

**Supplementary Table S1:** Different varieties days to flowering during 2019 and 2020 season at breeder seed production center

| SL No | Variety     | Year | Rep | Days to Flower | SL No | Variety     | Year | Rep | Days to Flower |
|-------|-------------|------|-----|----------------|-------|-------------|------|-----|----------------|
| 1     | BARI ALU-25 | 2019 | 1   | 76             | 25    | BARI ALU-38 | 2019 | 1   | 59             |
| 2     | BARI ALU-25 | 2019 | 2   | 67             | 26    | BARI ALU-38 | 2019 | 2   | 67             |
| 3     | BARI Alu-25 | 2020 | 1   | 116            | 27    | BARI Alu-38 | 2020 | 1   | 74             |
| 4     | BARI Alu-25 | 2020 | 2   | 128            | 28    | BARI Alu-38 | 2020 | 2   | 68             |
| 5     | BARI ALU-31 | 2019 | 1   | 52             | 29    | BARI ALU-41 | 2019 | 1   | 79             |
| 6     | BARI ALU-31 | 2019 | 3   | 97             | 30    | BARI ALU-41 | 2019 | 2   | 94             |
| 7     | BARI Alu-31 | 2020 | 1   | 86             | 31    | BARI Alu-41 | 2020 | 1   | 87             |
| 8     | BARI Alu-31 | 2020 | 2   | 64             | 32    | BARI Alu-41 | 2020 | 2   | 65             |
| 9     | BARI ALU-32 | 2019 | 1   | 53             | 33    | BARI ALU-47 | 2019 | 1   | 57             |
| 10    | BARI ALU-32 | 2019 | 2   | 79             | 34    | BARI ALU-47 | 2019 | 2   | 44             |
| 11    | BARI Alu-32 | 2020 | 1   | 82             | 35    | BARI Alu-47 | 2020 | 1   | 73             |
| 12    | BARI Alu-32 | 2020 | 2   | 53             | 36    | BARI Alu-47 | 2020 | 2   | 43             |
| 13    | BARI ALU-34 | 2019 | 1   | 62             | 37    | BARI ALU-48 | 2019 | 1   | 51             |
| 14    | BARI ALU-34 | 2019 | 2   | 69             | 38    | BARI ALU-48 | 2019 | 2   | 58             |
| 15    | BARI Alu-34 | 2020 | 1   | 79             | 39    | BARI Alu-48 | 2020 | 1   | 110            |
| 16    | BARI Alu-34 | 2020 | 2   | 60             | 40    | BARI Alu-48 | 2020 | 2   | 61             |
| 17    | BARI ALU-36 | 2019 | 1   | 77             | 41    | BARI ALU-49 | 2019 | 1   | 87             |
| 18    | BARI ALU-36 | 2019 | 2   | 70             | 42    | BARI ALU-49 | 2019 | 2   | 66             |
| 19    | BARI Alu-36 | 2020 | 1   | 78             | 43    | BARI Alu-49 | 2020 | 1   | 100            |
| 20    | BARI Alu-36 | 2020 | 2   | 56             | 44    | BARI Alu-49 | 2020 | 2   | 60             |
| 21    | BARI ALU-37 | 2019 | 1   | 53             | 45    | BARI Alu-53 | 2019 | 1   | 64             |
| 22    | BARI ALU-37 | 2019 | 2   | 69             | 46    | BARI Alu-53 | 2019 | 2   | 67             |
| 23    | BARI Alu-37 | 2020 | 1   | 80             | 47    | BARI Alu-53 | 2020 | 1   | 99             |
| 24    | BARI Alu-37 | 2020 | 2   | 60             | 48    | BARI Alu-53 | 2020 | 2   | 65             |

