# STATUS KERENTANAN NYAMUK *Culex quinquefasciatus* TERHADAP INSEKTISIDA MALATION DAN PERMETRIN DI DAERAH ENDEMIS DAN NON ENDEMIS FILARIASIS BANCROFTI DI KABUPATEN BREBES

Husnatun Nihayah[1], Budi Mulyaningsih[2], Sitti Rahmah Umniyati[2]

[1]Mahasiswa Programstudi Magister Ilmu Biomedik, [2]Departemen Parasitologi Fakultas Kedokteran Kesehatan Masyarakat dan Keperawatan Universitas Gadjah Mada, Yogyakarta, Indonesia.

## INTISARI

**Latar Belakang**: Filariasis banyak ditemukan di Indonesia. Kabupaten Brebes merupakan daerah endemis filariasis bancrofti. Nyamuk *Culex quinquefasciatus* merupakan vektor utama filariasis yang disebabkan oleh *Wuchereria bancrofti*. Pemberantasan vektor penyakit yang banyak dilakukan di Indonesia adalah dengan menggunakan insektisida malation dan permetrin. Penggunaan insektisida dalam jangka panjang dapat menyebabkan penurunan status kerentanan dari target vektor. Penentuan status kerentanan *Cx. quinquefasciatus* di Kabupaten Brebes perlu dilakukan untuk monitoring penggunaan insektisida.

**Tujuan**: Mengkaji status kerentanan nyamuk *Cx. quinquefasciatus* terhadap insektisida malation dan permetrin, serta mengkaji aktivitas enzim esterase non spesifik dan enzim monooksigenase pada *Cx. quinquefasciatus* yang berasal dari daerah endemis dan non endemis filariasis bancrofti di Kabupaten Brebes.

**Metode**: Sampel nyamuk diambil dari daerah endemis (Kecamatan Ketanggungan) dan non endemis (Kecamatan Paguyangan) filariasis di Kabupaten Brebes. Penentuan status kerentanan dilakukan dengan metode CDC *bottle bioassay* terhadap insektisida malation dengan dosis uji 400 µg/botol, dan permetrin dengan dosis 43 µg/botol. Uji biokimia dilakukan dengan metode Lee.

**Hasil**: Nyamuk *Cx. quinquefasciatus* yang berasal dari daerah endemis (Desa Karangmalang) dan non endemis (Desa Pakujati dan Winduaji) masih rentan terhadap malation, persentase kematiannya mencapai 100%. Namun sudah resisten terhadap permetrin dengan persentase kematian di Karangmalang 57,22%; Pakujati 45%; dan Winduaji 57,77%. Hasil uji biokimia menunjukkan adanya peningkatan aktivitas enzim esterase non spesifik pada larva dari kedua daerah, namun tidak ada peningkatan aktivitas enzim monooksigenase di kedua daerah (kecuali Winduaji).

**Kesimpulan**: Nyamuk *Cx. quinquefasciatus* yang berasal dari Kabupaten Brebes masih rentan terhadap malation dan sudah resisten terhadap permetrin. Ada peningkatan aktivitas enzim esterase nonspesifik namun tidak ada peningkatan ektifitas enzim monooksigenase (kecuali Winduaji).

**Kata Kunci**: *Cx. quinquefasciatus,* malation, permetrin, enzim esterase non spesifik, enzim monooksigenase.

# SUSCEPTIBILITY STATUS OF *Cx. quinquefasciatus* MOSQUITY TO MALATION AND PERMETRIN INSECTICIDE ON ENDEMIC AND NON ENDEMIC AREAS OF BANCROFTIAN FILARIASIS IN BREBES REGENCY

Husnatun Hidayah[1], Budi Mulyaningsih[2], Sitti Rahmah Umniyati[2]

[1]Students of Graduate Biomedical Science Study Program, Faculty of Medical Community Health and Nursery, Gadjah Mada University, Indonesia
[2]Department of Parasitology, Faculty of Medical Public Health and Nursery, Gadjah Mada University, Indonesia

## ABSTRACT

**Background:** Filariasis is found in Indonesia. Brebes District is a bancroftian filariasis endemic area. *Culex quinquiefasciatus* is the main vector of filariasis, which has been caused by *Wuchereria bancrofti*. The eradication of disease vector that has been widely performed in Indonesia relies on the use of malathion and permethrin insecticide. The use of such insecticide in the long term might decrease on susceptibility status for the targeted vector. The determination on the state of susceptibility *Cx. quinquefasciatus* in Brebes district should be pursued in order to monitor the insecticide use.
**Objective:** The research was to elucidate the susceptibility status of *Cx. quinquefasciatus* on malathion and permethrin insecticide and to review the activity of non-specific esterase enzyme and monooxygenase enzyme on *Cx. quinquefasciatus* that have been collected from endemic and nonendemic bancroftian filariasis area in Brebes.
**Method:** Samples were taken from endemic area (Ketanggungan district) and non-endemic area (Paguyangan district) filariasis in Brebes Regency. The determination on the state of susceptibility was performed by performing CDC bottle bioassay method on malathion with the diagnostic dose 400 µg/bottle, on permethrin with the diagnostic dose 43 µg/bottle. Then, the biochemical test was conducted by performing Lee method.
**Results:** *Cx. quinquefasciatus* mosquitos that had been collected from endemic area (Karangmalang) and non endemic area (Pakujati, and Winduaji) were still susceptible toward malathion; percentage of mortality is 100%, however, these mosquitos had been resistance toward permethrin with respective percentage of mortality as follows: 57.22%; 45.00%; and 57.77%. The results of biochemical test showed increasing activity on non-specific esterase enzyme on both location but did not show increasing activity on monooxygenase enzyme (exc. Winduaji)
**Conclusions:** *Cx. quinquefasciatus* mosquitos that have been collected from Brebes District are still susceptible to malathion but have been resistance toward permethrin. In addition, there has been increasing activity on non-specific esterase enzyme but did not show increasing activity on monooxygenase enzyme (except Winduaji).
**Keyword:** *Cx. quinquefasciatus*, malathion, permethrin, non-specific esterase enzyme, and monooxygenase enzyme.