

Managing Split Pit in Peaches¹

Ali Sarkhosh and Jonathan Clavijo-Herrera²

Split pit is a physiological disorder observed in peach fruit that significantly reduces fruit quality and postharvest shelf life, thereby causing substantial economic losses. Fruit affected by split pit are highly susceptible to pathogen infection and decay, becoming a source of inoculum that can rapidly spread to healthy fruit. A peach is botanically classified as a drupe, or stone fruit. It is characterized by fleshy outer layers (the exocarp and mesocarp) that surround a single, hardened shell (the endocarp, or pit), which encloses a seed (Figure 1). Unusually large fruit can exhibit typical symptoms of split pit including accelerated peel coloration, making fruit appear ready for harvest several weeks prior to reaching harvest maturity. In addition to early ripening, the presence of a small, diamond-shaped crack at the abscission point (where the fruit connects to the stem) can indicate a peach has split pit disorder (Figure 2). In advanced stages of the disorder, this crack may expand into a large internal cavity. When affected fruit are cut longitudinally along the suture plane, mold growth or gummy exudates may be present, and tissue rot may be ongoing (Figure 3). This publication addresses split pit disorder in peaches, describes its main symptoms, and highlights key factors to consider for reducing its occurrence in the orchard. This information is intended for county and state Extension faculty, growers, and homeowners interested in peach production in Florida.

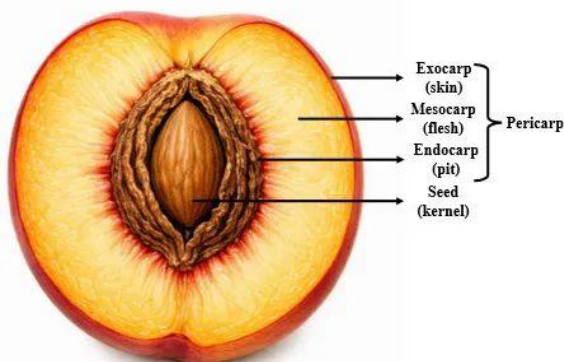


Figure 1 . Internal and external structure of a peach fruit.
Credit: Image generated by DALL-E via ChatGPT

