

Indian River [IR] Minneola Rootstock Trial, Vero Beach

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CREC Citrus Plant Improvement

IR Minneola Rootstock Trial - Description

In this trial with Minneola tangelo scion, the main objectives were to control tree size by rootstock choice and determine if that increased fruiting without sacrificing fruit size, and to evaluate tree response to HLB. Evidence from other trials indicated such rootstocks as Flying Dragon trifoliolate orange [FDT] had such effects; thus, FDT was included as the comparison standard for a group of somatic hybrids and other stocks that were promising for tree-size control in other trials.

This trial was planted in a commercial Minneola block with Temple as a pollinator. Among the Temple trees were 50 trees of a selection known as Fertic discovered as backyard trees in a Kissimmee homestead. Molecular analysis indicated the trees matched those of true Temple, however, the Fertic trees while growing in a St. Cloud cooperative project displayed no scab on the fruit or tree.

Also, planted adjacent to the main trial were Minneola trees on C-35 citrange, Cleopatra mandarin and Morton citrange in sets of three, i.e., groups of one tree on each rootstock.

IR Minneola Rootstock Trial - Summary

- Location: Vero Beach, Indian River County
- Scion: Minneola
- Rootstocks: see Table 1.
- Date planted: May 2000
- Design: Randomized complete-block; 2 or mostly 3 replications
 - Plot size: 10-12 trees
 - Spacing: 10 x 25 ft. or 174 trees/acre
- Data:
 - 2017/18: HLB rating; juice quality*.
 - 2018/19: HLB rating; juice quality*; yield, PS/acre.
 - 2019/20: HLB rating, juice quality*.
 - 2020/21: HLB rating, % survival, yield, tree height.

() No fruit was available for Willits rootstock at the time of sampling*

- Trial status: **INACTIVE**

Table 1. IR Minneola Rootstock Trial - List of rootstocks, parentage and number of trees.

Rootstock	Parentage	Number of Trees
C-35 citrange	Ruby swt. x WF TF	53
CL+ATF	Cleopatra mandarin + Argentine trifoliolate orange [somatic hybrid]	23
CL+FDT	Cleo + Flying Dragon TF [somatic hybrid]	25
CL+SwC	Cleo + Swingle citrumelo [somatic hybrid]	38
Cleo	Cleopatra mandarin	123
FDT	Flying Dragon TF	33
Mort	Morton citrange	41
RPxFDT	Ridge Pineapple orange x Flying Dragon	20
Willits	Ruby swt. x TF	33

IR Minneola Rootstock Trial - Interpretive Summary [as of July 2021]:

This small trial was planted in 2000 mainly for observational purposes to see how somatic hybrids, a new type of rootstock, would perform especially with regard to reducing tree size. The trial was designed with replicates to allow statistically valid data to be collected as possible. The trial was inactivated in 2021.

Tree survival [Fig. 22]. Most of the original trees survived except for those on CL+ATF [60%] and RPxFDT [70%].

Tree ht. [Fig. 23]. At age 11 years, tree height ranged from 12 ft. [e.g., RPxFDT and FDT] to 9 ft. [C-35 and CL+FDT].

HLB. Ratings were made in four seasons with visible symptoms apparent, but with no overall strong effects or clear distinctions among rootstocks. In most seasons, the most obvious effect was fruit drop, again with no differences among rootstocks.

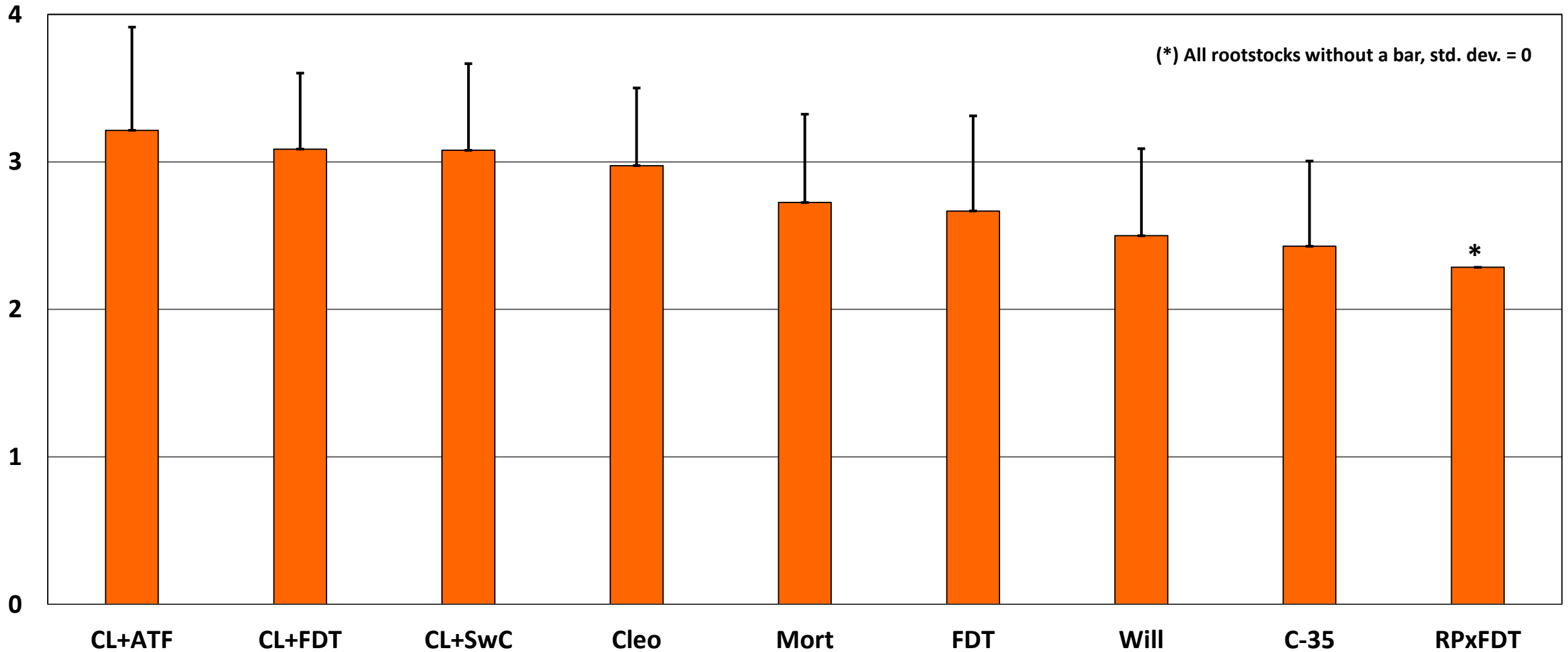
Yield [Fig. 25]. In the two years yield was measured, data were obtained for both years from 6 of 9 rootstocks. Most trees were similar in tree height and yield to those on Cleopatra mandarin.

IR Minneola Rootstock Trial - Interpretive Summary [as of July 2021]:

Juice Brix. Over three seasons with fruit samples collected in January, Brix values were mostly in the range of 10.5 to 13. In two seasons, the higher values were from trees on FDT and CL+FDT rootstocks. However, bear in mind that the presence of HLB among the trial trees may have influenced the data. No separation of fruit into that with or without HLB symptoms was attempted during sampling.

Rootstocks. For those trees on rootstocks with 90-100% survival, no dramatic reduction [>30%] in tree height was achieved nor any substantial improvement in juice quality or tolerance to HLB. Minneola was compatible with all the somatic hybrid rootstocks and Flying Dragon trifoliolate orange.

Fig. 1. IR Minneola Rootstock Trial – HLB rating: mean + std. dev. [January 2018].



HLB Rating

- 0= dead or severely declined.
- 1= overall poor condition; lt. crop; small fruit, most dropped.
- 2= some leaf symptoms and decline with significant fruit drop.
- 3= average-fair condition; good crop; little drop.
- 4= good tree condition; few leaf symptoms; good crop; little drop.
- 5= excellent tree condition/crop

Rootstock

Fig. 2. IR Minneola Rootstock Trial – Juice Brix: mean + std. dev. [January 2018].

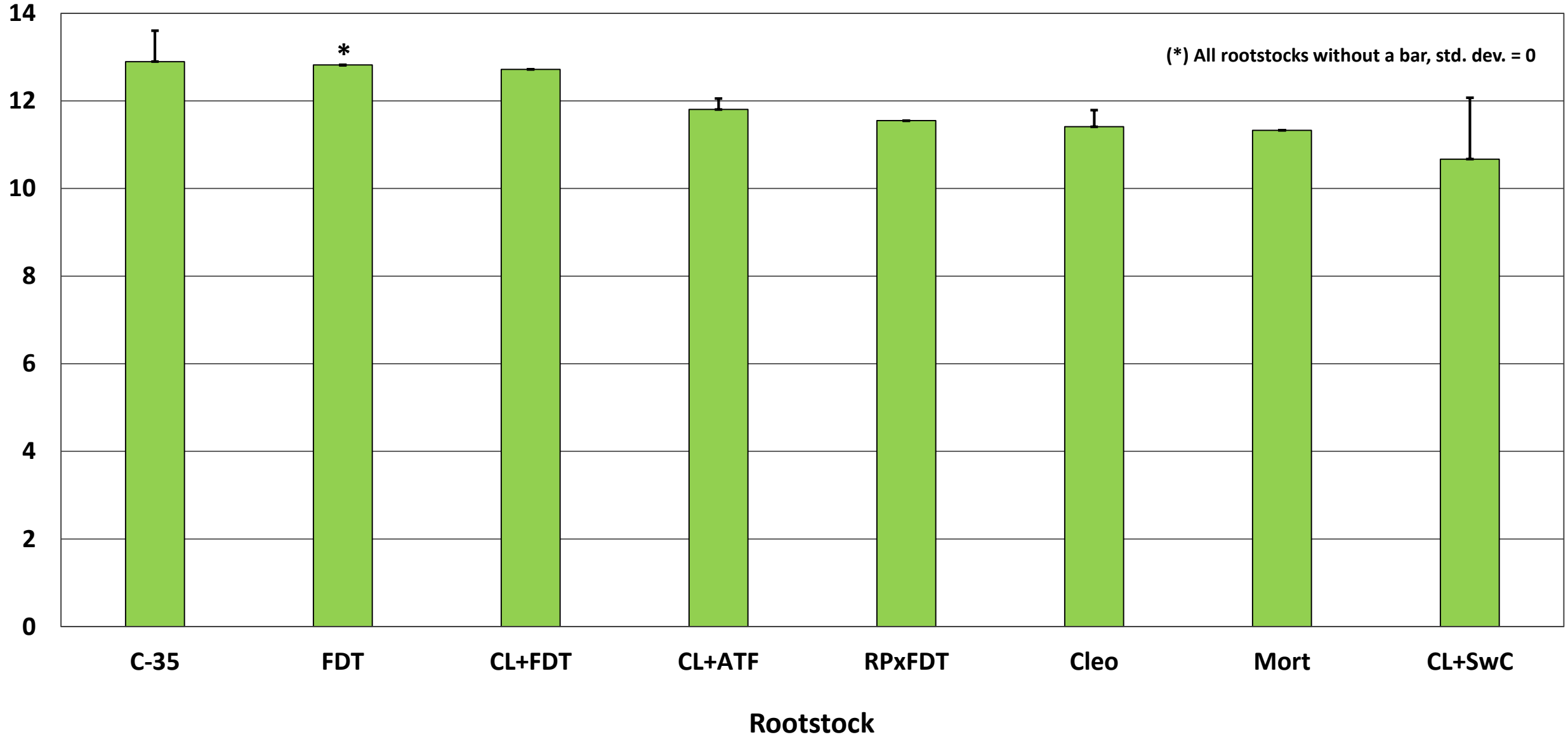


Fig. 3. IR Minneola Rootstock Trial – Juice Acid: mean + std. dev. [January 2018].

