STUDIES ON FLOWERING, YIELD AND QUALITY OF ONION SEED CV. PHULE SUVARNA AS INFLUENCED BY BULB SIZE AND PLANTING DATES.

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ABSTRACT
Keeping in mind export of onion, Mahatma Phule Krishi Vidyapeeth, Rahuri, has been released “Phule Suvarna” cultivar of onion having great export potential, which is being popularized among growers. To bridge up the seed requirement and supply of quality seed, this trial consisting of different bulb size with three planting dates was initiated. Planting time and bulb size had influenced growth, flowering and seed yield of onion cv. Phule Suvarna under Pune condition. Bulbs having diameter 65 mm and above when planted on 24th November flowered earlier (48.33 days), while 65 mm and above diameter bulb when planted on 9th November, flowered little late (51.66 days), produced more flower stalks per bulb (12.60), with maximum length of flower stalk (74.66 cm), giving highest seed yield per umbel (3.03 g) and per plant (12.86 g). Seed obtained from P2B4 gave highest germination. Seedlings from P2B3 recorded maximum seedling health. From this experiment, after analysing results, conclusion can be drawn that large bulb size having diameter 65 mm and above when planted on 9th November were most efficient in growth, maximum flowering and higher quality of onion seed yield of onion Cv. Phule Suvarna.

KEY WORDS: Onion (Allium cepa L), bulb vegetables, Phule suverna.

INTRODUCTION
Onion (Allium cepa L) is one of the most popular bulb vegetables in India having commercial importance worldwide. India is the largest producer of onion bulbs in world after China covering 4.9 lakh hectare with bulb production of 49 lakh ton. In spite of domestic demand throughout the year, efforts are being made to produce quality bulbs for International market. Release of Phule Suvarna a new onion variety by Mahatma Phule Krishi Vidyapeeth, Rahuri is one of the achievements in this respect with internationally acceptable golden colour, moderate T.S.S. 11.5 %, excellent keeping quality and competent yield. (240 q/ha). For production of export oriented quality onion bulbs, it is essential to increase the availability of good quality and ample quantity of seed. Unless enough quality seed is produced gap between breeder and producers can’t be reduced. Bulb size and planting time are the most determining factors for seed production, which varies with different locations and varieties. From this point of view, the present studies were carried out at College of Agriculture, Pune-5.

MATERIALS AND METHODS
The present investigation was carried out at Modibaug Garden, Horticulture Section, College of Agriculture, Pune-411 005 during 2001-2002 in Rabi season using onion cultivar “ Phule Suvarna” with twelve treatment combinations (4 bulb sizes x 3 planting dates) in factorial randomized block design. The treatments included were four different sizes of bulbs measured in diameter viz. 35-44 mm, 45-54 mm, 55-64 mm and 65 mm and above with three planting dates starting from 24th October having fortnight interval.

Bulbs were planted at 5 to 7 cm depth at spacing of 45 x 30 cm with net plot size of 1.8 m x 2.1 m. The crop was fertilized @100:50:50 kg of N, P and K per hectare. Isolation distance of 1000 m was maintained. Timely cultural operations were carried out as and when required. Observations were recorded on days taken to sprout, flower, number of flower stalks produced per bulb, length of flower stalk, days to maturity, seed yield per umbel and seed yield per plant. For seed weight per 100 seeds, hundred seeds were counted in three sets from each plot and average was worked out. For germination per cent, between paper method of germination (BP) was employed and observations were recorded. In case of seedling health (viability), seedlings, which developed healthy shoot and root...
RESULTS AND DISCUSSIONS
Data regarding various characters have been presented in Table 1 under different heads.

Table 1. Effect of different bulb sizes and planting dates on flowering, seed yield and quality of onion cv. Phule Suvarna.

