Biological control of the common aloe scale *Duplachionaspis exalbida* on large aloes

Ralph G Peckover

An *Aloe* showing severe infestation of scale insects. The clear area was cleaned by mice during the night.

Many a gardener and succulent collector, especially in southern Africa, will have seen that almost overnight, specimen plants of especially larger *Aloe* species become covered by white scale insects. If left in the garden without any treatment, the whole plant with all its leaves soon becomes white from almost millions of scale, and dieback of leaves results. In severe cases plants may even be lost. What then occurs in nature, as this insect has been around for millions of years and very few plants succumb to this pest in habitat?

There are two rows of various large *Aloe* species and hybrids along the avenue on my property outside Pretoria, and these need constant observation and remedial treatment to prevent losses from this scale insect, as well as the destructive aloe weevil. Over the years there have been infestations of scale, and one would grab the oil and chemical plant protection product (pyrethroid or other nasties) and spray the whole plant to kill all insect pests. Two seasons ago, it was decided to allow plants to become fully infested to observe if and what would control this pest naturally. A few plants became fully infested – would these plants succumb to the scale insect or not?

After closely observing the infested plants, the scale insect's life cycle became clear. The first stage begins as small crawlers which emerge from eggs under the protective shell of the mother and are mobile. These either crawl to a new spot near the mother or are blown by wind to new sites or to new plants, usually landing near the tips of leaves. Once at an open site, they become immobile and develop their full lifecycle at this spot. This takes around one month in summer but longer in winter. They feed from the plant through two long proboscises which are inserted permanently into the leaf tissue to draw out sap for nourishment. Droplets of sap on leaves which have been eaten clean show the location of the scale insects proboscises, due to the turgor pressure from within the leaf tissue, the remaining mouth parts act as a conduit system under pressure. This exudation persists for quite a few days before stopping. Bees and flies then eagerly consume this nutritive sap.

The position of crawlers on a leaf is quite interesting as they space themselves equidistant from one another on the leaf surface to ensure they have sufficient space to develop fully without being crowded out. A white waxy protective covering is produced from the surface of the insect and protects the insect from external conditions. The numerous white insects then give the whole leaf a whitish colour. When mature, the females then produce many eggs under this protective scale and then die.

The scale insects are food for other living creatures as well. There are the larvae as well as the adult black spotted ladybird, where both stages feed on the insects. Both stages are ferocious feeders and consume large amounts of these insects over time. The photos depict the ladybird stages as well as the controlling effect they have on the scale population.

A parasitic wasp is also involved in the control of these insects by laying an egg inside the body of the insect. This larva develops within the insect and pupates therein. What one see at a later stage is a round hole on the top of the scale, which is the exit hole for the emerging wasp. In some cases, there may be thousands of these parasitized insects on a leaf.

A strange predatory caterpillar which carries its victim's body shells on its back was observed on some aloe leaves, leaving a clean trail after eating its way through hundreds of aloe scale. The insect itself cannot easily be seen beneath its protective cover, but turned out to be the predatory larva of E*ublemma costimacula*.

All the observed predators of aloe scale do not usually clear all insects from the leaves. What then leads to the later complete recovery of the aloes without any further infestation? If one looks at the photo where the twin spot ladybird is covered with young scale crawlers, this gives a clue to this mystery. The crawlers all appear at the same time from eggs and can only live a few days without food and if no suitable site is found to settle, then they quickly die of starvation. If all settlement sites are already booked, then there will be a population crash and all crawlers die as the life cycle becomes broken.

In winter, aloe leaves do not grow out, no new surface tissue is made available for settlement, consequently no living scale insects remain. This is a good example of exponential population growth, as well as the crash in populations where there is not enough space left to continue on a finite aloe leaf area. Nature balances the populations in nature, but unfortunately not for human kind.

R G Peckover
P O Box 910-1083, Pyramid 0120
South Africa
Email:brachy@vodamail.co.za

Underside of the caterpillar.

The predatory caterpillar with its protective cover of eaten scale insects.

Closeup of the predatory larva of *Eublemma costimacula*. Here the whole body is covered with the remains of already consumed scale insects.

Area cleaned by mice feeding on the scale insects at the end of winter when food is scarce.

Area cleaned by the predatory of *Eublemma costimacula*.

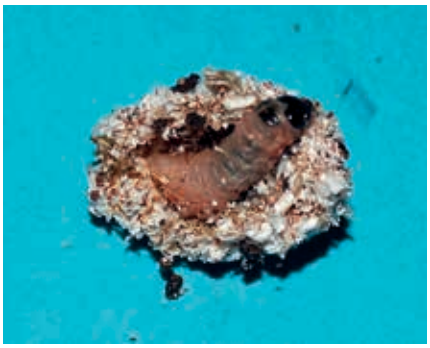
The predatory wasp larva having almost consumed the caterpillar.

The predatory moth *Eublemma costimacula* whose larvae eat through many scale insects.

The two spotted black aloe ladybird with numerous round crawler scale insects on its back, note the clear area of leaf already eaten clean by this predator.

Exit holes caused by small parasitic wasps on scale bodies.

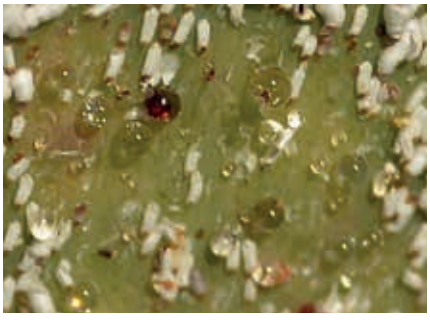
A combined shelter for three caterpillars, top one was healthy, lower one was just consumed by a predatory wasp larva, and thebottom one only a shell.



Top head view of the predatory caterpillar.

The pupal case of the two spotted aloe ladybird.

Larva of the black two spotted aloe ladybird with remains of the eaten scale insects.



Droplets of sweet plant sap exuded through the remaining mouthpart tubes of the scale insects.