

## **‘VRW-3’: A Yellow Rinded Watermelon with High Total Soluble Solids**

B.R. Choudhary<sup>1,a</sup>, S. Pandey<sup>2</sup>, P.K. Singh<sup>1</sup>, R. Singh<sup>1</sup> and M. Rai<sup>2</sup>

<sup>1</sup> Indian Institute of Vegetable Research-Seed Production Centre, Sargatia, Kushinagar, 274406 (Uttar Pradesh), India

<sup>2</sup> Indian Institute of Vegetable Research, Varanasi, 221305 (Uttar Pradesh), India

**Keywords:** watermelon, rind color, total soluble solids

### **Abstract**

**‘VRW-3’ is a new line of watermelon [*Citrullus lanatus* (Thunb.) Mansf.] with yellow colored rind right from the ovary stage. This line was developed through selection from a local landrace. Plants bear round and yellow rinded fruits with red purple flesh. The fruits are small in size (3.0 kg), very attractive and become ready for first harvest in 82 days from sowing. The fruits have a distinct flavor, delicious taste, and high total soluble solids (15%) and high carotenoids (5 mg/100 g) as compared with other cultivars recommended for cultivation in India. This precious material could be used as a source to develop yellow rinded cultivars and hybrids of watermelon.**

### **INTRODUCTION**

Watermelon [*Citrullus lanatus* (Thunb.) Mansf.] belongs to the family *Cucurbitaceae* and it is the only cultivated species of this genus (Bisgonin, 2002). It is widely cultivated throughout the tropics and Mediterranean (Tindall, 1983) and one of the most widely cultivated crops in the world (Huh et al., 2008). Watermelon is grown for its fleshy, juicy and sweet fruits. Mostly eaten fresh which provide a delicious and refreshing dessert in hot weather. Now, it is no longer just a summer fruit and is becoming an everyday fruit like apples, bananas and oranges due to its nutritional and medicinal properties. The greater part of fruit flesh is mostly derived from placenta. The rind colors and patterns of watermelon fruit have been among the major breeding objectives. Watermelon is considered to have a green rind, ranging from light to dark and from solid to striped (Guner and Wehner, 2003). In present day cultivars the most common rind colour are solid green (dark, medium and light), striped (narrow, medium, and wide dark green stripes on a light green background), and gray (a light green background with a medium or dark green network of reticulations) as reported by Gusmini and Wehner (2005). In India, many watermelon landraces are grown in different parts having wide variation in rind pattern. Farrukhabadi, Mradabadi, Faizabadi of Uttar Pradesh and Mateera of Rajasthan are a few common landraces grown by farmers using their own saved seeds. Breeding for specific rind color is often a challenge to attract consumers. The rind colors and patterns of watermelon fruit have been among the major objectives of breeding (Gusmini and Wehner, 2006). In this article, we report ‘VRW-3’, a germplasm line with better agronomic performance, high total soluble solids (TSS) and high carotenoids.

### **ORIGIN**

‘VRW-3’ originated from an open pollinated land race collected from Shahjahanpur, Uttar Pradesh, India. During 2005-06, a total of 54 landraces were collected from farmer’s field and grown at the research farm of Indian Institute of Vegetable Research-Seed Production Centre, Sargatia, Kushinagar. Two plants were identified having fruits with yellow color rind right from the ovary stage. The rind color was yellow (RHS 8B; Royal Horticultural Society, 2001) with dark yellow lining and flesh color of mature fruits was red purple (RHS 61A; Royal Horticultural Society, 2001), which was distinct from those of other collected landraces. These plants were self-pollinated and the seeds were

---

<sup>a</sup> Corresponding author; choudharybr71@gmail.com

collected separately; individual plant progenies were grown, and single plant selection was based on earliness, TSS, and fruit weight in addition to rind color and flesh color. In the next generation, seeds from all the fruits of the selected plants were sown and 25% plants were selected based on earliness, rind color, flesh color and TSS. To increase the seeds, plants were self-pollinated for three seasons.

### **DESCRIPTION**

Plants of 'VRW-3' are monoecious, have medium vine (3.2 - 3.6 m) and produced the first female flower on the 17<sup>th</sup> node of the vine. Fruits are attractive, round with yellow rind (RHS 8B; Royal Horticultural Society, 2001). The fruit flesh color is red purple (RHS 61A; Royal Horticultural Society, 2001) at edible maturity (Fig. 1). The fruit become ready for first harvest in 82.4 days from seed sowing and produces 4.33 fruits per plant. The fruits are small in size weighing 3 kg, which suits the icebox segment that is the need of the hour for nuclear families. The flavor of fruit is distinct with delicious taste having TSS content (15%) and carotenoid content (5 mg/100 g) is higher compared to with that of the other popular cultivars previously recommended for cultivation in India (Table 1). Besides, the morphological data have also been recorded (Table 2).

