

Hyphaene thebaica (Doum Palm) in First World War Medicine

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The Doum palm, *Hyphaene thebaica* (L.) Mart., has long been used for local medicinal applications, and phytochemical analyses have provided supporting evidence of therapeutic effectiveness. During the First World War, a novel medicinal use was employed for the powdered fruits of this palm, forming an extension of biocultural knowledge within former French colonies in west Africa, from where it was derived.

Palms have historically been the source of materials used in warfare across the world – from hand-to-hand weapons and shields in South America (Rival 1996, Beckerman & Yost 2007) and bows in the Philippines (Montague 1921) to the world's first military pontoon bridges made from palm wood planks (Gabriel & Metz 1992).

The First World War severed economic links with pre-war sources of materials, triggering a need for substitutes and novel solutions to wartime challenges, both military and social. This led to significant innovation, especially with regard to botanical products (Wearn 2016). Research on plants affected during the course of, or utilized for, military activity (= polemobotany, see Wearn 2016) has led to the discovery of a previously unreported wartime

application of the powdered fruits of the Doum palm (*Hyphaene thebaica*), which is evidenced through correspondence and materials held within the Archives and Economic Botany Collection at the Royal Botanic Gardens, Kew.

Hyphaene thebaica is native to tropical Africa, from Senegal in the west through Niger to Egypt in the east, and distinctive in its frequent habit of the trunk branching one or more times (Fig. 1). Parts of the plant have a range of traditional uses in Africa. The leaves were made into hats and mats in Nigeria (Holland 1922) and were crafted into basketry and matting by ancient Egyptians (El Hadidi & Hamdy 2011), while the plant's roots are used in the treatment of bilharziasis and its resin employed as a diuretic and diaphoretic (Boulos 1983). The fruit (Fig. 2) is a source of strong



1. *Hyphaene thebaica* palm growing in Benin, west Africa. Photo by Marco Schmidt, CC-BY.

antioxidants, and a hot water extract infusion (Fig. 3) is commonly consumed as a health tonic. The mesocarp is eaten, especially in Egypt, and is acknowledged as a famine food (Hsu et al. 2006, Seleem 2015).

Wartime endeavors

During the early stages of the First World War, French entrepreneur Madame Jeanne Perchat (Fig. 4) turned her attention to potential



2. Fruits of *Hyphaene thebaica*. Photo by William J. Baker.



3. Powdered fruit mesocarp of *Hyphaene thebaica*, used for creating an infusion in hot water. Photo by Aleksasfi, CC-BY.

applications of palm-derived products to aid the war effort. This was familiar territory for Mme. Perchat, who had already been credited with the first production in Africa (within the French colony of Upper Senegal and Niger in French West Africa) of *aggloméré d'ivoire végétal*, an agglomerate made from palm endosperm, otherwise known as “vegetable ivory” (Librairie illustrée 1914). The first vegetable ivory had begun to be mass-produced around the 1860s, the early product being derived from powdering and processing ripe endosperm of South American *Phytelephas* (ivory-nut palms) imported to Europe (Barfod et al. 1990). Vegetable ivory was so-named because of its similar appearance to elephant ivory and could be produced from several Borassoid and Phytelephantoid palms, including *Hyphaene*, *Borassus* and *Phytelephas* (Holland 1922). Vegetable ivory was used as an alternative to elephant ivory or wood for the manufacture of small decorative objects, buttons, marquetry and building decorations. Indeed, it was reported that a large number of U.S. military buttons produced during the Second World War were made from it (Acosta-Solís 1948). Recently, a resurgence in interest in this alternative botanical product has followed increasing pressure to conserve elephant and rhinoceros populations (e.g., Chu et al. 2015).

On 26 August 1915, a letter was received by Sir David Prain, Director of the Royal Botanic Gardens, Kew, which outlined a novel use of the powdered fruit of the Doum palm,

enclosing a sample packaged under the title *Poudre d'Amande d'Afrique* (“Kernel Powder of Africa,” Kew EBC Cat. Nos. 35678 and 35699; Fig. 5). Madame Perchat had contacted RBG Kew recognizing that this organization occupied a unique position in Britain – with the greatest botanical expertise and direct connection to the British Government and, through it, the British Empire and its army. In relation to the powder, Perchat outlined the uses that had been found for its application to sores and wounds, stating that she had received “many letters of thanks from our soldiers.” As such, she was now offering to render services to the British Army by highlighting and sharing this discovery.

Madame Perchat enclosed a printed sheet reporting the documented applications analyzed by the *Jardin Colonial* (Colonial Gardens) in Paris. The sheet summarized the following uses (translated from French):

1. *Against cold feet, put plenty of the powder on the sock.*
2. *For burning wounds sprinkle them and especially never wet the powder.*
3. *For toothaches, put the powder on the unwell part.*
4. *To clean teeth it replaces all toothpaste.*

Cases of *le froid aux pieds* (cold or frostbitten feet) and *pied de tranchée* (trench foot) became abundant among soldiers during the winter of

1914/15. During that winter, 20,000 British soldiers were treated for trench foot, and due to the magnitude of cases, the soldiers were instructed to dry their feet and then grease them with whale oil as a protective barrier against the damp (Greene 1945). John Henry Holland, Assistant to the Keeper of Museums at Kew, immediately informed Sir David of the new arrival, retaining a small sample of the powder along with its packaging within the museum and passing the greater part of the sample to his director. Sir David clearly saw some potential in the product because he, in turn, wrote to Lieutenant General Sir Arnold Keogh, Director General of the British Army Medical Services. Although Keogh's reply was swift, he was dismissive of the powder's utility and required "surgical evidence."

