Biological Recording Company

Fungus Recording and Verification Consultation Report

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British Mycological Society promoting fungal science

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NCEA Natural Capital and Ecosystem Assessment

Department for Environment Food & Rural Affairs

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Contents

1 Executive Summary

The following paragraphs summarise the key findings and recommendations from the two consultation components, followed by 7 key recommendations made by the principal author of this report.

Fungus Recorder Online Survey

The survey responses reflect a broad cross-section of the recording community and reveal a strong bias toward distinctive macrofungi, suggesting that prioritising these taxa would most effectively reduce verification backlogs. Records are submitted via diverse platforms, and there is a clear preference for expert verification over automated or AI-based approaches. While many respondents lack confidence in their expertise, around 60% expressed interest in training, indicating scope to expand verification capacity. There is also strong support for open data sharing, alongside a need for clearer guidance on licensing and data use.

British Mycological Society Consultation Workshop

Workshop discussions highlighted differing views among local groups, making consensus on verification challenging. However, there was clear agreement on the need for more consistent FRDBI submission standards and a defined verification protocol. A pragmatic, prioritised approach—focusing on factors such as species distinctiveness and record certainty—could help address the existing backlog. Given limited expert capacity, verification efforts should be targeted, alongside continued data sharing with appropriate safeguards for sensitive species.

Recommendation 1: ID Difficulty Codes

All checklisted UK species of fungi should be assigned a species ID difficulty code and these should be submitted to the Biological Records Centre as a Record Cleaner rule set.

Recommendation 2: Bulk Verification of Existing Records

A pragmatic approach should be taken to bulk verify existing FRDBI records, clearing a large proportion of the verification backlog and enabling verifiers to focus on new and contentious records.

Recommendation 3: Design a Species-focused Verification Protocol

A clear set of guidelines should be produced to outline how fungus records within the FRDBI should be assessed by human verifiers, based on factors such as species ID difficulty, recorder experience, supporting evidence and known distribution.

Recommendation 4: Set Up A Verifier Network

A network of local and national verifiers should be recruited and trained to assess incoming records and existing FRDBI records via FRDBI Verification Protocol 2.

Recommendation 5: Take A Holistic Approach To Verification

Verifiers should be provided with guidance on how to consider all the data within a record alongside external factors such as the likelihood of the record being correct and the potential impact of the record on our understanding of a species.

Recommendation 6: Implement An Open Data Policy

BMS should publish an open data policy outlining how fungal records submitted through the FRDBI can be accessed through the NBN Atlas, including guidance for recorders on choosing an appropriate licence for their records and photographs.

Recommendation 7: Looking To The Future

BMS should consider 'what comes next' and think about how FRDBI and other fungal datasets could be enhanced and used more widely.

2 Project aims and background

The Fungal Records Database of Britain and Ireland (FRDBI) is an Indicia-based recording platform designed by the British Mycological Society (BMS) to compile fungal species occurrence records from BMS recorders and Local Fungus Recording Groups. The FRDBI currently contains over 2,000,000 fungal records. Some historic data (~ 500,000 records) from a previous iteration of the FRDBI is not currently within the database and needs to be transferred from the older system to the current system. As of 30th March 2026, 1,084,244 records from the FRDBI are shared via the NBN Atlas, all of which are listed as not having verified identifications (British Mycological Society, 2022), with the lack of documented verification for the FRDBI records limiting their use.

The Biological Recording Company was contracted by the British Mycological Society (BMS) in September 2025 to consult with BMS members, local fungus groups and the wider recording community to determine how FRDBI records can be verified, and produce a draft verification protocol. This project consisted of the following four activities.

Fungi Recorder Online Survey: An online survey designed to gather feedback from fungi recorders regarding their fungi recording habits, experience of recording platforms, attitudes towards verification/data quality and motivations for recording. The aim of the survey is to gather quantitative data to inform the Draft BMS Verification Protocol.

BMS Consultation Workshop: A half-day workshop on verification to be conducted as part of the British Mycological Society (BMS) meeting at Kew Gardens on Sat 29th November 2025. The workshop was to be classroom-based and include a mixture of taught components and group activities, with the aim of gathering qualitative data to inform the BMS Verification Protocol and to gain insight into potential processes within the Draft BMS Verification Protocol.

Fungi Recording and Verification Consultation Report: A report summarising the information gathered through the Fungi Recorder Online Survey and the BMS Consultation Workshop, as well as any additional feedback provided by BMS with regards to the Draft BMS Verification Protocol.

Draft BMS Verification Protocol: A simple 2-page Draft BMS Verification Protocol, also including a summary of next steps and data flow diagram for the management of fungi biological records by BMS.

2.1 Verification versus validation

As a biological record flows from observation to dissemination, it goes through a number of processes within the biological recording data flow pathway (see Figure 1).

