**APPENDIX S3**. Average dimensions and ratios of ventral valve of *Eohadrotreta*? *zhujiahensis* from the Cambrian (Series 2) Shuijingtuo Formation of the Three Gorges area, South China, demonstrating the three ontogenetic development stages respectively.

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **T1** | | L | | W | H | | Lm | Lms | | Wms | | Li | | Wi | Lf | | Wf | | L/W | | H/L | Lm/L | |
| N | | 32 | | 32 | 19 | | 17 | 12 | | 14 | | 31 | | 30 | 29 | | 30 | | 32 | | 19 | 17 | |
| Mean | | 524 | | 622 | 126 | | 248 | 184 | | 221 | | 8 | | 21 | 74 | | 79 | | 84.43% | | 24.30% | 49.09% | |
| Median | | 539 | | 628 | 119 | | 226 | 175 | | 232 | | 0 | | 0 | 79 | | 79 | | 84.23% | | 23.76% | 47.78% | |
| Min | | 360 | | 411 | 64 | | 191 | 145 | | 179 | | 0 | | 0 | 31 | | 58 | | 78.10% | | 17.78% | 42.83% | |
| Max | | 649 | | 831 | 254 | | 339 | 235 | | 261 | | 70 | | 170 | 115 | | 97 | | 88.60% | | 39.20% | 58.10% | |
| SD | | 89 | | 113 | 40 | | 44 | 27 | | 27 | | 19 | | 50 | 21 | | 10 | | 2.36% | | 4.69% | 4.25% | |
| **T1** | Lms/L | | Lms/Wms | | | Li/L | | | Li/H | | Wi/W | | Li/Wi | | | Lf/L | | Lf/H | | Lf/Wf | | | Wf/W | |
| N | 13 | | 12 | | | 32 | | | 19 | | 31 | | 6 | | | 29 | | 19 | | 29 | | | 30 | |
| Mean | 34.52% | | 84.18% | | | 1.28% | | | 1.96% | | 2.77% | | 31.44% | | | 14.14% | | 64.67% | | 94.59% | | | 13.15% | |
| Median | 33.08% | | 85.70% | | | 0.00% | | | 0.00% | | 0.00% | | 29.00% | | | 13.64% | | 58.16% | | 95.70% | | | 12.62% | |
| Min | 23.77% | | 68.31% | | | 0.00% | | | 0.00% | | 0.00% | | 21.28% | | | 7.68% | | 44.44% | | 43.66% | | | 7.73% | |
| Max | 65.28% | | 92.35% | | | 11.63% | | | 22.97% | | 22.43% | | 50.00% | | | 19.11% | | 85.29% | | 146.55% | | | 22.40% | |
| SD | 12.34% | | 7.47% | | | 3.01% | | | 6.04% | | 6.62% | | 10.00% | | | 3.55% | | 13.78% | | 29.80% | | | 3.12% | |

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **T2** | | L | W | | H | | Lm | Lms | | Wms | | La | Li | | Wi | Lc | | Wc | | Lf | Wf | | L/W | | H/L | | Lm/L | | Lms/L |
| N | | 12 | 14 | | 10 | | 3 | 7 | | 8 | | 1 | 16 | | 15 | 3 | | 3 | | 16 | 16 | | 12 | | 7 | | 3 | | 7 |
| Mean | | 750 | 915 | | 244 | | 305 | 180 | | 217 | | 187 | 70 | | 171 | 136 | | 593 | | 95 | 80 | | 82.54% | | 32.49% | | 44.06% | | 25.02% |
| Median | | 744 | 936 | | 252 | | 321 | 180 | | 219 | | 187 | 73 | | 154 | 117 | | 547 | | 90 | 80 | | 82.27% | | 32.54% | | 45.78% | | 25.55% |
| Min | | 658 | 773 | | 186 | | 264 | 175 | | 189 | | 187 | 20 | | 74 | 112 | | 541 | | 64 | 65 | | 80.00% | | 25.96% | | 39.82% | | 21.74% |
| Max | | 835 | 1013 | | 314 | | 331 | 186 | | 242 | | 187 | 126 | | 258 | 179 | | 693 | | 142 | 100 | | 85.77% | | 38.20% | | 46.59 | | 28.05% |
| SD | | 66 | 86 | | 41 | | 36 | 5 | | 20 | | 0 | 34 | | 51 | 37 | | 86 | | 21 | 11 | | 1.86% | | 4.36% | | 3.70% | | 2.41% |
| **T2** | Lms/Wms | | | La/L | | Li/L | | | Li/H | | Wi/W | | | Li/Wi | | | Lc/L | | Wc/W | | | Lf/L | | Lf/H | | Lf/Wf | | Wf/W | | |
| N | 7 | | | 1 | | 12 | | | 10 | | 13 | | | 15 | | | 2 | | 2 | | | 10 | | 10 | | 16 | | 14 | | |
| Mean | 81.92% | | | 27.18% | | 9.21% | | | 31.58% | | 19.03% | | | 40.39% | | | 14.02% | | 61.59% | | | 13.22% | | 40.00% | | 118.07% | | 9.04 | | |
| Median | 81.94% | | | 27.18% | | 9.35% | | | 34.25% | | 20.62% | | | 44.19% | | | 13.51% | | 54.70% | | | 12.47% | | 37.18% | | 112.59% | | 8.83% | | |
| Min | 75.31% | | | 27.18% | | 2.41% | | | 15.63% | | 9.17% | | | 13.04% | | | 13.51% | | 54.70% | | | 9.69% | | 24.15% | | 98.46% | | 6.66% | | |
| Max | 92.11% | | | 27.18% | | 15.33% | | | 43.02% | | 27.06% | | | 66.67% | | | 14.53% | | 68.48% | | | 18.68% | | 59.90% | | 161.97% | | 11.76% | | |
| SD | 5.53% | | | 0.00% | | 4.08% | | | 10.52% | | 5.53% | | | 15.67% | | | 0.72% | | 9.74% | | | 2.64% | | 11.02% | | 17.89% | | 1.46% | | |

