

## GV-2: A high yielding little millet variety for South Gujarat conditions

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### SUMMARY

A high yielding little millet (*Panicum miliare* L.) culture WV-13 was developed through mutation breeding at Hill Millet Research Station, Navsari Agricultural University, Waghai (Dangs), Gujarat and released as Gujarat Vari-2 (GV-2) for south Gujarat region during 2006. It recorded an average grain yield of 1731 kg/ha. The culture WV-13 recorded 32.6 per cent increased grain yield over check variety GV-1 in station trials. In All India Coordinated trial during 2009-2010, the culture WV-13 registered 36.27 percent and 39.39 per cent increased grain yield over both the national checks CO-2 and OLM-203, respectively. Likewise, it ranked second position during 2010-2011 recording 10.16 per cent and 22.42 per cent more yield over national checks JK-8 and CO-2, respectively. It matures in 115-125 days. The panicle is long, semi-compact and branched. The grains are bold and attractive yellow in colour. The nutritional quality of culture WV-13 was found better than check variety GV-1.

**Key Words :** Little millet, Grain yield, Nutritional quality

**How to cite this article :** Chaudhari, P.P., Patel, D.A. and Saravaiya, S. N. (2012). GV-2: A high yielding little millet variety for South Gujarat conditions. *Internat. J. Plant Sci.*, 7 (1) : 165-167.

**Article chronicle :** Received : 14.10.2011; Sent for revision : 02.11.2011; Accepted : 26.12.2011

Little millet (*Panicum miliare* L.) is grown in India under varied agro-ecological situations. It is a hardy crop which can withstand drought better than most of the other cereal crops and also water logging to a certain degree (Gautam and Kaushik, 1981). It is a good source of protein, very rich in carbohydrate, fat, minerals and vitamins and should be considered as essential food for nutritional security (Nirmalakumari *et al.*, 2010). It is locally known as *Vari* and cultivated in hilly tracts of south Gujarat. The area under this crop is mainly concentrated in the districts of Dangs, Valsad and Navsari. In Gujarat, little millet is cultivated in an area of 9,400 hectares with 8,800 tonnes of production having the

productivity of 936 kg/ha. It is normally cultivated in marginal and poor soil under rainfed situation. The tribals consume its grains in place of paddy. In urban areas, grains are used during fast-day after removing the seed coat.

The research work on evolution of improved strain of little millet was initiated at Hill Millet Research Station, Waghai (Dangs) of Navsari Agricultural University and as a result a high yielding variety Gujarat Vari-1 (GV-1) was released in 1995. Due to pure line selection from local germplasm, the genetic superiority of GV-1 was not much evident. Hence, to broaden the genetic base of the variety, mutation breeding work was initiated and as a result a new high yielding GV-2 variety was developed to increase the production and productivity of little millet in south Gujarat. Ganapathy *et al.* (2008) also studied mutagenic effect on little millet varieties and revealed that induced mutagenesis has been successfully used to generate wider variability, portioning for isolating mutants with desirable characters of economic importance.

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### MATERIALS AND METHODS

Little millet culture WV-13 was developed through

mutation breeding at Hill Millet Research Station, Navsari Agricultural University, Waghai (Dangs). The seeds of little millet variety GV-1 were treated with 40 Kr Gamma rays. The treated seeds were sown and elite plants with desirable characters which contribute towards high grain yield were selected from M<sub>2</sub> generation onwards. They were evaluated for their sustained performance and the culture WV-13 was identified as the best. The culture WV-13 was tested along with checks in station trials from 1997 to 2005. The culture WV-13 was also tested at farmers' field during *Kharif* 2005. The culture WV-13 was also tested in All India Coordinated trials during 2009-2010 and 2010-2011. Based on the standard procedures the grain qualities were also analysed.

## RESULTS AND DISCUSSION

The overall performance of culture WV-13 from the station trials are presented in Table 1. The culture WV-13 was tested in station trials from 1997 to 2005 along with local check GV-1. The culture WV-13 recorded a mean grain yield of 1731 kg/ha, which was 32.6 per cent increased over check variety GV-1 (1305 kg/ha). This culture was also tested and compared

**Table 1 : Performance of culture WV-13 over years at Hill Millet Research Station, Waghai**

| Season and years            | Grain yield (kg/ha) |      | C.D. (0.05) | CV%  |
|-----------------------------|---------------------|------|-------------|------|
|                             | WV-13               | GV-1 |             |      |
| <i>Kharif</i> 1997          | 824                 | 396  | 108         | 21.7 |
| <i>Kharif</i> 1998          | 1238                | 792  | 139         | 13.0 |
| <i>Kharif</i> 1999          | 1877                | 1673 | 271         | 15.3 |
| <i>Kharif</i> 2000          | 925                 | 747  | 139         | 14.2 |
| <i>Kharif</i> 2001          | 1916                | 1771 | 276         | 9.4  |
| <i>Kharif</i> 2002          | 2079                | 1364 | 144         | 5.6  |
| <i>Kharif</i> 2003          | 1754                | 1169 | 90          | 4.3  |
| <i>Kharif</i> 2004          | 2241                | 1591 | 289         | 10.1 |
| <i>Kharif</i> 2005          | 2729                | 2241 | 175         | 5.2  |
| Mean yield (kg/ha)          | 1731                | 1305 | -           | -    |
| Per cent increase over GV-1 | 32.60               | -    | -           | -    |

with GV-1 on ten farmers' field during *Kharif* 2005 (Table 2). The culture recorded average grain yield of 2185 kg/ha, which was 29 per cent higher over check variety GV-1 (1690 kg/ha).