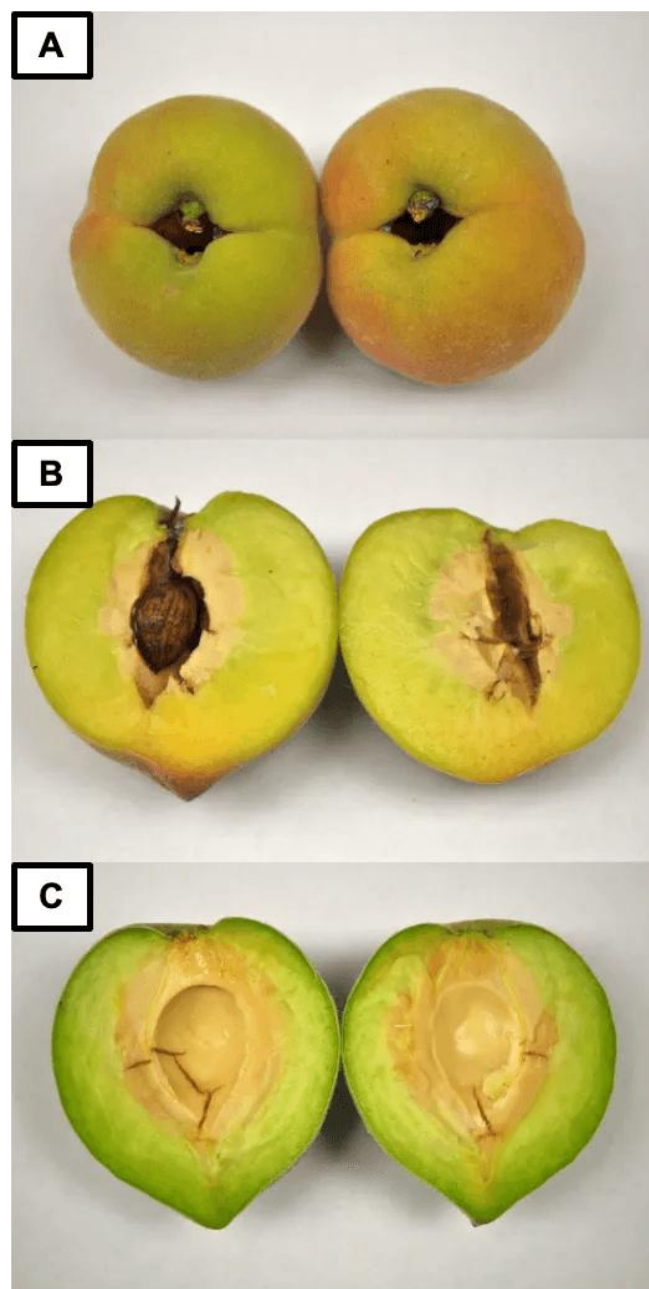


Figure 2. Peach split pit disorder in immature fruit. (A) Similar to mature fruit, a small, diamond-shaped crack can be present at the abscission point of the fruit. (B) When cut longitudinally along the suture plane, the fruit can exhibit early pit hardening and initial stages of decay. (C) Small cracks further develop into large internal cavities.
Credit: Ali Sarkhosh, UF/IFAS

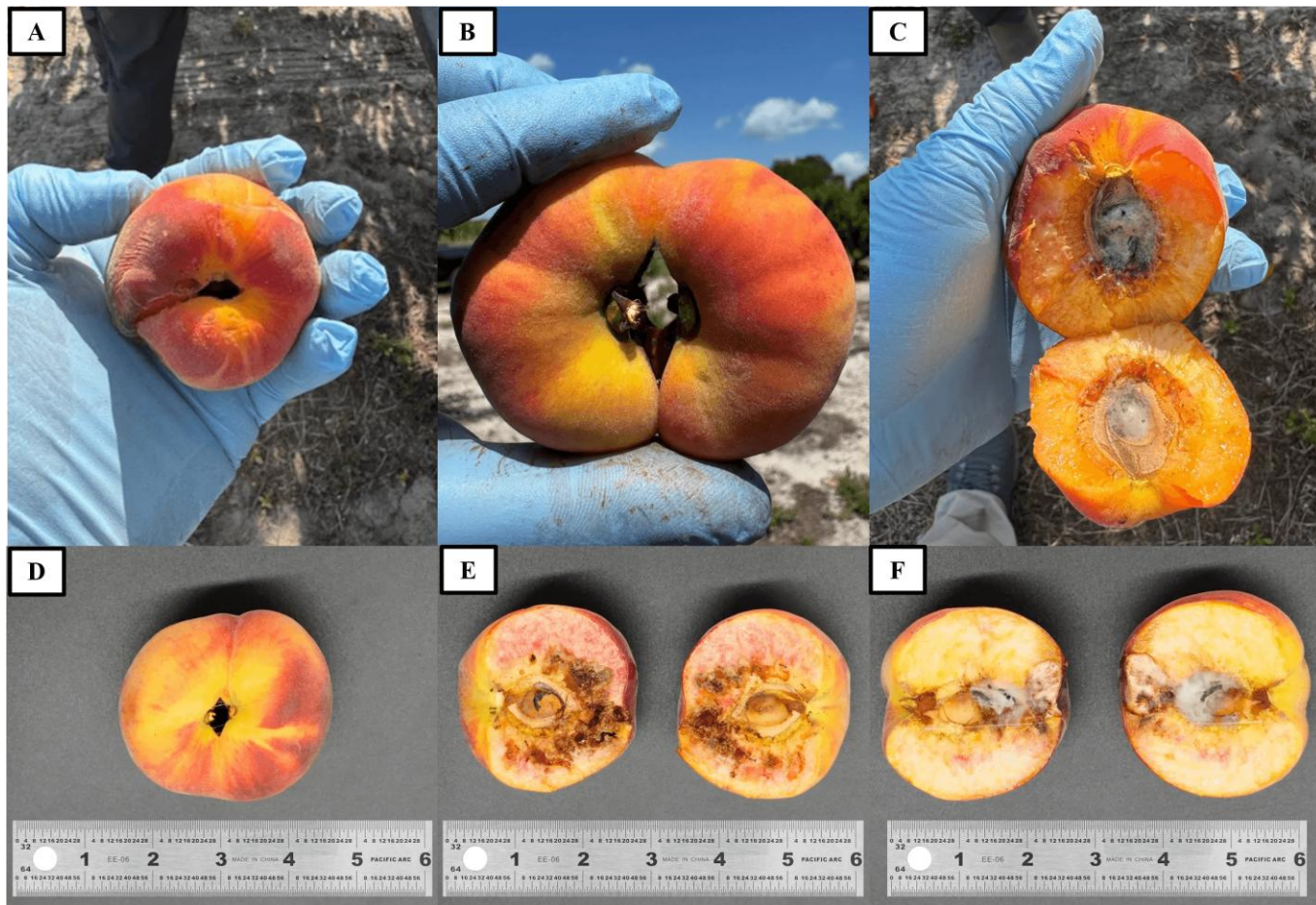


Figure 3. Peach split pit disorder in mature fruit. (A, D) A small, diamond-shaped crack is typically present at the abscission point of affected fruit. (B) The crack may further develop into a large internal cavity. (C, E, F) When the fruit is cut longitudinally along the suture plane, mold or gummy exudates may be present, and tissue rot may be already progressing.
Credit: Jonathan Clavijo-Herrera, UF/IFAS

Why Does Peach Split Pit Occur?

