

## Revisiones



### **An update on published literature (period 1992-2010) and botanical categories on plant essential oils with effects on mosquitoes (Diptera: Culicidae)**

### ***Una actualización de las publicaciones (período 1992-2010) y las categorías botánicas de aceites esenciales de plantas con efectos sobre los mosquitos (Diptera: Culicidae)***

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#### SUMMARY

Diseases such as malaria, yellow fever and dengue which are responsible for millions of cases of sickness and death among people living in developing countries of the tropical regions continue to be of great concern to health authorities. Efforts to control such mosquito transmitted diseases have primarily been concentrated on the use of synthetic insecticides. Unfortunately, this has resulted in the appearance of physiological mosquito resistance, toxicity problems to human patients, environmental contamination, ecological imbalance and economic burden. Such problems have created the need to look for alternative, environmentally friendly control mechanisms based on those found in nature. These include the essential oils from plants, some of which have been used for years by people for medicinal purposes without knowing their active components. For the past 40 years, a great impulse has taken place in the research on natural essential oils from plants. Those oils exhibiting properties that affect mosquitoes such as ovicides, larvicides, insecticides, repellents, attractants and regulators of development have been of special interest to researchers and pest management personnel. An important contribution in summarizing the research in this field prior to 1991 was a report done by K. Sukumar, M. J. Perich & L. R. Boobar (1991). These authors emphasized that the phytochemical compounds derived from the plants tested, may be used as an alternative to synthetic compounds. The above mentioned authors summarized 130 references for the period before 1991 and mentioned 345 species of plants which exhibited bioactive action against different mosquito species, the type of bioactivity and the corresponding references for each study. Herein, we present 358 references of papers concerning this topic published between 1991 and 2010. Following the format of Sukumar, Perich and Boobar, we have included the botanical name of the plant (family, genus, species), its bioactivity against mosquitoes (OV=ovicide, LA=larvicide, AD=adulticide, RE=repellent, IN= insecticide, DR=development retardant, AT=attractant), and the corresponding number reference from which the record was cited.

**Key words:** Botanical essential oils-control of mosquitoes (Diptera: Culicidae).

#### RESUMEN

Se pretende seguir con una revisión de la literatura correspondiente al periodo 1992-2010 sobre el control de mosquitos (Diptera: Culicidae), mediante el uso de aceites esenciales de plantas con efectos ovicidas, larvicidas, pupicidas y adulticidas. La revisión sigue el mismo formato de la anterior revisión publicada por Sukumar, Perich M. J & Boobar L.R. en 1991. Se incluye un cuadro sobre la taxonomía de algunos aceites esenciales botánicos, sus actividades contra los mosquitos y las referencias correspondientes, lo que permite conocer en detalle, las familias, géneros y especies estudiadas por los distintos autores. Además, y no menos importante, el poder comparar los resultados de la presente revisión con los obtenidos en la anterior de Sukumar et al. Se concluye que el campo en estudio es de gran trascendencia para la Salud Pública ya que con la actual tecnología y un costo mínimo, es posible el utilizar la biodiversidad en especial en los países en desarrollo. Del análisis de las 358 referencias incluidas en la actual revisión, se nota la ausencia de estudios participativos, regionales, que permitan la utilización de aceites esenciales en el control de mosquitos vectores de patologías de interés regional.

**Palabras clave:** Aceites esenciales botánicos, control de mosquitos (Diptera: Culicidae).

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## BRIEF HISTORY

Campbell *et al.* (1933) first found that plant alkaloids kill mosquito larvae.

Hartzell & Wilcoxon (1941) evaluated extracts from 150 species of plants for their toxicity to mosquitoes.

Fifty years ago Jacobson (1953) gave a review of the literature (1941-1953) on insecticides obtained from plants.

A few examples show us how different studies from different countries set up the base of a field of tremendous implications in public health such as the use of natural botanical resources for arthropod control of different groups of medical importance.

This review represents a second effort in trying to compile the published papers, 1992-2010 on natural essential oils botanical oils applied to mosquito control, Diptera-Culicidae (see Table I).

The references are given by author's alphabetical order and included the traditional structural sections.

The first aspect to emphasize is that the 358 published papers in our checked period represents an increased interest worldwide on looking for natural resources for mosquito control and avoiding the controversial use of synthetic compounds.

A comparison between the total number of botanical families, genera and species, mentioned by Sukumar *et al.* (1991) as being 99, 266 and 345, against 99, 272 and 389 included here, shows no great differences. At a specific level the bioactivity of the plant species mentioned by Sukumar it is of 256 as larvicidals against 299 mentioned in our references. Other references on repellency, growth inhibition, ovipositional deterrents, adulticidal, sex sterilants, ovicidal, toxicity, pupicidal, reduction of adult emergence, adult attractants, are mentioned in both revisions only in a very few occasions.

Out of 358 references included in our review only 24 were published by latinamerican authors, eventhough the countries great botanical biodiversity, found in our country. It is urgent that our researchers

and institutions such as Universities, coordinate efforts to evaluate resources to control mosquitoes as important vectors of pathogens.

Among the papers dedicated to the study of the botanical essential oils and their derivatives used in the control of public health vectors, there is one that gives us an integrated concept of the problem which is that of Isman (2006). The author mentions four major types, pyrethrum, rotenone, neem and sabadilla, additional plant extracts and oils, garlic oil, capsicum oleoresin. Then Isman gives detailed information on pyrethrum, neem, plant essential oils, the active constituents of nicotine, pyrethrin, rotenone, cevadine, ryanodine and asimicin. The author discussed the potential new botanicals: annonaceous acetogenins, sucrose esters, and melia extracts. Another section of the cited text covers the insect antifeedants and repellents, the current trends in the use of botanicals and the role of botanicals in the future. The paper includes 91 references.

Many plants discussed by Isman are tropical and the efficacy against pests according to the author is only one factor in the adoption of botanicals. For this reason according to Isman it is time to refocus the attention of the research community toward the development and application of known botanicals, rather to look for more plants and isolate further new bioactive substances but are unlikely to be of much utility.

In our point of view, there is, as Isman recognized, a great potential in the tropical botanicals but at the same time, there are many in our latin American countries that need urgently to be studied and used for the control of mosquitoes vectors of diseases such as filariasis, malaria, dengue and yellow fever for example.

Another Review of great importance in the topic of mosquito repellents is done by Pohlit AM *et al.* (2011). Such paper covers the literature on patented plant essential oils (PEO) that acts as mosquito repellents. The authors restricted their search to PEO and found 144 active patents mostly from Asia, China, Japan, Korea and India. They found that such patents since 1998 almost doubled about every four years. Those patents describe repellent composition used for many purposes. One half of all patents named only one PEO and synergistic effects

were found when combined with synthetic insect control agents with repellent properties such as in pyrethroids.

The authors named some of the PEO included in the registered patent literature such as *Cymbopogon nardus* (citronella), *Cymbopogon citrates* (lemongrass), *Cymbopogon winterianus* (rendle), *Eucalyptus* (eucalyptus), *Cinnamomum camphora* (camphor), *Cinnamomum zeylanicum* (cinnamon), *Syzygium aromaticum* (clove), *Lavandula angustifolia* (lavender), *Mentha piperita* (peppermint), *Pelargonium graveolens* (geranium), and *Citrus limon* (lemon).

Finally, the authors insist in that the synergistic effects involving one or more PEOs and synthetic compounds are included in about 10 % of all patents.

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## Taxonomy of some botanical essential oils, their activity against mosquitoes (Diptera: Culicidae) and references.

FAMILY	GENUS	SPECIES	SHAPE EXTRACTION	ACTIVITY	MOSQUITOES EXPOSED	CONCENTRATION IN PPM (LC 50)	REFERENCE LIST NUMBER
Acanthaceae	<i>Acanthus</i>	<i>ilicifolius</i>	P.E.	LA-RE	<i>Ae. aegypti-Cx. quinquefasciatus</i>		314
	<i>Andrographis</i>	<i>paniculata</i>	P.E.	OV-LA	<i>Ae. subpictus-Cx. tritaeniorhynchus</i>	167.00//99.03//79.68//112.56//133.01	76-96-102
	<i>Lepidagathis</i>	<i>alopecuroides</i>	P.E.	LA	<i>An. gambiae-Cx. quinquefasciatus</i>	1:4.5//1:21.8	182
	<i>Rhinacanthus</i>	<i>nasutus</i>	P.E.-E.O.	LA	<i>Ae. aegypti-An. dirus-An. stephensi-Ma. uniformis</i>	13.2-45.2//16.0-48.2//3.9-11.5//8.1-14.7//11.2-18.84//3.91-9.39//9.04-35.49//13.21-28.92	126-220
Acoraceae	<i>Acorus</i>	<i>calamus</i>	P.E.-E.O.	LA	<i>Ae. aegypti-Cx. quinquefasciatus-An. dirus-Ma. uniformis</i>	13.2-45.2//16.0-48.2//3.9-11.5//8.1-14.7//11.2-18.84	126
Agavaceae	<i>Agave</i>	<i>americana</i>	P.E.	LA	<i>An. stephensi-Ae. aegypti-Cx. quinquefasciatus</i>		67
	<i>Gloriosa</i>	<i>superba</i>	E.O.-P.E.	LA-RE	<i>Ae. aegypti-Ae. subpictus-An. stephensi-Cx. quinquefasciatus</i>		48-102
Alliaceae	<i>Allium</i>	<i>sativum</i>	P.E.-E.O.	LA-RE	<i>Ae. albopictus-Cx. quinquefasciatus-Ae. aegypti-An. dirus-Cx. pipiens</i>		82-300-306-320-55
Amaranthaceae	<i>Achyranthes</i>	<i>aspera</i>	P.E.	LA	<i>Ae. aegypti-An. stephensi-Cx. quinquefasciatus-Ae. subpictus-Cx. tritaeniorhynchus</i>	18.20//27.24//48.83//135.36//106.77//102.71//68.27//95.98//59.51//93.94	17-102-358
	<i>Amaranthus</i>	<i>oleraceae</i>	P.E.	LA	<i>An. stephensi</i>	17768,00//1378,00//15541,00//10174,00//848,75//311,50//11063,00//10922,00	284
Anacardiaceae	<i>Anacardium</i>	<i>occidentalis</i>	P.E.-E.O.	LA	<i>Ae. aegypti</i>	14.5//41.57//98//148//27	160
	<i>Pistacia</i>	<i>lentiscus</i>	P.E.	LA	<i>Cx. pipiens molestus</i>	16,36//39,70//89//36-49	324
	<i>Schinus</i>	<i>molle</i>	E.O.	LA	<i>An. arabiensis-Ae. aegypti</i>	20.9//17.5//85.9//9.1//67.8//8.6	153

