

Observations and farmer experimentation with predatory ants

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Mr. Nguyen Van Cung cultivates one hectare of organic citrus in Giong Trom district of Ben Tre province in the Mekong Delta of Vietnam. He has nearly 40 years of experience with biological pest control. Mr. Cung fears that a lot of his experience will be lost because the new generation of farmers spends less time observing and 'experiencing' their crop. Whilst on a visit to his orchard, Mr. Cung shared with us some of his knowledge and experiences in keeping the weaver ant *kien vang* (*Oecophylla smaragdina*).

Orchard diversity

Mr. Cung grows mainly lemon trees in his 1 ha. orchard as lemon tolerates the widely-occurring greening disease better than other citrus varieties. But we also came across trees of papaya, mandarin, king orange, pomelo, soursop (*Annona muricata*) and rose apple (*Syzygium* sp.) in his orchard. This he does to spread labour and get an income throughout the year. On an average he makes about 1000 US\$ per month.

Moreover, Mr. Cung finds the latter three fruit species particularly useful for the weaver ant, because these trees have big and flexible leaves that are ideal for building nests. The density of the trees is such that the canopies touch one another, enabling the spread of the weaver ant throughout the orchard.



Farmer Nguyen Van Cong (left) and son Phong (second left) in the family orchard. Photo: Vo The Truyen

Benefits from the weaver ant

Protects fruit crops from pests

It is known that the weaver ant is a good predator on citrus and other trees such as mango, longan, lychee, cashew and coconut palm. A fruit crop not mentioned before in publications is soursop, which does not suffer from the fruit borer due to the weaver ant.

Protects annual crops from pests

Before Mr. Cung started cultivating citrus, he helped his father on the farm. With a rope the ants were guided from the trees towards the rice nursery beds and to the fields where pulses were grown. If left undisturbed ants even made nests by stitching the leaves of the leguminous crop together. Through

experimentation they had found out that pests in these major annual crops could also be sufficiently controlled by the weaver ant that normally resides in the trees.

Deters rats

Besides insect pests, the weaver ant also attacks or deters a small type of rat that feeds on fruit in and around the orchard.

Increases mango fruit set

A major problem for mango production in the Mekong Delta is low fruit set, which is greatly improved when ants are present. Mr. Cung describes this as an indirect consequence of the ant preying on the mango flower hopper.

Improves citrus fruit quality

Mr. Cung says that mandarins grown without ants would be less sweet and juicy, and more granulous (*suong*). He also has a good citrus yield with the ants.

Provides a means of weather forecasting

The ants' behaviour helps him to predict the weather of the coming days. For instance, weaver ants sense oncoming storms. They become very active and move from the weaker to the stronger branches of the trees. This is a sign for the family to prepare for a storm.

Some observations on ant behaviour

The best time for making new nests is the beginning of the rainy season, as the trees produce new growth flushes. It is also a good time for introducing nests to new orchards as the ants are highly active. In the dry season there are more and smaller nests with a lesser number of ants per nest compared to the beginning of the rainy season when ants seem to join in larger nests.

During the cooler period of the year, from December to February, the nests are high up in the trees. At the hottest time of the year and during the rainy season from May to November, ants move to nests inside the canopy, to protect themselves from the heat and strong rains.

The Vietnamese word Mr. Cung uses to describe a colony or several nests that can live happily together without fighting is literally translated as ants 'from the same place' or settlement (*ô*). This can vary from nests in one tree at the beginning of colony establishment, to nests in one planting bed, one orchard or in neighbouring orchards. Mr. Cung's interventions to support the ants throughout the years have resulted in his colony covering more than 1 ha at present.

Weaver ant technology

Mr. Cung is often asked by colleague farmers to give advice on matters concerning the weaver ant. He was one of the first farmers who started converting paddy fields into orchards. Now, all citrus farmers of the village practice some level of ant technology. At social gatherings farmers discuss and exchange ideas about many things of their farm, including the ants.

Weaver ant colony establishment

Citrus farmers generally consider the black ant *kien hoi* a pest. Mr. Cung tells us that the black ant causes a lot of the citrus fruit to drop. He attributes this to the presence of sucking insects that are abundant when the black ant is present. As black ants and weaver ants fight each other, one of the first things before establishing a weaver ant colony is to get rid of this black ant.