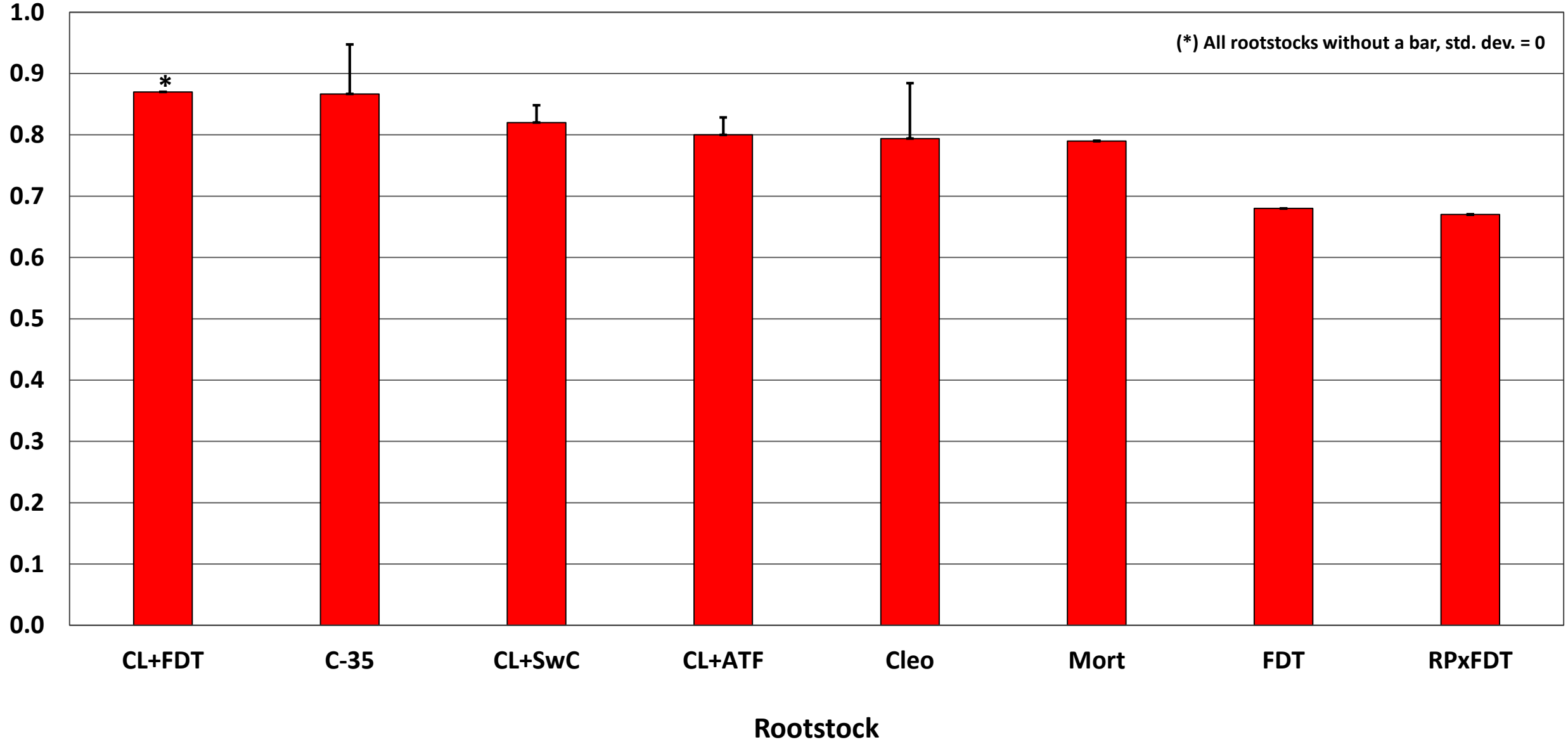


Fig. 4. IR Minneola Rootstock Trial – Juice Ratio: mean + std. dev. [January 2018].

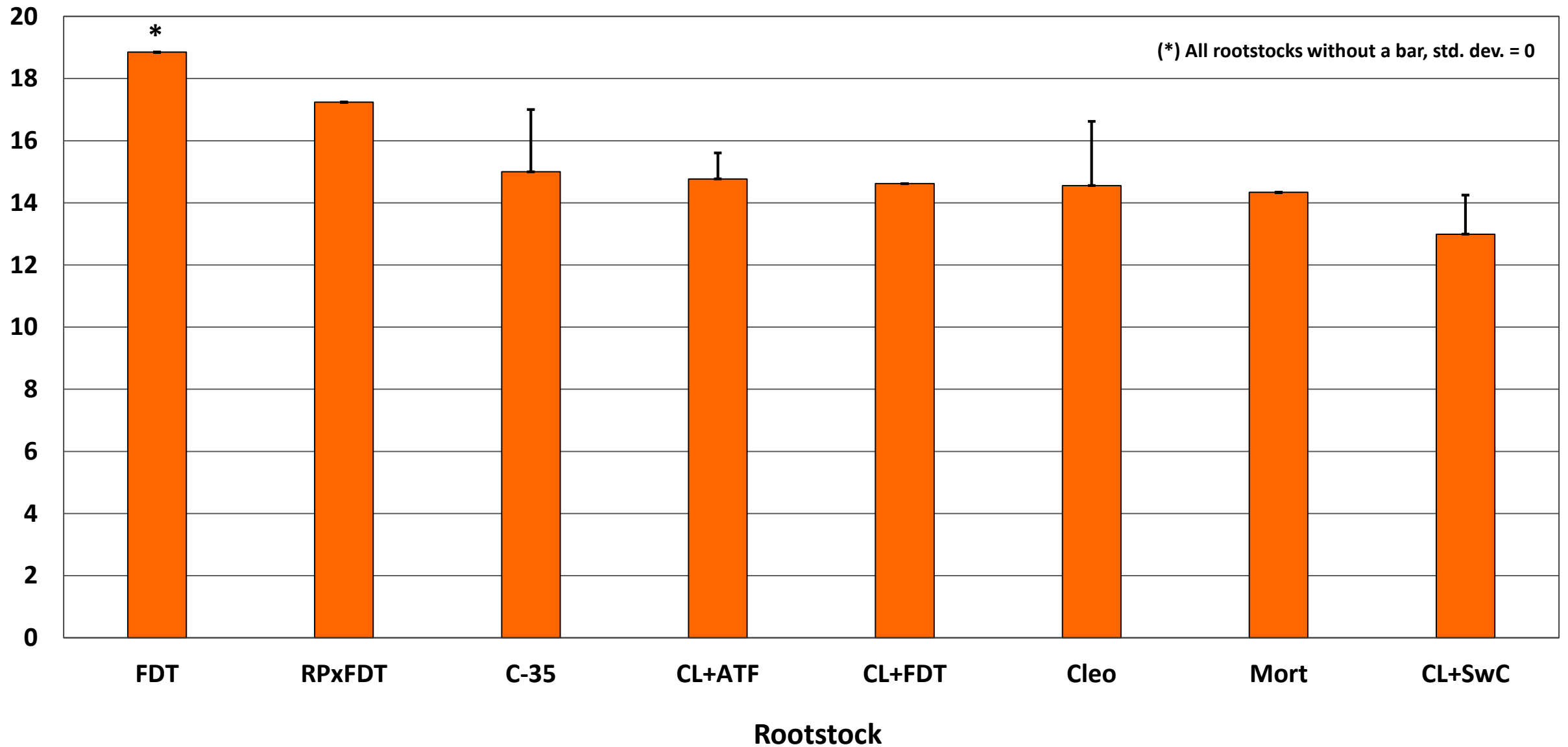


Fig. 5. IR Minneola Rootstock Trial – Juice PS/box: mean + std. dev. [January 2018].

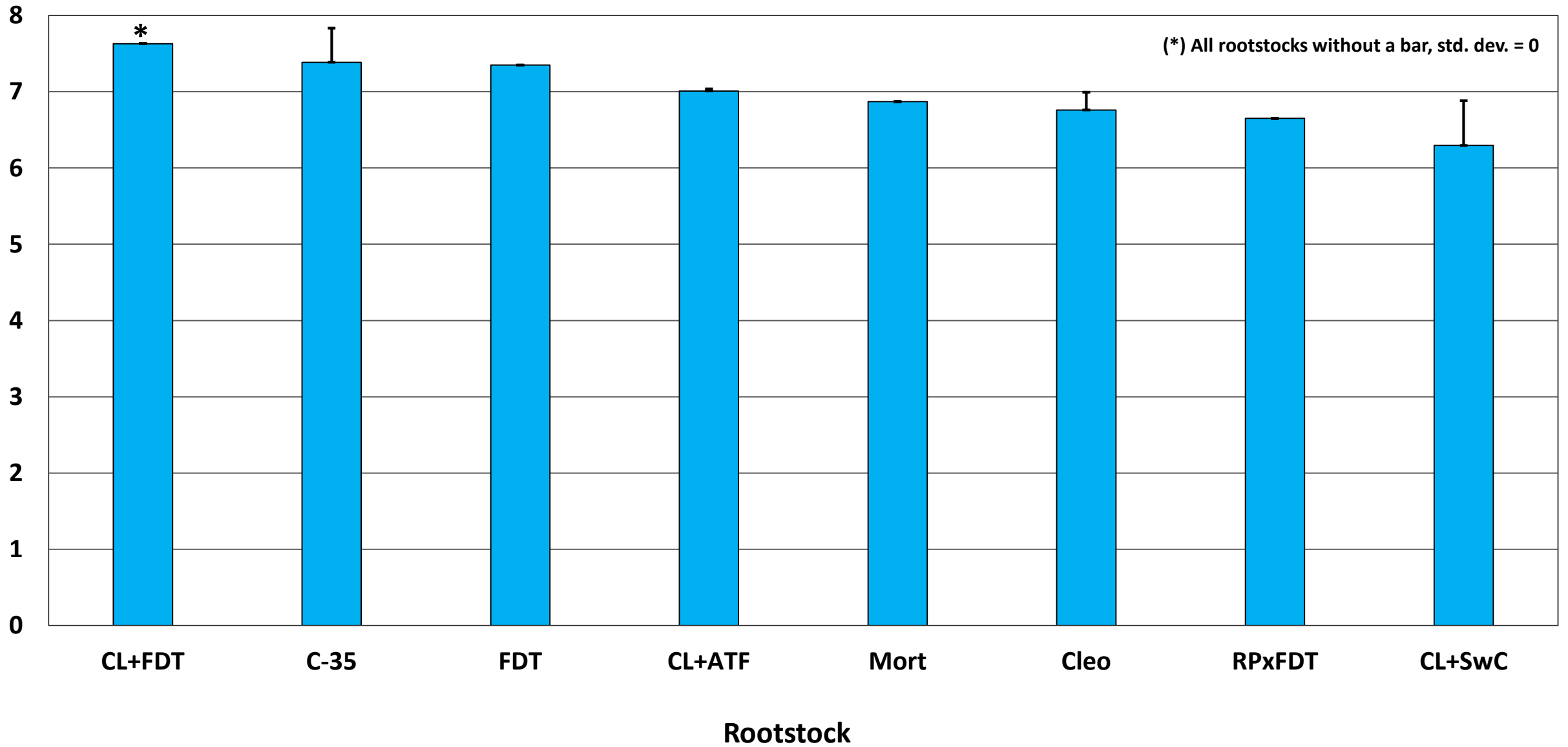


Fig. 6. IR Minneola Rootstock Trial – Juice color: mean + std. dev. [January 2018].