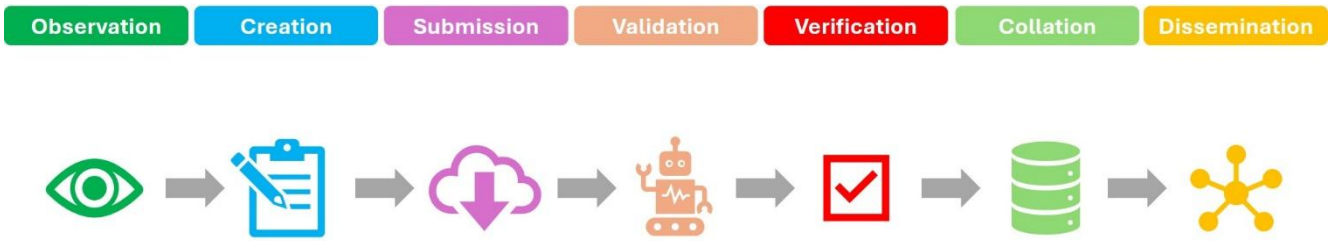

Figure 1: Biological recording data flow pathway.

The terms 'validation' and 'verification' are often used interchangeably, but in fact refer to distinct processes with the data flow pathway:

- **Validation** refers to checks that data within a biological record is in the correct standardised format (e.g. valid dates and grid references).
- **Verification** refers to assessments that data within a biological record is true (i.e., was the stated species at the stated location on the stated date?).

2.2 Verification and recorder roles

Verification roles for biological recording have traditionally been undertaken by people with specific expertise relating to the taxa within the record being assessed. However, as the number of records being received annually is consistently increasing, recording schemes/groups and recording platforms are looking to other verification methods (such as the use of AI and crowdsourcing) as an alternative to a reliance on specialists that are in short supply.

Below are descriptions of some roles within recording and verification. Different terms for these roles may be used across different organisations and groups, so this section sets out the terminology used within this report.

Recorder: The individual who observed the organism that is the subject of a record. This is often also the same person as the determiner, but may not be if they simply collected a specimen or took a photo but did not make the species determination.

Determiner: The individual who identified the organism.

Local Verifier: An individual responsible for performing verification checks on records for a taxonomic group entered within a specified local area, such as a vice county, county or area covered by a local natural history group. The individual would be expected to have a good level of experience within the taxonomic group they are covering, but may need to consult with a national verifier in some instances. These roles may also be referred to as County Recorders, Vice County Recorders or Area Organisers. Taxonomic groups covered may range to relatively specific groups (such as ladybirds) to broad groups (such as beetles). These roles may be associated with a local natural history group, a Local Environmental Record Centre or part of a network within a National Recording Scheme or Society.

National Verifiers: An individual responsible for performing verification checks on records for a taxonomic group across the UK. These individuals usually have specialist knowledge of the group that they are covering, and would be considered national authorities for their taxa. These roles may also be referred to as National Recorders, and are almost always associated with the National Recording Scheme or Society for the taxa that they are covering.

Verification Assistants: Individuals who assist Local or National Verifiers by tackling a subset of the records for a taxonomic group either locally or nationally. Verification Assistants are usually granted access to only the records of select distinctive species with a photograph, and reduce the need for local and national experts to review records that are relatively simple to verify. Verification Assistants need not be experts, but should have received sufficient training to be able to confidently and accurately verify records for the taxa they are assigned. Any contentious or complex records should be referred to the relevant Local or National Verifier. Butterfly Conservation has had proven success with verification assistants through the Supporting Science project (Biological Recording Company, 2023).

2.3 Verification statuses

When referring to verification statuses of biological records, this report uses the system used in iRecord, and indeed in other Indicia-based systems, due to the fact that the FRDBI is an Indicia-based system. This system consists of three broad verification statuses (known as verification status 1 terms) that can be broken down into six specific verification statuses (known as verification status 2 terms) (see Table 1 below).

Table 1: Indicia verification statuses

Verification status 1		Verification status 2	
Accepted		**Correct**	
		Considered correct	
Not accepted		**Unable to verify**	
		Incorrect	
Unconfirmed		**Plausible**	
		Not reviewed	

Explanation of terms for verification status 1:

- **Accepted**: The record is accepted as meeting the standard required for inclusion by the recording scheme or project in question
- **Not accepted**: The record is NOT accepted as meeting the standard required for inclusion
- **Unconfirmed**: The record is in the system but has either not been looked at, or a verification decision not yet been reached

Explanation of terms for verification status 2:

- **Correct**: The verifier is able to confirm that the species has been identified correctly, usually on the basis of photo/s within iRecord (or specimen/s outside iRecord)
- **Considered correct**: The verifier has not seen photo/s or specimen/s but has a high degree of confidence that the record is likely to be correct, based on difficulty of ID, date, location and recorder skills/experience etc.
- **Unable to verify**: The verifier has a high degree of confidence that the record is likely to be incorrect based on difficulty of ID, date, location and recorder skills/experience (and where no photo/s or specimen/s are available); or photos are available but do not show enough detail to confirm the identification; and/or the record is not sufficiently well documented to confirm (e.g. location is vague)
- **Incorrect**: The verifier is able to confirm that the species has not been identified correctly, or the record is erroneous in other respects, on the basis of photo/s or specimen/s, or on information from the recorder
- **Plausible**: The record is plausible based on species, date and location, but there is not enough supporting evidence for the possibility of misidentification to be ruled out, and the record remains within the "Unconfirmed" category
- **Not reviewed**: The record is in the system but has either not been looked at, or a verification decision not yet been reached (all records start off in this category)

2.4 Data Flow of Fungal Records Report

In September 2025, the **NECR650 Edition 1: Data Flows of UK Fungal Data Records**, commissioned by **Natural England** and produced by the **UK Centre for Ecology and Hydrology (UKCEH)**, was published (Amy, Henson, & Harvey, 2025). This report examined how fungal records are currently collected, verified, stored, and shared across the UK. The report's function was to clarify how fungal data flows between recorders, databases, and users to improve access, quality, and conservation outcomes.

Key findings included:

- **Complex Data Landscape:** Fungal data collection involves two national recording schemes (British Mycological Society – BMS, and Fungus Conservation Trust – FCT), local fungus groups, environmental records centres, and online platforms (e.g. iRecord, iNaturalist, Observation.org). This fragmented landscape causes **duplication, inconsistent verification**, and **restricted sharing**.
- **Identification of Major Data Sources:**
    - **BMS – Fungal Records Database of Britain and Ireland (FRDBI):** The largest dataset, but not fully open access nor verified.[1]
    - **FCT – CATE2 Database:** Contains substantial data, but recorder and geographic fields are restricted for public or cross-database use.[2]
    - **National Biodiversity Network (NBN) Atlas and GBIF:** Provide national and international data access but contain limited fungi records due to sharing restrictions.
    - **Local and Online Sources:** Local fungus groups and online citizen science platforms contribute valuable data but vary in quality and verification standards.
- **Verification Challenges:** Fungal identification is complex, requiring expert review. Current verification systems vary across databases, leading to uneven data quality and confidence levels.
- **Data Sharing Barriers:** Closed databases, inconsistent licensing, and differing standards limit access for conservation, Red List assessments, and ecological research.
- **Stakeholder Insights:** Surveys of recorders and database managers revealed concerns about data fragmentation, complexity of submission processes, and insufficient collaboration between recorders, data managers, and end users.

To improve fungal data management and conservation outcomes, the report recommends:

1. **Adopting FAIR Data Principles** – ensuring data is Findable, Accessible, Interoperable, and Reusable.
2. **Standardising Verification Protocols** – establishing shared quality assurance processes.
3. **Enhancing Accessibility** – expanding data sharing to national repositories such as NBN Atlas and GBIF.
4. **Improving Interoperability** – aligning taxonomies and metadata standards across systems.
5. **Encouraging Data Use in Conservation and Research** – supporting Red List assessments, land management, and ecological monitoring.
6. **Supporting Recorders** – through training, technical tools, and national coordination.

The full report can be found here:
https://publications.naturalengland.org.uk/publication/6376073955377152

[1] Over 1 million records are available via the NBN Atlas under a Creative Commons with Attribution Non-commercial 4.0 licence. (British Mycological Society, 2022)

[2] Since this report was published, the Fungus Conservation Trust has published the totality of records with the CATE database on the NBN Atlas, which is over 1.6 million records as of February 2026. The data has been generalised to 10km and is licensed under a Creative Commons with Attribution Non-commercial 4.0 licence. (Fungus Conservation Trust, 2026)

3 Fungus Recorder Online Survey

3.1 Survey respondents

The Fungus Recorder Online Survey was completed by a total of 183 respondents between 12th October 2025 and 29th January 2026. The first section of the survey gathered information about the respondents themselves, asking respondents to provide details about their affiliation with fungus recording organisations, their level of experience, their focuses and methodologies for recording and identifying fungi, and their preferred ways for submitting records.

