

The New Gwen and Whitsell Avocados

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Two years ago (Bergh and Whitsell, 1982), we reported on the three varieties (technically "cultivars") being patented by the University of California. This is a progress report on their performance since that time. Each has now been assigned a United States plant patent number, as 1 below.

Esther (#5309). Our previous report noted that it "Has an insipid flavor until late in the season, and then is not very 'nutty'; flavor rated only 'good' ' The subsequent summers of 1982 and 1983 were unusually tropical' for southern California, with higher humidity and an unusual number of warm nights. Perhaps for that reason, Esther fruit quality declined disastrously for each of these two autumns-to a level consider not acceptable.

Enough harm has been done to our avocado markets by fruit that i. inferior from under-maturity, over-maturity, or just inherent lack of quality without further hurting consumer satisfaction by introducing a variety that (in some years) fails to produce good quality fruit.

The chief problem both years was that the flavor passed from too bland in summer through unpleasant or "off" in early fall to rancid over-mature, without ever being really worth picking. Moreover, although in previous years it had hung with acceptable quality through January or even well into February, these two years it was objectionably over-mature by November, in terms of both flavor and flesh color. We used to say to each other "Yes, Esther doesn't have the greatest taste in the world, but at least it is clearly better in the fall than over-mature Hass." Now, we just say, "Yech!"

This past fall, the flavor was somewhat better again. But not enough better to redeem it. And, whatever caused the disasters of 1982 and how frequently may they recur?

Moreover, although in our report two years ago we estimated productivity as very heavy and in fact equal to Gwen, subsequent experience on larger numbers of young trees has not been as favorable (Tables 1 and 2).

We now expect that it will about equal Whitsell and significantly outbear Hass, but not be in the Gwen class.

But the really serious detriments are season and especially flavor and these give it a present label of "not recommended for planting. We did permit the patent to go through, because it takes so long to obtain one from scratch, and always there is the hope that something (a new rootstock? micro-climate? processing use?) will turn up that induces consistently good Esther fruit quality.

Table 1: Trees topworked in Field 2A UCR, Spring 1982.

Variety	<u>Average Number of Fruits/Tree, Set Spring</u>		
	1983	1984	Total
Hass	0	46	46
Fuerte	0	22	22
Pinkerton	22	44	66
Reed	26	79	105
Gwen	54	149	203
Whitsell	9	161	170
Esther	46	81	127
Hx48	5	148	153

Table 2: Selection "minitrees"* planted Spring 1982.

Variety	<u>Average Number of Fruits/Tree, Set Spring</u>		
	1983	1984	Total
Gwen	6	34	40
Whitsell	1	22	23
Esther	0	27	27
Hx48	1	28	29

*8" to 12" tall, from 2" by 10" nursery lines.

Whitsell (#5299). Our evaluation of it is essentially unchanged from two years ago.

The Whitsell spring 1983 set was disappointing, but in spring 1984 it set very heavily. The data in Table 1 are based on 13 (or less) trees per variety, and so cannot be regarded as very precise. They do agree rather well with our observations elsewhere; perhaps the chief surprise would be that Reed has outborne Pinkerton (and Hass) by that wide a margin, so far.

Only two years' data are obviously inadequate. However, we have previously found a strong correlation between precocity—whether as own-root seedlings, planted grafts, or topworks—and ultimate total bearing capacity. There are exceptions. For example, Bacon usually has less long-term productivity than its relative precocity would lead one to expect. And one could expect examples of the reverse: light early crops with good tree development, ultimately giving rise to regular heavy production. But such exceptions are rare in our experience—nearly always, the more precocious a variety, the heavier its annual average production will be.

One complication is with varieties that bear alternately. Hass does this on a tree basis, especially as the trees reach maturity. Whitsell does it much sooner, perhaps because it combines a dwarf tree with heavier setting ability. Because the Whitsell trees set so

lightly the first year (1983), they all were in physiological condition to set very heavily in 1984—and so they did, out-producing everything else (Table 1).

But this means that they are expected to set much less this spring (1985). After two years, the Whitsells averaged nearly four times as many fruits as Hass. Because the Whitsell tree is hardly half as large, this means about eight times as much Whitsell fruit per tree volume. But the (alternating) Whitsell set should be considerably lower the third year, considerably reducing its advantage over Hass. We think that our guess of two years ago, that Whitsell will average about 40% more fruit per acre than Hass, is still as good a guess as we can make.

