SWOT analysis, from interviews with custom planters, growers, & distributors

Agriplanter	Strengths	High speed, low labor requirement, high degree of adjustability, good customer service
	Weaknesses	Most short & long skips of all tested planters. Performance most dependent on good quality trays, plants, bed prep
	Opportunites	Increasingly cost-effective if labor costs continue to rise, availablity to decrease
	Threats	Depends on availability of good plants, skilled labor. If these become less available, may do a poorer planting job
Futura	Strengths	Low labor requirement @ medium speed. Lower price, fewer skips than Agriplanter, may be more adaptable to poor bed prep
	Weaknesses	Slower than AgriPlanter, may translate to higher labor costs/acre. Difficulty with leggy plants. Somewhat higher maintenance costs
	Opportunites	Increasingly cost-effective if labor costs continue to rise, availablity to decrease.
	Threats	Depends on availability of good plants, skilled labor. If these become less available, may do a poorer planting job
FMAX	Strengths	Fewest skips of all tested planters. Adaptable to many crops, configurations. Special shoe may decrease heat damage.
	Weaknesses	Slowest of all tested planters. Requires contract labor. Does not perform well on hard clay soils.
	Opportunites	If incidence of hot weather during planting increases, narrower shoe/more targeted water delivery system may be an advantage
	Threats	Increasing cost, lower availability of contract labor.
Finger	Strengths	Least expensive. Least sensitive to non-ideal planting conditions. Very adaptable (crop type, configuration, depth)
	Weaknesses	Highest labor requirement; contract labor necessary (must be skilled). Wide shoe; may require more transplant water
	Opportunites	As processing tomato productions expands to new areas, adaptability & robustness may be an advantage
	Threats	Increasing cost, lower availability of contract labor.

Conclusions

Trial results suggest that under a range of representative growing conditions for high-yielding processing tomato production in the southern Sacramento Valley, planter type is unlikely to influence fruit yield or quality. While the automated planters (especially the Agriplanter) have more frequent skips, they were small and rare enough that they didn't influence yields. However, while planting conditions were different in all three fields, it's important to note that:

1. Each machine was operated by a grower and planting crew experienced in its use
2. Apart from the high wind at the Dixon site, planting conditions were generally good (e.g. moderate temperatures, excellent bed prep, generally good quality transplants and trays.)
3. All three fields were flat, did not have major differences in soil type or drainage, and did not have any complicating surface conditions such as stones or undecomposed biomass.

Sponsored by the California Tomato Research Institute

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Contact:

This study: Patricia Lazicki (palazicki@ucanr.edu)

Ferrari Futura & FMAX: Todd Diederich, MTD transplanting (todd@mtdfarms.com)

AgriPlanter: Eric Puehler, Puehler Ag (eric@pagco.us)

Automated Transplanter Study: Field performance & cost analysis

This is a brief summary of the findings of a 2024 field study comparing performance of two automated planters (the Agriplanter and the Ferrari Futura) with two traditional planters (a Ferrari FMAX carousel planter and a finger planter). Replicated side-by-side trials were performed in three different grower fields in Yolo & Solano counties. Measurements include planting depth, the number and length of skips directly and 3 weeks after planting, and fruit yields and quality.

For the cost component, interviews with distributors, growers and custom planters were used to compare costs, strengths, and weaknesses among different planter types.

The full report can be found here: http://ucanr.edu/u.cfm?id=352

This study was funded by the California Tomato Research Institute

Dr. Patricia Lazicki
UCCE Vegetable Crops Advisor
Yolo, Solano & Sacramento counties
palazicki@ucanr.edu

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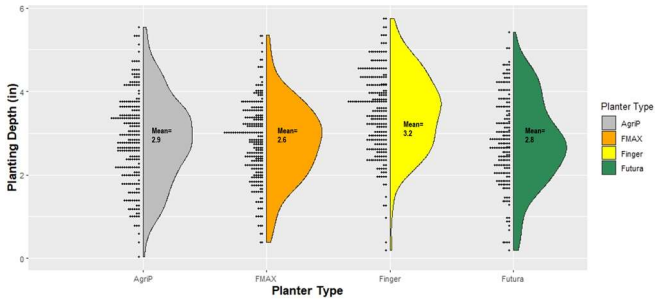
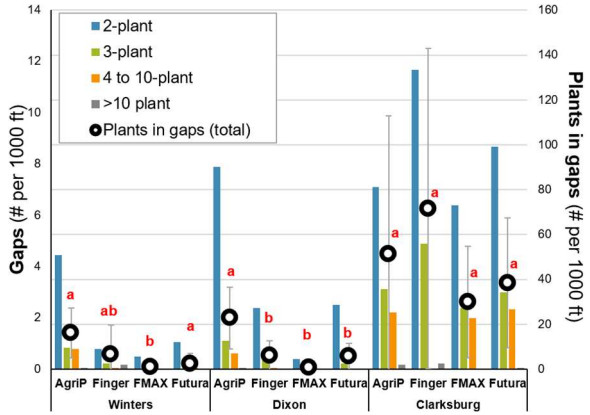
Planting depth was similar



