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The amazing travels of a great naturalist to Sarawak (Malaysia): Odoardo Beccari's wanderings in Borneo, 1865–1868

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ABSTRACT

Odoardo Beccari (1843–1920) is considered to be one of the more important Italian naturalists of the nineteenth century, in particular for his pioneering explorations of the Malaysian Archipelago. During this period, he collected many thousands of botanical, zoological and ethno-anthropological specimens which are now conserved in natural history museums. Based on this conserved material, hundreds of species new to science have been described. In this study, we accurately reconstruct the travel itineraries of Beccari's first trip to Borneo (Sarawak, 1865–1868). We link modern locations to the names he used, which were Italian transliteration of the local names of the time. We place these locations in time sequence on up-to-date georeferenced topographic maps. We expect our study to be useful to botanists, zoologists, anthropologists, curators of natural history museums and to nature conservators, as it provides precious information on the fauna and flora of Sarawak in the 1860s.

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1. Introduction

Odoardo Beccari (1843–1920) is considered one of the most important Italian naturalists of the nineteenth century, in particular for his pioneering explorations of the Malaysian Archipelago, from Borneo to western Papua (Barosi, 2010; Pichi Sermolli, 1994; Pichi Sermolli & Van Steenis, 1983). After his first trip to Borneo in 1865–1868 (Beccari, 1868; Giglioli, 1873), Beccari continued to travel in Africa, southeast Asia and Oceania for a further 10 years, making important observations and collecting many thousands of specimens (Barosi, 2010; Biagioli, 2005; Cucchini & Nepi, 2006; Giordano, 2020; Innocenti & Nistri, 2008; Van Steenis, 1952). Beccari was a well-rounded naturalist, devoted to various branches of natural sciences (botany, zoology, ethnology, anthropology and physical geography). He was nominated as an honorary member of various scientific societies (e.g. the Zoological Society of London and the Italian Anthropological Society) but, internationally, he is most renowned as a botanist because he brought back a very large amount of plant material from his travels and, based on this material, some hundreds of species new to science were described by him and by other botanists with whom Beccari was in contact. According to the International Plant Name Index (www.ipni.org), more than 1400 plant names resulted from Beccari's descriptions, while about 380 plant species have the

epithet starting 'beccar' (e.g. *beccarii*, *beccarianum*). This indicates the original authors dedicated these species to Beccari, probably because they described them based on specimens collected by Beccari. The materials he collected have provided, and continue to provide, the basis for an enormous volume of scientific typification (e.g. Cecchi et al., 2021; Giordano et al., 2013; Harries et al., 2020; Häkkinen & Väre, 2008). They also form the basis of more modern genetic studies (Barbosa & Almeida, 2019; Deka et al., 2020). Beccari's most important botanic legacies are held by the *Malesian Herbarium* (FI-HB), with more than 16,000 specimens (Nepi, 2009; Van Steenis, 1952) and the *Herbarium Palmarum* (FI-HP) with about 6800 palm specimens (Cucchini & Nepi, 2006). Both are hosted in the Natural History Museum of the University of Florence, Italy. Indeed, Beccari was a palm specialist who published several important contributions (e.g. Beccari, 1912–14, 1919 and 1920) and co-authored many floristic works on the family *Palmae* (today the *Arecaceae*) with numerous colleagues, e.g. with JD Hooker *The flora of British India* (Hooker, 1894).

More than 30 years after his return from Sarawak in 1868, Beccari described his first extraordinary voyage to Borneo in a book, first published in Italian, entitled *Nelle foreste di Borneo. Viaggi e ricerche di un naturalista* (Beccari, 1902). The English edition *Wanderings*

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in the great forests of Borneo. Travels and researches of a naturalist in Sarawak (Beccari, 1904) soon followed and would become a classic of travel literature, a very successful work, still available in bookshops in Sarawak. In this book, he accurately describes the locations and times of his journey, which have crucial scientific importance due to the descriptions of new species based on them. Unfortunately, the names of many of these location are transliterations (in Italian) of the local names used at the time. Hence, it is often now difficult now to identify the places to which they refer. The English edition of the book (Beccari, 1904) does not help us much in this regard. With this report, marking the 100th anniversary of Beccari's death, on 25 October 1920, we aim to reconstruct the travel itineraries of Beccari's first voyage to Borneo, linking the names he used then to the ones currently in use. We also place them, in time sequence, on updated georeferenced topographic maps.

