News

Sponging cattle with insecticide halves malaria incidence in study

Malaria is endemic in much of southern Asia, and current methods for controlling the disease are limited by cost considerations. But a study published 9 June in *The Lancet* shows, for what is believed to be the first time, that sponging livestock with insecticide might offer a far cheaper but just as effective a method, which may also have added benefits.

One method health workers use to control malaria in southern Asia is insecticide spraying inside homes. This method is expensive, since it uses large amounts of insecticide. In 1999, a research team led by Dr Mark Rowland of the London School of Hygiene and Tropical Medicine, in the UK, showed that treating livestock with insecticides could kill mosquitoes. Because the two species of mosquitoes that spread malaria in southern Asia — *Anopheles stephensi* and *A. culicifacies* — feed preferentially on domestic animals, Rowland's group theorized that treating livestock should reduce the spread of malaria in this region.

The researchers tested their theory in six Afghan refugee settlement villages in north-west Pakistan. They randomly assigned the villages to two groups. Livestock in the villages assigned to the first group were treated with insecticide during the 1995 and 1997 malaria seasons but not in 1996, while livestock in the second group of villages received the insecticide treatment during the 1996 season but not in 1995 or 1997. In this crossover design, each village acted as its own control. Researchers supervised the villagers as they sponged the livestock with the insecticide deltamethrin. At the end of the study, the researchers compared malaria incidence in each village during livestock treatment seasons with incidence in seasons without livestock treatment.

The results were dramatic. Treating livestock with insecticide produced a 56% fall in the incidence of falciparum malaria, the most deadly form of the disease, and a 31% fall in the incidence of vivax malaria, a disabling but rarely fatal form. The livestock insecticide method was thus as effective as standard indoor spraying, but the cost was 80% less — US$ 0.34 per person protected vs US$ 0.07 for the animal sponging method.

Courtesy *The Lancet*

Afghan villagers in Pakistan sponge cattle with insecticide to lower incidence of human malaria.

"The livestock method should be good for epidemic control since it can be done more quickly than indoor spraying," Rowland commented to the *Bulletin*. Though he says the method could stem malaria in much of southern Asia, he is quick to point out that it will only work in regions where mosquitoes prefer feeding on livestock. That's not the case in sub-Saharan Africa, for example, where malaria is spread primarily by *A. gambiae* mosquito species which don't home in on livestock but prefer to feed indoors on humans. Further testing is needed to find out if the method will work against livestock-loving mosquitoes in Africa, China and South America, he says.

Local people must be committed to the programme, since all the domestic animals in a village must be treated and the insecticide must be applied every six weeks. That wasn't a problem in the test villages, where people were eager to continue with the regimen when they noticed their animals thriving. Indeed, the researchers found significant weight gains among treated cattle and in some villages there were increased milk yields, though these gains weren't statistically significant.

Deltamethrin, the insecticide used in the study, is one of the safest insecticides known, says Rowland. But epidemiologist and malaria expert Dr Syed Jamil Hasan Kazmi at the University of Karachi in Pakistan says that deltamethrin does pose a danger to humans if ingested orally. He says further studies should investigate whether the milk and meat of treated animals contain pesticide residues. Dr Bernard Nahlen of the WHO-based Roll Back Malaria Initiative adds: "Monitoring of insecticide resistance and potential changes in mosquito feeding behaviour will also be important in this type of malaria control activity which relies on the use of insecticides".

Kazmi praises the new study, and believes its findings could greatly benefit rural areas of southern Asia. "However, its effectiveness in urban areas is still questionable. Urban areas like Mumbai, Karachi, New Delhi, Decca, etc. are the growing hotspots of malaria and there are no cattle available for the lethal lady [female mosquito] so she has to rely on human beings," says Kazmi. Still, plenty of regions in southern Asia do host livestock and in these areas Rowland's method could greatly reduce the cost of controlling malaria. ■

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Near halving of some populations likely in next 50 years

A total of 39 industrialized countries will probably see their populations shrink by the year 2050, even as the world's population is predicted to grow from the current 6.1 billion to between 7.9 and 10.9 billion, according to new data issued by the United Nations Population Division. The countries expected to grow smaller in population size include many prosperous nations, such as Austria, Finland, Germany, Japan and Sweden (see Table). The predicted declines average 18%, ranging from under 1% (Netherlands) to as high as 46.1% (Estonia). Most countries will likely see a fall between 10% and 29%.

The anticipated declines are due to a combination of factors, including changes in fertility and mortality and in migration and emigration patterns, says Dr Hania Zlotnik, chief of the population estimate and projection section in the UN Population Division. "There is not one single reason they are losing population," she says. "But in most of them, fertility tends to be very low. That's the main driving force."

With falling fertility rates and rising life expectancies, the result is an ageing of the population, she adds. According to the UN report, people aged 60 and older now make up 20% of the population in more developed regions. By 2050, they will constitute 33% of those populations, with a ratio of two older people for every child under the age of 15.