### **AVAILABILITY**

Seeds of 'VRW-3' are being maintained at IIVR-Seed Production Centre, Sargatia, Kushinagar, Uttar Pradesh, India. The seed has also been deposited at National Bureau of plant Genetic Resources (NBPGR), New Delhi under the accession number IC-582909.

### **Literature Cited**

- Bisognin, D.A. 2002. Origin and Evolution of Cultivated Cucurbits. *Ciencia Rural*, Santa Maria, 32(5):715-723.
- Guner, N. and Wehner, T.C. 2003. Gene list for watermelon. *Cucurbit Genet. Coop. Rep.* 26:76-92.
- Gusmini, G. and Wehner, T.C. 2005. Genes determining rind pattern inheritance in watermelon: a review. *Hort. Sci.* 40(6):1929-1930.
- Gusmini, G. and Wehner, T.C. 2006. Qualitative inheritance of rind pattern and flesh color in watermelon. *J. Hered.* 97(2):177-185.
- Huh, Y.C., Solmaz, I. and Sari, N. 2008. Morphological characterization of Korean and Turkish watermelon germplasm. 1<sup>st</sup> Cucurbitaceae 2008. In: M. Pitrat (ed.), *Proceedings of the IX<sup>th</sup> EUCARPIA meeting on genetics and breeding of Cucurbitaceae INRA, Avignon (France), May 21<sup>st</sup>-24<sup>th</sup>*.
- Royal Horticultural Society. 2001. RHS colour chart. Royal Hort. Soc., London, UK.
- Tindall, H.D. 1983. *Vegetables in the tropics*. The Macmillan Press Limited, p.150.

## **Tables**

Table 1. On-station performance<sup>z</sup> of watermelon cultivars for yield, yield attributes and quality traits.

Cultivars	Days to first fruit harvest	Fruit weight (kg)	No. of fruits/plant	Fruit yield/plant (kg)	Rind thickness (mm)	No. of seed/Fruit	TSS (%)*	Ascorbic acid (mg/100 g)	Carotenoids (mg/100 g)
VRW-3	82.4 b <sup>y</sup>	3.04 c	4.33 a	13.16 a	10.67 b	267.4 b	15.00 a	6.64 a	5.00 a
Sugar Baby	83.2 b	2.87 c	2.73 b	7.77 b	10.33 b	286.13 b	13.13 b	6.25 a	4.22 b
Arka Manik (NC)	91.39 a	5.95 a	2.40 bc	14.25 a	12.40 a	296.07 b	14.40 a	6.38 a	4.22 b
Durgapura Lal (NC)	91.27 a	5.01 b	2.33 bc	11.43 a	12.20 a	498.60 a	12.53 b	6.32 a	3.24 c
Durgapura Meetha	98.07 a	6.35 a	2.13 c	13.44 a	12.40 a	472.87 a	12.47 b	6.27 a	4.08 b
LSD at 5%	7.27	0.86	0.52	2.78	1.39	56.00	1.15	0.68	0.25

\*Total soluble solids determined by Hand Refractometer (Erma, Japan), 0% to 32% scale.

NC- National check.

y- Values within a column followed by the different letters in the superscript are significantly different at 5% level according to Duncan's multiple range test.

z- Data collected over 2 years (2009 and 2010) from a trial laid out in randomized complete block design with 3 replications, data were recorded from 5.4 m x 3 m plots with a plant density of 1.35 plant/m<sup>2</sup>.

Table 2. Morphological data<sup>z</sup> of watermelon cultivars.

Cultivars	Growth habit	Leaf shape	Ovary colour	Fruit shape	Main rind color	Rind color pattern	Flesh color	Seed size	Seed color
VRW-3	Runner	Pentalobate	Yellow	Round	Yellow	Solid	Red purple	Small	Dark brown
Sugar Baby	Runner	Pentalobate	Green	Round	Dark green	Medium green stripes	Red	Small	Brown
Arka Manik (NC)	Runner	Pentalobate	Dark green	Oval	Green	Dark green stripes	Deep crimson	Small	Brown with black tip
Durgapura Lal (NC)	Runner	Non-lobed	Dark green	Round	Dark green	Dark lining	Dark red	Small	Brown with black spots
Durgapura Meetha	Runner	Pentalobate	Light green	Round	Light green	Dark lining	Red	Medium	White with black tip and margin

NC- National check

z- Data collected over 2 years (2009 and 2010) from a trial laid out in randomized complete block design with 3 replications.

**Figures**



Fig. 1. Mature fruits of 'VRW-3'.