**Supplementary Table S1: Continued**

| Sl No. | Variety     | Year | Rep | Days to Flower | Sl No. |             | Year | Rep | Days to Flower |
|--------|-------------|------|-----|----------------|--------|-------------|------|-----|----------------|
| 49     | BARI ALU-7  | 2019 | 1   | 72             | 74     | BARI ALU-79 | 2020 | 1   | 101            |
| 50     | BARI ALU-7  | 2019 | 2   | 67             | 75     | BARI ALU-79 | 2020 | 2   | 66             |
| 51     | BARI ALU-7  | 2019 | 3   | 68             | 76     | BARI ALU-8  | 2019 | 1   | 74             |
| 52     | BARI ALU-7  | 2019 | 2   | 68             | 77     | BARI ALU-8  | 2020 | 2   | 69             |
| 53     | BARI ALU-7  | 2019 | 3   | 69             | 78     | BARI ALU-8  | 2019 | 1   | 79             |
| 54     | BARI ALU-7  | 2020 | 1   | 63             | 79     | BARI ALU-8  | 2020 | 2   | 122            |
| 55     | BARI ALU-7  | 2019 | 2   | 83             | 80     | BARI ALU-82 | 2019 | 1   | 83             |
| 56     | BARI ALU-71 | 2019 | 1   | 83             | 81     | BARI ALU-82 | 2019 | 2   | 73             |
| 57     | BARI ALU-71 | 2019 | 2   | 67             | 82     | BARI ALU-82 | 2020 | 1   | 103            |
| 58     | BARI ALU-71 | 2020 | 1   | 86             | 83     | BARI ALU-82 | 2020 | 2   | 93             |
| 59     | BARI ALU-71 | 2020 | 2   | 57             | 84     | BARI ALU-83 | 2019 | 1   | 54             |
| 60     | BARI ALU-72 | 2019 | 1   | 63             | 85     | BARI ALU-83 | 2019 | 2   | 60             |
| 61     | BARI ALU-72 | 2019 | 2   | 58             | 86     | BARI ALU-83 | 2020 | 1   | 83             |
| 62     | BARI ALU-72 | 2020 | 1   | 78             | 87     | BARI ALU-83 | 2020 | 2   | 62             |
| 63     | BARI ALU-72 | 2020 | 2   | 62             | 88     | BARI ALU-86 | 2019 | 1   | 57             |
| 64     | BARI ALU-73 | 2019 | 1   | 63             | 89     | BARI ALU-86 | 2019 | 2   | 69             |
| 65     | BARI ALU-73 | 2019 | 2   | 53             | 90     | BARI ALU-86 | 2020 | 1   | 69             |
| 66     | BARI ALU-73 | 2020 | 1   | 79             | 91     | BARI ALU-86 | 2020 | 2   | 60             |
| 67     | BARI ALU-73 | 2020 | 2   | 61             | 92     | BARI ALU-88 | 2019 | 1   | 81             |
| 68     | BARI ALU-75 | 2019 | 1   | 76             | 93     | BARI ALU-88 | 2019 | 2   | 73             |
| 69     | BARI ALU-75 | 2019 | 2   | 68             | 94     | BARI ALU-88 | 2020 | 1   | 118            |
| 70     | BARI ALU-75 | 2020 | 1   | 82             | 95     | BARI ALU-88 | 2020 | 2   | 67             |
| 71     | BARI ALU-75 | 2020 | 2   | 65             |        |             |      |     |                |
| 72     | BARI ALU-79 | 2019 | 1   | 90             |        |             |      |     |                |
| 73     | BARI ALU-79 | 2019 | 2   | 77             |        |             |      |     |                |