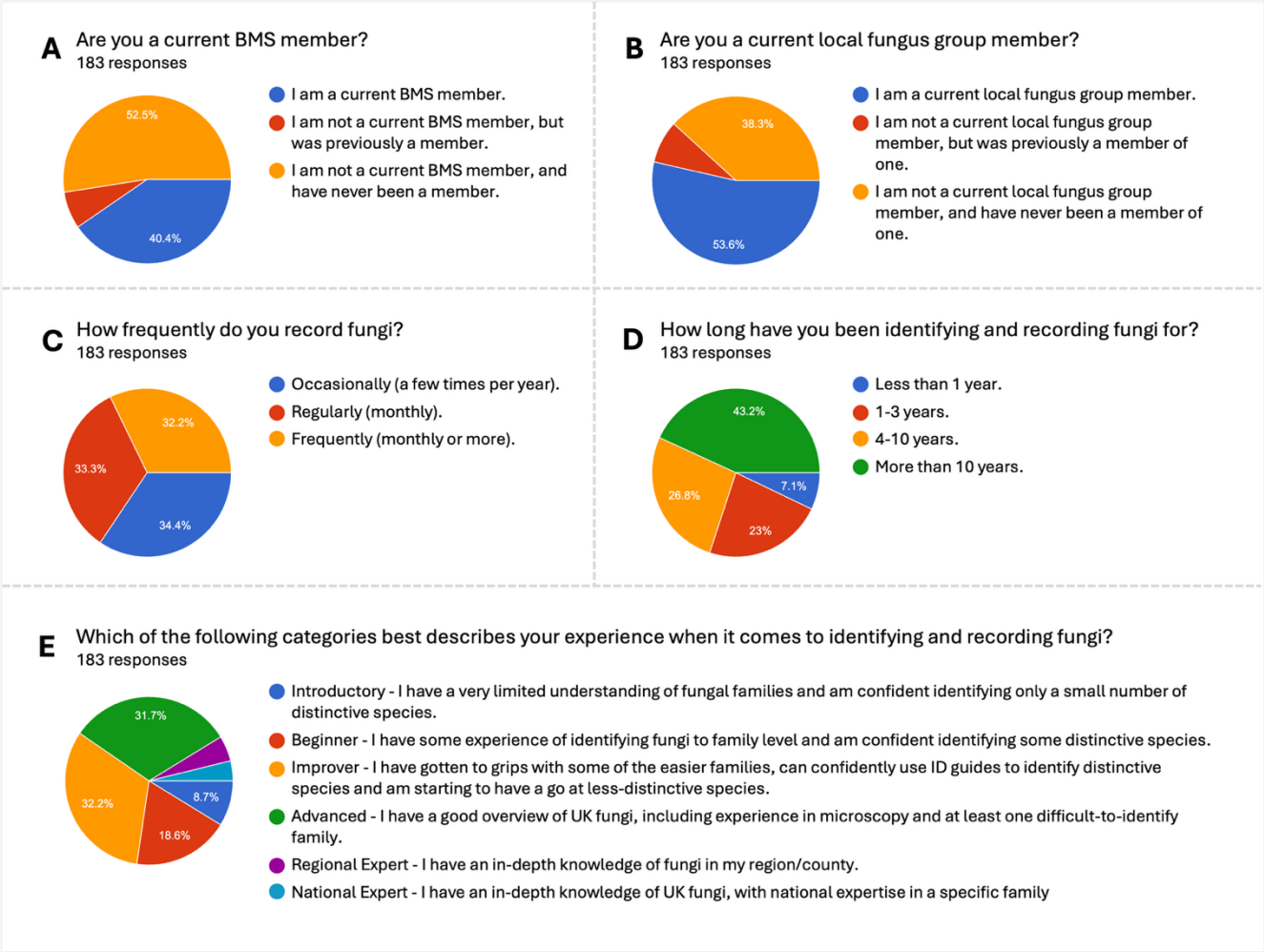

Figure 2: Responses to the first five questions of the survey. These questions gathered basic information about respondents, including their affiliation with fungus recording organisations, how frequently they record fungi, and their experience level.

Respondents were varied in terms of their organisational affiliation, recording effort, and experience level. For example, there was an approximately equal number of respondents affiliated and not affiliated with BMS (**Figure 2A)**. The same pattern was also observed for membership of local fungus groups (**Figure 2B**). In both cases, there was also a small proportion of respondents who had once been affiliated with each organisation but had since withdrawn their membership. Respondents were also varied in how frequently they recorded, with almost exactly a third of respondents recording fungi 'occasionally', 'regularly' and 'frequently' each (**Figure 2C**). In terms of how long respondents had been recording fungi for, the largest response group were those that had been recording for more than 10 years (43.2%), followed by 4-10 years (26.8%) (**Figure 2D**). Self-assessed experience level was also mixed, with all levels (introductory–national expert) being represented by at least 7 respondents. The largest categories of respondents were 'improver' (32.2%) and 'advanced' (31.7%) (**Figure 2E**).

