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| **Table S1**. The oligonucleotide primers and accession numbers of GA-related genes of *Cyperus rotundus*. | | | |
| Gene | Forward primer | Reverse Primer | Accession number |
| *CrGA20ox* | CACAGCAAATTAAGCAAACGTC | GATCTACAGTCGTTGTCCCTCTT | OQ735211 |
| *CrGA3ox1* | ATGCCGTCTATAGCAGAGAAGCC | TCATATACATGCTATCTGTTGTATCTCCTG | OQ735212 |
| *CrGA3ox2* | TACATGTCTCAACCAACACTTG | TCACTTCATCACCACGCA | OQ735213 |
| *CrGA3ox3* | ATGAGCGATCAGCCCGTC | TTAATTCTCACATATTTTTATTGACTG | OQ735214 |
| *CrGA2ox1* | ATGCGCGATCTCGTTCGTCAA | GTCTAGAGCTCAAAGGGTCCAAGCC | OQ735215 |
| *CrGA2ox2* | AAATGGTGGTGCTAGCTCAA | TCTTCTACCTTTCAAACTGGACA | OQ735216 |
| *CrGA2ox3* | TTGTGCTGTGTGCATAGCCATG | TTAGTTCAATGCTTTGTTCTCCTGG | OQ735217 |
| *CrGA2ox4* | TATGCCAATATGGTGGTGTTA | ATCTCCATTTCATCCTCACAG | OQ735218 |
| *CrDELLA1* | AACATGGGCCCGTACGAGT | AACTAACTAATCCTGTTATTATCCTCACTCC | OQ735219 |
| *CrDELLA2* | ATGAAGCGAGAGTACCCGGACAG | TCAAGCTGCCGTGACACGC | OQ735220 |
| *CrDELLA2* | ATGGCAGTGCCACTCAACACATG | CTAGCAGTTAGAACTAACAAAGCCCTTGAT | OQ735221 |

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| **Table S2.** The protein information and corresponding accession numbers used for constructing the phylogenetic trees. | | | |
| Protein name | Accession number | Description | Organism |
| StGA20ox1 | Q9FS86 | GA20 oxidase | *Solanum tuberosum* |
| OsGA20ox1 | P93771 | Gibberellin 20 oxidase 1 | *Oryza sativa subsp. japonica* |
| AtGA20ox1 | Q39110 | Gibberellin 20 oxidase 1 | *Arabidopsis thaliana* |
| ZmGA20ox | Q0PWF8 | Gibberellin 20 oxidase | *Zea mays* |
| ClGA20ox1-D-like | KAF3335184.1 | Gibberellin 20 oxidase 1-D-like protein | *Carex littledalei* |
| StGA3ox1 | C0LZW9 | Gibberellin 3-oxidase | *Solanum tuberosum* |
| OsGA3ox1 | Q6AT12 | Gibberellin 3-beta-dioxygenase 1 | *Oryza sativa subsp. japonica* |
| AtGA3ox1 | Q39103 | Gibberellin 3-beta-dioxygenase 1 | *Arabidopsis thaliana* |
| ZmGA3ox2-2 | A0A3L6FF91 | Gibberellin 3-beta-dioxygenase 2-2 | *Zea mays* |
| ClGA3ox1-like | KAF3322026.1 | Gibberellin 3-beta-dioxygenase 1-like protein | *Carex littledalei* |
| StGA2ox1 | A7LCJ5 | Gibberellin 2-oxidase 1 | *Solanum tuberosum* |
| OsGA2ox1 | Q5W726 | Gibberellin 2-beta-dioxygenase 1 | *Oryza sativa subsp. japonica* |
| AtGA2ox1 | Q8LEA2 | Gibberellin 2-beta-dioxygenase 1 | *Arabidopsis thaliana* |
| ZmGA2ox1-3 | A0A3L6E745 | Gibberellin 2-beta-dioxygenase | *Zea mays* |
| ClGA2ox2 | KAF3334532.1 | Gibberellin 2-beta-dioxygenase 2 | *Carex littledalei* |
| StGAI | I1SZ96 | DELLA protein | *Solanum tuberosum* |
| OsSLR1 | Q7G7J6 | DELLA protein SLR1 | *Oryza sativa subsp. japonica* |
| AtRGL1 | Q9C8Y3 | DELLA protein RGL1 | *Arabidopsis thaliana* |
| AtGAI | Q9LQT8 | DELLA protein GAI | *Arabidopsis thaliana* |
| AtRGA | Q9SLH3 | DELLA protein RGA | *Arabidopsis thaliana* |
| ZmD9 | Q06F07 | DELLA protein | *Zea mays* |
| ClGAI-like | KAF3339624.1 | DELLA protein GAI-like protein | *Carex littledalei* |
| StGID1 | M1CS49 | Gibberellin receptor GID1 | *Solanum tuberosum* |
| OsGID1 | Q6L545 | Gibberellin receptor GID1 | *Oryza sativa subsp. japonica* |
| AtGID1a | Q9MAA7 | Gibberellin receptor GID1A | *Arabidopsis thaliana* |
| AtGID1b | Q9LYC1 | Gibberellin receptor GID1B | *Arabidopsis thaliana* |
| AtGID1c | Q940G6 | Gibberellin receptor GID1C | *Arabidopsis thaliana* |
| ZmGID1a | B0S4S6 | Putative GID1-like gibberellin receptor | *Zea mays* |
| ZmGID1b | B0S4S7 | Putative GID1-like gibberellin receptor | *Zea mays* |
| ClGID1c-like | KAF3330359.1 | gibberellin receptor GID1C-like protein | *Carex littledalei* |