The culture WV-13 was also tested in All India Coordinated trials at nine locations during 2009-2010 and at twelve locations during 2010-11 (Table 3). During 2009-10, the culture WV-13 occupied 6<sup>th</sup> ranked at national level. The

**Table 2 : Performance of culture WV-13 on farmers' field (*Kharif* 2005)**

| No. of field                | Grain yield (kg/ha) |      |
|-----------------------------|---------------------|------|
|                             | WV-13               | GV-1 |
| 1.                          | 2238                | 1648 |
| 2.                          | 2078                | 1432 |
| 3.                          | 1866                | 1522 |
| 4.                          | 1954                | 1648 |
| 5.                          | 1824                | 1518 |
| 6.                          | 2156                | 1726 |
| 7.                          | 2482                | 1836 |
| 8.                          | 2362                | 1946 |
| 9.                          | 2518                | 1838 |
| 10.                         | 2372                | 1786 |
| Mean yield (kg/ha)          | 2185                | 1690 |
| Per cent increase over GV-1 | 29.00               | -    |

**Table 3 : Performance of culture WV-13 in All India Coordinated Trials (2009-10 and 2010-11)**

| Location         | Grain yield (kg/ha) |       |          |           |       |       |
|------------------|---------------------|-------|----------|-----------|-------|-------|
|                  | 2009-2010           |       |          | 2010-2011 |       |       |
|                  | WV-13               | CO-2* | OLM-203* | WV-13     | JK-8* | CO-2* |
| Waghai (Gujarat) | 2332                | 250   | 748      | 3108      | 1300  | 1369  |
| All India        | 1157                | 849   | 830      | 1507      | 1368  | 1231  |
| Mean             |                     |       |          |           |       |       |
| % increase       | -                   | 36.27 | 39.39    | -         | 10.16 | 22.42 |
| over checks      |                     |       |          |           |       |       |

national average grain yield of culture WV-13 was 1157 kg/ha, which was 36.27 per cent and 39.39 per cent higher than national check varieties CO-2 (849 kg/ha) and OLM-3 (830 kg/ha), respectively. This culture ranked second position at Waghai (Gujarat) with grain yield of 2332 kg/ha as against checks CO-2 (250 kg/ha) and OLM-203 (748 kg/ha). In All India Coordinated trial during 2010-2011, the culture WV-13 ranked second position with 1507 kg/ha grain yield, which was 10.16 per cent and 22.42 per cent higher over national checks JK-8 (1368 kg/ha) and CO-2 (1231 kg/ha), respectively.

At Waghai (Gujarat), the culture WV-13 recorded the highest yield (3108 kg/ha) as compared to checks JK-8 (1300 kg/ha) and CO-2 (1369 kg/ha).

No major pest and disease were observed during the period of investigation.

### Grain quality :

This culture was evaluated for nutritional quality (Table

**Table 4: Nutritional quality of little millet culture WV-13**

| Variety | Protein (%) | Fat (%) | Minerals (%) | Fibre (%) | Carbohydrates (%) | Calcium (mg/100 g) | Phosphorus (mg/100 g) | Magnesium (mg/100 g) |
|---------|-------------|---------|--------------|-----------|-------------------|--------------------|-----------------------|----------------------|
| WV-13   | 9.25        | 4.6     | 1.8          | 7.7       | 68                | 21                 | 220                   | 67                   |
| GV-1    | 6.31        | 4.7     | 1.5          | 7.6       | 67                | 17                 | 192                   | 60                   |

**Table 5: Morphological characters of little millet culture WV-13**

| Sr. No. | Characters                     | WV-13       | GV-1             |
|---------|--------------------------------|-------------|------------------|
| 1.      | Days to 50% flowering          | 79          | 86               |
| 2.      | Days to maturity               | 120         | 122              |
| 3.      | Plant height (cm)              | 164         | 170              |
| 4.      | Number of productive tillers   | 5.0         | 4.5              |
| 5.      | Panicle length (cm)            | 37.3        | 36.7             |
| 6.      | Plant habit                    | Erect       | Erect            |
| 7.      | Number of branches per panicle | 7           | 4                |
| 8.      | Stem colour                    | pink        | pink             |
| 9.      | Degree of lodging at maturity  | Non-lodging | Moderate-lodging |
| 10.     | Grain yield (kg/ha)            | 1731        | 1305             |
| 11.     | Grain colour                   | Yellow      | Dirty yellow     |
| 12.     | Number of grains per panicle   | 3042        | 2766             |
| 13.     | 1000 grain weight (g)          | 2.380       | 1.610            |

4). The culture WV -13 was nutritionally better than check GV-1.

#### **Morphological characters :**

The little millet culture WV-13 attained 50 per cent flowering in 75-80 days after sowing and matured in 115-125 days. It had erect plant habit with 160-170 cm plant height. The panicle was long, semi-compact and branched with bold grains (Table 5). Seed colour is attractive yellow. It has non-lodging and non-shattering habit.

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