

**Table S3.** Characteristics of *XTHs* of hybrid poplar ‘84K’.

| Gene Name   | Gene ID        | Chromosome location         | AA  | MW(Da)   | PI   | CDS(bp) | Subcellular localization |
|-------------|----------------|-----------------------------|-----|----------|------|---------|--------------------------|
| PagXTH1(A)  | Pop_A01G004173 | chrA01(-):37831133-37833946 | 351 | 40852.28 | 9.08 | 1056    | Cell wall                |
| PagXTH2(A)  | Pop_A01G074711 | chrA01(-):43380918-43382981 | 293 | 33989.46 | 8.45 | 882     | Cell wall. Cytoplasm.    |
| PagXTH3(A)  | Pop_A02G023990 | chrA02(-):1628047-1629881   | 272 | 31012.32 | 7.14 | 819     | Cell wall                |
| PagXTH4(A)  | Pop_A02G023780 | chrA02(-):2297892-2300258   | 288 | 32980.3  | 9.24 | 867     | Cell wall. Cytoplasm.    |
| PagXTH5(A)  | Pop_A02G012191 | chrA02(-):11242935-11244005 | 170 | 19160.6  | 5.13 | 513     | Cell wall                |
| PagXTH6(A)  | Pop_A02G005519 | chrA02(+):17974145-17975351 | 294 | 33490.04 | 9.27 | 885     | Cell wall. Cytoplasm.    |
| PagXTH7(A)  | Pop_A02G005521 | chrA02(+):17977241-17978291 | 289 | 32601.89 | 7.56 | 870     | Cell wall. Cytoplasm.    |
| PagXTH8(A)  | Pop_A03G020147 | chrA03(+):4891416-4893760   | 298 | 34791.56 | 8.4  | 897     | Cell wall. Cytoplasm.    |
| PagXTH9(A)  | Pop_A03G050272 | chrA03(+):9231032-9234445   | 348 | 40397.71 | 8.71 | 1047    | Cell wall                |
| PagXTH10(A) | Pop_A04G018283 | chrA04(-):18915927-18917647 | 279 | 32298.07 | 4.74 | 840     | Cell wall                |
| PagXTH12(A) | Pop_A05G056355 | chrA05(-):4094702-4095869   | 330 | 37191.45 | 9.02 | 993     | Cell wall. Cytoplasm.    |
| PagXTH13(A) | Pop_A05G056354 | chrA05(-):4104542-4105601   | 294 | 33321.63 | 8.47 | 885     | Cell wall. Cytoplasm.    |
| PagXTH14(A) | Pop_A05G016860 | chrA05(+):20719418-20720614 | 291 | 33029    | 4.54 | 876     | Cell wall. Cytoplasm.    |
| PagXTH15(A) | Pop_A06G064752 | chrA06(+):9069411-9070519   | 287 | 32666.68 | 6.65 | 864     | Cell wall. Cytoplasm.    |
| PagXTH16(A) | Pop_A06G064753 | chrA06(+):9080027-9081133   | 287 | 32709.71 | 7.04 | 864     | Cell wall. Cytoplasm.    |
| PagXTH17(A) | Pop_A06G079417 | chrA06(+):10588797-10590497 | 291 | 33163.31 | 9.14 | 876     | Cell wall                |
| PagXTH18(A) | Pop_A06G085762 | chrA06(+):14455149-14457552 | 330 | 37856.13 | 9.36 | 993     | Cell wall                |
| PagXTH20(A) | Pop_A06G061600 | chrA06(-):18650084-18651141 | 269 | 29898.41 | 8.25 | 810     | Cell wall. Cytoplasm.    |
| PagXTH21(A) | Pop_A07G022723 | chrA07(+):13192966-13194223 | 296 | 34089.82 | 7.08 | 891     | Cell wall                |
| PagXTH22(A) | Pop_A08G086532 | chrA08(-):8064453-8067051   | 236 | 27216.36 | 6.45 | 711     | Cell wall                |
| PagXTH23(A) | Pop_A09G015395 | chrA09(+):5210154-5211315   | 294 | 34398.86 | 9.14 | 885     | Cell wall                |
| PagXTH24(A) | Pop_A09G083696 | chrA09(+):11169772-11171821 | 294 | 33181.17 | 6.3  | 885     | Cell wall                |
| PagXTH25(A) | Pop_A10G048486 | chrA10(+):9994489-9996718   | 336 | 38242.91 | 6.21 | 1011    | Cell wall                |