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		<i>cherimolia</i>	P.E.	LA	<i>Anopheles spp.</i>	0,009//0,038//0,001//0,016	26
	<i>Annona</i>	<i>muricata</i>	P.E.	LA	<i>Ae.aegypti-An.spp</i>	0,009//0,038//0,001//0,016	25-26-108-259
Annonaceae		<i>squamosa</i>	P.E.-E.O.	LA	<i>An.stephensi-Cx.quinquefasciatus</i>	0,00025//0,00701//178,126//751,428	108-168-203-263
	<i>Cananga</i>	<i>odorata</i>	E.O.	RE	<i>Cx.pipiens pallens</i>		119-213
	<i>Ferula</i>	<i>hermonis</i>	P.E.-E.O.	RE	<i>Cx.pipiens molestus</i>	24.5//44.0//60.0//75.0//117.0//120.0	323
	<i>Ammi</i>	<i>majus</i>	P.E.	LA	<i>Cx.pipiens molestus</i>		173
	<i>Anethum</i>	<i>graveolens</i>	E.O.	RE	<i>Ae.aegypti</i>		48
	<i>Apium</i>	<i>graveolens</i>	P.E.-E.O.	LA-RE-AD	<i>Ae.aegypti-An.dirus</i>	71.3//98.2//5.6//8.1	51-209-223-273
	<i>Centella</i>	<i>asiatica</i>	P.E.	LA-DR	<i>Cx.quinquefasciatus</i>	6.84//1.12	229
Apiaceae	<i>Coriandrum</i>	<i>sativum</i>	E.O.	RE	<i>Cx.pipiens pallens</i>		119
	<i>Cuminum</i>	<i>myrrha</i>	E.O.	LA	<i>Ae.aegypti-Cx.pipiens pallens</i>	67.3//53.3	136
	<i>Daucus</i>	<i>carota</i>	E.O.	LA	<i>Ae.aegypti-Cx.pipiens pallens-Cx.annulipes</i>	67.3-53.3//20.12//5.1//5.08//7.62//236,00//36.59//77.19	136-272-310
	<i>Foeniculum</i>	<i>vulgare</i>	E.O.-P.E.	LA-RE	<i>Ae.albopictus-Ae.aegypti-Cx.pipiens pallens-An.dirus-Cx.pipiens molestus</i>	24.5//44.0//60.0//75.0//117.0//120.0	57-119-209-323
	<i>Hydrocotyle</i>	<i>javanica</i>	P.E.	LA	<i>Cx.quinquefasciatus</i>		336

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	<i>Imperatoria</i>	<i>osthruthium</i>	P.E.	LA	<i>Cx. quinquefasciatus</i>	6-15//23-28-49//5-100//500-1000//101-500	194
Apiaceae	<i>Pimpinella</i>	<i>anisum</i>	E.O.-P.E.	LA-OV-RE	<i>Cx. pipiens</i> - <i>Ae. aegypti</i> - <i>An. stephensi</i> - <i>Cx. quinquefasciatus</i>	12.5//25-50	38-77-216-273
	<i>Polylophium</i>	<i>involutatum</i>	E.O.	LA	<i>An. stephensi</i> - <i>Cx. pipiens</i>	8,01//13,59//3,68//5,13	246
	<i>Catharanthus</i>	<i>roseus</i>	P.E.	LA	<i>Ae. aegypti</i>	203,49//230,76//281,35//75,31//156,85//207,83	245
Apocynaceae	<i>Ervatamia</i>	<i>coronaria</i>	P.E.	OV-LA-RE	<i>Ae. aegypti</i> - <i>An. stephensi</i> - <i>Cx. quinquefasciatus</i>	72,41//136,55//65,67//127,24//62,08//120,86	93-155
	<i>Nerium</i>	<i>indicum</i>	P.E.	LA	<i>Cx. quinquefasciatus</i> - <i>An. stephensi</i>	133,85//141,60//95,19//76,27//163- 81//83,38//105,85//185,99// 148,05//229,28//149,43//209,00//155,97//13,10//9,02//	226-281-299-309
	<i>Rhazya</i>	<i>stricta</i>	P.E.	LA-DR	<i>Cx. pipiens</i>	209-326	101
	<i>Acorus</i>	<i>calamus</i>	P.E.	LA-RE-AD	<i>Ae. aegypti</i> - <i>Cx. pipiens pallens</i>	0,04//0,11//0.20	65-106
Araceae	<i>Homalomena</i>	<i>aromatica</i>	P.E.-E.O.	LA	<i>Ae. aegypti</i> - <i>An. dirus</i> - <i>Cx. quinquefasciatus</i> - <i>Ma. uniformis</i>	13,2//45,2//16,0//48,2//3,9//11,5//8,1//14,7//11,2//18,84	126
	<i>Typhonium</i>	<i>trilobatum</i>	P.E.	LA	<i>Cx. quinquefasciatus</i>	73,67	104
Aracaceae	<i>Cocos</i>	<i>nucifera</i>	P.E.	LA	<i>An. farauti</i> - <i>Cx. annulirostris</i>	8.6//1.2	80
Aristolochiaceae	<i>Asarum</i>	<i>heterotropi- dea</i>	P.E.	LA	<i>Ae. aegypti</i> - <i>Cx. pipiens pallens</i> - <i>O. togoi</i>		207
	<i>Ajania</i>	<i>tenuifolia</i>	E.O.	RE-AD	<i>Cx. quinquefasciatus</i>		331-348
Asclepiadaceae	<i>Gymnema</i>	<i>sylvestre</i>	P.E.	LA	<i>Cx. quinquefasciatus</i>		88-127-309

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Asclepiadaceae	<i>Hemidesmus</i>	<i>Indicus</i>	P.E.	LA	<i>Cx. quinquefasciatus</i>		88-127	
	<i>Achillea</i>	<i>millefolium</i>	E.O.-P.E.	RE-LA	<i>Ae. albopictus-Ae. aegypti- Ae. cantans-Ae. sinereus- Ae. ocimum</i>		57-109-307-331	
		<i>santolina</i>	P.E.	LA	<i>Cx. pipiens molestus</i>		173	
	<i>Ageratina</i>	<i>adenophora</i>	P.E.	LA- AD	<i>Ae. aegypti-Cx. quinquefasciatus</i>	356,70//227,20	166-236	
	<i>Ageratum</i>	<i>conyzoides</i>	P.E.-E.O.	LA- DR	<i>An. stephensi- Cx. quinquefasciatus-Ae. aegypti</i>		261-262-298	
	<i>Anthemis</i>	<i>nobilis</i>	E.O.	RE-LA	<i>Cx. pipiens pallens</i>		119	
		<i>abrotanum</i>	E.O.	LA	<i>Ae. aegypti</i>		139	
			<i>annua</i>	P.E.	LA	<i>An. stephensi</i>		21- 322
	Asteraceae	<i>Artemisia</i>	<i>vulgaris</i>	E.O.	RE	<i>Ae. aegypti</i>		213-354
			<i>anthelminticum</i>	P.E.	LA	<i>An. stephensi</i>	162,60//522,94//322,1//83,119	305
<i>Chrysanthemum</i>		<i>cinerariifolium</i>	P.E.	RE	<i>Ae. albopictus- Cx. quinquefasciatus</i>	0,01//0,02//0,56//0,65	29-82	
<i>Conyza</i>		<i>newii</i>	E.O.	RE	<i>An. gambiae</i>		186	
		<i>paniculata</i>	P.E.	OV-LA	<i>An. stephensi-Ae. fluviatilis</i>	79,68//112,56//133,01	96-145	
<i>Eclipta</i>		<i>prostrata</i>	P.E.	LA	<i>An. subpictus- Cx. tritaeniorhynchus- Cx. quinquefasciatus- Ae. aegypti-An. stephensi</i>	167,00//99,03	76-88-102-127	

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Asteraceae	<i>Eupatorium</i>	<i>bentonica-ceae</i>	E.O.	LA	<i>Ae.aegypti</i>		4
		<i>microphyllum</i>	E.O.	LA	<i>Ae.aegypti</i>		249
	<i>Helichrysum</i>	<i>italicum</i>	E.O.	LA	<i>Ae.albopictus</i>		57
	<i>Hemizonia</i>	<i>spp</i>	P.E.	RE	<i>Ae.aegypti-An.spp</i>		181
	<i>Matricaria</i>	<i>recutita</i>	A review: P.E.- E.O. as mosquito repellents				213
	<i>Neurolaena</i>	<i>lobata</i>	A review: P.E.- E.O. as mosquito repellents				213
	<i>Spilanthes</i>	<i>acmella</i>	P.E.	LA	<i>Cx.quinquefasciatus</i>	50,54//54,11//61,43	210
	<i>Tanacetum</i>	<i>parthenium</i>	A review: P.E.- E.O. as mosquito repellents				213
	<i>Tarhonanthus</i>	<i>camphoratus</i>	E.O.	RE	<i>An.gambiae</i>		186
		<i>Tridax</i>	<i>procumbens</i>	P.E.	DR	<i>Cx.quinquefasciatus</i>	
Balanitaceae	<i>Balanites</i>	<i>aegyptiaca</i>	P.E.	LA	<i>Ae.aegypti</i>		343
Bixaceae	<i>Bixa</i>	<i>orellana</i>	P.E.	LA	<i>Ae.aegypti</i>		259
Brassicaceae	<i>Brassica</i>	<i>napus-geniculata</i>	E.O.-P.E.	LA-RE	<i>Cx.pipiens-Cx.tarsalis-Ae.aegypti-Ae.albopictus-An.quadrifasciatus-Cx.peus</i>	32,42//47,17//71,37//83.36//86,06//152,94	132-244-344
	<i>Capsella</i>	<i>bursa-pastoris</i>	P.E.	LA	<i>Cx.tarsalis-Cx.peus</i>		244