"The whole social and economic structure of those countries will have to change to one that is geared toward the elderly," says Zlotnick. "Will it still be valid to stop working at 60? What about health care? What will happen to family relationships when people have fewer relatives and no siblings and when there are more elderly relatives with few younger people to provide social support?"

Mr Joseph Chamie, director of the UN Population Division, adds that all sorts of products and services will have to change to meet the needs of a population with a greater ratio of older to younger people. "Shoes, clothing, bathroom accessories will all change. Classroom and maternity wards will shrink in size and geriatric wards will increase. Voting patterns will be affected." We could even see changes in creativity, he says. "There may be changes in art, literature, and music, with fewer young people in relation to the proportion of older people."

Although the 39 countries will probably see declines in population, overall, the total population of all of more developed regions, currently at 1.2 billion, is not expected to change significantly by 2050. And the declines will not do much to offset the expected growth in the developing regions, which are predicted to expand from a current 4.9 billion to 8.2 billion, accounting for the bulk of the predicted total world population increase.

Updated versions of the UN report, *World Population Prospects*, have been issued every few years since 1950. One of the earliest reports, in 1953, predicted that the world's population would reach 6.2 billion in 2000, vs the present actual number of 6.1 billion. For further information, consult *World Population Prospects, The 2000 Revisions, Highlights*, at www.un.org/esa/population/unpop.htm. ■

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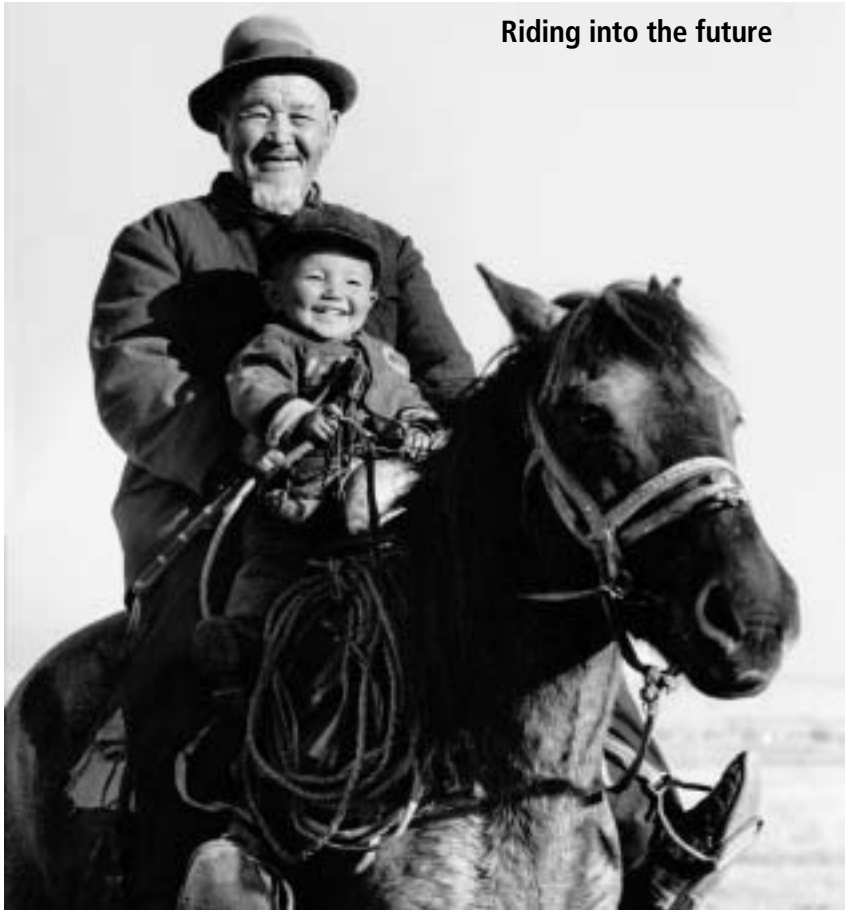
Dwindling populations

Country or territory	% decline by 2050
Estonia	46.1
Bulgaria	43.0
Ukraine	39.6
Georgia	38.8
Guyana	33.7
Russian Federation	28.3
Latvia	28.0
Italy	25.3
Hungary	24.9
Slovenia	23.2
Switzerland	21.8
Spain	21.6
Austria	20.1
Romania	19.1
Lithuania	19.1
Belarus	18.5
Czech Republic	17.9
Channel Islands	17.2
Armenia	16.8
Republic of Moldova	16.7
Greece	15.3
Yugoslavia	14.4
Japan	14.1
Germany	13.7
Poland	13.6
Slovakia	13.4
Bosnia and Herzegovina	13.0
Sweden	12.1
Croatia	10.2
Portugal	10.1
Finland	9.3
Former Yugoslav Republic of Macedonia	6.9
Belgium	6.5
Kazakhstan	5.4
Denmark	4.5
Cuba	3.9
Barbados	1.7
United Kingdom	0.8
Netherlands	0.1
Average	**17.7**

Source: UN Population Division



UNICEF/Roger Lemoyne

... but by 2050 there will be two old people per child in many developed countries.