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **T3** | | L | W | | H | | Lms | Wms | La | | Li | | Wi | Lc | | Wc | | Lf | | Wf | L/W | | H/L | | Lms/L | | |
| N | | 15 | 16 | | 14 | | 2 | 7 | 1 | | 17 | | 15 | 4 | | 4 | | 19 | | 19 | 14 | | 12 | | 14 | | |
| Mean | | 1096 | 1345 | | 347 | | 194 | 241 | 293 | | 110 | | 309 | 170 | | 730 | | 117 | | 95 | 80.39% | | 32.63% | | 80.39% | | |
| Median | | 1050 | 1288 | | 333 | | 194 | 227 | 293 | | 120 | | 278 | 160 | | 718 | | 112 | | 87 | 79.67% | | 32.75% | | 79.67% | | |
| Min | | 855 | 1069 | | 230 | | 186 | 216 | 293 | | 15 | | 180 | 143 | | 665 | | 86 | | 76 | 78.06% | | 23.05% | | 78.06% | | |
| Max | | 1617 | 2055 | | 535 | | 202 | 305 | 293 | | 162 | | 594 | 219 | | 820 | | 181 | | 163 | 85.13% | | 38.10% | | 85.13% | | |
| SD | | 224 | 289 | | 69 | | 11 | 31 | 0 | | 38 | | 114 | 34 | | 65 | | 25 | | 24 | 2.14% | | 4.48% | | 2.14% | | |
| **T3** | Lms/Wms | | | La/L | | Li/L | | Li/H | | Wi/W | | Li/Wi | | | Lc/L | | Wc/W | | Lf/L | | | Lf/H | | Lf/Wf | | Wf/W |
| N | 2 | | | 1 | | 14 | | 14 | | 14 | | 15 | | | 3 | | 2 | | 15 | | | 14 | | 19 | | 16 |
| Mean | 79.32% | | | 32.20% | | 10.02% | | 33.58% | | 22.51% | | 37.88% | | | 15.90% | | 59.48% | | 10.92% | | | 34.51% | | 124.68% | | 7.22% |
| Median | 79.32% | | | 32.20% | | 10.92% | | 34.42% | | 21.09% | | 40.65% | | | 16.00% | | 59.48% | | 11.19% | | | 34.56% | | 116.48% | | 7.23% |
| Min | 78.48% | | | 32.20% | | 1.60% | | 17.78% | | 15.35% | | 8.33% | | | 14.97% | | 51.95% | | 8.24% | | | 25.58% | | 105.66% | | 5.89% |
| Max | 80.16% | | | 32.20% | | 15.32% | | 46.96% | | 36.77% | | 56.25% | | | 16.73% | | 67.00% | | 14.52% | | | 45.65% | | 154.32% | | 8.98% |
| SD | 1.19% | | | 0.00% | | 3.64% | | 8.77% | | 6.70% | | 12.72% | | | 0.88% | | 10.64% | | 1.71% | | | 5.00% | | 17.05% | | 0.98% |

All measurements are in μm. Abbreviations: L, width; W, width; H, height of valve where not specified, and of elements: a, ventral apical process; c, cardinal muscle scars; f, pedicle foramen; i, ventral intertrough; m, at maximum width; ms, metamorphic shell; T1, pedicle foramen forming stage; T2, pedicle foramen enclosing stage; T3, Intertrough increasing stage.