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Bulletin of the Entomological Surveillance Network :

Aedes aegypti survey in Nouméa and Dumbéa.

Activity subsidized by New Caledonian Government, with the collaboration of the city councils of Nouméa and Dumbéa.

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Introduction

In New Caledonia, the only known vector of dengue, chikungunya and Zika viruses is *Aedes aegypti*. Monitoring the evolution of *Ae. aegypti* populations' densities provides us with a better understanding of epidemic risks and enables us to take appropriate measures if necessary. This monitoring is carried out by the Entomological Surveillance Network, which was set up at the joint initiative of the Department of Health and Social Affairs of New Caledonia (DASS-NC), the Institut Pasteur of New Caledonia (IPNC) and the city councils of Nouméa, Dumbéa and Mont-Dore.

This bulletin presents the evolution of the entomological situation in Nouméa during the last 12 months.

Entomological indices description

A "positive breeding site" refers to any object containing stagnant water in which at least one larvae is found (including first development stage larvae).

The Houses Index (HI): estimates the percentage of houses where at least one positive breeding site is found.

The Breteau Index (BI): estimates the number of positive breeding sites found for 100 houses.

The "Sticky Trap" Index (STI): is the mean number of gravid females caught per sticky trap (only in Nouméa).

These indices are calculated for the specie Ae. aegypti.



Figure 1: Monthly evolution of the Houses Index (HI) in Nouméa, from 2000 to 2017 and epidemics of arbovirosis over the same period. The Houses Index (HI) estimates the percentage of houses where at least one positive breeding site is found. Between 200 and 300 different houses are visited every month in Nouméa. The vertical bars on the index curves (in black) represent the 95% confidence intervals. Incidence rates for confirmed and probable human cases of dengue (red), Zika (green) and chikungunya (yellow) are also represented for Nouméa. More information about the entomological situation history of Nouméa and Dumbéa can be found in the Bulletin N°01/16 (http://www.institutpasteur.nc/bulletins-reseau-de-surveillance-entomologique/).

Current Entomological Situation in Nouméa



Figure 2: Monthly evolution of entomological indexes and effects of dengue, Zika and chikungunya on Nouméa from March 2016 to March 2017. (a) HI estimates the percentage of houses where at least one positive breeding site is found. (b) BI estimates the number of positive breeding sites found for 100 houses. (c) STI is the mean number of gravid females caught per sticky trap (around 30 traps per month). The vertical bar on the index curves represents the 95% confidence intervals. Incidence rates for confirmed and probable human cases of dengue (red), Zika (green) and chikungunya (yellow) are shown for the city of Nouméa (source: DASS-NC). (d) Weather data are presented for Nouméa (source: Météo France).

The entomological BI and HI calculated for March are lower than February indexes. However, these indexes remain higher than those calculated for January (Figure 2a and 2b). In March 2017, approximately 17% of the houses had at least one positive breeding site (HI, Figure 2a). Over the same period, there were on average 20 breeding sites for 100 houses (BI, Figure 2b). The Sticky Trap Index (STI) decreased compared to January and February 2017 (Figure 2c). The decline in indices in March may be the result of decrease rainfall (Figure 2d), coupled with significant preventive actions carry out by the Grand Noumea city councils. Nevertheless, the decrease of the entomological indices in March did not prevent the circulation of the dengue virus.

Concerning Dumbéa city, about 20% of the houses had at least one positive breeding site (HI), and on average there is 30 breeding site for 100 house (BI).

Entomological indices by sector: Nouméa (3 sectors)

The detail of the indexes by sector (Noumea West, East and South) is shown in Figure 3. The House Index (HI) is about 20% for the Sector West and South . For the sector East, the HI is around 10% (Figure 3a). The Sector Est shown the lowest Breteau Index (BI), with about 10 breeding sites found for 100 houses. This index is higher in the Sector West, with about 30 breeding sites found for 100 houses.



Figure 3: Monthly evolution of entomological indexes by sector from March 2016 to March 2017. (a) HI estimates the percentage of houses where at least one "positive" breeding site is found (b) BI estimates the number of positive breeding sites found for 100 houses. The vertical bars on the index curves represent the 95% confidence intervals.

Although the entomological indexes declined in March, the indices remain high. Indeed, since 2016, entomological indices tend to increase gradually (Figure 1). This situation is concerning and the increase of *Aedes aegypti* densities may facilitate the transmission of arboviruses in the future.

Contact and useful links

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To know more about :

Institut Pasteur of New Caledonia web-site (French): http://www.institutpasteur.nc/les-moustiques-et-la-dengue/

Department of Health and Social Affairs of New Caledonia (DASS-NC) web-site (French): http://www.dass.gouv.nc/portal/page/portal/dass/observatoire_sante/veille_sanitaire/

The Pacific Community (SPC) web-site (English available) :

http://www.spc.int/phd/epidemics/











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