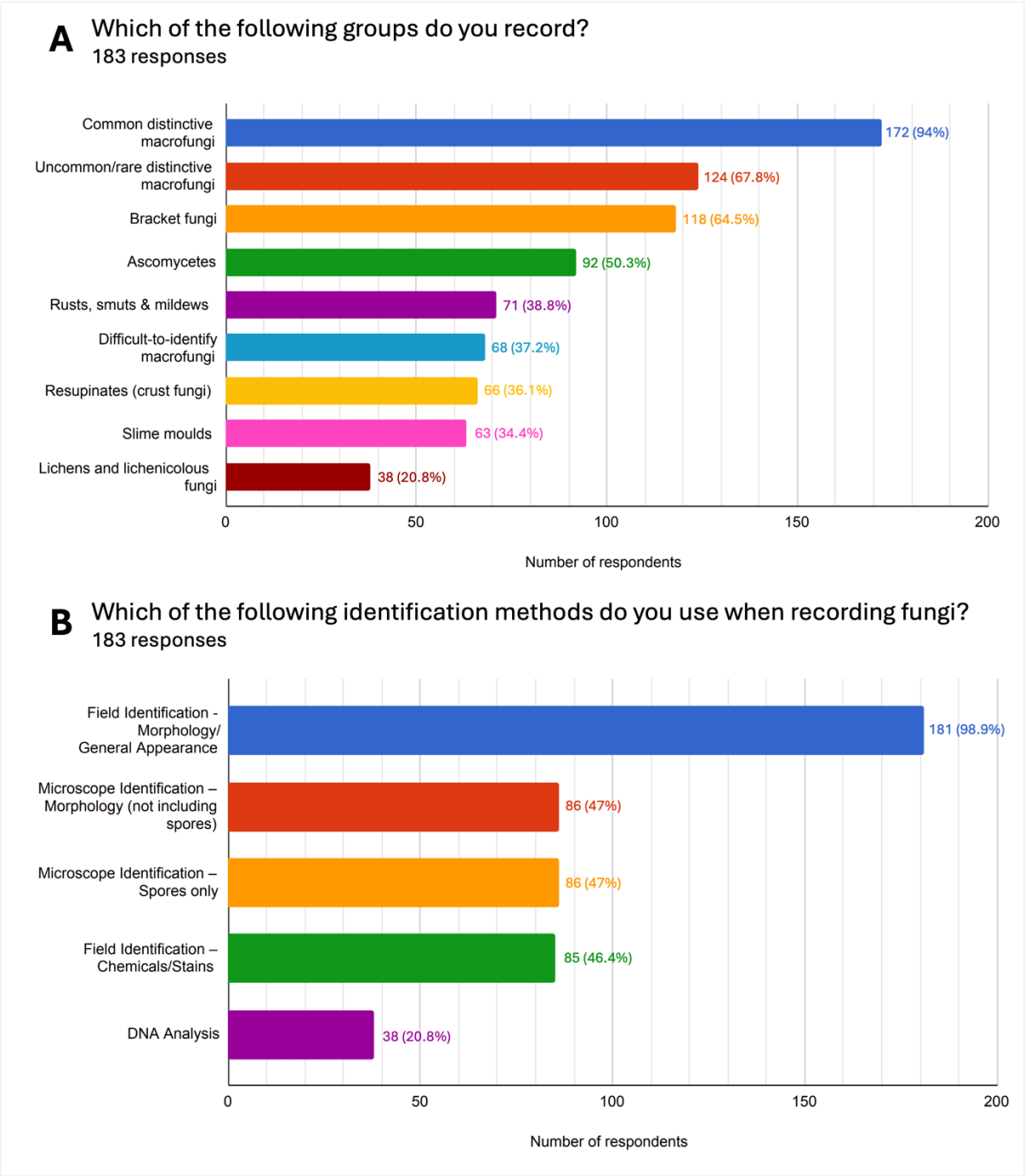

Figure 3: Responses to two questions asking about taxonomic preferences for recording and identification methods.

Respondents were also asked about which sub-groups of fungi they recorded and their identification methods. Responses indicated that all provided sub-groups of fungi were recorded by at least 38 of the 183 respondents (**Figure 3A**). However, the 'easier' sub-groups of fungi (e.g. distinctive macrofungi and bracket fungi) were, perhaps unsurprisingly, recorded by a higher number of respondents, whilst the more difficult sub-groups (e.g. resupinates and lichens) were recorded by fewer respondents. Species in these more difficult sub-groups tend to require advanced identification methods such as the use of chemicals and microscopy. As expected, fewer respondents reported using microscopy and chemical techniques than field identification techniques, and fewer still used DNA analysis (**Figure 3B**).

An additional open question in the survey asked respondents whether they had a particular specialism within fungi recording/identifying. Responses were very mixed, with about half of the respondents indicating some specialism and the remainder indicating no specialism. Some common specialisms including waxcaps and grassland fungi, DNA analysis, plant pathogens and some particular genera and families.

