

High insecticide resistance found in the flea vector for plague in Madagascar

February 4 2016

Madagascar is one of the countries with the highest incidence of bubonic plague in the world. As insecticides are highly important in controlling the spread of plague, researchers from the Institut Pasteur de Madagascar carried out a bioassay to determine the response of the flea vector to different types of insecticides. They found that only 1 out of 12 insecticides tested produced 100% mortality in all flea samples, suggesting a high level of insecticide resistance across the country.

The researchers took flea samples from 8 different geographical regions of Madagascar. Rats were trapped from both rural and urban environments and flea samples taken to be reared in an insectarium in the laboratory. The World Health Organization standard protocol for bioassays was followed to test the responses of the fleas to 12 insecticides from 4 different insecticide families.

Mortality rate was found to differ between the 8 geographical locations, with all populations at least somewhat susceptible to 6 of the insecticides. Only one insecticide, the organochlorine dieldrin, had 100% mortality across all flea populations, while the next four effective insecticides had very different susceptibility profiles across the different populations.

Positive correlations in mortality rates between some insecticides suggest a possible insecticide cross-resistance mechanism. Further research into the molecular mechanisms of resistance would be required to fully understand these cross-resistances.

"Even if plague is nowadays considered as a disease from the Middle Ages, it kills around 100 persons per year in Madagascar." Said lead researcher Adélaïde Miarinjara, "In the context of public health emergency, our findings could be a great improvement in the fight against plague vectors."

This research shows an alarmingly high level of insecticide resistance in the plague vector flea, as well as revealing that different geographical populations are likely to require different insecticide treatment for the most effective results. Within a public health context, periodic monitoring of the susceptibility status of fleas in [plague](#) risk areas would allow all regions to be prepared in the case of an outbreak. The researchers also suggest further research on the mechanisms of resistance and cross-resistance within the flea vector, to gain a fuller understanding of how [insecticide](#) develops and spreads across populations.

The study is published in *PLOS Neglected Tropical Diseases*.

More information: *PLOS Neglected Tropical Diseases*,
[dx.doi.org/10.1371/journal.pntd.0004414](https://doi.org/10.1371/journal.pntd.0004414)

Provided by Public Library of Science

Citation: High insecticide resistance found in the flea vector for plague in Madagascar (2016, February 4) retrieved 19 April 2024 from <https://medicalxpress.com/news/2016-02-high-insecticide-resistance-flea-vector.html>

<p>This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.</p>
--