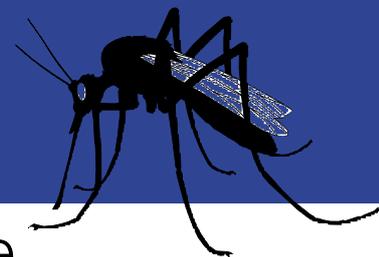


Let us fight malaria

The Organic Farmer Nr. 34, March 2008



Malaria Special



Malaria prevention is cheaper than cure

Malaria is one of the major disease burdens worldwide. It causes about 400-900 million cases of fever and approximately one to three million deaths annually. More than 90 percent of illnesses and deaths due to malaria occur in Sub-Saharan Africa. Children and pregnant women are at a higher risk. In Kenya, it threatens the life of around 25 million out of the country's total population of 39 million people. Malaria is estimated to cause more than 20 percent of all deaths in children under the age of 5 years. Every Kenyan family spends an average of Ksh 1,400 every year to treat cases of malaria.

Malaria is caused by protozoan parasites of the genus Plasmodium, which are transmitted by the female anopheles mosquitoes. A mosquito becomes infected when it sucks blood from an infected human being. The mosquito then carries the infectious Plasmodium sporozoites in its salivary gland and spreads the disease by biting other humans.

Blood test important

Early diagnosis and prompt treatment are key elements of malaria control because they can shorten the duration of the infection and prevent further complications including most deaths. Whether someone has malaria or not can only be determined by a blood test. Since malaria symptoms can

be very similar to those of a severe flu – notably fever, shivering and headaches – it is important to confirm the infection of malaria through a proper diagnosis before taking any drugs! If any drugs need to be taken, the prescribed dosage should be followed timely and accurately. Correct usage of anti malarial drugs is an important means to prevent the malaria parasite from developing resistance to drugs used to fight it.

Create awareness

Malaria is not caused by fate or witchcraft nor is it punishment for one's sins. Rather it is a disease, transmitted by the anopheles mosquito, and it is preventable and curable.

- We need to understand the life cycle of the anopheles mosquitoes (see page 2). Mosquito bites mostly occur between 8 pm and 6 am, when people go to bed or when they are asleep. This shows the importance of mosquito-nets (see page 4), which is a very effective method of protecting ourselves against mosquitoes. In



the last 5 years, the Kenyan Ministry of Health has distributed 13.4 million mosquito-nets. In this period, the mortality rate decreased by 44 percent to 16,000 deaths in 2006. However, many of these nets are misused as some people use them for fishing or making cushions or underwear.

- We need to know more about breaking the transmission cycle of malaria. anopheles mosquitoes require stagnant water in which to lay their eggs. The destruction of mosquito breeding sites through water and environmental management is the first step in malaria control (see page 3).

The fight against malaria can be won, as the ICIPE-project in Nyanbondo area in Nyanza province clearly shows. With massive campaigns to raise awareness through distribution of mosquito-nets and the destruction of breeding sites the hospital reported that mortality record for children under 5 years of age dropped from 60 to 20 percent in a year.



Dear Farmers,

Every day, 3,000 children in Africa die from malaria. In Kenya alone, 62 children below 5 years succumb to this scourge daily. This is unacceptable! When affected, the patient cannot work, children cannot attend school and farmers cannot tend their farms. Apart from the grief due to loss of their loved ones that malaria causes in many families, it reduces the quality of our day-to-day-life.

Moreover, we should not forget the socio-economic impact. Malaria is not just a disease commonly associated with poverty, but is also a major hindrance to economic development. The impact of malaria on the economy has been estimated to cost Africa Ksh 720 billion every year. This includes the costs of health care, working days lost due to illness, days lost in education, decreased productivity due to brain damage by cerebral malaria, loss of investment and decline in tourism.

The progress made by hundreds of scientists in developing efficient weapons against malaria (for instance a vaccine) is slow and time consuming. Thus, there is no time to wait and see! People have to take their own initiative and fight malaria. Do not forget: Prevention of malaria is by far much more cost-effective than the treatment of the disease!

However, the fight against malaria can only be more effective if we thoroughly know about the behaviour of the mosquitoes and the way they transmit the disease. We have to know the prevention methods. This is why The Organic Farmer brings you this special issue. We would like to thank the Federation of American Women's Clubs Overseas, which financed this special effort of TOF magazine.

Wakulima, tushirikiane tuangamize malaria!



Bed nets allow you a peaceful sleep, stagnant water breeds mosquitoes.