1.1. Notes about the young Odoardo Beccari and his preparations for his first voyage to Borneo

Beccari attended the universities of Pisa and Bologna and graduated from the latter in natural sciences in 1864 when he was only 21 years old. There, he came to know the Genoese Marquis Giacomo Doria, who would later become a patron of science and the founder of the Civic Museum of Natural History in Genoa. These two young men, united by the same passion for naturalistic exploration in countries then unknown, decided to carry out a long exploration together. On the advice of the famous English naturalist John Ball (1818–1889), they chose as their destination the English protectorate of Sarawak in Borneo, ruled by the 'white Rajah' James Brooke (Giordano, 2020; Martelli, 1921; Pichi Sermolli, 1994). In preparation for his travels, Beccari spent a period in England to examine the Malesian collections existing in the great herbaria of Kew Gardens and the British Museum in London. Beccari stayed in London from February to April 1865 and there met the great botanists Sir William Jackson Hooker (1785–1865) and his son Joseph Dalton Hooker (1817–1911). These helped Beccari by providing a large amount of background information. He also met Alfred Russel Wallace (1823–1913), Charles Lyell (1797–1875) and the Rajah of Sarawak, James Brooke, who assured him the full support of his nephew, Charles Brooke, who was ruling the territory in the absence of his uncle at that time (Giordano, 2020; Martelli, 1921; Pichi Sermolli, 1994). Some sources report that Beccari also encountered Charles Darwin (1809–1882) but it is unlikely they ever met (Giordano, 2020). Having completed his preparations, Beccari sailed from Southampton (England) on 4 April 1865 and joined Doria in Alexandria, Egypt.

After making stopovers in Suez, Aden, Ceylon, the island of Pinang and Singapore. On 19 June 1865, they reached Kutching, the capital of Sarawak, which Beccari and Doria had chosen as their base of operations. Beccari would spend the next three years exploring the forests of Borneo. Less than a year later, Doria was forced to go back home for health reasons (Burkill & Moulton, 1921; Martelli, 1921; Pichi Sermolli, 1994).

1.2. Notes on Sarawak territory and phytogeographical aspects of Borneo

Sarawak covers an area of about 124,000 square km and is located in the northwestern part of the island of Borneo, between 0°50' and 5°N, and 109°36' and 115°50' E. To the northeast the area borders Brunei, Darussalam and Sabah (Malaysia) and to the southeast it borders Kalimantan (Indonesia).

The geomorphology is characterised by large coastal plains. At the time of Beccari's visit (Kaur, 1998), these were extensively occupied, by peat swamps and mangrove forests, that inland gave way to rugged mountains, with peaks slightly exceeding 2000 m a.s.l. The coast faces the South China Sea and is constantly exposed to the northeastern monsoons. The abundant and uniform rainfall gives rise to a multiplicity of rivers, the longest flowing from the mountain ranges of the Sarawak–Kalimantan border, the shortest, but equally rich in water, flowing into the plains of middle Sarawak (Kaur, 1998).