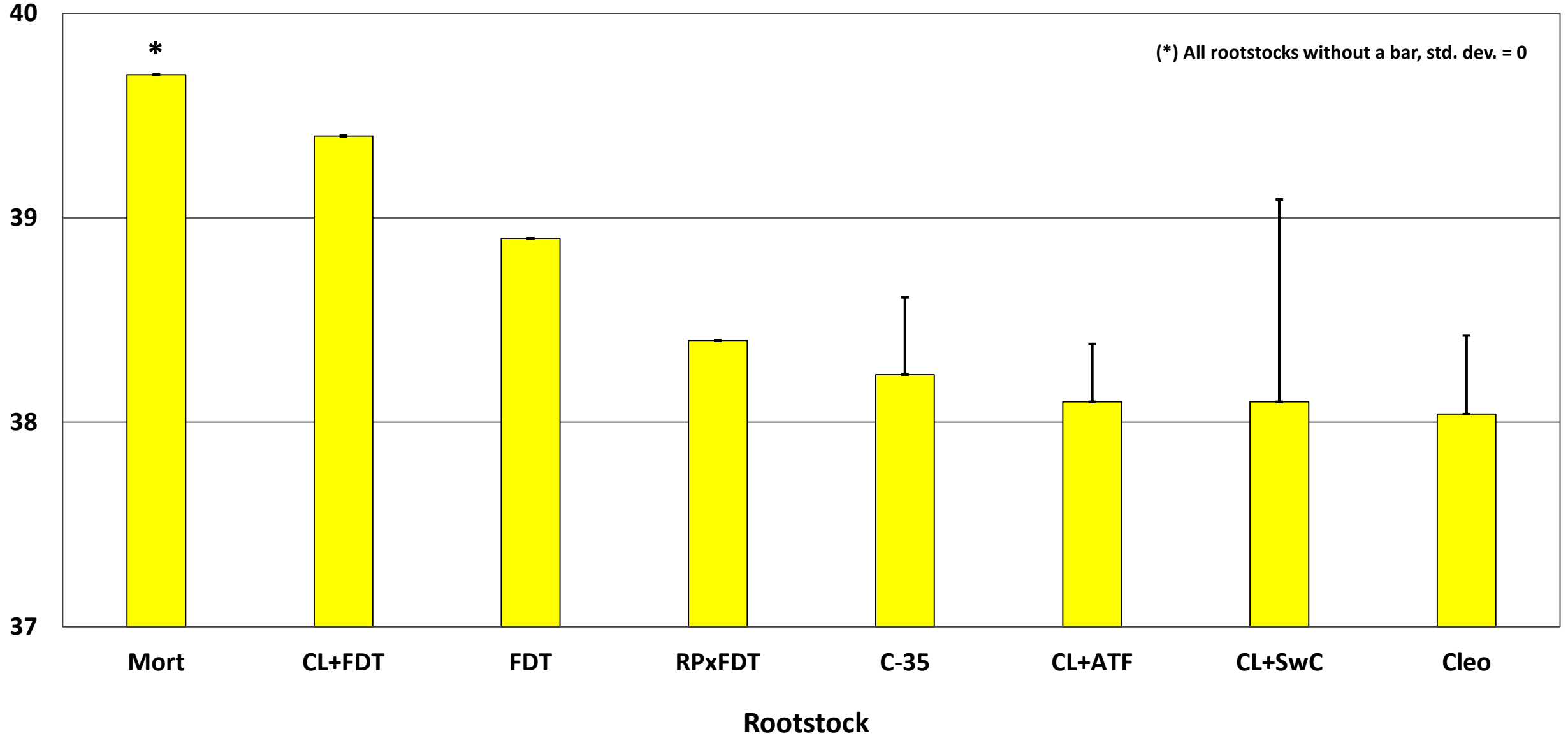
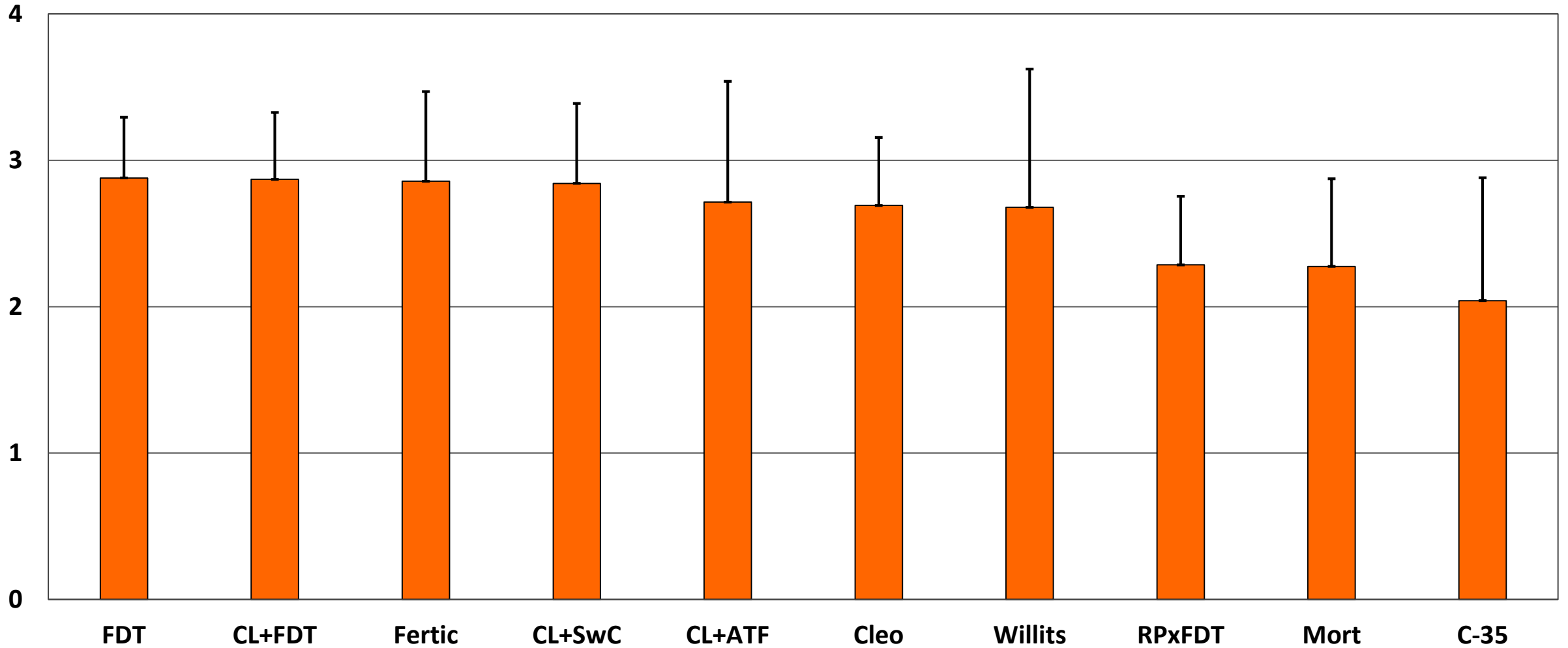


Fig. 7. IR Minneola Rootstock Trial – HLB rating: mean + std. dev. [October 2018].



HLB Rating

- 0= dead or severely declined.
- 1= overall poor condition; lt. crop; small fruit, most dropped.
- 2= some leaf symptoms and decline with significant fruit drop.
- 3= average-fair condition; good crop; little drop.
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Rootstock

Fig. 8. IR Minneola Rootstock Trial – Juice Brix: mean + std. dev. [January 2019].

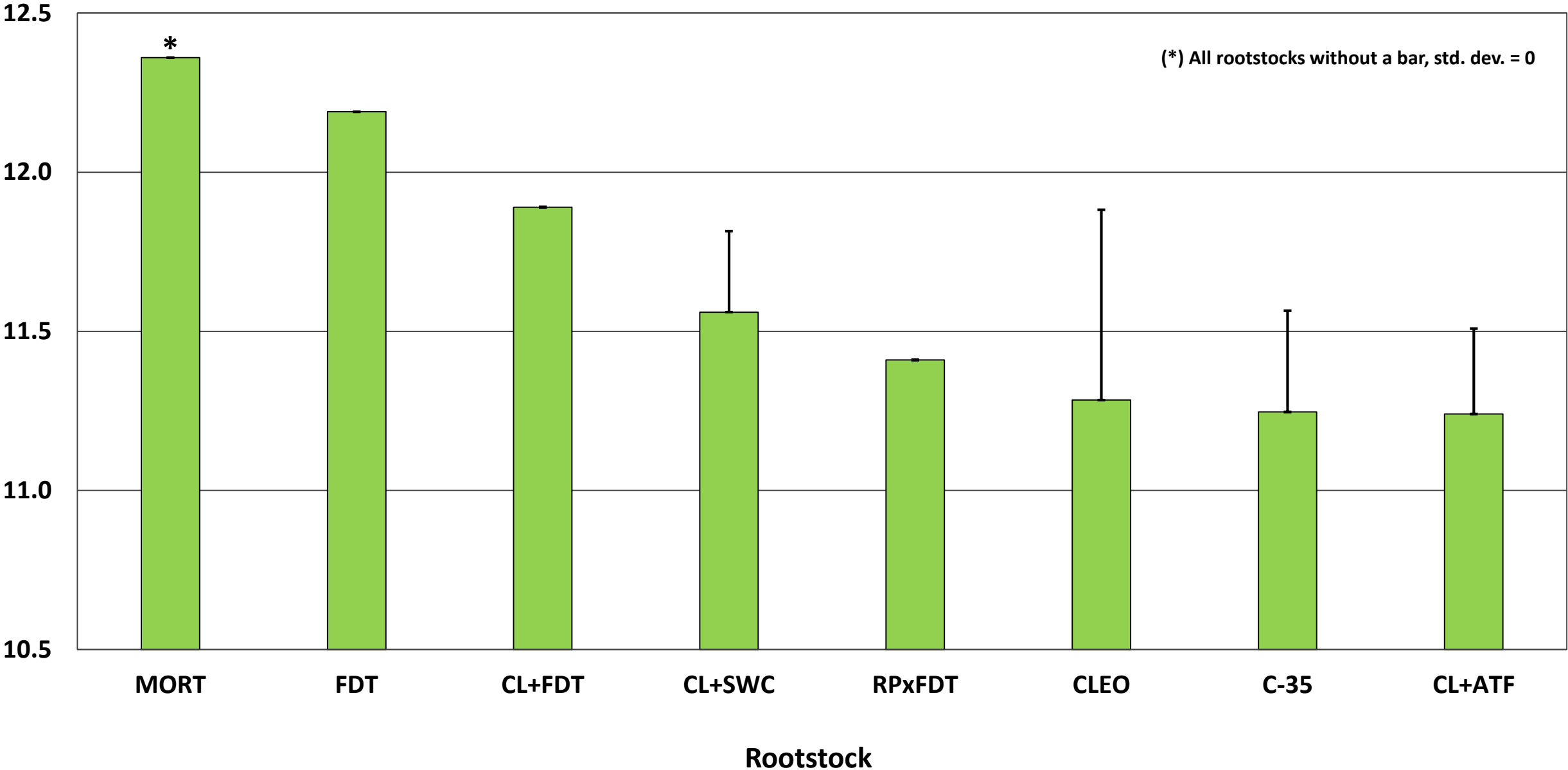


Fig. 9. IR Minneola Rootstock Trial – Juice Acid: mean + std. dev. [January 2019].

