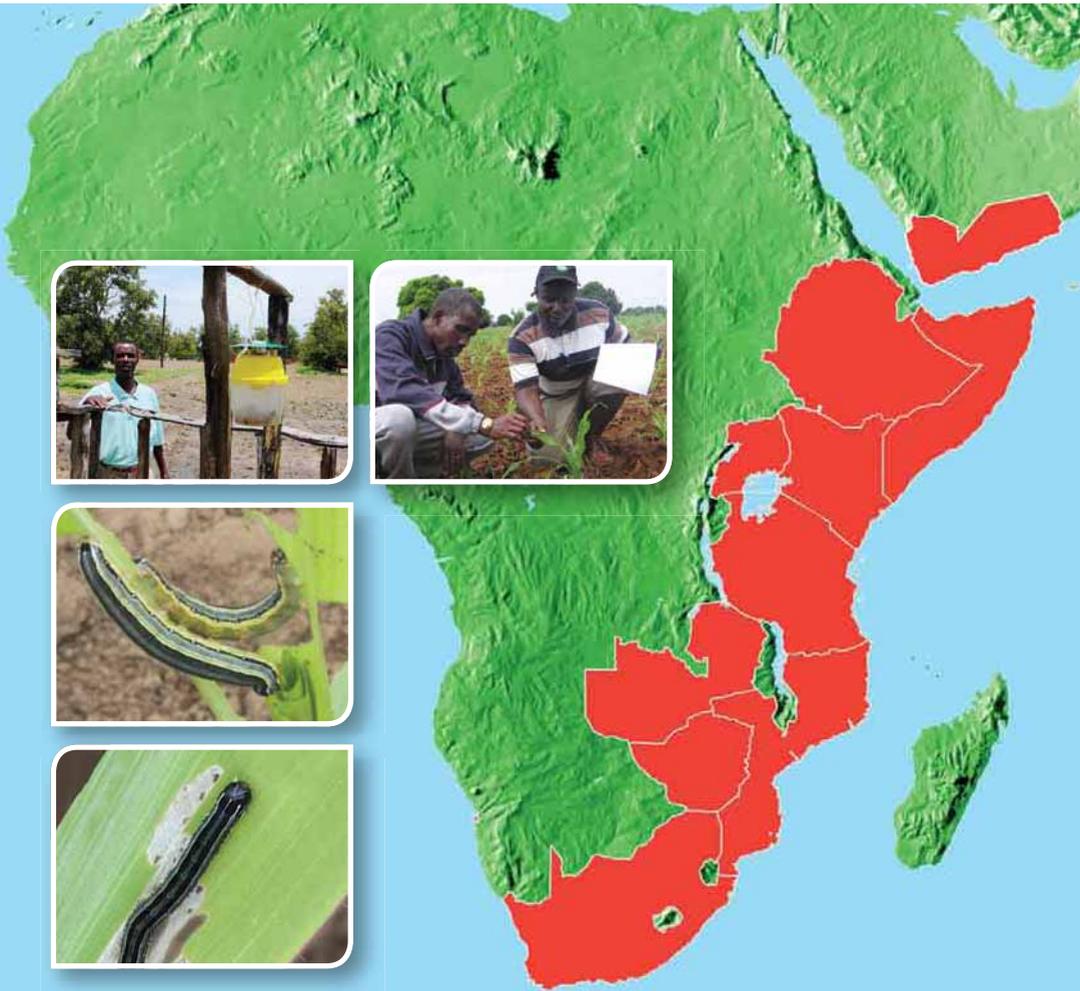


NPV: A New Biological Control for Armyworm in Africa



United Republic of Tanzania
Ministry of Agriculture and
Food Security



The African armyworm is the caterpillar of the moth *Spodoptera exempta* and is a major crop pest in Eastern Africa. Its annual outbreaks frequently escalate into major plagues that can spread across much of the region, causing major damage to cereal crops and pasture. These plagues start in well-known primary outbreak areas of Tanzania and Kenya, but moths can travel long distances subsequently to start new outbreaks wherever the seasonal rains produce new growth of crops or pasture.



Community pheromone trap

Why is it a problem?

In major outbreak years, hundreds of thousands of hectares of grain crops can be attacked and destroyed, which has a massive impact on the food security of millions of the poorest families in Africa. Subsistence farmers, such as women growing maize on family plots, are particularly vulnerable, as they do not have access to the knowledge and tools to prevent losses. Armyworms can be killed by chemical pesticides but most

Cover image: Armyworm outbreak areas of Central and Southern Africa.

poor farmers lack access to these and in plague years local resources in a specific area are overwhelmed, leaving 70% of poor farmers without access to any protection. Armyworm control is a high priority for countries such as Tanzania, but a combination of the high cost of chemical pesticides and the unwillingness of donors to support the wide-scale use of chemicals, due to their environmental impact, has resulted in increasing failure to effectively control this pest.

