



N°= 5

## The use of weaver ants in fruit fly pest control



### Background

The fruit industry in Africa is confronted with the problem of fruit flies. Among the numerous species that attack the mango, a new invasive species, *Bactrocera invadens*, is causing particularly extensive damage compared to the native species. It possesses a number of advantages such as good flying skills and competitive demographic parameters which allow it to re-infest orchards relatively quickly. Making more efficient use of natural means of pest control can be of great benefit to the planters. When weaver ants, *Oecophylla longinoda*, are highly abundant in an orchard, damage incurred by fruit flies is considerably reduced (Van Mele et al., 2007).

**Key point:** The use of *Oecophylla* colonies is well-suited for perennial cropping systems in sub-Saharan Africa, because they are efficient, constantly available, widespread and self-regenerating.

### Main objective

Practical information about the use of weaver ants in fruit fly pest control should be made available to all those involved in the fruit industry, at every level (particularly local official producers, pickers and rural advisors).

### Targeted fruit fly species

*Ceratitis* spp., *Bactrocera* spp.

### Tree crops

Mango (Anacardiaceae), Citrus (Rutaceae), cashew (Anacardiaceae).



**Photo 1:** Weaver ant nest

## ANT ECOLOGY AND BEHAVIOUR

### 1. Weaver ant colony organisation

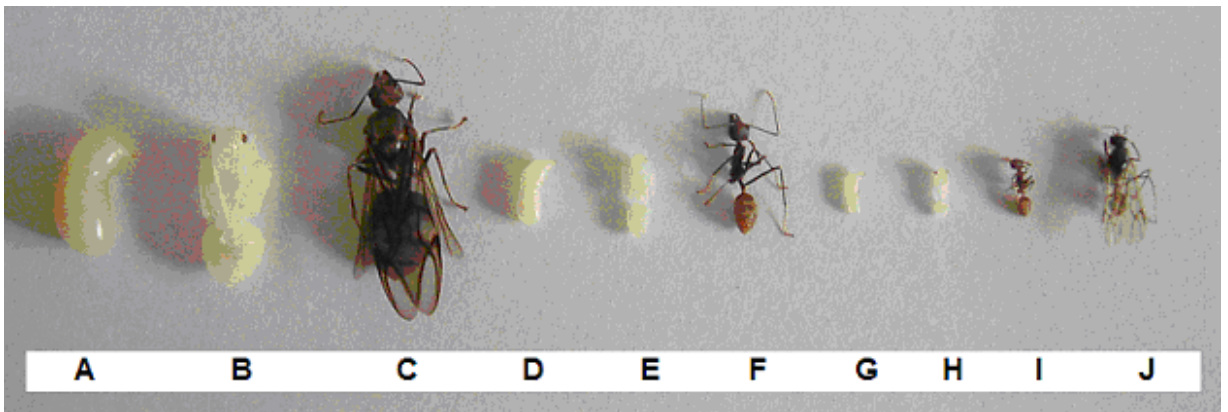
- Like most other ant species, weaver ants live in communities in many different nests (**Photo 1**) where tasks are divided up among the members.
- The members of a colony live in numerous nests established in several trees. They patrol and hunt on trees but also on areas of several hundred square metres around.
- The members of a colony all know and cooperate with each other in their adopted territory.
- Different life stages and forms of weaver ant can be distinguished in a colony (**Photo 2**):



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- o A **queen** in a nest (during the dry season) or several winged queens in several nests (during the rainy season). The queen is big, has a large abdomen and produces eggs. Winged at first, she loses her wings after mating.
- o The **males**, smaller than the queens, have a blackish coloured body. They are winged and their sole role is to mate with the queen. They die after mating.
- o The **small worker ants** often remain inside the nest, administering to the needs of the hatch and other domestic tasks.
- o The **large worker ants** are the largest group in the colony and are responsible for several activities (building nests, defending them, collecting food).