Although research on the causes of peach split pit has been conducted for nearly a century, this disorder is still not fully understood. Following fruit set, peach fruit development consists of three stages: cell division, pit hardening, and cell expansion (Figure 4). During pit hardening, lignin is gradually deposited in the endocarp, conferring its characteristic woody texture and appearance. This brown compound binds with cellulose fibers in a process known as lignification, which initiates at the blossom end (tip) of the endocarp and progresses upward toward the stem end to form the pit. Hardening during this stage is not uniform throughout the entire endocarp, leaving certain regions more vulnerable to rupture. Split pit occurs when mesocarp development and seed expansion generate mechanical stress that fractures portions of the pit that are not yet fully hardened.

Several factors, particularly those affecting fruit growth rate, play an important role in the occurrence of split pit in

peach orchards. Fruit anatomy, water relations, nutrient availability, fertilization practices, temperature fluctuations, and cultivar susceptibility are key production factors to consider in reducing fruit losses associated with split pit.

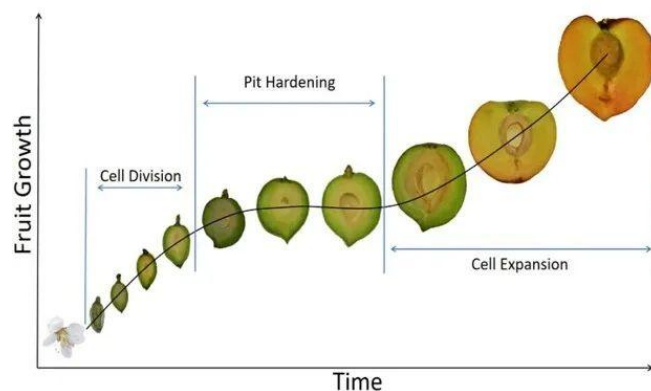


Figure 4 . Fruit growth stages in 'UFSun'.
Credit: Ali Sarkhosh, UF/IFAS

Importance of Fruit Growth Rate and Thinning

In general, environmental factors and management practices that influence fruit growth rate can directly affect the incidence of split pit in peach orchards. Moreover, factors that promote increased fruit size are likely to contribute to a higher occurrence of split pit. For example, when trees carry a low fruit load, nutrients and other resources that would normally be shared among many fruit are instead concentrated in fewer fruit, resulting in larger fruit size.

Thinning is a common and important management practice that increases fruit size to meet commercial standards, reduces excessive crop load, and helps prevent limb breakage. However, thinning too early in the season or at excessive intensity can increase the risk of split pit. Delaying thinning may help reduce the incidence of this disorder. Therefore, appropriate timing and intensity for thinning, considering the specific conditions of the orchard, are essential to prevent yield losses associated with split pit. For more information, please see Ask IFAS publication HS1324, "[Thinning Florida Peaches for Larger Fruit](#)."

Water Relations and Irrigation

Inconsistent irrigation schedules or excessive water applications, especially following periods of water stress, can cause rapid changes in the internal water status of trees. Moreover, sudden shifts in fruit water balance may increase pressure inside the pit, creating conditions that favor split pit development. Adjusting irrigation management practices, particularly after heavy rainfall events, can help reduce abrupt changes in fruit turgor and lower the risk of split pit occurrence. However, it is important to consider that irrigation management also significantly influences nutrient availability, especially when using broadcast fertilizers in the orchard.

Nutrient Management

Nutrient balance is essential for healthy plant growth and development. A lack of essential nutrients leads to low fruit quality and increases susceptibility to disorders, diseases, and even plant death. On the other hand, excessive nutrient applications can cause excessive vegetative growth or result in toxic levels that may negatively affect plant health.

A study evaluating nitrogen (N) fertilization with urea at rates ranging from 0 to 3 lb per tree reported a strong relationship between N rate and split pit occurrence (Han et al. 2015). At the highest N rate, 30% of the fruit exhibited split pit symptoms, compared with 10% at the medium rate and only 2% at the low rate. According to the authors, N influenced the development of vascular bundles responsible for water and nutrient transport, particularly those associated with the embryo (seed) and the pit. Excessive N promoted overdevelopment of vascular tissues in the seed, increasing seed size while simultaneously weakening pit structure. This combination significantly increases the likelihood of split pit disorder.

