

## **Weevils Threaten U. S. Avocado Industry**

### **A Photoessay on Damage to Avocado Fruit by Larvae of an Avocado Weevil**

**(Photographs by the author)**

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In November, 1989, an unknown weevil began to be intercepted at El Paso, Texas, in the Hass-type avocado from Mexico. Four hundred thirty-eight larvae were intercepted in 48.5 tons of fruit in fiscal-year 1991. Weevils entering the United States are certainly more numerous than stated here, since it was not possible to look closely for weevil damage on more than about 20% of the avocados seized. The weevil in Mexican avocados has also been intercepted at the Port of Dallas, Texas.

Weevil interceptions in El Paso can be linked with the large amount of contraband avocados seized in special operations. Given the speed and volume of international travel, infested Mexican avocados can be moved rapidly from growing areas to possible sites of new infestation—to California, for example. It is apparent that El Paso is located along a major pathway of introduction.

The weevils are found from mid-November to mid-February, becoming large as the season progresses. Larvae feed under the avocado skin near the stem-end. The weevil belongs in the family Curculionidae, subfamily Zygopinae, and may reside in or near the genus *Copturominius*. The genus and species remain uncertain.

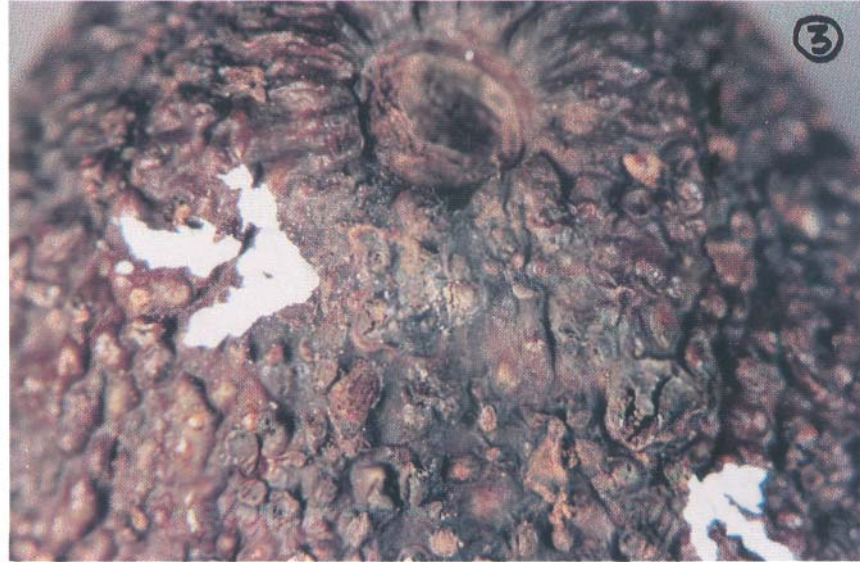
The purpose of this photoessay is to present a clear picture of the damage to avocado fruits caused by this potentially significant pest. It is hoped that the photographs will aid detection of the weevil at other ports of entry into the United States.



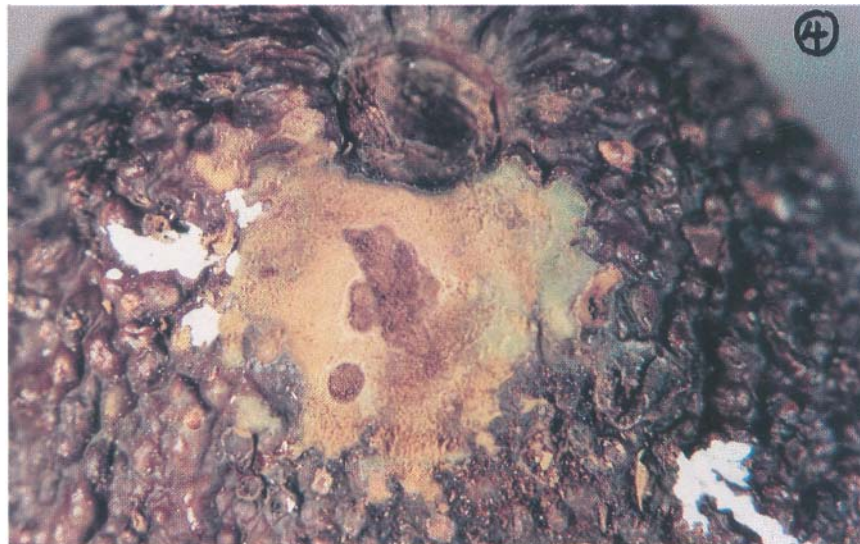
*Fig. 1. Two Mexican Hass-type avocados of the type most often infested by the avocado stem weevil. These avocados are small, dark colored, with a warty surface and dull finish. Both avocados in Fig. 1 are infested with weevil larvae.*