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		<i>sophia</i>	P.E.	LA	<i>Cx.tarsalis-Cx.peus</i>		244
	<i>Descurainia</i>						
		<i>pinnata</i>	P.E.	LA	<i>Cx.tarsalis-Cx.peus</i>		244
Brassicaceae	<i>Eruca</i>	<i>sativa</i>	E.O.	LA	<i>Cx.pipiens</i>	32,42//47,17//71,37//83.36//86,06//152,94	132
		<i>costarricense</i>	E.O.	LA	<i>Cx.corniger</i>	31,60//29,91//29,37//17,65//17,32//12,55//10,51//7,44	83
	<i>Lepidium</i>						
		<i>flavum</i>	P.E.	LA	<i>Cx.tarsalis-Cx.peus</i>		244
Burseraceae	<i>Boswellia</i>	<i>carteri-serrata</i>	E.O.	LA	<i>Cx.pipiens</i>	32,42//47,17//71,37//83.36//86,06//152,94	132
	<i>Commiphora</i>	<i>myrha</i>	E.O.	LA	<i>Ae.aegypti-Cx.pipiens pallens</i>		136
Caesalpinaceae	<i>Caesalpinia</i>	<i>pulcherrima</i>	P.E.	OV-RE	<i>Ae.aegypti-An.stephensi-Cx.quinquefasciatus</i>		93
	<i>Daniellia</i>	<i>oliveri</i>	P.E.	RE	<i>An.stephensi-An.gambiae-Ma.uniformis</i>		168-177-190-191
Campanulaceae	<i>Campanula</i>	<i>afranunculoides</i>	P.E.	LA	<i>Cx.quinquefasciatus</i>		234
		<i>thyrsoideum</i>	P.E.	LA	<i>Cx.quinquefasciatus</i>		250
Cannabaceae	<i>Cannabis</i>	<i>sativa</i>	P.E.	LA-IN	<i>Cx.quinquefasciatus</i>	15,31//11,01//25,97//88,51//144,44//160,78//294,42	159
Cannaceae	<i>Canna</i>	<i>indica</i>	P.E.	LA	<i>Ae.subpictus-Ae.aegypti-An.stephensi-Cx.quinquefasciatus</i>	29,62//59,18//40,77//44,32//121,88//118,25//69,76//56,31	102-225
Chenopodiaceae	<i>Atriplex</i>	<i>canescens</i>	P.E.	OV	<i>Cx.quinquefasciatus</i>		187

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Chenopodiaceae	<i>Chenopodium</i>	<i>ambrosioides</i>	E.O.	LA-RE	<i>Ae.aegypti-An.arabiensis</i>	0,0017//0,0027//0,0035//0,0057//17,5//85,9//9,1//67,8//8,6	86-140-153
Cladoniaceae	<i>Cladonia</i>	<i>macilenta</i>	E.O.	LA	<i>Ae.aegypti</i>		170
Cladophoraceae	<i>Cladophora</i>	<i>glomerata</i>	A review: P.E.- E.O. as mosquito repellents				307
Cleomaceae	<i>Cleome</i>	<i>icosandra</i>	P.E.	AD	<i>Cx.quinquefasciatus</i>		262
		<i>glaucescens</i>	P.E.	LA	<i>Cx.pipiens molestus</i>		173
Clusiaceae	<i>Calophyllum</i>	<i>inophyllum</i>	P.E.	LA	<i>Cx.quinquefasciatus-An.stephensi-Ae.aegypti</i>	3,91//9,39//9,04//35,49//13,21//28,92	220
	<i>Garcinia</i>	<i>praniana</i>	E.O.-P.E.	LA	<i>Ae.aegypti</i>	13,7//20,6//20,9//103//271	112
Colchicaceae	<i>Yucca</i>	<i>filifera</i>	P.E.	LA	<i>Cx.quinquefasciatus-Ae.aegypti</i>		252
	<i>Gloriosa</i>	<i>superba</i>	P.E.	LA	<i>An.subpictus</i>	48,83//135,36//106,77//102,71//68,27//95,98//59,51//93,94	358
Commelinaceae	<i>Tradescantia</i>	<i>zebrina</i>	P.E.	LA	<i>An.benarrochi</i>		204
Compositae	<i>Cotula</i>	<i>cinérea</i>	P.E.	LA	<i>An.labranchiae</i>		152
	<i>Dahlia</i>	<i>pinnata</i>	P.E.	LA	<i>Cx.quinquefasciatus</i>		234
	<i>Tagetes</i>	<i>erectus</i>	P.E.	LA-DR-AD	<i>Ae.subpictus-Cx.tritaeniorhynchus-Ae.aegypti-An.stephensi-Cx.quinquefasciatus</i>	167,00//99,03//43//58	76-205-253-262-278
<i>minuta</i>		E.O.-P.E.	LA-RE-AD	<i>Ae.aegypti-An.stephensi-An.gambiae-Cx.quinquefasciatus</i>		86-98-145-184-205-206-270-330	

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Compositae	<i>Tagetes</i>	<i>patula</i>	P.E.	LA	<i>Ae.albopictus-Cx.quinquefasciatus</i>	0,01-0,02//0,56-0,65//13,57//12,08//22,33	29-68-145-205
		<i>pusilla</i>	E.O.	RE	<i>Ae.aegypti</i>		86
Convolvaceae	<i>Ipomoea</i>	<i>cairica</i>	E.O.	LA	<i>Ae.aegypti-An.stephensi-Cx.quinquefasciatus-Cx.tritaeniorhynchus</i>	14,8//22,3//14,9//58,9	318
		<i>carnea</i>	P.E.-E.O.	LA-AD	<i>Ae.subpictus-Ae.aegypti-An.stephensi-Cx.quinquefasciatus-Cx.tritaeniorhynchus</i>	29,62//59,18//40,77//44,32//121,88//118,25//69,76//56,31//76//82//84//100//10,39//14,8//22,3//14,9//58,9	102-225-260-318
		<i>staphylina</i>	P.E.	LA	<i>An.subpictus</i>	76//82//84//100//10,39	260
	<i>Benincasa</i>	<i>cerifera</i>	P.E.	LA	<i>Cx.quinquefasciatus</i>	465,85//567,81//839,81//1189,30//1636,04	214
	<i>Citrullus</i>	<i>colocynthis</i>	P.E.	OV-LA-RE	<i>An.stephensi-Ae.aegypti-Cx.quinquefasciatus</i>	18,56//48,51//49,57//50,32//74,57//309,46//492,73//199,14//554,20//88,24//377,69//623,50//207,61//542,34	171-227
		<i>vulgaris</i>	P.E.	OV-LA-RE-AD	<i>An.stephensi</i>	18,56//48,51//49,57//50,32	171
	<i>Coccinia</i>	<i>indica</i>	P.E.	LA-OV-RE	<i>Ae.aegypti-Cx.quinquefasciatus</i>	74,57//309,46//492,73//199,14//554,20//88,24//377,69//623,50//207,61//542,34	227
Cucurbitaceae	<i>Cucumis</i>	<i>sativus</i>	P.E.	LA-OV-RE	<i>Ae.aegypti-Cx.quinquefasciatus</i>	74,57//309,46//492,73//199,14//554,20//88,24//377,69//623,50//207,61//542,34	227
	<i>Cucurbita</i>	<i>maxima</i>	P.E.	OV-LA-RE	<i>An.stephensi</i>	18,56//48,51//49,57//50,32	171
	<i>Luffa</i>	<i>acutangula</i>	P.E.	LA	<i>Cx.quinquefasciatus</i>	465,85//567,81//839,81//1189,30//1636,04	214
	<i>Momordica</i>	<i>charantia</i>	P.E.	LA	<i>Cx.quinquefasciatus-An.stephensi</i>	27,60//17,22//41,36//465,85//567,81//839,81//1189,30//1636,04//74,57//309,46//492,73//199,14//554,20//88,24//377,69//623,50//207,61//542,34	156-214-227
	<i>Trichosanthes</i>	<i>anguina</i>	P.E.	LA-OV-RE	<i>Cx.quinquefasciatus-Ae.aegypti</i>	465,85//567,81//839,81//1189,30//1636,04//74,57//309,46//492,73//199,14//554,20//88,24//377,69//623,50//207,61//542,34	214-227

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	<i>Callitris</i>	<i>glaucophylla</i>	P.E.	LA-DR	<i>Ae.aegypti-Cx.annulirostris</i>	0,69//5,21//306,43//0,23//9,53//38,95	78-271
	<i>Callitropsis</i>	<i>nootkatensis</i>	E.O.	AD	<i>Ae.aegypti</i>		195
	<i>Cryptomeria</i>	<i>japonica</i>	E.O.	LA	<i>Ae.aegypti</i>	37,6//48,1	46
Cupressaceae	<i>Cupressus</i>	<i>arizonica</i>	E.O.	LA	<i>An.stephensi</i>	79,30	267
		<i>communis</i>	E.O.	RE	<i>Cx.pipiens pallens</i>		129
	<i>Juniperus</i>	<i>macropoda</i>	E.O.	LA-OV	<i>An.stephensi-Ae.aegypti-Cx.quinquefasciatus</i>		216
		<i>virginiana</i>	E.O.	LA	<i>Ae.albopictus-Cx.quinquefasciatus</i>		55
	<i>Thuja</i>	<i>orientalis</i>	P.E.	LA	<i>Ae.aegypti-An.spp-Cx.quinquefasciatus-An.stephensi</i>	185,99//148,05//229,28//149,43//209,00//155,97//13,10/9,02	82-181-281
Cyperaceae	<i>Cyperus</i>	<i>rotundus esculentus</i>	E.O.	LA	<i>Cx.pipiens</i>	32,42//47,17//71,37//83,36//86,06//152,94	132
	<i>Thuja</i>	<i>orientalis</i>	P.E.	LA	<i>Ae.aegypti-An.spp-Cx.quinquefasciatus-An.stephensi</i>	185,99//148,05//229,28//149,43//209,00//155,97//13,10/9,02	82-181-281
Discoreaceae	<i>Ferula</i>	<i>hermonis</i>	P.E.	RE	<i>Cx.pipiens mollestus</i>	24,5//44,0//60,0//75,0//117,0//120,0	323
Ericaceae	<i>Cardiospermum</i>	<i>halicacabum</i>	P.E.	OV-LA	<i>An.stephensi</i>	79,68//112,56//133,01	96
	<i>Rhododendron</i>	<i>tomentosum</i>	P.E.-E.O.	RE-LA	<i>Ae.cantans-Ae.aegypti-Ae.communis-Ae.diantaeus-O.punctor</i>		109
Euphorbiaceae	<i>Acalypha</i>	<i>indica</i>	P.E.	LA-AD	<i>An.stephensi-Ae.aegypti-Cx.quinquefasciatus-An.subpictus</i>	18,20//27,24//76//82,84//100	17-91-260