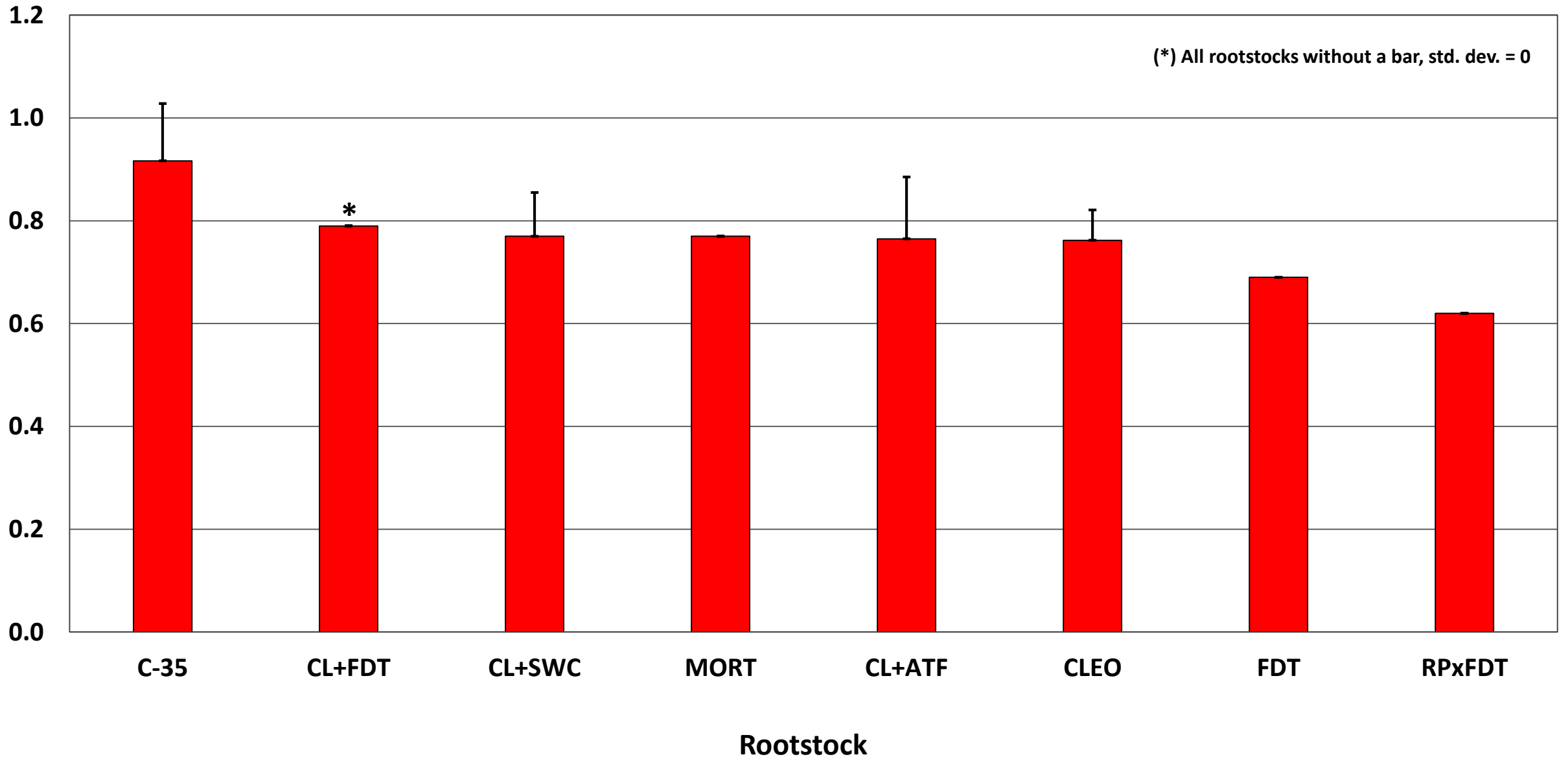


Fig. 10. IR Minneola Rootstock Trial – Juice Ratio: mean + std. dev. [January 2019].

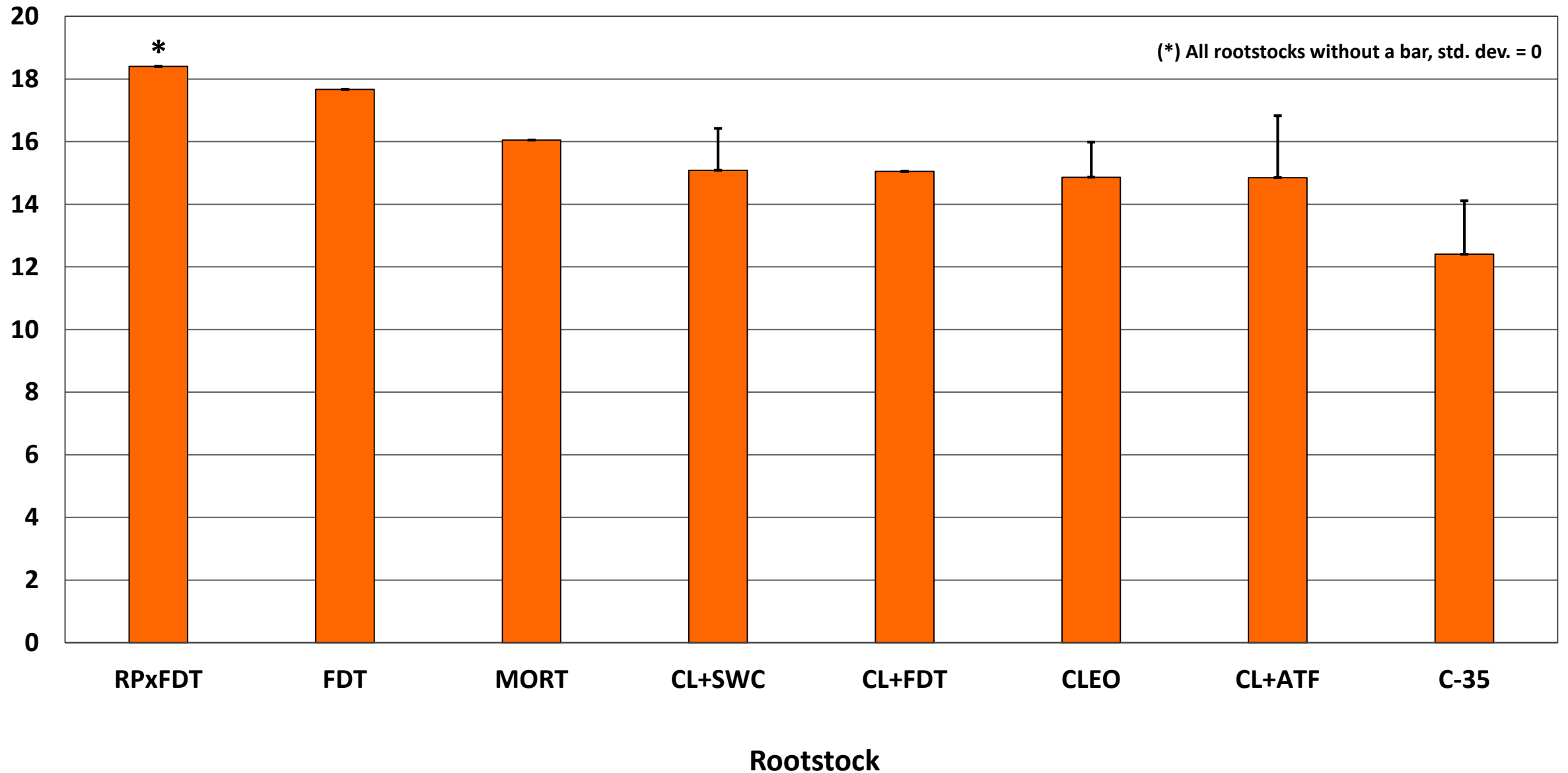


Fig. 11. IR Minneola Rootstock Trial – Juice PS/box: mean + std. dev. [January 2019].

