**Supplementary Methods**

**Method S1**

**PA analysis**

A total of 1 mL of the supernatant, 10 mL of benzoyl chloride and 1 mL of 2 M NaOH were mixed together, and 1 mL of the supernatant was used for quantification. The mixture was incubated in a 37°C water bath for 30 min, and 1 mL of the supernatant was used to extract free PAs. In total, 1 mL of the supernatant and all precipitates along with 6 mL of 6 M HCl were added to a glass test tube and mixed together, after which the mixture was hydrolyzed at 110°C for 18 h. The residue was dissolved in 1.6 mL of 5% PCA, and the soluble conjugated PAs were centrifuged at 12 000×g for 30 min at 4°C in the same manner as that used in the free PA assay. The pellets were rinsed four times with 5% PCA to remove any traces of soluble PAs and then suspended in 5 mL of 6 M HCl to determine insoluble PAs. The PAs were determined via high-performance liquid chromatography (HPLC). The mobile phase was 64% methanol; the equipment included an ODS-RPC18 column (4.6×250 mm) and an SPD-6AV UV detector. The detection conditions included a wavelength of 254 nm, a column temperature of 25°C, and a flow rate of 0.7 mL·min-1.

**PA biosynthesis enzyme activity**

The reaction mixture used to measure the ODC and ADC activity consisted of 100 mM Tris-HCl buffer (pH of 7.5), 5 mM DTT, 5 mM EDTA, 50 mM pyridoxal phosphate, and 0.3 mL of dialyzed enzyme extract. The mixture was centrifuged at 3 000×g for 10 min, after which 0.5 mL of the obtained supernatant and 1 mL of 2 mM NaOH and 10 mL of benzoyl chloride were mixed together. The mixture was subsequently stirred for 20 s. The mixture was then incubated at 35°C for 30 min, mixed with 3 mL of diethyl ether and 2 mL of saturated NaCl solution, stirred well, centrifuged at 1 500×g for 5 min, and then extracted with 3.0 mL of ether. In total, 1.5 mL of the ether phase was dried and redissolved in 3 mL of 60% methanol. The methanol solution was detected under UV light at a wavelength of 254 nm. The SAMDC activity was measured according to the methods of Duan et al. (2008). The reaction mixture for the SAMDC assay contained 100 mM potassium phosphate buffer (pH of 7.5), 5 mM DTT, 1 mM PLP, 5 mM EDTA, 40 mM SAM and dialyzed enzyme extracts. The carbon dioxide production from the substrate was measured via the Warburg technique while being stirred at 37 °C for 30 min. The enzyme activity was measured in microliters of carbon dioxide per gram of FW per minute.

**DAO and PAO activity assay**

The reaction mixture consisted of 0.2 mL of 4-aminoantipyrine/N,N-dimethylaniline, 2.5 mL of 0.1 M potassium phosphate buffer (pH of 6.5) and 0.1 mL of horseradish peroxidase solution (250 U·mL-1), with 15 μL of PAs (20 mM). After the reaction was started, the suspended matter was thoroughly mixed. The mixture was then incubated for 30 min at 25°C, after which it was centrifuged at 10 000×g for 10 min at 25°C. The supernatant was subsequently measured at a wavelength of 550 nm at an optical density of 0.001, and the OD550 min-1 was equal to one unit of enzyme activity (U).

**Reference**

Duan JJ, Li J, Guo SR and Kang YY (2008). Exogenous spermidine affects polyamine metabolism in salinity-stressed Cucumis sativus roots and enhances short-term salinity tolerance. Journal of Plant Physiology 165(15): 1620-1635.