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	<i>argyrophyloides</i>	E.O.	LA	<i>Ae. aegypti</i>		170
	<i>nepetafolius</i>	E.O.	LA	<i>Ae. aegypti</i>		170
<i>Croton</i>	<i>pseudopulchellus</i>	E.O.	RE	<i>An. gambiae</i>		183
	<i>sonderanius</i>	E.O.	LA	<i>Ae. aegypti</i>		170
	<i>zenhtmeri</i>	E.O.	LA	<i>Ae. aegypti</i>		170
	<i>hirta</i>	P.E.	LA	<i>An. stephensi-Ae. aegypti-Cx. quinquefasciatus</i>	8,79//55,26-90,92-272,36//4,25//11,34//76,61//113,40//424,94//552//17768,00//1378,00//15541,00//10174,00//848,75//311,50//11063,00//10922,00	228-284
<i>Euphorbia</i>	<i>royleana</i>	P.E.	LA	<i>Cx. quinquefasciatus</i>		299
Euphorbiaceae	<i>tirucalli</i>	P.E.	LA	<i>Ae. aegypti-Cx. quinquefasciatus</i>	8,79//55,26//90,92//272,36//4,25//11,34//76,21//113,40//424,94//5,92	228
	<i>Excoecaria agallocha</i>	P.E.	LA-RE	<i>Ae. aegypti-Cx. quinquefasciatus</i>		314
	<i>Jatropha curcas</i>	P.E.	LA	<i>An. stephensi-Ae. aegypti-Cx. quinquefasciatus</i>	8,79//55,26//90,92//272,36//4,25//11,34//76,21//113,40//424,94//5,92	172-228
	<i>Pedilathus tithymaloides</i>	P.E.	LA	<i>Ae. aegypti-Cx. quinquefasciatus</i>	8,79//55,26//90,92//272,36//4,25//11,34//76,21//113,40//424,94//5,92	228
	<i>Phyllanthus amarus</i>	P.E.-E.O.	LA	<i>An. gambiae-Ae. aegypti-Cx. quinquefasciatus</i>	8,79//55,26//90,92//272,36//4,25//11,34//76,21//113,40//424,94//5,92	189-228
	<i>Ricinus communis</i>	P.E.-E.O.	LA-OV-RE	<i>An. albimanus-An. stephensi-Ae. aegypti-Cx. quinquefasciatus-Cx. pipiens molestus-Cx. tritaeniorhynchus-An. gambiae</i>	48,83//135,36//106,77//102,71//68,27//95,98//59,51//93,94	1-55-102-173-253-334-358
	<i>Trigonostemon reidioides</i>	P.E.-E.O.	LA	<i>Ae. aegypti-Cx. quinquefasciatus-Ma. uniformis</i>	13,2//45,2//16,0//48,2//3,9//11,5//8,1//14,7//11,2//18,84	126



	<i>corymbosa</i>	P.E.	LA	<i>Ae.aegypti-Cx.pipiens pallens</i>		110
	<i>farneciana</i>	P.E.-E.O.	LA	<i>Cx.quinquefasciatus</i>	0,00025//0,00701	203
<i>Acacia</i>	<i>ferruginea</i>	P.E.	LA	<i>Cx.quinquefasciatus</i>	2214,7	332
	<i>nilotica</i>	P.E.	LA	<i>Cx.quinquefasciatus- An.stephensi-Ae.aegypti</i>		172
	<i>obtusifolia</i>	P.E.-E.O.	LA	<i>Ae.aegypti-Cx.pipiens pallens- Ae.togoi</i>	1,4//1,9//2,2//19,6	111-352-355
	<i>fistula</i>	P.E.	OV-LA-DR	<i>An.spp-Cx.spp-Ae.aegypti</i>	10,69//18,27//23,95//44,50//54,00//31,7//27,00	92-94-163
<i>Cassia</i>	<i>tora</i>	P.E.	LA	<i>Ae.aegypti-Cx.pipiens pallens</i>		111-355
<b>Fabaceae</b>	<i>Clitoria tematea</i>	P.E.	LA	<i>Cx.quinquefasciatus- An.stephensi-Ae.aegypti</i>	303,2//228,9//291,5//518,2//244,4//747//65,2//154,5//54,4//65,2//154,5//54,4	102-127-146-154-99
	<i>Copaifera reticulata</i>	E.O.	LA	<i>Cx.quinquefasciatus</i>		290
	<i>Dalbergia sissoo</i>	E.O.	LA-RE	<i>Cx.quinquefasciatus- An.stephensi-Ae.aegypti</i>		8
	<i>Daniellia oliveri</i>	P.E.	RE	<i>An.gambiae-Ma.uniformis</i>		190
	<i>Derris elliptica</i>	P.E.-E.O.	LA	<i>Ae.aegypti-An.dirus- Ma.uniformis- Cx.quinquefasciatus</i>	13,3//45,2//16,0//48,2//3,9//11,5//8,1//14,7//11,2//18,84	126
	<i>Dolichus kilimandscharicus</i>	P.E.	LA	<i>Ae.aegypti-Cx.pipiens pallens</i>		110
	<i>Glinicidia sepium</i>	P.E.	LA	<i>An.stephensi- Ae.aegypti-Cx.quinquefasciatus</i>		279-280

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		<i>argyrea</i>	E.O.	LA	<i>Ae.aegypti</i>		308
	<i>Lesquerella</i>	<i>fendleri</i>	E.O.	LA	<i>Ae.aegypti</i>		308
		<i>miraniana</i>	E.O.	LA	<i>Ae.aegypti</i>		308
	<i>Myroxylum</i>	<i>balsamum</i>	E.O.-P.E.	LA	<i>Ae.aegypti</i>	15,9//28,5//95,80//102,86	81-295
	<i>Pithecellobium</i>	<i>dulce</i>	P.E.-E.O.	LA	<i>Cx.quinquefasciatus</i>	0,00025//0,00701	203
Fabaceae	<i>Pongamia</i>	<i>glabra</i>	P.E.	LA	<i>Cx.quinquefasciatus-Ae.aegypti</i>		255-257
	<i>Saraca</i>	<i>inidica</i>	P.E.	LA-DR	<i>Culicids</i>	44,50//54,00//31,7//27,00	163
	<i>Soja</i>	<i>hispida</i>	P.E.-E.O.-S.R.	RE	<i>Ae.albopictus-Cx.nigripalpus-O.tristis-Ae.aegypti-An.quadrifasciatus</i>		19-344
	<i>Tephrosia</i>	<i>vogelii</i>	P.E.	LA	<i>Culicids</i>		157
	<i>Trigomella</i>	<i>foemum-grecum</i>	E.O.	LA	<i>Cx.pipiens</i>	32,42//47,17//71,37//83,36//86,06//152,94	132
	<i>Vicia</i>	<i>tetrasperma</i>	P.E.-E.O.	LA	<i>Ae.aegypti-Cx.pipiens pallens</i>		111-355
Fagaceae	<i>Quercus</i>	<i>lusitania-infectoria</i>	E.O.	LA	<i>Cx.pipiens</i>	60	173-243
Ginkgoaceae	<i>Ginkgo</i>	<i>biloba</i>	P.E.	LA	<i>Cx.pipiens pallens</i>		141
Gentianaceae	<i>Swertia</i>	<i>chirata</i>	P.E.	OV-LA	<i>Ae.aegypti-Cx.quinquefasciatus</i>	192,67//237,30//339,06//329,29//164,91//220,10//284,05//326,46	18

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		<i>citrosium</i>	P.E.-E.O.	LA-RE	<i>An.stephensi-Ae.spp-Ae.aegypti</i>		114-158-193-355
Geraniaceae	<i>Pelargonium</i>	<i>graveolens</i>	P.E.-E.O.-S.R.	RE	<i>Ae.aegypti-An.albimanus-Cx.pipiens-An.quadrifasciatus</i>		20-82-320-344-208
		<i>reniforme</i>	P.E.	RE	<i>An.arabiensis</i>		90
Hippocrateaceae	<i>Hippocratea</i>	<i>excelsa</i>	P.E.	LA	<i>Ae.aegypti-Cx.quinquefasciatus</i>		252
Illiciaceae	<i>Illicium</i>	<i>verum</i>	P.E.	LA	<i>Cx.quinquefasciatus</i>	50,54//54,11//61,43	210
	<i>Ajuga</i>	<i>remota</i>	P.E.	LA	<i>An.stephensi-Cx.quinquefasciatus</i>		283
	<i>Alyssum</i>	<i>minutum</i>	E.O.	LA	<i>Ae.aegypti</i>		308
	<i>Anisomeles</i>	<i>malabarica</i>	P.E.	LA	<i>Ae.subpictus-Cx.tritaeniorhynchus</i>	167,00//99,03//48,83//135,36//106,77//102,71//68,27//95,98//59,51//93,94	76-358
	<i>Cassia</i>	<i>fistula</i>	P.E.	LA-DR	<i>Culicids</i>	44,50//54,00//31,71//27,00	163
Labiatae		<i>martisii</i>	E.O.-P.E.	LA	<i>Ae.aegypti</i>		12
	<i>Hyptis</i>	<i>pectinata</i>	E.O.-P.E.	LA-RE	<i>Ae.aegypti</i>	31,60//29,91//29,37//17,65//17,32//12,55//10,51//7,44	3-83-287
		<i>suaveolens</i>	E.O.	LA-RE	<i>Ae.gambiae</i>	67//60//63//69	14-34-3-109-190-191-248-307
	<i>Lavandula</i>	<i>angustifolia</i>	E.O.-P.E.	RE	<i>Ae.aegypti-Cx.pipiens-Ae.albopictus-An.quadrifasciatus</i>		82-316-320-344-87-208
		<i>officinalis</i>	P.E.-E.O.-S.R.	RE	<i>Ae.albopictus-Cx.nigripalpus-O.triseriatus-Cx.pipiens pallens</i>		19-119

(Continued from page 176)

