

**Supplementary Table S1** The physicochemical properties of *FvPP2Cs* in woodland strawberry

| Group | Gene name           | Sequence ID    | Length (aa) | MW (Da)  | pI   | Full length (bp) | GRAVY  | Subcellular localization |
|-------|---------------------|----------------|-------------|----------|------|------------------|--------|--------------------------|
| C     | <i>FvPP2C2</i><br>9 | FvH4_4g17950.1 | 499         | 54451.08 | 4.89 | 3452             | -0.244 | Nuclear                  |
|       | <i>FvPP2C3</i><br>8 | FvH4_5g21630.1 | 787         | 86512.58 | 5.37 | 5658             | -0.531 | Chloroplast              |
|       | <i>FvPP2C4</i><br>5 | FvH4_6g13730.1 | 667         | 74684.97 | 5.67 | 2975             | -0.521 | Nuclear                  |
|       | <i>FvPP2C2</i><br>1 | FvH4_3g35990.1 | 720         | 80511.07 | 5.58 | 3381             | -0.519 | Chloroplast              |
|       | <i>FvPP2C0</i><br>8 | FvH4_2g04560.1 | 383         | 42632.62 | 8.71 | 2756             | -0.285 | Chloroplast              |
|       | <i>FvPP2C0</i><br>6 | FvH4_1g17120.1 | 373         | 42010.91 | 5.97 | 3173             | -0.258 | Cytoplasm                |
|       | <i>FvPP2C3</i><br>1 | FvH4_4g19920.1 | 383         | 42097.94 | 6.52 | 3752             | -0.194 | Chloroplast              |
|       | <i>FvPP2C4</i><br>7 | FvH4_6g22310.1 | 383         | 43217.32 | 6.47 | 3240             | -0.278 | Cytoplasm                |
| D     | <i>FvPP2C4</i><br>6 | FvH4_6g14920.1 | 380         | 42635.78 | 9.3  | 2677             | -0.327 | Chloroplast              |
|       | <i>FvPP2C5</i><br>1 | FvH4_7g20640.1 | 385         | 42903.49 | 9.2  | 4119             | -0.23  | Chloroplast              |
|       | <i>FvPP2C0</i><br>9 | FvH4_2g15570.1 | 395         | 43837.76 | 8.45 | 4929             | -0.276 | Nuclear                  |
|       | <i>FvPP2C0</i><br>5 | FvH4_1g11150.1 | 393         | 43461.53 | 8.26 | 3944             | -0.221 | Chloroplast              |
|       | <i>FvPP2C3</i><br>3 | FvH4_4g25730.1 | 542         | 58832.58 | 8.71 | 3280             | -0.531 | Nuclear                  |
|       | <i>FvPP2C5</i><br>3 | FvH4_7g24650.1 | 373         | 40224.8  | 6.67 | 1850             | -0.242 | Nuclear                  |
|       | <i>FvPP2C2</i><br>3 | FvH4_3g38990.1 | 380         | 41170.62 | 8.2  | 2302             | -0.364 | Nuclear                  |
|       | <i>FvPP2C1</i><br>2 | FvH4_2g29850.1 | 377         | 41353.61 | 5.35 | 2765             | -0.349 | Chloroplast              |
| E     | <i>FvPP2C3</i><br>2 | FvH4_4g20910.1 | 385         | 42495.07 | 5.34 | 2376             | -0.193 | Nuclear                  |
|       | <i>FvPP2C0</i><br>7 | FvH4_1g26700.1 | 387         | 42873.46 | 4.85 | 3096             | -0.214 | Nuclear                  |
|       | <i>FvPP2C3</i><br>9 | FvH4_5g25660.1 | 385         | 42210.07 | 5.57 | 3237             | -0.236 | Cytoplasm                |
|       | <i>FvPP2C0</i><br>4 | FvH4_1g10220.1 | 390         | 42156.71 | 5.61 | 2946             | -0.252 | Nuclear                  |

