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Edinburgh Biologists Find Fungi to Fight Malaria



Scientists at The University of Edinburgh have discovered an unlikely ally in the fight against malaria. By infecting mosquitoes with fungi, they can drastically reduce transmission of the disease, which kills well over a million people each year.

In the past, insecticides like DDT have been used to kill the mosquitoes that transmit malaria. Over time, however, many mosquitoes have become resistant to chemical pesticides. By contrast, this radical new approach uses a fungus as a biological pesticide.

Inert fungal spores are impregnated on cloth or netting, or sprayed on house walls or ceilings. When a mosquito touches the spores, the fungus germinates, penetrating the mosquito and growing within it. The mosquito succumbs to the fungus before it has begun to transmit malaria.

The scientists at The University of Edinburgh and Imperial College London discovered that fungal infection reduced malaria transmission in the laboratory by 98 per cent. Mostly, the mosquitoes died before they became infectious. But the fungus also reduced transmission by interrupting mosquito feeding and may also have directly interfered with the malaria parasites in the mosquito.

"It seems likely that fungal-infected mosquitoes will also fly less well, and produce fewer eggs," said Dr Simon Blanford, of the University of Edinburgh's School of Biological Sciences, who carried out the laboratory work.

"There is no evidence that insects can develop resistance to fungi," explained Dr Matt Thomas of Imperial College, one of the leaders of the research. "However, even if mosquitoes were to become resistant, it is extremely unlikely that they would also be resistant to chemical pesticides. It should be possible to use the chemical and biological pesticides together or in rotation to prolong their usefulness".

Practical Benefits

According to a companion paper in *Science* by scientists from Tanzania and northern Europe, the method may well prove to be practical for use in Africa.

Researchers hung fungus-impregnated black sheets inside African houses near Ifakara, central Tanzania, and found that mosquitoes resting on these sheets after taking a blood meal became infected and died. In houses in this area, people are bitten almost once a night by a malaria-carrying mosquito. Calculations showed that the use of fungal-impregnated sheets could reduce this to once every three weeks.

"The results are extremely encouraging," said Ernst-Jan Scholte, who led the Tanzania fieldwork. "The fungi provide another tool for use in the fight against malaria". His Tanzanian counterpart, Kija Ng'habi, emphasised the desire to push this research line further: "This technology needs to be developed to be manageable and affordable. We need to evaluate this on a larger scale in communities that have little resources."

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