'Equinox' Heat-tolerant Hybrid Tomato

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'Equinox' is a determinate, heat-tolerant, fresh-market tomato (*Lycopersicon esculentum* Mill.) hybrid that sets a high percentage of marketable fruit in spring and fall in Florida and likely is adapted to other growing regions. The high-temperature fruit-setting ability is similar to that of 'Solar Set' (Scott et al., 1989). Under 30 to 33C days/21 to 25C nights, fruit set was superior to most large-fruited cultivars, but flowers aborted in the early clusters. This level of heat tolerance is adequate for economic yields to be produced in Florida growing districts within normal planting periods. For fall crops, 'Equinox' can be planted 2 weeks later than heat-sensitive cultivars and yet yield more on the same first harvest date, which is similar to the behavior of 'Solar Set'. Later planting allows for a longer crop-free period, reducing infections of tomato mottle virus transmitted by the silverleaf whitefly [*Bemisia argentifolii* Bellows & Perring] or bacterial spot [*Xanthomonas*

campestris pv. *vesicatoria* (Doidge) Dye]. The primary advantage of 'Equinox' over 'Solar Set' and some other heat-tolerant cultivars is the relatively smooth blossom scar, which

results in more reliable marketable fruit production during cooler cropping seasons.

Origin

'Equinox' was tested as Fla. 7249B and is a hybrid resulting from the Fla. 7324 x Fla. 7060 cross. The pollen parent was tested as Fla. 7249B (Fig. 1). Fla. 7060 also was the pollen parent in 'Solar Set', and its background has been described by Scott et al. (1989). Fl. 7060 was the seed parent cited in the release circular, but subsequently the parentage was reversed due to germination sensitivity in Fla. 7060, which was transferred maternally to 'Solar Set'. 'Solar Set' contributes large fruit size and good flavor to the hybrid. Fla. 7324 is the seed parent and contributes heat-tolerant fruit set and major components of blossom scar smoothness and crack resistance. The major source of heat tolerance in Fla. 7324 is from 'Campbell 28', although heat tolerance was enhanced by crosses with other lines, all of which are heat sensitive. Florida line 626 is similar to 'Florida 1A' (Augustine et al., 1981) and Florida line 648, which has been described briefly by Scott et al. (1985). Fla. 7057 is a jointless breeding line with firm fruit, used to increase the fruit size and firmness of the heat-tolerant inbred to which it was crossed.

Description

Vines of 'Equinox' are determinate (*sp*), similar in size to those of 'Solar Set' and smaller than those of 'Sunny' or 'Agriset 761',

Fig. 1. Pedigree of Equinox F₁.

Table 1. External and internal color and firmness for 'Equinox' and selected tomato cultivars grown in Bradenton, Fla., in Fall 1993.^a

Cultivar	Fruit color ^y						Firmness (mm deformation) ^x
	External			Internal			
	L	a	b	L	a	b	
Equinox	48.3 b ^w	20.4 a	30.0 b	41.4 c	22.3 a	21.6 ab	4.9 b
Solar Set	48.7 ab	21.2 a	31.9 a	42.9 bc	22.1 a	21.1 bc	5.2 ab
Sunny	50.3 a	18.1 b	32.5 a	44.2 ab	20.9 b	22.1 a	5.6 a
Agriset 761	50.3 a	17.4 b	32.6 a	44.9 a	19.5 c	20.7 c	5.3 ab

^aFruit picked at breaker stage, all data from table-ripe stage.

^bData taken with a Minolta CR-300 chromameter, higher "L" numbers indicate lighter color (value); higher "a" and "b" numbers indicate greater red and yellow color (hues), respectively.

^cDetermined with a pressure tester using a 1-kg weight for 5 sec with a fruit contact plate 1.5 cm in diameter. Pressure applied over a locule in the equatorial plane. Lower values indicate greater firmness.

^wMean separation in columns by Duncan's multiple range test at *P* ≤ 0.05.