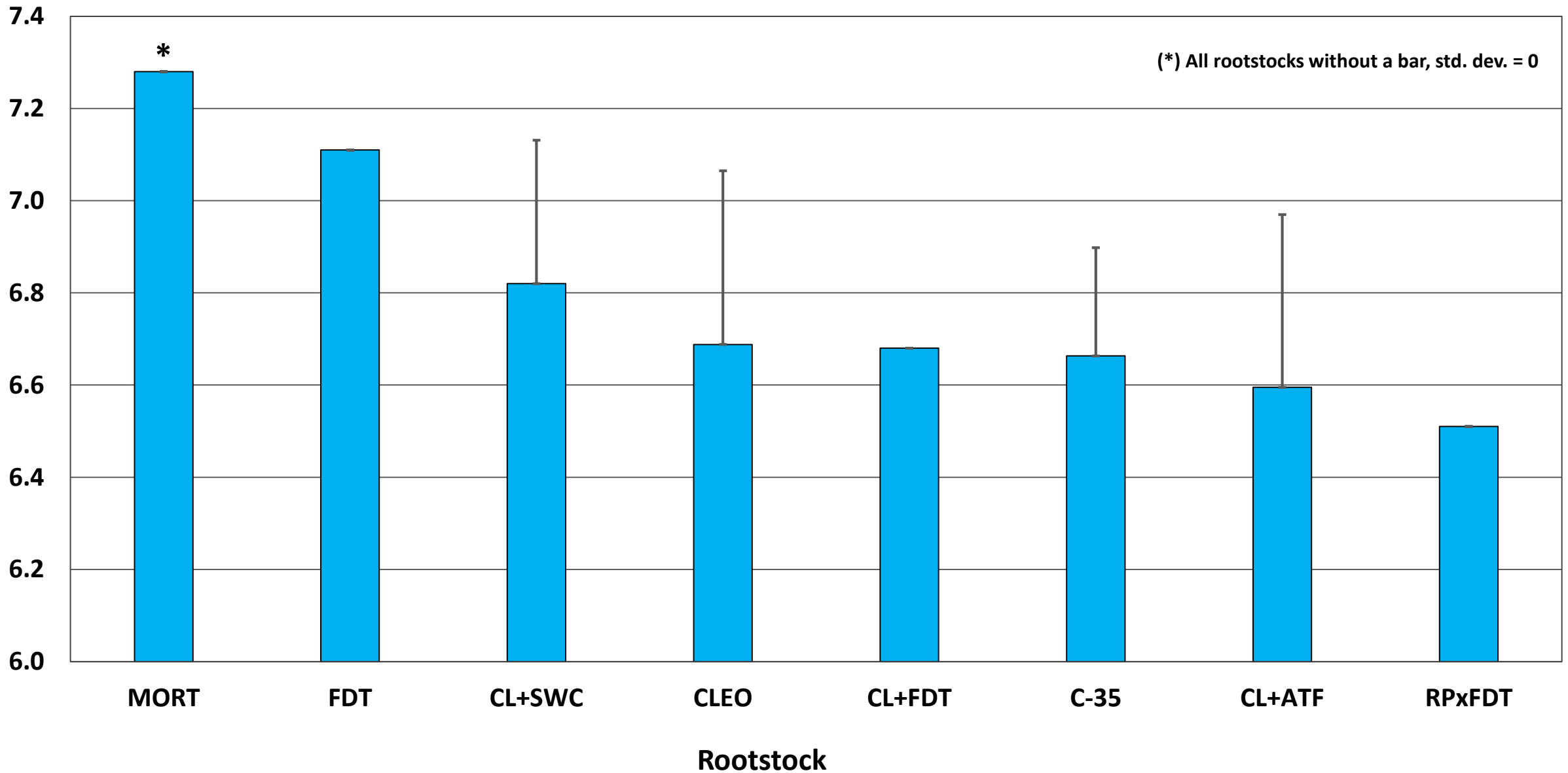
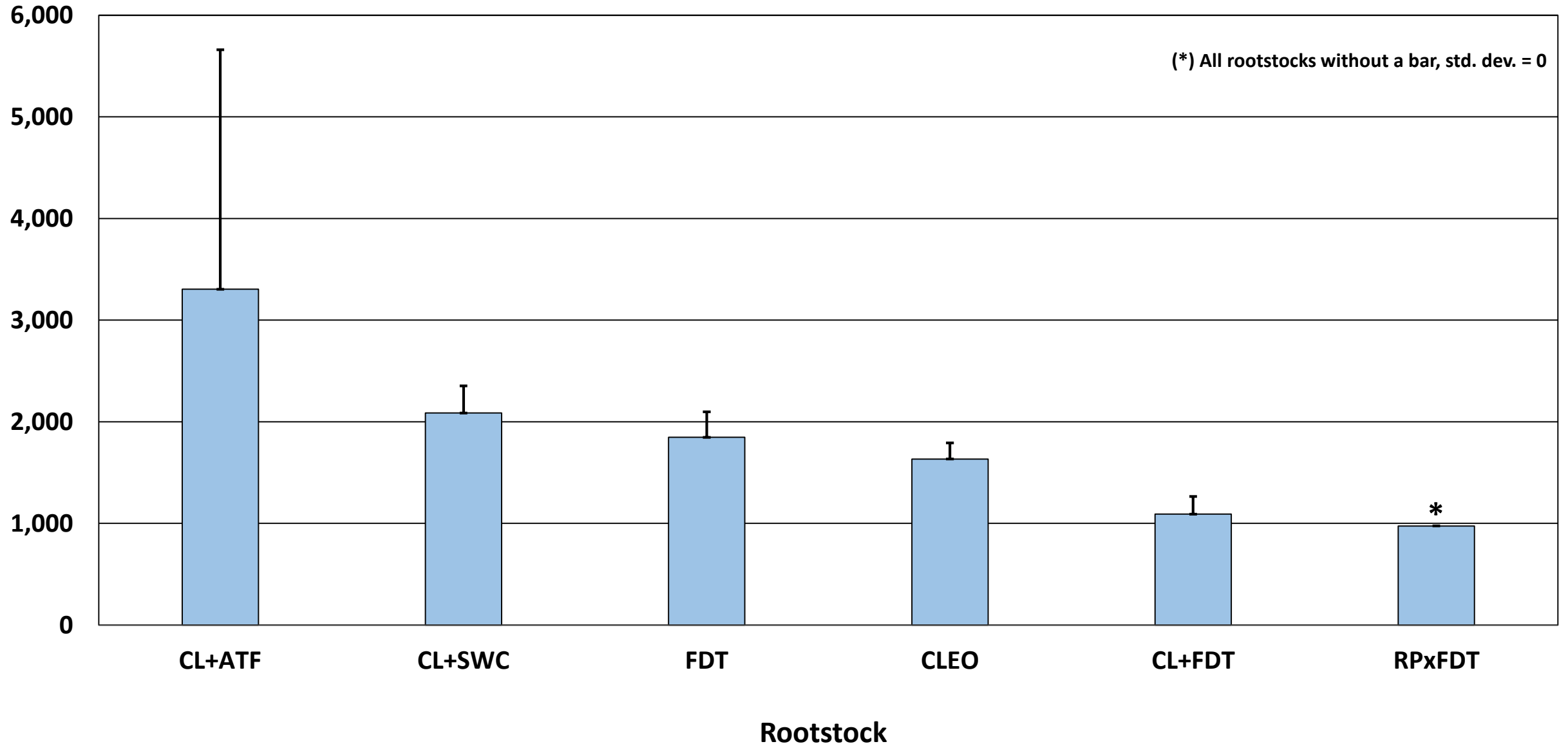


Fig. 12. IR Minneola Rootstock Trial – PS/acre[§]: mean + std. dev. [January 2019].



(§) Data not available for rootstocks: MORT, C-35 and Will

Fig. 13. IR Minneola Rootstock Trial – Juice color: mean + std. dev. [January 2019].

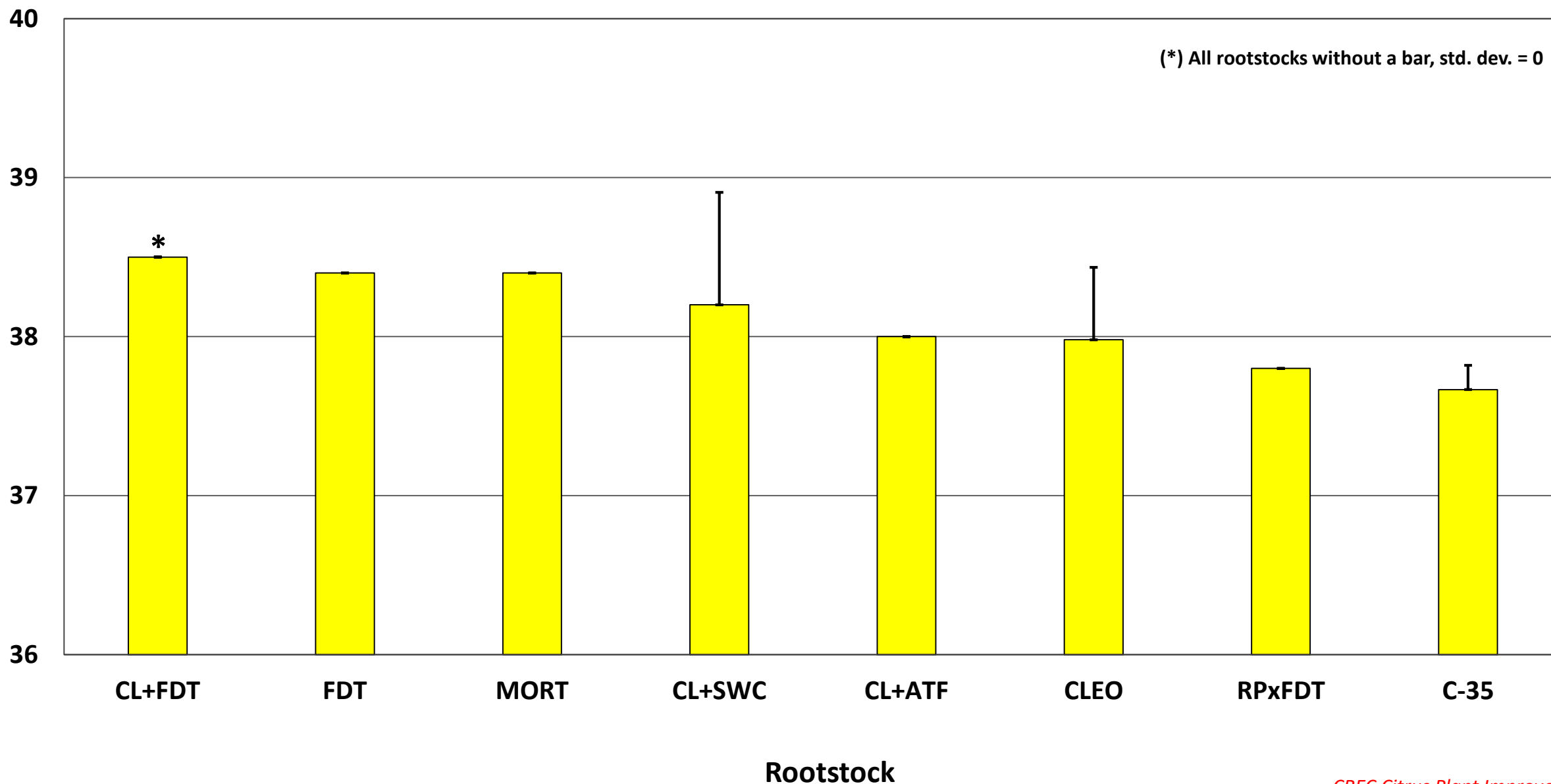
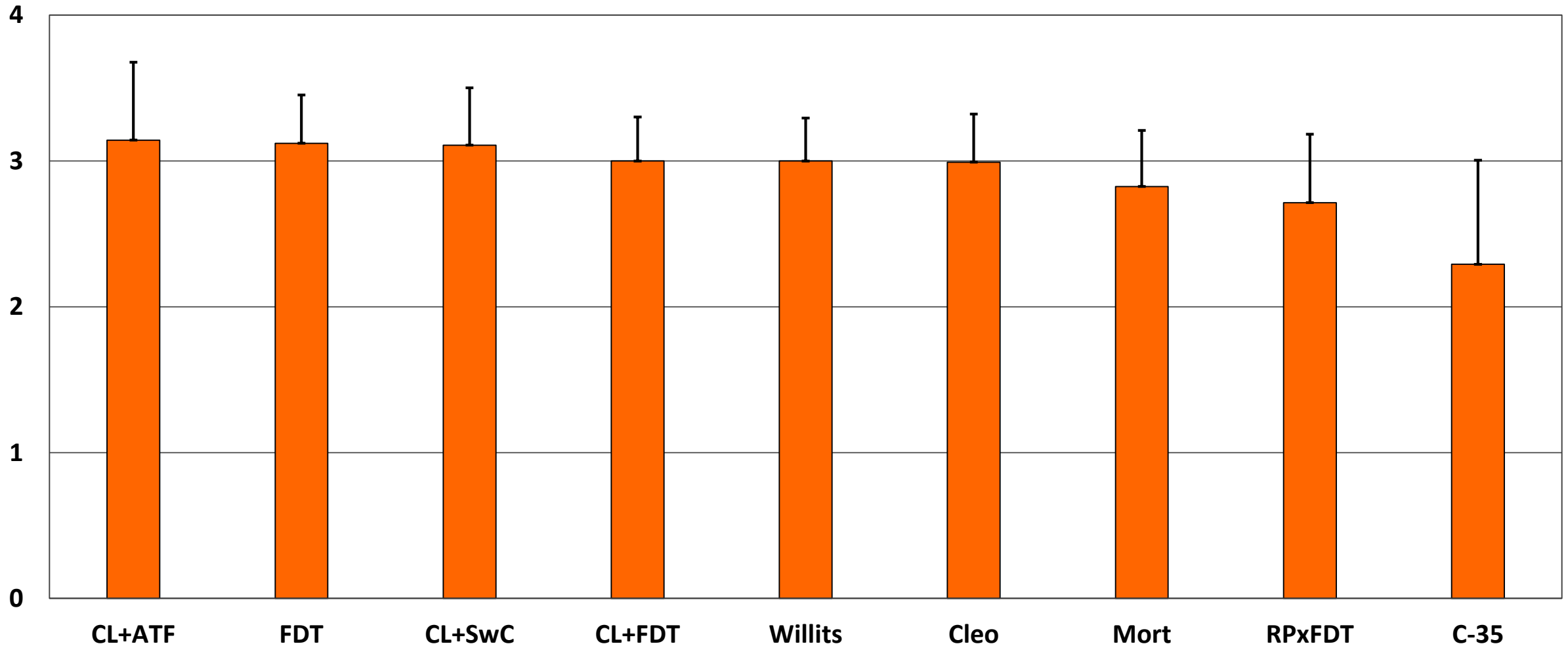


Fig. 14. IR Minneola Rootstock Trial – HLB rating: mean + std. dev. [December 2019].