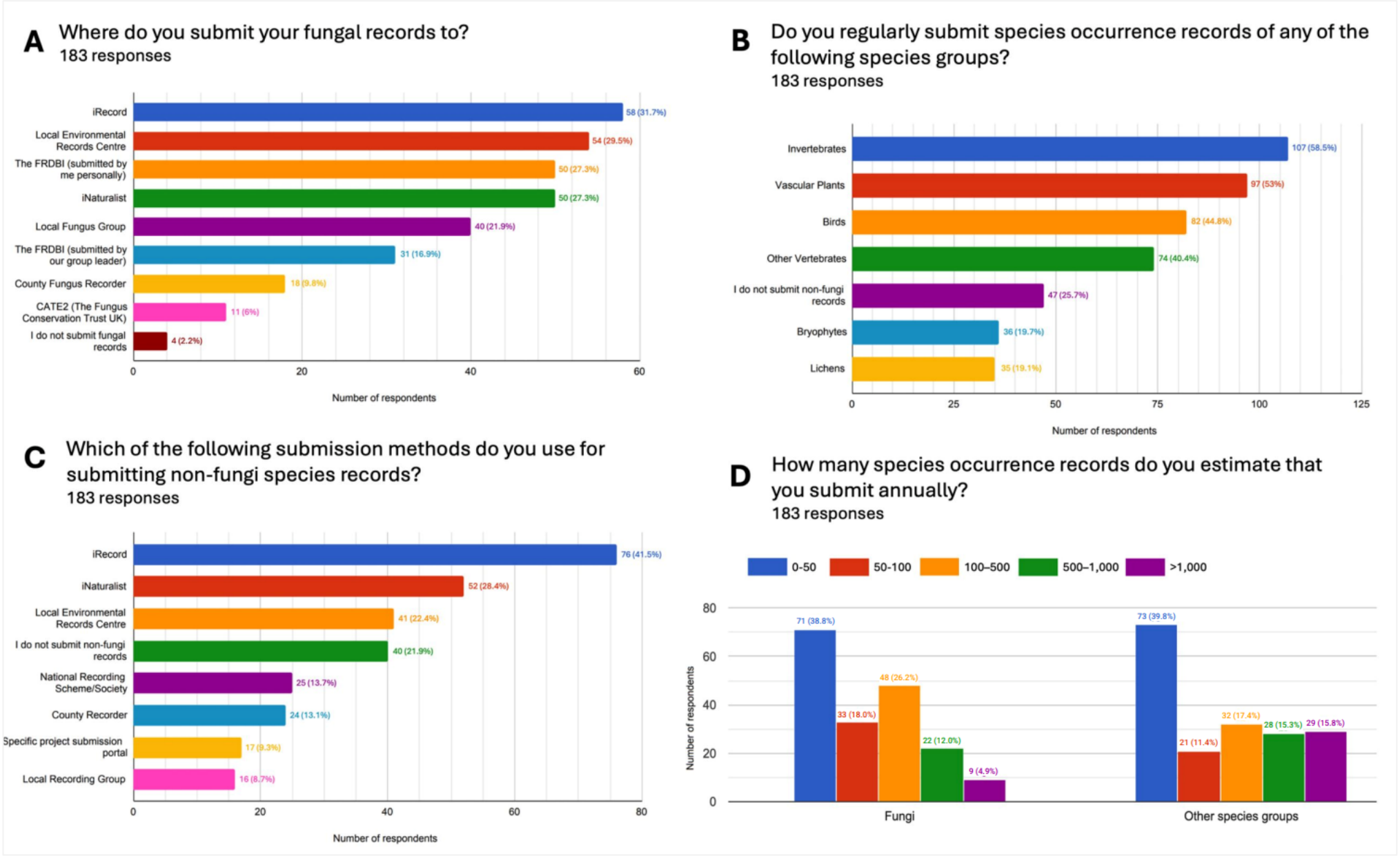

Figure 4: Responses to four questions asking respondents how they submit records of fungi and other taxonomic groups.

Respondents were also asked four questions focused on how they currently submit fungal records and records for other taxonomic groups. The first of these questions – asking where respondents currently submit their fungal records to – is particularly important, the results warranting particular attention. One first conclusion which may immediately be drawn from the responses to the question is that there is a **wide variety** of locations for fungi records to be submitted. The most popular recording destination was iRecord, but this was only favoured by 31.7% of respondents **(Figure 4A**). Three more routes (Local Environmental Record Centres, personal submission to the FRDBI, and iNaturalist) were each used by >25% of respondents. CATE2 (The Fungus Conservation Trust UK's data submission portal) was only used by 6% of respondents. Another observation is that many respondents are clearly using multiple platforms for data submission, and that some recorders (16.9%) may be reliant on others to submit their records (in the form of local fungus group leaders).

Respondents were also asked whether they recorded other species groups and, if so, which methods they used to submit these records. Around three-quarters of respondents indicated that they did record other species groups, with invertebrates (58.5%), vascular plants (53%) and birds (44.8%) being the most popular groups. Again, many respondents clearly recorded multiple species groups. A quarter of respondents only recorded fungi (**Figure 4B**). For submission of non-fungi species occurrence records, the most popular submission method was iRecord (41.5%) followed by iNaturalist (28.4%) and Local Environmental Record Centre (22.4%) (**Figure 4C**).

Finally, for this section, respondents were asked to estimate how many species occurrence records they submitted per year, both for fungi and, if relevant, other species groups. For fungi, the largest group of respondents submitted 0–50 records per year (38.8%) and the next largest group submitted 100–500 (26.2%) (**Figure 4D**). Only nine respondents (4.9%) indicated that they submitted >1,000 fungi records per year. A similar pattern was apparent for other species groups, with the modal response being 0–50 records per year (39.9%), and between 11.4% and 15.8% of respondents associated with the remaining four categories (**Figure 4D**).

