



## Evaluation of Farmers' Onion Varieties Under Konkan Conditions of Maharashtra

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Onion (*Allium cepa* L.) belongs to the Alliaceae family and has origin in central Asia. It is commercially by far the most important crop as compared to other spice bulb crops. During 2017-18, India's average annual production of onion was 23262 thousand metric tonnes from an area of 1285 thousand ha. Maharashtra is the leading onion growing state accounting for 507.96 thousand hectares area with 8854.09 thousand metric tonnes of production (Horticulture Statistics Division, 2018). Successful onion production depends on the selection of varieties that are adapted to different conditions imposed by a specific environment. There are many commercial released onion varieties, which are popular for wide cultivation or location-specific performance. The present investigation was carried out to evaluate the onion varieties *viz.*, Sona Chalis Onion and Sandip Pyaz developed by the farmers from Maharashtra.

A field experiment was conducted at the Agriculture Research Station of Dr. B.S. Konkan Krishi Vidyapeeth at Repoli, Raigad, Maharashtra, India to evaluate and assess the farmers' onion varieties under Konkan conditions of Maharashtra during *rabi* 2017-2018. The field experiment was laid out in randomised block design with 4 treatments and five replications. The treatments consisted of varieties *viz.*, V<sub>1</sub>: Sona Challis Onion, V<sub>2</sub>: Sandip Pyaz, V<sub>3</sub>: Agrifound Light Red and V<sub>4</sub>: Phule Samarth. Transplanting of onion was done at 15 cm × 10 cm spacing and the dose of manures and fertilizers applied was FYM @ 20 t ha<sup>-1</sup> and N, P and K @ 100:50:50 kg ha<sup>-1</sup>. Recommended cultural practices were followed to raise the crops successfully. Harvesting of onion was done at maturity *i.e.*, at 50% neck fall stage. Five plants were selected at random in each plot to record the observations on plant height (cm), no. of leaves per plant, days to maturity, average bulb weight (g), no. of rings per bulb, ring size (cm), average bulb diameter (cm), yield (t ha<sup>-1</sup>), degree of splitting (%), TSS (%), bulb shape uniformity, keeping quality (days), bulb shape, firmness, skin retention and flesh brightness. The mean data were subjected to statistical analysis as per

the methods suggested by Panse and Sukhatme (1995).

From the data (Table 1), it was revealed that the maximum plant height at 90 DAT (days after transplanting) was recorded by Sona Challis onion (43.80 cm) which was at par with Sandip Pyaz variety (41.80 cm) and both were found superior over the varieties Phule Samarth (34.20 cm) and Agrifound Light Red (31.80 cm). At harvesting, significantly higher numbers of leaves were found in Sandip Pyaz variety (10.00) which was at par with Sona Challis onion and significantly higher than Agrifound Light Red (6.80) and Phule Samarth (6.20) varieties. Similar results were reported by Mohanty *et al.* (2002), Sarada *et al.* (2009) and Dwivedi *et al.* (2012) under different climatic conditions with different varieties.

The onion variety Sona Challis recorded significantly less number of days for maturity *i.e.*, 50 % neck fall (118.40 days), whereas Phule Samarth recorded 120.80 days. Agrifound Light Red variety required the maximum number of days for maturity (124 days) followed by Sandip Pyaz (121.20 days). These differences in the maturity period of bulb were observed due to the different genetic constitution of onion varieties. Patil *et al.* (2003) and Ijoyah *et al.* (2008) also reported the influence of onion varieties on days required for maturity.

A significantly higher average bulb weight was found in Sandip Pyaz variety (82.60 g) as compared to rest of the varieties *viz.*, Sona Challis Onion (73.20 g), Phule Samarth (66.00 g) and Agrifound Light Red (65.20 g). Similar results were reported by Yadwinder and Brar (2002) and Sarada *et al.* (2009).

The number of rings per bulb was found significantly maximum in Sandip Pyaz variety (9.16) followed by Sona Challis (8.04), Agrifound Light Red (7.46) and Phule Samarth (7.00) varieties. Similarly, the ring size of the onion was recorded highest in Sandip Pyaz variety (0.40 cm) followed by Sona Challis (0.38 cm), Agrifound Light Red (0.23 cm) and Phule Samarth (0.21 cm) varieties. Data revealed that the average bulb

**Table 1.** Growth attributes, yield attributes, yield and quality of onion influenced by different onion varieties under Konkan conditions of Maharashtra

| Varieties           | Plant height (cm) | No. of leaves per plant | Days to maturity | Average bulb weight (g) | No. of rings per bulb | Ring size (cm) | Average bulb diameter (cm) | Yield (t ha <sup>-1</sup> ) |
|---------------------|-------------------|-------------------------|------------------|-------------------------|-----------------------|----------------|----------------------------|-----------------------------|
| Sona Challis Onion  | 43.80             | 9.40                    | 118.40           | 73.20                   | 8.04                  | 0.38           | 5.37                       | 33.57                       |
| Sandip Pyaz         | 41.80             | 10.00                   | 121.20           | 82.60                   | 9.16                  | 0.40           | 4.45                       | 37.87                       |
| Agrifound Light Red | 31.80             | 6.80                    | 124.00           | 65.20                   | 7.46                  | 0.23           | 4.39                       | 30.56                       |
| Phule Samarth       | 34.20             | 6.20                    | 120.80           | 66.00                   | 7.00                  | 0.21           | 4.95                       | 30.27                       |
| SE (m) +            | 3.02              | 0.52                    | 0.70             | 0.89                    | 0.17                  | 0.01           | 0.17                       | 0.54                        |
| CD at 5%            | 9.31              | 1.61                    | 2.14             | 2.74                    | 0.51                  | 0.03           | 0.514                      | 1.66                        |