HLB Rating

- 0= dead or severely declined.
- 1= overall poor condition; lt. crop; small fruit, most dropped.
- 2= some leaf symptoms and decline with significant fruit drop.
- 3= average-fair condition; good crop; little drop.
- 4= good tree condition; few leaf symptoms; good crop; little drop.
- 5= excellent tree condition/crop

Rootstock

Fig. 15. IR Minneola Rootstock Trial – Juice Brix: mean + std. dev. [January 2020].

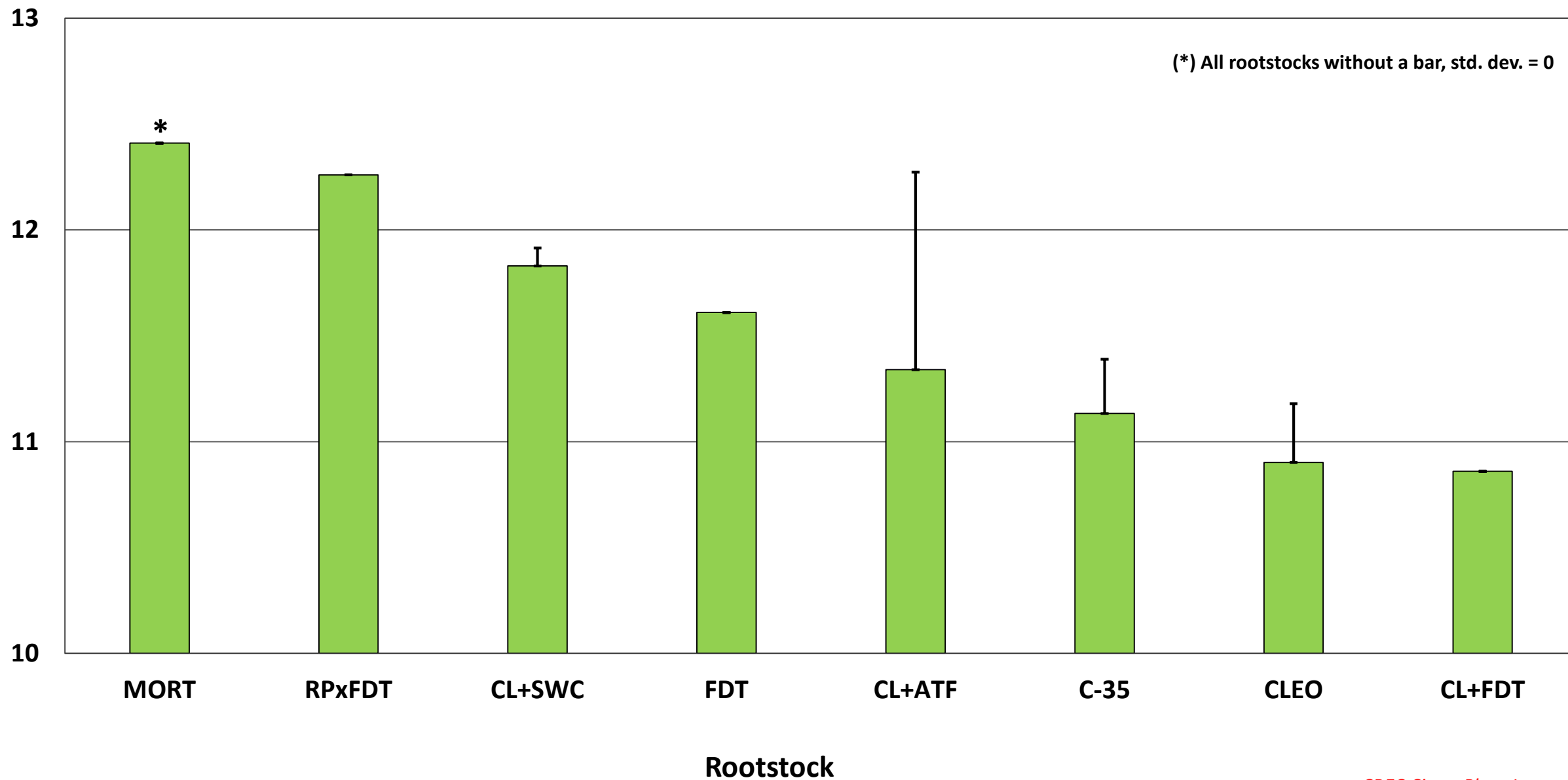


Fig. 16. IR Minneola Rootstock Trial – Juice Acid: mean + std. dev. [January 2020].

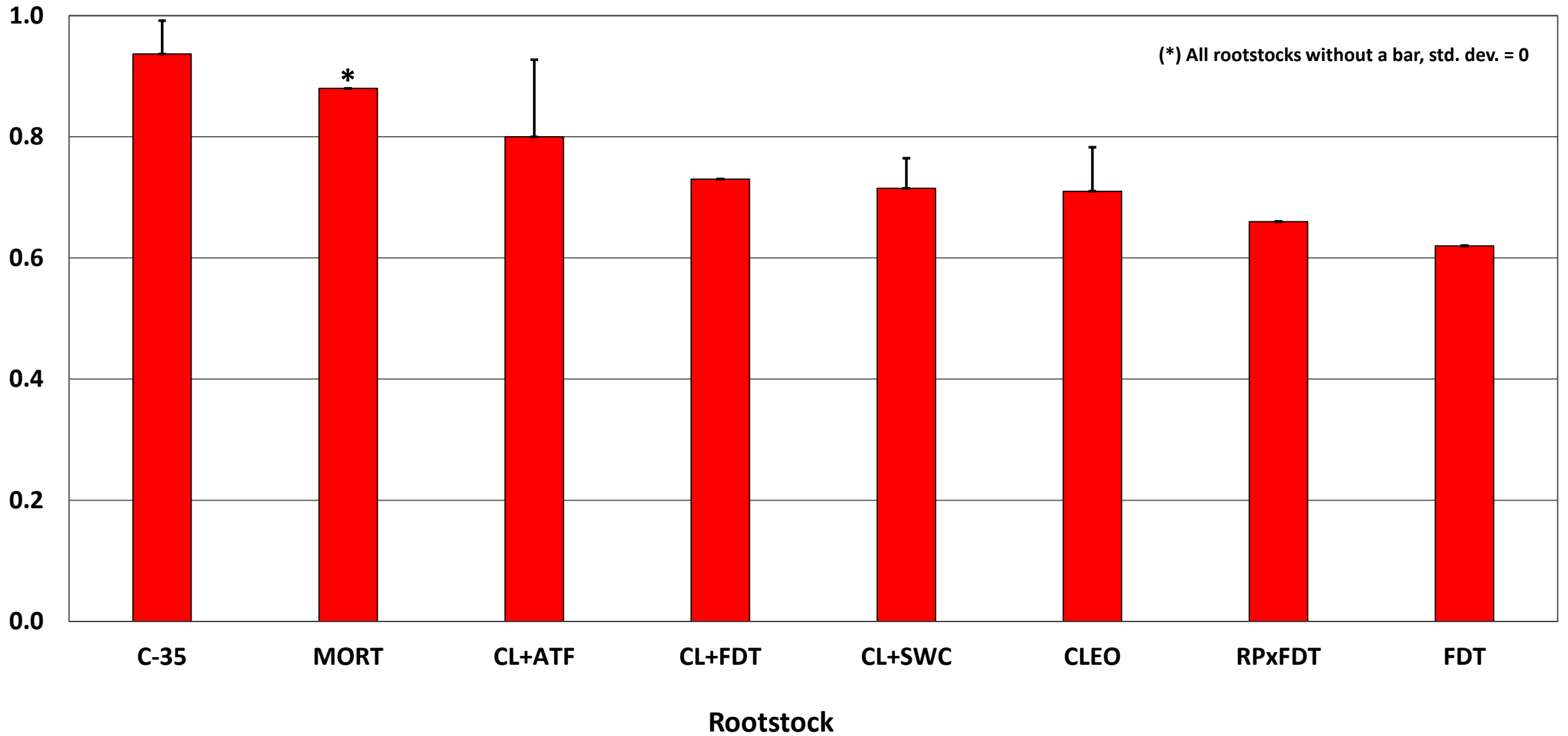


Fig. 17. IR Minneola Rootstock Trial – Juice Ratio: mean + std. dev. [January 2020].

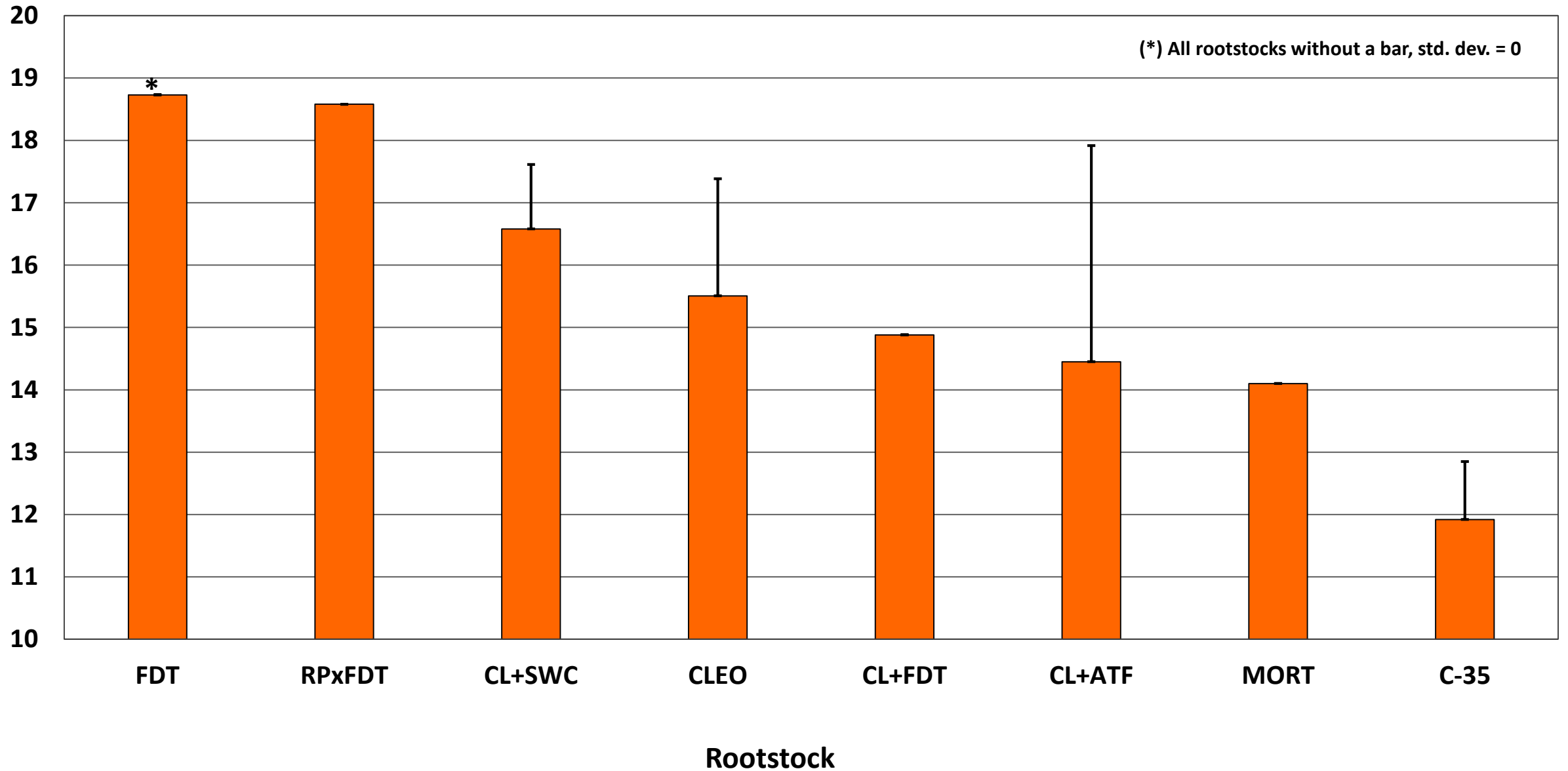


Fig. 18. IR Minneola Rootstock Trial – Juice PS/box: mean + std. dev. [January 2020].