| PagXTH26(A) | Pop_A11G056756 | chrA11(-):9502121-9516438   | 518 | 59586.03 | 9.29 | 1557    | Cell wall                |
| PagXTH28(A) | Pop_A11G091347 | chrA11(-):14728747-14730434 | 272 | 31863.62 | 4.7  | 819     | Cell wall                |
| PagXTH29(A) | Pop_A13G031118 | chrA13(+):688926-691819     | 329 | 37349.17 | 5.94 | 990     | Cell wall                |
| PagXTH30(A) | Pop_A13G054411 | chrA13(-):13936126-13937594 | 370 | 41373.56 | 6.59 | 1113    | Cell wall. Cytoplasm.    |
| PagXTH31(A) | Pop_A14G045767 | chrA14(+):8642735-8644436   | 272 | 30997.07 | 9.11 | 819     | Cell wall. Cytoplasm.    |
| PagXTH32(A) | Pop_A14G045470 | chrA14(-):9097957-9099330   | 240 | 27371.06 | 6.58 | 723     | Cell wall. Cytoplasm.    |
| PagXTH34(A) | Pop_A14G044010 | chrA14(-):10881361-10882658 | 312 | 34941.33 | 6.66 | 939     | Cell wall                |
| PagXTH35(A) | Pop_A16G028679 | chrA16(+):6308151-6310455   | 294 | 33943.51 | 9.46 | 885     | Cell wall                |
| PagXTH36(A) | Pop_A18G018789 | chrA18(-):3799291-3801931   | 349 | 39514.25 | 5.03 | 1050    | Cell wall. Cytoplasm.    |
| PagXTH37(A) | Pop_A18G018791 | chrA18(-):3805220-3806258   | 286 | 31977.75 | 4.91 | 961     | Cell wall. Cytoplasm.    |
| PagXTH38(A) | Pop_A18G018793 | chrA18(+):3815307-3816391   | 291 | 33037.11 | 5.59 | 876     | Cell wall. Cytoplasm.    |
| PagXTH39(A) | Pop_A18G018794 | chrA18(+):3820971-3822550   | 323 | 36650.93 | 8.36 | 972     | Cell wall. Cytoplasm.    |
| PagXTH40(A) | Pop_A18G018913 | chrA18(-):4972888-4974565   | 291 | 33195.35 | 8.93 | 876     | Cell wall                |
| PagXTH43(A) | Pop_A19G055144 | chrA19(-):521586-524048     | 296 | 33729.01 | 5.78 | 891     | Cell wall                |
| PagXTH44(A) | Pop_A09G077102 | chrA09(-):407926-408813     | 295 | 33177.77 | 5.43 |         | Cell wall                |
| PagXTH1(G)  | Pop_G01G089278 | chrG01(-):38048006-38051012 | 351 | 40872.27 | 9.08 | 1056    | Cell wall                |
| PagXTH2(G)  | Pop_G01G002830 | chrG01(-):43855307-43858312 | 293 | 33953.45 | 8.45 | 882     | Cell wall. Cytoplasm.    |
| PagXTH3(G)  | Pop_G02G015825 | chrG02(-):1699033-1700885   | 272 | 31012.32 | 7.72 | 819     | Cell wall                |
| PagXTH4(G)  | Pop_G02G015923 | chrG02(-):2444280-2446404   | 289 | 33049.41 | 9.24 | 870     | Cell wall. Cytoplasm.    |

| Gene Name   | Gene ID        | Chromosome location         | AA  | MW(Da)   | PI   | CDS(bp) | Subcellular localization |
|-------------|----------------|-----------------------------|-----|----------|------|---------|--------------------------|
| PagXTH5(G)  | Pop_G02G030954 | chrG02(-):11277616-11278736 | 213 | 24066.9  | 4.77 | 642     | Cell wall                |
| PagXTH6(G)  | Pop_G02G065438 | chrG02(+):18472956-18474328 | 294 | 33437.97 | 9.36 | 885     | Cell wall. Cytoplasm.    |
| PagXTH7(G)  | Pop_G02G065437 | chrG02(+):18476176-18477609 | 289 | 32602.94 | 8.1  | 870     | Cell wall. Cytoplasm.    |
| PagXTH8(G)  | Pop_G03G013929 | chrG03(+):5635456-5637787   | 289 | 32602.94 | 8.1  | 885     | Cell wall. Cytoplasm.    |