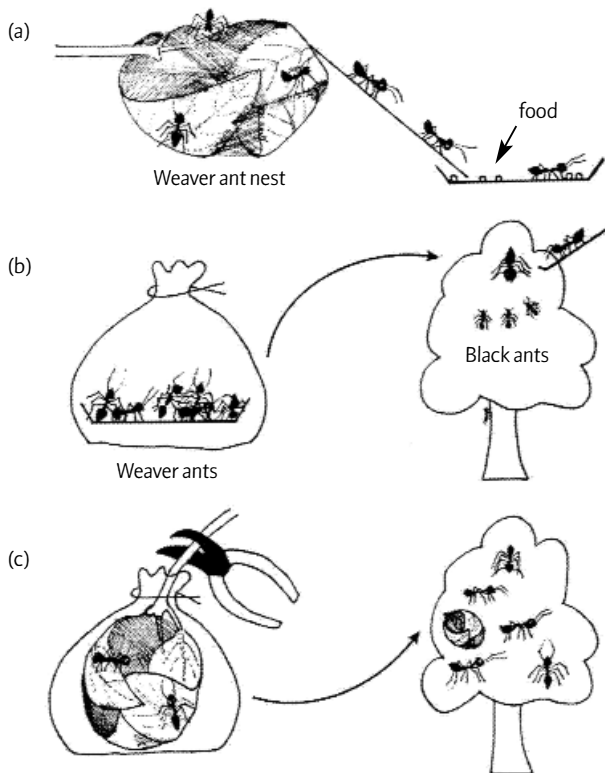


Figure 1: A good way to introduce a new weaver ant colony in case black ants are present as proposed by Mr. Cung. Drawing by Marcella Vrolijk.

Mr. Cung has developed a very successful strategy for this purpose as illustrated in figure 1.

The first step is to lure the strong soldier weaver ants by putting a rope from one of the trees with nests to a container with food such as shrimps (figure 1a). After the container is full of strong soldier ants you put a bag over it and transport it to the place where you want to establish a new colony. Once on the spot, you climb the tree all the way to the top where you then release the soldier ants (figure 1b). This approach guarantees better success than when you just release it at any other place in the tree. Once the black ants are defeated you then introduce a complete nest (figure 1c). The best time to do this is at the beginning of the rainy season (April/May) as ants are then very active.

Helping weaver ants to win from invading black ants

'To fight the black ant, you study its military strategy, and then you know how you can help the weaver ant to win the battle', Mr. Cung continues. One weaver ant can easily win from 5-6 black ants by cutting their bodies in half. However, when black ants become too numerous, the weaver ant gets tied down by the legs and finally killed. But it is not only numbers that matter.

Mr. Cung has observed that black ants sometimes attack established weaver ant colonies from several directions, simultaneously. When the weaver ants start running away, it is time to intervene so that they do not lose the battle. You have to trace down the soldier base of the black ants and cut their support line, for instance by pruning the branches along which they enter the tree. Black ants also have a kind of journalist ants or 'liaison officers' (*giao lien*) that report back to the 'base camp' (*can cu*) for more support. By cutting the line, this flow of information is also cut off.

But if the branches are bearing fruit, they cannot be pruned. Then a different intervention is required. Mr. Cung collects an 'aid force' (*luc luong ho tro*), a nest from the same weaver ant colony, and puts it directly in the base camp of the black ants. The fighting black ants in the tree are soon informed and return to their base camp. The weaver ants, which were disoriented, return and fight side by side with the ants of the aid force.

In the case of black ants attacking a newly introduced weaver ant colony, it is even possible to bring in an aid force from a different colony. This is the only time that weaver ants from different colonies do not fight each other, but join forces against a common enemy.

Mr. Cung has developed two different strategies to keep the black ant population under control. When the black ant becomes too numerous in the dry season, a rotten fish is crushed and spread over a small area of half a square metre in the orchard. This attracts many black ants, which are killed by burning the spot. In the rainy season, the black ants look for a dry place to build their nest. By hanging a bunch of dried leaves or grass in the tree, black ants are lured in and then removed and burnt.

Supplementary feeding

Mr. Cung has observed that weaver ants do not need supplementary feeding in the rainy season due to an abundance of food. He now feeds them moderately in the dry season with mainly fish and small shrimps. Although the ants can transport large pieces of food to their nest, he prefers to provide small pieces that can be carried by a single ant. The amount of food given determines for a great part the number of nests.

Reducing harm to both the weaver ant and farmer during harvest

To avoid the irritation of ant bites during harvest, Mr. Cung has developed a simple ant-friendly technique. When harvesting fruit he takes a bag of wood ash and spreads some ash on the branches he wants to climb. The ants retreat back to their nests. Once the wind or rain removes the ash from the branches, the ants return.

Conclusion

The knowledge and experience of farmers like Mr. Cung will be lost unless more efforts are undertaken to document and spread them to others.

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We invite everybody having experience with farmers making use of predatory ants to share information on this topic. Of special interest is also how other farmers have been convinced and trained in using such predators. Please contact Paul Van Mele.



Weaver ant nest in pomelo. Photo: Paul Van Mele