*Fig. 2. A higher magnification of the avocado on the right in Fig. 1. The white arrows point to three oviposition/infestation sites. Damage is usually on the upper half of the avocado close to the stem attachment.*



*Fig. 3. Higher magnification of the damage site shown at the upper left in Fig. 2. The sites look blistered, with cracks and/or small holes. Under a binoc brown granular frass may show through the cracks. White crystalline to granular material usually is present at the damage site (see lower center, Fig. 2), and may be prominent enough to resemble bird dropping. In the following series of photos, progressively deeper removal of tissue will show internal damage symptoms.*

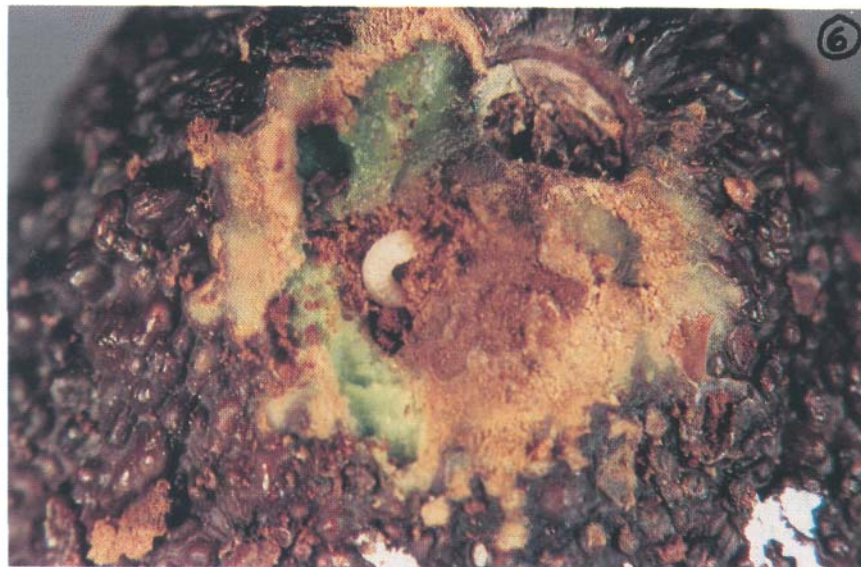


*Fig. 4. Same damage site shown in Fig. 3 after removal of the avocado skin. The places where a weevil larva (or larvae) has been feeding are filled with granular frass resembling "coffee grounds". The presence of frass below the skin almost always indicates a larva or larvae deeper within.*





*Fig. 5. Continuing deeper into the damage site, the area of larval feeding is larger and filled with frass. The damage site usually shows thickening of the avocado skin, and it appears to be this material that the larva is feeding into.*



*Fig. 6. A larva residing in a cavity at a level slightly deeper than that shown in Fig. 5. This larva is very close to the soft tissue of the fruit and may be feeding on it.*

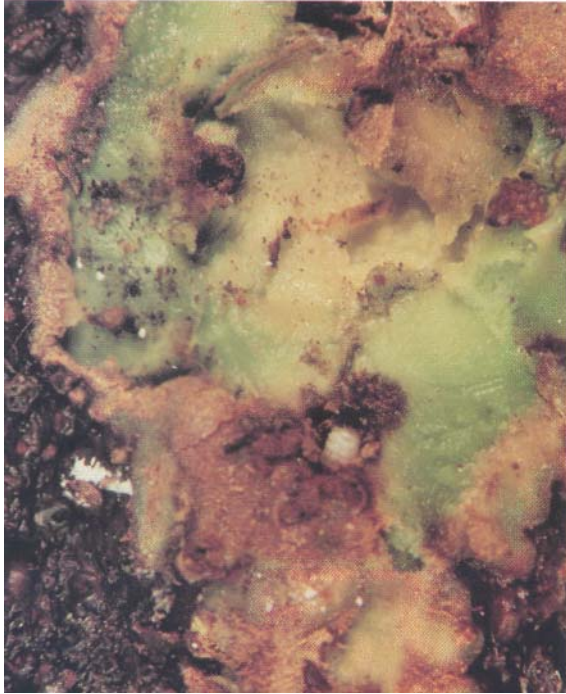


*Fig. 7. Slightly lower at the same damage site seen in Fig. 6, a second larva occupies a cavity below and to the right of the first larva. Note that the damage site is deep enough within the fruit to be surrounded on the sides by soft green tissue. A small section of frass from another damage site shows in the lower right quarter of the photo.*



