

Guide to Codling Moth Damage Identification

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Figure 1. Fruit heavily infested with codling moth are easily detected in the orchard and should not be picked.

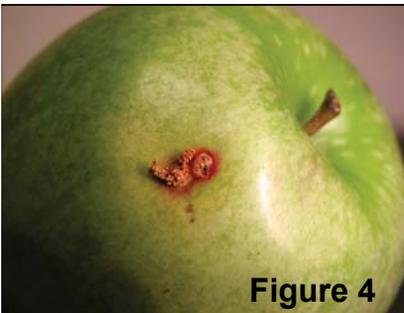


Figure 4

Introduction

Codling moth is one of the most serious pests of apples. The larva cause two types of damage: stings and deep entries. A sting is a place where a larva chews into the flesh only a short distance before either dying or turning back to re-enter at another spot (figure 2). A deep entry is a site where the larva penetrates the skin and chews down to the core to feed on the seeds (figure 3). As the larva feeds, frass is pushed out and may accumulate around the entry hole (figure 4).

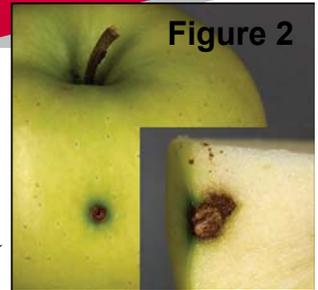


Figure 2

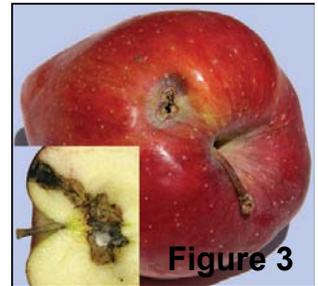


Figure 3

Identifying codling moth entries

Figures 1-4 show larval side entry points. However, larvae may also enter through the calyx or stem ends of the fruit. Entry holes in these locations may be much harder to detect. Figures 5-7 show cases where an entry hole is located at the stem end. It is easy to miss seeing these entry holes if the

view is obstructed by the stem or they are covered with debris. Holes at the stem end could easily be confused with stem rubbing and splitting so it is important to examine any suspicious fruit.



Figure 5



Figure 6



Figure 7

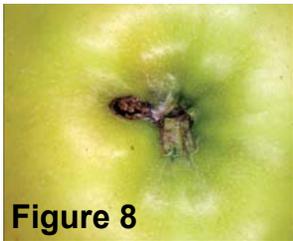


Figure 8



Figure 9

Identifying codling moth entries (cont.)

Figures 8-10 show entry holes at the calyx end of

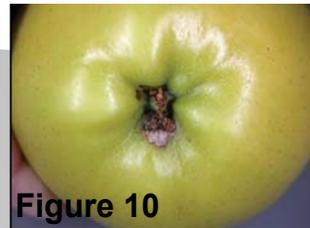


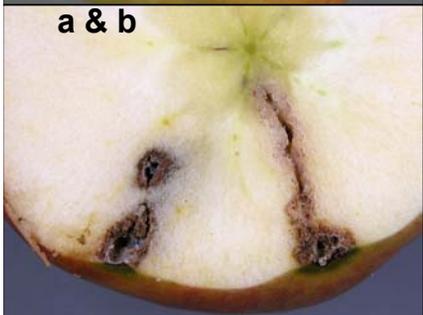
Figure 10

a & b



Figure 11

a & b



the fruit. Here CM damage could be camouflaged by residual flower parts or debris (Figures 10a & b). Once the CM larva is ready to pupate it exits the the fruit either through the same hole it made upon entry or it chews a new tunnel to the surface. Figure 11a & b shows where a larva entered this Gala fruit in one spot and exited out a separate hole. It is important to note that the presence of two holes does not indicate necessarily that the larva has left the fruit. The fruit may have been infested by more than one larva. Or the larva may have created more than one entry hole (see “sting” on the front page.)



Figure 12a shows where there are multiple attempts to enter this Golden fruit at the stem end. The holes may have been made by different CM larva or by a single larva. Upon cutting the fruit it appeared that only one entry was successful (Figure 12b.) The larva then exited the fruit through the calyx end

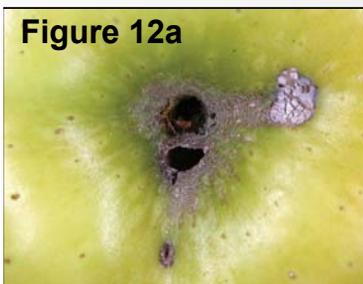
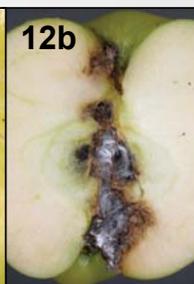
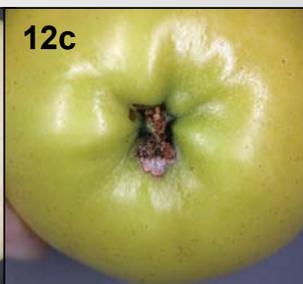


Figure 12a



12b



12c

(Figure 12c.) Figure 12b shows the secondary problem with a CM larval infestation: the introduction of fungi and/or bacteria causing the fruit to rot.

Sampling for Codling Moth

Apple lots destined for the Taiwan export market must be sampled to pass CM quarantine requirements. The sampling protocol we recommend is as follows: for each lot of fruit to be shipped, 50 cull fruit should be sampled from each 20 bins. This should be a separate sampling from the regular cull analysis. All fruit should be examined specifically for signs of codling moth. Fruit with stings or deep entry holes must be cut and examined for the presence of a larva. A single live larva should result in rejection of the entire lot for export to Taiwan. These are recommendations not government required protocols.