**Photo 2:** Different life stages and forms of weaver ants. **A** – queen larva; **B** – queen pupa; **C** – winged queen; **D** – male or large worker larva; **E** – male or large worker pupa; **F** – large worker; **G** – small worker larva; **H** – small worker pupa; **I** – small worker; **J** – male.

### 2. Favourable conditions

- Worker ants prefer an environment with abundant rainfall and luxuriant vegetation.
- To build their nests, they prefer trees with large supple leaves, or alternatively trees with small but abundant leaves.

### 3. Diet

- Oecophylla ants are predators which feed on a wide range of insects and in particular on crop pests such as fruit fly larvae (**Photo 3**) or more rarely on adults (**Photo 3 bis**).
- They also eat sugary substances that they gather from plant nectar, or from scale insect secretions (**Photo 4**).



**Photo 3**



**Photo 3 bis**

**Photo 4**

Scale insects are protected by the weaver ants, since they produce sugary substances that are essential to the diet of the ants. Only a small proportion of the fruit produced by the mango tree is colonised by the scale insects. And their presence does not cause any internal damage to the fruit pulp; after washing, few traces subsist on the skin. The drawbacks linked to scale insects on the fruit are nothing compared to the services rendered by the untiring weaver ant.



### THE ROLE OF ANTS IN COPING WITH PESTS AND IMPROVING ORCHARD PRODUCTION

#### 1. Protecting against fruit flies

The presence of weaver ants in mango or citrus fruit orchards considerably reduces the damage caused by fruit flies :

- o Predatory behaviour in relation to fruit fly larvae reduces the population of these pests (**Photo 3**).
- o A repulsing mechanism or chemical reaction (pheromones) apparently prevents the females from laying eggs.

#### 2. Chasing away snakes and thieves

In addition to insects, the weaver ants attack and/or deter other types of pests.

In Benin, some planters have introduced weaver ants into their orchards to protect their mango trees from thieves.

#### 3. Improving the quality and production of fruit

According to some fruit pickers, the fruit from trees harbouring weaver ants keep longer and are more sugary. Likewise, Asian producers have noticed that citrus fruit trees harbouring ants produce fruit that is more juicy and shiny.

Note: do not forget that Asian growers have used weaver ants to protect their citrus crops for over 2000 years. It is the most ancient record of biological control.



### RECOMMENDATIONS FOR INTRODUCING NESTS OR MAINTAINING EXISTING ONES IN ORCHARDS

#### 1. Maintain a favourable environment

- Keep the old trees that are around the edge and inside the orchard.
- Eliminate any hostile ants (black ants...).
- Disturbing the friendly ants by spraying toxic chemicals must be avoided and, of course, fires under the trees must be prevented.

#### 2. Collect weaver ant nests to create new colonies

- Collect nests when ants are abundant (rainy season), and when a large number of queens are present inside the nests.
- The nests must belong to the same colony, i.e. preferably nests from the same tree in order to avoid conflict between the ants.
- Choose large trees with young foliage and a great number of flexible leaves.
- Place the bag containing about 5 nests from the same colony on the lower branches of a tree and leave it open.
- As soon as they leave the bag, the ants will rapidly begin building new nests.

#### 3. Maintain the nests and spread the ants around the orchard

- When the ants begin building new nests on a tree, food can be provided (chicken or fish intestines) so that they do not move away.
- During the rainy season, the ants do not like descending the trees to find food. They tend to move from one tree to another using the branches.
- When young trees do not touch each other, and when ants become abundant, they need to be helped to colonise neighbouring trees, by putting wooden sticks or pieces of string between the trees (**Photo 5**). Avoid linking trees that are colonised by two different colonies.



**Photo 5:** Ants on a piece of string linking two trees.

#### 4. Avoid ant bites

To avoid being bitten during the harvest :

- o Use picking poles for fruit collection.
- o Climb into the trees during the hottest part of the day when the ants are resting.
- o Throw wood ash on the branch on which you are standing in order to repulse the ants.

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**For complementary information** on weaver ants see also the book: 'Ants as friends' by P. van Mele and N.T.T. Cuc.