Hybrid' and 'Stokes Hybrid' were less sensitive in comparison to other cultivars. Within cultivar variation in response to 20 pphm ozone, as indicated by standard deviations, was not very high, ranging from 1.1% in 'Royal Knight' to 3.6% in 'Early Hybrid'.

Greater damage was observed after plants were exposed to 40 pphm ozone. All cultivars had leaf damage but cultivar differences were obvious. Leaf area damage ranged from 5.0% for 'Blacknite' to 24.6% for 'Early Hybrid' on a whole plant basis. 'Imperial Black Beauty' and 'T.S. Cross Hybrid' were less sensitive than 'Early Hybrid' and 'Royal Knight', 'Jersey King Hybrid', 'Stokes Hybrid' and 'Burpee Hybrid' were intermediate in sensitivity. The order of cultivar sensitivity was almost the same in 20 and 40 pphm ozone.

This study shows some eggplant cultivars are sensitive to ozone concn which may be found occasionally outdoors in some production areas such as locations in California (4), New York (8) and Ontario (2). Although the number of cultivars tested was relatively small, the results indicate genetic differences in sensitivity. Eggplant cultivars of low sensitivity could be selected for use in oxidant smog prone areas. The genetic differences could be further exploited by breeding, as had been done for sweet corn (3). There was no relationship between fruit shape and ozone sensitivity.

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A Roundleaf Mutant in 'Bighart' Pimiento Pepper (*Capsicum annuum* L.)[1]

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Additional index words. pepper genetics

Abstract. **A roundleaf mutant in 'Bighart' pimiento pepper readily classified in segregating F_2 and backcross progenies, is determined by a recessive gene, *rl*. The *rl* gene reduces the length of the leaves but not the width, changing the length/width ratio from 1.50 to 1.24. The *rl* gene does not produce obvious pleiotropic deleterious effects on the plant and could prove useful as a marker gene in producing F_1 hybrids or for characterizing new pepper cultivars.**

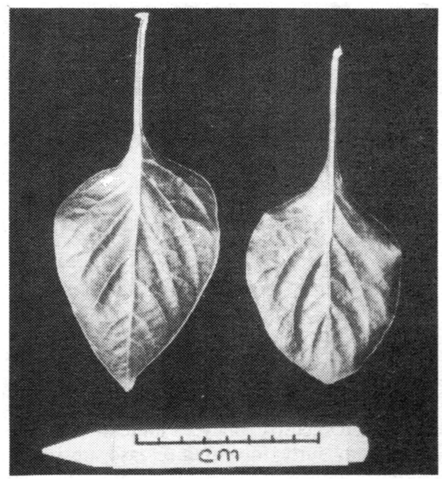

Fig. 1. Top view of pimiento pepper leaves: (Left) normal acuminate, rl^+, (Right) roundleaf mutant, *rl*.

A roundleaf variant that differed conspicuously from the normal acuminate leaf shape of 'Bighart' pimiento (Fig. 1), appeared among the progeny of a single open-pollinated field selection of this cultivar (2). This progeny segregated 11 roundleaf : 5 normal on the greenhouse bench during the winter of 1971–72. This ratio strongly suggests that the parent plant was roundleaf outcrossed with normal. Hence, the normal plants should be heterozygotes and the roundleaf plants true breeding recessives. Three of the normal plants were selfed to produce 3 F_2 populations 73–13, 14, and 16 and were also crossed as seed parents with 3 roundleaf plants to produce the 3 backcrosses 73–18, 20, and 21. The fourth backcross 73–19, is the reciprocal cross of 73–18 (Table 1). Two roundleaf selections were selfed.

Seedlings were grown in steamed U.C. Mix C (1), a 1 peat:1 sand mix, and classified for leaf type 6 weeks after seeding. Chi-squares (X^2) for

Table 1. F_2 (expected 3:1) and backcross (expected 1:1) ratios of normal (rl^+) to roundleaf (*rl*) pimento pepper plants.

Generation	Germinated seed/total seed	Observed ratios rl^+ : rl	X^2	P
F_2			*3:1 ratio*	
73–13	141/162	44 : 8	2.564	>0.11
73–13		40 : 17	0.813	>0.38
73–13		24 : 6	0.267	>0.62
73–14	130/162	42 : 9	1.471	>0.23
73–14		23 : 9	0.167	>0.68
73–14		27 : 15	2.571	>0.11
73–16	74/162	30 : 9	0.077	>0.78
73–16		25 : 5	1.111	>0.29
Summed X^2 (8 d.f.)			9.041	>0.34
Pooled ratio		255 : 78	0.441	>0.50
Homogeneity X^2 (7 d.f.)			8.600	>0.28
Backcross			*1:1 ratio*	
73–18	69/108	36 : 27	1.286	>0.26
73–19	59/108	17 : 20	0.243	>0.63
73–20	92/108	30 : 22	1.231	>0.27
73–20		17 : 21	0.421	>0.52
73–21	109/126	21 : 23	0.091	>0.76
73–21		24 : 31	0.891	>0.35
Summed X^2 (6 d.f.)			4.163	>0.65
Pooled ratio		145 : 144	0.003	0.96
Homogeneity X^2 (5 d.f.)			4.159	>0.52

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goodness of fit and for homogeneity were calculated on 8 sample ratios from the 3 F_2 populations and on 6 sample ratios from the 4 backcrosses (Table 1).