<table>
<thead>
<tr>
<th>Treatments</th>
<th>Days to sprout</th>
<th>Days taken to flower</th>
<th>No. of flower stalks produced/bulb</th>
<th>Length of flowering stalk (cm)</th>
<th>Days to maturity</th>
<th>Seed yield per umbel (g)</th>
<th>Seed yield per plant (g)</th>
<th>Seed weight/100 seed (g)</th>
<th>Germination (%)</th>
<th>Seedling health (viability)</th>
</tr>
</thead>
<tbody>
<tr>
<td>P1B1</td>
<td>2.33</td>
<td>58.66</td>
<td>6.06</td>
<td>59.48</td>
<td>144.66</td>
<td>1.53</td>
<td>4.36</td>
<td>0.31</td>
<td>81.25</td>
<td>94.72</td>
</tr>
<tr>
<td>P1B2</td>
<td>3.33</td>
<td>60.33</td>
<td>6.76</td>
<td>59.03</td>
<td>146.00</td>
<td>1.50</td>
<td>5.30</td>
<td>0.31</td>
<td>81.50</td>
<td>94.69</td>
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<tr>
<td>P1B3</td>
<td>3.66</td>
<td>61.33</td>
<td>7.93</td>
<td>57.73</td>
<td>144.33</td>
<td>1.60</td>
<td>4.32</td>
<td>0.31</td>
<td>83.75</td>
<td>95.54</td>
</tr>
<tr>
<td>P1B4</td>
<td>3.33</td>
<td>64.33</td>
<td>7.46</td>
<td>54.96</td>
<td>145.00</td>
<td>1.66</td>
<td>4.95</td>
<td>0.31</td>
<td>90.75</td>
<td>94.79</td>
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<tr>
<td>P2B1</td>
<td>2.33</td>
<td>55.00</td>
<td>6.70</td>
<td>63.33</td>
<td>136.33</td>
<td>1.53</td>
<td>5.66</td>
<td>0.30</td>
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<td>95.20</td>
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<td>P2B2</td>
<td>3.33</td>
<td>49.66</td>
<td>7.10</td>
<td>60.83</td>
<td>132.66</td>
<td>2.10</td>
<td>5.73</td>
<td>0.31</td>
<td>79.75</td>
<td>94.98</td>
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<td>4.33</td>
<td>52.00</td>
<td>7.73</td>
<td>67.66</td>
<td>133.33</td>
<td>2.06</td>
<td>7.33</td>
<td>0.30</td>
<td>82.25</td>
<td>95.64</td>
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<td>P2B4</td>
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<td>12.60</td>
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<td>134.33</td>
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<td>12.86</td>
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<td>4.85</td>
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<td>49.00</td>
<td>7.20</td>
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<td>134.33</td>
<td>1.96</td>
<td>4.85</td>
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<td>8.80</td>
<td>69.66</td>
<td>134</td>
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<td>6.86</td>
<td>0.31</td>
<td>90.00</td>
<td>94.67</td>
</tr>
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<td>S.E. ±</td>
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<td>1.74</td>
<td>0.39</td>
<td>1.19</td>
<td>1.45</td>
<td>0.10</td>
<td>0.73</td>
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<td>CD at 5%</td>
<td>1.20</td>
<td>5.22</td>
<td>1.15</td>
<td>3.51</td>
<td>4.35</td>
<td>0.30</td>
<td>2.14</td>
<td>NS</td>
<td>9.84</td>
<td>1.65</td>
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</table>

P1- Planting on 24th October  
P2- Planting on 9th November,  
P3- Planting on 24th November  
B1- Bulb size 35-44 mm  
B2- Bulb size 45-54 mm  
B4- Bulb size 65 mm and above

Days taken to sprout:
The different bulb sizes and planting dates had significant effects in respect of days to sprout. When bulbs having 35-44 mm diameter planted on all the planting dates sprouted earlier whereas 55-64 mm sized bulbs planted on 24th November, required more number of days for sprouting. As the large bulb has more number of thick scales, it might have taken more time for translocation of nutrients toward growing region making it to sprout late than smaller bulbs. Verma et al. (1994) reported similar results in sprouting of onion.

