# Weaver ants help farmers to capture organic markets

*Weaver ants are predatory insects which kill key pests of many tree crops effectively decreasing the need to use pesticides.* ***Paul Van Mele*** *and* ***Jean-François Vayssières*** *describe how these fascinating insects have been husbanded effectively in Asia to manage pests of citrus and cashew. Their use has recently been extended into Africa in organic cashew, mango and cocoa production. The authors indicate how the expansion of weaver ant husbandry can be encouraged.*

The remarkable weaver ants *Oecophylla* are generalist predators, patrolling trees continuously on the look out for prey. They effectively control a wide range of pests including beetles, sap-sucking bugs, caterpillars, fruit flies and thrips on many tree crops such as citrus, cashew, mango, coconut, oil palm, cocoa and lychee.

Managing and optimizing the benefits of weaver ants is referred to as weaver ant husbandry. It involves obtaining and establishing ant colonies, providing food and refuge for them, placing rope bridges between trees containing nests of the same colony, and protecting established colonies from competing ant species. It is also essential to avoid pesticide use as much as possible. Some other pests, such as mealybugs and scale insects, are tended by weaver ants, and so, may have to be controlled by soft chemicals or other means.

There are two species which are native to different parts of the world; the Asian weaver ant *O. smaragdina* is widely distributed in south-east Asian countries, south pacific islands and northern Australia, whereas *O. longinoda* is distributed in tropical Africa.

Weaver ants are particularly suitable for developing countries where fruit trees are rarely monitored for pests and pest management is hampered by tall tree size and insufficient farmer knowledge. However, farmers often have negative attitudes towards ants, which may be re-enforced by researchers, extension agents and pesticide dealers, and need to be trained that some ants are beneficial. The challenges for research and extension differ from crop to crop and from country to country.

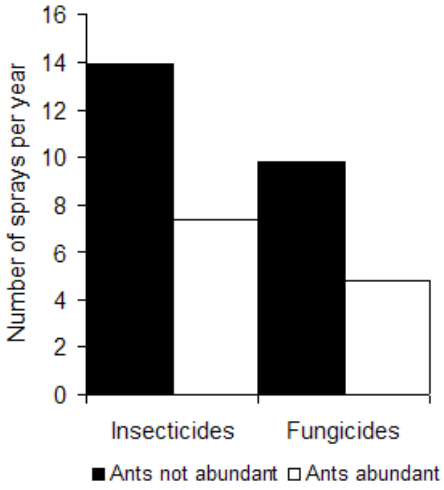
## Weaver ants in citrus

In China and Vietnam weaver ant husbandry is a centuries-old tradition, however, scientific research on ants only began relatively recently. In the 1980s in China, following problems of insecticide resistance[1], research was initiated on the use of ants to control citrus pests. In the early 1990s similar research was initiated in Vietnam[2].

*The weaver ant* Oecophylla *effectively controls a wide range of pests in tree crops. To increase their efficiency, ropes can be attached between trees containing ant nests of the same colony.*

*Photo: Paul Van Mele*

**Figure 1. Impact of weaver ant on pesticide use, Vietnam[3].**




A survey in 1998 showed that mandarin farmers in the Mekong Delta of Vietnam applied only half as much insecticides and fungicides when *O. smaragdina* was present, compared to those without weaver ants in their orchard (Figure 1). However, despite these benefits pesticide use increased throughout the 1990s, endangering the sustainability of the system[3]. No recent data are available, but national and international efforts may have reversed the trend of unnecessary pesticide use, which mainly targeted citrus leafminers and mites (both secondary pests)[4].

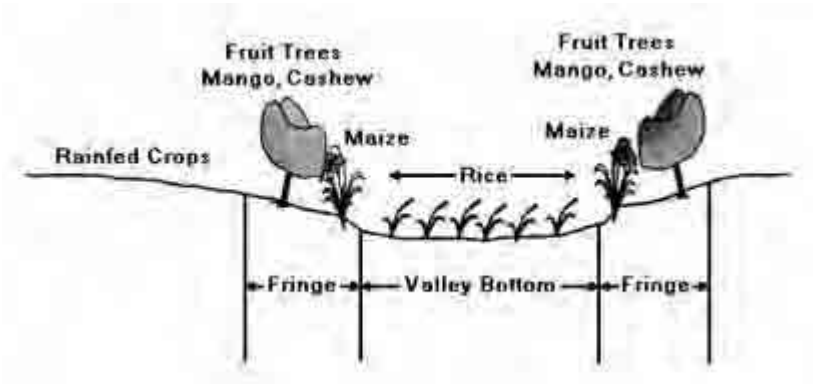
For the past 15 years the recently retired Professor Nguyen Thi Thu Cuc from Cantho University, Vietnam, has encouraged and supported studies on weaver ants. In 2004, her research group received the Golden Rice Ear, a prestigious national award, for its contribution to *Oecophylla* research. Her former students now work in various research institutes and universities. Funded by the provincial governments and foreign donors, they frequently train farmers on the use of *Oecophylla* in citrus (*Citrus* spp.), mango (*Mangifera indica*) and cashew (*Anacardium occidentale*).