From letters sent by Mme. Perchat to Kew during August and September 1915, it is clear that she had begun distributing her palm product to soldiers in the French Army before January 1915. As testimonial to the perceived efficacy of the powder, she included transcripts of 13 letters, penned by soldiers in several different regiments between 5 January and 1 September 1915. These included Victor Lecombe of 4^e Compagnie, 3^e Regiment de Ligne, 15^e Corps, who was on the frontline (his unit was in the environs of Avocourt and Malancourt, near Verdun, having recently faced strong German opposition) and so was subjected to the cold and wet weather. He wrote on 1 April to say that "*The powder against cold feet [frostbite] which you had sent to me through my sister is of an indisputable effectiveness; I send you my thanks as testimony.*" The official regimental history provides further evidence stating that during the winter of 1914/15 there were "*numerous evacuations due*

to cold and frozen feet" (Rabanit 1920). Louis Josse from 62^e Compagnie d'Instruction, 1^{er} régiment de Zouaves, Saint Denis (French-African light infantry training company, based close to Paris), who had heard about the powder, wrote to request a supply on 15 March. A month later he offered a favorable review of the powder, suggesting that "*it was of the utmost necessity to me,*" so much so that he had subsequently distributed it to his comrades to share its healing benefits. French colonial soldiers of Senegalese and Sudanese origin apparently found the powder particularly useful for their frozen feet. A similar powder produced from the fruits of *Borassus flabellifer* L. palms (called *Ronier* or *Rondier*) was also noted to have a similar effect, with a sample also sent to Kew in 1915 (EBC Cat. No. 35132).

These endorsements, whilst exceedingly positive, did not constitute scientific analyses or offer the empirical proof desired by figures such as Lieut. Gen. Keogh. However, encouraged by the powder's potential and unperturbed by Keogh's negativity, the ever-pioneering Arthur Hill, Assistant Director at Kew, began making enquiries to chemists in England. In May 1916, analytical chemist E.R. Bolton found the powder to contain "*a marked proportion of tannin, which...is a powerful astringent, and as such has styptic properties*" (letter in RBG Kew Archives, 5 May 1916), alluding to its anti-hemorrhagic potential through inducing the sealing of wounds. It was also noted that if it were to be used on raw wounds then sterilization of the product would be recommended, although no bacteriological analysis had been undertaken. Madame Perchat had recognized this in one of her letters to Sir David, explaining that native people in the French colonies attempted to heal wounds by applying soil to the affected area, only to find that often such a procedure aggravated the injury (likely through microbial infection). However, when Doum powder was applied, it did not have such negative side-effects, and so became used as an accepted alternative locally.

A modern perspective

Despite being well received by French soldiers and the lengthy correspondence during 1915–1916 among Madame Perchat, the French Colonial Garden in Paris, RBG Kew, analytical chemists and the British Army Medical Corps, the medicinal application of the powders was never actively promoted in

4. Madame Perchat and her *Aggloméré d'Ivoire Vegetal* in Senegal, c. 1915. Photographer unknown.





5. "Poudre d'Amande d'Afrique" container in the Economic Botany Collection at the Royal Botanic Gardens, Kew, EBC 35678. Photo by Director and Trustees of the Royal Botanic Gardens, Kew.

Britain. Post-war, an assessment of useful plants in Nigeria by Holland (1922) did briefly refer to the collection at RBG Kew, noting: "Powdered nuts have been recommended as a dressing for wounds (Perchat, Mus. Kew)," but little more documentary evidence exists for the period. More recent phytochemical analyses of the fruits have confirmed the tannin content highlighted historically by Dr. Bolton in 1916 and have provided further evidence of anti-inflammatory and anti-oxidant properties inherent in the fruit (Eltayeb et al. 2009, Farag & Pare 2013). Similarly, the pericarp extract of *Hyphaene thebaica* has been identified as exhibiting antimicrobial activity (Mohamed et al. 2010, Auwal et al. 2013, Putta & Kilari 2015). Indeed Auwal et al. (2013) concluded that "*H. thebaica* has some important phytochemicals that can be used as therapeutic agents." A review of African palm ethno-medicine recorded 37 medicinal use records for *Hyphaene thebaica*, including in the treatment of pain, inflammation and injuries (Gruca et al. 2015: 230). Laboratory trials of crude mesocarp

extract have also provided evidence to validate its traditional use in anti-viral and anti-parasitic applications (Mohammed et al. 2012). Thus, the novel military medical application reported here, which was actively embarked on at least within parts of the French Army, was by no means an inconsistent extension of biocultural knowledge of local populations within the former French colonial countries of west Africa.

The example of the Doum palm cited here is a pertinent reminder that ascribed historical or traditional value and modern use are not entities that stand diametrically opposed and instead offer stimulus for further study.

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