CRI Cutting Edge / CRI Snykant
RESEARCH NEWS FROM CITRUS RESEARCH INTERNATIONAL
NAVORSINGSNUUS VAN CITRUS RESEARCH INTERNATIONAL

May/Mei 2012 No/Nr 139

Identification of insect larvae infesting citrus fruit

by
Sean Moore and Aruna Manrakhan
Citrus Research International

It is absolutely imperative that larvae infesting citrus fruit be correctly identified. Incorrect identification can lead to misdirected control measures in the orchard and even unjustified rejection of packed fruit. It has become apparent of late that correct identification of insect larvae infesting citrus fruit should not be taken for granted. Although there may be a number of insect larvae which theoretically could infest citrus fruit, there are four major categories which are considered to be by far the most predominant.

Fruit fly

The first instar larvae of fruit fly are translucent with pale mouthhooks. The second and third instar larvae are generally creamy white with black projecting mouthhooks and are at least 5 mm in length. Fruit fly larvae lack the sclerotised head capsule which is obvious in lepidopteran (e.g. FCM) and coleopteran (e.g. sap beetle) larvae. The body tapers to a point at the mouthparts and is truncated at the posterior. The larvae burrow into the fruit tissue. If dark larvae are found, they are dead, normally as a result of deleterious temperatures (this is usually after shipping).

Identifikasie van insek larwes wat sitrusvrugte besmet

deur
Sean Moore en Aruna Manrakhan
Citrus Research International

Dit is uiters belangrik dat larwes wat sitrusvrugte besmet korrek geïdentifiseer word. Verkeerde identifikasie kan tot verkeerde beheermaatreëls lei en selfs ongegronde afkeuring van gepakte vrugte. Dit het onlangs duidelik geword dat korrekte identifikasie van insek larwes wat sitrusvrugte besmet nie altyd die geval is nie. Alhoewel daar teoreties verskeie insek larwes is wat sitrusvrugte kan besmet, is daar vier hoof kategorië wat as die mees dominantste beskou kan word.

Vrugtevlieg

Die eerste stadium larwes van vrugtevlieg is deurskynend met vaal mondhoeke. Die tweede en derde stadium larwes is gewoonlik roomwit met swart uitsteek mondhoeke en is minstens 5 mm lank. Vrugtevlieg larwes het nie die harde kopkapsule wat in Lepidoptera (bv VKM) en Coleoptera (bv sapkewer) duidelik is nie. Die liggaam is dunner en puntagtig by die monddele en die agterend is afgestomp. Die larwes penetreer tot binne-in die vrug. As donker larwes gekry word is hulle dood, gewoonlik as gevolg van nadelige temperature (gewoonlik na verskeping).

Figure 1. Fruit fly larvae infesting a citrus fruit.
Figuur 1. Vrugtevlieg larwes wat 'n sitrusvrug besmet (Photo/Foto: P Stephen).

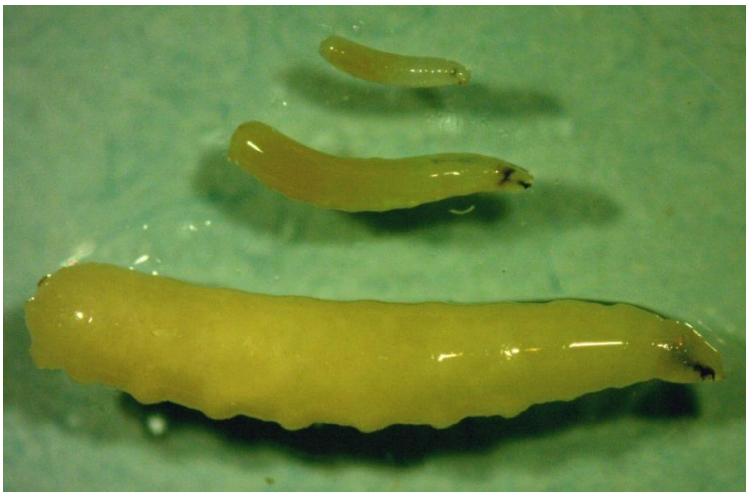

Figure 2. The three fruit fly larval instars.
Figuur 2. Die drie vrugtevlieg larwestadiums (Photo/Foto: J-H Daneel)

Vinegar fly

Vinegar fly larvae appear similar to fruit fly larvae especially the first instar fruit fly larvae. The main difference is that vinegar fly larvae lack the flat stump rear end of the fruit fly larva. Additionally, vinegar fly larvae tend to be a bit smaller (2.5 to 4.5 mm long) and are usually found in groups of several individuals, whereas fruit fly larvae often occur solitarily (but not always). Vinegar fly is not a primary pest; it will only infest fruit which is already damaged.

Asynvlieg

Asynvlieg larwes lyk baie soos vrugtevlieg larwes, veral die eerste stadium vrugtevlieg larwe. Die belangrikste verskil is dat asynvlieg larwes nie die plat afgestompte agterend van 'n vrugtevlieg larwe het nie. Boonop is asynvlieg larwes gewoonlik 'n bietjie kleiner (2.5 tot 4.5 mm lengte) en is gewoonlik in groepe van verskeie individue, waar vrugtevlieg larwes gewoonlik (maar nie altyd nie) enkel voorkom. Asynvlieg is nie 'n primêre plaag nie; dit sal net vrugte besmet wat alreeds beskadig is.

