Abstracts of Independently Published Peer Reviewed Articles on Neem & Azadirachtin

**Cat & Dog Fleas**

**Effects of azadirachtin on Ctenocephalides felis in the dog and the cat.**

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Azadirachtin-containing neem seed extract is a powerful insect growth regulator, a feeding deterrent and repellent with low toxicity. The purpose of this work was to describe the effects of normal and potentiated azadirachtin on Ctenocephalides felis in the dog or cat. Groups of kennelled greyhounds and domestic cats infested with C. felis were sprayed once with azadirachtin containing neem seed extract with or without diethyltoluamide (Deet) and/or citronella. Methanolic extracts with 200, 1000 or 2400 ppm azadirachtin reduced fleas in a dose-dependent manner. Compared with fleas counted on treated dogs just before treatment and untreated infested dogs, 1000-2400 ppm azadirachtin reduced fleas 93-53% for 19 days. However, combined with 500 ppm Deet and 33% w/v citronella, only 500 ppm azadirachtin reduced fleas 95-62% for 20 days. On cats inoculated with 50 fleas 2 days before treatment, the combination reduced fleas and eggs 100% to day 6 and 83-51% from day 7 to 9. On petri dishes, the combination achieved 100% egg mortality up to day 7 and 80% to day 14 and 48-52% to days 21-28. Deet, with or without neem seed extract or citronella, and citronella, with or without neem, did not reduce fleas significantly. The results show that azadirachtin reduced fleas in a dose-dependent manner in flea-contaminated environments. In cats, the combination killed most fleas within 24 h, providing effective flea control for 7 days. The results suggest that Deet with citronella potentiated the effect of azadirachtin on C. felis.

**Head Lice**


Evaluation of the in-vitro pediculicidal action of four known insecticides and three medicinal plant extracts.

Morsy TA, el-Ela RG, Nasser MM, Khalaf SA, Mazyad SA.

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Human lice are an increasing community health problem worldwide. This is particularly true among school children who spend most of their daytime in crowded areas. Four commercially known insecticides and three medicinal plant extracts were studied to evaluate their pediculicidal activities in-vitro. The best result with insecticides was achieved with malathion (LT50 10.396 and slope function 1.183). The best result with medicinal plant extracts was achieved with neem oil (A. indica) (LT50 85.27 and slope function 1.480). Although, neem oil extract was less active than malathion, however it is safer for human usage.

**Sheep Lice**


Evaluation of non-conventional treatments for control of the biting louse (Bovicola ovis) on sheep.

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AgResearch, Wallaceville Animal Research Centre, Upper Hutt, New Zealand.

A variety of non-conventional treatments was applied to biting louse (Bovicola ovis) infested sheep in order to evaluate ways in which farmers could control the louse infestations and still maintain Organic Production Standards. In one trial, louse scores of sheep shorn but kept dry or wetted by water alone or with water plus detergent were compared with unshorn sheep treated similarly. Shearing alone accounted for a 35.7-68.3% reduction in mean louse scores. Wetting alone either with water or with water and added detergent accounted for a 26.9-35.3% reduction in mean louse scores. The combined effects on mean louse scores of shearing and wetting, as opposed to shearing alone, were statistically significant on two of the three farms at 32-35 days post-treatment. The effects persisted for the duration of the trial (between 48 and 52 days), at which point shearing and wetting with detergent provided 95.3-99.6% control of lice. In a second trial, a range of insecticidal substances considered acceptable by Organic Production Standards, azadirachtin (neem), pyrethrum, soap, was applied to louse-infested sheep and their efficacy compared with that of a commercial formulation of cypermethrin. The sheep treated with azadirachtin and pyrethrum had significantly less lice than either the control or soap treated sheep over the 48 days of the trial. Neither azadirachtin nor pyrethrum were significantly less effective than cypermethrin. Control (reduction in louse score) of 85.0-100% was achieved over the period of the trial. It is concluded that most of the non-conventional treatments evaluated had a useful and cost-effective role to play in reducing louse numbers on sheep for at least 40-50 days. The lack of persistence compared with that obtained with conventional insecticides was the only apparent drawback.

**Flies**

**J Econ Entomol 1989 Oct;82(5):1375-8**

Azadirachtin as a larvicide against the horn fly, stable fly, and house fly (Diptera: Muscidae).

Miller JA, Chamberlain WF.

