

Zestar!™ — a Paulared Alternative for the Northeast?

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Zestar! is a new apple variety introduced in 1999 by the University of Minnesota. It matures with or slightly before Paulared, hence, a comparison of attributes such as fruit quality and taste should be of natural interest to Northeast apple growers. As it turns out, Zestar! may indeed be a good alternative or compliment to Paulared in the Northeast, particularly for roadside markets and farm stands.

University of Minnesota breeders David Bedford and James Luby's narrative of Zestar! includes:

Description: Zestar!™ is an early season apple that ripens in late August in east-central Minnesota and is notable for cold hardiness and high fruit quality. It likely will be useful for commercial apple producers and gardeners in the northern U.S., Canada, and other countries with similar climatic characteristics.

Origin: This cultivar was raised as a seedling from the cross State Fair x MN 1691 designated as cross AE7214 made in 1972 at the University of Minnesota Horticultural Research Center (HRC) near Excelsior, Minnesota. It was propagated by budding or grafting as MN 1824 for later observations in trial orchards at the HRC, and at the Univ. of Minnesota's West Central and North Central Research and Outreach Centers in Morris and Grand Rapids, respectively.



Season: Zestar!™ ripens approximately August 20-26 at Excelsior, MN, approximately one week after State Fair and with Paulared. The fruit adhere well to the tree and can usually be harvested in one or two pickings.

Fruit: The fruit are globose (blocky round) in shape and have an average diameter of approximately 3 inches. The color is 50-85% red stripe depending on exposure to the sun. The stripes may condense into a solid scarlet red in some areas. The flavor is the most notable feature of this variety, being well balanced in acid and sugar content but tasting more sweet than tart. In several years, sensory evaluation panels have rated it as the best or among the best evaluated. The texture is crisp and juicy. The flesh color is white but is prone to oxidative browning when the fruit is cut. The storage life of the fruit in ambient atmosphere at 35°F is approximately 7 weeks, which is better than State Fair or Paulared in our tests.

Tree: The tree form is somewhat upright and vigorous in early years but attains a spur-type habit and moderate vigor as it matures. Trees have exhibited average precocity. Compared to other varieties we have tested, it has average susceptibility to apple scab and moderate susceptibility to fire blight tests. The bloom period is relatively early in the season.

In the short time since its introduction, growers, fruit testers and breeders in the Northeast, Midwest, and Northwest have evaluated Zestar!. Here are some of the comments as published by the Pacific Northwest Fruit Testers Association:

SW Wisconsin: "It is a very good apple, but of the 30+ trees we planted, all but two have succumbed to fireblight."

Lower Yakima (WA) Valley: "Our two-year-old tress of our commercial planting of Zestar! gave us our first fruit this year. If picked on the early side of maturity, the flavor is lacking, however, if given a little more time the flavor is improved. In general,

Table 1. Fruit quality characteristics of Zestar! and Paulared apples harvested on two dates in 2000 at the UMass HRC.

Characteristic	August 22		August 29	
	Zestar!	Paulared	Zestar!	Paulared
Weight (oz.)	6.2	6.2	6.5	6
Color (% red skin)	48	66	50	74
Flesh firmness (lbs.)	16.1	16.0	14.6	14.6
Soluble solids (% brix)	15.1	12.1	13.8	11.4
Starch index	3.1	3.2	3.9	4.6

the harvest is after Sansa and overlaps Gala. The birds love this variety.”

Upper Yakima Valley: “Zestar! picked a bit early on August 7 to accommodate the Tester’s Annual Summer Tour did not impress the tour members for lack of flavor, however, that same fruit was put in storage until December 3 and displayed in the Tester’s Annual Meeting ‘Show & Tell.’ Surprisingly, those apple were still firm, crisp, and very flavorful! It appears to have maturity advance in storage.”

North-central WA, Wenatchee: “Our first look this year: promising, better than Sansa.”

Zestar! has been under evaluation at the University of Massachusetts Horticultural Research Center (HRC) in Belchertown since the first trees were planted in 1996. Overall, we have been impressed with the horticultural characteristics and fruit quality of this variety, particularly at the time of year it ripens and high quality apples are in short supply. Paulared, GingerGold, and Sansa are the only varieties currently recommended that ripen during the pre-Labor Day period that have high quality and are appropriate for both commercial and direct apple markets.

Zestar! trees, as previously described, are distinctly vigorous and upright growing, at least during the establishment years. Once fruiting, it should settle down and produce an easily managed tree. Fruit yields have been light to moderate at the HRC, however, it’s large fruit size should help boost overall production. No particular disease or insect problems have been noted, however, it has been reported Zestar is somewhat fire blight susceptible—not a particular problem here in the Northeast..