**Supplementary Tables**

**TABLE S1 Effects of GA3 and Spd on free Put, Spd and Spm during the flowering process of petals of *Rhododendron.***

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Stage** | **Treatment** | **CK** | **T1** | **T2** | **T3** | **T4** | **T5** | **T6** | **T7** |
|  | free Put (nmol·g-1 FW) | 62.87±2.06d | 64.19±3.5d | 78.16±3.67c | 91.42±3.38a | 51.5±3.63e | 68.51±5.67d | 82.47±2.68bc | 86.42±2.91ab |
| Stage 1 | free Spd (nmol·g-1 FW) | 45.02±1.17d | 48.08±1.96cd | 51.89±1.48cd | 68.48±2.07a | 46.17±2.86d | 55.95±11.34bc | 63.11±5.48ab | 68.45±0.71a |
|  | free Spm (nmol·g-1 FW) | 22.2±3.19f | 28.86±2.21e | 45.76±2.21d | 54.65±2.30c | 31.34±0.94e | 66.33±5.80b | 79.89±3.52a | 81.52±2.56a |
|  | free Put (nmol·g-1 FW) | 18.11±2.4e | 33.65±2.15d | 39.25±1.76c | 49.75±3.55a | 22.09±3.11e | 31.96±3.41d | 45.12±3.33ab | 42.1±3.48bc |
| Stage 2 | free Spd (nmol·g-1 FW) | 30.12±1.51d | 28.1±2.30d | 35.16±2.52c | 47.97±2.19b | 28.33±1.75d | 37.17±1.73c | 51.24±4.57ab | 55.43±2.16a |
|  | free Spm (nmol·g-1 FW) | 14.59±0.70d | 18.26±1.17d | 26.15±2.07c | 32.59±3.82c | 27.75±2.42c | 48.25±3.92b | 65.75±9.80a | 72.32±2.17a |
|  | free Put (nmol·g-1 FW) | 46.66±1.36d | 43.17±2.41de | 46.3±1.92d | 53.58±2.13c | 39.22±3.89e | 57.00±4.3c | 74.33±1.77b | 80.52±2.54a |
| Stage 3 | free Spd (nmol·g-1 FW) | 37.93±1.99d | 42.62±3.89c | 46.82±0.81c | 52.43±2.01b | 37.51±3.65d | 52.84±2.43b | 55.76±2.26b | 61.42±1.90a |
|  | free Spm (nmol·g-1 FW) | 28.97±2.63f | 32.85±2.15e | 37.02±2.21d | 49.67±1.61c | 36.85±1.22d | 52.60±1.95c | 68.99±3.06b | 76.52±1.83a |
|  | free Put (nmol·g-1 FW) | 55.97±2.16d | 63.27±2.76c | 67.88±2.4c | 82.65±2.25a | 45.7±5.31e | 63±4.13c | 74.66±3.45b | 85.63±2.52a |
| Stage 4 | free Spd (nmol·g-1 FW) | 43.57±2.99e | 47.22±2.28de | 52.89±2.39cd | 65.48±3.92b | 48.19±3.61cde | 53.41±2.85c | 70.11±4.33ab | 75.33±2.16a |
|  | free Spm (nmol·g-1 FW) | 18.86±1.35f | 20.26±1.81f | 26.33±1.18e | 34.65±1.84d | 32.63±1.09d | 43.45±2.13c | 56.97±4.10b | 64.52±1.53a |

The data in the table are the averages of three replicates, and the different letters after the same column data indicate that the difference between treatments is significant at the 0.05 level (Duncan’s multiple range test). The same scheme applies below.

**TABLE S2 Effects of GA3 and Spd on soluble conjugated Put, Spd and Spm during the flowering process*.***

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Stage** | **Treatment (nmol·g-1 FW)** | **CK** | **T1** | **T2** | **T3** | **T4** | **T5** | **T6** | **T7** |
|  | soluble conjugated Put | 17.10±1.86f | 15.43±0.97f | 23.22±2.41e | 34.96±1.31c | 18.54±1.83f | 26.87±1.5d | 40.25±2.6b | 43.63±2.34a |
| Stage 1 | soluble conjugated Spd | 34.9±3.17e | 34.45±2.78e | 42.85±2.39cd | 53.43±2.32b | 38.75±2.02de | 45.9±2.88c | 56.88±2.39ab | 60.41±2.42a |
|  | soluble conjugated Spm | 16.81±1.56f | 15.14±2.20f | 21.16±2.51e | 26.63±2.34d | 30.87±2.41c | 34.65±2.25bc | 37.97±2.53b | 42.86±1.72a |
|  | soluble conjugated Put | 23.58±1.60e | 25.26±1.46e | 30.94±2.56d | 42.49±0.84c | 26.52±2.11e | 42.32±1.93c | 51.36±3.65b | 55.74±3.81a |
| Stage 2 | soluble conjugated Spd | 38.41±2.94g | 43.58±3.26f | 51.82±2.28e | 62.35±1.80c | 47.99±1.59e | 56.78±2.22d | 68.8±3.13b | 73.15±1.31a |
|  | soluble conjugated Spm | 18.23±1.84f | 20.88±2.20f | 25.05±2.00e | 29.85±1.90d | 32.57±2.09d | 38.3±1.47c | 48.48±2.17b | 55.12±1.78a |
|  | soluble conjugated Put | 49.52±2.76f | 52.32±3.63ef | 61.43±2.45d | 73.59±1.87c | 55.33±2.72e | 71.91±3.02c | 87.44±2.41b | 92.42±1.01a |
| Stage 3 | soluble conjugated Spd | 44.25±1.84f | 48.87±2.13ef | 57.89±2.55d | 69.55±2.82c | 52.85±2.21e | 65.92±2.01c | 77.86±5.25b | 84.13±1.52a |
|  | soluble conjugated Spm | 38.65±2.05f | 42.67±2.19e | 49.77±2.00d | 58.99±2.31b | 47.72±1.29d | 54.49±1.85c | 61.52±1.76ab | 64.1±1.85a |
|  | soluble conjugated Put | 51.15±2.23f | 54.96±1.57ef | 65.65±2.44d | 68.69±1.70d | 57.32±1.65e | 75.43±1.83c | 90.48±1.97b | 101.43±3.89a |
| Stage 4 | soluble conjugated Spd | 48.23±2.48f | 52.66±1.45e | 60.97±2.43d | 71.52±2.70c | 58.55±2.80d | 68.27±3.41c | 75.32±1.51b | 86.41±1.51a |
|  | soluble conjugated Spm | 41.77±0.75e | 45.21±1.96d | 53.98±1.52c | 62.12±2.43b | 51.35±1.81c | 62.05±2.23b | 63.85±1.25b | 68.48±1.80a |