	<i>Lavandula</i>	<i>stoechas</i>	P.E.	LA	<i>Cx.pipiens molestus</i>	16,36//39,70	324
	<i>Lepidium</i>	<i>medium</i>	E.O.	LA	<i>Ae.aegypti</i>		308
	<i>Melissa</i>	<i>officinalis</i>	P.E.	LA-RE	<i>Cx.pipiens</i>	18,6//26,8//39,1//62,7//81,0	39-213
		<i>arvensis</i>	P.E.-E.O.	RE-AD	<i>Ae.albopictus- Cx.quinquefasciatus-Ma.titillans</i>	0,01//0,02//0,56//0,65	29-169
		<i>longifolia</i>	P.E.	LA	<i>Cx.pipiens</i>	18,6//26,8//39,1//62,7//81,0	39
	<i>Mentha</i>	<i>piperita</i>	E.O.	LA-RE-AD	<i>Ae.aegypti-An.stephensi- Cx.quinquefasciatus</i>		20-10-77-82-119-130- 213-306-347-348-208
		<i>pulegium</i>	P.E.-E.O.-S.R.	LA-RE	<i>Ae.albopictus-Cx.nigripalpus- Ae.aegypti-An.quadrifasciatus</i>	18,6//26,8//39,1//62,7//81,0	19-39-82-119-344
Labiatae		<i>spicata</i>	E.O.	LA-OV-RE- DR	<i>Cx.pipiens pallens</i>	61,64//82,95	119-326-348
	<i>Myntostachys</i>	<i>setosa</i>	P.E.	LA	<i>Ae.aegypti</i>	3,9//1,6//15,1//5,2	54
	<i>Nepeta</i>	<i>cataria</i>	E.O.-P.E.	RE-AD	<i>Ae.aegypti-An.stephensi- Cx.quinquefasciatus</i>	130//72//123	6-23-79-198-212-341- 356-45-234-265-344
		<i>kilimandscharicum</i>	E.O.	RE	<i>An.arabiensis-An.gambiae- Cx.quinquefasciatus</i>		133-270
	<i>Ocimum</i>	<i>lamiifolium</i>	E.O.	LA	<i>An.arabiensis-Ae.aegypti- An.gambiae</i>	20,9//17,5//85,9//9,1//67,8//8,6//0,67//9,21	153-183
		<i>selloi</i>	E.O.	RE	<i>An.braziliensis</i>		192
		<i>suave</i>	E.O.	LA-RE	<i>An.arabiensis-An.gambiae- Cx.quinquefasciatus</i>		133-270

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	<i>Ocimum</i>	<i>gratissimum</i>	E.O.	LA-AD	<i>An.gambiae-An.funestus</i>		180
		<i>americanum</i>	E.O.-P.E.	LA-RE	<i>Ae.aegypti-An.dirus-An.gambiae-Cx.quinquefasciatus</i>	60//63//67//69	34-150-269-270-313
		<i>basilicum</i>	E.O.	LA-RE-OV-DR	<i>Cx.pipiens-Cx.pipiens pallens-An.gambiae-An.spp-Ae.aegypti</i>	190//300//0.67//9,21	77-82-119-178-179-183-213-306
	<i>Origanum</i>	<i>canum</i>	P.E.	LA-RE-AD	<i>An.stephensi-An.gambiae-Ae.aegypti</i>	95,74//101,53//28,96//54,94//	116-144-191-291
		<i>sanctum</i>	P.E.-E.O.	LA-RE-AD	<i>Ae.aegypti-Cx.quinquefasciatus-Cx.pipiens-An.stephensi-An.spp</i>	18,20//27,24//24,8//61,3//73,8//118,9//95,74//101,53//28,96	17-40-116-294
		<i>syriacum</i>	E.O.	LA	<i>Cx.pipiens-Ae.albopictus</i>	12,5//25//50//16,36//39,70	38-324
	<i>Pelarginium</i>	<i>odoratissimus</i>	E.O.	RE	<i>Ae.albopictus-Cx.annulatus</i>		247
Labiatae	<i>Pimenta</i>	<i>racemosa</i>	E.O.	LA	<i>Cx.pipiens pallens-Ae.aegypti</i>	0,0017//0,0027//0,0035//0,0057	82-136-140-213
	<i>Plectranthus</i>	<i>marruboides</i>	E.O.	RE	<i>An.gambiae</i>	0,67//9,21	183-186
	<i>Pogostemum</i>	<i>cablin</i>	P.E.-E.O.-S.R.	RE	<i>Ae.albopictus-Cx.nigripalpus-Cx.pipiens pallens-An.dirus-Ae.aegypti-Cx.quinquefasciatus-An.quadrifasciatus</i>		19-119-213-328-344
	<i>Rosmarinus</i>	<i>officinalis</i>	P.E.-E.O.	OV-RE-IN	<i>An.stephensi-Ae.aegypti-Ae.cinereus-Ae.communis-Cx.pipiens pallens-Ae.albopictus-Cx.quinquefasciatus-Ae.diantaeus-An.quadrifasciatus</i>		82-86-109-118-119-213-2-55-216-344
		<i>hispanica</i>	E.O.	LA	<i>Cx.corniger</i>	31,60//29,91//29,37//17,65//17,32//12,55//10,51//7,44	83
	<i>Salvia</i>	<i>officinalis</i>	E.O.-P.E.	RE	<i>Cx.pipiens pallens-Ae.aegypti-Ae.albopictus-An.quadrifasciatus</i>		119-344
		<i>sclarea</i>	P.E.-E.O.	LA-RE-OV-DR	<i>Cx.pipiens-Cx.pipiens pallens</i>	18,6//26,8//39,1//62,7//81,0	39-119

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	<i>Teucrium</i>	<i>divaricatum</i>	P.E.	LA	<i>Cx.pipiens</i>	18,6//26,8//39,1//62,7//81,0	39
Labiatae		<i>serpyllum</i>	E.O.	LA-RE	<i>Ae.aegypti-An.stephensi-Cx.quinquefasciatus</i>	1//101,3//9,7//101,4//1//50,2	5
	<i>Thymus</i>	<i>vulgaris</i>	E.O.-S.R.-P.E.	LA-RE	<i>Ae.aegypti-An.albimanus-An.stephensi-Cx.quinquefasciatus-Cx.pipiens pallens-O.togoi</i>	1//101,3//9,7//101,4//1//50,2//0.41-2.1-2.3//LC90-130//LC90-72//LC90-123	20-32-5-82-108-119-199-200-213-344-356-167
		<i>zygis</i>	E.O.	RE	<i>Cx.pipiens pallens</i>		119
Lamiaceae	<i>Leucas</i>	<i>aspera</i>	P.E.	LA	<i>Ae.aegypti-Cx.quinquefasciatus</i>	122,50//149,97//193,43//230,71//77,40//144,00//199,72//257,17	147
	<i>Lemon</i>	<i>eucalyptus</i>	P.E.	RE	<i>An.arabiensis</i>		89
Lauraceae	<i>Laurus</i>	<i>nobilis</i>	E.O.	RE	<i>Cx.pipiens</i>	24,5//44,0//60,0//75,0//117,0//120,0	77-323
		<i>camphora</i>	P.E.	LA-RE	<i>Ae.aegypti-Cx.pipiens pallens-Cx.pipiens</i>		111-320-349-208
		<i>cassia</i>	E.O.	LA-RE	<i>Cx.pipiens pallens-Ae.aegypti-Ae.caspius-Ae.albopictus-Cx.pipiens</i>	43,0//58,4//81,3//58,41//42,98//81,32//LC90-130//LC90-72//LC90-123//1,82//0,06//3,33//0,48//1,06//0,11//3,24//0,14//1,55//0,07//3,91//0,44	119-349-351-356-357
		<i>glanduliferum</i>	E.O.	LA	<i>Ae.caspius-Ae.aegypti</i>	43,0//58,4//81,3//58,41//42,98//81,32	351
Laureaceae	<i>Cinnamomum</i>	<i>impressicoes-tatum</i>	E.O.-P.E.	LA	<i>Ae.aegypti</i>	13,7//20,6//20,9//103//271	112
		<i>microphyllum</i>	E.O.-P.E.	LA	<i>Ae.aegypti</i>	13,7//20,6//20,9//103//271	112
		<i>mollissimum</i>	E.O.-P.E.	LA	<i>Ae.aegypti</i>	13,7//20,6//20,9//103//271	112
		<i>osmophloem</i>	E.O.	LA	<i>Ae.aegypti</i>	50//29	47

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Laureaceae		<i>pubescens</i>	E.O.-P.E.	LA	<i>Ae.aegypti</i>	13,7//20,6//20,9//103//271	112
	<i>Cinnamomum</i>	<i>rhyncophyllum</i>	E.O.-P.E.	LA	<i>Ae.aegypti</i>	13,7//20,6//20,9//103//271	112
		<i>zehlneri</i>	E.O.	LA	<i>Ae.aegypti</i>	56//28//84//102//104	170
	<i>zeylanicum</i>	P.E.-E.O	LA-RE-DR	<i>Ae.aegypti-An.stephensi-Cx.quinquefasciatus-Cx.pipiens</i>	LC90-130//LC90-72//LC90-123//1,82//0,06//3,33//0,48//1,06//0,11//3,24//0,14//1,55//0,07//3,91//0,44	82-216-253-320-356-357-208-55	
	<i>Litsea vera-elliptica</i>	E.O.-P.E.	RE-AD	<i>An.dirus-Ae.aegypti-An.stephensi-Cx.quinquefasciatus-Ae.albopictus</i>	0,04//0,11//0,20	6-106-311	
	<i>Rhynchosia volubilis</i>	P.E	LA	<i>Ae.aegypti-Cx.pipiens pallens</i>		111	
Liliaceae	<i>Aloe barbadensis</i>	P.E.	LA-RE	<i>Ae.aegypti-Cx.quinquefasciatus-Ae.albopictus-An.quadrifasciatus</i>		234-344	
	<i>Chlorophytum capense</i>	P.E.	LA	<i>Cx.quinquefasciatus</i>		234	
	<i>Labisia pumilia</i>	E.O.-P.E.	LA	<i>Ae.aegypti</i>	13,7//20,6//20,9//103//271	112	
	<i>Thymus capitatus</i>	P.E.	LA-AD	<i>Cx.pipiens</i>	49,0//58,0//100//0,0070//0,0076	151	
Lythraceae	<i>Pemphis acidula</i>	P.E.	LA-RE-OV	<i>Cx.quinquefasciatus-Ae.aegypti</i>		300	
Magnoliaceae	<i>Magnolia salicifolia</i>	P.E.	LA	<i>Ae.aegypti</i>		124	
Malvaceae	<i>Abelmoschus moschatus</i>	P.E.	LA	<i>An.culicifacies-An.stephensi-Cx.quinquefasciatus</i>	52,3//52,6//43,8//29,62//59,18//40,77//44,38//121,82//118,25//69,76//56,31//133,85//141,60//95,19//76,27//163,81//83,38//105,85	72-225-226	
	<i>Pavonia zeylanica</i>	P.E.	LA	<i>Cx.quinquefasciatus</i>	2214,7	332	

