How big and how small is the minimum of a branching random walk?

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Consider the minimum M_n of a real-valued branching random walk in the boundary case. It was shown by Aidekon (2013) that $M_n - \frac{3}{2}\log n$ converges in law. We are interested in the almost sure limits of M_n: in a joint work with Zhan Shi (2009), we proved that almost surely, $\limsup_{n\to\infty} \frac{M_n}{\log n} = \frac{3}{2}$ and $\liminf_{n\to\infty} \frac{M_n}{\log n} = \frac{1}{2}$. Furthermore, Aidekon and Shi (2014) proved that $\liminf_{n\to\infty}(M_n - \frac{1}{2}\log n) = -\infty$ a.s. We present here two laws of iterated logarithm to describe the upper and lower limits of M_n.