before July, except in Liuchiu Township, the house indices in the other areas were all lower than the 35% critical density, though Aedes aegypti were still active in high density in these areas. In August, all indices were above the critical density. House index in Liuchiu Township has always been above the critical density. This may be related to their long-time practice of storing water in cisterns. The adult indices were all above the critical density in June. They went down as a result of the vector control program. They are, however, still high enough to initiate an outbreak. Control measures should be continued. When the outbreak occurred at the end of 1987, the Taiwan Provincial Institute of Infectious Diseases conducted surveys of the distribution of vectors in some counties and cities south of Chiayi. It was found that there were Aedes aegypti in all coastal areas south of Putai Township, Chiayi County, and north of Linpien Township, Pingtung County. Between January and August 1988, the Institute conducted surveys again in the various parts of the Island and found that Aedes aegypti concentrated primarily in Tainan City, Kaohsiung City and Kaohsiung and Pingtung Counties (Figure 5).

Since the outbreak of Dengue fever in September 1987, the major control measures taken by the health and environmental protection units have been:

1. Vector control:

1) Vector surveillance: the Taiwan Provincial Institute of Infectious Diseases is made responsible for the periodic surveillance of larvae and adults in various areas to serve as a control index. Depending upon the indices, local health and environmental protection units strengthen control measures when the critical areas were found. Survey of larvae focuses on indoor and outdoor spots where larvae are most likely to breed (water containers). If larvae are found in a container, all larvae in the container are collected and labeled with the name of the container, and date and place of collection. Preservative is then added and the collections are sent to the laboratory for identification. The results are expressed by the following indices:

(1) House index: % of houses with Aedes aegypti larvae (eg. if 50 houses out of 100 surveyed are infested with larvae, the index is 50%).

(2) Container index: % of containers with Aedes aegypti larvae (eg. if 80 containers out of 100 surveyed are infested with larvae, the index is 80%).

(3) Breteau index: the number of containers with Aedes aegypti larvae per 100 houses (eg. of 100 houses surveyed, if the total number of containers infested with larvae is 300, the index is 300).

The survey of adults is to collect the adults resting in the darker cornors of the house with sweep nets. The average number of female adults collected in a house is used as the index.

2) Vector control: Application of insecticide with ULV sprayers either on car or portable is to kill adults. Larvae breed mostly in indoor water containers, and they are hard to be eliminated completely by spraying. In the Taiwan Province,application of insecticide is carried out by the Taiwan Provincial Institute of Infectious Diseases jointly with local health stations, while in the Kaohsiung City,it is done by health and environmental protection units with the assistance of the village clerks.