Another complication is differences in fruit size. Table 1 gives fruit numbers only. This is somewhat unfair to larger-fruited varieties like Reed and Pinkerton, and to a lesser degree, Whitsell and Esther.

Although ultimate size and growth rate are not yet clear, Whitsell trees should be given about one-half the ground spacing of Hass. Thus, under conditions of soil, climate, care, and tree-removal plans where Hass is planted 17 feet square, Whitsell could be planted 12 feet square.

Two years ago, we suggested that Whitsell might be pickable a month earlier than Hass; e.g., in February in situations where Hass is coming off in March. This was based on the larger Whitsell fruit size, plus good-flavored fruit that we had sampled as early as January. But we are now more aware of fruit-to-fruit variability, and we think it safer to consider Whitsell as commercially maturing possibly two weeks later than Hass.

Whitsell fruits hang about as long and as well as Hass. But they become quite russeted toward the end of the season and may also then be uncomfortably large.

Whitsell uses:

1. **Cross-pollinator.** Its "B"-type flower can be expected to increase the production of Hass, Pinkerton, Reed, Gwen, and other "A"-types.
2. **Early Hass season.** Even if it matures a little later than Hass, Whitsell's larger fruit size can be valuable during the period when Hass fruits average smaller than the market ideal.
3. **Early Eastern season.** Although it is rough-skinned, it is green and rather large-fruited by the April-June period before Florida enters its developed market. Whitsell is also less "nutty"-flavored than Hass (or Gwen), which may make its entrance into the market easier.
4. **Topworking in crowding Hass groves.** Rather than just removing every other row, topworking that row to Whitsell can mean more fruit production two ways:
(a.) more cross-pollination set on the remaining Hass, (b.) fruit set on the dwarfier Whitsell topworks.
5. **In its own right.** A heavy producer of high-quality fruits, with a thick, rough skin like Hass, on small trees with low picking costs, the Whitsell merits wide testing for major commercial usefulness.

Gwen (#5298). Two years ago, we suggested that it might mature a month earlier than Hass, based on good flavor as early as December in some fruits. As with Whitsell, we are now evaluating this more cautiously, and we now suggest that Gwen usually reaches palatable maturity about the same time as Hass. It usually stores on the tree at least as long as Hass. A tree of Gwen may provide reasonably palatable fruit each month of the year—but so may a tree of Hass in the right climate.

Two years ago we noted that some Gwen fruits ripen with unattractive black discolored areas. This became more pronounced and of greater concern after the more tropical summers of 1982 and 1983, sometimes accompanied by much more serious flesh rots. Hass fruits from the South Coast Field Station had some similar flesh rots, but fewer, and its black skin camouflaged darkened skin spots. Suggested explanations have included the weather itself, as in the case of Esther; for the greater prevalence in Gwen, the known presence of viruses and severe cutting for budwood have been postulated. We have found almost no Gwen fruits with rot spots or even darkened skin areas so far this season and hope there will be no significant future problems.

As in the case of Whitsell, uncertainties concerning growth rate and mature tree size remain. We would now suggest about the same planting distance for Gwen as for Whitsell, standardized at about one-half the area per tree of the Hass standard, about 12 feet square. Comparable spacings such as 10 feet by 15 are, of course, possible.

Under conditions of shallow soils, or chilling ocean summer breezes, or limitations of irrigation or fertilization, or semi-dwarfing rootstocks such as even Duke 6, both Gwen and Whitsell might be maintainable at this spacing indefinitely without tree thinning. Where the contrasted growing conditions stimulate maximum vigor and tree growth leading to crowding, Gwen is highly unusual among avocados in that it can be severely pruned with minimal effect on subsequent fruit production.

Gwen productivity has been even more remarkable these past two years. Table 1 illustrates that its early production after topworking was over four times that of Hass per tree and in fact has been greater than any other of our selections (most of which are not listed in the table).

A number of our better selections were also planted out as very juvenile grafted trees, from small liners. It is surprising if such tiny trees could set any fruit a year later—Gwen set more than all other selections combined. Gwen also led the second year, when the trees generally were of a more commercial size. Table 2 lists the four top producers to date.

