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BGsmartR: an open-access data analysis pipeline to enable smarter living collections management

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Botanic Gardens are becoming proficient at keeping precise and detailed records of their living plant collections (LPCs), partly thanks to the improvement and accessibility of modern databasing software. Although that technology is robust in treasuring the records, it is rarely capable of analysing them to support managers in their goal of keeping optimal LPCs. Here we present BGsmartR, an informatic tool that reveals the dynamics of LPCs over time and in the global context. In essence, BGsmartR will take an export from a database (typically including ~12 standard fields recorded in LPC databases) and run a series of automated analyses, focussing on collections quality and management, both as a snapshot and over time. The process involves enriching the extracted report with updated information on taxonomic nomenclature, geographic distribution, conservation status, and the number of collections that grow a given plant. That information can then be fed back into a database to automatically enhance the quality of its records. The outputs from BGsmartR are strong and aesthetically pleasing graphics that can be static or dynamic, as well as tailored spreadsheets that managers can use to inform their practices and to communicate to their stakeholders. Users can either run the entire pipeline or select among the available data modules. BGsmartR is designed as an open-access portal and as a package to users of the R programming language. This tool allows users to visualise the dynamics and the quality of their LPCs as often as they need to, to iteratively track the impact of policies and strategies on all their collections combined, or on specific horticultural sections. BGsmartR was envisioned to empower LPCs managers and revolutionise their field by enabling high quality LPCs, capable of hosting thriving plant diversity and support successful *ex situ* conservation missions.