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Malvaceae	<i>Kunzea</i>	<i>ambigua</i>	P.E.-E.O.	LA-RE	<i>An.stephensi-Ae.aegypti</i>		268-319
Menispermaceae	<i>Abuta</i>	<i>grandifolia</i>	P.E.	LA	<i>Ae.aegypti</i>	3,9//1,6//15,1//5,2	54
	<i>Cocculus</i>	<i>hirsutus</i>	P.E.	LA-DR	<i>An.subpictus-Cx.tritaeniorhynchus-Cx.quinquefasciatus-Ae.aegypti-An.stephensi</i>	167,00//99,03	76-102
		<i>excelsa</i>	P.E.	LA-DR	<i>Cx.pipiens molestus</i>		173
	<i>Azadirachta</i>	<i>indica</i>	P.E.	OV-LA-RE	<i>Cx.quinquefasciatus-An.stephensi- Ae.aegypti-An.darlingi-An.culicifacies-An.spp-Ar.subaltus-An.tessellatus-An.gambiae-Cx.pipiens-An.arabiensis-Cx.tarsalis-Armigeres spp</i>	246,38//198,82//709,96//562,07//1,6//1,8//1,7//209//326//49,7//34,0//303,2//228,9//291,5//518,2//244,4//749//65,2//154,5//54,4//150//178,26//751,428//4,5//LC-95 0,93//0,54//0,77	13-15-16-22-28-32-35-36-43-66-69-74-85-101-108-120-125-133-148-149-154-161-167-191-193-237-239-241-256-258-263-264-277-302-303-304-307-309-333-238-282-285-275-176-185-238-355
Meliaceae	<i>Carapa</i>	<i>guianensis</i>	P.E.-E.O.	LA	<i>Ae.aegypti-Ae.albopictus</i>	14,5//45,57//98//148//27//0,74//0,68//0,66//0,55//128//90//220//95//228	160-288-289
	<i>Khaya</i>	<i>sengalensis</i>	E.O.	LA	<i>Cx.annulirsotris</i>	20,12//5,1//5,08//7,62//236,00//36,59//77,19//241,8	272
	<i>Melia</i>	<i>azederach</i>	P.E.	LA-RE	<i>Ae.aegypti-An.stephensi-Ae.albopictus</i>	0,017//0,034//0,133//0,089	58-177-218-219-254-259-338
		<i>volkensis</i>	P.E.	LA-DR	<i>Ae.aegypti</i>		175
Mimosaceae	<i>Parkia</i>	<i>biglobosa</i>	P.E.	RE	<i>A review: Plants compounds as mosquito repellents.</i>		191
Moraceae	<i>Ficus</i>	<i>benghalensis</i>	P.E.	LA	<i>Cx.quinquefasciatus-Ae.aegypti-An.stephensi</i>		97
	<i>Maclura</i>	<i>porifera</i>	P.E.	RE	<i>Cx.pipiens</i>		265

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Moringaceae	<i>Moringa</i>	<i>oleifera</i>	P.E.	LA	<i>An.stephensi</i> - <i>Ae.albopictus</i> - <i>Cx.quinquefasciatus</i>	57,79//125,93//63,90//133,07//72,45//139,82//78,93//143,20//0,01//0,02//0,56//0,65	215-29
Myricaceae	<i>myrica</i>	<i>gale</i>	E.O.	RE-AD	<i>Ae.aegypti</i>		24-301
	<i>Callistemom</i>	<i>viminalis</i>	A review: P.E.- E.O. as mosquito repellents				213
	<i>Corymbia</i>	<i>citriodora</i>	P.E.	LA-RE	<i>Ae.alboscutellatus</i> - <i>Cx.quinquefasciatus</i> - <i>An.gambiae</i> - <i>Ae.cantans</i> - <i>Cx.sitiens</i> - <i>O.notoscriptus</i> - <i>Ve.fumerea</i>	0,33//0,55//0,41//0,63//0,68//0,90//1,82//0,06//3,33//0,48//1,06//0,11//3,24//0,14//1,55//0,07//3,91//0,44	56-100-157-247-250-266-321-325-357-125
		<i>camaldulensis</i>	E.O.-P.E.	RE-LA	<i>Ae.aegypti</i> - <i>Cx.quinquefasciatus</i> - <i>Cx.annulirostris</i> - <i>Ae.albopictus</i>		340-41
		<i>globulus</i>	P.E.-E.O.-S.R.	LA-RE	<i>Ae.aegypti</i> - <i>An.stephensi</i> - <i>Ae.albopictus</i> - <i>Cx.nigripalpus</i> - <i>O.triseriatus</i> - <i>Cx.pipiens pallens</i> - <i>An.culicifacies</i> - <i>An.dirus</i> - <i>An.quadrifasciatus</i>	LC-50_LC-90 0,112//0,258//0,058//0,289//0,052//0,218	59-19-119-121-213-306-344-347
	<i>Eucalyptus</i>	<i>grandis</i>	E.O.	LA	<i>Ae.aegypti</i>		142
Myrtaceae		<i>maculata</i>	P.E.	RE	<i>Cx.pipiens</i> - <i>An.darlingi</i>	98,72//619,52	30-167
		<i>urophylla</i>	E.O.	LA-RE	<i>Ae.aegypti</i> - <i>Ae.albopictus</i> - <i>Cx.pipiens pallens</i>	LC90-130//LC90-72//LC90-123	356-41
	<i>Eugenia</i>	<i>melanadenia</i>	E.O.	LA	<i>Ae.aegypti</i>	0,0085//0,0104//0,0063//0,0071	2
	<i>Melaleuca</i>	<i>alemfolia</i>	E.O.-P.E.	RE-LA-OV- DR	<i>Cx.pipiens pallens</i> - <i>Ae.aegypti</i>		119-213-316
		<i>leucadendron</i>	E.O.-P.E.	LA-RE	<i>Ae.aegypti</i> - <i>An.stephensi</i> - <i>Cx.quinquefasciatus</i>		6-82-311-312-139
	<i>Myrtus</i>	<i>communis</i>	E.O.-P.E.	LA-RE	<i>Ae.aegypti</i> - <i>An.stephensi</i> - <i>Cx.quinquefasciatus</i> - <i>Cx.pipiens molestus</i>	1//101,3//9,7//101,4//1//50,2//16,36//39,70	5-213-324

(Continued from page 182)

Myrtaceae	<i>Psidium</i>	<i>guajava</i>	E.O.-P.E.	LA-RE	<i>Ae. aegypti</i> - <i>An. dirus</i> - <i>Ae. albopictus</i> - <i>Cx. quinquefasciatus</i> - <i>An. subpictus</i> - <i>Cx. tritaeniorhynchus</i>	48,83//135,36//106,77//1,2,71//68,27//95,98//59,51//93,94	311-358
		<i>rotundatum</i>	E.O.-P.E.	LA-RE-DR	<i>Ae. aegypti</i>	0,0085//0,0104//0,0063//0,0071	2
Myrtaceae	<i>Syzygium</i>	<i>aromaticum</i>	E.O.-P.E.	LA-DR-RE	<i>Cx. pipiens</i> - <i>Ae. aegypti</i> - <i>An. dirus</i>	209//326	101-208-306
		<i>jambolana</i>	E.O.-P.E.-S.R.	LA-RE	<i>Ae. aegypti</i> - <i>An. albimanus</i> - <i>Cx. quinquefasciatus</i> - <i>Cx. pipiens</i> - <i>An. dirus</i> - <i>Ma. uniformis</i> - <i>Cx. gelidus</i> - <i>Cx. tritaeniorhynchus</i>	67//60//63//69//209//326	20-34-101-306-320-321-327-328
Myristicaceae	<i>Myristica</i>	<i>fragans</i>	E.O.	RE-DR	<i>Ae. aegypti</i> - <i>Ae. albopictus</i> - <i>An. dirus</i> - <i>Cx. quinquefasciatus</i>		311
Nelumbonaceae	<i>Nelumbo</i>	<i>nucifera</i>	P.E.	LA-AD	<i>An. subpictus</i>		260
Oleaceae	<i>Eugenia</i>	<i>caryophyllata</i>	E.O.	RE	<i>Cx. pipiens pallens</i>		119-129
		<i>jambolana</i>	P.E.	LA	<i>Ae. aegypti</i> - <i>An. stephensi</i> - <i>Cx. quinquefasciatus</i>	40,97//53,84//96,00	224
	<i>Nyctanthes</i>	<i>arbor-tristis</i>	P.E.	LA	<i>Ae. aegypti</i> - <i>An. stephensi</i> - <i>Cx. quinquefasciatus</i>	303,2//228,9//291,5//518,2//244,4//747//65,2//154,5//54,4	154
Oocystaceae	<i>Chlorella</i>	<i>ellipsoidea</i>	P.E.	RE	<i>Cx. tarsalis</i> - <i>Cx. quinquefasciatus</i>		107
Papaveraceae	<i>Argemone</i>	<i>mexicana</i>	P.E.	LA-DR	<i>Ae. aegypti</i> - <i>An. stephensi</i> - <i>Cx. quinquefasciatus</i>		172-276
Pinaceae	<i>Cedrus</i>	<i>deodara</i>	P.E.	LA-RE	<i>Ae. subpictus</i> - <i>An. stephensi</i> - <i>Ae. aegypti</i> - <i>Cx. quinquefasciatus</i> - <i>Ae. albopictus</i> - <i>An. quadrimaculatus</i>	133,85//141,60//95,19//76,27//163,81//83,38//105,85	102-226-344
		<i>caribaea</i>	E.O.	LA-OV	<i>Ae. aegypti</i>		138
	<i>Pinus</i>	<i>longifolia</i>	E.O.	LA-RE	<i>An. culicifacies</i> - <i>Ae. aegypti</i> - <i>Cx. quinquefasciatus</i>	82//112	7-82-142

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		<i>pinea</i>	P.E.	RE	<i>Cx.pipiens molestus</i>	24,5//44,0//60,0//75,0//117,0//120,0	323
Pinaceae	<i>Pinus</i>	<i>sylvestris</i>	E.O.	LA-RE	<i>Ae.aegypti</i>		105
		<i>tropicalis</i>	E.O.	LA-OV	<i>Ae.aegypti</i>		138
		<i>aduncum</i>	P.E.-E.O.	LA-RE-AD	<i>Ae.aegypti</i>	0,04//0,11//0,20//0,0017//0,0027//0,0035//0,0057	106-140-162
		<i>auritum</i>	E.O.	LA	<i>Ae.aegypti</i>	0,0017//0,0027//0,0035//0,0057	140
		<i>betle</i>	E.O.	RE-DR	<i>Ae.aegypti-Ae.albopitus-An.dirus-Cx.quinquefasciatus</i>		311
		<i>fimbriulatum</i>	P.E.	LA	<i>Culicids</i>		297
Piperaceae	<i>Piper</i>	<i>longum</i>	P.E.	LA-AD-RE	<i>Ae.albopictus-Cx.quinquefasciatus-Ae.aegypti-Cx.pipiens pallens</i>	0,01//0,02//0,56//0,65//2,23//4,06//8,13	29-42-49-137-346-350-353
		<i>nigrum</i>	P.E.-E.O.	LA-AD	<i>Ae.aegypti-An.stephensi-Cx.quinquefasciatus-Ae.albopictus-An.gambiae-Cx. Pipiens pallens-O.togoi-An.dirus</i>	1//101,3//9,7//101,4//11//50,2//0,01//0,02//0,56//0,65//0,004//0,039//0,01	5-29-61-119-196-312-311
		<i>retrofractum</i>	P.E.	LA	<i>Ae.aegypti-Cx.quinquefasciatus</i>		44
		<i>sarmentosum</i>	P.E.	LA-AD	<i>Ae.aegypti</i>	2,23//4,06//8,13	42-49
		<i>solmsianum</i>	P.E.	LA	<i>Ae.aegypti</i>		33
				<i>citratum</i>	E.O.-P.E.-S.R.	OV-LA-RE-AD	<i>Ae.aegypti-An.stephensi-Cx.quinquefasciatus-Culicifacies-Cx.pipiens pallens-An.darlingi-Cx.nigripalpus-Ar.subalbatu-Man.titillans-An.quadrifasciatus-Cx.pipiens-An.dirus</i>

