

**Supplementary table 1.** ELISA results performed on mother plants and the plants produced from them by somatic embryogenesis. Samples with a OD value at least 2-fold greater than the average value of the negative controls were considered positive (red shading). OYDV - Onion yellow dwarf virus, GCLV - Garlic common latent virus, LYSV - Leek yellow stripe virus, SLV - Shallot latent virus. For mother plants, the first number represents the ecotype, the second number represents the bulb used for regeneration; 2,4 D and Kin represent different treatments, the last number (1 to 16) represents the exact regenerant obtained from the bulb of the mother plant.

| Sample   |                     | OYDV  | GCLV  | LYSV  | SLV   |
|--|---------------------|-------|-------|-------|-------|
| Mother plants  | IPT013-2            | 1.423 | 2.368 | 0.491 | 0.154 |
|  | IPT013-3            | 2.305 | 0.202 | 1.03  | 0.13  |
|  | IPT013-6            | 1.253 | 0.184 | 0.742 | 0.131 |
|  | IPT013-7            | 0.892 | 0.16  | 0.734 | 0.131 |
|  | IPT013-8            | 1.756 | 0.156 | 0.78  | 0.136 |
|  | IPT012-4            | 1.806 | 1.872 | 0.461 | 0.136 |
|  | IPT012-6            | 1.677 | 1.862 | 0.53  | 0.134 |
|  | IPT012-8            | 2.513 | 1.869 | 1.194 | 0.156 |
| Regenerants from mother plant 13-2 and MS2,4-D treatment | IPT013-2 MS2,4-D 1  | 1.368 | 2.143 | 0.197 | 0.141 |
|  | IPT013-2 MS2,4-D 2  | 1.556 | 1.753 | 1.009 | 0.116 |
|  | IPT013-2 MS2,4-D 3  | 0.152 | 0.138 | 0.129 | 0.122 |
|  | IPT013-2 MS2,4-D 4  | 1.719 | 1.221 | 0.618 | 0.118 |
|  | IPT013-2 MS2,4-D 5  | 0.835 | 1.223 | 0.688 | 0.123 |
|  | IPT013-2 MS2,4-D 6  | 0.861 | 1.656 | 0.365 | 0.123 |
|  | IPT013-2 MS2,4-D 7  | 2.481 | 1.455 | 0.756 | 0.123 |
|  | IPT013-2 MS2,4-D 8  | 1.879 | 0.195 | 0.901 | 0.135 |
|  | IPT013-2 MS2,4-D 9  | 0.902 | 1.565 | 0.891 | 0.14  |
|  | IPT013-2 MS2,4-D 10 | 1.189 | 1.527 | 0.809 | 0.122 |
|  | IPT013-2 MS2,4-D 11 | 1.391 | 1.758 | 0.265 | 0.124 |
| Regenerants from mother plant 13-3 and MS2,4-D treatment | IPT013-3 MS2,4-D 1  | 1.189 | 0.149 | 0.576 | 0.124 |
|  | IPT013-3 MS2,4-D 2  | 1.045 | 0.145 | 0.531 | 0.125 |
|  | IPT013-3 MS2,4-D 3  | 0.587 | 0.14  | 0.39  | 0.125 |
|  | IPT013-3 MS2,4-D 4  | 1.575 | 0.14  | 0.332 | 0.117 |
|  | IPT013-3 MS2,4-D 5  | 2.527 | 0.156 | 0.139 | 0.127 |
|  | IPT013-3 MS2,4-D 6  | 2.349 | 0.132 | 1.317 | 0.137 |
|  | IPT013-3 MS2,4-D 7  | 1.571 | 0.193 | 0.126 | 0.123 |