**Supplementary Table S2:** List of BARI variety X BARI variety crossing success during 2019 season at breeder seed production center

| SL No. | Cross                     | SL No. | Cross                     |
|--------|---------------------------|--------|---------------------------|
| 1      | BARI ALU-73 X BARI ALU-53 | 18     | BARI ALU-35 X BARI ALU-72 |
| 2      | BARI ALU-53 X BARI ALU-8  | 19     | BARI ALU-78 X BARI ALU-77 |
| 3      | BARI ALU-76 X BARI ALU-86 | 20     | BARI ALU-24 X BARI ALU-53 |
| 4      | BARI ALU-79 X BARI ALU-86 | 21     | BARI ALU-41 X BARI ALU-86 |
| 5      | BARI ALU-37 X BARI ALU-73 | 22     | BARI ALU-65 X BARI ALU-77 |
| 6      | BARI ALU-29 X BARI ALU-86 | 23     | BARI ALU-66 X BARI ALU-73 |
| 7      | BARI ALU-7 X BARI ALU-72  | 24     | BARI ALU-74 X BARI ALU-73 |
| 8      | BARI ALU-34 X BARI ALU-73 | 25     | BARI ALU-13 X BARI ALU-73 |
| 9      | BARI ALU-25 X BARI ALU-77 | 26     | BARI ALU-20 X BARI ALU-72 |
| 10     | BARI ALU-48 X BARI ALU-36 | 27     | BARI ALU-28 X BARI ALU-73 |



|    |                           |    |                           |
|----|---------------------------|----|---------------------------|
| 11 | BARI ALU-72 X BARI ALU-77 | 28 | BARI ALU-61 X BARI ALU-86 |
| 12 | BARI ALU-45 X BARI ALU-73 | 29 | BARI ALU-71 X BARI ALU-72 |
| 13 | BARI ALU-40 X BARI ALU-72 | 30 | BARI ALU-17 X BARI ALU-73 |
| 14 | BARI ALU-68 X BARI ALU-73 | 31 | BARI ALU-32 X BARI ALU-73 |
| 15 | BARI ALU-12 X BARI ALU-86 | 32 | BARI ALU-43 X BARI ALU-53 |
| 16 | BARI ALU-6 X BARI ALU-77  | 33 | BARI ALU-56 X BARI ALU-77 |
| 17 | BARI ALU-77 X BARI ALU-53 | 34 | BARI ALU-86 X BARI ALU-53 |

**Supplementary Table S3:** List of BARI variety X BARI variety Crossing success during 2020 season at breeder seed production center