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		<i>excavatus</i>	P.E.	RE	<i>An.arabiensis</i>		90
	<i>Cymbopogon</i>	<i>nardus</i>	E.O.-P.E.	RE-LA	<i>Cx.quinquefasciatus</i> - <i>An.gambiae</i> - <i>An.culicifacies</i> - <i>Ae.albopictus</i> - <i>Cx.nigripalpus</i> - <i>An.albimanus</i> - <i>Ae.aegypti</i> - <i>O.triseriatus</i> - <i>An.funestus</i> - <i>An.stephensi</i> - <i>An.dirus</i>		11-19-60-82-119-128- 213-306-316-328-320- 355-208-167-55
		<i>martinii</i>	E.O.-P.E.	RE	<i>An.culicifacies</i> - <i>Cx.quinquefascia</i> - <i>tus</i> - <i>Ae.aegypti</i> - <i>An.annularis</i> - <i>An.subpictus</i> - <i>An.pulcherrimos</i> - <i>An.darlingi</i>		9-11-181
Poaceae		<i>winterianus</i>	P.E.-E.O.	LA-RE	<i>Ae.aegypti</i> - <i>An.dirus</i> - <i>Cx.quinquefasciatus</i> - <i>Cx.pipiens</i> - <i>Cx.spp</i> - <i>Ae.spp</i>	14,5//41,57//98//148//27	160-313-320-321-208
	<i>Cynodon</i>	<i>dactylon</i>	P.E.	AT	<i>Cx.tarsalis</i> - <i>Cx.quinquefasciatus</i>		107
	<i>Echinochloa</i>	<i>stagninum</i>	P.E.	LA-RE	<i>Cx.pipiens</i>	80,32//112,78//2413,48//7,20//14,01//42,86	31
	<i>Phragmites</i>	<i>australis</i>	P.E.	LA-RE	<i>Cx.pipiens</i>	98,72//619,52	30
	<i>Pseudospondias</i>	<i>microcarpa</i>	P.E.	LA	<i>Ae.aegypti</i> - <i>Cx.pipiens pallens</i>		110
Phrymaceae	<i>Phryma</i>	<i>leptostachya</i>	P.E.	LA	<i>Ae.aegypti</i> - <i>Cx.pipiens pallens</i> - <i>O.togoi</i>	0,41//2,1//2,3	197
Phytolaccaceae	<i>Petiveria</i>	<i>alliaceae</i>	A review: P.E.- E.O. as mosquito repellents				213
		<i>marginatum</i>	A review: P.E.- E.O. as mosquito repellents				213
Ranunculaceae	<i>Nigella</i>	<i>sativa</i>	E.O.	LA	<i>An.arabiensis</i> - <i>Ae.aegypti</i>	20,9//17,5//85,9//9,1//67,8//8,6	153
Rhizophoraceae	<i>Rhizophora</i>	<i>apiculata</i>	P.E.	LA	<i>Cx.quinquefasciatus</i>	25,7	315

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Rosaceae	<i>Quillaja</i>	<i>saponaria</i>	P.E.	LA	<i>Ae.aegypti-Cx.pipiens</i>		202
	<i>Sorbus</i>	<i>commixta</i>	P.E.	LA	<i>Ae.aegypti-Cx.pipiens pallens</i>		110
Rubiaceae	<i>Morinda</i>	<i>tinctoria</i>	P.E.	LA	<i>Ae.aegypti-Cx.quinefasciatus</i>	18,20//27,24	17
	<i>Myragina</i>	<i>speciosa</i>	E.O.-P.E.	LA	<i>Ae.aegypti</i>	13,7//20,6//20,9//103//271	112
	<i>Rubia</i>	<i>tinctorum</i>	P.E.	LA	<i>Ae.aegypti-Cx.pipiens pallens</i>		110
Rutaceae	<i>Aegle</i>	<i>marmelos</i>	P.E.	LA	<i>Ae.subpictus-Cx.tritaeniorhynchus</i>	167,00//99,03	76-102
		<i>limonia</i>	P.E.	LA	<i>Ae.aegypti-An.stephensi-Cx.quinefasciatus</i>	129,24//79,58//57,23	231
	<i>Amyris</i>	<i>balsamifera</i>	P.E.	LA-RE	<i>Ae.aegypti-An.stephensi-Cx.quinefasciatus</i>	1//101,3//9,7//101,4//1//50,2//LC90-130//LC90-72//LC90-123	5-356
	<i>Atlantia</i>	<i>monophylla</i>	P.E.	LA	<i>Ae.aegypti-An.stephensi-Cx.quinefasciatus</i>		296
	<i>Chloroxylon</i>	<i>swietenia</i>	P.E.	LA-AD	<i>Ae.aegypti-An.stephensi</i>	1,0//1,2//1,7//1,8//2,8	240-242
Rutaceae	<i>Citrus</i>	<i>aurantifolia</i>	P.E.-E.O.	LA-RE	<i>Ae.albopictus-Cx.quinefasciatus-Cx.pipiens pallens-Cx.pipiens</i>	0,01//0,02//0,56//0,65	29-64-119-253-274
		<i>aurantium</i>	E.O.	RE	<i>Cx.pipiens pallens</i>		119
		<i>bergamia</i>	E.O.	RE-LA	<i>Cx.pipiens pallens-Ae.aegypti-An.dirus</i>		119-136-306
		<i>hystrix</i>	E.O.	RE-LA	<i>Cx.quinefasciatus-Ae.aegypti-An.dirus</i>		150-313

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	<i>limonia</i>	P.E.-E.O.	RE-LA	<i>Ae.aegypti-Cx.pipiens</i>	67//60//63//69	34-320-208	
	<i>medica</i>	A review: P.E.- E.O. as mosqui- to repellents				307	
<i>Citrus</i>	<i>paradisi</i>	E.O.	RE	<i>Cx.pipiens pallens</i>		119	
	<i>reticulata</i>	E.O.	DR	<i>Cx.quinquefasciatus-Ae.aegypti- Culicids</i>		113-143-293	
	<i>sinensis</i>	P.E.-E.O.	LA-RE	<i>Ae.aegypti-An.stephensi- An.dirus-Cx.pipiens mollestus- Ae.albopictus- Cx.quinquefasciatus</i>	67//60//63//69//95,74//101,53//28,96//24,5//44,0//60,0//75,0//1 17,0//120,0	34-116-306-323-347-348	
<i>Clausena</i>	<i>anisata</i>	E.O.	LA	<i>Cx.quinquefasciatus-Ae.aegypti- An.stephensi</i>	140,96//130,19//119,59	95	
<i>Euodia</i>	<i>ridleyi</i>	P.E.	LA	<i>Ae.aegypti-An.stephensi- Cx.quinquefasciatus</i>		217	
<i>Rutaceae</i>	<i>Feronia</i>	<i>elephantum</i>	P.E.	RE	<i>Ae.aegypti</i>	335-337	
	<i>Glycosmis</i>	<i>pantaphylla</i>	P.E.	LA-OV-MR	<i>Ae.aegypti-Cx.sitiens- An.stephensi- Cx.quinquefasciatus</i>	46,77//44,88//27,45//29,11//58,75//48,08//45,81//37,49	135
	<i>Poncirus</i>	<i>trifoliata</i>	E.O.	LA	<i>Ae.aegypti</i>	0,082//0,122	232
		<i>acanthopod- ium</i>	P.E.-E.O.	LA	<i>Ae.aegypti</i>	355	
		<i>armatum</i>	E.O.	RE	<i>Ae.aegypti</i>	63-134	
<i>Zanthoxylum</i>		<i>chiloperone</i>	P.E.	LA	<i>Ae.aegypti</i>	259	
		<i>limonella</i>	P.E.-E.O.	LA-RE-AD	<i>Ae.albopictus-Cx.quinquefascia- tus-An.dirus-Ae.aegypti- An.stephensi-Cx.gelidus- Cx.tritaeniorhynchus- Ma.uniformis</i>	0,01//0,02//0,56//0,65	29-64-209-328-327-329

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Rutaceae	<i>Zanthoxylum</i>	<i>piperitum</i>	E.O.	RE	<i>Ae. aegypti</i> - <i>Cx. gelidus</i> - <i>Ae. gardneri</i> - <i>An. barbirostris</i> - <i>Ma. uniformis</i> - <i>Cx. tritaeniorhynchus</i> - <i>Arm. subalbatus</i>		48-117
	<i>Leptadenia</i>	<i>madagasca- riensis</i>	P.E.	LA	<i>Ae. aegypti</i> - <i>Cx. pipiens pallens</i>		110
Santalaceae		<i>álbum</i>	P.E.-E.O.	LA-RE-IN	<i>Ae. aegypti</i> - <i>An. stephensi</i> - <i>Cx. quinquefasciatus</i>	1//101,3//9,7//101,4//1//50,2//1,82//3,33//1,06//3,24//1,55//3,91	5-118-119-357
	<i>Santalum</i>	<i>spicatum</i>	E.O.	RE	<i>Cx. sitiens</i> - <i>Ve. funerea</i> - <i>Cx. annulirostris</i> - <i>Ae. alboscute- llatus</i> - <i>O. notoscriptus</i>		247
Sapindaceae	<i>Paullinia</i>	<i>clavigera</i>	P.E.	LA	<i>An. benarrochi</i>		204
Sapotaceae	<i>Manilkara</i>	<i>zapota</i>	P.E.	LA-AD	<i>An. subpictus</i>		260
Saururaceae	<i>Houttuynia</i>	<i>cordata</i>	P.E.	RE-DR	<i>Cx. quinquefasciatus</i>		312
Schisandraceae	<i>Schisandra</i>	<i>chinensis</i>	P.E.	LA	<i>Cx. quinquefasciatus</i>		194
Scrophulariaceae	<i>Hebe</i>	<i>speciosa</i>	P.E.	LA	<i>Cx. quinquefasciatus</i>		234
	<i>Capsicum</i>	<i>annuum</i>	E.O.-P.E.	LA-AD	<i>An. gambiae</i> - <i>An. stephensi</i> - <i>Cx. quinquefasciatus</i>		61-62-146
		<i>anagyris</i>	P.E.	LA	<i>Cx. quinquefasciatus</i> - <i>Ae. aegypti</i>	42,33	50-250-251-252
Solanaceae	<i>Cestrum</i>	<i>diumum</i>	E.O.-P.E.	LA	<i>An. stephensi</i> - <i>An. gambiae</i>		84-250
		<i>roseum</i>	P.E.	LA	<i>Cx. quinquefasciatus</i>		234
	<i>Datura</i>	<i>metel</i>	P.E.	LA-OV-RE	<i>Cx. quinquefasciatus</i>	246,38//198,82//709,96//562,07	43-309

