



Ethics in archaeobotany: identifying current issues and initiating a declaration of principles

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Abstract

This article presents the first systematic assessment of ethical concerns specific to archaeobotanical research, focusing on principles and values. Conducted by an international group of archaeobotanists, the study used an anonymous online survey to document experiences and perceptions within the archaeobotanical community with the aim of raising awareness, identifying prevalent good practices and noting points for improvement. The questionnaire included ten thematic blocks and 63 main questions that covered regulations and guidelines, archaeobotany in excavations, funding, credit and authorship, intellectual property and right to access material, engagement with local communities, research obstacles, misconduct, ecological footprint, and dissemination of research results. We received responses from 114 participants, and the results highlight key challenges, including limited systematic recovery and study of plant remains, scarce funding, unclear decision-making authority, recurrent research misconduct, insufficient benefits for local communities, and low visibility of archaeobotanical research in dissemination and outreach. Building on these findings, we propose a declaration of principles tailored to archaeobotany, outlining the collective commitments of our community. This framework emphasizes safeguarding archaeological plant remains, ethical and rigorous research practices, and equitable participation. By adhering to these principles, archaeobotanists can promote scientific knowledge whilst fostering inclusivity, transparency, and respect for all individuals and communities involved or affected by our research. In this way, the initiative aims to strengthen archaeobotany as a discipline and cultivate a more ethical, inclusive, and collaborative research culture for both current and future generations of archaeobotanists.

Keywords Ethics · Archaeobotany · Regulations · Misconduct · Publication · Survey · Declaration of principles

Introduction

Ethics, as a branch of philosophy, concerns the principles that govern human behaviour and, in professional settings, the duties and obligations that regulate conduct within a discipline. In archaeology, ethical debates have broadened over recent decades from practical issues such as excavation procedures, conservation, and the trade in antiquities to wider questions about repatriation, the treatment and display of human remains and sacred objects, the balance between excavation and preservation, and the political uses

of archaeological narratives, including their mobilisation in nationalist or colonial projects (Golson 1987; Scarre and Scarre 2006; Watkins 2015; Pollock 2016; González-Ruibal 2018).

Similar reflections have emerged across several areas of environmental archaeology. Recent work in human bioarchaeology, isotopic analysis, experimental studies of animal resources, and aDNA has underscored the need for explicit ethical frameworks and shared principles (Alpaslan-Roodenberg et al. 2021; Squires et al. 2022; Stantis et al. 2025; Steele et al. 2025). In archaeobotany, however,

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explicit engagement with ethics has remained limited and has largely focused on methodological practice. An early attempt to identify shared concerns was Miller's questionnaire on archaeobotanical methodology (Miller 2011), which revealed widespread unease about communication and standardisation, especially in quantification and presentation of plant evidence. More recently, discussions have centred on data sharing and reuse, highlighting issues of transparency, attribution and responsible data management (Lodwick 2019; Kerfant et al. 2023; Roushannafas et al. 2024). Together, these contributions show that archaeobotany, like other subfields, must confront its ethical responsibilities both in everyday practice and at the level of guiding principles.

This work emerged from ongoing conversations among archaeobotanists at different career stages, which highlighted the fact that unethical behaviours, spanning both methodological challenges and lapses in professional conduct, can affect researchers at all levels and often remain unspoken or unresolved. To address these shared concerns, an open call was launched via the Archaeobotany mailing list, inviting colleagues to form a working group to design a questionnaire on "Ethics in Archaeobotany". The call brought together a diverse and highly engaged team of 18 researchers from around the world, all committed to advancing ethical reflection in the field.

The main objectives of the "Ethics in Archaeobotany" initiative were twofold:

1. To document the types and frequency of ethical and unethical issues encountered in archaeobotanical research, both in terms of ethical principles (the values and responsibilities that guide our work) and ethical practice (the everyday decisions through which these values are enacted).
2. To raise awareness of these issues and stimulate dialogue toward the eventual development of ethical principles and best practice frameworks for archaeobotany.

In this paper, we report the results of the first questionnaire dedicated specifically to ethical principles in archaeobotany. The questionnaire comprised 63 questions organised into ten thematic blocks (Fig. 1), with an additional section dedicated to recording participant profiles (Block 0). We summarize the main findings, discuss their implications, and propose a 14-point declaration of principles. We hope this framework will help establish shared standards for responsible practice, reinforce the professional standing of archaeobotanists, and promote more equitable and respectful collaboration with local communities.

