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VARIABILITY IN ASCORBIC ACID CONTENT OF SOME *Lycopersicon* SPECIES

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Evaluation and analysis of 19 exotic germplasm of tomato comprising of *L. esculentum, L. peruvianum* and *L. pimpinellifolium* for ascorbic acid and fruit attributes indicated an appreciable range of variation. *L. peruvianum*, a non-edible green fruited species averaged the highest (60.97 mg/100 g of fresh weight) than other species analysed for ascorbic acid content. The average fruit length, fruit width and fruit weight of *L. esculentum* was more as compared to other two species. Variability in fruit attributed was low in *L. pimpinellifolium*

Key words : Tomato, *Lycopersicon* spp., variability, ascorbic acid

People can not produce ascorbic acid within their bodies, it must be consumed as part of a balanced diet. Nearly 90 per cent of this ascorbic acid is obtained from vegetables and fruits. Vegetables are an important dietary source of ascorbic acid, though there are a marked differences in the ascorbic acid content of different vegetables and even within the same species (Inove *et al*, 1998). Wills *et al.* (1996) reported that tomatoes possessed about 20 mg of ascorbic acid per 100 g of fresh weight. Some of the wild and semi cultivated forms had ascorbic acid values considerably higher than cultivated varieties. Since a wide variety of exotic germplasm were grown in the field at NBPGR Regional Station for characterization and evaluation, particular attention was paid to record differences among these species (*L. esculentum, L. peruvianum, L.pimpinellifolium*) in ascorbic acid content to use in future tomato improvement programs.

MATERIALS AND METHODS

A total of 188 exotic accessions of tomato germplasm (*Lycopersicon* spp) was transplanted for characterization, multiplication and evaluation at the NBPGR Regional Station, Hyderabad during Rabi season 1997-98 in an augmented design at a spacing of 60 × 60 cm, with local checks after every 10 accessions. About 19 exotic accessions comprising three species were analysed for ascorbic acid content by volumetric method by extracting 5 g sample in 4 per cent oxalic acid and by using 2, 6 - dichlorophenol indophenol dye. The amount of ascorbic acid was estimated by $\frac{0.5}{V_r\,ml} \times \frac{V2}{5ml\,Wt.} \times \frac{100}{Ofsample} \times 100$. The fruit length, width were determined by digital caliper and fruit weight was determined by electronic balance. The data were recorded as per IPGRI descriptor (1996) on 10 randomly selected fruits taken from 5 different plants.

RESULTS AND DISCUSSION

The *L. peruvianum*, a non edible green fruited species averaged the highest (60.97 mg/100g) of other types examined for ascorbic acid content. Representatives of this species were EC 211582,

Table 1. Variability in Vitamin C content and fruit attributes of *Lycopersicon* species

L. peruvianum				
Acc. No.	Asco. acid (mg/100 g)	Fruit length (mm)	Fruit width (mm)	Fruit weight (g)
EC 211582	59.77	13.966	13.75	0.8
EC251668	62.8	13.822	13.648	0.886
EC169966	32.5	13.892	14.904	0.6
EC267727	70	10.55	11.06	0.478
EC274122	87.5	8.3	8.31	0.22
EC274046	34.2	8.7	8.526	0.2401
EC251661	80	8.5	8.835	0.4055
Average	60.9671429	11.1042857	11.2904286	0.51851429
Range	32.5-87.5	8.3-13.966	8.31-14.904	0.22-0.886
Sed ±	21.1324606	2.71050043	2.80691942	0.25883032
C.V	34.662	24.419	24.86	49.91
L. esculentum				
Acc.No.	Ascor.acid (mg/100 g)	Fruit length (mm)	Fruit width (mm)	Fruit weight (g)
EC162508	45	28.68	23.38	15
EC251680	25	42.235	37.415	12.88
EC338734	27.5	40.21	46.794	44.9
EC163894	25	31.068	40.714	20
EC144681	40	32.28	40.01	36
EC164660	25	40.127	48.13	40
EC163594	23.68	39.1	47.92	40.5
EC338717	36.84	35.51	32.508	18
EC310301	35.07	51.22	39.804	14
EC315457-1	35	30.815	34	16
Average	31.809	37.1245	39.0675	25.7
Range	23.68-45	28.68-51.22	23.38-48.13	12.88-44.93
Sed ±	7.53479403	6.84035899	7.75937551	12.9093186
C.V	23.67	18.43	19.86	3.89
L. pimpinellifolium				
Acc.No.	Ascor.acid (mg/100g)	Fruit length (mm)	Fruit width (mm)	Fruit weight (g)
EC315464	29.885	20.13	25.62	3.08
EC313478	32.2	20	24.8	3
Average	31.0425	20.065	25.21	3.04
Range	29.89-32.2	20-20.13	24.8-25.62	3-3.08
Sed ±	1.639522	0.09192388	0.57982756	0.05656854
C.V	5.28	4.98	3.97	1.84