**Table 2.** Different quality parameters of onion as influenced by different varieties under Konkan conditions of Maharashtra

| Varieties           | Degree of Splitting (%) | TSS (%) | Bulb shape uniformity (1-5 scale) ## | Keeping quality (days) | Bulb shape # | Firmness # | Skin retention # | Flesh brightness # |
|---------------------|-------------------------|---------|--------------------------------------|------------------------|--------------|------------|------------------|--------------------|
| Sona Challis Onion  | 3.20                    | 12.22   | 3.00                                 | 35.60                  | Ovate        | 3.30       | 3.60             | 3.60               |
| Sandip Pyaz         | 3.76                    | 11.74   | 3.20                                 | 40.20                  | Elliptic     | 4.10       | 4.60             | 4.40               |
| Agrifound Light Red | 2.46                    | 12.32   | 3.30                                 | 33.00                  | Elliptic     | 4.10       | 3.40             | 3.40               |
| Phule Samarth       | 3.34                    | 11.72   | 3.30                                 | 30.60                  | Ovate        | 3.80       | 3.80             | 4.00               |
| SE (m) +            | 0.19                    | 0.03    | 0.25                                 | 0.44                   |              |            |                  |                    |
| CD at 5%            | 0.57                    | 0.09    | N.S.                                 | 1.34                   |              |            |                  |                    |

## Bulb shape uniformity is based on 1-5 scale (1- non uniformity, 5 - uniform in shape); # These observations are based on 1-5 scale (Firmness 1= soft, 5 = hard), Skin retention (1 = bald, 5 = no cracks), Flesh brightness (1 = dull, 5 = strongly bright)

**Table 3.** Response of different onion varieties to incidence of Purple blotch as influenced under Konkan conditions of Maharashtra

| Varieties           | Incidence of Purple blotch (%) |
|---------------------|--------------------------------|
| Sona Challis Onion  | 13.00                          |
| Sandip Pyaz         | 11.40                          |
| Agrifound Light Red | 17.40                          |
| Phule Samarth       | 13.60                          |
| SE (m)+-            | 0.93                           |
| CD at 5%            | 2.87                           |

diameter was significantly superior in the variety Sona Chalis (5.37 cm) over the rest of the varieties, where it

is recorded lowest in Agrifound Light Red (4.39 cm). Variety Sandip Pyaz recorded a significantly higher yield over the rest of the varieties. The increase in yield could also be due to plant height, leaf number, chlorophyll content, bulb diameter and weight of bulb. Similar results were reported by Mohanty *et al.* (2002), Khar *et al.* (2007), Sarada *et al.* (2009), Yadav *et al.* (2010) and Dwivedi *et al.* (2012) in different varieties.

The degree of splitting was found lowest in variety Agrifound Light Red (2.46 %) which was significantly lowest among all varieties. However, Sandip Pyaz variety recorded the highest splitting (3.76 %), being at par with Phule Samarth (3.34 %) and Sona Challis

varieties of onion (3.20%), respectively. These results are in conformity with the findings of Jadhav *et al.* (1990) and Soni *et al.* (1993).

The highest total soluble solids (TSS) was found in the variety Agrifound Light Red (12.32%) which was at par with Sona Challis Onion (12.22%), and these varieties had significantly higher TSS content over Sandip Pyaz (11.74%) and Phule Samarth (11.72%). The increased TSS was due to enhanced physiological activity and availability of nutrients and the development of a strong source and sink relationship. These results conform with the findings of Saimbhi and Bal (1996), Yadav *et al.* (2010) and Dewangan *et al.* (2012).

In general, medium shape uniformity was observed in all the varieties. There was no significant varietal difference in bulb shape. In the case of keeping quality, the variety Sandip Pyaz recorded higher keeping quality (40.20 days) over Sona Challis Onion (35.60 days), Agrifound Light Red (33.00 days) and Phule Samarth (30.60 days). The Sona Challis and Phule Samarth produced ovate shaped bulbs, whereas, variety Sandip Pyaz and Agrifound Light Red produced elliptical-shaped bulbs. The highest score for firmness, skin

retention and flesh brightness was observed in Sandip Pyaz variety.

Significantly lowest incidence of purple blotch disease was recorded in Sandip Pyaz variety (11.40%) followed by Sona Challis (13.00%) and Phule Samarth (13.60%). The highest incidence was observed in the Agrifound Light Red variety (17.40%). No thrips infestation was observed during this investigation.

The study revealed that the average bulb weight (g), number of rings per bulb, ring size (cm) and keeping quality along with onion yield per ha was found superior in Sandip Pyaz followed by Sona Challis onion. The average bulb diameter (cm) was found maximum in Sona Challis onion followed by Phule Samarth. Less degree of splitting (%) and higher TSS was recorded in a variety of Agrifound Light Red followed by Sona Challis Onion. However, the lowest incidence of purple blotch disease and the highest score for quality parameters *viz.*, the skin retention, firmness and flesh brightness was recorded in Sandip Pyaz.

#### CONFLICTS OF INTEREST

There is no conflict of interest.

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