Materials and methods

The survey questions were developed collaboratively by the participants of the Ethics in Archaeobotany initiative (see the full questionnaire in SI 1). The questionnaire was approved by the Ethics Committee of the University of the Basque Country, Spain, and was implemented using Google Forms. It was launched on 2 December 2024 and respondents were asked to answer based on their primary study region and their experience over the previous decade (2014–2024). To preserve anonymity, participants were advised to log out of their Google accounts before completing the form.

Participation was voluntary, with no compensation provided. Respondents were informed that they could withdraw at any point without explanation and that all data would remain confidential and anonymised. The information sheet outlined participants' data rights, including rights of access, correction, and deletion.

The questionnaire was distributed through the Archaeobotany (archaeobotany@jiscmail.ac.uk), Association for Environmental Archaeology (env-arch@jiscmail.ac.uk), and Wood and Anthracology (wood-charcoal@jiscmail.ac.uk) listservs, to members of the Archaeobotany Interest Group hosted by the Society for American Archaeology, and to other researchers outside these institutions through direct emailing. It remained open for two months, closing on 31 January 2025. Preliminary results were presented at the 20th Conference of the International Work Group for Palaeoethnobotany, held in Groningen from the 21st to the 25th of July 2025, followed by a 30-min discussion to gather community feedback and suggestions for addressing the issues identified.

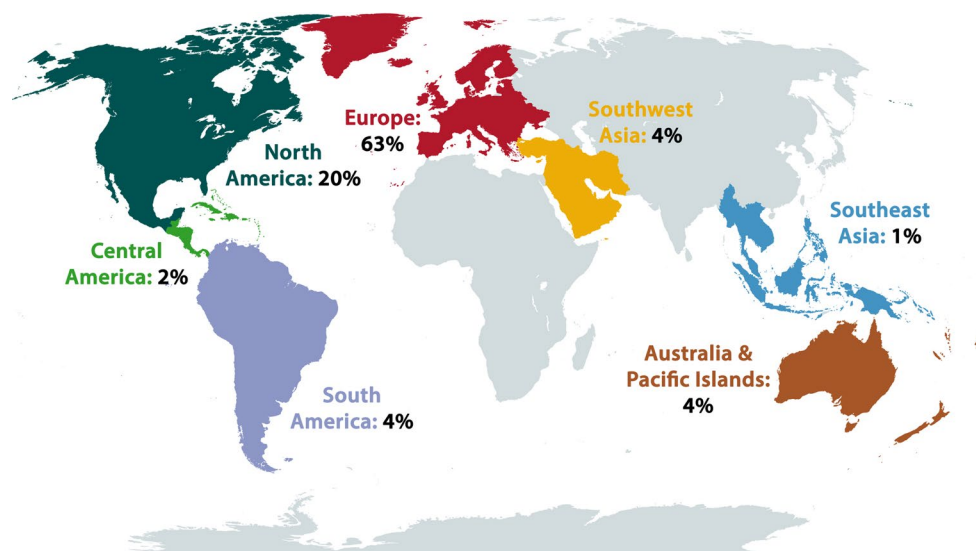
Results

A total of 114 archaeobotanists completed the survey (see SI 2 for a detailed breakdown of the results by question). Because questions were optional, response numbers vary



Fig. 1 Overview of the main thematic areas covered in the ethics in archaeobotany survey

Fig. 2 Geographic distribution of survey respondents, showing the world regions where participants were based. Percentages indicate the proportion of respondents associated with each region



across sections, with slightly fewer responses to sensitive topics.

Participant profile

Block 0 focused on the demographics and professional backgrounds of the questionnaire participants. While respondents were distributed globally and reported working with material from all continents except Antarctica, approximately 63% were based in Europe, and 48% primarily worked with European material. Other regions with notable representation included North America (20%) and Southwest Asia (4%) (Fig. 2).

Participants predominantly worked with seeds/fruits (>70%) and wood/charcoal (>57%). In terms of career stage, respondents were equally distributed among students, PhD holders in non-established positions, PhD holders in established positions and active established academics and researchers. Regarding experience, approximately 35% had up to 10 years of professional experience, 40% had between 10 and 20 years, and 25% had more than 20 years. 70% of participants identified as female, and 71% were employed in academic institutions.

