

Industry Funding of Avocado Research

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At the most recent annual meeting of the California Avocado Society, in San Diego, the question of whether or not California avocado growers really benefit enough to justify production research was raised publicly. Doubts on this point have been expressed earlier, by various people. The concern runs something like this:

"It's bothersome enough that California taxpayer money is used to fund research that tends to increase production when we already have too much fruit — research results that are soon used by our foreign competitors against us. But what's *really* galling is that we as an industry are actually choosing to 'tax' ourselves for this production research, and so we *are paying* to hurt ourselves!

"This situation may have been tolerable when we California avocado growers were getting a good return for our fruit. (Although, with hindsight, we can see how it may have contributed to our present economic woes.) It is surely no longer tolerable when many of us are now losing money. When Chile lowers our returns further by shipping in competing fruit of 'our' Hass.

"True, nearly all of the 5.75% California Avocado Commission assessment goes toward increasing the consumption of avocados. And I agree with that spending — it worked to strengthen my returns. But the 1/2 of 1% C.A.C. assessment diverted to production research seems to me to work in exactly the opposite direction. The proportion is tiny, but the principle is major: Let's quit taking money out of our own pockets and spending it so as to take more money out of our pockets!"

Granted, we all know that disaster results when production exceeds consumer interest at prices adequate for sustaining a healthy industry; in a free enterprise system, we still live or die by the supply/demand relationship. And equally real is the growing threat of fruit coming in from abroad; a June, 1986 report by the California Avocado Society on a survey of its members showed 77% of its respondents concerned about foreign competition, 10% more than the next highest percentage, concern about root rot.

We can agree on the problems. But, their causes — and their cures — are a more complicated matter. A truly comprehensive analysis is beyond both my expertise and a reasonable length for this article. A few observations follow.

When the issue of our foreign competition profiting from our grower-funded production research was raised at the C.A.S. annual meeting, discussion by Dean Seymour Van Gundy and others made several pertinent points.

First, international exchange of research findings is a two-way street. Some top quality

avocado research is being done in other countries. We have profited in many respects; e.g., 'Slow-flow' irrigation from Israel, Ridomil from South Africa, dry matter determination of maturity from Australia, our industry itself (including such recent finds as G755) was introduced from Mexico and Central America.

Second, modern transportation and communication inevitably makes us ever more "one world" And indeed, in the long run, the greatest good to the greatest number will accrue in the absence of artificial barriers to knowledge as well as goods.

Third, research findings are, on the average, most applicable to the particular environment in which they were made. What we discover in California *may* be adaptable elsewhere; it is applicable here. At the very least, California growers get California research results first and clearest.

This may be more apparent when reversed. If our foreign competitors put more effort into production research than we do, our industry can probably expect a gradual comparative decline into secondary status. Israel offers a provocative example of the positive: its excellent avocado production research helped to fuel a strikingly successful national industry, in spite of its relatively late beginning, its long distance from major (European) markets, and its intrinsically high production costs.

Fourth, in the long run, for any industry the alternative to progress from research is stagnation and eventual decline. This seems to me to be basic. Some research pays off immediately. Some will not for years. Some may not until our childrens' (or even grandchildrens') generation. We, the California avocado industry of 1986, have built on and are helped by research over the past 50 years and more.

But, once we reach a stage of "*over-production*," isn't it time to curtail production research? Well, what superficially appears logical may not survive close examination. Cyclic over-production is common for agriculture come-of-age, particularly with tree fruit; our present problems are one reflection of our maturing as a major horticultural industry. There are essentially two possible solutions *to* over-production: alternative uses of the land, or greater consumption of the product. (The latter reminds us that our avocados are actually not over-produced, but under-consumed; if all Americans ate avocados like Californians do, there wouldn't be enough to go around!) Our so-called over-production was probably due less to avocado research than to tax laws that encouraged tax shelter over-planting.

We may forget how remarkably our standard of living has increased, especially the quarter-century after World War II, and how this would not have been possible without the greatly increased efficiency of food production resulting from—production research. Within the agricultural spectrum, and certainly among tree fruits, there will be further research, further progress, further efficiencies, in the years ahead. Other things being equal, the industries that will thrive in the continuing competition for the consumer dollar (competition with foreign growers and also among the many available foods) are those that maintain a competitive edge — by research.

It is tempting to think that, in these difficult economic times of "overproduction," we can save a little money by cutting back on production research. Such an approach may, then, be "penny-wise but pound-foolish." The ultimate result could well be a stagnant,

faltering, and eventually permanently depressed California avocado industry.