3.2 Biological record data quality and verification

The next section of the survey asked respondents for their views on a selection of topics related to data quality and verification of fungus records.

The first question of this section was rather specific but nevertheless represents an important area of diverging opinion amongst stakeholders. Within the current version of the FRDBI, it is possible, when submitting a record or collection of records, to provide as one data field the name of an 'independent confirmer'. Where provided, this should represent the name of another person besides the recorder who independently reviewed the target specimen and reached the same conclusion as to its species identification. In most cases, such 'independent confirmation' occurs in the field based on two or more people independently reviewing a specimen in situ. This is common practice on fungal forays conducted by local fungus groups, for example. In some cases, independent confirmation may also involve review of collected material, including via microscopy.

For the survey, we asked participants whether they believed that records with a provided independent confirmer should be considered verified (or, alternatively, an additional round of verification should be required). The most popular response was 'It depends on the experience of the independent confirmer' (87 respondents; 47.5%) (**Figure 5**). The second most popular response was 'It depends on the difficulty or rarity of the species' (39 respondents; 21.3%). Only 18 of the 183 respondents (9.8%) answered that they thought all records with an independent confirmer listed should be considered verified. 14 respondents (7.7%) indicated that they thought all records should be reassessed.

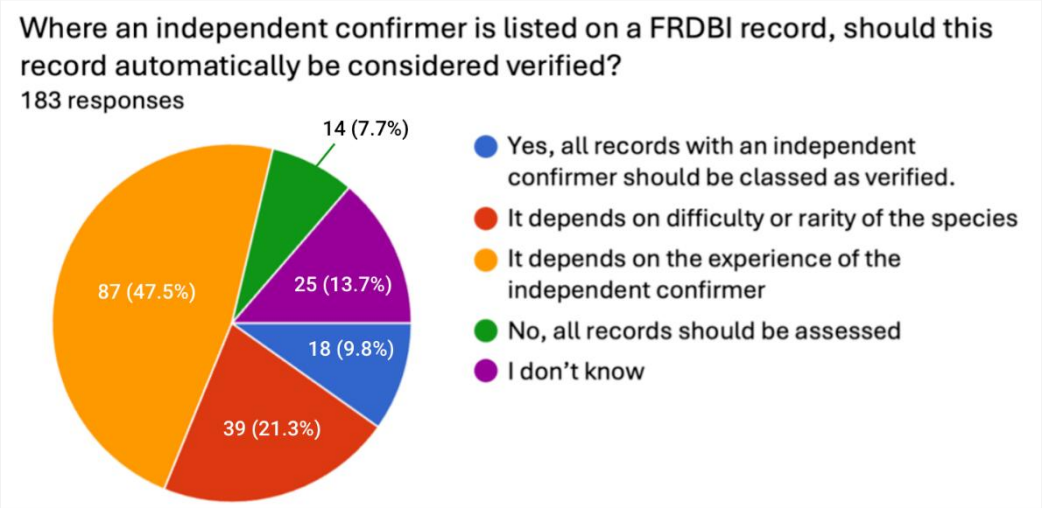

Figure 5: Responses to a question of the survey asking about independent confirmers within the FRDBI

The next question of the survey asked respondents to rate twelve data aspects in terms of their importance for contributing to forming a high-quality fungal species occurrence dataset. A scale from 'essential' to 'irrelevant' was provided. Responses were in many ways consistent with one another. For example, nearly all respondents indicated that a 'species-level identification' and 'date of record' were essential or important (**Figure 6**). Similarly, most respondents indicated they believed that 'recorder/identifier full names', 'high resolution location info', 'supporting evidence (e.g. photo, specimen, spore print, DNA)', 'substrate', 'habitat details', 'associations', 'recorder certainty' and 'identifier experience' were important. 'Morph' and 'abundance' were seen as less important, although still of some usefulness. 'Morph', 'abundance' and 'recorder/identifier full names' were the only data aspects to receive more than 3 votes for 'unimportant'.

Respondents were next asked to indicate how appropriate they believed various 'verification systems' were in terms of the verification of fungi records. The question was asked twice, once for distinctive fungi and again for non-distinctive fungi, with the same seven options available. In terms of distinctive fungi, the most popular verification approach was the use of verification assistants (73.8% of respondents deemed this appropriate) (**Figure 7A**) followed by specialist verifiers (62.3%) and automatic acceptance of records from local fungus groups (i.e. where specimens had been reviewed by multiple people before submission) (53.6%). In terms of non-distinctive fungi, the most popular verification approach by far was specialist verifiers (78.1%) followed by independent confirmers (54.1%) (**Figure 7B**). For both distinctive and non-distinctive fungi, the use of automated tools – automated rules and artificial intelligence image recognition algorithms – received low approval. Artificial intelligence was notably unpopular for non-distinctive fungi (only 7.7% approval).

