cause killed prey are not efficiently utilized by these predators a medium-sized, growing larva must kill and feed on numerous small *M. domestica* maggots per day to obtain enough food. On the other hand, should such an *Ophyra* larva kill a *M. stabulans* or *M. domestica* maggot larger than itself, the feeding predator may become fully gorged before consuming all the remains of its victim. When this occurs, and if no other living prey are present after its first meal is digested, an *Ophyra* will return to a previously killed cadaver to feed on it again. However, if living prey are present, an *Ophyra* will kill and feed on them instead of feeding on the remains of a previously killed maggot.

When the total number of missing prey larvae per experimental jar is considered (after adjusting for natural mortality in control jars), it is apparent that *Ophyra* larvae kill many more prey per day than they can possibly eat. Superfluous prey larvae killed and left (or not found) by the *Ophyra* are subsequently eaten by the remaining living prey species. House fly maggots, for example, in preference to other food in the rearing medium, are rapidly attracted to and devour members of their own kind which have been killed and left by *Ophyra*. As no prey larval cadavers remain when the *Ophyra* are ready to feed again, they kill and feed on the remaining living prey larvae.

In addition to the voraciousness of the larvae, another aspect which makes *O. leucostoma* particularly attractive as a potentially favored biological control agent of house flies and related nuisance flies is that we have found that the adults rest at different sites about poultry ranches than do those flies on which its larvae feed. Current field studies are being conducted to determine whether the various insecticides recommended for fly control can be applied in a selective manner to kill a maximum number of house flies and other nuisance flies while sparing maximum numbers of the black garbage fly.

The black garbage fly is not considered a nuisance fly about poultry ranches because the adults do not, like house flies and other nuisance species, congregate about houses and other buildings. Instead, *O. leucostoma* adults gather about trees and shrubs and are not usually noticed.

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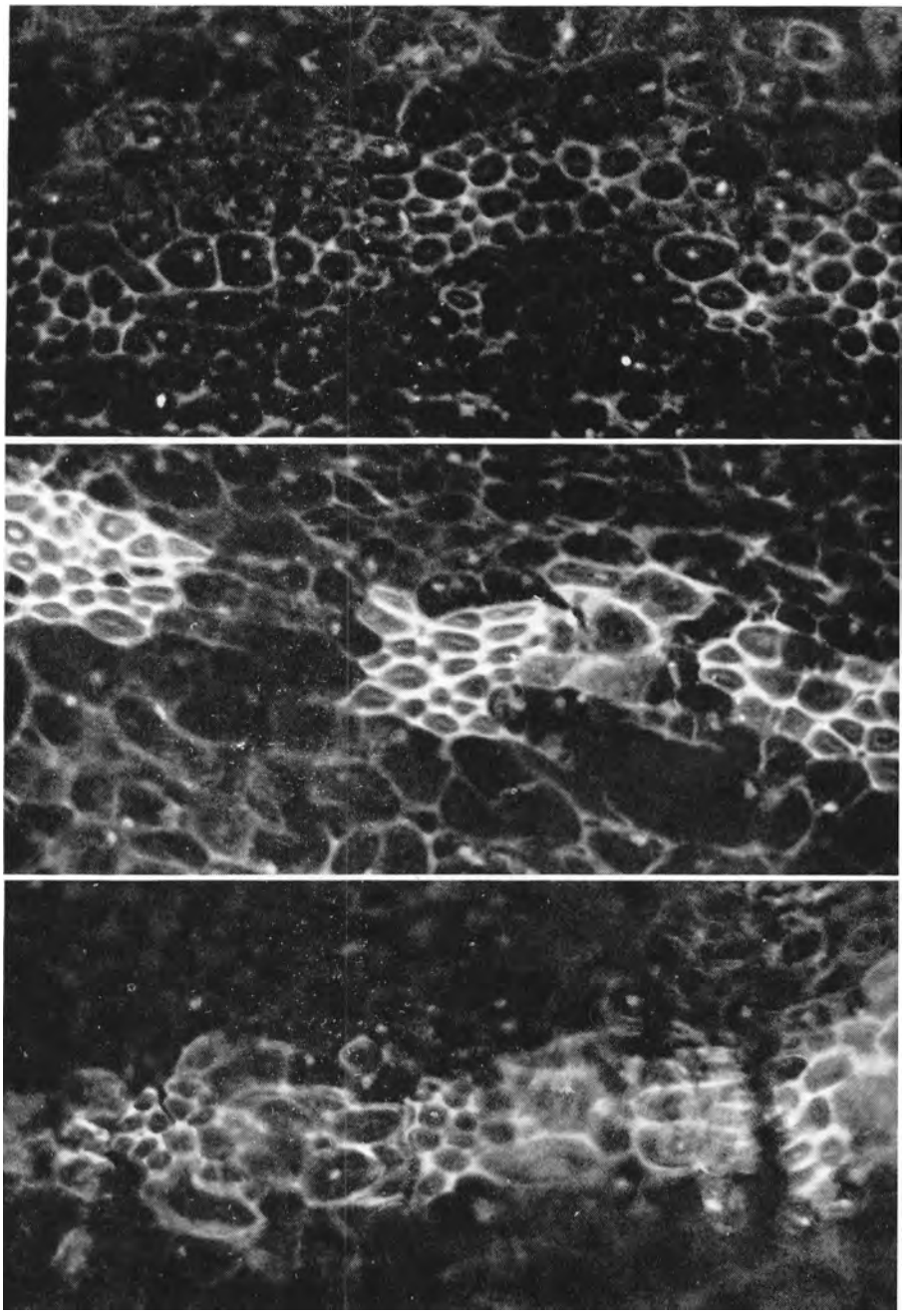
Plant Rooting Studies Indicate Sclerenchyma A Restricting Factor