**TABLE S3 Effects of GA3 and Spd on the levels of insoluble bound Put, Spd and Spm during the flowering process*.***

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Stage** | **Treatment** (nmol·g-1 FW) | **CK** | **T1** | **T2** | **T3** | **T4** | **T5** | **T6** | **T7** |
|  | insoluble bound Put | 5.32±1.05cd | 4.52±0.5d | 7.85±0.72b | 13.52±0.95a | 8.24±1.56b | 14.53±1.94a | 15.42±1.91a | 7.52±1.08bc |
| Stage 1 | insoluble bound Spd | 6.52±0.95d | 8.52±1.20d | 13.22±1.16c | 17.52±1.06ab | 7.00±0.86c | 15.74±1.41b | 19.52±1.70a | 18.43±1.50a |
|  | insoluble bound Spm | 11.42±1.55de | 10.43±1.32e | 13.52±0.92d | 18.43±1.40c | 12.52±2.01de | 21.33±1.94b | 23.41±2.04b | 26.75±1.11a |
|  | insoluble bound Put | 7.63±0.78e | 9.85±2.03de | 11.52±1.12cd | 15.85±2.33b | 12.52±1.17cd | 16.33±1.47b | 26.53±1.65a | 14.36±1.78bc |
| Stage 2 | insoluble bound Spd | 11.33±0.69e | 13.52±1.01e | 16.77±1.65d | 24.12±1.97b | 12.03±1.22e | 20.75±2.09c | 28.74±1.36a | 30.15±2.29a |
|  | insoluble bound Spm | 15.63±1.73g | 18.43±1.82fg | 21.74±1.66e | 25.45±1.67d | 20.43±1.86ef | 34.06±1.57c | 38.12±1.90b | 41.62±1.22a |
|  | insoluble bound Put | 10.03±1.41e | 15.74±2.26d | 16.53±1.11d | 22.42±2.65c | 16.53±1.03d | 28.75±2.17b | 35.42±1.65a | 30.12±2.17b |
| Stage 3 | soluble conjugated Spd | 28.63±1.82d | 30.11±2.24d | 35.12±2.23c | 38.02±1.98c | 31.25±1.15d | 41.21±1.87b | 45.75±1.73a | 47.12±1.45a |
|  | insoluble bound Spm | 30.43±0.85d | 32.52±1.82d | 36.22±1.59c | 42.04±1.68b | 35.99±2.17c | 43.44±1.21b | 48.74±2.00a | 51.32±1.56a |
|  | insoluble bound Put | 10.87±2.10e | 17.86±2.25d | 20.42±1.69d | 26.76±1.67c | 18.52±0.90d | 33.21±1.74b | 41.52±1.82a | 42.42±1.21a |
| Stage 4 | insoluble bound Spd | 35.42±1.22d | 37.52±1.82cd | 42.52±1.99b | 40.23±1.41bc | 38.4±1.90cd | 43.22±1.91b | 48.75±1.96a | 51.49±1.72a |
|  | insoluble bound Spm | 41.43±1.85f | 45.25±1.71e | 48.74±1.72d | 51.52±2.55cd | 43.53±1.74ef | 54.32±1.76c | 58.74±1.83b | 62.45±2.11a |