

PLANT PORTRAITS

POLLEN CAKES OF *TYPHA* SPP. [TYPHACEAE]—‘LOST’ AND LIVING FOOD

Find any temperate or tropical wetland habitat and a *Typha* species (Typhaceae) is likely to be there too. The dozen or so species worldwide, and many of their plant parts, have been put to a great diversity of uses that were comprehensively documented by Morton (1975), although their application to water treatment in constructed wetlands is a more recent development (see e.g. papers cited on <http://www.nal.usda.gov/waic/Bibliographies/eb9701.html>).

The pollen of *Typha*, like that of other taxa (Linskens and Wolde 1997), has been widely used as food. As with many plant uses, however, it is often difficult to tell from literature to what extent pollen consumption is contemporary or historical. For example, the references numbered in this statement by Morton (1975)—“In southern Iraq (49) and China, the pollen is mixed with honey and sold as a sweetmeat (134)” —date back to 1933 and 1911 respectively (authors’ italics).

The great marshes of southern Iraq (and Iran), round the confluences of the Tigris and Euphrates, do in fact continue to be the source of *Typha* pollen, from *T. domingensis* Pers. It is widely sold (as *kharet*) in the souks and cooperatives of Kuwait having been mixed with sugar and steamed in a bag; quoted prices are 1.500–2.000 Kuwaiti dinars (c. \$4.5–6.0)/kg (Dr James Bishop, in litt.). A sample of it, bought in 1999 and donated to Kew’s Economic Botany Collections (EBC 75973), has already been put to use and gone on public display in a new nature reserve and education center in central London (<http://www.wwt.org.uk/>). *Typha*, widely distributed and multitudinously used, made an obvious and easily recognisable candidate to illustrate the global need to conserve wetlands for both people and wildlife. A sample of its pollen, among more ‘obvious’ *Typha* derivatives such as a mat from Montserrat and fiber from Australia, creates its own level of curiosity.

Another sample of *Typha* pollen (Fig. 1) con-

served at Kew is fulfilling a very different role. On 9 August and 13 September 1880, the Philosophical Institute of Hawke’s Bay, North Island/*Te Ika a Maui*, New Zealand/*Aotearoa* heard talks about the food of the “ancient New Zealanders” given by the Reverend William Colenso (Fig. 2; see Bagnall and Petersen 1948). “Another highly curious article of vegetable food”, he was to write, “was the *pungapunga*, the yellow pollen of the *raupo* flowers—the common bulrush, or cat’s-reed mace (*Typha angustifolia*). This was collected in the summer season, when the plant is in full flower, in the wet swamps and sides of lagoons, streams and lakes. I have been astonished at the large quantities of pollen then obtained. On one occasion, more than thirty years ago, I had several buckets full brought me by the present chief, in his canoe, some of which I sent both raw and cooked to Kew Museum. In appearance in its raw state it exactly resembles the ground yellow mustard of commerce, and when put up into bottles would be mistaken for it. It is obtained by gently beating it out of the dense flowering spikes” (Colenso 1881).

In New Zealand, *raupo* (*T. orientalis* C.Presl, rather than ‘*T. angustifolia*’ as reported by Col-



Fig. 1. *Raupo* pollen cake (c. 200 g) and loose pollen (c. 100 g) after over 150 years of storage. (Kew EBC 34556 and 34558. A. McRobb, RBG Kew.)



Fig. 2. William Colenso (1811–1899; photo taken in 1868), the botanist who collected *raupo* pollen in New Zealand in the 1840s. (Photography courtesy of Alexander Turnbull Library, National Library of New Zealand, Te Puna Mātauranga o Aotearoa, Reference F-5028-1/2.)

enso 1881) has many cultural and historical linkages. It is most widely recognised as a visually pleasing swamp dweller, and its pollen as a Maori food delicacy. Known as *pua*, the pollen is mixed with water and steamed to make a 'bread'. Traditionally, Maori would wrap leaves around the mixture and steam it in a *hangi* (earth oven) (Anon. 1996).

Industrial Research Ltd, in collaboration with Tainui Maaori Trust Board, has been studying the history and composition of *pua*. The sample collected by Colenso, and donated by him to Kew in 1851, became a crucial element in the study as it represented the only evidence of historical *pua* cooking methods from the time. The nutritional composition (e.g., vitamins, amino acids, fats, total nitrogen) of baked and unbaked

pollen are being compared to assess the effect of the baking process. The flavonoid pigments in *pua* are also being studied since these are not only significant as nutritionally important antioxidants, but also provide species-specific "fingerprints." The fingerprint of *pua* is being used to check for the presence of *raupo* pollen in New Zealand-sourced bee pollens that are marketed commercially as nutrient supplements. It appears in fact that honey bees do not collect *raupo* pollen and that it is not therefore a constituent of these commercial products.

Harvesting the bright yellow, very fine *pua* is confined to a one-two week period in the early New Year when the *Typha* is of the right maturity. The *pua*, when cooked like a steam pudding, produces a yellow-brown cake with a granular texture and a pleasant "biscuity" aroma; Colenso (1881) however, described the cooked cakes as "sweetish and light, and reminds one strongly of London gingerbread." Old collections, such as that made by Colenso, and traditional knowledge enhanced by scientific studies will enable this cultural treasure of *pua* to be more appreciated and valued. Newer collections, on the other hand, serve as reminders not only of the human utility of wetlands but also that these may be, as in the Tigris-Euphrates delta, the focus of continuing threat.

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