*Fig. 8. After the larvae are removed, a hemispherical plug of dense tissue is all that remains of the damage/feeding site (center of photo). It is not clear if larvae feed on tissue elaborated from the skin, or on tissue modified from the soft green flesh. The next two photos show excavation of a damage site at the tip of the white arrow in the right center of Fig. 8.*

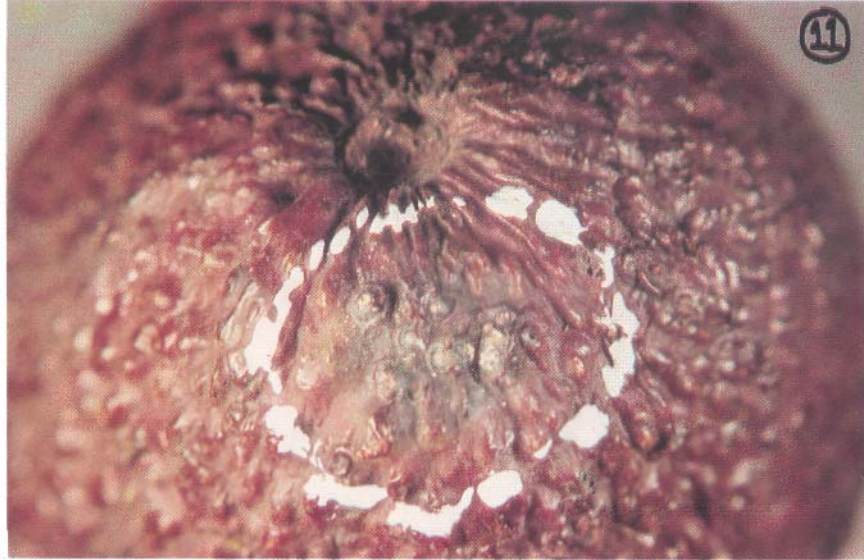




*Fig. 9. The larva at the feeding site in Fig. 9 is relatively close to the surface of the fruit and in close proximity to the soft liquidy flesh. Fig. 10 shows a deeper excavation of this site.*

*Fig. 10. In this photo the larva was coaxed out of its cavity in the feeding site. Notice that only a thin dark zone separates the larva and frass from the soft green tissue. When excavating such sites, it is necessary to slice thinly with the scalpel, to prevent pulling the entire feeding site out of the soft green tissue, before the larva itself is exposed.*



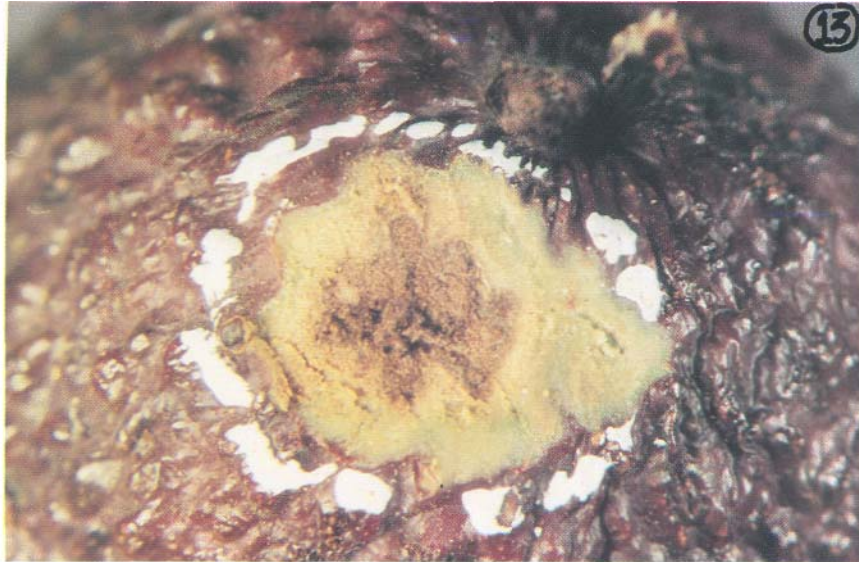


*Fig. 11. The weevil damage site inside the white circle in Fig. 11 is an enlargement from the top of the avocado on the left in Fig. 1. For this avocado and others, the presence of a small hole in the warty projections of the site suggests that female weevils may oviposit directly into the warty bumps.*