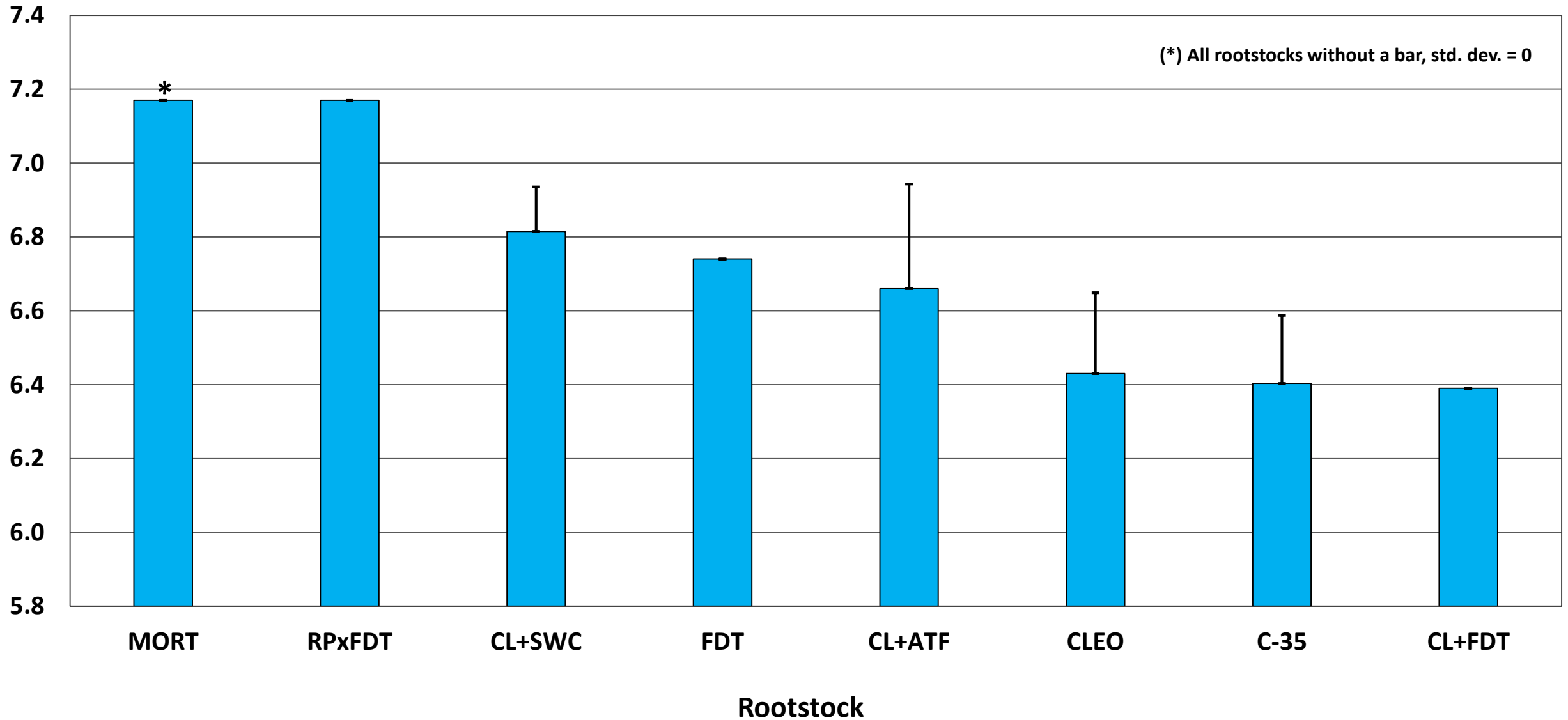
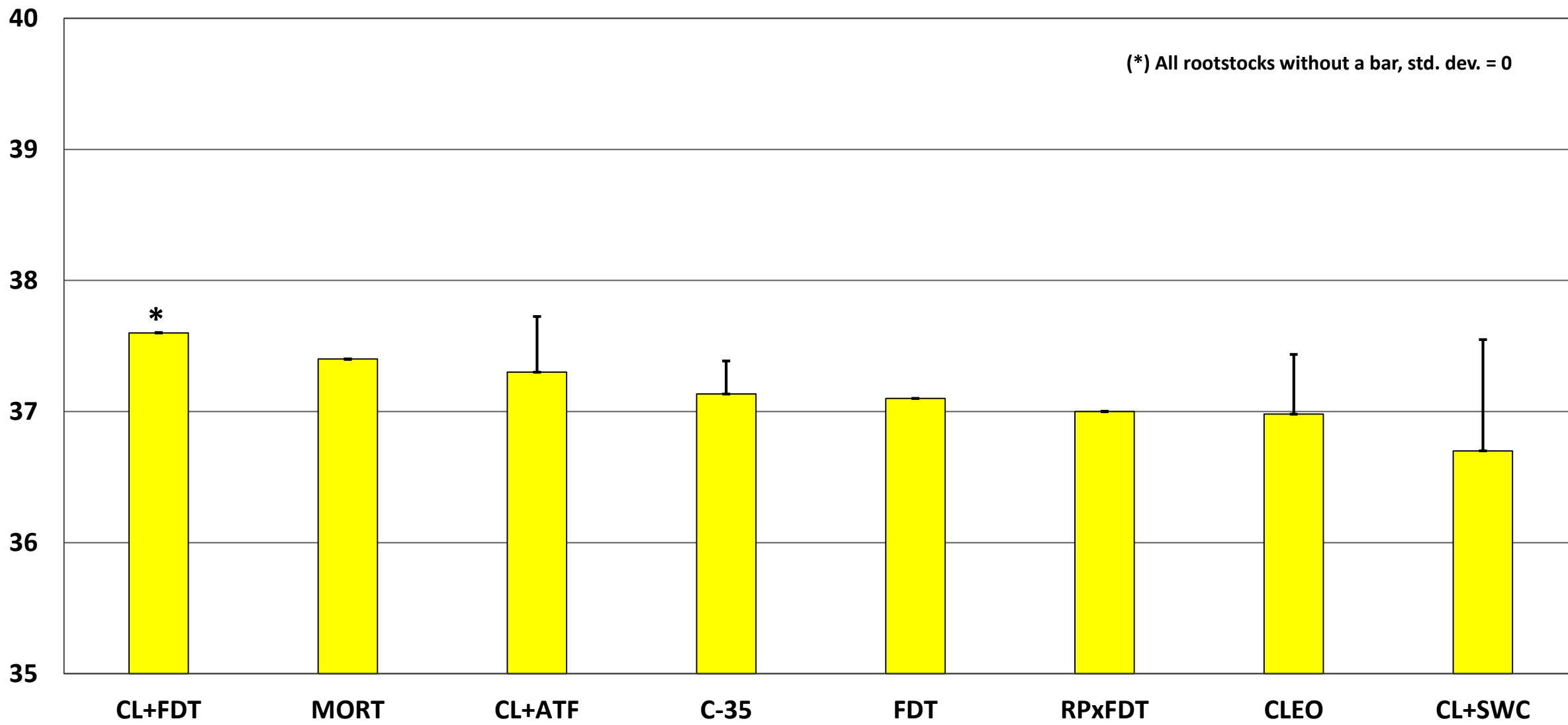
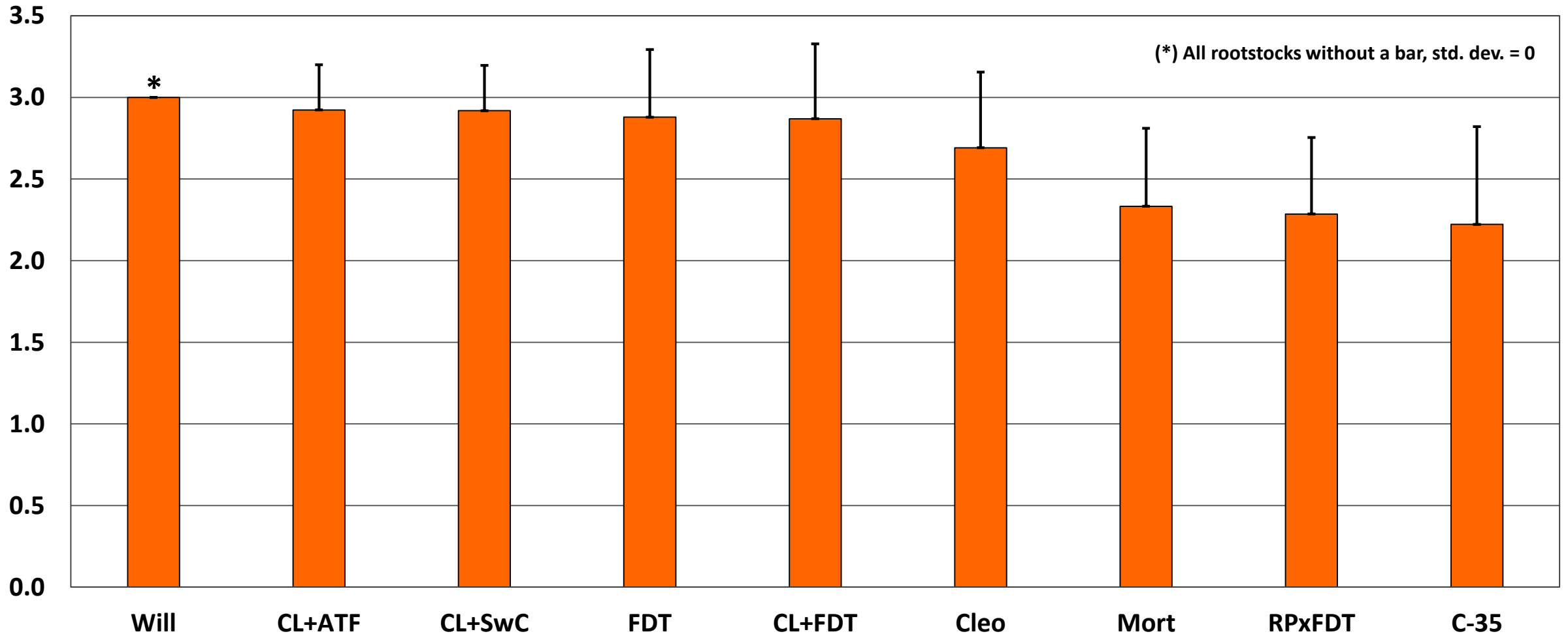


Fig. 19. IR Minneola Rootstock Trial – Juice color: mean + std. dev. [January 2020].



