

ROOT ROT AND ROOTSTOCK FACTS

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1. The only known cause of avocado root rot is *Phytophthora cinnamomi*. It causes the feeder roots to become black and brittle. The tree loses its leaves, branch-die back occurs and eventually death follows.
2. A young tree on a susceptible rootstock such as Topa Topa planted in a range of soil types will generally die within 6 months to 2 years following initial infection with *Phytophthora cinnamomi*. An older tree on a susceptible rootstock may sometimes decline more slowly, occasionally taking 5-10 years to die.
3. In soils with impeded drainage the disease is always extremely severe and death of trees of any age is usually rapid, generally occurring within 1-2 years.
4. In deeper, well-drained soils root rot will be less damaging, though it will almost inevitably eventually kill the tree. In exceptional rare situations it may take upwards of 15-20 years.
5. There is no good evidence that interplanting with citrus, or any other crop, will slow down root rot on avocados.
6. There are no other known causes of avocado root rot and none are suspected. Other fungal pathogens attacking avocado below ground such as *Phytophthora citricola*, *Armillaria* and *Verticillium* are easily distinguished from *P. cinnamomi* in the distinct ways they attack avocado. The only other disease problems of any consequence are sunblotch and blackstreak. These are easily separated from rootrot by the unique symptoms they cause.
7. Rootstocks such as Duke 7 which possess moderate resistance to *P. cinnamomi* will survive for much longer than susceptible seedling rootstocks in rootrot situations.
8. In root rot situations, Duke 7 and other moderately resistant rootstocks such as G755 should only be planted in well-drained situations. In addition, they should also be treated with a fungicide such as Ridomil® or Aliette®.
9. In terms of grove performance the long-term prognosis for any commercially-available resistant rootstock has yet to be evaluated. In particular, it is not yet established for how long, or with what quantities, a tree will have to be treated with fungicides such as Ridomil® or Aliette®.

10. Good data on the production potential of Hass on these rootstocks, either in the presence or absence of root rot, has not been obtained at this time.

11. In comparative trials carried out by our research group at both South Coast Field Station (Irvine), Embarcadero Ranch (Goleta) and Betty Spaulding Ranch (Carpinteria) no differences in cold tolerance behavior have been observed between G755 and rootstocks such as Duke 7 (both with Hass scions) over two cold winters (1986, 1987).

12. Where Hass scions are used differences in salt-tolerance between rootstocks, including Toro Canyon, G755 and Thomas, have not been observed in our research program. Differences in salt tolerance of ungrafted rootstocks have been seen. In general the Mexican types such as Duke 7 display more "Spring" tip burn on mature leaves than either G755 (*P. schiedeana* hybrid) or G1033 (Guatemalan avocado). However, it is not at all certain that these limited observations with ungrafted trees have any meaning when considering a situation where they are grafted with Hass or Gwen, especially since these two scion varieties are themselves Guatemalan and therefore relatively salt tolerant in their own right.

13. In the final analysis, growers are advised to try a little of everything available and make their own judgments. In our limited research experiences two rootstocks have so far consistently proved themselves better than others in severe root rot situations. These are G755 (Martin Grande) and Thomas. In our research, consistent differences in rootstock performance between G755A, G755B, and G755C have yet to be demonstrated. In one small field plot comparing G755B and G755C, G755B was slightly better than G755C. Both were very good performers, however.

14. A common feature that we have encountered with failed rootstock situations is evidence of a poor root system present to begin with. Growers are advised to check their trees carefully for evidence of the presence of a good root system. A poorly rooted tree is not likely to survive in a root rot situation, even when helped by fungicide application.

15. An occasional problem that we have encountered with young trees is a deep, brown colored canker that can girdle the trunk and cause die-back. Recently, we have isolated a fungus *Dothiorella* from some of these cankers. We do not have any evidence that this is the primary cause of the problem, however. All currently available rootstock/Hass combinations have displayed this occasional problem. No differences between rootstocks has been observed. Further, the canker is on the Hass scion wood and may, in fact, not be a rootstock-related problem, but may reflect the source of scionwood.

16. If you wish to plant in a root rot situation, the choices are limited. Our advice is plant the trees in a separate irrigation block. Plant on mounds where root rot has previously been severe. Use Aliette® and/or Ridomil®. Irrigate carefully and avoid excessively dry or wet soil conditions. In the beginning try 2 or 3 different rootstocks in small quantities. On the basis of a minimum of 2 to 3 years observations, make your own decisions. If in doubt, then please consult with your farm advisor.