Surely we want something far better for the magnificent fruits growing on the lovely green trees that decorate our southern California hillsides!

California Advantages from Production Research

Fifth, research that lowers production costs gives a competitive advantage to the local producer. I think that this is a highly significant point, not mentioned at our annual meeting.

Unless I have overlooked something, every single request for research funding made in autumn, 1986, to the Production Research Committee of the California Avocado Society for funding by the California Avocado Commission, was aimed at reducing the per-pound cost of producing avocado fruit. Some proposals approached this aim more indirectly. Others involved such cost-reduction factors as reducing post-harvest losses.

I will use my own research as an example. I am trying to breed root-stocks distinctly more tolerant of *Phytophthora cinnamomi* root rot than any now available. Tree injury or death causes obvious economic loss and so adds to average production costs. Preventative costs in the nursery add to tree cost, and in the grove add to cultural cost; both increase the production cost per pound. My major research project is variety (cultivar) breeding. I am trying to breed smaller mature trees, for lower cost of picking and of any needed cultural care. Above all, I am trying to breed heavier producing trees (with equally high quality fruit). Because there are major fixed overhead costs — taxes, management, irrigation, etc. — as production per acre goes up, production cost per pound goes down. There is a direct inverse relationship (Figure 1).

How does this give the California grower an advantage over more distant growers? Answer: By making production cost less important relative to shipping cost. Compared with the foreign competition that has begun with Chile and ominously looms much larger on the horizon, we California growers have one major disadvantage: higher production costs. And we have one major advantage: lower shipping costs to our major markets.

By far the best, ongoing, economic analyses of the California (and probably any other) avocado industry are provided by The Market Report of the Avocado Growers Association. Twice recently, The Report has addressed the question of the present Chilean competition. The December 31, 1985 issue made a brief statistical inquiry, concluding: ". . . we (California) can compete, *but only if we increase our productivity.*"

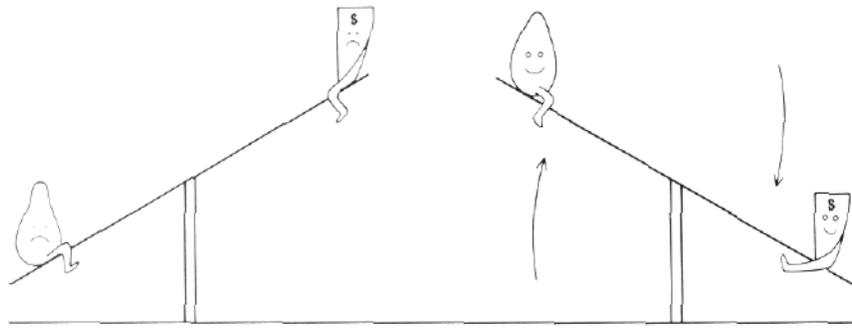


Figure 1. Low production per acre means high production cost per pound, but high productivity means low per pound production cost.

The July 15, 1986 issue has a much more detailed analysis, under the heading: *Gwenonomics—the Vital Role of Productivity in Our Future*. It concludes, "Productivity is our salvation. The great sin would be to cling thoughtlessly to the past." The article first compares us with Chile, at two production levels. The Report assumes future production in *both* countries of 30,000 pounds per acre (made possible chiefly by UC Riverside production research). That reduces calculated production costs to 8.3c/lb. in California, compared with 2.7c/lb. in Chile. Even assuming that the "head-on clash" is in Philadelphia, much farther for us than our major, nearby markets, The Report estimates transportation plus duty for Chile at 22.5c/lb., compared with 10.0c for us. Granted another 2c or so extra packing and miscellaneous costs for us, we still end up able to sell avocados in Philadelphia at about 5c/lb. less than the Chileans.

But the long-range Hass production average in California has been under 8,000 lbs/acre (Takele, 1984), about the same as the present Chilean average. Assuming that production cost per pound is about doubled at this lower production in both countries (the exact figures are not important; the relative figures are), ours increases by 8.3c and theirs by 2.7c/lb., for a calculated 5.6c disadvantage for us at present production levels. That would more than wipe out the potential 5c per pound advantage calculated by The Market Report.

As The Report notes, "The advantages of low labor costs that some countries would have in producing the fruit at one-third our cost makes little difference when per pound production costs are under 10 cents. Transportation costs then become the critical factor." The Report makes a similar statistical analysis of potential Mexican competition, concluding that on the Los Angeles market we again have a cost advantage *if* production per acre is much higher in both countries than the present averages.

