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WARREN, KEITH. 1988. **Perfecting the crab.** Am. Nurseryman 168(7):77, 79-81.

Crab apples are nearing perfection. Advances in breeding and selection, coupled with careful research of disease resistance, have made these ornamentals more beautiful and problem-free than ever. The best cultivars now approach the theoretical "perfect" landscape tree—with one exception, suckers. With crab apples, the roots close to the soil surface tend to produce heavy sucker growth. And the more you cut them back, the more they seem to multiply. Suckers are not only unslightly, but they also limit the tree's use in landscapes where low maintenance is a prime criterion. Eliminating suckers may be the last frontier to conquer in perfecting the crab apple. To accomplish this, the industry needs to examine our current propagation techniques.

BALL, JOHN. 1988. **Roots, air and tree health.** Arbor Age 8(11):12-14.

Roots are often viewed as food-absorbing organs. Roots, as with all other living portions of the tree, do undergo a process called respiration. This process utilizes oxygen. Low oxygen conditions can prevent new roots from forming—and old roots from growing. Anything that reduces soil oxygen levels, such as pavement or soil compaction, can retard root growth. Regardless of how the nutrient is brought in contact with the root, the absorption of the nutrient into the root requires oxygen. The symptoms a tree expresses for low soil oxygen—off-color foliage and loss of vigor—are the same for low soil fertility. The tree does not have to utilize energy to absorb water. For the tree to survive, the roots must continue to grow, so that it can reach out to new supplies of water.