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Chikungunya epidemic outbreak in Emilia-Romagna (Italy) during summer 2007

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Abstract. During summer 2007, an outbreak due to the local transmission of CHIKV by *Aedes albopictus* mosquitoes occurred moreover in Italy, Emilia-Romagna Region, in the areas of Ravenna, Forlì-Cesena, Rimini and Bologna cities.The original outbreak developed in Castiglione di Cervia and Castiglione di Ravenna, two small villages divided by a river. The first case was recorded on August 9th the epidemic outbreak then spread out, thus giving rise to smaller secondary outbreaks and further sporadic cases in the same area, for a total of 337 suspected cases, 217 of which confirmed by blood analysis. CHIKV has been isolated and characterized on both blood and mosquito samples.

Key words: Aedes albopictus, Arboviruses., Vector Borne Diseases, Europe, Italy

Introduction

Chikungunya virus (CHIKV) is an arthropod-borne virus transmitted to human beings by *Aedes* spp. mosquitoes; it has been suggested that the strain of CHIKV isolated on islands in the Indian Ocean and in India, during the epidemic of 2005-06, has better adapted to *Ae. albopictus* than it has to other *Aedes* spp. This is particularly worrying because *Ae. albopictus* is widespread in almost whole Italy with an especially high population density. In fact in Emilia-Romagna, during summer 2007, an outbreak due to the local transmission of CHIKV occurred moreover in the areas of Ravenna, Forlì-Cesena, Rimini and Bologna.

The first case was reported to the Public Health Department of the Local Health District of Ravenna on August 9th. During the following days an epidemiological investigation was immediately started. It was detected an unusuallly high number of cases of febrile illness in Castiglione di Cervia and Castiglione di Ravenna, two small villages divided by a river. A first list of 47 cases was already available from August 14th. First analysis of data suggested the hypothesis of an arborviral fever so there were located in the area some entomological traps and many specimens of *Ae. albopictus* were collected. Waiting for the laboratory confirmation of etiologic agent a first extraordinary pest control treatment with insecticides was conducted against adults of tiger mosquitoes in the whole centre of Castiglione di Cervia during the night between August 18th and 19th. Successively, from August 23th to 28th, pest control activities were systematically extended, covering the whole epidemic area and carried out in three stages, with the following synergy: adulticidal treatment, larvicidal treatment, removal of larval breeding grounds.

At the end of August serological testing and PCR by the National Health Institute confirmed the diagnosis of Chikungunya fever. Finally, on August 31st, the Chikungunya virus was isolated by the laboratory of the Experimental Zooprophylactic Institute of Lombardy and Emilia-Romagna, on a sample of *Ae. albopictus* collected by traps in the area. On August 29th the Emilia-Romagna Regional Authority passed the first regional directive addressed to all the Regional Local Health Districts to implement a surveillance system throughout the whole regional territory.

Results

The original outbreak developed in Castiglione di Cervia and Castiglione di Ravenna, where 142 confirmed cases were recorded; the epidemic outbreak then spread out, thus giving rise to smaller secondary outbreaks (Cervia with 19 cases, Ravenna with 9 cases, Cesena with 15 cases, Bologna with 5 cases and Rimini with 6 cases); further sporadic cases were recorded in various spots in the same area (figure 2). The distribution of positive confirmed cases by sex is rather homogeneous (45.6% males, 54.4% females). Cases are mainly concentrated in the more elderly population age bracket: as a matter of fact, 42% was older than 65, with an average age of about 57 years. As for the symptoms, 94.5% of cases reported fever, 93.6% arthralgia, 53.5% skin rash, in a few cases itching and in 94.5% of cases asthenia, 49.8% myalgia and, finally 50.2% cephalalgia. If the index case coming from a journey to India (region of Kerala) is ruled out, the first case dates from July 4th, whereas in the last case the onset of symptoms dates from September 28th. 337 suspected cases were reported, 217 out of which were confirmed as positive by laboratory test, 30 were classified as probable since patients refused to receive the blood

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test, whereas for the remaining 89 patients, tests proved to be negative. Figure 1 shows the epidemic curve of confirmed and probable cases, thus showing the time distribution of cases since the onset date of symptoms.

Discusssion

The described event has proven that vector-borne diseases can spread not only in tropical areas but also in all those sites where the vector (in this case *Ae. albopictus*) is present. This new scenario is due to the massive presence of carrier insects that are responsible for the transmission of this type of diseases in the Emilia-Romagna Region. It requires an overhaul and timely adoption of effective and sensitive pest control measures as well as health surveillance systems.
These measures are not only required by international health authorities, but they have become absolutely necessary to avoid the recurrence of epidemic outbreaks, like the one that emerged last summer in the Emilia-Romagna Region, which is likely to cause serious public health problems. At this aim a "Regional Plan of the Emilia-Romagna Regional Authority for the fight against the Asian Tiger Mosquito and the prevention of Chikungunya and Dengue Fever" for the year 2008 has been adopted. The objectives of the plan are:
(i) optimization of the fight against the Asian Tiger Mosquito to reduce the pest population rate as much as possible, (ii) early detection of the presence of potentially viremic patients in view of an immediate and coordinated implementation of health protection measures.
The Regional Plan, which has been designed taking into account the specific situation of the Emilia-Romagna region, complies with the national rules and regulations in the field, with special reference to the compulsory transmissible disease notification scheme, surveillance and control system, international prophylaxis measures and international movement control of goods, blood donations and organ and tissue sampling.

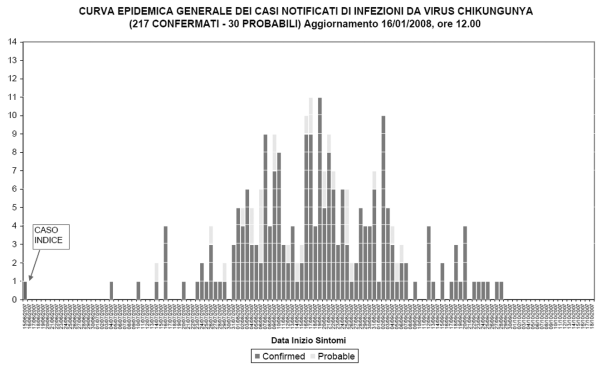

Fig. 1. CHICV outbreak, Emilia Romagna Region, Italy, August, 2008. Epidemic curve of confirmed and probable cases,s showing the time distribution of cases since the onset date of symptoms.

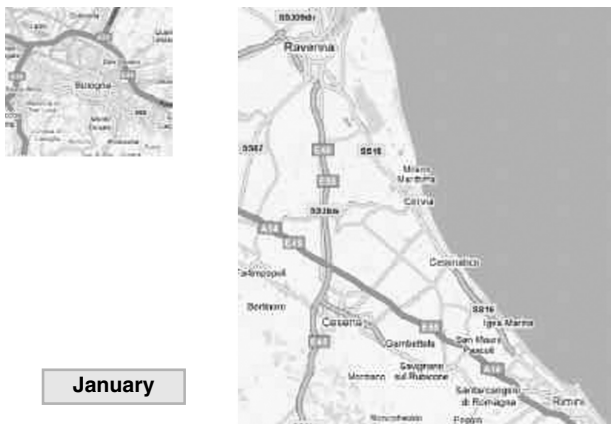

Fig. 2. CHICV outbreak, Emilia Romagna Region, Italy, August, 2008. Provinces of Ravenna, Forli-Cesena and Rimini. Distribution of the 217 confirmed cases

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