Two years ago we suggested that Gwen might be expected to produce about twice as much fruit per acre as Hass. Since it should be planted at twice as many trees per acre, this ratio will be achieved if the two varieties average a similar number of fruits per tree. The data of Table 1, with results from a few older trees elsewhere, suggest that a 2:1 Gwen advantage over Hass may be an understatement.

When one adds to this the greater year-to-year production consistency of Gwen (demonstrated elsewhere), plus the smaller size of the tree (for cheaper harvesting), plus the superiority of its flavor (for consumer satisfaction)—the Gwen becomes indeed

a remarkably promising new variety.

The importance of better production to a healthy fruit industry is generally recognized. In the **Avocado Grower** magazine for March, 1983, Bob Coleman of Calavo (and Cal Flavor) is quoted: "The only way for growers to increase earning power in today's market is with higher net yields per acre." And the November, 1983 issue interviewed Steve White of the California Avocado Commission's Marketing Committee, reporting him as "bullish on the industry's future," but "White sees great importance in increasing grove production...Ten thousand pounds per acre will not be enough to keep some groves going..." The September 13, 1983 issue of the Avocado Growers Association **The Market Report** points out: "At the outset, we must recognize our problem of inadequate return to growers. This must be approached from three directions at the same time: (1) Increased productivity, (2) lower costs, and (3) higher returns. In one sense, CAC only impacts No. 3..." And the November 1, 1983 issue of **The Market Report** adds: "We have not touched on increased productivity based on new varieties or new cultural techniques. We don't undervalue this area for it is likely to be highly important... an advantage for those who promptly take advantage of the best new varieties."

Figures 1 and 2 illustrate Whitsell and Gwen productivity.

With substantial fixed costs, higher production means higher grower profit at a given fruit price. This means a competitive advantage within our California industry. It also gives our California industry an advantage in competition with avocados from Florida, possibly from Israel, and from Mexico if the seed weevil embargo is ended for some regions. It also gives the avocado industry an advantage in competition for the consumer's produce dollar.

To cite a specific example, it probably takes less than half as much irrigation water to produce a Gwen fruit as to produce a Hass fruit.

