

# PRODUCTS FROM LINK NATURAL

## MOSQUITO REPELLANTS FROM ESSENTIAL OILS

### Mosquitoes



**Phylum: Arthropoda**

**Class: Insecta**

**Order: Diptera**

Although tiny in size mosquitoes are easily identifiable by their sharp irritating bites and annoying and whiny hum of their buzzing wings. Their involvement as disease vectors have been given much publicity in the media as well.. Nearly 3000 species of mosquitoes exist worldwide. They recognize their hosts by exhaling CO<sub>2</sub>, body odors and body temperature<sup>12</sup>.

#### **Life cycle**

Eggs-Larvae-Pupae-Adult

#### **Habitat**

Mosquitoes spend most of their life cycle in water (Eggs, Larvae & Pupae) and adults are found in terrestrial habitats.

Both male and female mosquitoes feed on nectar and plant sugars. In addition, female mosquitoes have mouthparts for sucking blood

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### **Mosquitoes in Sri Lanka**

Being a tropical country, Sri Lanka provides an ideal habitat for different species of mosquitoes. In a recent survey done in the Mahaweli project area, 27 species of male mosquitoes 67 species of female mosquitoes<sup>1</sup> and 49 species of mosquito larvae<sup>2</sup> were recorded.

### **Mosquitoes and vector-borne diseases**

Mosquitoes are one of the main vectors responsible for transmitting some of the major vector borne diseases. Mosquito borne diseases such as Malaria, Japanese encephalitis, Filariasis, Dengue (Table 01) cause serious health problems in Sri Lanka, almost reaching epidemic proportions. Studies have revealed that these diseases contribute to major economic and social problems such as 1.8% loss of labour days, US\$ 15.56 of annual economic loss per household, 10% lost schooldays in children and adverse impact on the school performance due to malaria.<sup>10</sup>

As far back as 1675, Thomas Willis, a physician and founding member of the U.K. Royal Society, noted that the urine of people afflicted with diabetes "tasted wonderfully sweet as if it were imbued with honey or sugar."

*Rich Cohen in the National Geographics Magazine, Aug 2013.*

Disease	Reported pathogens in Sri Lanka	Vector mosquito
Malaria <sup>3</sup>	<i>Plasmodium vivax</i> <i>Plasmodium falciparum</i> <i>Plasmodium ovale</i> <i>Plasmodium malariae</i>	<i>Anopheles culicifacies</i> <i>Anopheles subpictus</i> <i>Anopheles vagus</i> <i>Anopheles peditaeniatus</i>
Dengue <sup>4</sup>	<i>DENV-1-4 flavivirus serotypes</i>	<i>Aedes aegypti</i> <i>Aedes albopictus</i>
Chikungunya	<i>Chikungunya virus</i>	<i>Aedes aegypti</i> <sup>9</sup>
Filariasis	<i>Wucheraria bancroftii</i> <i>Brugia malai</i>	<i>Culex pipiens fatigans</i> <i>Mansonia spp.</i>
Japanese encephalitis	<i>Japanese encephalitis virus (flavivirus)</i>	<i>Culex tritaeniorhynchus</i> <i>Culex gelidus</i> <i>Culex fuscocephala</i> <i>Culex whitmorei</i> <i>Mansonia uniformis</i> <sup>6</sup>

Table 01: Major Mosquito borne diseases in Sri Lanka

#### How to Control mosquitoes<sup>11</sup>

- Source reduction (reduction of breeding sites)
- Use of larvicides such as Methoprens
- Use of adulticides such as Malathion
- Bio-control methods such as introduction of mosquito larvae eaters such as Mosquito fish (*Gambusia affinis*) and Tilapia (*Tilapia mosambica*)
- Oil-drips (dripping of a thin oil layer onto the water)
- Genetic methods such as sterile male technique
- Mosquito traps

Use of repellents is a practical and economical method of preventing mosquito bites. Active components of the most common mosquito repellent formulations available on the market are DEET (N, N-diethyl - 3- methyl benzamide), Diethyl phthalate, Diethyl carbate, etc. DEET has shown excellent efficacy against mosquitoes<sup>13</sup>. However, human toxicity reactions after the application of DEET vary from mild to severe. In addition, the long term use of synthetic insecticides cause a number of ecological and medicinal problems such as the development of resistant insect strains and ecological imbalance. To avoid these adverse effects, natural plants that contain compounds of insecticidal, insect repelling and insect anti-juvenile properties can be used. Therefore the demand for natural mosquito repellents has dramatically increased during the last decade leading search for to mosquito repelling formulations from essential oils.

#### Essential oils that display mosquito repellent activities

Citronella (*Cymbopogon nardus*), Eucalyptus (*Eucalyptus globulus*), Lemongrass (*Cymbopogon citratus*), Lemon (*Citrus limon*), Cinnamon (*Cinnamomum verum*), Basil (*Ocimum bacilicum*), Cajeput (*Malaleuca leucadendron*), Rosemary (*Rosmarinus officinalis*), Listea (*Listea cubeba*), etc

Many plants produce essential oils that demonstrate mosquito repellent activities.

Over 2 billion people, in tropical countries carry a risk from mosquito - borne diseases. However, the search for effective vaccines against mosquito born diseases is still in progress. Therefore mosquito control and personal protection from mosquito bites are currently the most important measures to control these diseases.

#### A mosquito repellent remedy from Link Natural

Link Natural Products (Pvt) Ltd. has formulated a natural mosquito repellent as a spray and cream.

This is expected to be out in the market no sooner the necessary regulatory procedures have been completed.

#### References:

1. Amarasinghe H & Ariyasena TG (1991) Survey of Adult Mosquitoes (Diptera: Culicidae) During Irrigation Development in the Mahaweli project, Sri Lanka, Journal of Medical Entomology. 28 (3); 387-393
2. Amarasinghe H & Ariyasena TG (1990) Larval survey of surface breeding mosquitoes during Irrigation Development in the Mahaweli project, Sri Lanka, Journal of Medical Entomology. 27 (5); 789-802
3. Priyanie H et al (1999) Malaria vectors in a traditional dry zone village in Sri Lanka, Am.J.Trop.Med.Hyg. 60 (3), 421-429
4. Tissera HA et al (2011) New Dengue virus type 1 Genotype in Colombo, Sri Lanka, Emerg Infect Dis. 17 (11); 2053-2055
5. Japanese Encephalitis - A manual for medical officers of health, Epidemiological Unit, Ministry of Health, Sri Lanka
6. Peiris JS et al (1992) Japanese encephalitis in Sri Lanka - the study of an epidemic : vector incrimination, porcine infection and human disease, Trans R Soc Trop Med Hyg. 86 (3); 307- 313
7. Lambrecht FL (1974) Entomological aspects of Filariasis control in Sri Lanka, Bu World Health Organ. 51 (2)
8. Chikungunya - For service members and their families (2007) extracted from www.deploymenthealthlibrary.fhp.osd.mil
9. Chikungunya (2013) extracted from ww.nt.gov.au/health/cdc
10. Yasuoka J et al (2006) Impact of education on knowledge, Agricultural practices and community actions for mosquito control and mosquito-borne disease prevention in rice ecosystems in Sri Lanka, Am J Med Hyg, 74 (5); 1034-1035
11. Mosquito control (2013) retrieved from en.wikipedia.org/wiki/mosquito-control
12. Mosquito (2013) retrieved from animals.nationalgeographic.com/animals/bugs/mosquito