



DETECTIVE DENDRO THE DIAGNOSTIC SLEUTH

By James Komen

The Case of the Redwood Roots

I looked out the window of my office to see Codit in the parking lot washing my car by hand. He had lost a bet in our most recent tree-identification challenge, and I was thoroughly enjoying my victory. Before I could point out that he had missed a spot, the phone rang.

It was Frank, a friend of one of my regular clients.

“Detective Dendro, I’ve got an 80-year-old coast redwood (*Sequoia sempervirens*) growing in my backyard that’s breaking up my concrete patio! It looks like we’re going to have to take the tree out. Can you give me some advice for what to replace it with?”

Something about Frank’s story didn’t seem right. Coast redwoods are not known for their aggressive root behavior. In fact, these trees can coexist quite nicely with paved infrastructure, provided there is enough soil pore space and available water.

I offered to help. “Before you condemn your coast redwood, how about I come over and take a look at it?”

Moments later, I jumped in my half-clean vehicle, eager to see the scene for myself. Codit was all too happy to take a break, so he grabbed his diagnostic tools and joined me on the drive to the site.

We arrived there to see a gorgeous coast redwood rising above the client’s house from the backyard. From the street, the tree appeared to be in excellent condition—all of the foliage was green, and the scaffold structure looked to be untouched by pruning.

Codit and I edged our way around the narrow side yard to discover the patio had already been torn up.

“The concrete was already busted up pretty bad before we started the demo work,” said a man coming into view. The man, Frank, showed me the work he and his demo crew had done. “We’ve barely needed to use our tools. All these concrete pieces have been coming up fairly easily. Those roots sure did a lot of damage.”

He gestured to and proceeded toward the trunk of the redwood, about 30 feet (9.1 m) from where we were standing on the patio. He then picked up a large chunk of concrete and began to carry it through the narrow side yard out to a pile he had started on the driveway. As he walked away, Codit and I took the opportunity to examine the exposed soil.

“Look at all those fine fibrous roots!” Codit exclaimed. “It looks like this redwood must have found a favorable rooting environment beneath this patio.”



Curious cracks in the concrete out back! Can Dendro close the case?

Careful not to step on any roots, he moved to the edge of the remaining concrete slab to take a closer look, and . . .

Squish!

His boot squeezed out a fine film of water from the saturated soil.

"Perhaps there isn't a favorable rooting environment below the surface," I observed. "Roots need air, and they're not getting much in that saturated soil."

Brushing away some surface soil, we found only fibrous roots. Puzzled, Codit pulled out his trowel.

"There must be at least some structural roots that are causing this patio to lift up." He went to work. But as he proceeded with some preliminary excavation, his trowel barely made a mark in the soil surface. "We've got some really dense, clay soil here."

"Tell me about it!" Frank shouted from behind. "It was a real nightmare for the drainage project we did here a few years back. It took forever to dig the trench over there." He handed me a bottle of water as he proceeded to rehydrate himself as well.

I was curious. "Can you tell me a little about that drainage project?"

"Sure. The way our hillside drained, my neighbor's garage flooded whenever it rained. So we took the initiative to re-route the drainage to the other side of our yard. It made things a little wetter on our side, but at least we don't have to deal with any more complaints from next door."

Frank gestured left and right as he spoke. "One good thing about the drainage project," he continued, "is that my redwood has never looked healthier! It seems to be growing faster now that it's getting all this extra water. It's a shame that I'll have to take it out, Dendro, but I just can't have its roots damaging our patio."

Codit looked up from his excavation, covered in mud. How did he manage to get so dirty in less than a minute?

"I just don't get it," Codit said. "How could these tiny fibrous roots have done so much damage to this concrete patio?"

I turned to Frank. "I don't think your redwood is responsible for the patio damage . . . But I do think that the reason for the damage is right under your feet."

*What did Detective Dendro see?
Turn to page 69 for the solution.*



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WHAT'S THE SOLUTION?

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I directed Frank's attention to the drainage project he pointed out earlier. "You told me that you recently changed the drainage patterns on this property, and it resulted in a wetter backyard. Well, for starters, your redwood has certainly been benefiting from the additional moisture."

Frank nodded, no doubt wondering where I was going with my explanation.

"Clay soils are highly expansive," I said, reaching into Codit's bag for one of his dry sponges. "When their moisture content changes, they can expand and contract, resulting in substantial displacement. Before your drainage project, your soil remained fairly dry for most of the year."

I held up the sponge and poured some water onto it. "But like this sponge, the dry soil expanded when additional moisture was applied. *That's* what cracked your concrete."

"*And* why we didn't find any structural roots!" Codit added.

"Correct." I continued, "The fibrous roots we found were all growing in the narrow space between the soil and the concrete patio slab because the soil underneath was too saturated. In the end, the redwood wasn't lifting the patio, but it was definitely responding to the changes in soil moisture."

Frank thought for a moment. "It looks like I don't need to take out this tree after all."

"That's right. You've got a great landscape asset that doesn't need to be touched at this time. But I do recommend replacing the patio with dry-laid pavers instead of a concrete slab to improve permeability of air in the soil."

As Codit and I walked back to the car, I tossed the damp sponge back to him and winked. "Don't think I've forgotten about our bet."

James Komen is a Board Certified Master Arborist (#WE-9909B) and Registered Consulting Arborist (RCA #555).



Consider the soils. If soil expands and contracts with the weather, then surely man-made surface coverings are prone to displacement as well.