| S.L No. | Cross                     | S.L. No. | Cross                     |
|---------|---------------------------|----------|---------------------------|
| 1       | BARI ALU-63 X BARI ALU-72 | 38       | BARI ALU-78 X BARI ALU-73 |
| 2       | BARI ALU-63 X BARI ALU-83 | 39       | BARI ALU-78 X BARI ALU-90 |
| 3       | BARI ALU-63 X BARI ALU-86 | 40       | BARI ALU-78 X BARI ALU-53 |
| 4       | BARI ALU-28 X BARI ALU-86 | 41       | BARI ALU-32 X BARI ALU-31 |
| 5       | BARI ALU-64 X BARI ALU-73 | 42       | BARI ALU-32 X BARI ALU-83 |
| 6       | BARI ALU-20 X BARI ALU-86 | 43       | BARI ALU-32 X BARI ALU-86 |
| 7       | BARI ALU-40 X BARI ALU-86 | 44       | BARI ALU-32 X BARI ALU-7  |
| 8       | BARI ALU-38 X BARI ALU-86 | 45       | BARI ALU-53 X BARI ALU-83 |
| 9       | BARI ALU-35 X BARI ALU-86 | 46       | BARI ALU-53 X BARI ALU-86 |
| 10      | BARI ALU-8 X BARI ALU-86  | 47       | BARI ALU-53 X BARI ALU-73 |
| 11      | BARI ALU-52 X BARI ALU-58 | 48       | BARI ALU-53 X BARI ALU-7  |
| 12      | BARI ALU-83 X BARI ALU-7  | 49       | BARI ALU-53 X BARI ALU-31 |
| 13      | BARI ALU-83 X BARI ALU-62 | 50       | BARI ALU-47 X BARI ALU-61 |
| 14      | BARI ALU-83 X BARI ALU-71 | 51       | BARI ALU-47 X BARI ALU-88 |
| 15      | BARI ALU-83 X BARI ALU-72 | 52       | BARI ALU-47 X BARI ALU-73 |
| 16      | BARI ALU-83 X BARI ALU-26 | 53       | BARI ALU-47 X BARI ALU-29 |
| 17      | BARI ALU-83 X BARI ALU-86 | 54       | BARI ALU-47 X BARI ALU-53 |
| 18      | BARI ALU-83 X BARI ALU-34 | 55       | BARI ALU-47 X BARI ALU-26 |
| 19      | BARI ALU-75 X BARI ALU-83 | 56       | BARI ALU-47 X BARI ALU-72 |
| 20      | BARI ALU-75 X BARI ALU-86 | 57       | BARI ALU-47 X BARI ALU-83 |
| 21      | BARI ALU-75 X BARI ALU-72 | 58       | BARI ALU-12 X BARI ALU-73 |
| 22      | BARI ALU-31 X BARI ALU-86 | 59       | BARI ALU-12 X BARI ALU-83 |
| 23      | BARI ALU-31 X BARI ALU-53 | 60       | BARI ALU-12 X BARI ALU-53 |
| 24      | BARI ALU-31 X BARI ALU-73 | 61       | BARI ALU-73 X BARI ALU-61 |
| 25      | BARI ALU-34 X BARI ALU-83 | 62       | BARI ALU-73 X BARI ALU-83 |
| 26      | BARI ALU-34 X BARI ALU-86 | 63       | BARI ALU-73 X BARI ALU-7  |
| 27      | BARI ALU-34 X BARI ALU-53 | 64       | BARI ALU-73 X BARI ALU-53 |
| 28      | BARI ALU-34 X BARI ALU-72 | 65       | BARI ALU-73 X BARI ALU-88 |



|    |                           |    |                           |
|----|---------------------------|----|---------------------------|
| 29 | BARI ALu-17 X BARI ALu-53 | 66 | BARI ALu-73 X BARI ALu-58 |
| 30 | BARI ALu-17 X BARI ALu-83 | 67 | BARI ALu-73 X BARI ALu-29 |
| 31 | BARI ALu-17 X BARI ALu-86 | 68 | BARI ALu-7 X BARI ALu-86  |
| 32 | BARI ALu-17 X BARI ALu-72 | 69 | BARI ALu-7 X BARI ALu-83  |
| 33 | BARI ALu-78 X BARI ALu-86 | 70 | BARI ALu-7 X BARI ALu-29  |
| 34 | BARI ALu-78 X BARI ALu-29 | 71 | BARI ALu-7 X BARI ALu-86  |
| 35 | BARI ALu-78 X BARI ALu-36 | 72 | BARI ALu-68 X BARI ALu-7  |
| 36 | BARI ALu-78 X BARI ALu-83 | 73 | BARI ALu-68 X BARI ALu-83 |
| 37 | BARI ALu-78 X BARI ALu-72 | 74 | BARI ALu-68 X BARI ALu-73 |