| Regenerants from mother plant 13-6 and MS2,4-D treatment | IPT013-6 MS2,4-D 1  | 1.193 | 0.138 | 0.86  | 0.122 |
|  | IPT013-6 MS2,4-D 2  | 1.294 | 0.138 | 0.152 | 0.123 |
|  | IPT013-6 MS2,4-D 3  | 1.647 | 0.139 | 0.839 | 0.124 |
|  | IPT013-6 MS2,4-D 4  | 1.958 | 0.137 | 0.614 | 0.124 |
|  | IPT013-6 MS2,4-D 5  | 0.152 | 0.136 | 0.124 | 0.116 |
|  | IPT013-6 MS2,4-D 6  | 0.163 | 0.167 | 0.157 | 0.129 |
|  | IPT013-6 MS2,4-D 7  | 0.94  | 0.182 | 0.771 | 0.13  |
|  | IPT013-6 MS2,4-D 8  | 1.585 | 0.138 | 0.673 | 0.121 |
|  | IPT013-6 MS2,4-D 9  | 0.142 | 0.138 | 0.138 | 0.117 |
|  | IPT013-6 MS2,4-D 10 | 1.479 | 0.134 | 0.745 | 0.122 |
|  | IPT013-6 MS2,4-D 11 | 0.817 | 0.138 | 0.167 | 0.127 |
|  | IPT013-6 MS2,4-D 12 | 1.377 | 0.136 | 0.653 | 0.118 |
|  | IPT013-6 MS2,4-D 13 | 0.151 | 0.132 | 0.122 | 0.119 |
|  | IPT013-6 MS2,4-D 14 | 3.044 | 0.157 | 1.868 | 0.127 |
|  | IPT013-6 MS2,4-D 15 | 1.611 | 0.159 | 0.669 | 0.133 |
|  | IPT013-6 MS2,4-D 16 | 1.367 | 0.139 | 0.129 | 0.12  |
|  | IPT013-7 MS2,4-D 1  | 2.427 | 0.132 | 1.122 | 0.13  |
|  | IPT013-7 MS2,4-D 2  | 1.965 | 0.129 | 1.019 | 0.12  |

|  |                        |       |       |       |       |
|--|------------------------|-------|-------|-------|-------|
| Regenerants from mother plant 13-7 and MS2,4-D treatment             | IPT013-7 MS2,4-D 3     | 1.716 | 0.139 | 0.969 | 0.122 |
|  | IPT013-7 MS2,4-D 4     | 0.146 | 0.136 | 0.135 | 0.122 |
|  | IPT013-7 MS2,4-D 5     | 1.59  | 0.132 | 1.169 | 0.116 |
|  | IPT013-7 MS2,4-D 6     | 0.737 | 0.158 | 0.671 | 0.125 |
|  | IPT013-7 MS2,4-D 7     | 0.145 | 0.147 | 0.164 | 0.133 |
|  | IPT013-7 MS2,4-D 8     | 0.446 | 0.132 | 0.868 | 0.12  |
|  | IPT013-7 MS2,4-D 9     | 0.141 | 0.134 | 0.122 | 0.117 |
| Regenerants from mother plant 13-8 and MS2,4-D treatment             | IPT013-8 MS2,4-D 1     | 1.091 | 0.132 | 0.491 | 0.122 |
|  | IPT013-8 MS2,4-D 2     | 1.821 | 0.138 | 0.959 | 0.122 |
|  | IPT013-8 MS2,4-D 3     | 2.55  | 0.14  | 0.836 | 0.122 |
|  | IPT013-8 MS2,4-D 4     | 1.566 | 0.133 | 0.52  | 0.118 |
|  | IPT013-8 MS2,4-D 5     | 0.158 | 0.18  | 0.141 | 0.128 |
|  | IPT013-8 MS2,4-D 6     | 1.731 | 0.151 | 0.648 | 0.134 |
|  | IPT013-8 MS2,4-D 7     | 0.143 | 0.133 | 0.142 | 0.12  |
|  | IPT013-8 MS2,4-D 8     | 1.769 | 0.131 | 0.479 | 0.121 |
|  | IPT013-8 MS2,4-D 9     | 1.855 | 0.13  | 0.785 | 0.123 |
|  | IPT013-8 MS2,4-D 10    | 1.578 | 0.14  | 0.668 | 0.123 |
|  | IPT013-8 MS2,4-D 11    | 2.271 | 0.131 | 0.808 | 0.123 |
|  | IPT013-8 MS2,4-D 12    | 0.165 | 0.13  | 0.121 | 0.12  |