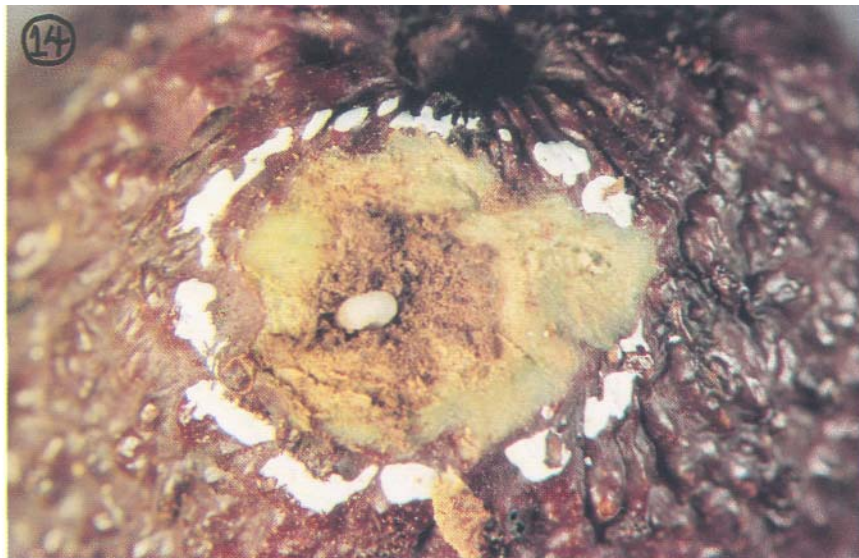


*Fig. 12. The same infestation site as in Fig. 11 after the warty skin has been sliced away. The brown circles are larval excavations filled with frass. The distribution pattern of frass-filled tunnels in the skin mimics the distribution pattern of warty projections on the surface of the fruit (compare Figs. 11 and 12).*



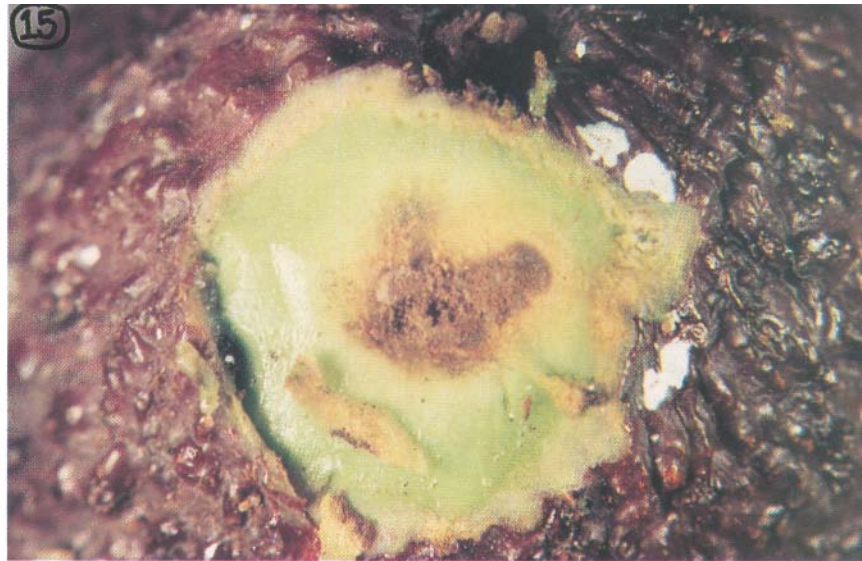


*Fig. 13. A deeper excavation of the damage site shown in Fig. 12. The feeding tunnels are merged together into a broad zone filled with frass.*



*Fig. 14. The same feeding site at about the same level as seen in Fig. 13, except that frass has been pushed aside to reveal a larva inside its cavity. If multiple larvae hatched and began feeding at this damage site (see feeding tunnels in Fig. 12), then it is clear that only one larva survived to the time of dissection.*





*Fig. 15. Same infestation site as Fig. 14 after slicing deeper into the fruit. Only one larva was present at this feeding site. Notice a zone of yellow-green tissue around the brown frass and separating frass from the soft, green fruit interior. The yellow-green zone is dense material apparently fed upon by the larva, and elaborated from inner parts of the skin after early stages of weevil infestation.*