

Pesticidal Plant Research and Capacity Building at NRI

The management and control of insect pests is arguably the most important component of crop production in Africa. Although commercial insecticides are usually effective, there are constraints to their use, especially for poor small-scale farmers. Their availability may be limited in rural areas and their effectiveness may be reduced by adulterated or inappropriately applied products. Pesticide resistance and incorrect application by ill-informed farmers leads to poor efficacy and further resistance. Surveys with rural farmers highlight these problems, and along with health and safety fears, lead to many farmers avoiding commercial products.

Pesticidal plants have been used by African farmers for generations and are of importance to poor, small-scale farmers for effective, low-cost pest control. Plant materials are perceived as safe alternatives to synthetic pesticides, and farmers recognise that pesticidal plants are a known quantity that cannot be adulterated. However, their use can have associated health risks. For example, *Tephrosia vogelii* is traditionally used as a fish poison and contains the known toxin rotenone which has acute and chronic toxic effects in humans. Its efficacy in the laboratory against stored grain beetles has been evaluated and this work may contribute to extension programmes that promote the use of *Tephrosia vogelii* for on-farm stored grain protection. This seems, at best, ill-advised as the toxin may be ingested with the food grain.

Recent research by NRI in Africa has shown that the use of plant materials is often constrained by a lack of knowledge, which may be limited geographically, generationally or ethnically. Although pesticidal plants are a relevant pest management technology, their use is under threat by a stagnating knowledge base that can not keep up with contemporary health, safety and reliability directives. If improved, pesticidal plants can enable poor farmers to reduce their insect pest problems. NRI scientists have been working in collaboration with African scientists to optimise the way pesticidal plants are used, understanding plant chemistry, and the best ways of harvesting and processing plant materials to maximise their efficacy and sustainable use. More than 10 years of research in Ghana led to the identification of approximately 20 highly effective plant species that were indigenously used for pest control. Together with Ghanaian scientists and government extensionists, knowledge about plant chemistry, mode of action and application rates was collected and evaluated through field and on-farm trials. Of specific concern was whether pesticidal plants were safe if accidentally ingested by people, particularly in the context of using them to treat stored grain.

A new project led by NRI, the SAPP project, is investigating pesticidal plants from the Caesalpinoid woodlands of southern Africa (e.g. mopane and miombo). Together with scientists from Zambia, Zimbabwe and Malawi, the project aims to increase the wealth of small-scale farmers through sustainable pesticidal plant use. The project will strengthen the market potential for pesticidal plants while promoting the conservation of habitat diversity across the region. This project is funded through the Competitive Regional Agricultural Research Fund (CRARF) as part of the Implementation and Coordination of Agricultural Research and Training (ICART) Programme in the Southern African Development Community. A major objective of the ICART programme is to strengthen the capacity of agricultural scientists to deliver research and technology that can meet the needs of small rural farmers. The experience of NRI will be used to improve the capacity of agricultural researchers to investigate the knowledge gaps that currently restrict the promotion of pesticidal plants.

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See also:

The SAPP project website <http://www.nri.org/sapp/>

Belmain, S.R. and Stevenson, P.C. (2001) [Ethnobotanicals in Ghana: reviving and modernising age-old farmer practice](#). *Pesticide Outlook* 12, 233-238.

Belmain, S.R., Neal, G E., Ray, D.E. and Golob, P. (2001) [Insecticidal and vertebrate toxicity associated with ethnobotanicals used as post-harvest protectants in Ghana](#). *Food and Chemical Toxicology*. 39(3):287-291.



NGO and government agricultural extension staff learning how to safely and sustainably promote pesticidal plants.



Farmers consider many factors when choosing pesticidal plants. Increasingly availability is more important than efficacy as many natural habitats become degraded.



Setting up field and farm trials allows pesticidal plants to be comparatively evaluated under 'semi-natural' conditions, in this case using traditional pots commonly used for storing cowpeas.