Governmental and/or institutional regulations and guidelines

Block 1 concerned governmental and/or institutional regulations and guidelines covering field and laboratory practices, export and storage, and whether they are implemented following regulations or self-imposed policies. While nearly 60% of the respondents worked with some kind of regulations or guidelines, regulations often were not enforced or controlled. Only a minority of the respondents (17%) considered the regulations that apply to them to be appropriate

and sufficient. Topics that were relatively rarely covered by regulations include the sampling strategy, investigated contexts, mode of preservation, and budgets.

Archaeobotany on archaeological excavations

Block 2 concerned how archaeobotany was perceived and practiced on excavations. Respondents reported highly uneven integration of archaeobotany in archaeological projects. Whether archaeobotany was included often depended on project leadership, funding, and region. Plant macroremains and pollen were the most widely recognised lines of evidence, while tubers, phytoliths, starch, diatoms and amorphous charred objects remained less familiar to archaeologists. Many archaeobotanists felt that their work was undervalued or poorly understood, affecting sampling strategies and overall data quality.

Funding

Block 3 focused on the ease of obtaining funding, source(s), adequacy of funding, requirements and whether funding bodies exerted pressure to alter results. Overwhelmingly participants found attracting funding was difficult, regardless of career stage (70%). Although there may be some variation in responses across career stages, the results of the statistical analysis suggest that perceptions of funding difficulty do not vary significantly across career stages within the sample (see SI 2). National funding schemes are pivotal for the support of archaeobotanical research at all career stages.

Recognised researchers (a PhD holder in a temporary position: post-doc, short-term lecturer, etc.), in particular, often found funding levels were insufficient. Just over half of respondents (57%) indicated that their funding had

requirements (e.g. publication/ open access/ conference). A few participants suggested that the scope of their research was tailored to the funding body's criteria or research theme.

The vast majority (82%) felt their funding body did not exert pressure to change or alter their results. However, some indicated pressure was applied in terms of how they conducted their work (i.e. number of samples collected or analysed, 12%).

Credit and authorship

Block 4 examined rules and practices of authorship in archaeobotany. Responses indicate a divided approach to guidelines: 75% of the respondents reported being aware of authorship guidelines (e.g. Vancouver rules and journal-specific guidelines), although many noted their knowledge was limited. Nevertheless, only 38% of the responding researchers reported following authorship rules, 38% did not, and the remainder applied them occasionally.

Questions about uncredited contributors made clear that unpaid students, volunteers, local collaborators and professional excavators are most frequently denied authorship or left out of acknowledgments, with reported frequencies ranging from 41 to 85%. People in senior roles such as site directors, postdoctoral researchers, and professors were rarely uncredited. In terms of contributions, persons responsible for early work stages – sampling, sample processing, and preparation for radiocarbon and isotope analysis – were most often left uncredited, whereas persons responsible for laboratory analysis and interpretation were more consistently recognised.

When asked which contributions should warrant authorship, responses suggest that tasks such as funding acquisition, excavation, plant identification support, sample processing and recovery are generally not considered sufficient for authorship, whereas authorship is primarily linked to research design, initial stratigraphic and chronological framing, laboratory analyses, results description and data interpretation. Other contributions may warrant acknowledgment or co-authorship depending on their extent and intellectual input.

In practice, authorship was most frequently based on the type (82%) and quantity (77%) of work, but also on seniority (41%) and on the main author's judgment (37%). Perceptions of fairness were mixed. While many considered their own co-authorship rules transparent and fair, 54% reported including undeserving authors ("gift authorship"), and 17% acknowledged excluding deserving contributors ("ghost authorship"). Gift authorship was most frequently associated with high-ranking project coordinators and directors. In contrast, ghost authorship was most often reported for technicians, students, and local collaborators.

Intellectual property, material rights and publications

Block 5 dealt with decision-making and data management in archaeobotanical research. Seven questions explored who holds authority over different aspects of research (including the material, intellectual property, and publication) and the degree of adherence to the FAIR principles (Wilkinson et al. 2016). Results show a clear gap between who respondents identify as legitimate decision-makers and those who exercise decision-making power in practice. For sample curation, most respondents (62%) felt local institutions should lead, yet archaeobotanists usually decide (43%). Similarly, although 77% of the respondents believed that archaeobotanists should determine analytical approaches, project (44%) and site directors (24%) often influence these choices. Comparable mismatches appeared in decisions about material access, sharing, and publication, where project directors frequently were perceived to dominate the decision process.