What is NPV?

NPV is a naturally present disease that kills armyworm and helps control its outbreaks. The NPV disease is caused by an insect virus that occurs naturally in Africa. Each armyworm killed by NPV can contain 2,000 million new infective particles, each capable of infecting another armyworm. Thus, each insect killed by NPV can act as a new source of NPV to spread the disease. However, while NPV can destroy outbreaks once it has established in the armyworm population, in most years the NPV appears too late in the outbreak cycle to prevent serious armyworm damage.



Armyworm killed by NPV. Dead insects can be seen hanging from plants

NPV development in Tanzania

While NPV can kill armyworm on a large scale, it naturally spreads too slowly to stop outbreaks of armyworms attacking and damaging crops. Work is now under way to evaluate spraying outbreaks of armyworm with NPV in Tanzania to see if it can be used to control armyworm without the use of expensive and risky chemical insecticides. The trials of NPV applied by both ground spraying and aerial application have shown that spraying NPV on to armyworm outbreaks can kill off armyworm just as effectively as chemical insecticides. NPV takes longer to kill than chemical insecticides, three to five days, but infected armyworms stop feeding before they actually die, preventing serious crop damage. NPV can be used just like a normal insecticide and requires no special equipment.

Is NPV safe to us?

Yes. NPV only infects the armyworm and cannot harm man, domestic animals, plants or even other insects. An international report by the Organisation for Economic Co-operation and Development concluded that NPV use is safe and does not cause any health hazard. A number of different NPVs have already been developed to control other pests and have been adopted for wide-scale use as safe and effective biological pesticides in Europe, North America and Asia.

NPV production

NPV can be used to create more NPV simply by infecting armyworms and allowing the disease to multiply. Armyworm outbreaks in low-value pasture are inoculated by spraying with NPV. The disease is then allowed to develop naturally and this quickly produces dense masses of dead insects that are full of new



Ground application of NPV

infective NPV particles. The dead insects can then be collected and crushed to release NPV, which can be used to spray more outbreaks. In this way, NPV can be produced much more cheaply than chemical insecticide. NPV produced in one year can be cheaply processed and stored so that it is available for the next year. This approach can provide a new, safe control method for armyworm that can be produced and used in Tanzania.

This improved approach to armyworm control is closely linked to better ways of predicting when and where there will be outbreaks. Communities can now use pheromone traps that attract male armyworm moths using the artificial scent of mating female armyworms. The catches of armyworm in these traps are used to forecast armyworm outbreaks at a local level and alert farmers much faster to the need for control.



What is needed next?

So far, this approach has only been developed on a pilot scale as a research project in Tanzania. The Research Into Use programme, run by the UK's Department for International Development, has recently funded the building of a pilot production laboratory for NPV led by Eco Agri Consultancy Services Ltd in Tanzania. However, to scale-up production of the virus to allow both farmers and government pest control services to evaluate it on a national scale in Tanzania further funding of £1.5 million would be needed. Adopting this control for armyworm in a country such as Tanzania would help secure the food of around 30 million Tanzanians. There is also strong interest from other countries in the region to evaluate NPV and adopt its use in place of the currently used chemical insecticides.

Early intervention to prevent the spread of armyworm outbreaks from Tanzania to

neighbouring countries could also reduce the armyworm threat to free a vast swathe of sub-Saharan Africa. Research to scientifically validate this strategic approach is already under way by a consortium involving partners in both the UK (Natural Resources Institute and Lancaster University) and Tanzania (Eco Agri Consultancy Services Ltd, Sokoine University of Agriculture and Pest Control Services of the Tanzanian Ministry of Agriculture and Food Security). This is funded by the UK's Biotechnology and Biological Sciences Research Council and Department for International Development (DFID).



Aerial spraying of NPV

For further information please contact:

- **David Grzywacz**
Natural Resources Institute
E-mail: d.grzywacz@gre.ac.uk
- **Wilfred Mushobozi**
Eco Agri Consultancy Services Ltd,
Tanzania
E-mail: info@ecoagriconsult.com
- **Ken Wilson**
Lancaster University
E-mail: ken.wilson@lancaster.ac.uk





UNIVERSITY
of
GREENWICH

For more information, please contact:

**University of Greenwich
Natural Resources Institute**

Medway Campus
Central Avenue
Chatham Maritime
Kent ME4 4TB

Tel: +44 (0)1634 880088

Fax: +44 (0)1634 883386

E-mail: nri@gre.ac.uk

Website: www.nri.org



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