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Larvicidal Activity of Natural Products Against Mosquito Species - A review

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Abstract : Mosquito as vector transmits diseases to millions of people and causes serious human diseases such as malaria, chikungunya, encephalitis, yellow fever, dengue and filariasis. Insecticides have an harmful impacts on health and environment and induces resistance to a number of mosquito species. Hence quest had driven to minimize the treat. In nature a layer number of phytochemicals present in flora encompasses a better alternative source to commercial insecticides and can be used in vector control programs. From the literature, a large number of plant species have been tested for their activities against different vectors and found to be target specific degradable and environmentally safe.
Keywords : Mosquito, larvae, medicinal plants, diseases, insecticides.

Introduction

Mosquitoes belongs to single group of insects which are known for community wellbeing. In view of the fact that they take action as vector meant for many disease like yellow fever, encephalitis, malaria, dengue fever and filariasis the most important vector for disease such as lymphatic filarialis, malaria and dengue are *culex quinquefasciatus anopheles sstephensi* and *aedes aegypti*[1] on spraying the breeding sites insecticides interruptes the infection transmission cycle by killing either by mosquito larvae. [2]

Mosquitoes act as vectors by their bit transmit parasites and pathogens like malaria, filariasis, yellower fever, dengue and Japanese encephalitis significantly, which found to have devastating impact on human beings. Mosquitoes are found in lentic aquatic habitate environments for breeding such as sewage water, stagnant water, septic tank, natural and artificial containers such as pools, gutters, coconut, shells, tree holes, bamboo stumps, leaf axils, water tanks and so on.

Diflubenzuron and methoprene (insect growth regulators), synthetic insecticides like chlorpyri forstemephos and fenthion(organophosphates) and organochlorine compound used to control mosquito larvae.[3] on repeated usages this controlling agent disruptes natural biological control systems at sustainability lead to pesticide resistance [4]. In addition to this these controlling agents are high cost effective concern for environmental sustainability provoked side effects to human health and non target organisms.[5-7]. These undesirable effects initiated a search for alternative control measures. An alternative strategies to reduce mosquito population has developed a new method using more importantly ecofriendly products particularly natural products a large number of natural products plant derived products posses possible biological activity including toxicity repellent action and anti feedant.

Culex quinquefasciatus it breeds profusely in dirty water collection including stagnant drains, cesspools, septic tank with leaks, burrow pit, and almost all organic polluted water collection. In optimum temperature and humidity the life cycle will be completed in seven day passing through the egg larval, pupal and adult stages. The house mosquito can transmit zoonotic disease that effects humans and wild and domestic animal such as lymphatic filariasis, avian malaria, encephalitis, western equine encephalitis and west nile fever and may be a vector of the zika virus. It causes infection through biting during blood meal.

Aedes aegypti mosquito can be recognized by white marking on its legs and marking in the form of a lyre on the upper surface of its thorax . It is found in tropical and subtropical region throughout the world. The yellow fever mosquito *aedes aegypti* is a mosquito that can spread the dengue fever, chikungunya, zika fever, mayaro and yellow fever viruse and other disease.

Anopheles *stephensi* causes diseases like o'nyong' nyong fever. canine heartworm dirofilariaimmitis, and the filariasis causing species *wuchereria bancrofti* and *brugia malayi* .

Review

S.No	Mosquito Name	Name of the Plant	Parts of Plant	Extract	Reference
1	*Culex tritaeniorhynchus*	*Calotropis gifantea*	Leaves	Aqueous extract	Kumar *et al*., 2012 [8]
2	*Anopheles stephensi*	*Centratherumanthelminticum*	Fruits, Leaves.	Petroleum ether, Chloroform, Methanol.	Srivastava *etal*., 2008[9]
3	*Anopheles stephensi, Culexquinquefasciatus*	*Chlorophytum, Borivilianum, Santapau and Fernand*	Roots	Methanolic extract	Deore*etal*.,2009 [10]
4	*Culex quinquefasciatus*	*Cosmos bipinnatus, Foeniculum vulgar, Tagetesminuta*	Fresh leaves	Ethanol, Aqueous, Hexane.	Modise.*etal*.,2016[11]
5	*Culex quinquefasciatus, Anopheles stephensi and Aedesaegypti*	*CrossandraInfundibuliformis*	Leaves	Petroleum ether, ethyl acetate, methanol.	Madhumitha *et al*.,2012[12]
6	*Culex quinquefasciatus*	*Durantarepens, vitexnegundo*	Leaves	Ethanol, Methanol.	Hemavathy *et al*.,2016[13]
7	*Anopheles stephensi*	*Enteromorphaflexuosa, J.agardh and GracilaracorticataJ. agardh*	Algal	Methanol, Acetone, Benzene.	Poonguzhali*et al*.,2013[14]
8	*Culex mosquito*	*Indigoferearrecta*	Leaves	Methanol , Water.	RaheliNeema*et al*.,2015[15]
9	*Culex quinquefasciatus*	*Leucasaspera*	Leaves	Chloroform, Ethanol.	Maheswaran*et al*.,2008[16]
10	*Culex quinquefasciatus, Aedesaegypti*	*Annonas quamosa, Cynodondactylon, Melia azedarach, H.indicus*	Root	Acetone, ethyl acetate, chloroform, butanol.	Ramanibai*et al*.,2014[17]
11	*Culex pipiens*	*Momordica Charantia*	Fresh fruits	Methanol	Nagappan *etal*.,2014[18]
12	*Culex quinquesfasciat*	*Monstera adansonii*	Leaves	Petroleum ether,	Gomathi *et al*.,2014[19]