|  | IPT013-8 MS2,4-D 13    | 2.331 | 0.169 | 1.211 | 0.122 |
| Regenerants from mother plant 13-2 and MS2,4-D+Kin→MS2,4-D treatment | IPT013-2 MS2,4-D+Kin 1 | 0.149 | 1.027 | 0.134 | 0.121 |
|  | IPT013-2 MS2,4-D+Kin 2 | 1.468 | 1.363 | 0.414 | 0.117 |
|  | IPT013-2 MS2,4-D+Kin 3 | 1.163 | 0.977 | 0.166 | 0.123 |
|  | IPT013-2 MS2,4-D+Kin 4 | 0.148 | 0.179 | 0.14  | 0.127 |
|  | IPT013-2 MS2,4-D+Kin 5 | 0.141 | 0.14  | 0.128 | 0.124 |
|  | IPT013-2 MS2,4-D+Kin 6 | 0.139 | 0.134 | 0.122 | 0.119 |
| Regenerants from mother plant 13-6 and MS2,4-D+Kin→MS2,4-D treatment | IPT013-6 MS2,4-D+Kin 1 | 0.573 | 0.132 | 0.266 | 0.115 |
|  | IPT013-6 MS2,4-D+Kin 2 | 1.634 | 0.169 | 0.677 | 0.122 |
| Regenerates from parent plant 12-4 and MS2,4-D treatment             | IPT012-4 MS2,4-D 1     | 2.293 | 0.963 | 1.279 | 0.129 |
|  | IPT012-4 MS2,4-D 2     | 1.566 | 0.989 | 1.426 | 0.125 |
| Regenerants from mother plant 12-6 and MS2,4-D treatment             | IPT012-6 MS2,4-D 1     | 1.642 | 0.736 | 0.964 | 0.122 |
|  | IPT012-6 MS2,4-D 2     | 2.614 | 0.911 | 1.154 | 0.125 |
|  | IPT012-6 MS2,4-D 3     | 0.134 | 0.14  | 0.129 | 0.123 |
|  | IPT012-6 MS2,4-D 4     | 2.271 | 0.902 | 1.551 | 0.116 |
|  | IPT012-6 MS2,4-D 5     | 2.496 | 1.058 | 1.296 | 0.113 |
|  | IPT012-6 MS2,4-D 6     | 2.501 | 1.132 | 0.319 | 0.13  |
|  | IPT012-6 MS2,4-D 7     | 2.942 | 0.976 | 1.595 | 0.127 |
| Regenerants from mother plant 12-8 and MS2,4-D treatment             | IPT012-8 MS2,4-D 1     | 1.901 | 0.988 | 0.934 | 0.122 |
|  | IPT012-8 MS2,4-D 2     | 0.366 | 0.139 | 0.134 | 0.117 |
|  | IPT012-8 MS2,4-D 3     | 2.625 | 0.823 | 1.413 | 0.117 |
|  | IPT012-8 MS2,4-D 4     | 2.546 | 0.613 | 1.091 | 0.117 |
|  | IPT012-8 MS2,4-D 5     | 3.097 | 0.992 | 1.019 | 0.122 |
|  | IPT012-8 MS2,4-D 6     | 0.185 | 0.221 | 0.146 | 0.138 |
| Regenerates from parent plant 12-8 and MS2,4-D+Kin→MS2,4-D treatment | IPT012-8 MS2,4-D+Kin 1 | 2.421 | 0.931 | 1.431 | 0.137 |
|  | IPT012-8 MS2,4-D+Kin 2 | 2.674 | 0.964 | 1.414 | 0.121 |
|  | IPT012-8 MS2,4-D+Kin 3 | 2.393 | 1.067 | 1.078 | 0.126 |
| Internal controls  | Positive control 1     | 0.699 | 1.457 | 1.246 | 1.339 |
|  | Positive control 2     | 0.728 | 1.756 | 1.371 | 1.517 |
|  | Negative control 1     | 0.125 | 0.126 | 0.119 | 0.122 |
|  | Negative control 2     | 0.133 | 0.132 | 0.126 | 0.118 |
|  | Blank 1                | 0.183 | 0.146 | 0.124 | 0.123 |
|  | Blank 2                | 0.15  | 0.213 | 0.169 | 0.131 |