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	<i>Nicotiana</i>	<i>glauca</i>	P.E.	RE	<i>An.arabiensis-An.gambiae</i>	0,97//1,72//2,44	342
		<i>tabacum</i>	P.E.	LA	<i>An.stephensi-Ae.subpictus-Ae.aegypti-Cx.quinquefasciatus</i>	133,85//141,60//95,19//76,27//163,81//83,38//105,85	102-226
		<i>elaeganifolium</i>	P.E.	LA	<i>An.labranchiae</i>	28//325	152
		<i>nigrum</i>	P.E.	LA	<i>Cx.quinquefasciatus</i>	133,85//141,60//95,19//76,27//163,81//83,38//105,85	226
		<i>sodomaeum</i>	P.E.	LA	<i>An.labranchiae</i>	28//325	152
Solanaceae	<i>Solanum</i>	<i>suratense</i>	P.E.	LA	<i>Cx.quinquefasciatus</i>	23,53//46,04	174
		<i>trilobatum</i>	P.E.	OV-LA-RE	<i>Cx.quinquefasciatus-An.stephensi-Cx.tritaeniorhynchus-An.subpictus</i>	23,53//46,04//48,83//135,36//106,77//102,71//68,27//95,98//59,51//93,94	174-230-233-358-
		<i>villosum</i>	P.E.	LA	<i>Cx.quinquefasciatus-Ae.aegypti-An.spp</i>	3,33//96,67	52-53
		<i>xanthocarpum</i>	P.E.	LA-RE	<i>An.stephensi-Ae.aegypti-An.culicifacies-Cx.quinquefasciatus</i>	LC-50_LC-90 0,112//0,258//0,058//0,289//0,052//0,218	121-164-165-235-218-292
	<i>Withania</i>	<i>somnifera</i>	P.E.	LA	<i>An.stephensi-Ae.aegypti-Cx.quinquefasciatus</i>	350,9//372,4//576,9//115,0//197,1//554,6//154,9//312,0//1085,0	27-172
Stemonaceae	<i>Stemona</i>	<i>tuberosa</i>	P.E.-E.O.	LA	<i>Ae.aegypti-An.dirus-Ma.uniformis-Cx.quinquefasciatus</i>	13,2//45,2//16,0//48,2//3,9//11,5//8,1//14,7//11,2//18,84	126
Sterculiaceae	<i>Sterculia</i>	<i>guttata</i>	P.E.	LA	<i>Ae.aegypti-Cx.quinquefasciatus</i>	35,520//21,552	123
Thymelaeaceae	<i>Aquilaria</i>	<i>malaccensis</i>	P.E.-E.O.	LA-RE-OV	<i>Ae.aegypti</i>		355
Umbelliferae	<i>Carum</i>	<i>carvi</i>	E.O.	LA-RE	<i>Cx.papiens pallens-Ae.aegypti-Cx.papiens-An.dirus</i>	32,42//47,17//71,37//83,36//86,06//152,94	119-136-132-209

(Continued from page 189)



Valerianaceae	<i>Valeriana</i>	<i>jatamansi</i>	P.E.	LA-AD	<i>Ae.aegypti</i> - <i>Cx.quinquefasciatus</i> - <i>Ae.albopictus</i> - <i>An.stephensi</i> - <i>An.culicifacies</i>	68,1//42,8//51,2//53,8//80,6//0,14//0,16//0,09//0,08//0,24//0,34 //0,25//0,21//0,28	70
	<i>Aloysia</i>	<i>citriodora</i>	E.O.	RE	<i>Ae.aegypti</i>		86
	<i>Clerodendrum</i>	<i>inerme</i>	P.E.	LA	<i>Ae.aegypti</i>		201
	<i>Lantana</i>	<i>camara</i>	E.O.	LA-RE-OV	<i>An.gambiae</i> - <i>Ae.albopictus</i> - <i>Cx.quinquefasciatus</i> - <i>Ae.aegypti</i> - <i>An.arabiensis</i> - <i>An.stephensi</i> - <i>An.culicifacies</i> - <i>An.fluviatilis</i>	0,01//0,02//0,56//0,65//0,06//0,05//0,05//0,05//0,06//203,49//23 0,76//281,35//75,31//156,85//207,83	1-29-71-73-75-131-133- 269-270-245-168
		<i>adoensis</i>	E.O.	LA	<i>An.arabiensis</i> - <i>Ae.aegypti</i>	20,9//17,5//85,9//9,1//67,8//2,6	153
		<i>alba</i>	A review: P.E.- E.O. as mosquito repellents				213
		<i>citriodora</i>	E.O.	LA-RE-AD	<i>Ae.aegypti</i> - <i>An.stephensi</i> - <i>Cx.quinquefasciatus</i>	1//101,3//9,7//101,4//1//50,2	5
Verbenaceae	<i>Lippia</i>	<i>gracilis</i>	E.O.	LA	<i>Ae.aegypti</i>		287
		<i>javanica</i>	P.E.-E.O.	RE	<i>An.arabiensis</i> - <i>An.gambiae</i>	54,94	90-144-186
		<i>sidoides</i>	E.O.	LA-RE	<i>Ae.aegypti</i>	67//60//63//69	34-37
		<i>ukambensis</i>	P.E.-E.O.	LA-RE	<i>An.gambiae</i> - <i>Cx.quinquefasciatus</i>		186-250-269-270
		<i>canadensis</i>	P.E.-E.O.	RE	<i>Cx.corniger</i>		82
	<i>Verbena</i>	<i>officinalis</i>	P.E.	LA	<i>Cx.quinquefasciatus</i>		194
	<i>Vitex</i>	<i>negundo</i>	P.E.-E.O.	LA-RE	<i>Cx.tritaeniorhynchus</i> - <i>Ae.aegypti</i>		103-122-168

(Continued from page 190)

Verbenaceae	<i>Vitex</i>	<i>rotundifolia</i>	P.E.	RE-DR-LA-AD	<i>Cx. quinquefasciatus</i>		312-339
Violaceae	<i>Viola</i>	<i>odorata</i>	P.E.-E.O.	RE	<i>Ae. aegypti</i> - <i>An. stephensi</i> - <i>Cx. quinquefasciatus</i>		6
Vitaceae	<i>Ampelozizyphus</i>	<i>amazonicus</i>	P.E.	LA	<i>Ae. aegypti</i> - <i>Cx. pipiens pallens</i>		110
Zingiberaceae		<i>galanga</i>	E.O.	RE-AD-DR	<i>Cx. quinquefasciatus</i> - <i>An. dirus</i> - <i>Ae. albopictus</i> - <i>Ae. aegypti</i>		311-312
	<i>Alpinia</i>	<i>zerumbet</i>	E.O.	LA-RE	<i>Ae. aegypti</i>	67//60//63//69	34
		<i>aromatica</i>	P.E.-E.O.	RE	<i>Ae. togoi</i> - <i>Ar. subalbatus</i> - <i>Cx. quinquefasciatus</i> - <i>Cx. tritaeniorhynchus</i>	0,06//1,55	63-211
		<i>domestica</i>	P.E.-E.O.	LA	<i>Ae. aegypti</i>	13,7//20,6//20,9//103//271	112
	<i>Curcuma</i>	<i>longa</i>	P.E.-E.O.	LA-RE	<i>Ae. aegypti</i> - <i>An. dirus</i> - <i>Cx. quinquefasciatus</i> - <i>Cx. pipiens</i> - <i>An. albopictus</i>	1,82//3,33//1,06//3,24//1,55//3,91	139-316-313-357-311
		<i>zedoaria</i>	E.O.	LA	<i>Ae. aegypti</i> - <i>An. dirus</i>	42,33//50,54//54,11//61,43	209
	<i>Elettaria</i>	<i>cardamomum</i>	P.E.-E.O.	RE-IN-OV	<i>Cx. pipiens pallens</i>		118-119
	<i>Heaychium</i>	<i>coronarium</i>	P.E.-E.O.	RE-IN-OV	<i>Cx. pipiens pallens</i>		118
	<i>Kaempferia</i>	<i>galanga</i>	P.E.-E.O.	LA-RE-AD	<i>Ae. aegypti</i> - <i>Cx. quinquefasciatus</i>		48-50-210
	<i>Thymbra</i>	<i>spicata</i>	E.O.	LA-OV-RE	<i>Cx. pipiens</i>	12,5//25//50	38
	<i>Zinger</i>	<i>officinale</i>	E.O.	RE-LA-OV-AD	<i>Cx. pipiens pallens</i>		119-150

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		<i>cassumunar</i>	E.O.-P.E.	LA	<i>Ae.aegypti-Cx.quinquefasciatus</i>	13,7//20,6//20,9//103//271	112
Zingiberaceae	<i>Zingiber</i>	<i>officinalis</i>	E.O.-P.E.	LA-OV-RE-AD	<i>Ae.albopictus-Cx.quinquefasciatus-An.gambiae-Ae.aegypti</i>	0,01//0,02//0,56//0,65	29-61-216-221-312
Zygophyllaceae	<i>Bulnesia</i>	<i>sarmentoi</i>	E.O.-P.E.	LA-OV-RE-DR	<i>Ae.aegypti</i>		259

PE = PLANT EXTRACT; E:O = ESSENTIAL OILS

OV = OVICIDE; LA = LARVICIDE; AD = ADULTICIDE;

IN = INSECTICIDE; RE = REPELLENT;

DR = DEVELOPMENT RETARDANT; AT = ATTRACTANT;

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