|   |                     |                |      |           |      |      |        |             |
|---|---------------------|----------------|------|-----------|------|------|--------|-------------|
| G | <i>FvPP2C1</i><br>0 | FvH4_2g16790.1 | 385  | 41957.39  | 5.31 | 3286 | -0.241 | Nuclear     |
|   | <i>FvPP2C1</i><br>1 | FvH4_2g18940.1 | 658  | 72746.13  | 5.8  | 1977 | -0.124 | Cytoplasm   |
|   | <i>FvPP2C4</i><br>8 | FvH4_6g28470.1 | 475  | 51354.32  | 5.39 | 7385 | -0.633 | Nuclear     |
|   | <i>FvPP2C1</i><br>6 | FvH4_2g41190.1 | 365  | 39912.75  | 4.95 | 6175 | -0.414 | Chloroplast |
|   | <i>FvPP2C3</i><br>7 | FvH4_5g16840.1 | 329  | 35988.04  | 8.19 | 3262 | -0.312 | Cytoplasm   |
|   | <i>FvPP2C5</i><br>6 | FvH4_7g32030.1 | 420  | 45564.19  | 5.44 | 3149 | -0.2   | Chloroplast |
|   | <i>FvPP2C5</i><br>4 | FvH4_7g31190.1 | 345  | 37723.4   | 5.75 | 4141 | -0.349 | Chloroplast |
| H | <i>FvPP2C1</i><br>7 | FvH4_2g41410.1 | 292  | 31463.87  | 5.04 | 4309 | -0.342 | Nuclear     |
|   | <i>FvPP2C2</i><br>5 | FvH4_4g03890.1 | 271  | 30749.07  | 9.24 | 2296 | -0.572 | Nuclear     |
|   | <i>FvPP2C1</i><br>8 | FvH4_3g10800.1 | 273  | 30328.15  | 4.9  | 1090 | -0.338 | Cytoplasm   |
|   | <i>FvPP2C4</i><br>0 | FvH4_5g37270.1 | 282  | 30902.67  | 7.09 | 5076 | -0.158 | Chloroplast |
|   | <i>FvPP2C1</i><br>9 | FvH4_3g19640.1 | 282  | 31332.55  | 5.9  | 2807 | -0.408 | Nuclear     |
|   | <i>FvPP2C2</i><br>8 | FvH4_4g14950.1 | 597  | 66286.4   | 6.36 | 6104 | -0.324 | Chloroplast |
|   | <i>FvPP2C1</i><br>5 | FvH4_2g34570.1 | 432  | 46820.93  | 5.01 | 4165 | -0.324 | Chloroplast |
| I | <i>FvPP2C4</i><br>3 | FvH4_6g07050.1 | 426  | 45973.7   | 5.99 | 3483 | -0.121 | Chloroplast |
|   | <i>FvPP2C3</i><br>5 | FvH4_4g26880.1 | 429  | 46053.43  | 8.27 | 3450 | -0.238 | Chloroplast |
|   | <i>FvPP2C2</i><br>7 | FvH4_4g13960.1 | 432  | 45879.01  | 5.14 | 4036 | -0.379 | Nuclear     |
|   | <i>FvPP2C0</i><br>1 | FvH4_1g05740.1 | 1080 | 119808.08 | 4.88 | 6991 | -0.232 | Nuclear     |
|   | <i>FvPP2C4</i><br>2 | FvH4_6g06970.1 | 376  | 41950.44  | 5.76 | 3804 | -0.369 | Nuclear     |
|   | <i>FvPP2C3</i><br>0 | FvH4_4g18870.1 | 377  | 41911.93  | 8.95 | 2826 | -0.302 | Nuclear     |
|   | <i>FvPP2C1</i><br>4 | FvH4_2g32170.1 | 336  | 36465.2   | 5.09 | 1674 | -0.139 | Cytoplasm   |
| J | <i>FvPP2C4</i><br>4 | FvH4_6g10560.1 | 453  | 50272.18  | 4.99 | 2701 | -0.532 | Chloroplast |

|   |                     |                |     |          |      |      |        |                         |
|---|---------------------|----------------|-----|----------|------|------|--------|-------------------------|
| K | <i>FvPP2C5</i><br>0 | FvH4_6g45040.1 | 470 | 52006.45 | 5.45 | 4445 | -0.488 | Chloroplast             |
|   | <i>FvPP2C2</i><br>4 | FvH4_3g41300.1 | 534 | 58715.13 | 5.05 | 4085 | -0.391 | Nuclear                 |
|   | <i>FvPP2C4</i><br>1 | FvH4_6g00430.1 | 497 | 54676.21 | 5.21 | 4105 | -0.451 | Chloroplast             |
|   | <i>FvPP2C2</i><br>6 | FvH4_4g12270.1 | 424 | 45688.02 | 7.56 | 5138 | -0.123 | Cytoplasm               |
|   | <i>FvPP2C0</i><br>3 | FvH4_1g08010.1 | 476 | 52094.86 | 5.55 | 2978 | -0.336 | Chloroplast             |
|   | <i>FvPP2C1</i><br>3 | FvH4_2g31450.1 | 446 | 47853.84 | 4.34 | 4378 | -0.034 | Nuclear                 |
|   | <i>FvPP2C4</i><br>9 | FvH4_6g34170.1 | 552 | 59486.52 | 4.94 | 3684 | -0.088 | Extracellular<br>matrix |
|   | <i>FvPP2C3</i><br>4 | FvH4_4g25760.1 | 551 | 59394.42 | 4.96 | 5791 | -0.063 | Chloroplast             |
|   | <i>FvPP2C0</i><br>2 | FvH4_1g06040.1 | 371 | 40546.6  | 5.04 | 4333 | -0.276 | Chloroplast             |
|   | <i>FvPP2C5</i><br>5 | FvH4_7g31810.1 | 389 | 42639.17 | 5.66 | 2014 | -0.312 | Nuclear                 |
|   | <i>FvPP2C3</i><br>6 | FvH4_5g04500.1 | 350 | 37509.95 | 5.24 | 1053 | -0.276 | Chloroplast             |
|   | <i>FvPP2C5</i><br>2 | FvH4_7g23060.1 | 422 | 45402.3  | 5.99 | 2344 | -0.356 | Chloroplast             |
|   | <i>FvPP2C2</i><br>2 | FvH4_3g37010.1 | 397 | 43679.28 | 5.33 | 2213 | -0.393 | Chloroplast             |
|   | <i>FvPP2C2</i><br>0 | FvH4_4g18870.1 | 377 | 41911.93 | 8.95 | 2826 | -0.302 | Chloroplast             |