

**Fleischmann, Klaus; Vatutin, Vladimir A.**

**Reduced subcritical Galton-Watson processes in a random environment.** (English)

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The authors study the structure of a reduced subcritical BGW process in a random environment given by a sequence  $(f_n)$  of i.i.d. offspring generating functions with probability law  $\mathbb{P}$ . The quantity considered is the number of particles in generation  $m$  having nonempty offspring in generation  $n$ . The behaviour is essentially different depending on whether  $\mathbb{E}f'_0(1) \log f'_0(1)$  is finite non-positive or finite positive. In the first case, the most recent common ancestor of the non-empty  $n$ th generation is 'located' close to the moment  $n$ , i.e., the situation is similar to that for classical subcritical BGW processes. In the second case, however, a new hybrid type of behaviour occurs: The most recent common ancestor is located exactly at the beginning of the genealogical tree, just as in classical supercritical BGW processes. This implies the so-called "branchless thick trunk" phenomenon. Relations to random walks in random environment are also discussed.

Reviewer: [H.Hering \(Göttingen\)](#)

**MSC:**

[60J80](#) Branching processes (Galton-Watson, birth-and-death, etc.)

[60G50](#) Sums of independent random variables; random walks

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**Keywords:**

[branching process](#); [random environment](#); [reduced process](#); [reduced tree](#); [conditional limit theorem](#); [source time](#); [random walk](#); [ladder epochs](#)

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