Effects of azadirachtin, a triterpenoid extracted from neem seed, Azadirachta indica A. Juss., were similar to those of insect growth regulators against the immature stages of the horn fly, Haematobia iritans (L.), the stable fly, Stomoxys calcitrans (L.), and the house fly, Musca domestica L. When an ethanolic extract of ground seed was blended into cow manure, LC50 and LC90's for larval horn flies were 0.096 and 0.133 ppm azadirachtin, respectively. An emulsifiable concentrate (EC) had an LC50 for larval horn flies of 0.151 ppm and an LC90 of 0.268 ppm. For larval stable flies, the EC formulation had an LC50 of 7.7 ppm and an LC90 of 18.7 ppm azadirachtin in manure. Against larval house flies, the LC50 and LC90 were 10.5 and 20.2 ppm, respectively.
Mosquito & Midge

Field studies on the mosquito repellent action of neem oil. Sharma SK, Dua VK, Sharma VP.
Malaria Research Center (Field Station), BHEL Complex, Ranipur, Hardwar, India.

Repellent action of neem oil was evaluated against different mosquito species. 2% neem oil mixed in coconut oil provided 96-100% protection from anophelines, 85% from Aedes, 37.5% from Armigeres whereas it showed wide range of efficacy from 61-94% against Culex spp. Therefore, neem oil can be applied as a personal protection measure against mosquito bites.

2: J Am Mosq Control Assoc 1993 Sep;9(3):359-60
Mosquito repellent action of neem (Azadirachta indica) oil. Sharma VP, Ansari MA, Razdan RK.
Malaria Research Centre, Delhi, India.

Two percent neem oil mixed in coconut oil, when applied to the exposed body parts of human volunteers, provided complete protection for 12 h from the bites of all anopheles species. Application of neem oil is safe and can be used for protection from malaria in endemic countries.

Cattle Ticks

www.oneworld.org/vso/pubs/wpapers/parasites.htm

A study on the effect of neem oil extract to control external cattle parasite by John Farries

A report of a trial undertaken in a dairy herd in Thailand an addition to the current research literature on neem as a natural pesticide

John Farries has a Scottish Diploma in Agriculture and Dairying, and over thirty years’ experience of working with livestock. He has extensive experience as a farm manager and has also worked as a research adviser in dairy and beef production including conducting breeding trials and collating data.

Three concentrations of neem oil extract Azadirachta indica were compared with a proprietary chemical, Asuntol, on four groups of dairy cattle, each group made up of 10 randomly selected animals. These groups were compared with a control group of untreated animals.

The results of this field observation indicate that horse flies, stable flies and horn flies are discouraged from landing on and biting the treated animals. There was little visual evidence of mosquitoes or that mosquitoes were controlled other than that the cattle rested more comfortably after a spray application.

With the recent disquiet over the effect of organo-phosphate based chemicals normally used to control ticks and flies, the use of a botanical insecticide offers a safer alternative, particularly with milking cattle where the milk is being consumed by children.

Conclusions

- Flies of all kinds are discouraged from settling on cattle which have been sprayed with neem oil, regardless of the concentration of the oil. However, using 100% neem oil is unlikely to be economical, so the lower concentrations are recommended.
- For cattle held inside on concrete, 1% dilution with water is considered adequate when sprayed every week.

It cannot be emphasised too strongly that a botanicals act in a different way to chemical insecticides. The results are not immediate as is the case with chemicals, but there is a gradual build-up in control with no side effects at the dilutions used in this trial.

General Review


Activity and biological effects of neem products against arthropods of medical and veterinary importance.

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Botanical insecticides are relatively safe and degradable, and are readily available sources of biopesticides. The most prominent phytochemical pesticides in recent years are those derived from neem trees, which have been studied extensively in the fields of entomology and phytochemistry, and have uses for medicinal and cosmetic purposes. The neem products have been obtained from several species of neem trees in the family Meliaceae. Six species in this family have been the subject of botanical pesticide research. They are Azadirachta indica A. Juss, Azadirachta excelsa Jack, Azadirachta siamens Valeton, Melia azedarach L., Melia toosendan Sieb. and Zucc., and Melia volkensii Gurke. The Meliaceae, especially A. indica (Indian neem tree), contains at least 36 biologically active principles. Azadirachtin is the predominant insecticidal active ingredient in the seed, leaves, and other parts of the neem tree. Azadirachtin and other compounds in neem products exhibit various modes of action against insects such as antifeedancy, growth regulation, fecundity suppression and sterilization, oviposition repellency or attractancy, changes in biological fitness, and blocking development of vector-borne pathogens.

Some of these bioactivity parameters of neem products have been investigated at least in some species of insects of medical and veterinary importance, such as mosquitoes, flies, triatomines, cockroaches, fleas, lice, and others. Here we review, synthesize, and analyze published information on the activity, modes of action, and other biological effects of neem products against arthropods of medical and veterinary importance. The amount of information on the activity, use, and application of neem products for the control of disease vectors and human and animal pests is limited. Additional research is needed to determine the potential usefulness of neem products in vector control programs.

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