Archaeobotanists typically owned research results (68%), but almost half reported that intellectual property restrictions hindered access to materials or delay publication. While most archaeobotanists (74%) controlled when and how to publish, only half indicated that their reports are "commonly" or "always" publicly available. Adherence to FAIR principles, promoted since 2016, remained limited: just 33% reported that raw data were consistently curated accordingly.

Working with local communities

Block 6 focused on engagement with local communities (in the questionnaire defined as minorities, indigenous, or underprivileged communities) and ethics. While most archaeobotanists acknowledged their importance, only 35% included these aspects systematically, and 33% did so 'sometimes', as implementation could be related to the archaeobotanists' role in project design. There was a strong commitment to capacity building: 41% engaged actively and 35% occasionally with local stakeholders through presentations (82%), training students and researchers (74%), and workshops or internships in local institutions (69%). Sample repatriation remained uncommon, as nearly a third of respondents for whom this issue was relevant reported that it is not considered (21% out of 69% concerned), raising concerns about the lack of acknowledgement of archaeobotanical and cultural heritage. Only 33% reported a formal ethics approval process for ethnoarchaeological or ethnobotanical research in their workplace. Although they recognised the importance of ethics, there is no standardised approach to integrating ethical considerations, despite official frameworks (e.g. *Nagoya protocol*, a supplementary

agreement to the Convention on Biological Diversity, <https://www.cbd.int/abs/about>). Overall, archaeobotanists sought to involve local communities, either before projects begin or during the dissemination of results. Communities often have been informed in advance about project aims (37%) or how results would be used and shared (36%), and some projects have allowed them to consent or decline participation (32%).

Research obstacles

Block 7 addressed research obstacles in archaeobotany. The vast majority of archaeobotanists who participated in the survey had experienced or observed unethical behaviours, with exception of only 4 out of 102.

More than a quarter of archaeobotanists (27%) had been denied access to samples due to a conflict of interest (e.g. denied access to material or information, as well as undefined other conflicts of interest) and around 40% had heard about this happening. Only 15% had never heard of it. Most people had not had any issues with exporting samples or this question is not relevant to them (over 77%). For the 10% that had problems, a variety of causes were cited.

Unprofessional practices had been observed by a high number of participants (>95%). This especially concerned archaeobotanical sampling carried out by non-experts and not acknowledging local institutions, researchers or other people involved in the archaeobotanical studies in publications.

Behavioural misconduct

Block 8 explored behavioural misconduct including harmful behaviours such as bullying, gaslighting, exclusion and isolation, career sabotage, sexual harassment and physical and/or psychological threats. Of the 112 total responses, 76% – 3 out of 4 – reported that they or someone close to them had encountered at least one type of behavioural misconduct. Gender was statistically not associated with reported misconduct, whereas career stage was, with senior researchers reporting more cases (see SI 2). The most commonly encountered forms of misconduct are bullying, gaslighting, isolation from team members and career sabotage.

Nearly 60% of participants reported that their workplace has a clear, effective mechanism for reporting behavioural misconduct. However, half of the participants who reported behavioural misconduct at their workplace then experienced repercussions for reporting, such as retaliation. In addition, 40% of participants responded that the culprits received no punishment at all for their behavioural misconduct.

A substantial percentage of archaeobotanists have experienced mental health issues due to misconduct in academia.

78% of participants reported experiencing issues themselves or knowing someone close to them who experienced these issues as a result of behavioural misconduct.

Ecological footprint

Block 9 focused on the ecological footprint of archaeobotanists. The majority of the researchers (40% up to ca. 70%) considered their ecological footprint in most of the work-related situations, such as transportation, work meals, laboratory work and especially fieldwork. A smaller number of participants (ca. 40% in the case of work meals and 10–19% for the other situations evaluated) never take these issues into account, while 20–43% of the participants considered their ecological footprint at least sometimes.

Dissemination and outreach

Block 10 dealt with dissemination and outreach. Most respondents (92%) took an active role in designing, leading, or joining outreach activities, suggesting a strong level of engagement. Only a small group (about 8%) reported no involvement at all. Women appear more frequently among those leading initiatives, which reflects their higher presence in the sample. Senior and established researchers were more likely to organise or plan such activities, while early-career scholars tend to participate rather than lead. Publications and public talks were the most common forms of dissemination (both 20%), followed by science events and school collaborations. Participation in school outreach rises with seniority, perhaps because of greater experience. Public lectures and social media were generally viewed as the most effective ways to reach broader audiences, yet confidence in science communication remained limited. Half of the respondents believed archaeobotany is underrepresented in museums. 40% of respondents felt that outreach toward people with disabilities is insufficient, and that local communities are only occasionally involved. In the open comments, participants voiced concerns about gender imbalance, job insecurity and uneven ethical standards.

