On the max version of the generalized spectral radius theorem

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Let Ψ be a bounded set of $n \times n$ non-negative matrices. Recently, the max algebra version $\mu(\Psi)$ of the generalized spectral radius of Ψ was introduced. We show that

$$\mu(\Psi) = \lim_{t \to \infty} \rho(\Psi^{(t)})^{1/t},$$

where ρ denotes the generalized spectral radius and $\Psi^{(t)}$ the Hadamard power of Ψ. This provides a description of $\mu(\Psi)$ that uses no max terminology. As an application we give a short proof of the max version of the generalized spectral radius theorem.