|  |  |  |
| --- | --- | --- |
| Gene name | Forward primer (5′→3′) | Reverse primer (5′→3′) |
| *PyDET2e* | TACAAGGTTCCCAAGGGTGG | AACTCCTCCCCGTCAGGTAA |
| *HIS* | TTTAAGACTGATCTGCGTTTCC | GAACAGCCCAACAAGGTATG |

**Table S1** Primer sequence of RT-qPCR

**Table S2**. Identification of *DET2* family genes in *P. yunnanensis.*

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Gene name** | **Gene ID** | **Amino****Acid(aa)** | **Molecular****Weight (kDa)** | **Isoelectric****Point (pI)** | **Instability****Index** | **GRAVY** | **Secondary structure/%** | **Subcellular****Localization** |
| **Alpha helix** | **Extended strand** | **Beta turn** | **Random coil** |
| *PyDET2a* | *Pyun04G015560.1* | 339 | 38.94 | 8.79 | 46.84 | 102.36 | 53.98 | 16.22 | 3.83 | 25.96 | Chloroplast |
| *PyDET2b* | *Pyun05G003670.1* | 253 | 29.71 | 9.17 | 38.71 | 86.68 | 29.25 | 28.46 | 4.74 | 37.55 | Golgi apparatus |
| *PyDET2c* | *Pyun08G000950.1* | 267 | 30.10 | 9.65 | 42.71 | 110.90 | 51.69 | 17.23 | 2.62 | 28.46 | Chloroplast. |
| *PyDET2d* | *Pyun08G000960.1* | 263 | 29.62 | 9.53 | 31.45 | 102.59 | 49.43 | 17.11 | 5.32 | 28.14 | Cell membraneChloroplastGolgi apparatus |
| *PyDET2e* | *Pyun08G000970.1* | 264 | 30.02 | 9.66 | 43.18 | 108.11 | 47.35 | 21.97 | 3.79 | 26.89 | Chloroplast |
| *PyDET2f* | *Pyun09G012590.1* | 351 | 40.35 | 8.99 | 44.34 | 101.11 | 47.29 | 19.66 | 4.84 | 28.21 | Cell membrane |
| *PyDET2g* | *Pyun10G023000.1* | 268 | 30.26 | 9.40 | 45.98 | 109.78 | 48.51 | 17.91 | 4.85 | 28.73 | Cell membraneChloroplastPeroxisome |
| *PyDET2h* | *Pyun10G023010.1* | 253 | 28.74 | 9.58 | 40.06 | 106.32 | 48.22 | 18.58 | 4.74 | 28.46 | Cell membrane |
| *PyDET2i* | *Pyun10G023020.1* | 264 | 29.76 | 9.34 | 43.02 | 107.08 | 54.20 | 13.74 | 4.2 | 27.86 | Cell membraneGolgi apparatusPeroxisome |
| *PyDET2j* | *Pyun13G013760.1* | 264 | 30.90 | 9.35 | 43.38 | 89.02 | 34.09 | 25.38 | 3.41 | 37.12 | Cell membraneGolgi apparatusMitochondrion |
| *PyDET2k* | *Pyun13G013800.1* | 264 | 20.71 | 9.35 | 45.08 | 89.39 | 36.74 | 24.24 | 2.65 | 36.36 | Cell membraneGolgi apparatusMitochondrion |
| *PyDET2l* | *Pyun14G008550.1* | 320 | 38.25 | 9.25 | 22.63 | 94.69 | 43.12 | 20.62 | 3.12 | 33.12 | Chloroplast |
| *PyDET2m* | *Pyun15G004230.1* | 292 | 33.11 | 8.99 | 28.32 | 114.79 | 46.58 | 17.47 | 4.45 | 31.51 | Cell membrane |
| *PyDET2n* | *Pyun16G010440.1* | 267 | 29.68 | 9.48 | 46.55 | 91.44 | 38.52 | 24.51 | 3.50 | 33.46 | Cell membrane |

Note: Information provided includes gene names, gene ids, amino acid, molecular weight (kDa), isoelectric points(PI), instability index, GRAVY, Secondary structure and subcellular localization.

**Table S3.** Base composition of codons in the *DET2* gene family of *P. yunnanensis.*

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Gene Name | T3s/% | C3s/% | A3s/% | G3s/% | CAI/% | CBI/% | Fop/% | ENc/% | GC1/% | GC2/% | GC3/% | GC/% |
| *PyDET2a* | 0.4514 | 0.1701 | 0.3529 | 0.2617 | 0.193 | -0.120 | 0.335 | 51.96 | 0.482 | 0.410 | 0.368 | 0.419 |
| *PyDET2b* | 0.4135 | 0.2933 | 0.2485 | 0.2785 | 0.172 | -0.142 | 0.323 | 53.86 | 0.450 | 0.394 | 0.496 | 0.448 |
| *PyDET2c* | 0.3930 | 0.2620 | 0.2900 | 0.2707 | 0.191 | -0.002 | 0.397 | 50.99 | 0.429 | 0.366 | 0.444 | 0.413 |
| *PyDET2d* | 0.3991 | 0.2790 | 0.2698 | 0.2798 | 0.189 | -0.011 | 0.402 | 46.88 | 0.383 | 0.375 | 0.451 | 0.403 |
| *PyDET2e* | 0.3689 | 0.2800 | 0.2814 | 0.3149 | 0.184 | -0.055 | 0.367 | 52.85 | 0.460 | 0.351 | 0.472 | 0.429 |
| *PyDET2f* | 0.4184 | 0.1973 | 0.3574 | 0.2622 | 0.184 | -0.078 | 0.362 | 53.27 | 0.463 | 0.415 | 0.395 | 0.425 |
| *PyDET2g* | 0.4353 | 0.2328 | 0.2965 | 0.2584 | 0.199 | -0.023 | 0.388 | 52.03 | 0.424 | 0.368 | 0.402 | 0.398 |
| *PyDET2h* | 0.3641 | 0.2903 | 0.3118 | 0.2695 | 0.168 | -0.096 | 0.343 | 52.62 | 0.449 | 0.358 | 0.457 | 0.423 |
| *PyDET2i* | 0.3722 | 0.2870 | 0.2915 | 0.2787 | 0.176 | -0.063 | 0.363 | 49.75 | 0.453 | 0.366 | 0.462 | 0.428 |
| *PyDET2j* | 0.4045 | 0.3091 | 0.2443 | 0.2761 | 0.181 | -0.058 | 0.371 | 48.22 | 0.430 | 0.404 | 0.498 | 0.446 |
| *PyDET2k* | 0.4045 | 0.3091 | 0.2472 | 0.2635 | 0.188 | -0.032 | 0.388 | 49.71 | 0.438 | 0.411 | 0.494 | 0.449 |
| *PyDET2l* | 0.3900 | 0.2741 | 0.3029 | 0.2880 | 0.191 | -0.063 | 0.369 | 53.41 | 0.433 | 0.393 | 0.486 | 0.438 |
| *PyDET2m* | 0.4033 | 0.2140 | 0.3213 | 0.2598 | 0.211 | 0.045 | 0.420 | 54.85 | 0.515 | 0.406 | 0.420 | 0.447 |
| *PyDET2n* | 0.3364 | 0.3458 | 0.1761 | 0.3636 | 0.180 | -0.043 | 0.376 | 48.81 | 0.481 | 0.438 | 0.600 | 0.506 |



**Figure S1.** Prediction of phosphorylation sites and transmembrane regions of *PyDET2e* protein