Discussion

The survey responses revealed a wide range of key ethical challenges that affect archaeobotanical practice at multiple levels. In this section we outline possible ways forward, drawing on respondents' suggestions, our collective reflections, and feedback received during the IWGP 2025 Conference in Groningen. These insights form the foundation for the declaration of principles presented at the end of the paper.

Representativeness of the survey

The survey provided a useful, though inevitably partial, picture of the archaeobotanical community. A total of 114 respondents participated, representing a range of career stages, specialisms, and experience levels. However, geographic representation was uneven. Europe and North America were disproportionately represented, reflecting both the distribution of the archaeobotany mailing lists used and broader structural imbalances in the field. As a result, perspectives from regions with fewer institutional resources or where English is not the primary language may be under-represented. The sample also shows a gender imbalance, with ~70% female respondents. Although not supported by exact numbers, the gender balance of the respondents is considered to roughly mirror the gender balance of scholars in the field of archaeobotany, where female researchers have historically been well represented, and is consistent with broader patterns of higher female participation in online surveys (Porter and Umbach 2006; Smith 2008). To improve inclusivity and ensure broader global participation in future surveys, the Ethics in Archaeobotany initiative plans to develop a worldwide directory of archaeobotanists. Such a resource would help to identify the size and distribution of the community and facilitate more equitable engagement.

Regulations and guidelines

Regulations and guidelines are essential for ensuring minimum standards in archaeobotanical work, yet the survey showed clear room for improvement in their development, enforcement, and visibility worldwide. In many regions, the existence of effective regulations depended on having a critical mass of specialists able to advocate for them. Strengthening local initiatives and engaging in dialogue with archaeologists could support this process.

To facilitate improvement, it is useful to compile existing regulations from different regions (see SI 3) and examine how they have been developed and adapted over time. Where regulations exist, consistent implementation and appropriate training for both archaeobotanists and archaeologists are crucial. Studies evaluating regulatory effectiveness (e.g. Bazelmans et al. 2005; Lauwerier and Brinkkemper 2012) will provide valuable models for future refinement.

Archaeobotany in archaeological excavations

The survey revealed that many archaeobotanists felt their work is not consistently and sufficiently valued within archaeological projects. This perception echoes the broader phenomenon of cultural “plant blindness” (Wandersee and Schussler 1999), in which plants, both past and present, are

overlooked compared with other forms of evidence. While not strictly an ethical problem, this dynamic affects how archaeobotanical sampling strategies are prioritised, how resources are allocated, and how fully the potential of botanical evidence is integrated into archaeological interpretation.

To overcome this, archaeobotanists should take active roles in communicating the value of their work to project directors, field archaeologists, and locally hired staff. This includes demonstrating the implications of poor sampling, emphasising the importance of systematic recovery methods, and showing how botanical data can illuminate broader research questions. At the same time, archaeologists, project leaders, and site directors also have a responsibility to recognise the importance of archaeobotanical evidence and create the conditions for its systematic recovery and study. Collective efforts, such as required education for university students, on-site training sessions, explanatory materials for excavation teams, or project-level protocols, could help mitigate these persistent gaps.

Funding

The survey showed that securing funding remains challenging for archaeobotanists at all career stages. While supranational programmes (e.g. European Research Council, former US National Science Foundation) offer important opportunities, national schemes remain pivotal, especially for early-career researchers. Respondents noted that funders rarely interfere with the reporting of archaeobotanical data but commonly require dissemination through publications or conference presentations.

Funding considerations should be incorporated early in project design or grant application development. Many archaeobotanical activities (e.g. fieldwork, post-excavation processing, sample sorting, data analysis), are supported by students, research assistants, and volunteers, whose contributions should be acknowledged in any subsequent publication. Support mechanisms such as mentoring or grant-writing workshops can help less-experienced researchers to obtain funding. Examples include university-based programmes (e.g. Cornell University, USA, 2025; University of Oxford, UK, 2025) and initiatives specifically aimed at women (e.g. Danewise, Denmark, 2025; Viamento, Kiel University, Germany, 2025).