Supplementary Table S3: Continued

| SL No. | Cross                        | SL. No. | Cross                     |
|--------|------------------------------|---------|---------------------------|
| 75     | BARI ALu-68 X BARI ALu-53    | 108     | BARI ALu-86 X BARI ALu-72 |
| 76     | BARI ALu-36 X BARI ALu-86    | 109     | BARI ALu-86 X BARI ALu-83 |
| 77     | BARI ALu-36 X BARI ALu-73    | 110     | BARI ALu-26 X BARI ALu-72 |
| 78     | BARI ALu-36 X BARI ALu-53    | 111     | BARI ALu-26 X BARI ALu-86 |
| 79     | BARI ALu-36 X BARI ALu-72    | 112     | BARI ALu-26 X BARI ALu-83 |
| 80     | BARI ALu-36 X BARI ALu-13    | 113     | BARI ALu-26 X BARI ALu-73 |
| 81     | BARI ALu-36 X BARI ALu-83    | 114     | BARI ALu-26 X BARI ALu-31 |
| 82     | BARI ALu-49 X BARI ALu-7     | 115     | BARI ALu-13 X BARI ALu-72 |
| 83     | BARI ALu-49 X BARI ALu-86    | 116     | BARI ALu-13 X BARI ALu-53 |
| 84     | BARI ALu-49 X BARI ALu-73    | 117     | BARI ALu-82 X BARI ALu-83 |
| 85     | BARI ALu-37 X BARI ALu-86    | 118     | BARI ALu-82 X BARI ALu-72 |
| 86     | BARI ALu-37 X BARI ALu-73    | 119     | BARI ALu-82 X BARI ALu-86 |
| 87     | BARI ALu-29 X BARI ALu-86    | 120     | BARI ALu-7 X BARI ALu-86  |
| 88     | BARI ALu-29 X BARI ALu-53    | 121     | BARI ALu-7 X BARI ALu-72  |
| 89     | BARI ALu-29 X BARI ALu-73    | 122     | BARI ALu-7 X BARI ALu-73  |
| 90     | BARI ALu-29 X BARI ALu-72    | 123     | BARI ALu-38 X BARI ALu-83 |
| 91     | BARI ALu-50 X BARI ALu-86    | 124     | BARI ALu-38 X BARI ALu-86 |
| 92     | BARI ALu-22 X BARI ALu-86    | 125     | BARI ALu-38 X BARI ALu-53 |
| 93     | BARI ALu-22 X BARI ALu-28    | 126     | BARI ALu-38 X BARI ALu-73 |
| 94     | BARI ALu-87 X BARI ALu-86    | 127     | BARI ALu-41 X BARI ALu-73 |
| 95     | BARI ALu-87 X BARI ALu-72    | 128     | BARI ALu-41 X BARI ALu-86 |
| 96     | BARI ALu-72 X BARI ALu-53    | 129     | BARI ALu-41 X BARI ALu-72 |
| 97     | BARI ALu-72 X BARI ALu-83    | 130     | BARI ALu-41 X BARI ALu-83 |
| 98     | BARI ALu-76 X BARI ALu-86    | 131     | BARI ALu-79 X BARI ALu-83 |
| 99     | BARI ALu-76 X BARI ALu-53    | 132     | BARI ALu-79 X BARI ALu-73 |
| 100    | BARI ALu-56(2) X BARI ALu-86 | 133     | BARI ALu-79 X BARI ALu-86 |
| 101    | BARI ALu-56(2) X BARI ALu-72 | 134     | BARI ALu-79 X BARI ALu-72 |
| 102    | BARI ALu-80 X BARI ALu-72    | 135     | BARI ALu-43 X BARI ALu-73 |



|     |                           |     |                           |
|-----|---------------------------|-----|---------------------------|
| 103 | BARI ALu-80 X BARI ALu-53 | 136 | BARI ALu-43 X BARI ALu-86 |
| 104 | BARI ALu-80 X BARI ALu-86 | 137 | BARI ALu-62 X BARI ALu-83 |
| 105 | BARI ALu-86 X BARI ALu-73 | 138 | BARI ALu-62 X BARI ALu-86 |
| 106 | BARI ALu-86 X BARI ALu-58 | 139 | BARI ALu-88 X BARI ALu-72 |
| 107 | BARI ALu-86 X BARI ALu-29 | 140 | BARI ALu-88 X BARI ALu-86 |