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| **Table S3.** The oligonucleotide primers of genes for qRT-PCR | | |
| Gene Name | Forward primer | Reverse primer |
| *CrActin* | GGTGTAATGGTTGGTATGGG | TTCTCTCTGTTAGCCTTCGG |
| *CrGA20ox* | GTCCAATGGGCGATACAAGA | TCTGCGTGAAGTTGAGTAGGGT |
| *CrGA3ox1* | CAAGGTGATGAAACGACTCAGTAAC | AGGGCACGCTGGGTATGAA |
| *CrGA3ox2* | GAAAATCGGACCCGTCAGTAA | CGCCCTCTGTGCCTTCCT |
| *CrGA3ox3* | TCCCGTTTCTTCTCCAAGTTCC | TTGTTCCTCAGTCAGTCCCAGTG |
| *CrGA2ox1* | CCCGTTGATACAGGGCTTCA | GTCCTTGTCCGATGGTACGG |
| *CrGA2ox2* | CTCGGGGTCCCTCATCGT | CGCTTGCTGCCGTAGTCG |
| *CrGA2ox3* | CAGGCAATGACAAATGGAAGG | TGTACTCGGACCAGGTGAACG |
| *CrGA2ox4* | ACAACTCCATCCATAGACCAAATCC | CAACCTTAAAGAACCCGTACAACA |
| *CrDELLA1* | TGAACACGTTGTCGGGGATT | CTGGTTGGCTGTAAAGTGCG |
| *CrDELLA2* | CGTCTATCGTCCCCTCTTTCG | CAGTCCGCATCCGTTTCCT |
| *CrGID1* | CCTTGTGCTTATGATGATGGC | ACCCTGAGGCGTGCTGTG |

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| **Table S4.** The oligonucleotide primers of genes for yeast two-hybrid vectors. | | | |
| Genes | Primers | Sequences | Restriction site |
| *CrDELLA1* | Forward | GGGAATTC CATATG AAC ATGGGCCCGTACGAGT | NdeⅠ |
|  | Reverse | ATTAA GGCCTCCATGGCC AA CTAACTAATCCTGTTATTATCCTCACTCC | SfiⅠ |
| *CrDELLA2* | Forward | GGGAATTC CATATG ATGAAGCGAGAGTACCCGGACAG | NdeⅠ |
|  | Reverse | GCG GAATTC TCAAGCTGCCGTGACACGC | EcoRⅠ |
| *CrGID1* | Forward | GGGAATTC CATATG ATGGCAGTGCCACTCAACACATG | NdeⅠ |
|  | Reverse | ATTAA GGCCTCCATGGCC CA CTAGCAGTTAGAACTAACAAAGCCCTTGAT | SfiⅠ |

**A**

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**B**

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**C**



**D**

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**E**

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**Figure S1.** Amino acid sequence alignment of GA synthesis, metabolism, and signal components genes. (A) *CrGA20ox1*; (B) *CrGA3ox1*, *CrGA3ox2* and *CrGA3ox3*;(C) *CrGA2o*x*1*, *CrGA2o*x*2*, *CrGA2o*x*3* and *CrGA2ox4*; (D) *CrDELLA1* and *CrDELLA2*; (E) *CrGID1*.