Credit and authorship

Problems arising from unclear inconsistencies in authorship and acknowledgement practices remain a significant concern in science and also in archaeobotany. The survey indicates that students, volunteers, technicians, and local collaborators often go uncredited, and are not even mentioned in the

acknowledgements, despite their essential roles in tasks like sampling and processing. In contrast, senior researchers and those involved in analysis and writing are rarely omitted from authorship, reflecting hierarchical biases in how credit is assigned. These patterns highlight both ethical and intellectual dimensions of credit, shaping whose labour becomes visible and whose expertise is recognised in what ways within the discipline.

While respondents largely agree that authorship should be based on design, analysis, interpretation, and writing – clearly distinguishing these from contributions more often acknowledged – the high incidence of reported ghost and gift authorship underlines a lack of transparent criteria and underlying power imbalances. Although initiatives such as the CRediT taxonomy help specify individual contributions, they do not ensure that authorship guidelines are consistently applied in practice, and the reasons for this warrant further investigation.

Intellectual property, material rights and publications

The survey highlighted persistent gaps between ideal and actual practices. While archaeobotanists generally agree that they should have agency in deciding analytical strategies, access to materials, and publication of results, in many projects these decisions are influenced or controlled by site or project directors. These dynamics reflect broader power structures within archaeology, which continue to operate under hierarchical models despite increasing interdisciplinarity in archaeology.

Addressing these challenges requires clearly defined rights and responsibilities at multiple levels. Institutions (e.g. museums, heritage authorities and universities) should provide transparent frameworks to ensure long-term and safe curation and accessibility, while respecting repatriation or other sovereignty concerns when relevant. Site and project directors should recognise the expertise of archaeobotanists and their professional rights regarding analytical strategies, data management, and publication. In turn, archaeobotanists must adhere to agreed-upon protocols, maintain open communication with directors and institutions, and ensure that results are made publicly accessible. The low adherence to FAIR principles identified in the survey underscores the need for broader implementation of existing recommendations (Allen and Hartland 2018; Lodwick 2019) in order to improve transparency, reproducibility, and long-term scientific value of archaeobotanical datasets.

Working with local communities

Engagement with local communities is increasingly recognised as a core element of ethical archaeobotany, though implementation needs attention more often. Because archaeobotanists often participate as specialists within larger teams, they may have limited influence on project design or community involvement. Even so, they share responsibility for promoting inclusive practices and countering the perception, still evident in some responses, that community engagement lies outside archaeobotany.

Local participation can take many forms, including participatory reference collections, training activities, or co-authored publications. While capacity-building is common, it is often of short-term character. Integrating training, knowledge transfer, and long-term collaboration into project design would support more equitable partnerships and strengthen local scientific autonomy.

Repatriation practices expose deeper structural imbalances. Over half of the respondents reported that repatriation is rarely considered, reflecting logistical constraints as well as enduring colonial legacies. Whether returning materials to institutions abroad or within the country of origin, repatriation should be understood as an ethical responsibility that maintains access to archaeobotanical heritage and supports shared research agendas (Roehrenbeck 2010). Ethics approval for ethnoarchaeological and ethnobotanical work also remains inconsistent, underscoring the need for clearer, standardised procedures and greater emphasis on reciprocity and benefit-sharing (Messenger 1999; Cohan 2003, 2004).

Research obstacles

Respondents identified several practical challenges affecting ethical archaeobotanical practice. One frequent issue was the execution of sampling and analyses by non-experts, often without proper training or supervision. Such practices risk compromising data quality and can limit the interpretive potential of archaeobotanical studies. Another concern was the insufficient acknowledgement of local institutions, collaborators, and individuals contributing to archaeobotanical work. Such issues highlight the need to integrate archaeobotanists fully into research teams, ensuring their involvement in planning, sampling design, processing, analysis, publication, and curation. Specific protocols or guidelines also may help researchers recognise unethical situations and promote more consistent professional practice.

Behavioural misconduct

The high prevalence of behavioural misconduct indicates that mistreatment, discrimination, and hostility are not isolated incidents but systemic issues within archaeobotany. Despite reporting procedures in many workplaces, respondents noted that these mechanisms often fail to deter perpetrators or provide transparency and resolution. While reporting can sometimes lead to positive outcomes, policies are frequently ineffective, and a lack of transparency in investigative processes leaves victims unaware of whether any action has been taken. Strengthening reporting and solution pathways is essential to ensure that victims are protected and not penalised for coming forward.