Know your enemy - to be able to fight him

Many people are infected by malaria not only because of ignorance but also due to negligence. Therefore the first step towards avoiding the disease is to understand the mosquito's life cycle. Just imagine, a single mosquito can deposit 80 to 200 eggs during its life span, which can take up to a month! Being very smart, anopheles mosquitoes have adjusted perfectly to their host; since many people are now using bednets, the mosquitoes have also

changed their feeding habits. Previously they would begin biting between 9 and 10 pm when most people went to bed. Now they begin to feed earlier before people retire to bed. However, bednets still provide the most effective protection against mosquitoes.

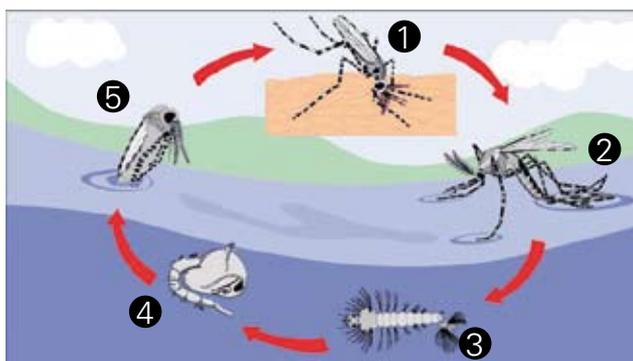
The second step is to act: To avoid mosquito bites, we have to combine all the possible measures to protect ourselves.



5 The adult mosquito will hatch from the pupae. It occurs in early evening or late at night. After mating, the females fly away in search of a blood meal which is obtained by biting people.

4 The larvae change into pupae. The pupae are dark-brown, oval-shaped and about 4 mm long. The pupal stage lasts for about two days.

The life cycle of an anopheles mosquito



This illustration teaches us two things:

- We should drain away all stagnant water (page 3).
- Use mosquito-nets during the night (page 4).

1 A female mosquito feeding on human blood.



2 The mosquito lays the eggs in a nearby water surface and goes back to look for another blood meal. The larvae which develop within the eggs are ready for hatching within 2 to 3 days.

3 The tiny larvae start to feed on algae and bacteria present in the water. The larvae (about half a centimetre long) are well visible by eye.



Other methods of malaria prevention

Indoor spraying: This is the most effective means of rapidly reducing mosquito density. Its full potential is reached when at least 80 per cent of the premises containing mosquitoes are sprayed. It is effective for 3 to 6 months, depending on the insecticide used and the type of surface on which it is sprayed. The most common insecticide for spraying indoor walls is called ICON. The application has to be repeated every 6 months. ICON is quite expensive.

Naturub: This balsam and remedy balm is produced from extract of the *Ocimum suave* plant leaves. Naturub, the result of a promising project (done by ICIPE-researchers, and financed by BioVision) is a strong mosquito repellent.



Neem oil: The oil of the neem seeds is an old mosquito repellent. It is available in all pharmacies and chemists (see also page 4)

Mosquito coils: These are available in most shops (a pack of 10 coils goes for Ksh 25). Secure the coil in its holder and place it on the floor where you spend the evening or night. If you are sitting around a table, put the coil under the table, this will drive away mosquitoes since they prefer dark sites located near the floor to bite. The fume of the coils should be positioned in such a way that it swathes

the legs, since anopheles mosquitoes are attracted by smell of feet!

Smoking: Insects don't like smoke; smoke from the fire place will chase the mosquitoes away. To repel mosquitoes, one can use animal dung. A more effective method (and with a better scent!) is the smoke of the leaves of eucalyptus trees and of neem trees. This smoke gives more than 70 percent protection.

Bacillus thuringiensis (Bt): Even more promising are trials with *bacillus thuringiensis*. This bacillus, thrown in stagnant water, kills the larvae, but does not harm fishes or human beings. Two types of *bacillus thuringiensis* are being used successfully in western countries to control mosquitoes in nature reserves. These biological control agents are very expensive and are not available in the African market.

Sawdust of neem trees: ICIPE-researchers in western Kenya experimented with cushions filled with neem tree sawdust. The cushions were thrown in stagnant



Neem tree sawdust in a cushion bag

water (such as bricks-ponds); the neem killed the larvae. Research is still on going, but the results are promising.

The problem with DDT

One of the most controversial insecticides is DDT. Developed as the first of the modern insecticides, DDT was extensively used in the 1950's and 1960's during the malaria eradication campaign. The problems began when DDT was used more and more and in huge amounts in agriculture to eliminate insect pests, particularly in the developed world. In the 1970's, DDT was banned because of its damaging side effects to humans, wildlife and the environment. By this time, its large-scale use had already led to the evolution of resistant mosquitoes in many regions where it was extensively used. There is considerable controversy regarding the restrictions placed on the use of DDT in controlling malaria. Some African countries would like to lift the ban on the use of DDT to control insects. Most of the problems associated with DDT use stem specifically from its industrial-scale application in agriculture, rather than from its use in public health to eradicate malaria.

