Chromosome-scale genome assembly of Lepus oiostolus (Lepus, Leporidae) provides insights into the high levels of ultraviolet radiation

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October 3, 2023

Abstract

Lepus oiostolus (L. oiostolus) is a species endemic to the Qinghai-Tibet Plateau. However, the absence of a reference genome limits genetic studies. Here, we report a high-quality L. oiostolus genome assembly, with scaffolds anchored to 24 chromosomes and a total assembled length of 2.80 Gb (contig N50 = 64.24 Mb). We found that transposable elements account for 49.84% of the genome, a total of 22,295 predicted protein-coding genes. Long interspersed nuclear elements (LINEs) constitute a high proportion of the genome, and their expansion is a key contributor to this species's relatively large genome size. A total of 1,282 genes were found to have expanded into gene families. Comparative analyses indicated that L. oiostolus probably diverged from its close relatives Ochotona curzoniae and Ochotona princeps, approximately 53.1 million years ago (MYA). This study suggested that the Tipin gene enabled Lepus oiostolus to adapt to the high levels of ultraviolet radiation in the Qinghai-Tibet Plateau. As the first chromosome-level genome assembly of Lepus oiostolus, this study will provide a valuable genomic resource for future research on the evolution of the Leporidae.

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`FIGURE 1 Distribution of various elements on the chromosomes of L. oiostolus..ai` available at https://authorea.com/users/670851/articles/670626-chromosome-scale-genome-assembly-of-lepus-oiostolus-lepus-leporidae-provides-insights-into-the-high-levels-of-ultraviolet-radiation

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`FIGURE 2 Phylogenetic and evolutionary analyses of L. oiostolus..ai` available at https://authorea.com/users/670851/articles/670626-chromosome-scale-genome-assembly-of-lepus-oiostolus-lepus-leporidae-provides-insights-into-the-high-levels-of-ultraviolet-radiation

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FIGURE 3 KEGG pathway analysis and GO enrichment of positive selection genes (PSGs)..ai available at https://authorea.com/users/670851/articles/670626-chromosome-scale-genome-assembly-of-lepus-oiostolus-lepus-leporidae-provides-insights-into-the-high-levels-of-ultraviolet-radiation

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FIGURE 4 Tipin genes family in Lepus oiostolus genome.ai available at https://authorea.com/users/670851/articles/670626-chromosome-scale-genome-assembly-of-lepus-oiostolus-lepus-leporidae-provides-insights-into-the-high-levels-of-ultraviolet-radiation