Rootstock

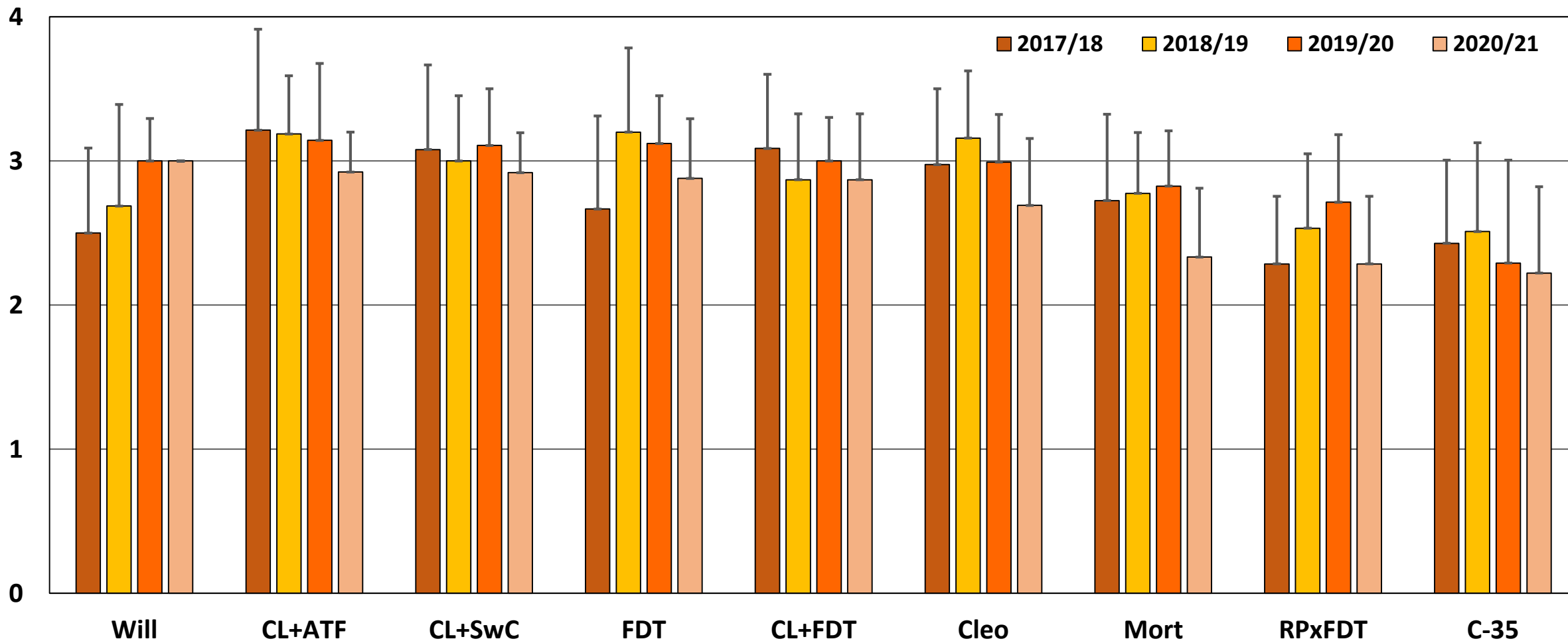
Fig. 20. IR Minneola Rootstock Trial – HLB rating: mean + std. dev. [October 2020].



Rootstock

HLB Rating
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4= good tree condition; few leaf symptoms; good crop; little drop.
5= excellent tree condition/crop

Fig. 21. IR Minneola Rootstock Trial – HLB rating: mean + std. dev. [2017/18, 2018/19, 2019/20 & 2020/21.]



HLB Rating

- 0= dead or severely declined.
- 1= overall poor condition; lt. crop; small fruit, most dropped.
- 2= some leaf symptoms and decline with significant fruit drop.
- 3= average-fair condition; good crop; little drop.
- 4= good tree condition; few leaf symptoms; good crop; little drop.
- 5= excellent tree condition/crop

Rootstock

Fig. 22. IR Minneola Rootstock Trial – % of tree survival – 2017/18, 2018/19, 2019/20 & 2020/21.

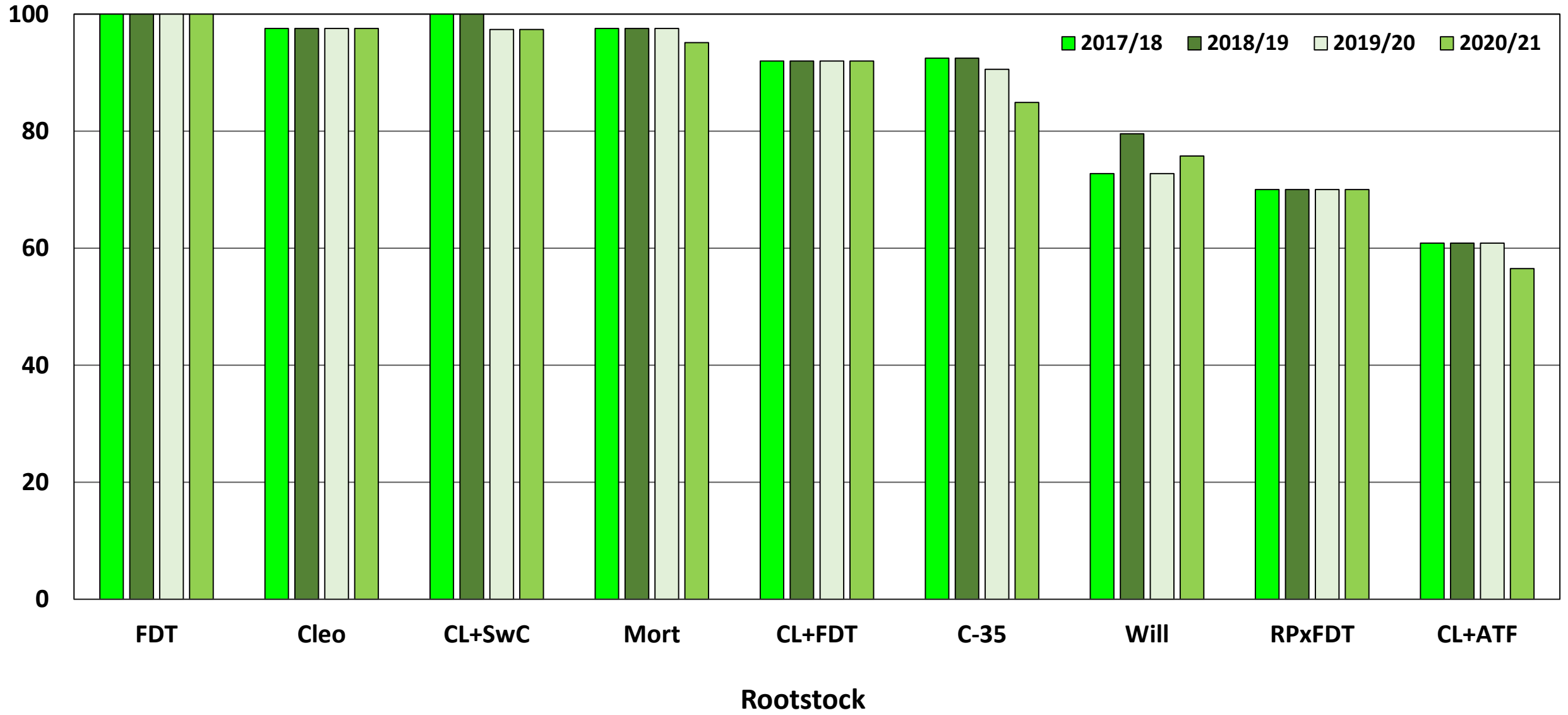


Fig. 23. IR Minneola Rootstock Trial – Tree height [ft.]: mean + std. dev. [May 2021].

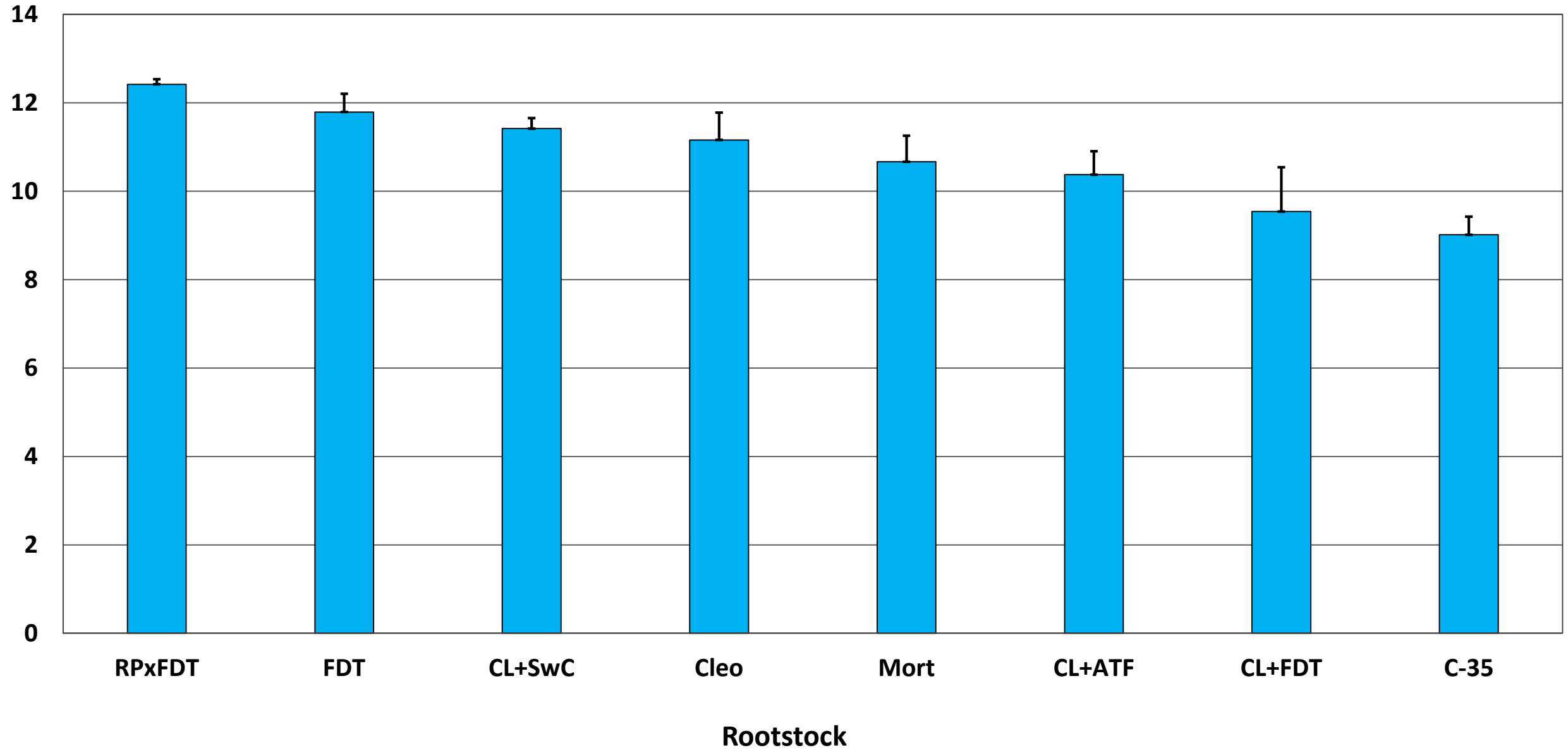


Fig. 24. IR Minneola Rootstock Trial – Yield [boxes/tree]: mean + std. dev. [January 2019 & February 2021].