				Chloroform, Methanol.	
13	*Culex quinquefasciatus*	*C.citratus O.basilium*	Oil of the plant	Water extract	Aidaross*etal*.,2005[20]
14	*Anopheles stephensi , Aedesaegypti*	*A.marmelos L. C.gigantica L M.koenigii L N.arbortristis L B. aegytica L P.zeylanica L*	Leaves, Roots.	Chloroform, Dichloromethane, Methanol.	Patil*etal.*,2010[21]
15	*Aedesaegypti*	*Rauvolfiaserpentina*	Fruits	Methanol, Ethanol.	Nayak*etal.*,2015[22]
16	*Culex quinquesfasciatus*	*Sterculin quiqudoba*	Leaves, Stem, Bark.	Petroleum ether, Ethyl acetate, Methanol.	Wilson *et al.*, 2014[23]
17	*Culex quinquefasciatus*	*Ulvafasciata Grateloupia Gthophila*	Sea, weeds.	Methanol, Acetone, Benzene.	Poonguzhali *et al.*, 2012[24]
18	*Mosquito species*	*Hyptissuaveolens, Balanitesa egyptiace*	Leaves, Roots.	Methanol, Acetone.	Bobbo *et al.*,2016[25]
19	*Anophelex mosquitoes*	*Gliricidia sppium*	Fresh leaves	Petroleum ether	Mathew *et al.*,2015[26]

Conclusion

Some of the plant species described above appear to have effective as mosquito larval control agents. Researches demonstrated that these herbal mosquito larvicidal are cost effective to its easily available raw material, while the inorganic insecticides are expensive and environmentally hazardous. Hence, the naturals products are novel potent drug generally preferred for control of mosquito due to their environmentally safe, inexpensive and biodegradable nature.

References

1. Service M.W., Management of vectors. Youdeowei A., Service M.W., Pest Vector Management in Tropics. 1983, 265–280.
2. Harborne J.B., Biochemistry of plant pollination. Introduction to Ecological Biochemistry. Academic Press, London, 1993, 36-70
3. Brown A.W.A., Insecticide resistance in mosquitoes. a pragmatic review, J. Am.Mosq. Control Assoc., 1986, 2, 123-143.
4. Casida J.E.andQuistad G.B., Insecticide targets learning to keep up with resistance and changing concepts of safety,Agr.Chem.Biotechnol., 2000, 43,185–191.
5. Lee S.E., Kim J.E. .and Lee HS., Insecticide resistance in increasing interest,Agr.ChemBiotechnol., 2001, 44, 105–112.
6. Venketachalam M.R. andJebasan A.,Larvicidal activity of *Hydrocotyljavanica*Thunb (Apiaceae) extract against *Cx. Quinquefasciatus*, J .Exp. Zool., 2001, 4, 99-101.
7. Thomas T.G., Rao S. and Lal S., Mosquito larvicidal properties of an indigenous plant, *Ipomoea cairica*Linn,Jpn. J. Infect Dis., 2004, 57, 176-177.
8. Kumar G., Karthik. L.,BhaskaraRao K.V., Kirthi A.V.andRahuman A.A.,Larvicidal, repe llent and ovicidal activity of *Calotropis gigantean* against *Culexgelidus, Culextrita eniorhynchus(Diptera: Culicidae)*, J.Agr., 2012, 8(3), 869-880.