Brighter-walled cells running through center of micro-photos below are sclerenchyma tissue of Ascolano, top photo, easiest-to-root olive variety in these tests; Sevillano, center photo; and Moraiolo, bottom photo, the two most difficult to root varieties. Many holes appear to exist in continuity of sclerenchyma tissue of both Ascolano and Sevillano as compared with Moraiolo which is nearly continuous in this photo.



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Tissue Is Not

In many fruit and ornamental plants, uniformity of yield and quality or appearance are achieved only by means of clonal or vegetative propagation—usually by the rooting of stem cuttings. Some varieties are easily rooted, while others are very difficult. There are few explanations to account for such differences in ease-of-rooting, but one long held horticultural hypothesis suggests that stems of shy-rooting plants possess a band of tissue (sclerenchyma) that mechanically blocks protrusion of roots formed to the inside of the sclerenchyma. Results of research reported here show that there is no simple relationship between the density or continuity of the ring of sclerenchyma and ease of rooting in olive, pear, and cherry stem cuttings. Great differences were found in the capacity of stem tissues to form root primordia to the inside of the sclerenchyma ring. Such differences may be related to the ability of cells of the root-initiating tissues to expand and proliferate, and subsequently to organize root primordia.

SEVERAL STUDIES over the past few decades suggest that ease-of-rooting in many soft and hardwood stem cuttings may be inversely related to the continuity of a peripheral ring of sclerenchymatic tissue bordering the phloem (see photo-diagram for location of stem tissues). Sclerenchymatic tissues contain large numbers of hard, thick-walled cells which add considerable mechanical strength to the tissue. According to some horticulturists, a ring of sclerenchyma bordering the phloem and cambium where root primordia are formed, blocks the outward growth of roots in shy-rooting varieties. There are several facts not explained by this hypothesis, however. In carnation stems, the ring of sclerenchyma is truly impenetrable to root primordia, yet carnations are not shy-rooting. Nearly all varieties root well from cuttings. Root initials formed to the inside of the sclerenchyma find their way to the outside by growing down and out the base of the cutting where there is no sclerenchyma. The same possibility is open to all shy-rooting plants, since the sclerenchymatic tissue is *circumferential* and never forms a *transverse plate* sealing the base of cuttings. Also, the sclerenchyma-ring is always broken at the point of insertion of leaf and axillary bud on the stem, thus providing another opening to the exterior for root primordia.