However, in the long term the use of DDT is more harmful than beneficial.



No stagnant water – no mosquitoes – no malaria

Water is precious, essential for human well-being, for the household, for your livestock and for your crop. Water is at the same time the breeding ground for the eggs of the anopheles mosquito. This means that the management of your water has to take into account the need for the prevention of the transmission of malaria. Do not give the mosquitoes a chance to find water in which to deposit

their eggs. Water that flows freely does not usually harbour mosquito eggs. All measures to reduce the opportunity for mosquitoes to deposit their eggs in stagnant waters should be taken together by neighbours and the entire community since mosquitoes do not respect shamba boundaries! The smallest puddle can be infested by these dangerous insects.

1. Use covers: The containers used for the storage of drinking water must be covered at all time either with a net or a lid (plastic tanks should be covered at all time with the screw cap).



2. Remove any stagnant water: Rain water is usually collected in flower pots, used tyres, tin cans, thrown away plastic bags, wreck-

ages of cars, tractors and agricultural machinery. Remove them! Manholes and unused wells should be covered tightly to prevent mosquitoes from laying their eggs in the water.



3. No puddles! If you irrigate your crops, do it with the required amount of water. No puddles should remain standing after irrigation. Think about drip irrigation: With this method the water drips slowly into the ground without leaving any standing water. With drip irrigation, you use much less water!



Let the water flow since mosquitoes do not breed in flowing water! Keep your irrigation trenches open, so that the water is able to flow freely. Prevent the formation of cavities (notches which hold stagnant water in the trench), remove the grass and any rubbish that may have accumulated. Use irrigation pipes if possible.



Water points and ponds for your livestock are difficult to be kept free of mosquitoes. In ponds, the presence of fish is of course ideal. You can eat fish, and a single fish can devour hundreds of mosquito larvae every day. It is recommended that you contact the fisheries department for advice on larvae-eating fish.

Mosquitoes don't like certain herbs

Most insect repellents in the market contain the chemical DEET. It effectively "blinds" the insect's senses so that the biting or feeding instinct is not triggered by humans or animals.

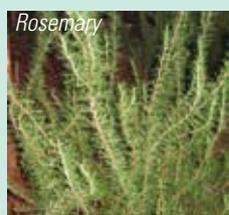
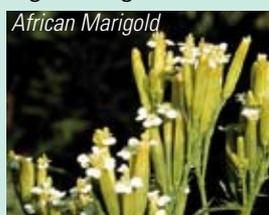
Alternatively, there are quite a number of various helpful herbs with a lot of advantages. Planted around the house, they chase mosquitoes away – and beautify your shamba! They are cheap. Marigold for instance is well known by organic farmers. They use marigolds as companion plants to keep aphids away. Mosquitoes don't like the scent of marigolds as well as most of the other insects (and some humans feel the same way!). Mosquitoes avoid lantana. This shrub has nice flowers, but careful! It grows very fast and suffocates other bushes and plants!

Leaves of these plants placed in the house repel mosquitos; the leaves must be crushed to release the aroma and to emit a stronger smell. For instance, rosemary has been used for centuries as a great natural mosquito repellent. Crush a few leaves of rosemary and rub on your skin and clothing and especially the feet to enhance the effect. – And, by the way, you can even use rosemary in the kitchen, it gives a good taste to nyama choma!

Oil made of some of these plants (e.g. neem, *ocimum suave*, and eucalyptus) act as long-lasting mosquito-repellents. Some drops of neem oil vapourised from a mat at the door repel mosquitoes, keeping them off for approximately five to seven hours.

Be careful

Many people especially in malaria-endemic areas use herbs for treatment. These patients only go to hospital when it is already too late to get effective treatment. When not treated in good time, malaria can cause death. Most herbs used in malaria treatment have been tested and found to be ineffective. The herbs only help to stabilise the liver and can give patients some temporary relief making them believe that they are cured, but the herbs are not able to kill malaria parasites in the blood. The only herbs which have proved effective are those that are based on extracts such as quinine and *artemisia annua*. These can treat malaria when given in the right dosage. – The extracts of *artemisia annua* are the basis of the most effective modern anti-malaria drugs (see page 2): the tea from artemisia leaves is not a medicine against malaria



Protect your family with a mosquito-net

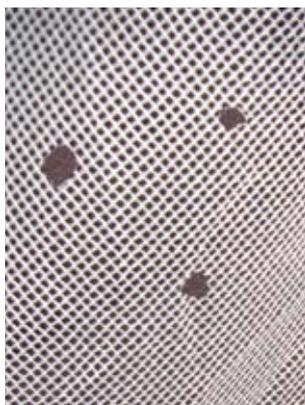


The main biting period of anopheles mosquitoes lasts from sunset to sunrise. Therefore, everybody should sleep under a mosquito-net. The nets keep mosquitoes away from people, and thus greatly reduce the risk of transmission of and infection with malaria parasites. Nets impregnated with insecticide are a highly effective means of malaria prevention. Furthermore, it is also one of the most cost-effective methods.