Water is another production cost strikingly higher in most of southern California than in the avocado growing areas south of the border. The one major production comparison that has been made between Hass and Gwen so far is our replicated plots at the South Coast Field Station. By three years from topworking, the Gwens have produced over twice as much fruit per tree on trees one-third as large. That is, it would have taken something like six times as much water to produce a pound of Hass fruit as a pound of

Gwen fruit.

This is by no means to argue that Gwen should therefore replace Hass. The long-range performance of Gwen in the industry generally (and even at S.C.F.S.) remains to be seen. But, the Gwen and Whitsell, with newer selections that are even much less tested, do argue strongly that it is possible to find new varieties comparable to Hass in quality that are far more precocious and far heavier bearing, on far smaller trees. And our recent superior breeding parents suggest that our best finds of all may prove to be seedlings of the future,

The point of the discussion is that varietal breeding can make highly significant contributions toward rendering our industry more competitive among international producers. The same logic applies to making it more competitive among other foods contending for the American consumer dollar. And varietal breeding is only one example of production research potentialities in building a stronger and more profitable California avocado industry.

In one of his meaty, informative reports to the California Avocado Society membership this year, President Brokaw included this observation: "As many of you know, our industry is entering a new international phase, and California's advantage rests in having the latest technological knowledge available, including new and more productive varieties available to us on a year-round basis."

There is an additional significant aspect. During our discussion at the annual meeting, it was stated that production research cost reductions are advantageous primarily to the first growers to adopt them; the competitive advantage of each public research advance lasts only about three years. That observation is true of competition within a given area. But it is *not* true of international competition where shipping costs are major: production cost reductions give an advantage to local producers that is *permanent*. *The advantage is especially vital in situations like ours where production costs are high relative to our competitors.*

Occasionally, I encounter questions like: "Varieties with better production, etc., always appear desirable, but are there any real benefits for us when foreign competitors soon are using our improved varieties?" Or, "Growers are appalled to find that the varieties discovered in part with their money are quickly adopted by international growers who will be competing with us. Wouldn't it be best to just cool research and quit helping the competition?"

I trust that this article will have answered questions like the above. I trust that the reader will conclude with me that California production research may be our last, best hope to establish and maintain a profitable competitive edge.

Another objection: "Maybe so, but let's reduce governmental bureaucracy and taxation by leaving production research to *private* enterprise." By all means; let's do so whenever we can.

But, there are two serious limitations to private research. First, some research is so long-range and so expensive that private individuals cannot do it and survive in the short run. Second, private research results are commonly restricted to their discoverer, by patenting or ordinarily just by not making the knowledge public. This is only right, and

justifies the research expense. Yet, this tends to restrict the benefits to the discoverer. Indeed, his resulting competitive advantage may hurt the rest of the industry. And, because only the largest units may have the financial strength to conduct certain research, when private research dominates it is the "little guy" who tends to get frozen out.

A final objection: "OK, most of this seems to make sense. But don't forget that Bergh himself is funded by grower money. Therefore, his comments here are self-serving. So we better take all this with a large grain of salt!"

True. Right on. Guilty as charged. (However, in a very few years I'll no longer be in that situation. Set free from the somewhat uncomfortable position of arguing for my personal financial support, I honestly believe that I'll feel the truths of this article even more strongly.)

A couple of final points *re* foreign producers. Because all countries are required to pay the same (at present, \$1 per tree) royalty on UC patented varieties, and because little of their resulting fruit would be expected to compete with our own, and because all of my royalty receipts are immediately ploughed back into avocado research — foreign countries are, in reality, helping to pay *our* production research costs. Along that line, for two of my selections that will not be patented because they are not good enough under California conditions, Israel has agreed to pay \$5,000 into my research fund — to help my search for better avocado varieties for California. (A Spanish entrepreneur offered in writing to pay us 350,000 for the rights in Spain to my selections, but such an exclusive arrangement is precluded by University of California policy.)

Another type of question has come up repeatedly: "But, will foreign individuals actually send us the royalties that they owe?" Through the UC patent office, we are keeping a reasonable handle on the patented varieties, working with official, trustworthy agencies in other lands. We believe that it will work well, at least in most countries.

The specific question has been asked: "Do you think that the Israelis will pay up?" From my knowledge of the organization of the avocado industry in Israel, and its leaders, I confidently expect over 98% compliance in royalty payments. Can I expect as good in California?

Conclusion: Production research, funded in part by grower assessment, appears to offer the best long-range hope for maintaining a financially sound California avocado industry.

Acknowledgement

The illustration for Figure 1 was drawn by Ms. Linda Bobbitt of the Department of Media Resources, University of California at Riverside.

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