**Supplementary Information**

**Plant uses of clumped pollen and other commonly occurring pollen types.**

***Pimelea* spp.** (riceflowers) pollen (Figure 5M) is found throughout the R31 sediment sequence (and is absent in the possum scat samples). GunaiKurnai knowledge and ethnohistoric documents report the use of *Pimelea* spp. bark to make fine string for a range of purposes, including finely woven bags carried by *mulla-mullung* and for nets used to hold a range of materials (Gott 2008; Nash 2004).

***Plantago* spp.** (Figure 5N) in the pollen assemblage is native to Australia. *Plantago debilis* and *P. varia* have distributions across GunaiKurnai Country today and in recent historical times. *Plantago* spp. (e.g., *Plantago debilis*) can be used as both a food and medicine. Elsewhere, seeds of *Plantago* spp. produce a gel-like coating of sticky mucilage upon wetting and are used to make a thickened porridge rich in dietary fibre (Low 1991). The Noongar of southwest Western Australia use(d) the leaves to treat insect bites, cuts and infections, and to make poultices for the treatment of ulcers and boils (Hansen and Horsfall 2016; Low 1991). We do not know if *Plantago* spp. were also used in these ways in the past by GunaiKurnai. *Plantago* spp. pollen, as single grains and in single-taxon clumps, are most common in sediments dated to c. 15,000–11,000 cal BP in R31 and 5000–4000 cal BP in P35. Above these levels, the barren zones associated with the ash layers (SU2) preclude insight into the occurrence of cultural plant use during more recent times at Cloggs Cave.

**The Asteraceae family**, including members of the two major sub-families Asteroideae (echinate-type pollen) and Cichorioideae (fenestrate-type pollen), dominate the assemblage as both single grains and clumps. Several species of Asteraceae are known to have medicinal uses among the Wotjobaluk of western Victoria (c. 150 km west of GunaiKurnai Country) and the Yaegl of northern New South Wales (c. 800 km north) (De Angelis 2005; Packer et al. 2012). Few Aboriginal communities in SE Australia have published details of their plant uses, so their real geographical extents are likely to be more extensive than what is known from the literature. Pollen resembling *Microseris* spp. (Figure 5D), commonly known as *murnong* or yam daisy, cannot be definitively differentiated from other species of the Cichorioideae subfamily, so we refer to it as ‘*murnong*-type’ pollen to indicate that it resembles that of *murnong*. The tubers of Cichorioide spp. are an important group of plant foods in many parts of the world. *Murnong* was once an important staple food for Aboriginal peoples across much of SE Australia, where the tubers were eaten raw or roasted, sometimes in earth ovens (De Angelis 2005; Nash 2004). The leaves can also be eaten. *Murnong*-type pollen occurs in low levels throughout the P35 and R31 sediment sequences, with the highest values in the late glacial levels (c. 17,500 to 12,500 cal BP, XU13–XU33) (Figure 4). *Murnong*-type pollen usually transports only short distances from the parent plant (Macphail and Woodward 2017) and is not commonly found in other sedimentary pollen records, such as lake or swamp records. This is because *murnong* is thought to have low pollen production rates and relies on insects instead of air currents for pollination. *Murnong*-type pollen is not found in the Cloggs Cave possum scats.

The presence of ***Banksia*** **spp.** (Figure 5E) pollen in the Cloggs Cave sediments is intriguing. As with the *murnong*-type pollen, *Banksia* spp. pollen is rarely found in pollen records recovered from lakes and swamps (Hooley et al. 1980). This is largely due to the non-aerodynamic morphology of the pollen grains, and their pollination pathways that rely largely on small mammals, birds and insects (Ramsey 1988). In R31 at Cloggs Cave, *Banksia* spp. pollen is relatively common in the sediment samples between c. 15,000 and c. 11,000 cal BP (XU10–XU17, in SU4C–SU4G), both as individual grains and in large single-taxon clumps (Figure 8A) (in contrast, only one pollen grain of *Banksia* spp. was detected throughout all the possum scat samples). This suggests the *Banksia* spp. flowers were brought into the cave by people. This is partly supported by observations of whole *Banksia* spp. leaves in spits 2A and 7B of square SS in Flood’s 1971–1972 excavations (Flood 1974: 180–181), equating with our SU2 and top of SU3 respectively (see David et al. 2021; Delannoy et al. 2020).

