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Grafting Musings, Update 1991

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Parafilm I

During a recent trip to Israel, I observed widespread usage of Parafilm 'M' as a grafting wrap. Since being introduced to this product about five years ago by Richard Marrocco of Fallbrook and Hank Brokaw of Saticoy, California, I have been known to tout its benefits. I have considerable contact with Israeli researchers; and I understood from previous conversations that although some parafilm experimentation had been done, for the most part it was a relatively quiet topic in Israel. But, Israeli growers are adept and eager to implement promising research. As a result, in recent years parafilm usage has proliferated and basically been "institutionalized." Without wanting to sound preachy, I believe there is a significant lesson for California growers. It is crucial that valuable research data be quickly utilized if our industry is to remain globally competitive. Avocado research by UC-Riverside investigators and regional Cooperative Extension farm advisors is generally original and requires international literature searches to prevent duplication. Foreign research is studied and the findings combined with our own to produce advances in irrigation, nutrition, postharvest, etc. Once the findings are published, responsibility for their implementation is with the growers and their advisors. I believe it is imperative that research experience from individual growers be reported for broader scrutiny. If something works—or if it doesn't—we all need to know. To survive, the avocado industry requires a grower base that is economically strong. Our peril is not from other California groves, but from external problems like water and trade, etc. These issues require substantial grower communication and unity.

Parafilm II

Parafilm is a wax-like tape manufactured by American National Can, Greenwich, Connecticut. It is transparent, stretchable, self-adhering, and relatively inexpensive. Its most common use is as a seal for glassware in laboratories. It comes in an assortment of sizes, but it is mostly sold as a four-inch wide roll. The manufacturer also makes a number of similar products used in the floral industry which are sold as stem wrap or "florist tape." These products are only ½ inch wide; they have been used for bud-grafting but are too narrow for efficient scion graftage.

There are two different ways parafilm tape can be used when grafting, somewhat dependent on both the grafter and the type of graft method selected. The most common usage is to spiral-wrap the entire scion (stem, buds, and top cut) after tying the graft cuts with common plastic tape. The parafilm wrap prevents moisture loss from the scion, preserving it until the healing of the graft union is complete (see Figure 1). The

wrap is pliable and will allow new shoots to expand and break the wrap without any restriction damage (see Figure 2).

The second procedure is to have parafilm completely replace the plastic tying tape that is used to bind the cuts. If the plant material is juvenile or of small diameter, there is less need for the tautness achieved using plastic tape. However, now the parafilm will need to be pulled tight; this is best achieved by doubling the thickness of the tape. Parafilm may break when one is wrapping, but it is self-adhering, and thus a break is simple to correct. The benefit of using parafilm without any plastic wrap is the convenience of not having to return to the graft at a later date to cut away the plastic. Sometimes plastic wrap is left too long on the graft, causing restriction injury.

Parafilm undergoes rapid decomposition when exposed to direct sunlight for more than a couple of hours. Therefore, the graft must be shielded with a paper cone or equivalent until healed.



Fig. 1. Parafilm tape wrapped and sealing the scion graft.



Fig. 2. Newly emerging shoots growing uninhibited through Parafilm wrap.

Traditional vs. New vs. Combination of Both

Although I have been grafting for a number of years, I can no more do a "notch" graft than I can ride a bucking horse. Call it notch, wedge, or saw kerf; I call it nearly impossible. But, ask any old-timer what the best topworking graft is, and he will tell you, "the old notch." Alvin Lypps of Hemet is master of this graft style. He has been at it for longer than I can remember; that is, longer than I can remember anything: Alvin was wedging before my mother met my father auditioning for his jazz band in the 40's. So, now he does a lot of first-rate wedge grafts, right? Wrong. He can't afford to wedge graft in an industry that is so cost-competitive when it comes to topworking. Therefore, he now does an outstanding bark graft.

As a test, I compared Alvin's bark graft with a newer sucker-grafting approach fine-tuned by Richard "Ric" Morocco. His summer shoot grafting method is detailed in the 1989 University of California Leaflet 21461 entitled Avocado Propagation.

For this test, 'Bacon' trees approximately two feet in diameter were stumped in February, then bark-grafted in May by Alvin, and others were shoot-grafted in August by Ric. I tied Alvin's grafts myself. It was hard work: one could develop tendonitis pulling on the plastic tape to achieve a tight enough fit for the scion inserted under the bark of

these old trees. After tying and paper wrapping about 30 trees, I was happy to see the end of it. Later, I discovered that the paper wraps, which I had slaved to properly attach, were both wonder and delight to resident squirrels and crows. After fighting them for several months in addition to suffering some summer wind storm losses, the end result of our grafting was about 50% attrition and another 20% weak.