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and provide good fruit cover. Fruit are medium to large and have a flattened globe shape. Shoulders of green fruit are light green (*ug* gene probably), and pedicels are jointed. Blossom scars are stellate but occasionally enlarged and irregular, although this has not caused extensive cull fruit production. Fruit have a glossy appearance and have good resistance to cracking and rain checking. Fruit ripen well, without uneven ripening, on the vine or when picked at mature-green and ripened with ethylene. Fruit color has been consistently good in numerous trials. In a Fall 1993 trial, 'Equinox' fruit were similar to those of 'Solar Set' and exceeded those of 'Sunny' and 'Agriset 761' for darker ("L") and red ("a") color, externally and internally (Table 1). Fruit firmness is typical of cultivars currently grown in Florida. In Fall 1993, firmness of 'Equinox' was similar to that of 'Solar Set' and 'Agriset 761' but greater than that of 'Sunny'. We rated flavor, based on tasting table-ripe fruit in the field over several seasons, as very good (scale = poor, fair, good, very good, and excellent). Marketable yield and fruit weight have been consistent compared to 'Sunny', 'Agriset 761', and 'Solar Set', the three most widely grown cultivars in Florida for the last 2 years (Table 2). 'Equinox' has early season maturity, similar to 'Solar Set' and earlier than 'Sunny' and 'Agriset 761'.

'Equinox' is resistant to fusarium wilt races 1 and 2 caused by *Fusarium oxysporum* Schlecht f.sp. *lycopersici* (Sacc.) Snyder and Hansen (*I-1, I-2*), verticillium wilt race 1 caused by *Verticillium dahliae* Kleb. (*Ve*), and gray leafspot caused by *Stemphyllium solani* Weber (*Sm*). Postharvest decay in fresh-market shipping tomatoes is often due to bacterial soft rot caused by *Erwinia* spp. 'Equinox' is similar to 'Solar Set', 'Sunny', and 'Agriset 761' for low levels of detached-fruit water uptake and subsequent postharvest decay due to *Erwinia* spp. (data not shown); 'Sunny' and 'Solar Set' were less susceptible to *Erwinia* than some older cultivars (Bartz, 1991).

Table 2. Total marketable yield and yield of extra-large fruit or average fruit weight for 'Equinox' and selected other tomato cultivars in 11 yield trials in Florida.

		Cultivar			
Trials	Yield ^a	Equinox	Solar Set	Sunny	Agriset 761
Fall					
Bradenton, 1991	Total	3746 a ^y	3032 ab	2170 b	---
	Extra large	1080	914	551	--- ^{NS}
Bradenton, 1992	Total	5619	5197	4055	3921 ^{NS}
	Extra large	2540 a	1856 ab	1366 b	1814 ab
Bradenton, 1993	Total	3217	3605	3133	3739 ^{NS}
	Extra large	768 ab	1174 a	563 b	1112 a
Quincy, 1991	Total	6029	5416	5950	6462 ^{NS}
	Extra large	5350	4611	4312	5080 ^{NS}
Quincy, 1992	Total	6432	6657	6259	5728 ^{NS}
	Extra large	4826	5100	4243	4337 ^{NS}
Quincy, 1993	Total	3269	2995	2943	3669 ^{NS}
	Extra large	1774	1628	1638	2174 ^{NS}
Ft. Pierce, 1992 ^x	Total	4717	4453	5374	5530 ^{NS}
	Mean fruit weight ^x	193 b	193 b	190 b	224 a
Spring					
Bradenton, 1992	Total	7497 a	5819 b	7690 a	6494 ab
	Extra large	5085 a	3113 b	3666 b	3543 b
Bradenton, 1993	Total	6454	5967	5654	5426 ^{NS}
	Extra large	3627 a	3264 a	1972 b	3151 a
Quincy, 1992	Total	5710	4794	6089	5916 ^{NS}
	Extra large	4082	3227	3852	4393 ^{NS}
Ft. Pierce, 1992	Total	4655	4025	4547	5303 ^{NS}
	Mean fruit wieght ^x	207 a	196 b	190 b	207 a

^aTotal and extra-large (fruit ≥ 7 cm in diameter) yield in 11.3-kg boxes/ha.

^yMean separation in rows by Duncan's multiple range test significant or nonsignificant (ns) at $P \leq 0.05$.

^xGrams/fruit.

Seed availability

Seed distribution of 'Equinox' is handled by Florida Foundation Seed Producers, P.O. Box 309, Greenwood, FL 32443.

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