Some studies have found that calcium (Ca) concentration in the pit and flesh of split pit peaches is lower compared with healthy fruit. Ca plays a critical role in cell wall stability; consequently, Ca deficiency may reduce cell wall strength in the pit and lead to split pit. Applying foliar sprays of Ca-sugar alcohol chelate solutions during fruit development has been observed to reduce split pit in peaches. However, foliar applications of calcium nitrate during the pit hardening stage were considered ineffective against this disorder despite increased Ca concentration in the fruit. These findings indicate issues related to Ca mobility during the pit hardening stage. Consequently, research supports making earlier foliar Ca applications, before pit hardening initiation (Yu et al. 2025).

Researchers have also found that concentrations of potassium, iron, manganese, and zinc in the pit during early stages of split pit development were lower in the diseased fruit compared to healthy fruit, although there were no differences at the end of the pit hardening process. Proper nutrient management and fertilization practices are essential for obtaining high yields, high quality fruit, and lower risks of split pit in peaches. For more information on nutrient management in peach orchards, please see the Nutrient Management in Low-Chill Peach Orchards series: Ask IFAS publications HS1496, "[Guidelines for Fertilizer Rate Application in Florida Subtropical Climate](#)," and HS1497, "[Guidelines for Deficiency Symptoms and Leaf and Soil Sampling](#)."

Temperature Fluctuations

Temperature is a critical environmental factor affecting overall tree health and fruit development. Rapid temperature fluctuations can cause sudden expansion or contraction of endocarp tissue, disrupting normal tissue development and increasing the risk of split pit. However,

the effects of temperature on this disorder are considered indirect, as temperature primarily influences tree growth rate and fruit development.

Temperature fluctuations occurring around the critical periods before and during pit hardening can strongly increase the risk of split pit. A cool period, such as a frost or freezing event, that occurs before pit hardening and is followed by warm conditions as hardening begins, can greatly increase the likelihood of peach split pit. In contrast, the risk is lower when warm conditions occur before pit hardening and are followed by cooler environmental conditions. As previously mentioned, temperature appears to affect the rate of fruit growth rather than final fruit size, as fruit weight at harvest is often similar across different temperature patterns during development.

Cultivar Differences

Peach cultivars vary widely in their susceptibility to split pit, largely due to genetic differences that influence the structural strength of the seed and pit. In general, cultivars with crunchy flesh are more prone to split pit than those with denser textures. Similarly, cultivars that produce round-shaped fruit tend to be more susceptible to this disorder than those with more elongated or oblong fruit shapes.

Cultivars with shorter fruit development periods (FDP) are also generally more prone to split pit. Some early-maturing cultivars have an FDP as short as 60 days, and in extreme cases, up to 50% of the fruit may exhibit split pit. Because early-maturing peaches progress through each developmental stage more rapidly, growth rates during these phases are accelerated, increasing the likelihood of pit splitting. Although less common in later-maturing cultivars, split pit can still occur when combined with other contributing factors discussed in this publication. In addition, nectarines are generally more prone to split pit than peaches.

Conclusion

Peach split pit is a complex physiological disorder influenced by multiple factors, particularly those affecting fruit growth and development. Although the exact mechanisms underlying its occurrence are not fully understood, rapid seed enlargement, pit hardening, and mesocarp expansion play central roles. Orchard management practices such as thinning, irrigation, and fertilization can strongly influence fruit growth rate and

internal stress levels on the pit. In addition, environmental conditions, especially temperature fluctuations before and during pit hardening, can further increase susceptibility. Cultivar selection is also an important consideration, as genetic traits significantly affect split pit incidence. Due to the close interconnection and interaction among many of these factors, effective split pit management requires a balanced and integrated approach. By carefully adjusting management practices, selecting appropriate cultivars, and monitoring environmental conditions during critical growth periods, growers can reduce the risk of split pit, improve fruit quality, and enhance economic returns.

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¹This document is HS1526, one of a series of the Department of Horticultural Sciences, UF/IFAS Extension. Original publication date August 2026. Visit the Ask IFAS website at <https://ask.ifas.ufl.edu/> for the currently supported version of this publication. © 2026 UF/IFAS. This publication is licensed under [CC BY-NC-ND 4.0](#).

²Ali Sarkhosh, associate professor and Extension specialist, fruit crops, UF/IFAS Department of Horticultural Sciences, Gainesville, FL; Jonathan Clavijo-Herrera, postdoctoral associate, UF/IFAS Department of Horticultural Sciences, Gainesville, FL; UF/IFAS Extension, Gainesville, FL 32611.

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