Ric's work went differently. He strolled in and proceeded to tip-graft suckers with about as much effort as dining out. He used parafilm to wrap the cuts and scions, which meant that once he left the job site, he had no need to return to remove the binding tape. I thought to myself, "If this works, I owe Ric a fair share of praise." It worked. Virtually 100% take.

However, by autumn, Alvin's bark-grafted trees remained more vegetatively advanced, and the growth was clearly more hardened for winter dormancy. The late-season timing of the shoot graft meant that there was less time for graft growth before winter. As a result, these later grafts overwintered smaller, more succulent, and so more prone to freezing injury. Fortunately, there was no frost in our South Coast Research and Extension groves that winter.

For a third treatment-comparison, I combined aspects of the two methods of Alvin and Ric. A third group of Bacon stumps was not grafted the first year. Early next spring, for each stump I selected two vigorous, well attached shoots to bark graft—with the dining-out ease of Ric. Each stumped tree had overwintered as a bush and was more cold resistant than either Alvin's or Ric's trees because of both its size and the Mexican-race genes of the rootstock. Moreover, the unhindered regrowth since stumping had permitted superior recovery of tree health and vigor; hence, first-season graft growth was remarkable. By the end of the first year, the graft union was so well healed that the grafts did not need a stake against fall and winter winds—unlike both the Alvin and Ric grafts.

How do the three methods compare overall? For these precocious 'Gwen' grafts, nearly all of Alvin's healthy trees set some fruit a year later (although the total was probably not enough to pay for my tendonitis recovery). Ric's trees set considerably fewer fruits—not necessarily a bad thing, since more crop could have retarded early graft development resulting in reduced long-term production. Of course, my third approach allowed no fruits their first year; however, the full quota of healthy trees set well the next spring, about equaling the total production over the two years of the other two procedures. Just how the various advantages and disadvantages balance out in general practice will vary with stock size, variety, budwood availability, follow-up care availability, presence of varmints, grafting skill, seasonal workload, harvest dates of previous crop, and perhaps other factors. The grafter must choose accordingly.

Note: This experiment was carried out with very large stocks; more typical, smaller-sized trees can be stump bark-grafted easily and rapidly by the experienced propagator. However, when larger trees are to be topworked, shoot grafting the next spring would probably be my first choice.

Early Spring Grafting

Once the danger of frost is largely over, grafting as early as possible gives a longer season of graft development for greater frost resistance the first winter, and grafting early in the season offers the optimum period for budwood selection. But, early spring grafting is often limited by a lack of bark slippage. Easy separation of bark from wood requires actively dividing cambial cells: cold induces dormancy, dormancy means inactive cambium, and so bark-grafting especially is more difficult in winter and early spring.

However, greenbark cambium tends to slip most of the year. As a result, one can get about a one-month jump on spring grafting (which does not generally begin until about mid-April). It is true that tools can be made or purchased that help to force the dormant bark open, but initial growth is much faster from greenbark grafts.

Late Summer Graftings

Advances have also been made extending the grafting season at the other end, especially for hot interior climates. Most commercial grafters routinely use some form of cover for summer protection, but aluminum foil is the most effective material that I have tried. It should have paper lining, or equivalent, otherwise any growth touching the foil will burn. By using this cover, one could theoretically graft all summer, even in the interior valleys. However, any grafting done beyond about mid-August runs too much risk of winter cold damage.

Cut Sealing

Traditional arboriculture literature recommends covering large tree cuts with a wound dressing like asphalt emulsion. New studies suggest that the asphalt barrier actually protects fungal spores from drying out, thereby increasing rot danger. There is a "happy medium" solution: dilute the asphalt to the consistency of cheap paint. Such covering can provide the cambium with enough protection from desiccation while allowing the woody central region to dry out enough that rotting is inhibited.

Final Muse

Let us assume that you follow recommendations made in this article.

And, let us assume that thereby you, in fact, increase your graft success. I regret to inform you that your work is not finished; the topic of grafting has an often neglected additional essential ingredient: Aftercare. Possibly you can enhance your overall avocado graft success by pondering also the following article in this Yearbook, Avocado Tree Structuring.