From a phytogeographical point of view, Borneo is located in the Palaeotropical floristic kingdom, according to Takhtajan (1986) or in the Indo-Pacific one, according to Cox (2001). Within the geographical standards given by Brummitt (2001), this territory can be referred to the Malesia region of the Asia-Tropical botanical continent. The Indo-Malaysian Archipelago has recently been subdivided in three main phytogeographical areas, with Borneo belonging to the western one, named the Sunda Shelf (Van Welzen & Slik, 2009). The climate is equatorial, strongly influenced by monsoon. The Indo-Malaysian Archipelago, with its varied rainforest vegetation rich in endemic plants, is one of the most botanically diverse regions on Earth and a global hotspot for the conservation of biodiversity (Brooks et al., 2006; Kier et al., 2005; Mittermeier et al., 2011; Myers et al., 2000)

2. Methods

All data processing, mapping and map design was carried out in ESRI ArcGIS 10.7. The lean cartographic background, deliberately devoid of infrastructure, shows the morphology and orography taken from SRTM images (Shuttle Radar Topography Mission) merged, cropped and reclassified (Jarvis et al., 2008).

The lines have been drawn faithfully following the indications by Beccari, i.e. the itinerary drawings he published in his book (Beccari, 1902); we also consulted unpublished maps and notes found in Beccari's archives at the botanical library of the University of Florence (Biagioli, 2005). Nevertheless, the resulting information was not always accurate, especially regarding the intermediate sites of several itineraries. To increase accuracy, we consulted Beccari's books (Beccari, 1902; 1904) and verified the correspondence between the site names used by Beccari and the current topographic site names. The sites have been identified on current maps and georeferenced in the geographical coordinates system WGS84 (EPSG 4326). To better understand the ancient toponyms and to link these to current ones, we also consulted works dealing with the history of Sarawak and illustrating the uses and costumes of the ancient inhabitants of Borneo between the 19th and 20th centuries (Baring-Gould & Bampfylde, 1909; Kaur, 1998; Low, 1848; Noel, 1879; Wallace, 2010).

As a consequence, we produced a Chronological Table of Travels (Supplement 1) which was the base for reconstructing the accurate itineraries (routes) shown on the maps. The following data are indicated in the Chronological Table of Travels:

Route: Route number to which the toponym belongs in the main map. We produced 12 different itineraries to tell the story of his travels and to show in detail the available space–time data.

Date: Calendar date, taken from Beccari (1902), real or assumed, expressed in the format YYYY-MM-DD.

Page: Page number, with reference to Beccari (1902), in which toponyms and dates are mentioned. Repetitions are due to the need to follow the chronological order of the travel. A second Italian edition of Beccari's book was recently published (Beccari, 2020), but the page numbers do not correspond to the first one, so we always refer to the original edition.

Toponym_O: Original toponym in Italian language mentioned in Beccari (1902).

Toponym_C: Toponym identified in current maps after a comparison with numerous geographic service websites (see Sitography in Supplement 1).

State: State name to which the current toponym belongs.

Latitude: Latitude expressed in decimal degrees in the WGS84 geodetic reference datum.

Longitude: Longitude expressed in decimal degrees in the WGS84 geodetic reference datum.

Accuracy: Accuracy radius is measured in meters. For each point, the degree of accuracy was assessed with the indication of a distance radius expressed in meters. The term accuracy is used here to express the estimated range of distance between the old toponym and the toponym identified in the current maps. Four levels of positional tolerance have been defined:

250, 500, 1000 and 2000m. The accuracy radius is also estimated for sites with assumed geographic position because in part they have been identified along the routes drawn by Beccari on the historical maps attached to his book.

Notes: Explanatory notes, of several types; here we also specify when the cited date is assumed (estimated date) or when the cited place is uncertain (assumed geographical position).