9. Srivastava A., Bartarya R., Tonk S., Srivastava S.S.and Maharaj Kumari K.,Larvicidal activity of an indigenous plant*Centratherumanthelminticum*, J. Environ. Biol., 2008, 29, 669-672.
10. Deore S.L.,Khadabadi S., Larvicidal activity of the saponin fractions of Chlorophytum borivilianum santapau and Fernande, J. Entomol. Nematol.,2009, 1(5), 064-066.
11. Modise SA, Ashafa AOT., Larvicidalpupicidal and insecticidal activities of Cosmos bipinnatus, Foeniculum vulgare and Tagetesminuta against Culex quinquefasciatus mosquitoes, Trop. J. Pharm. Res., 2016, 15 (5), 965-972.
12. Madhumitha G,MarySaral A., Screening of larvicidal activity of crossandrainfundibuliformis extracts against *anopheles stephensi, aedesaegypti* and *culex quinquefasciatus*. Int. J. Pharm. Pharm. Sci., 2012; 4(1), 485-487.
13. Hemavathy J. andAnitha T., A study on larvicidal assay on *Duranta Repens*Linn and *VitexNegundo*Linn against *CulexQuinquefasciatus*say, Int J AdvSci Res., 2016, 1(4), 18-20.
14. Poonguzhali T., Josmin L.L., LaaliNisha., Larvicidal activity of two seaweeds, *Enteromorphaflexuosa*J. Agardh and *Gracilara corticata*J. Agardh Against Mosquito Vector, *Anopheles stephensi*.Biosci.Biotechnol. Res. Asia., 2013, 10(1), 333-337.
15. RaheliNeema M., Ojunga M., RameshF.,Thelarvicidal activity of *Indigoferaarrecta*leaf extract against culex mosquito larvae, Int.J.bioassays.,2015, 2 4 (01), 3666-3669.
16. Mehaswaran R., Sathish S. andlgnacimuth S., Larvicidal activity of leucas aspera against the larvae of culex quinquefasciatus say and aedes aegypti L,Int. J. Integr. Biol, 2008,2(3),214-217.
17. Ramanibai R, Velayutham K. Larvicidal efficacy of medicinal plant extracts for the control of mosquito vectors. Int J Pharm Sci 2014; 5(4): 707-715.
18. Nagappan P., and Gomathinayagam S., Study of mosquito larvicidal effects of *Momordicacharantia* (bitter gourd) extracts as nanopowder, Int.J.ChemTech. Res., 2014,6(9), 4052-4054.
19. Gomathi.R., IsaivaniIndrakuma. And KarpagamS.,Larvicidal activity of *Monstera adansonii* plant extracts against *Culex quinequefaciatus,*J.Pharmacogn.Phytochem, 2014, 3(3), 160-162.
20. Aidaross M., Kokob W. and GalalbM., Evaluation of repellent and larvicidal activity of *ocimum basilicum* and *cymbopogoncitratus*dc against *cule xquinquefasciatus,* Inti. chern. Pharm. Med. J.2005, 2(2),243-246 .
21. 21.PatilS.V.,Patil C.D., Salunkhe R.B.and SalunkeB.K, Larvicidal activities of six plants extracts against two mosquito species *Aedes aegypti* and *Anopheles stephensi,* Trop. Biomed.,2010,27(3), 360–365.
22. Nayak J.B., and Mohan B., Larvicidal activity of *Rauvolfia serpentine* L fruits against *Aedes aegypti* Mosquitolarvae,Int. J. Biol. Sci.,2015, 4(12), 54-56.
23. Wilson E., Chacha M., Omolo J.J. and Kidukuli A., Larvicidal Activity of Leaf and Stem extracts of *Sterculiaquin queloba* (Garcke) KSchum against the*Anopheles gambiae* GilesS. S*culexquin quefasciatus* Say and *Aedesaegypti* Mosquito,Asian. J. Res. Chem.,2014, 2(8), 61-71.
24. 24.PoonguzhaliT.V. and Josmin LaaliNisha L.L., Larvicidal activity of two seaweeds*Ulvafasciata*and *Grateloupia lithophila* against mosquito vector *Culex quinquefasciatus,* Int.J.Curr.Sci, 2012, 163-168.
25. Bobbo A.A., Pukuma M.S and QadeerM.A., Assessment of Larvicidal Activity of *Hyptis suaveolens* and *Balanitesaegyptiaca*Leaves and Root Extracts against Mosquito Species, Inter. J. Sci. Res.Publi,2016, 6(3), 10-14.
26. Mathew JJ.,Vazhacharickal PJ., SajeshkumarN.K., and Sunil J., Larvicidal activity of *gliricidia sepium* leaf extracts on mosquito larvae and its lethal effect on nontargeted organisms,CIB Tech. J.Biotechnol.,2015,4(2),13-19.

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