

Authoritative Taxonomic Databases for Progress in Edible Insect and Host Plant Inventories

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Abstract

Insects play a vital role for humans. Apart from well-known ecosystem services (e.g., pollination, biological control, decomposition), they also serve as food for humans. An increasing number of research reports (Mitsuhashi 2017, Jongema 2018) indicate that entomophagy (the practice of eating insects by humans), is a long-standing practice in many countries around the globe. In Africa notably, more than 524 insects have been reported to be consumed by different ethnic groups, serving as a cheap, ecofriendly and renewable source of nutrients on the continent.

Given the global recession due to the pandemic (COVID-19) and the threat induced to food security and food production systems, edible insects are of special interest in African countries, particularly the Democratic Republic of the Congo (DRC), where they have been reported as vital to sustain food security. Indeed, to date, the broadest lists of edible insects of the DRC reported (a maximum) 98 insects identified at species level (Monzambe 2002, Mitsuhashi 2017, Jongema 2018). But these lists are hampered by spelling mistakes or by redundancy. An additional problem is raised by insects only known by their vernacular names (ethnospecies) as local languages (more than 240 living ones) do not necessarily give rigorous information due to polysemy concerns.

Based on the aforementioned challenges, entomophagy practices and edible insect species reported for DRC (from the independence year, 1960, to date) have been reviewed using four authoritative taxonomic databases: [Catalogue of Life](#) (CoL), [Integrated Taxonomic Information System](#), [Global Biodiversity Information Facility taxonomic backbone](#), and the [Global Lepidoptera Names Index](#). Results confirm the top position of edible caterpillars (Lepidoptera, 50.8%) followed by Orthoptera (12.5%), Coleoptera and Hymenoptera (10.0% each). A total of 120 edible species (belonging to eighty genera, twenty-nine families and nine orders of insects) have been listed and mapped on a national scale. Likewise, host plants of edible insects have been inventoried after checking (using CoL, [Plant Resources of Tropical Africa](#), and the [International Union for Conservation of Nature's Red List of Threatened Species](#)). The host plant diversity is dominated by multi-use trees belonging to Fabaceae (34.4%) followed by Phyllanthaceae (10.6%) and

Meliaceae (4.9%). However, data indicated endangered (namely *Millettia laurentii*, [Pioria balsamifera](#)) or critically endangered (*Austranella congolensis*) host plant species that call for conservation strategies. To the best of our knowledge, aforementioned results are the very first reports of such findings in Africa.

Moreover, given issues encountered during data compilation and during cross-checking of scientific names, a call was made for greater collaboration between local people and expert taxonomists (through citizen science), in order to unravel unidentified ethnospecies. Given the challenge of information technology infrastructure in Africa, such a target could be achieved thanks to mobile apps. Likewise, a further call should be made for:

1. better synchronization of taxonomic databases,
2. the need of qualitative scientific photographs in taxonomic databases, and
3. additional data (i.e., conservational status, proteins or DNA sequences notably) as edible insects need to be rigorously identified and durably managed.

Indeed, these complementary data are very crucial, given the limitations and issues of conventional/traditional identification methods based on morphometric or dichotomous keys and the lack of voucher specimens in many African museums and/or collections. This could be achieved by QR (Quick Response) coding insect species and centralizing data about edible insects in a main authoritative taxonomic database whose role is undebatable, as edible insects are today earmarked as nutrient-rich source of proteins, fat, vitamins and fiber to mitigate food insecurity and poor diets, which are an aggravating factor for the impact of COVID-19.

Keywords

biodiversity, citizen science, DR Congo

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Conflicts of interest

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