| PagXTH9(G)  | Pop_G03G010661 | chrG03(+):10517014-10520862 | 349 | 40452.76 | 8.59 | 1050    | Cell wall                |
| PagXTH10(G) | Pop_G04G023264 | chrG04(-):19405895-19407830 | 293 | 34011    | 4.85 | 882     | Cell wall                |
| PagXTH13(G) | Pop_G05G008459 | chrG05(-):4022435-4030437   | 294 | 33235.54 | 8.83 | 885     | Cell wall. Cytoplasm.    |
| PagXTH14(G) | Pop_G06G053834 | chrG06(+):8921018-8928046   | 409 | 45308.2  | 8    | 1230    | Cell wall. Cytoplasm.    |
| PagXTH15(G) | Pop_G06G053835 | chrG06(+):8931321-8932386   | 287 | 32730.64 | 6.38 | 864     | Cell wall. Cytoplasm.    |
| PagXTH16(G) | Pop_G06G051233 | chrG06(+):10403665-10405365 | 291 | 33177.33 | 9.14 | 876     | Cell wall                |
| PagXTH17(G) | Pop_G06G051718 | chrG06(+):14552375-14554550 | 294 | 34006.64 | 9.64 | 885     | Cell wall                |
| PagXTH18(G) | Pop_G06G075982 | chrG06(-):18931312-18932958 | 285 | 31816.72 | 8.2  | 858     | Cell wall. Cytoplasm.    |
| PagXTH20(G) | Pop_G07G062649 | chrG07(+):13457322-13458964 | 296 | 34073.82 | 7.08 | 891     | Cell wall                |
| PagXTH21(G) | Pop_G08G046407 | chrG08(-):11032561-11034891 | 337 | 38261.95 | 6.06 | 1014    | Cell wall                |
| PagXTH22(G) | Pop_G09G077522 | chrG09(+):5279962-5281349   | 294 | 34354.81 | 9.14 | 885     | Cell wall                |
| PagXTH23(G) | Pop_G09G027710 | chrG09(+):10980152-10981765 | 294 | 33155.13 | 6.3  | 885     | Cell wall                |
| PagXTH24(G) | Pop_G10G000227 | chrG10(+):10073222-10076109 | 336 | 38187.83 | 6.07 | 1011    | Cell wall                |
| PagXTH28(G) | Pop_G13G072741 | chrG13(+):643134-645678     | 208 | 24035.69 | 5.96 | 627     | Cell wall                |
| PagXTH29(G) | Pop_G13G022225 | chrG13(-):14077989-14079060 | 293 | 32671.56 | 5.3  | 882     | Cell wall. Cytoplasm.    |
| PagXTH30(G) | Pop_G14G000662 | chrG14(+):7308059-7309808   | 284 | 32284.54 | 8.95 | 855     | Cell wall. Cytoplasm.    |
| PagXTH31(G) | Pop_G14G000593 | chrG14(-):7780697-7789498   | 470 | 54060.12 | 8.77 | 1413    | Cell wall. Cytoplasm.    |
| PagXTH32(G) | Pop_G14G051007 | chrG14(-):9571741-9573319   | 312 | 34896.27 | 6.89 | 939     | Cell wall                |
| PagXTH34(G) | Pop_G16G068625 | chrG16(+):4851250-4853931   | 294 | 33891.42 | 9.32 | 885     | Cell wall                |
| PagXTH35(G) | Pop_G18G080133 | chrG18(-):4252180-4253219   | 286 | 31994.8  | 4.83 | 861     | Cell wall. Cytoplasm.    |
| PagXTH36(G) | Pop_G18G080131 | chrG18(+):4264247-4265645   | 291 | 33009    | 5.55 | 876     | Cell wall. Cytoplasm.    |
| PagXTH37(G) | Pop_G18G080130 | chrG18(+):4270677-4271727   | 287 | 32596.13 | 9.05 | 864     | Cell wall. Cytoplasm.    |
| PagXTH38(G) | Pop_G18G080149 | chrG18(-):5749154-5750831   | 291 | 33152.28 | 8.93 | 876     | Cell wall                |
| PagXTH40(G) | Pop_G19G084027 | chrG19(-):555704-559486     | 231 | 26355.37 | 5.57 | 696     | Cell wall                |
| PagXTH44(G) | Pop_G09G011699 | chrG09(-):391349-392236     | 295 | 33232.86 | 5.64 | 888     | Cell wall                |