3. Results and discussion

The map of O. Beccari's wanderings in Sarawak (Malaysia), 1865–1868 (Main Map) is released as a composite map, made up of several sub-maps: one concerning the route of the nautical itinerary from England to Sarawak, one providing a general overview of the Borneo territory visited by Beccari, in which the frame of the routes is displayed, and 12 maps at different scales which, in chronological sequence, show his itineraries and the places he explored. The Main Map allows locations of Beccari's itineraries in Borneo with a topographic precision never before achieved and also provides a current toponymy. Further information can be retrieved from the Chronological Table of Travels (Supplement 1). Most of the 175 sites have been identified on current maps and their coordinates and dates, real or assumed, in which Beccari visited them, are provided at the best possible levels of accuracy. In the notes on the Chronological Table of Travels we also indicate eventual bibliographic references that correct the names and positions of sites wrongly reported by Beccari; e.g. one by Burt (1964), who stated that Beccari did not climb Gunong Pueh, as he had thought but a more southeastern peak in the Gunung Rumpat range. We were unable to locate about 20 places, probably due to the extensive transformation of the territory and landscape, that have taken place since the time of Beccari's travels. The toponyms not found are concentrated in the 6th route, that runs from Marup to Danau Seriang (Kapuas lakes) and in the area around the Kanowit and Entebai rivers (11th route).

The itineraries mainly follow the seacoast, or the courses of rivers navigable for most of the year, as boat was the best, sometimes the only, possible mode of travel, given the available communication routes of the time. Shortly after his arrival, Beccari bought a small boat, a sampan, for this purpose (Pichi Sermolli, 1994). He travelled far and wide through the forests of Sarawak but the core of his activities was around Mt. Matang, not far from Kuching (see the Main Map), where he built a hut and lived for a long time and, after Doria's departure, in solitude. He felt perfectly at ease in the wilderness. Challenging the adverse climatic conditions and the extreme dangers of the area, Beccari made important naturalistic observations