Figure 3. Vinegar fly and fruit fly larva.
Figuur 3. Asynvlieglarwe en vrugtevlieglarwe (Photo/Foto: P Stephen).

CRI Cutting Edge / CRI Snykant
RESEARCH NEWS FROM CITRUS RESEARCH INTERNATIONAL
NAVORSINGSNUUS VAN CITRUS RESEARCH INTERNATIONAL

May/Mei 2012 No/Nr 139

False codling moth

The neonate (just hatched) larva is white with a black head capsule and measures about 1.4 mm in length. As they age, larvae darken through off-white and finally have a pink body colour. The mature larva is 15 – 2- mm long.

Valskodlingmot

Die pasuitgebroeide larwe is wit met 'n swart kopkapsule en is omtrent 1.4 mm lank. Soos hulle ouer word, word die larwes donkerder tot af-wit en uiteindelik pienk. Die volwasse larwe is 15 - 20 mm lank.

Figure 4. False codling moth larvae – 1st (neonate) to 5th (mature) instars.
Figuur 4. Valskodlingmot larwe – 1ste (pasuitgebroeide) tot 5de (volgroeide) stadiums.
(Photo/Foto: JH Hofmeyr).

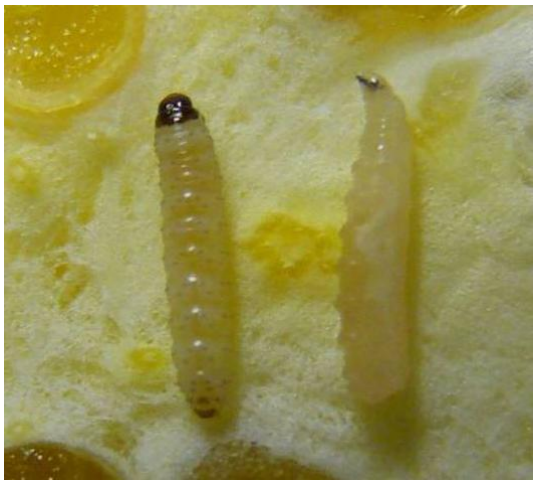

Figure 5. Young false codling moth larva on the left with a black head capsule compared with a fruit fly larva.
Figuur 5. Jong valskodlingmot larwe (links) met swart kopkapsule in vergelyking met 'n vrugtevlieg larwe.
(Photo/Foto: JH Hofmeyr)

CRI Cutting Edge / CRI Snykant
RESEARCH NEWS FROM CITRUS RESEARCH INTERNATIONAL
NAVORSINGSNUUS VAN CITRUS RESEARCH INTERNATIONAL

May/Mei 2012 No/Nr 139

Sap beetle

Nitidulid or sap beetles, like vinegar flies, are secondary pests or scavengers. They cannot infest healthy fruit. Like FCM they have a dark sclerotised head capsule. However, the most obvious features which enable differentiation from the former is the sap beetle's speckled body, bifurcate (forked) tail and total absence of any pink colouration.

If there is any uncertainty about identification of larvae infesting citrus fruit, CRI experts should be consulted. This should be done firstly by either emailing photos or posting them on CRInet. If it is still not possible to provide a certain identification, the CRI expert will inform you whether the larvae should be preserved in alcohol (preferably 70% alcohol) and sent to CRI, or if the larvae should be sent live. Particularly if larvae appear to be unusual, live specimens would be preferable (possibly as infested fruit). The chances for obtaining an accurate identification are improved by rearing the larva to adulthood.

Sapkewer

Nitidulidae of sapkewers, soos asynvlieë, is sekondêre plae of opruimers. Hulle kan nie gesonde vrugte besmet nie. Soos VKM het hulle 'n donker harde kopkapsule. Die mees duidelikste verskil tussen sapkewers en VKM, is die sapkewer se gespikkelde liggaam en gevurkte stert en die totale afwesigheid van enige pienk kleur.

Indien enige onsekerheid bestaan oor die identifikasie van 'n larwe wat 'n sitrusvrug besmet, moet CRI kundiges geraadpleeg word. Hierdie moet gedoen word deur eerstens 'n foto per e-pos te stuur of om dit op die CRI-net te sit. Indien dit nie moontlik is om op so 'n manier 'n korrekte identifikasie te gee nie, sal die CRI deskundige jou inlig of die larwe in alkohol (verkieslik 70% alkohol) gepreserveer moet word en of die larwe lewendig gestuur moet word. Veral as larwes ongewoon voorkom, sal lewendige monsters verkieslik wees (waarskynlik as besmette vrugte). Die moontlikheid van 'n akkurate identifikasie word verbeter deur die larwe tot volwasendheid te teel.

Figure 6. Sap beetle larva.
Figuur 6. Sapkewer larwe (Photo/Foto: W Kirkman).