Days required for flowering:
Effect of bulb size and planting dates on days to flower was found significant, Combination of 65 mm and above bulb diameter with planting on 24th November required minimum number of days (48.33 days) to flower as presented in Table1. It is apparent that temperature around 10-12 C is needed for initiation of floral primordia. As during growth period, crop plants from bulbs planted on 24th November received required temperature range early during the month of January flowering observed in 48.33 days. The results are in agreement with EL-Aweel and Ghobhashi (1999) who reported number of days for flowering decreased significantly with delayed planting under Oman condition.

Number of flowering stalks per bulb:
Bulb size and planting dates significantly influenced the number of flowering stalks per bulb. The combination P2B4 (9th November planting + 65 mm and above bulb diameter) produced highest flower stalk (12.60) per bulb followed by P3B4 (8.80). Significantly least number of flower stalks (6.06) per bulb was produced in P1B1 and P3B1.
treatment combinations. This might have happened as in a bulb, the apex of main axis and the apices of many lateral buds developed into inflorescences in combination with appropriate climatic conditions which produced more stalks per plant. Results are in close agreement of Mathanakar et. al (1990) who recorded 7.9 stalks per plant under Akola condition in Onion.

Length of flowering stalk:
Data presented in Table 1, showed significant differences in length of flowering stalk. P2B4 combination produced significantly tallest (74.66 cm) flowering stalk and followed by P3B4 (69.66 cm) whereas shortest stalk was produced by P1B4 (54.96 cm). Large bulbs have more food material within them, and treatment P2 with other bulb sizes showed good growth of leaves, which thereby increased photosynthetic area preparing more food, which produced long stalks.

Days to maturity:
Bulb size and planting time significantly influenced days for maturity. Minimum (131.33) days required for maturity was revealed with bulbs having 35-44 mm diameter with 24th November planting (P3B1) followed by P2B2 (132.66 days). Seed maturity found late (146 days) in treatment P1B2.

Seed yield per umbel:
Significantly higher seed yield (3.03 g) was obtained from 65 mm and above diameter bulbs when planted on 9th November (P2B4) as compared to other combinations followed by P3B4, while lowest seed (1.53 g) recorded from P1B2. Large bulbs having more food along with favourable climatic conditions (4.50 to 14.50 C) which produced more number of flowers in an umbel and setting more seed. The results are in close agreement of Bhardwaj (1991) and Jones and Mann (1963).

Seed yield per plant:
Data presented in Table 1, observed significant differences in terms of seed yield per plant due to various bulb sizes and planting time. Significantly higher seed yield per plant (12.86 g) was recorded with 65 mm and above diameter bulb with 9th November planting (P2B4) and followed by P2B3 (7.33 g). The least seed yield per plant (4.32 g) was obtained with P1B3; however it was at par with most of treatment combinations. The crop raised from different bulb size planted on 9th November received temperature in the range of 12.0 to 14.50 C, which favours conditioning process in onion and thus produced more number of flower and higher seed yield per plant. The results are similar with Krishnaveni et al, (1990) who have reported planting of bulbs in second or third week of November gave highest seed yield.

Seed weight per 100 seed:
No significant differences are revealed in seed weight per 100 seed due to various bulb sizes with different planting dates.

Germination per cent age:
Effect of planting dates and bulb sizes was showed significant differences with respect to seed germination percentage concerned. Seed from bulbs having diameter 65 mm and above with 24th October, 9th November and 24th November planting, gave significantly higher germination percentage of 90.75%, 92.50% and 90% respectively. This might be due to large bulbs having more nutrients in them, which are supplied for nourishment of all seed during development processes forming well-defined structure of seed giving better germination. The results are in confirmation of Mishra (1986) who reported that seeds of top quality were produced by large mother bulb size.

Seedling health:
Data showed significant differences due to various combinations of different bulb size and planting dates. Bulb diameter of 55-64 mm with different planting dates (P2, P1 and P3) had highest healthy seedlings (95.64, 95.54 and
95.07) respectively. This may be due to proper planting time for seed nourishment for optimum seedling growth. Whereas P1B3 and P2B3 treatment combinations were statistically at par with each other.

REFERENCES