The period from 15,000 to 11,000 cal BP corresponds precisely with the layers when very small, highly localised ritual fires were lit in R31 (David et al. 2024). The *Banksia* spp. spikes (woody ‘cones’) that contain the flowers were important fire-starters for GunaiKurnai during the 19th century (e.g., Smyth 1878: 132). *Banksia* spp. flowers typically dry and remain attached to the spikes for up to a few years, making them excellent fire-starters. The association of *Banksia* spp. pollen with ritual fireplaces at Cloggs Cave suggests that the flowering material may have arrived in the cave as spikes for fire-making, although dry flower spikes are unlikely to contain residual pollen. Fresh *Banksia* spp. flowers are also known to have been sucked as a traditional source of sweet nectar (Smyth 1878: 213).

***Casuarina* spp.** (she-oak) pollen is found in large quantities in R31 between XU11 and XU7 (SU4E to SU4B–SU4C interface), dating from c. 12,150 cal BP to 10,000 cal BP. This is particularly interesting as this horizon corresponds with that of the two ritual fires that include well-preserved wooden artefacts (in XU11 in SU4E, and XU9 in SU4D) made from *Casuarina* spp. branches that had been brought to the cave when green (David et al. 2024). The two wooden artefacts from R31 closely match descriptions of GunaiKurnai ritual installations described in 19th century ethnography; these ethnographic descriptions explicitly identify *Casuarina* as being used in the performance of ritual spells (Howitt 1887; see David et al. 2024 for details). In other contexts, *Casuarina* spp. wood is very dense and hard, making it an effective wood for fuel and for making wooden implements and weapons (Nash 2004).

**Poaceae** (grass) pollen (Figure 5O) is observed as both single grains and clumps and dominates the earlier levels of the R31 sediment pollen sequence (XU17–XU43) until c. 14,000 cal BP (XU17) when its relative percentage values begin to fall. While differentiating grass pollen to genus or species level is notoriously difficult, many grass species were utilised for a variety of cultural purposes in SE Australia. In Victoria and New South Wales, the *Poa* genus (tussock grass) was used in string-making for nets, bags, baskets and mats, while the seeds of other genera (e.g., *Themeda* spp., kangaroo grass; *Rytidosperma* spp., wallaby grass) were used to make porridge or ground to make flour for damper (Cumpston 2020; De Angelis 2005; Nash 2004). In GunaiKurnai ethnography, grass was burnt to make ritual ash (Howitt 1887). The grass pollen could have come from both manually introduced cultural and wind-borne environmental sources, and while pollen analysis is unable to resolve this issue, the large quantities of grass pollen in association with pollen of culturally important taxa that are rarely found in such quantities in natural settings (e.g., *Banksia* spp., *murnong*-type pollen) suggests that at least some of the grass was manually introduced for cultural purposes. Ongoing phytolith and micromorphological analyses of Cloggs Cave’s sediments may help shed light on whether the grass pollen content represents *in situ* cultural deposition of the grass itself.

**Myrtaceae** pollen (Figure 5K) emerges as an important element in the sediment pollen record from c. 14,000 cal BP (XU17 of the R31 sequence, and throughout the P35 sequence), including as clumps in R31 (XU13–XU17). Myrtaceae pollen is also detected in the possum scat samples. The Myrtaceae family includes several species of *Eucalyptus*, an important plant resource for Aboriginal peoples across SE Australia and beyond. GunaiKurnai peoples used the twigs and branches for a broad range of material culture such as spears and digging sticks, as did all nearby groups such as Djadja Wurrung of Central Victoria who used *Eucalyptus* spp. wood for weapons, the outer bark as tinder for fire-starting, and the inner bark to make coarse string for bags and fishing nets (De Angelis 2005). Medicinally, leaves of *Eucalyptus* spp. were used among the GunaiKurnai as well as Kulin Nations peoples of south-central Victoria as a treatment for scabies and for colds, breathing and chest complaints and fever. Kulin Nations peoples to the immediate west also used the sap to treat burns (Cumpston 2020; De Angelis 2005).

**Onagraceae** (Figure 5L), another culturally important taxon, is present in the middle of the R31 sediment sequence (XU18–XU19, 16,500–14,300 cal BP) as single grains and clumps (clumping has been described as part of pollen germination among members of Onagraceae; see Nemeth and Smith-Huerta 1997). Onagraceae was not detected in the scat samples. Parts of Onagraceae plant are known to be edible and the taxon has medicinal purposes (Calvert 2016; Steckel et al. 2019).

**Fern spores** increase in frequency in the upper levels of the sediment sequences (from XU18 upwards in R31, post-14,300 cal BP; and throughout P35). Fern spores are also present in the scats. Aboriginal peoples of Victoria and Tasmania ate the soft, starchy pith of ferns, either raw or by roasting then grinding into a damper or porridge (Cumpston 2020; Nash 2004).

