|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Esteban et al. (2004) | Features / Fossil species | *Cedroxylon shakhtnaense*  comb. nov. | 7. *Abies* sect. *Balsamea* Engelm. emend. Farjon \_ Type: *Abies*  *balsamea* (L.) Mill. (microscopic observation) | *A. fraseri*  (Pursh) Poir. | *A. koreana*  E. H. Wilson | *A. lasiocarpa* (Hook.)  Nutt. (microscopic observation) | *A.*  *nephrolepis*  (Trautv.) Maxim. | *A.*  *sachalinensis*  Mast. | *A. sibirica* Ledeb. (microscopic observation) | *A. veitchii*  Lindl. (microscopic observation) |
| AT1 | Well‐defined growth  rings | + | + | + | + | + | + | + | + | + |
| AT3 | Axial tracheids of  circular section | ‐ | ‐ | ‐ | ‐ | ‐ | ‐ | ‐ | ‐ | + |
| AT4 | Axial tracheids of  polygonal section | + | + | + | + | + | + | + | + | + |
| AT6 | Intercellular spaces  present | + | ‐ | ‐ | + | ‐ | ‐ | ‐ | ‐ | ‐ |
| AT8 | Spiral thickenings present,  but not in all the axial tracheids | ‐ | ‐ | ‐ | ‐ | ‐ | ‐ | ‐ | ‐ | ‐ |
| AT9 | Bordered pits present on the tangential walls  of the axial tracheids | + | + | + | + | + | + | + | + | + |
| AT10 | Uniseriate bordered pits on the radial walls  of the axial tracheids | + | + | + | + | + | + | + | + | + |
| AT11 | Biseriate bordered pits on the radial walls  of the axial tracheids | (occasionally) | + | ‐ | ‐ | ‐ | ‐ | + | ‐ | ‐ |
| AT14 | Bordered pits with included elliptic aperture | ‐ | ‐ | ‐ | ‐ | ‐ | + | ‐ | ‐ | ‐ |
| AT16 | Pits present borders with  radial striation | ‐ | ‐ | ‐ | ‐ | ‐ | + | + | ‐ | ‐ |
| AT19 | Bars of Sanio | + | ‐ | ‐ | ‐ | ‐ | ‐ | + | ‐ | ‐ |
| AT20 | Trabecula | ‐ | ‐ | ‐ | ‐ | + | ‐ | ‐ | ‐ | ‐ |
| AT21 | Crystals present in axial  tracheids | ‐ | + | ‐ | ‐ | ‐ | + | ‐ | ‐ | + |
| P1 | Axial parenchyma  absent or scarce | + | + | ‐ | ‐ | + | + | + | + | + |
| P2 | Axial parenchyma with smooth transverse walls | + | ‐ | ‐ | ‐ | ‐ | ‐ | ‐ | ‐ | + |
| P3 | Axial parenchyma with  nodular transverse walls | + | + | + | + | ‐ | ‐ | ‐ | + | + |
| P4 | Axial parenchyma with crystals | ‐ | + | ‐ | ‐ | ‐ | ‐ | ‐ | ‐ | + |
| P5 | Axial parenchyma  with resin | ? | ‐ | ‐ | ‐ | ‐ | ‐ | ‐ | + | ‐ |
| P6 | Diffuse axial parenchyma  present | + | + | + | + | ‐ | ‐ | ‐ | + | + |
| P8 | Terminal axial  parenchyma present | + / ‐ | ‐ | ‐ | ‐ | ‐ | ‐ | ‐ | ‐ | ‐ |
| R1 | Uniseriate rays | + | + | + | + | + | + | + | + | + |
| R2 | Partially biseriate rays | (in less than 10% of the total number of the rays) | + | ‐ | ‐ | ‐ | ‐ | ‐ | ‐ | ‐ |
| R4 | Ray height from 1 to  15 cells | + | + | + | + | + | + | + | + | + |
| R5 | Ray height from 16 to 30  cells | + | ‐ | ‐ | ‐ | + | ‐ | ‐ | ‐ | ‐ |
| R7 | Number of rays per  mm2 <70 | + | + | + | ‐ | + | ‐ | + | ‐ | ‐ |
| R8 | Number of rays per mm2 between 70‐100 | ‐ | ‐ | + | + | ‐ | ‐ | ‐ | + | ‐ |
| R9 | Number of rays per  mm2 >70 | ‐ | ‐ | ‐ | ‐ | ‐ | + | ‐ | + | + |
| R17 | Ray parenchyma with  nodular axial walls | + | + | + | + | + | + | + | + | + |
| R19 | Ray parenchyma with pitted horizontal walls | + | + | + | + | + | + | + | + | + |
| R20 | Ray parenchyma with  crystals | ‐ | + | ‐ | ‐ | ‐ | ‐ | ‐ | ‐ | ‐ |
| R23 | Piceoid cross field pits | + | + | + | + | + | + | + | + | + |
| R24 | Cupressoid cross field  pits | ‐ | ‐ | ‐ | ‐ | ‐ | ‐ | ‐ | ‐ | ‐ |
| R25 | Taxodioid cross field  pits | + | ‐ | ‐ | ‐ | + | ‐ | ‐ | ‐ | ‐ |
| R26 | 1 to 2 pits per cross field | + | + | + | + | + | + | + | + | + |
| R27 | 3 to 4 pits per cross  field | + | ‐ | ‐ | ‐ | ‐ | ‐ | + | ‐ | ‐ |
| RC1 | Resin canals absent | + | + | + | + | + | + | + | + | + |
| RC3 | Thick‐walled epithelial cell resin canals | + | ‐ | ‐ | ‐ | ‐ | ‐ | ‐ | ‐ | ‐ |
| RC4 | Number of epithelial cells in  the axial resin canals <9 | + | ‐ | ‐ | ‐ | ‐ | ‐ | ‐ | ‐ | ‐ |
| RC5 | Number of epithelial cells in the axial resin canals > 9 | + | ‐ | ‐ | ‐ | ‐ | ‐ | ‐ | ‐ | ‐ |