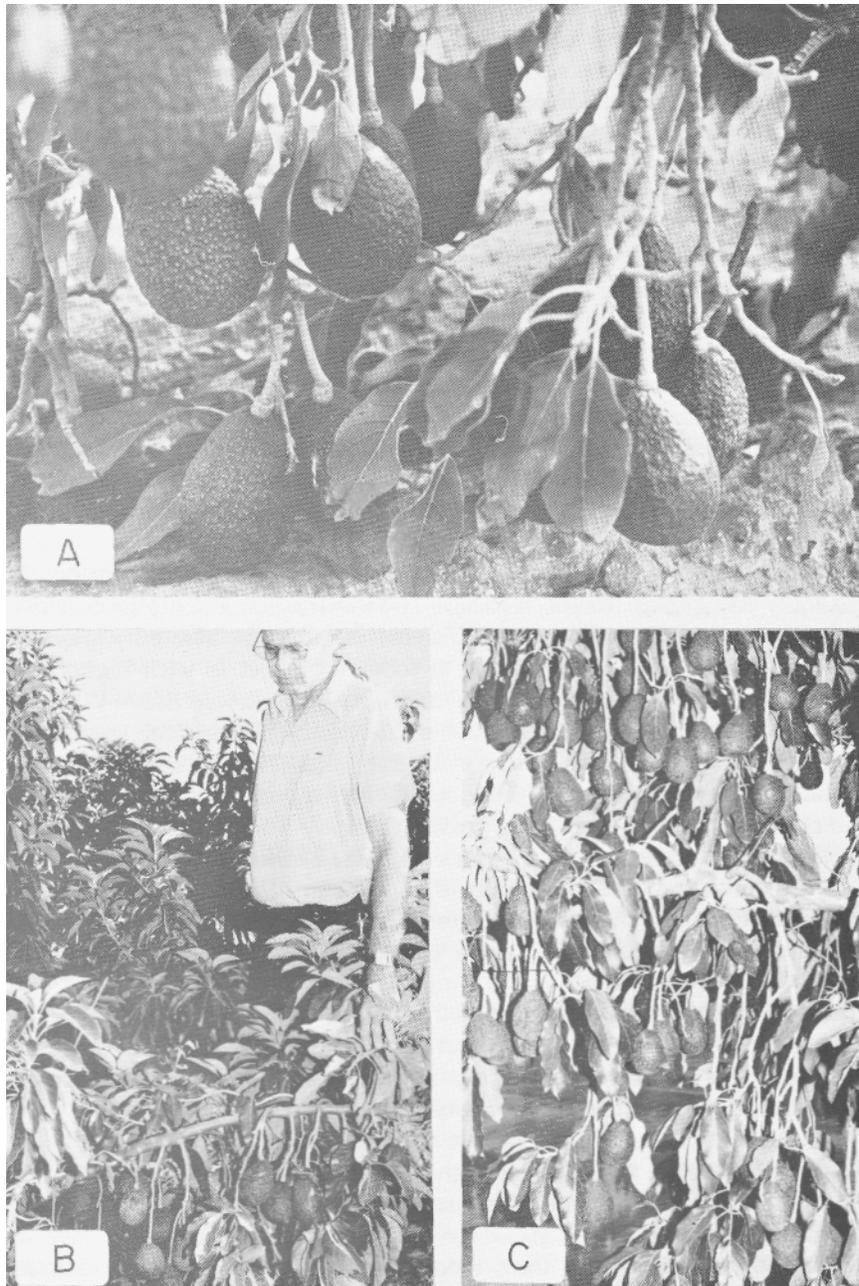


Fig. 1. Whitsell fruit set. A—one year after normal planting. B—two years after planting from liner. C—two years after topworking. All were photographed about six months after fruit set. The respective numbers of fruits on these trees: A—26, B—38, C—230. in B, normal-sized trees of the same age are shown in the background.



Fig. 2. Gwen fruit set. A—one year after planting from liner. B—two years after planting from liner. C—one year after topworking. D—12-year-old tree. All were photographed about six months after fruit set; except A, photographed a year after fruit set (two years after planting), and showing good new bloom for second year's set. The respective numbers of fruits on these trees: A—11, B—49, C—J08, D—"several hundred." A and B are the same tree. C set j30 fruits its second year.

Like Whitsell, Gwen trees can be planted as ordinary nursery trees in new areas. In our present situation of acreage retrenchment (and pain in the nursery business!), new varieties are more likely to be established by topworking. Zutano or Bacon (or Reed) trees, established at about 15 feet square or closer, can be topworked to Whitsell or Gwen with efficient use of space. But present spacing of about 20 feet square or more may never be filled in by Whitsell or Gwen topworks because of their semi-dwarf nature and the fact that topworking makes trees more upright. Such topworks may well produce considerably more fruit and profit than the original trees, but less than the acreage potential.

As the wider-spaced Hass or Fuerte trees begin to crowd, alternate rows can be topworked to Gwen, even as suggested earlier for Whitsell. In the case of Fuerte, a type-"B" flower, Gwen can provide reciprocal pollination, even as Whitsell does for Hass. For alternate-row topworking in crowding Hass, we do not know which will result in the greater total production. The greater expected set of Gwen is balanced against the greater expected pollination benefits of Whitsell. Whitsell may well give the greater production overall. Both new varieties should provide significant advantages in grower profitability over alternative ways of dealing with Hass crowding.

How long the half-topworked grove will go before beginning to crowd again will depend on the local conditions. The upright, smaller topworks will allow the grower a number of

years experience before the decision has to be made to retain both varieties—or just one—or neither.

Among all of our selections, both new and old, none appears at this time to be as commercially promising as either Gwen or Whitsell.

CAUTION. We do not yet know enough about these new varieties. For example, performance under long-range commercial shipping is untested. Even the indicated heavy production must be confirmed by large-scale testing in different regions. And the very sources of their strengths, smaller trees with more fruit, may, as the other side of the coin, cause a need for more careful rootstock selection or irrigation, or for more fertilizer.

Unexpected findings keep occurring. The topworked grove at UC Riverside has already yielded two surprises. First, both Gwen and Whitsell have dropped fewer fruits than others of our selections in severe Santa Ana winds. Second, both varieties have also suffered comparatively less drought injury. Other surprises may come that are not so pleasant!

Literature Cited

Bergh, B.O., and R.H. Whitsell. 1982. Three new patented avocados. California Avocado Soc. Yrbk. 66: 51-56.