Still, continuous efforts are needed to fully establish weaver ant husbandry in the curriculum of the national extension system and to counterbalance constant pressure from the pesticide lobby. Adherence to strict regulations on crop pesticide residues in order to comply with the Global Partnership for Safe and Sustainable Agriculture (EurepGAP) is giving farmer organizations incentives to reduce pesticide use and optimize use of weaver ants in biological crop protection.

## Cashew in a nutshell

Research on the potential of weaver ants in cashew took off in Australia at about the same time as the work on citrus in

**Figure 2. Typical inland valley in West Africa, with mango and cashew grown on the fringes, and rice in the valley bottom.**




Vietnam[5]. Initially funded by the University, Peng's research attracted industry attention. Cashew could be easily grown organically and because the nuts drop (attached to the ripe fruit) at harvest time, labourers do not have to climb trees or pick fruits and hence do not experience any nuisance from the ants who constantly patrol the trees. The practice of weaver ant husbandry is currently promoted through leaflets among Australian cashew growers, yet no evidence exists as to the adoption and diffusion of this practice.

Impressive scientific results from Australia triggered new research in other countries such as Vietnam, funded by Australian development funds. As weaver ants were already an inherent part of Vietnamese tradition, and the initiative to expand their use to cashew cultivation has full government support, Vietnamese growers may soon make significant inroads into the international organic cashew market, an easier target than the organic citrus market.

## Introducing weaver ant husbandry in Africa

Positive experiences from Asia have triggered interest in Africa. In Africa, pesticide quality and use is hardly controlled and occasionally pesticides not licensed for use on food crops (typically cotton pesticides) end up in the food chain. This endangers both the workers applying pesticides and consumers' health. Through a small grant from the Conservation, Food and Health Foundation (CFH), the author introduced weaver ant husbandry in 2006 in Guinea and Benin to help cashew and mango farmers grow tree crops without pesticides. The project is part of a concerted effort of the Inland Valley Consortium (IVC) hosted by the Africa Rice Center (WARDA) to protect the human and environmental health of the African inland valley ecosystems (Figure 2). In 2007, IVC expanded the project to include Mali and Burkina Faso.

A manual, *Ants as Friends*, has been written for extension workers and farmers to provide advice on managing tree crops without pesticides. It is now available in English, Vietnamese and Bahasa Indonesian with a French version under construction[6]. Using this manual, African farmers will be able to benefit from the experiences of their Asian colleagues, whose local innovations are presented in this book alongside user-friendly scientific information.

Both the International Institute of Tropical Agriculture (IITA) and the French Agricultural Research Centre for International Development (CIRAD) are increasingly involved in pest management programmes using weaver ants in West Africa. The first studies by IITA started in Benin in 2005 and focused on the use of *O. longinoda* in controlling mango fruit flies (see below). In the near future, applied research is planned for Burkina Faso. CIRAD has carried out some research on the relationships between weaver ants and cocoa pests. Both IITA and CIRAD are building a strong collaboration with WARDA, under a regional approach, for preserving, developing and improving the control of pests in horticultural crops by this effective, endemic natural enemy.

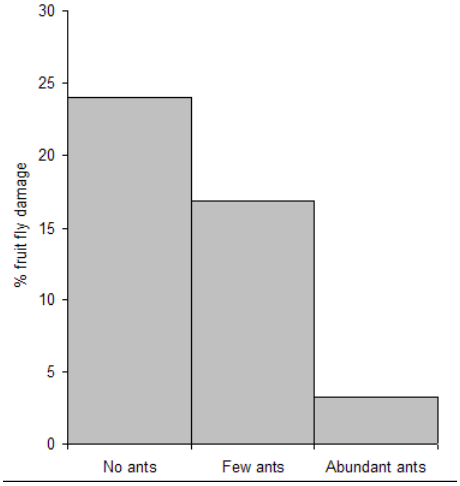
## African organic mangos in European supermarkets

One of the most serious problems for African fruit growers are fruit flies. These are quarantine pests in many parts of the world, including the European Union and the United States of America. For quarantaine reasons the latter currently prohibits imports of West African mangos. Apart from export restrictions, of the 1.9 million tonnes of mangos produced in Africa annually, about 40% is lost due to damage caused by fruit flies[7]. Farmers often use pesticides to control the fruit flies with limited effect. Recent research from Benin shows that abundant weaver ant populations can drastically reduce damage from fruit flies (Figure 3).