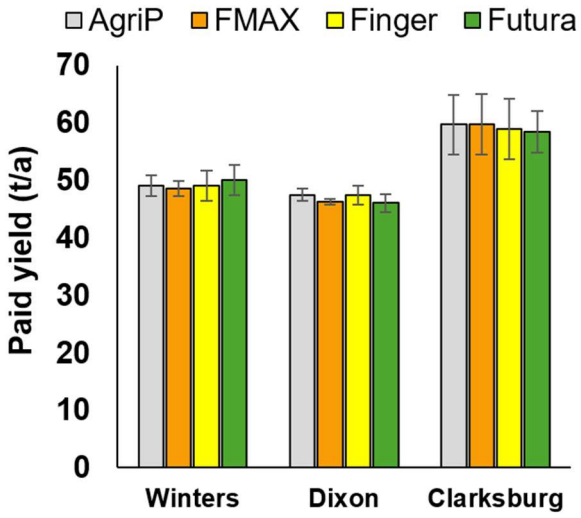
Planting depth (calculated as the difference between the average height from soil line to growing tip in the tray vs in the field) mean and variability were similar among planter types

Plant skips & gaps

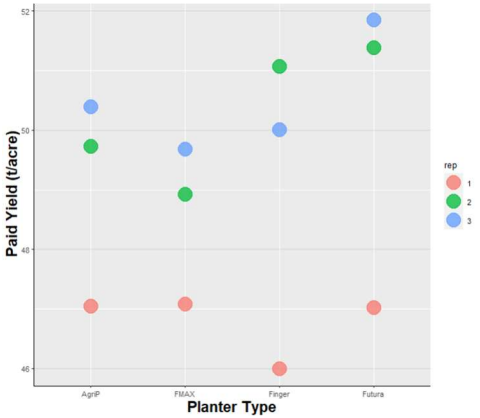


In the Winters and Dixon fields, the AgriPlanter had more skips measured at planting and gaps measured 3 wk after planting. The FMAX had the least. However, skips longer than 2 plants were rare for all types (<1 per 1000 ft). In the Clarksburg field, irrigation issues after planting caused greater mortality. There was no difference in stand establishment among planters at this site.

Yields did not differ among planter types at any site



Planters did not affect total or paid yields at any site. Cull percentage and processing quality were also similar. The differences between sites and replicates within a site were greater than the average difference among planters. The example below shows yields from each replicate at the Winters site.



Estimated costs, from grower & distributor interviews. ***Costs reflect only those directly associated with the machine itself, not the full cost of the planting operation.*** *Calculations exclude forklift/water truck operator.*

		AgriP 3-row	Futura 3-row	FMAX 3-row	Finger 3-row
	Acres per shift (seasonal avg)*	16 – 30	10 – 20	10 - 11	11 - 12
	Shift length (hr)	10 – 12	8	8 - 8.5	8 - 8.5
	Acres/ man-hr (seasonal avg)**	0.5 - 0.9	0.4 - 0.8	0.2 - 0.3	0.1 - 0.2
	Avg crew wage($/hr)***	$80	$80	$137	$205
	Avg labor cost ($/acre)	$29 – 44	$32 – 43	$100 - 117	$137 - 145
	Estimated diesel cost ($/acre)$	$5.44 - $7.25	$7.16	$4.63	$3.86
	Estimated maintenance cost ($/acre)$$	$3.00	$5.10	$4.50	$7.00
	Total average running costs ($/acre)	**$45.85**	**$49.76**	**$117.63**	**$151.86**
Cost per acre (5-year depreciation schedule)	Example purchase price	$352,000	$198,000	$63,000	$7500 (used)
	1000 acre/yr	$116.25	$89.36	$130.23	$153.36
	1500 acre/yr	$92.78	$76.16	$126.03	$152.86
	2000 acre/yr	$81.05	$69.56	$123.93	$152.61

*Grower and distributor-reported seasonal estimate (integrates breaks, cleaning, maintenance)

** Calculated using grower estimates of daily acreage, crew size, and shift length; not including water truck/forklift

Assumes 3 crew on automated planters

*** Calculated using averages of grower-reported wages for farm and contract labor

(Contract wage: base: $16; supervisor: $18; contract fee: 42%. Farm wage: base: $19, machine-operator: $22; benefits: 35%)

$ Calculated using grower reported diesel usage (per hour or per acre), California 5-yr average diesel cost of $4.63/gal

$$ As reported by Ray Yeung (AgriPlanter, FMAX, Finger) and Todd Diederich and Brad Strock (Futura)