**Other taxa** with recorded cultural uses that are consistent elements (single grains) in sediments from the upper part of the R31 sequence include *Wahlenbergia* spp. (bluebell) (XU4–XU31 of R31, 4700–17,100 cal BP) with its edible flowers; and, *Dodonaea* spp. (hop-bush) (XU1–XU22 of R31, 2000–15,000 cal BP), of which the durable, tough wood is favoured for firewood, tools and weapons, while a poultice can be prepared to treat toothache, cuts and stings (reported among the Kulin Nations peoples in southern Victoria, Hastings Community College 2017) (Figure 4). Members of Sapindaceae (the family that includes the *Dodonaea* genus) are present in two scats collected from R31, but Campanulaceae (including the *Wahlenbergia* genus) were not identified in the scats.

**Table 1**. Published examples of GunaiKurnai uses of taxa native to East Gippsland and other parts of Victoria that were identified in the clumped pollen from Cloggs Cave. As pollen identification occurred at the family or genus level, the plant taxa listed here are indicative of potential ways these plants may have been used in Cloggs Cave in the past.

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| **Family** | **Taxon** | **Common Name** | **GunaiKurnai Name** | **Uses** | **References** |
| Asteraceae | Various species | Daisy |  | Various species widely used medicinally, such as repellent for mosquitos (leaf), treatments for liver disease (leaf), treatment of coughs, colds and skin irritations (leaf and stems). | De Angelis 2005; Gott 2008; Packer et al. 2012 |
| *Microseris* spp.  | Yam daisy |  | Important staple food to First Australians. Roots/tubers were dug with digging sticks then roasted or cooked in baskets in an earth oven and eaten. The tubers can also be eaten raw. | De Angelis 2005; Nash 2004 |
| Myrtaceae | *Eucalyptus* spp. | Gum |   | Hard, quality timber used for making canoes, coolamons, shields, weapons and tools. Leaves of some species used medicinally by people of the Kulin Nations (and others), to treat colds and chest complaints and to make aromatic steam baths. Red sap to treat burns and diarrhoea. The outer bark of some species was powdered and used as tinder for fire making, while inner bark used to make coarse string for bags and fishing nets. | Cumpston 2020; De Angelis 2005; Nash 2004 |
| *Leptospermum* spp. | Tea-tree |  | Leaves used medicinally as a treatment for scabies and to relieve respiratory conditions. | De Angelis 2005 |
| *Melaleuca* spp. | Paperbark |  | Paper-like, soft bark used as a cloth to wrap infants and as blankets, bandages and roofing. Timber used to make weapons and digging sticks. Leaves used as a mosquito repellent as well as medicinally to treat coughs, colds/flus, respiratory complaints, and to make infusions to relieve general aches and pains. | Cumpston 2020; Packer et al. 2012 |
| Onagraceae |  | Evening primrose |   | Plant parts are edible and are also used for medicinal purposes. | Calvert 2016; Steckel et al. 2019 |
| Plantaginaceae | *Plantago* spp. | Plantain, Fleawort |   | Seeds are mixed with water to make porridge. Leaves are medicinally, to treat insect bites, cuts and infections. The Noongar people of southwest Western Australia heated and crushed the leaves to produce a liquid used to make poultices for sprains, ulcers, and boils. | Hansen and Horsefall 2016; Low 1991 |
| Poaceae |  | Grass | *Ban*: grass*Toomban*: good grass |  Species of the Poa genus used to make string for nets and bags, baskets and mats. Species of the *Themeda* and *Rytidosperma* genera are harvested for seeds to make porridge or ground to make flour for bread or cakes. Species of the *Phragmites* genus have a number of uses including as food, tools and weapons. | Cumpston 2020; De Angelis 2005; Nash 2004Wesson 2001: 60 |
| Proteaceae | *Banksia* spp. | Banksia |   | Carry when travelling (Smyth 1878: viii).Small ones for starting fires (Smyth 1878: 132). Drink honey-like secretions (Smyth 1878: 213).Flowers are soaked to extract nectar and make a sweet nectar drink. Stamens were used to make fine paint brushes. The dry cones are used as strainers and fire carriers. | Cumpston 2020; De Angelis 2005 |
| Thymelaeaceae | *Pimelea* spp.  | Rice flower |   | Flower eaten, but green plant may poison.Fine fibre extracted from the outside of stems and bark to make very fine nets and strings. These were used to catch Bogong Moths.Medicinal use, especially acupressure. | De Angelis 2005; Gott 2008: 222; Nash 2004 |

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