Meanwhile, the Food and Agriculture Organisation of the United Nations (FAO) is supporting West African mango growers and exporters to capture organic markets in Europe. One aspect of this entails the training of farmers. To expand their farmer field school (FFS) curriculum, WARDA assists in the development of discovery learning exercises to optimize the use of weaver ants

*African farmers protect their fruit crops in various ways, but against fruit fly attacks the weaver ant may offer the best solution.* *Photo: Paul Van Mele*

**Figure 3. Effect of weaver ants on fruit fly on mangos in six orchards near Parakou, Benin, 2005.**




in mango orchards in Burkina Faso. There are also plans for 2007 to train trainers who will be able to pass their knowledge on to larger numbers of farmers.

African farmers protect fruit crops in various ways, but the weaver ant may be most effective against fruit fly attacks.

## Organic cocoa

A recent drop in world cocoa prices and increased costs of insecticides triggered a renewed interest in research on *Oecophylla*, to help farmers capture niche markets for organic cocoa. Although researchers in Ghana initially objected to the idea, farmers of the local agricultural research committees insisted in exploring the potential of *Oecophylla* as a solution to their pest problems.

The results showed that weaver ants were only effective against capsids when they were present at high abundance. However, botanical insectides, such as neem (*Azadirachta indica*), were able to effectively complement such biological control. These results were obtained through the Convergence of Science (COS) programme of Wageningen University, the Netherlands. Strengthening such links and sustaining support for farmer training programs will be challenges for the future.

## Future prospects

More research will be needed to test the effectiveness of weaver ants in controlling major pests in multiple contexts, crops and agroecosystems across Africa. Emerging markets for organic and sustainably-managed fruit, nut and timber products should help to boost investment in weaver ants. For sure, research and development activities will be most effective if embedded in programmes supporting the market.

Farmer awareness programmes should be developed, making use of mass media. Ways in which scientists can facilitate learning processes will depend by and large on the knowledge of different players in the supply chain[8]. Farmer field schools can be further strengthened. As some biological and ecological principles may be difficult to observe in the field, the potential of farmer educational videos to trigger collective action should be explored. Short clips in various formats could equally be prepared to enhance learning among European consumers.

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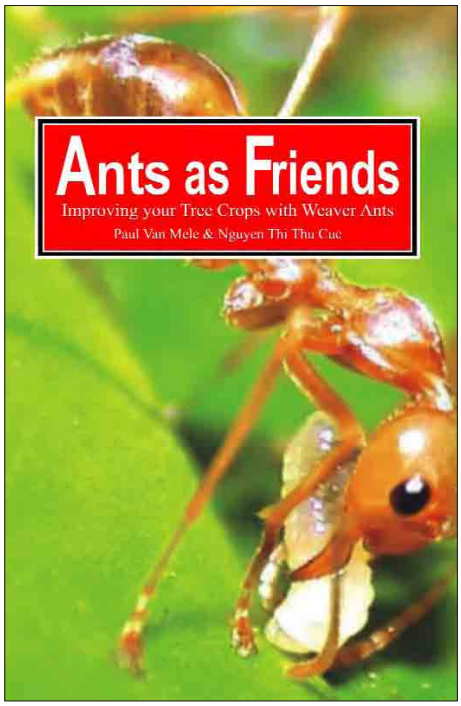


*Ants as Friends - Improving your Tree Crops with Weaver Ants. Paul Van Mele and Nguyen Thi Thu Cuc. (2nd ed) 2007. Africa Rice Center (WARDA), Cotonou, Benin and CABI Bioscience, Egham, UK.*

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# *French court recognises pesticides as cause of Parkinson's*

In October 2006, a court in Bourges, France, recognized Parkinson's Disease as an occupational disease, following a complaint from a retired agricultural worker suffering from the disease since 1997. It is the first time such a decision has been taken by a court, since Parkinson's is not on the official list of diseases considered to have an occupational origin.

Although the decision will not influence other court cases, it has serious consequences for employers who can no longer ignore the importance of communicating and preventing the risks of neurotoxic pesticides. Jean-Luc Dupupet, doctor from Caisse Centrale from Mutualité Sociale Agricole claims that exposure to neurotoxic pesticides doubles the risk of contracting Parkinson's. He supports his claim citing numerous scientific studies recently published. An epidemiological study conducted in France between 1999 and 2001 entitled 'Terre' concludes that the risk of developing Parkinson's is multiplied by 1.9 for those exposed to pesticide and for agriculture workers. A meta-review of 19 studies of the disease concluded that the risk of developing Parkinson's is multiplied by 1.9 among people with professional exposure to pesticides. And finally, an American study conducted by the team of Alberto Ascherio from Harvard following a population of 143,325 people for several years showed that exposure to pesticides increases the risk of contracting Parkinson's by 1.7.

*http://www.juragricole.com, 15 December 2006*