Zestar! apple’s appearance is perhaps one of its weaker characteristics, especially when compared to the more attractive Paulared. Red color of Zestar! has been described as blotchy, and a lighter ‘pink’ shade of red; whereas, Paulared has a very attractive medium-red blush, freckled with prominent white lenticels.

The flavor of Zestar! is a strong point of this variety. It is judged to be slightly perfumy, aromatic, sprightly, and—true to its name—zesty! Compared to Paulared, the flavor is much more complex, with a good sugar:acid ratio. Paulared flavor is so mild that crispness and juiciness are the dominant characteristics.

In 2000 we compared Zestar! and Paulared fruit harvested on two dates at the HRC to a battery of fruit quality tests and organoleptic and visual evaluations. The results of these evaluations are presented in Tables 1 and 2.

Overall, Zestar! and Paulared were similar in size and flesh firmness. At six plus ounces in weight, both apples are large—about three inches in diameter. Flesh firmness was adequate for an early season apple, and both apples were judged to be crispy on the first harvest date.

But Zestar! and Paulared differed substantially in red skin color and soluble solids (sugar content). Paulared was the clear winner in red skin color, averaging nearly 2/3 and 3/4 of the surface having a red blush on both harvest dates. Zestar! was only about half red, and the color was much ‘blotchier’, somewhat striped, and more pinkish-red in appearance. Paulared skin color looks like a McIntosh, however, Zestar!’s color is more akin to Honeycrisp or Gala. Zestar! had a much higher sugar content on both harvest dates as indicated by higher soluble solids concentration. Paulared is more McIntosh-like in tartness; whereas, Zestar! has a much sweeter (better acid:sugar balance) flesh.

Based on the organoleptic and visual rating (Table 2),

Table 2. Organoleptic and visual rating (1 <--> 5) of Zestar! and Paulared apples harvested on two dates in 2000 at the UMass HRC.

Characteristic	August 22		August 29	
	Zestar!	Paulared	Zestar!	Paulared
Attractiveness: 1-dislike <--> 5-like very much	3.5	3.5	2.5	4.5
Crispness: 1-not crisp <--> 5-extremely crisp	4	4	3.5	4
Juiciness: 1-dry <--> 5-extremely juicy	3.5	4	3.5	4
Sweetness: 1-not detected <--> 5-very sweet	2.5	1.5	3	2
Acidity: 1-none, bland <--> 5-very tart	3.5	4.5	3	3.5
Flavor: 1-dislike <--> 5-like very much	4.5	3	4.5	3
Desirability: 1-dislike <--> 5-like very much	4	3.5	4	3.5
Color: 1-dull <--> 5-bright	3	3.5	2.5	4
Fruit shape: 1-uniform <--> 5-severely mis-shapen	2.5	1.5	2.5	1.5
Skin: 1-tender <--> 5-tough	1.5	4	2	2.5
Flesh firmness: 1-soft <--> 5-hard	4	4	3.5	3
Astringency: 1-low <--> 5-high	3	3.5	3	3
Flesh color: 1-greenish <--> 5-yellow (3-white)	4	3	3.5	3.5
Cork spot: 1 = 0 <--> 5 = 10+	1	1	1	1
Bitter pit: 1 = 0 <--> 5 = 15+	1	1	1	1
Watercore: 1-none <--> 5-severe	1	1	1	3

neither apple emerged as being clearly superior. Some notable differences between the two apples were observed, however, and they include:

On August 29, Paulared was judged more attractive than Zestar!. The less attractive, blotchy pinkish-red skin color on Zestar! compared to the more extensive red blush of Paulared is the reason.

Zestar! was sweeter than Paulared on both harvest dates. This is to be expected given the higher soluble solids measured in Zestar!.

Zestar! was preferred over Paulared in flavor. Zestar! flavor is complex, with balanced sweetness, tartness, and aromatics that are perfumy and distinctly floral. The muted flavor and elevated levels of acids were less desirable with Paulared.

Paulared had a much higher color rating (brightness) on August 29 compared to Zestar!. Zestar!'s skin color was lacking, particularly on the second harvest date.

Paulared appears to have a more uniform shape (round), vs. the more irregular shape of Zestar!.

The skin of Paulared was much tougher on the first harvest date compared to Zestar!. By the second harvest date they were comparable in skin toughness (or tenderness).

Water core was prevalent in Paulared harvested on August 29, whereas none was observed in Zestar! fruit.

We conclude that both Zestar! and Paulared have a place in New England orchards, especially where sales are direct to the public. Paulared is an early McIntosh-like apple with a red blush over green background and fine white flesh. For individuals who are looking for an early McIntosh-type apple, Paulared is still an excellent choice. Zestar! has an entirely different flavor and appearance, and would likely appeal to people with a different palate. It's excellent and distinctive taste, however, should still please many people.