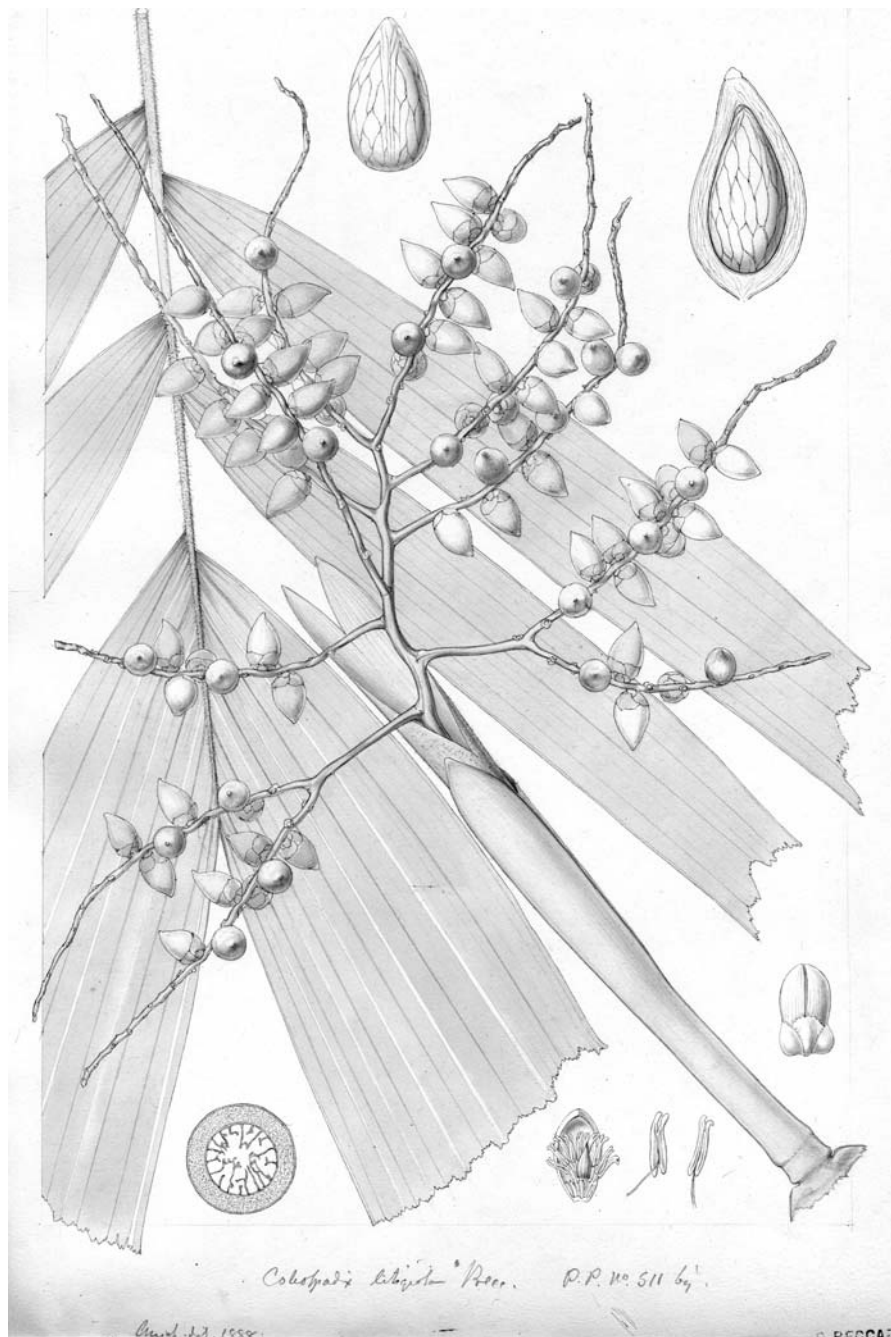


Figure 1. Beccari's analytic hand drawing of the palm *Ptychosperma litigiosa*, whose accepted name nowadays is *Drymophloeus litigiosus*, showing a leaf, inflorescence, flowers and seeds. The drawing comes from the type collection of the Natural History Museum, Botanical Collections, of the University of Florence.

and collected a huge amount of botanical, zoological, anthropological and ethnological material, today stored in a number of natural history museums. He also carried out topographic surveys of hitherto unexplored areas, discovering rivers and reliefs not yet reported. He was also a skilled draftsman, in fact in his notebooks we can find illustrations of places, plants (e.g. [Figure 1](#)), animals, men and women which he then partially published in the volumes of a journal he founded, named 'Malesia'. In his wanderings, he came into contact with many local indigenous populations. He also met several tribes of Dayaks, at that time a people famous as head-hunters and warriors.

Here, he established a bond of mutual respect and admiration with them. He also searched diligently for orangutans, which he shot, as naturalists did at that time. The notes he left in his books on this subject are today still cited in scientific works (e.g. [Meijaard et al., 2010](#)). His love for wilderness was boundless. After being forced to leave Sarawak for health reasons, Beccari arrived in Italy on 2 March 1868. However, many sources report that he had been fascinated by his primitive life in Borneo and felt some discomfort with the city and a western lifestyle. This probably provided the impetus for him to undertake further explorations ([Pichi Sermolli, 1994](#)).

4. Conclusion

We are confident that the map we produce will be of assistance to botanists, zoologists, anthropologists and curators of natural history museums, who study or deal with the specimens collected by Beccari during his first voyage to Borneo. We also believe it will be useful for modern nature conservation purposes. During the last hundred years, many anthropogenic threats and pressures (agriculture, industry, urban expansion) have resulted in habitat loss, the introduction of invasive alien species, climate change, all of which are strongly affecting biodiversity, especially in the richest and most accessible places (Brooks et al., 2006; Mittermeier et al., 2011). In recent decades, oil palm plantations have increased greatly in Sarawak, resulting in massive losses of the natural forests and severe fragmentation (Hon & Shibata, 2013; Messina, 2020). The precise geo-localisation of Beccari's itineraries, linked to the naturalistic descriptions of the places reported in his books, therefore provide precious information on these original wilderness of places and can be used to make comparisons with the present day situations and also for inferring future implications for wildlife and conservation.

Software

The maps were created and edited using the software ESRI ArcGIS 10.7.

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Disclosure statement

No potential conflict of interest was reported by the author(s).

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