Insecticide-treated nets have the advantage of protecting people sleeping under the net and simultaneously killing mosquitoes that come into contact with the net. Nets, which are treated with insecticides, are estimated to be twice as effective compared to untreated nets and thus offer a markedly improved protection. Damaged nets are dangerous, allowing access of mosquitoes to the sleeping area. Therefore, check your nets every day, and if you find holes, mend them immediately.

Two types of Insecticide-Treated Nets:

- The Insecticide Treated Nets (ITN's) are standard nets, which you have to treat yourself. To do so, use Powertab tablets as follows: dissolve 1 tablet in 0.5 litre water and soak the net for 1 min; protection lasts for 15 washes of the net, 1 tablet costs Ksh 40.
- The Long-Lasting Insecticide Treated Nets (LLITN's) provide good protection, especially to risk groups like young children and pregnant mothers. The nets are effective for 3 – 5 years, depending on models and conditions of use. Afterwards you can treat them with Powertab tablets.



Repair your nets!



Get a cheap mosquito net!

The Government of Kenya has distributed 13.4 million ITN's for free over the past five years among children and pregnant women. Furthermore, the government plans to distribute 2 million nets annually. In addition, the organisation Population Services International (PSI) distributes nets through rural commercial outlets throughout the country at a cost of Ksh 100 each, to fit a double-size bed. The organization also sells Long-Lasting Insecticide Treated Nets at a cost of Ksh 50 per net through health facilities of the Ministry of Health countrywide. Because of the high subsidy, these nets are only sold to pregnant women and children below 5 years. (Population Services International, PO Box 22591-00400 Nairobi, psi@psi.org, www.psi.org)

Nets on sale

- Permanent: (Insecticide-Treated Net, lasts for 4 years without any treatment), costs depend on net size: Ksh 850 - 999 Ksh
- K-O Tab 1-2-3: For single bed Ksh 390, for double bed Ksh 540 - 624
- Mosquisha Net: Ksh 525 (incl. 1 tablet Powertab)



Recommended anti-malarial drugs

Before you take drugs, make sure that you confirm the infection of malaria by a blood test to avoid resistance! Once an antimalarial drug is prescribed, it is essential to follow the prescribed dosage.

There are several families of drugs used to treat malaria. Chloroquin is very cheap and, until recently, was very effective. However, the anopheles mosquitoes developed resistance, making the drug ineffective against the most dangerous plasmodium strain.

Since 2001, the World Health Organization has recommended the use of Artemisinin-based Combination Therapy (ACT) as first-line treatment for uncomplicated malaria in areas experiencing resistance to older medications. Extracts of the plant artemisia offer over 90% efficacy rates, but their supply is far below the demand. Because ACT's cost up to twenty times as much as previously used medications, they remain unafford-

able in many malaria-endemic countries.

Coartem is a drug, which is recommended by the World Health Organization and a combination of Artemether and Lumefantrine (AL). It is distributed for free at public and mission health centres. It costs Ksh 400 - 650 if bought over the counter.

Coarsucam (6 tablets), at a cost of about Ksh 500 (recommended by pharmacists for patients in Western Province)

Cotexcin (8 tablets), available at about Ksh 400 (for patients in Coast Province).

NOTE:

Fansidar is no longer effective in curing malaria due to resistance of several malaria strains; it is still in use because most people find it cheap as it costs about Ksh 90 for a dose of three tablets.

Buy drugs from recommended pharmacies; there are many artemisinin-based drugs from China in the market which are faked and ineffective.



The Federation of American Women's Clubs Overseas (FAWCO) has sponsored the printing of this important malaria information as an insert of *The Organic Farmer* magazine. As an accredited United Nations Non-Governmental Organization with special consultative status to the Economic and Social Council of the UN, FAWCO supports the global challenge for reducing poverty and improving lives by supporting the UN Millennium Development Goals with a special focus on education and the natural and human environment. Since 2005 FAWCO members around the world have joined together to support malaria eradication.

Information at www.fawco.org