‘VL Tamatar 4’: New Tomato Cultivar for Open-field and Greenhouse Cultivation

Nirmal K. Hedau¹, Shri Dhar, Vinay Mahajan, Pawan K. Agarwal, and Jagdish C. Bhatt

Vivekananda Parvatiya Krishi Anusandhan Sansthan (ICAR), Almora, Uttarakhand 263601 (India)

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‘VL Tamatar 4’ (*Solanum lycopersicum* or *Lycopersicon esculentum* Mill.) is a new tomato cultivar released for Agro-ecological Zone I (Uttarakhand, Northwest Himalaya, India). It was developed by a pure-line selection method from the exotic collection (EC-461691). It has an indeterminate growth habit. Fruits are smooth, round, and an attractive red color with 75 g average weight and having a thick pericarp resulting in a long storage life. It is suitable for cultivation under both open-field and greenhouse conditions as well. The average fruit yield was 20 to 30 tons per hectare and 55 to 65 tons per hectare under open-field and greenhouse conditions, respectively.

Tomato is a very important and economic crop of the Northwest Hills of India because it fetches a higher price as a result of its off-season cultivation. Farmers cultivate tomato during the spring–summer season, i.e., March to July, under open-field and the spring–fall season, i.e., April to October, under greenhouse conditions. A tomato breeding program in India was strengthened with the commencement of the All India Coordinated Research Project on Vegetable Crops (AICRP-VC) in 1971. Only one open-pollinated cultivar i.e., Pusa Ruby, has been released through AICRP-VC for cultivation in Agro-ecological Zone I (temperate zone) of India (Rai et al., 2004). As a result of a lack of the public sector’s improved cultivars of tomato, the private sector’s hybrids are being grown by the farmers on a large scale. Because of off-season cultivation and limited acreage in the Northwest Hills of India, the seed availability

even the private sector’s hybrids is very poor as compared with main season tomato cultivation in other parts of the country. Seed dependency and high seed price are very serious problems of the region for off-season cultivation of tomato. Hence, through this article, we report the release of ‘VL Tamatar 4’, an open-pollinated cultivar with higher yields and better quality of the fruits. Being an open-pollinated cultivar, it can easily be multiplied and maintained by the farmers of the region and is suitable for organic as well as inorganic cultivation. This cultivar may be adapted to other temperate regions of the world having similar climatic conditions.

Origin

Indeterminate, autogamous, high-yielding genotypes with attractive fruits (medium, round, attractive red with a thick pericarp having a long storage life) were the major objectives of the tomato breeding program. In this endeavor, 41 accessions were evaluated at the experimental farm of Vivekananda Parvatiya Krishi Anusandhan Sansthan (ICAR), Almora, Uttarakhand, India (lat. 79°39' E; long. 29°35' N; altitude 1250 m above sea level). Among four promising accessions, EC-461691 was found to be better in fruit yield and other important horticultural traits like fruit shape, size, color, pericarp thickness, etc. This exotic collection is introduced from AVRDC, Taiwan, through the National Bureau of Plant Genetic Resources, New Delhi, as ‘CL 5915-206’. However, dissimilar plants observed in EC-461691 (CL 5915-206) and then the pure line selection were practiced to get uniform plants with desirable traits.

After two generations of selection, further segregation was not observed and finally it was named ‘VTG 93’.

Performance

A station replicated trial (pre-varietal trial) conducted at Hawalbagh, Almora (1250 m above sea level) under open-field inorganic conditions with four promising accessions during 2002–03 indicated that the fruit yield (31.75 t·ha⁻¹) of ‘VTG 93’ was higher than ‘Sioux’ and ‘Pusa Ruby’ (Rai et al., 2004; Table 1). This new cultivar (VTG 93) is comparable to other popular open-pollinated cultivars (Pusa Ruby and Pant Tamatar 3) grown in the region in terms of important horticultural traits such as fruit shape, size, color, and pericarp thickness. It also performed well under greenhouse conditions (Table 2). It also possesses resistance to fruit rot and seedling rot complex under field conditions. Because of its superiority over the popular cultivars in the pre-varietal trial, it was proposed to State Varietal Trials–Vegetable Crops (SVT-VC) of Uttarakhand, India. ‘VTG 93’ along with checks was evaluated in SVT-VC during 2003–05 at Hawalbagh, Almora (1250 m above sea level), Pithoragarh (1524 m above sea level), and Majhera, Nainital (900 m above sea level) under organic conditions. Evaluation under SVT-VC for 3 years (2003–05) indicated the suitability of ‘VTG 93’ for the midhills of Uttarakhand (900 to 1524 m above sea level) under organic conditions. Trials were planted (row distances 75 cm and plant to plant 45 cm) in an organic block of the experimental farm and followed the

Table 1. On-station performance^z of tomato cultivars for fruit yield (t·ha⁻¹), 2002–03.