Another more compelling reason for rejecting the sclerenchyma-ring hypothesis resulted from microscopic examination of seven varieties of olive cuttings at Davis. These tests showed no simple relationship existed between density and continuity of sclerenchyma and ease-of-rooting (see photos and table). Significant variations were found in the structure of the sclerenchyma, but with the exception of the variety Moraiolo (which is the most difficult to root and possesses the densest sclerenchyma) stems of some of the easy-rooting varieties have the same density as the shy-rooting types.

Similar comparisons between shy- and easy-rooting pear and cherry varieties (see table) again fail to reveal any relationship between the density of sclerenchyma and ease-of-rooting. In fact, cross-sections of all pear and cherry stems show relatively large holes in the sclerenchyma (the tissues do not form a continuous ring), and root primordia, if formed, would have no trouble penetrating to the outside.

During root initiation treatments, in which cuttings are treated with auxins (such as indolebutyric acid) and placed under mist, there is considerable cell expansion and proliferation in the cortex, phloem, and cambium. Such cellular activity causes disruption of the sclerenchyma. In shy-rooting varieties, such as Frantoio and Moraiolo, relatively large holes were found in this tissue after five weeks, but no root initials were formed.

Thus, the differences in ease-of-rooting among olive varieties appear to be related to the *ease-of-formation of root initials* and not to the mechanically restricting influence of the sclerenchyma. That is, shy-rooting varieties form fewer and slower developing root initials than the easy-rooting types. Future research on this problem will probably compare metabolic activities in the stems of easy- and shy-rooting varieties, and will study the effect of known root-influencing factors (growth substances, storage, time of year of cutting) on the activity of the phloem-cambium regions in which root primordia arise.

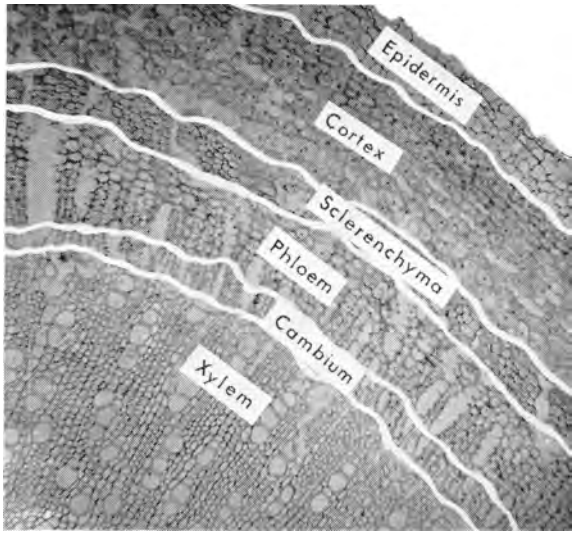

Photo-diagram of typical cross section of fruit tree stem cutting (except for pith) showing location of sclerenchyma tissue (highly magnified).

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ROOTING. PERCENTAGE

	Per cent cuttings with roots*			
	3rd week	5th week	8th week	12th week
OLIVE				
Ascolano	20	70	99	99
Nevadillo	10	35	50	87
Manzanillo	0	25	50	80
Mission	0	15	20	66
Frantoio	0	0	15	47
Sevillano	0	20	25	46
Moraiolo	0	0	20	32
		6th Week		
CHERRY				
Stockton Morello		77		
Bing		20		
PEAR				
Old Home		98		
Bartlett		6		

* Data from Prof. H. T. Hartmann, Dept. of Pomology, U. C., Berkeley. Cuttings were pretreated with appropriate concentrations of indolebutyric acid and placed in greenhouse under mist.