

## LEAFHOPPERS AND PLANTHOPPERS

*Empoasca distinguenda* Paoli  
*Penthimiola bella* Stal  
*Epignoma natalensis* Dworakowska  
*Decipha* species (Flatidae)

### 1 PEST PROFILE

#### 1.1 Distribution and status

Leafhoppers (Cicadellidae) occur sporadically in all the citrus production areas. However, they achieve pest status most frequently in the Cape provinces, North-West Province and parts of Limpopo Province. Outbreaks have sometimes been associated with the prior use of long-residual insecticides.

Planthoppers (Flatidae) appear to be a sporadic problem only in the southern and south-eastern Cape coastal regions, apparently preferring soft citrus varieties. They do occasionally occur on isolated trees in the northern citrus areas but are not regarded as pests.

#### 1.2 Description

The adult green citrus leafhopper, *Empoasca distinguenda*, is light green while the citrus leafhopper, *Penthimiola bella*, is mottled brown. *Epignoma natalensis* is also light green but has dark central marks on the upper surface of the head and thorax. The insects look like small cicadas. They are winged and about 2 to 3 mm long. When disturbed, leafhoppers exhibit a typical crab-like lateral movement before flying. Their eggs are laid in the plant tissue and can only be exposed with the aid of a microscope. There are five nymphal instars which have the general appearance of the adult, but are physically smaller.

Two other leafhoppers belonging to the genus *Theronopus* also attack citrus foliage but do not attack the fruit and are therefore not serious pests. *P. bella* commonly feeds on green fruit in summer whereas *E. natalensis* only attacks inside fruit as it breaks colour in autumn. *E. distinguenda* also causes most damage to colouring fruit in autumn but it has been known to attack green Valencias at this time.

The planthopper *Decipha* sp. differs from

leafhoppers in that the adults have very large and broad, generally green, triangular hind wings. At rest the wings are folded roof-like against the body, often covered in a dusty layer of white wax. The adults are approximately 8 mm long. Nymphs have long curly tendrils of wax protruding from their posterior end and like the adults, are covered in wax. At first glance, immatures on twigs may be confused with mealybugs. Planthoppers appear more gregarious than leafhoppers.

#### 1.3 Infestation sites on tree

Leafhoppers feed on young foliage as well as fruit and are usually found in association with these plant organs.

Planthoppers appear to only feed on the foliage, and not on the fruit.

#### 1.4 Damage

##### 1.4.1 Symptoms

###### 1.4.1.1 Leaves

The feeding activity of leafhoppers causes young leaves to develop an undulating, crinkled appearance. Chlorotic yellow marks can also occur on the edges of leaves. In the case of heavy infestations the damage may have a detrimental impact on physiological processes in the tree, sooty mould may become problematic due to large amounts of honeydew from *P. bella* and defoliation of new growth may occur.

Planthoppers do not appear to cause any significant direct damage to the leaves. However, they are able to produce copious amounts of honeydew, resulting in the development of severe levels of sooty mould.

###### 1.4.1.2 Fruit

Leafhopper feeding on fruit results in irregular shaped oleocellosis blemishes in the rind which have a diameter of 2 to 7 mm. These blemishes can be pale or dark; both can lead to down-grading of fruit. Damage to immature fruit caused by citrus leafhopper is initially light green but some blemishes darken with age to become brown. By harvest, most marks are not

very noticeable. Green citrus leafhopper rarely damages green fruit. Damage to coloured fruit is initially pale, but most blemishes darken with age. In heavily infested orchards more than 30 blemishes have been noted per fruit. In these circumstances the packhouse cull for leafhopper damage can exceed 50%.

As with the leaves, planthoppers do not cause any significant direct damage to the fruit. However, their honeydew secretion can cause unacceptable levels of sooty mould to develop on the fruit.

#### **1.4.2 Seasonal occurrence**

Leafhoppers can be found at low numbers in citrus trees throughout the year. However, the highest population densities occur during periods of new plant growth in summer and autumn.

Planthopper problems are often not apparent before mid-summer, and as with leafhoppers, tend to peak with periods of new plant growth.

## **2 MANAGEMENT ASPECTS**

### **2.1 Infestation/Damage assessment**

#### **2.1.1 Inspection**

With the aid of regular inspection, individual growers will need to assess the threat posed by leafhoppers during the main danger period which usually commences in December for citrus leafhopper and at colour-break for the green citrus leafhopper, and continues through to the winter months. The factors which promote leafhopper attack are not well understood. A shortage of new growth following a heavy infestation may cause leafhoppers to switch to fruit. The control of infested orchard weeds during a period of limited citrus plant growth may also promote the infestation of fruit. Mowing of adjacent fields of lucerne will cause green citrus leafhoppers to move into citrus.

#### **2.1.2 Treatment threshold**

Treatment thresholds are being developed for these pests. When using yellow card traps with counting area 170 x 82 mm (approximately 3

per ha, diagonally dispersed) the threshold for the mottled brown **citrus leafhopper is in the region of 120/trap/week**. In autumn, the approximate treatment threshold for the other **two green leafhoppers is 7/trap/week**. Trap usage can be supplemented by conducting visual inspections for general presence on young leaves. Leafhoppers can be shy of habit and therefore their presence may not be immediately obvious. Shaking of branches will indicate the presence of adults by agitating them to take flight.

No treatment threshold has been set for planthoppers. However, as pest populations can rapidly build up to damaging levels, a treatment should be applied when unacceptable levels of honeydew are observed.

### **2.2 Control options**

#### **2.2.1 Biological**

Various wasp species have been identified as egg parasitoids of leafhoppers. Mymarids are probably the most common and are attracted to yellow sticky traps. All examined cases of leafhopper outbreaks have been associated with a lack of mymarid presence, indicating the importance of the parasitoids as natural enemies of leafhoppers. Apart from parasitoids, spiders are probably important natural enemies because leafhoppers can often be seen in their webs. However, due to the mobility of these pests, rapid build-up often occurs in situations where insecticidal usage cannot always be held responsible for reducing their natural enemies.

The natural enemies of planthoppers on citrus have not yet been investigated.

#### **2.2.2 Cultural**

The cultivation of leafhopper hosts such as potatoes, lucerne, cowpeas, etc. in or adjacent to citrus orchards should be avoided. Where such crops are grown near orchards, growers must remain aware of the potential danger of leafhopper infestation and regularly monitor the situation.

**2.2.3 Plant protection products**

Experimental usage of low volume (1000 l/ha) sprays of Lannate at 60 g/hl have controlled both the citrus leafhopper and the green citrus leafhopper. Mevinphos EC is effective against the citrus leafhopper at 165 ml/hl and against the green citrus leafhopper at 132 ml/hl. Neither of these treatments are registered. Mevinphos EC at 132 ml/hl as an outside cover spray has been shown to be effective against planthoppers.