Cultivars	2002	2003	Pooled mean
VTG 91	13.66	25.50	19.58 c ^y
VL Tamatar 4 (VTG 93)	31.25	32.25	31.75 a
VTG 94	19.91	30.75	25.33 b
VTG 95	10.83	28.87	19.85 c
Sioux (C)	11.58	27.00	19.29 c
Pusa Ruby (C)	10.83	23.00	16.92 d
LSD (0.05)			2.35

^zData collected from a pre-varietal trial planted in a randomized complete block design with three replications under inorganic conditions.

^yValue within columns followed by the different letters are significantly different according to Duncan’s test at $P \leq 0.05$.

C = control cultivar; LSD = least significant difference.

Table 2. On-station performance^z of ‘VL Tamatar 4’ for fruit yield (t·ha⁻¹), 2002–04.

Cultivars	2002	2003	2004	Pooled mean
VL Tamatar 4 (VTG 93)	62.00	58.10	64.00	61.3 a ^y
VTG 92	48.00	45.40	46.00	46.4 b
VLT 1	32.20	30.40	34.00	32.2 c
Roma (C)	29.00	28.00	29.80	28.9 d
Pusa Ruby (C)	25.00	24.00	26.00	25.0 e
LSD (0.05)				3.2

^zData collected from trials planted in randomized complete block designs under green house over the years in V.P.K.A.S., Hawalbagh, Almora, Uttarakhand.

^yValue within columns followed by the different letters are significantly different according to Duncan’s test at $P \leq 0.05$.

C = control cultivar; LSD = least significant difference.

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¹To whom reprint requests should be addressed; e-mail hedanirmal_2003@yahoo.co.in.

Table 3. Performance^a of 'VL *Tamatar* 4' at State Varietal Trials–Vegetable Crops, Uttarakhand for fruit yield (t·ha⁻¹), 2003–05.

Cultivars	2003 (2) ^x	2004 (2)	2005 (3)	Pooled mean	Percent increase of VL <i>Tamatar</i> 4
VL <i>Tamatar</i> 4 (VTG 93)	18.40	16.73	17.35	17.47 a ^y	—
DARL 63 (Q)	16.01	12.21	15.22	14.58 b	+19.79
DARL 64 (Q)	13.72	11.30	15.72	13.89 b	+25.82
Pusa Ruby (C)	12.82	10.33	12.02	11.76 c	+48.52
VLT 1 (C)	14.42	14.96	15.44	15.01 b	+16.40
LSD (0.05)				2.11	

^aData collected from trials planted in randomized complete block designs over the years under organic conditions and locations (V.P.K.A.S., Hawalbagh, Almora, Uttarakhand, G.B.P.U.A. & T. Research Station, Majhera, Nainital, Uttarakhand, and D.A.R.L. Farm, Pithoragarh, Uttarakhand).

^yValue within columns followed by the different letters are significantly different according to Duncan's test at $P \leq 0.05$.

^xNumber of locations in parentheses.

Q = qualifying entry; C = control cultivar; LSD = least significant difference.

similar organic practices in which farm yard manure was applied at 20 t·ha⁻¹ without any chemicals (insecticide and fungicide). Fruit yield of 'VTG 93' was significantly higher than the other cultivars (Table 3). The trials were conducted in the spring–summer seasons and the average rainfall was 30 to 36 mm and temperature was 25 to 35 °C (day) and 10 to 16 °C (night). Based on its performance in SVT-VC Uttarakhand, it was identified and recommended for release in the workshop of the SVT-VC, Uttarakhand, held at GBPUA&T, Pantnagar, on 6 Mar. 2006 for its release in Uttarakhand. It was released as 'VL *Tamatar* 4' for the midhills of Uttarakhand (temperate, 900 to 1250 m above sea level) on 23 July 2008 at Dehradun by the State Vegetable

Variety Release Committee of Uttarakhand. Finally, 'VL *Tamatar* 4' was notified during the meeting of the Central Subcommittee on Crop Standard Notification and release for horticultural crops (The Gazette of India, 2010).

Description

The plants of 'VL *Tamatar* 4' are characterized by the indeterminate growth habit, 80- to 105-cm plant height, thick stem with two to four primary branches, yellow flowers with non-exserted style position, and 25 to 35 fruits per plant. Fruits are round, medium in size, smooth surface, four to six fruits per cluster, four to five locules per fruit, and attractive red fruits with 5-mm flesh thickness.

It is early in maturity (first picking 60 to 70 d after transplanting) and exhibited 50% flowering in 30 to 40 d after transplanting. The first week of March and April to July are the suitable transplanting times for its cultivation under open-field and greenhouse (naturally ventilated) conditions, respectively, for the Northwest Hills of India.

Availability

Seeds of 'VL *Tamatar* 4' are being multiplied every year and available at ICAR, Almora, Uttarakhand, 263601 (India) for Indian scientists and farmers. Seed requests within India may be addressed to The Director, Vivekananda Parvatiya Krishi Anusandhan Sansthan, Almora, Uttarakhand 263601 (India). Seeds of 'VL *Tamatar* 4' have also been deposited at the National Bureau of Plant Genetic Resources (NBPGR), New Delhi, under accession no. IC 565198. Seed requests from outside India may be addressed to the Director, National Bureau of Plant Genetic Resources (ICAR), Pusa, New Delhi, 110012 (India).

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