EC 251668, EC 169966, EC 267727, EC 274122, EC 274046 and EC 251661. Reynard and Kanapaux (1943) has also reported that small sized tomatoes account for high ascorbic acid content per unit of weight. The representatives of *L.esculentum* group were EC 162509, EC 251680, EC 338734, EC 163894, EC 144681, EC 164660, EC 163594, EC 338717, EC 310301 and EC 315457-1 and *L.pimpinellifolium* was represented by EC 315464 and EC 313478.

A significant difference in ascorbic acid content between *L. peruvianum* with other two species and a non significant difference between *L. esculentum* and *L. pimpinellifolium* for ascorbic acid content were recorded. Among *L. peruvianum* EC 274122 (87.5), EC 251661 (80), EC 267727 (70), EC 251668 (62.8) and EC 211582 (59.77) possessed more ascorbic acid content. EC 162508 (45), EC 144681 (40), EC 338717 (36.84), EC 31031 (35.07), EC 315457-1 (35) had more ascorbic acid content than other accessions in *L. esculentum* group. The range of asorbic acid content recorded for *L.esculentum, L.peruvianum* and *L.pimpinellifolium* was 23.68-45 mg; 32.5-87.5 mg and 29.85-32.2 mg per 100 g fresh weight respectively. Variability for this attribute was more in *L.peruvianum* followed by *L.esculentum* than *L.pimpinellifolium.*

L. esculentum averaged the highest fruit length (37.12 mm) than other two species and the least fruit length (11.10 mm) was recorded in *L.peruvianum.* The range of fruits length for *L.esculentum, L.peruvianum, L.pimpinellifollium* was 28.68- 51.20, 8.3-13.97 and 20.13-20.00 mm respectively. Significant differences were recorded for fruit length between *L. esculentum* with *L. peruvianum* and *L. pimpinellifolium.* Among *L. esculentum* EC 310301 (51.22 mm), EC 251680 (42.235), EC 338734 (40.21), EC 164660 (40.127), EC 163594 (39.1 mm) of *L. esculentum* got more length than other accessions. The average length of *L.pimpinellifolium* and *L.peruvianum* was 20.1 mm and 11.1 mm respectively. The variability for this attribute was less in *L.pimpinellifolium.*

Among these three species studied, *L.esculentum* recorded maximum average fruit width (39.07 mm). EC 164660 (48.13 mm), EC 163594 (47.92 mm), EC 338734 (46.794 mm), EC 163894 (40.7 mm), EC 144681 (40.01 mm), EC 310301 (35.07mm) of *L.esculentum* had more fruit width among the accessions analysed for ascorbic acid content. The average width of *L.peruvianum* and *L. pimpinellifolium* was 11.29 and 25.21 mm respectively. The range of fruit width recorded for *L.esculentum, L.peruvianum* and *L.pimpinellifolium* was 23.38-48.1; 8.31-14.9 and 24.8-25.624 mm respectively. The variability for this attribute was less in *L.pimpinellifolium.*

Maximum average fruit weight (25.7 g) was recorded in *L.esculentum* among these three species. The range for this attribute was 12.88 - 44.9 g; 0.22-0.886 g and 3-3.08 g in *L.esculentum, L.peruvianum* and *L.pimpinellifolium* respectively. EC 338734 (44.9 g), EC 163594 (40.5g), EC 164660 (40 g), EC144681 (36 g) belongs to *L.esculentum* got more fruit weight. The variability for this attribute was also less in *L.pimpinellifolium.*

From the above results, it can be concluded that *L.peruvianum,* a non edible green fruited species averaged the highest (60.97mg/100 g of fresh weight) in comparison to other species analysed for ascorbic acid content. The average fruit length, fruit width and fruit weight of *L. esculentum* was more compared to other two species. Variability in fruit attributes were low in *L. pimpinellifolium.*

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