The impact of misconduct is severe: over 75% of participants reported that they or someone close to them experienced mental health issues as a result. The overall high percentage of participants who have experienced some form of misconduct aligns well with previous surveys of archaeologists and field researchers where female respondents have reported nonphysical harassment at rates between 66 and 78% (Clancy et al. 2014; Meyers et al. 2015; Jalbert 2019; see also Voss 2021). This highlights the need for stronger institutional support, including emotional assistance and guidance throughout the reporting process (Hoekstra and Talsma 2021). These findings thus call for greater awareness, stronger institutional accountability, and more effective confidential mechanisms to prevent, address, and respond to behavioural misconduct.

Ecological footprint

Concerning sustainability, the questionnaire showed that archaeobotanists are aware of climate issues, and that our community would benefit from an open discussion on questions such as sustainable options in laboratory and field work, alternative formats for large conferences (cf. Ewijk and Hoekman 2021), collaboration with relevant stakeholders or even how to enable participation in policy-making institutions. We cannot forget that archaeobotanical studies, and the extensive corpus of data they provide on past environment, plant use and subsistence, constitute a key archive for understanding human–environment interactions over the long term. Such knowledge is essential not only for interpreting the past but also for informing more sustainable and resilient futures.

Dissemination and outreach

The results indicated that outreach in archaeobotany is widespread but unevenly distributed across career stages. Senior researchers tend to lead initiatives, while PhD students and

early-career scholars often play secondary roles – likely because outreach offers limited professional benefit and is more feasible for those in secure positions. Supporting younger researchers in leading outreach could foster innovation and continuity.

Lectures and social media remain the most common dissemination tools, yet respondents identify a need to strengthen communication skills and collaborate with science communicators. Many also note that archaeobotany is underrepresented in museums and public spaces. Institutional policies could help integrate archaeobotanical content into exhibitions and encourage engagement with local communities.

Other ethical concerns and the importance of collective action

Respondents also raised broader ethical issues, including gender imbalance, inadequate mentoring, limited institutional support for early-career researchers, insufficient integration of Traditional Ecological Knowledge, gaps in plant curation protocols, and data hoarding (see SI 2). Codes of conduct for workplaces, excavations, and conferences (e.g. La Draga; Oikos 2025) and practical measures such as childcare support at conferences can help reduce barriers to participation, and offer useful models for promoting safer and more equitable environments.

Overall, we consider that a common solution to many of the issues raised is to establish clear expectations at the outset of a project. Written agreements – such as Memoranda of Understanding (MOUs) – covering funding, authorship, intellectual property, data sharing, curation, publication, and outreach can help clarify responsibilities and minimise misunderstandings as projects develop. However, negotiating such agreements individually can be difficult, especially where power imbalances exist. Developing shared, community-supported MOU templates may therefore offer a constructive way forward: they would help articulate shared expectations, support fair working conditions, and strengthen the position of specialists within project teams. Acting collectively rather than individually may ultimately promote more consistent professional practice and provide a clearer, unified voice within archaeological projects.

Conclusions

This paper presents the results of the first survey dedicated to ethics in archaeobotany. A second survey is foreseen to address methodological topics such as sampling, flotation, resource use, and equity in training. The present results depict an active yet unevenly supported community,

committed to rigorous research and responsible plant-remains management, but facing ongoing challenges in decision-making authority, access to materials, publication and data practices, and professional recognition. Some issues lie outside archaeobotanists' control, others fall partly within it, and some are clearly matters of our own professional responsibility.

In response, we propose a declaration of principles centred on the practices archaeobotanists can shape and the decisions for which we are accountable. These shared values aim to safeguard archaeological plant remains, promote ethical and transparent research, and support equitable participation. As standards will evolve, the principles should be periodically revisited and updated. By engaging with them, archaeobotanists can help advance scientific knowledge while fostering inclusivity, transparency, and respect for all individuals and communities involved. Clear guidelines and regulations will be essential to translate these principles into practice and ensure minimum standards for ethical archaeobotanical research.