As anticipated, the 3 selfed normal plants proved to be heterozygotes and the 2 selfed roundleaf plants bred true. X^2 probabilities calculated on both the F_2 (expected 3:1) and backcross (expected 1:1) ratios support a single recessive gene hypothesis for roundleaf (Table 1). The symbol *rl* is assigned to the roundleaf gene.

One hundred leaf length × width measurements were made on 20 leaves of each of 5 mature plants of 4 pimiento breeding lines, 1 roundleaf and 3 normal, grown in 15 cm clay pots in the greenhouse (Table 2). The *rl* gene reduced leaf length (L) but not leaf width (W). The L/W ratio was reduced from an average of 1.50 for 3 normal leaf (rl^+) lines to 1.24 for an *rl* line, significantly different at the 1% level (Table 2). Because roundleaf is readily distinguishable from normal, and the gene *rl* does not produce obvious pleiotropic deleterious effects, it may prove useful as a marker gene in producing F_1 hybrids or for characterizing new pepper cultivars.

Table 2. Comparison of 3 normal pimiento lines with 1 roundleaf line for leaf length (L), width (W), and L/W ratio.

Line	Genotype	Phenotype	Leaf length (cm)	Leaf width (cm)	L/W
1	rl^+/rl^+	normal	9.7 a[z]	6.6 a	1.5 A
11	rl^+/rl^+	normal	9.4 a	6.1 b	1.5 A
4	rl^+/rl^+	normal	8.7 b	5.8 b	1.5 A
19	rl/rl	roundleaf	8.0 b	6.5 a	1.2 B

[z]Mean separation in columns by Duncan's multiple range test, 5% (lower case) and 1% (upper case) levels.

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Quality of Processed Tomato Juice Extracted from Tomatoes with Curly Top Virus Disease[1]

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Abstract. **Objective analyses indicate that fruits from tomato plants (*Lycopersicon esculentum* Mill.) with curly top virus disease are superior to fruits from healthy plants in soluble solids content, apparent viscosity, color and ascorbic acid content. Sensory panels detected differences between thermally-processed tomato juice from infected and healthy plants and preferred tomato juice from fruit produced by infected plants, probably due to its better color and higher apparent viscosity. Off-flavored fruits that are characteristic of this disease would present no problem in tomato juice processing; they even may enhance the quality of the juice.**

Curly top virus disease (CTV) is a severe limiting factor in tomato production in the Intermountain West (4). The disease reduces yields and adversely affects the flavor of the fruits. Resistant cultivars being released also have occasional plants with off-flavored fruits. Processors have been concerned that poor-flavored fruits from infected plants may result in off flavors in processed tomato products. At harvest, tomato plants with CTV shows signs that can range from primary symptoms on the upper leaves to death of the plant. Disease counts in commercial fields and research plots during the past 17 years showed that incidence of CTV ranged from 0–100% infection, and that 5–30% was the normal range.

Compositional differences between healthy and curly top-infected tomato plants have been demonstrated (5, 6, 7). In general, leaves of infected plants had higher dry matter, starch and sugar concn than leaves of healthy plants. No reports on the effect of CTV on the quality of processed tomato products are available.

This study was conducted to determine whether tomato fruit from CTV-affected plants adversely affects the quality of processed juice made from such fruit.

Fruits of the curly top-resistant 'Roza' were harvested from both healthy and infected tomato plants grown at the Washington State Univ. Irrigated Agriculture Research and Extension Center, Prosser. The fruits, 36 kg from healthy plants (8.5 kg/replication) and 18 kg from infected plants (4.5 kg/replication), were washed and mascerated at 88°C for 1 min. The juice was extracted with a Langsenkamps Model 1858[5] pulper-finisher equipped with a .027 mesh screen. The juice was then mixed by volume into the following portions: 1) 100% juice from healthy plants (H), 0% juice from infected plants (I); 2) 0% H, 100% I; 3) 50% H, 50% I. 4) 90% H, 10% I; 5) 95% H, 5% I, and 6) 99% H, 1% I. The juice was filled into 303 × 406 plain cans, exhausted to a center temp of 88°C, closed and processed at 100° for 20 min. No salt or other condiments was added to the juice.

Processed juice was analyzed after 30 days of storage. Soluble solids content and pH were determined using, respectively, a Bausch and Lomb refractometer with a sucrose scale calibrated at 20°C, and a Photovolt, digital, pH meter. Titratable acidity was determined with 0.1 N NaOH titrating to pH 8.1 and expressed as citric acid. Ascorbic acid was determined using the 2,6-dichloroendophenol visual titration method (1). The modified efflux-tube viscometer (2), standardized with distilled water to efflux 200 ml in 32 sec was used to measure apparent viscosity. Color was determined with the Hunter Color and Color Difference Meter by use of a red standard with the colorimetric specifications: L = 27.0, a = +61.6 and b = +20.6.

Sensory evaluations were performed with procedures outlined by Larmond

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