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Reconstruction of the early history of plant collection in Shenzhen reveals the biodiversity dynamics of a densely populated and rapidly developing city

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The Guangdong-Hong Kong-Macao Greater Bay Area is an excellent example of the synchronous progress of urbanization, economic development and biodiversity protection. Identified as the 'core engine' city of the Greater Bay Area, Shenzhen has succeeded in harmonizing the seemingly conflicting goals of mega-city construction and biodiversity protection in less than half a century.

To accurately assess the spatio-temporal dynamic of biodiversity caused by urban development, detailed historical taxonomic and geographic records are essential. The historical collection of plant specimens in herbaria is identified to represent the best medium for such records. Therefore, we clarified Shenzhen's early plant collection history by comprehensively tracing historical toponyms, researching historical documents, and analyzing digitalized specimens in the public domain. Reconstruction of the spatio-temporal pattern of vascular plant diversity in Shenzhen revealed a steady trend of improvement in species diversity over the past century while also reflecting the trend of increasing threats to some taxa. This outcome projects Shenzhen as a potential model city of sustainable development for other major cities worldwide.