Declaration of principles

- 1) *Heritage and recovery.* Plant remains, both macroremains (e.g. seeds/fruits, wood, tubers and amorphous charred objects) and microremains (e.g. pollen, phytoliths and starch) are an integral part of our shared heritage. Plant macroremains and microremains should be treated with the same care and importance as any other archaeological finds, and efforts should be made to recover them whenever relevant at every archaeological site. Consideration of how to fund recovery, analysis, publication and dissemination of results should occur at the design stage of any research/commercial excavation.
- 2) *Professional expertise.* Archaeobotanical research, projects, and training should be designed and led by or carried out under the supervision of professionals with proven and specific expertise in the relevant subdisciplines of archaeobotany.
- 3) *Integration of archaeobotanical expertise.* When research addresses topics central to archaeobotany – including, but not limited to, past vegetation, plant use, agriculture, diet, domestication and subsistence – collaboration with qualified archaeobotanists is essential to ensure that methods and interpretations are informed by specialist expertise and are accurate, thorough, and well-founded.
- 4) *Archaeobotanists' rights.* Archaeobotanists should be provided with all the provenance information necessary for their analyses and must have the agency to make decisions essential for archaeobotanical research, based on their professional expertise. This applies whether they are working in paid or voluntary/unpaid roles within a project and should include an active role in analytical strategy, sample management, and the publication and dissemination of archaeobotanical results.
- 5) *Archaeobotanists' responsibilities.* Archaeobotanists should respect project and excavation agreements and permissions, acknowledge those responsible for excavations, and ensure that site directors and relevant stakeholders are informed of ongoing work as well as funding, publication and dissemination plans. Archaeobotanists must also commit to sharing the resulting data through appropriate publication and dissemination channels.
- 6) *Intellectual property.* Work carried out by archaeobotanists, including sampling, sample processing, identification, interpretation, publication, database creation, and dissemination, must be properly acknowledged in publications, media, project grants, excavation permits, and other outputs, with full recognition of the intellectual property of the specialist work as discussed in this paper.
- 7) *Scientific integrity.* Scientific advancement must outweigh personal, institutional, or national interests (without overriding ethical obligations or social responsibilities toward indigenous and local communities, including their rights to data sovereignty). Fair access to materials and results must be ensured, integrity in reporting upheld, and a collaborative research environment fostered in which archaeobotanists support the inclusion of other qualified specialists where appropriate.
- 8) *Curation and return of materials.* Archaeobotanical materials should be stored in institutions that ensure long-term, safe curation and facilitated access, and under conditions where plant remains are given appropriate scientific and heritage value. Repatriation to the relevant national or local authorities must be ensured to avoid extractive or colonial practices, provided that the receiving institutions can guarantee minimum conditions. All transfers must be fully documented, and the final location of the materials should be made publicly available.
- 9) *FAIR/CARE data and archiving.* Results of archaeobotanical analysis should be shared in line with the FAIR principles (Findable, Accessible, Interoperable, Reusable; Wilkinson et al. 2016) and CARE principles (Collective benefit, Authority to control, Responsibility, and Ethics for indigenous data governance; Carroll et al. 2020) to promote scientific progress and that all data, photographs, and documentation are archived securely

to ensure long-term accessibility. Funding for archiving of archaeobotanical data should be part of any project, both in research and development-led archaeology.

- 10) *Public engagement.* Every effort should be made to make archaeobotanical results accessible to all sectors of society, including people with disabilities, health conditions, or other impairments, and especially to local, descendant, and indigenous communities when samples are exported from their countries and/or territories of origin for analysis.
- 11) *Training and capacity building.* When possible, archaeobotanists should promote and secure funding for training opportunities and knowledge exchange and seek to build local expertise at the site location, particularly in geographical areas where archaeobotany is underrepresented.
- 12) *Ethical conduct.* Misconduct of any kind, including bullying, gaslighting, harassment, or other abusive behaviours related to gender, career stage, age, or background, will not be tolerated in any professional setting (including but not limited to international conferences of the International Workgroup for Paleoethnobotany). Alleged criminal offences should be referred to the relevant public authorities and non-criminal ones to designated mediators or appropriate institutional bodies.
- 13) *Sustainability, solidarity and peace.* The archaeobotany community is committed to economic, environmental and social sustainability and resilience. The community rejects all forms of violence and stands in solidarity with people and communities affected by armed conflicts and colonialism worldwide.
- 14) *Equity and inclusion.* The archaeobotany community is committed to equality and increased participation of underrepresented groups, including the LGBTQ+ communities, BIPOC communities, researchers from the Global South, and those facing disadvantage due to conflict, displacement, or other forms of marginalisation.

Overall, we hope this work contributes to strengthening our discipline and cultivating a more ethical, inclusive, and collaborative research culture, not only for us today, but also for the generations of archaeobotanists to come.

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Declarations

Competing interests We declare no competing interests.

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