**Supplementary Table S3:** Continued

| S.L. No | Cross                     |
|---------|---------------------------|
| 141     | BARI ALu-88 X BARI ALu-83 |
| 142     | BARI ALu-27 X BARI ALu-72 |
| 143     | BARI ALu-27 X BARI ALu-86 |
| 144     | BARI ALu-61 X BARI ALu-73 |
| 145     | BARI ALu-61 X BARI ALu-86 |
| 146     | BARI ALu-61 X BARI ALu-53 |
| 147     | BARI ALu-48 X BARI ALu-73 |
| 148     | BARI ALu-48 X BARI ALu-83 |
| 149     | BARI ALu-90 X BARI ALu-73 |
| 150     | BARI ALu-90 X BARI ALu-7  |
| 151     | BARI ALu-90 X BARI ALu-72 |
| 152     | BARI ALu-90 X BARI ALu-86 |

**Supplementary Table S4:** Proportion of crossing success as male during 2019 and 2020 season at breeder seed production center

| Potato Variety | No of time used<br>2020 | No of time used 2019 | Total | % Proportion of success |          |
|----------------|-------------------------|----------------------|-------|-------------------------|----------|
|                |                         |                      |       | Year2019                | Year2020 |
| BARI ALu-53    | 16                      | 5                    | 21    | 23.80952381             | 76.19048 |
| BARI ALu-72    | 22                      | 5                    | 27    | 18.51851852             | 81.48148 |
| BARI ALu-73    | 21                      | 10                   | 31    | 32.25806452             | 67.74194 |
| BARI ALu-86    | 39                      | 6                    | 45    | 13.33333333             | 86.66667 |

**Supplementary Table S5:** Proportion of crossing success as female during 2019 and 2020 season at breeder seed production center

| Female      | No of times used2019 | No of times used 2020 | Total | % Proportion of success as<br>a female |          |
|-------------|----------------------|-----------------------|-------|--|----------|
|             |                      |                       |       | 2019                                   | 2020     |
| BARI ALU-12 | 1                    | 3                     | 4     | 25                                     | 75       |
| BARI ALU-13 | 1                    | 2                     | 3     | 33.33333                               | 66.66667 |
| BARI ALU-17 | 1                    | 4                     | 5     | 20                                     | 80       |
| BARI ALU-20 | 1                    | 1                     | 2     | 50                                     | 50       |



|             |   |   |   |          |          |
|-------------|---|---|---|----------|----------|
| BARI ALU-28 | 1 | 1 | 2 | 50       | 50       |
| BARI ALU-29 | 1 | 4 | 5 | 20       | 80       |
| BARI ALU-32 | 1 | 4 | 5 | 20       | 80       |
| BARI ALU-34 | 1 | 4 | 5 | 20       | 80       |
| BARI ALU-35 | 1 | 1 | 2 | 50       | 50       |
| BARI ALU-37 | 1 | 2 | 3 | 33.33333 | 66.66667 |
| BARI ALU-40 | 1 | 1 | 2 | 50       | 50       |
| BARI ALU-41 | 1 | 4 | 5 | 20       | 80       |
| BARI ALU-43 | 1 | 2 | 3 | 33.33333 | 66.66667 |
| BARI ALU-48 | 1 | 2 | 3 | 33.33333 | 66.66667 |
| BARI ALU-53 | 1 | 5 | 6 | 16.66667 | 83.33333 |
| BARI ALU-56 | 1 | 2 | 3 | 33.33333 | 66.66667 |
| BARI ALU-61 | 1 | 3 | 4 | 25       | 75       |
| BARI ALU-68 | 1 | 4 | 5 | 20       | 80       |
| BARI ALU-7  | 1 | 7 | 8 | 12.5     | 87.5     |
| BARI ALU-72 | 1 | 2 | 3 | 33.33333 | 66.66667 |
| BARI ALU-73 | 1 | 7 | 8 | 12.5     | 87.5     |
| BARI ALU-76 | 1 | 2 | 3 | 33.33333 | 66.66667 |
| BARI ALU-78 | 1 | 8 | 9 | 11.11111 | 88.88889 |
| BARI ALU-79 | 1 | 4 | 5 | 20       | 80       |
| BARI ALU-86 | 1 | 5 | 6 | 16.66667 | 83.33333 |