Finally, for this section, respondents were asked (a) whether they would be interested in being trained to assist with the verification of fungi records and (b) whether they believed they already had the experience and identification skills to undertake verification. In terms of the former question (interest in becoming an assistant verifier), 30.6% of respondents indicated 'yes', i.e. they would be interested, and 29.5% indicated 'maybe' (**Figure 8A**). In terms of the latter question, the majority of respondents (57.4%), perhaps unsurprisingly, indicated they did not believe they had the required experience (**Figure 8B**). 24.7% of respondents, however, indicated they would be interested in conducting verification on either the FRDBI, iRecord, or both platforms.18% indicated they had the appropriate experience but would not be interested in doing verification.

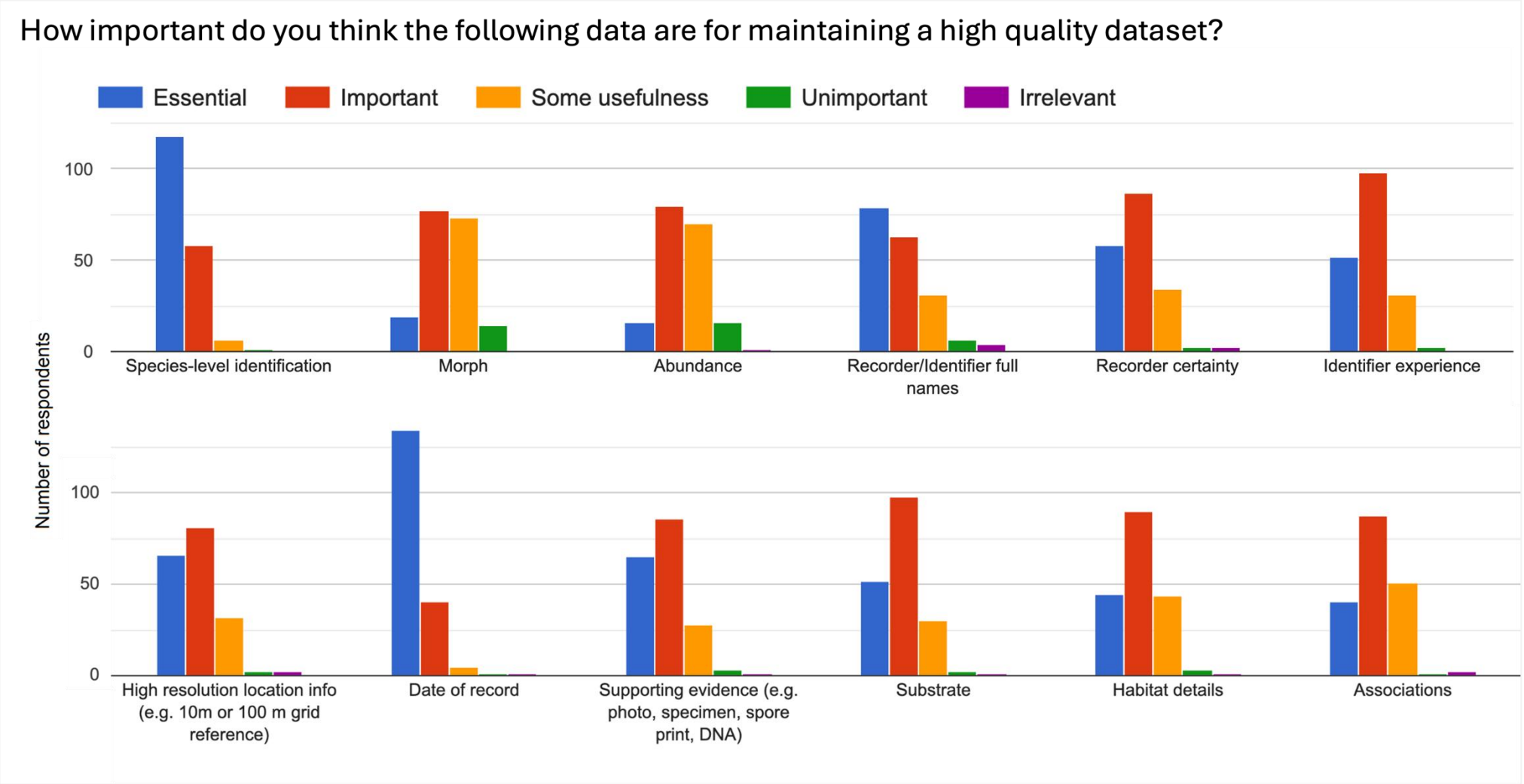

Figure 6: Responses to a question asking respondents to indicate how important they thought twelve different data fields were as part of a high quality fungus record dataset. Respondents were able to choose from five categories (essential, important, some usefulness, unimportant, irrelevant).

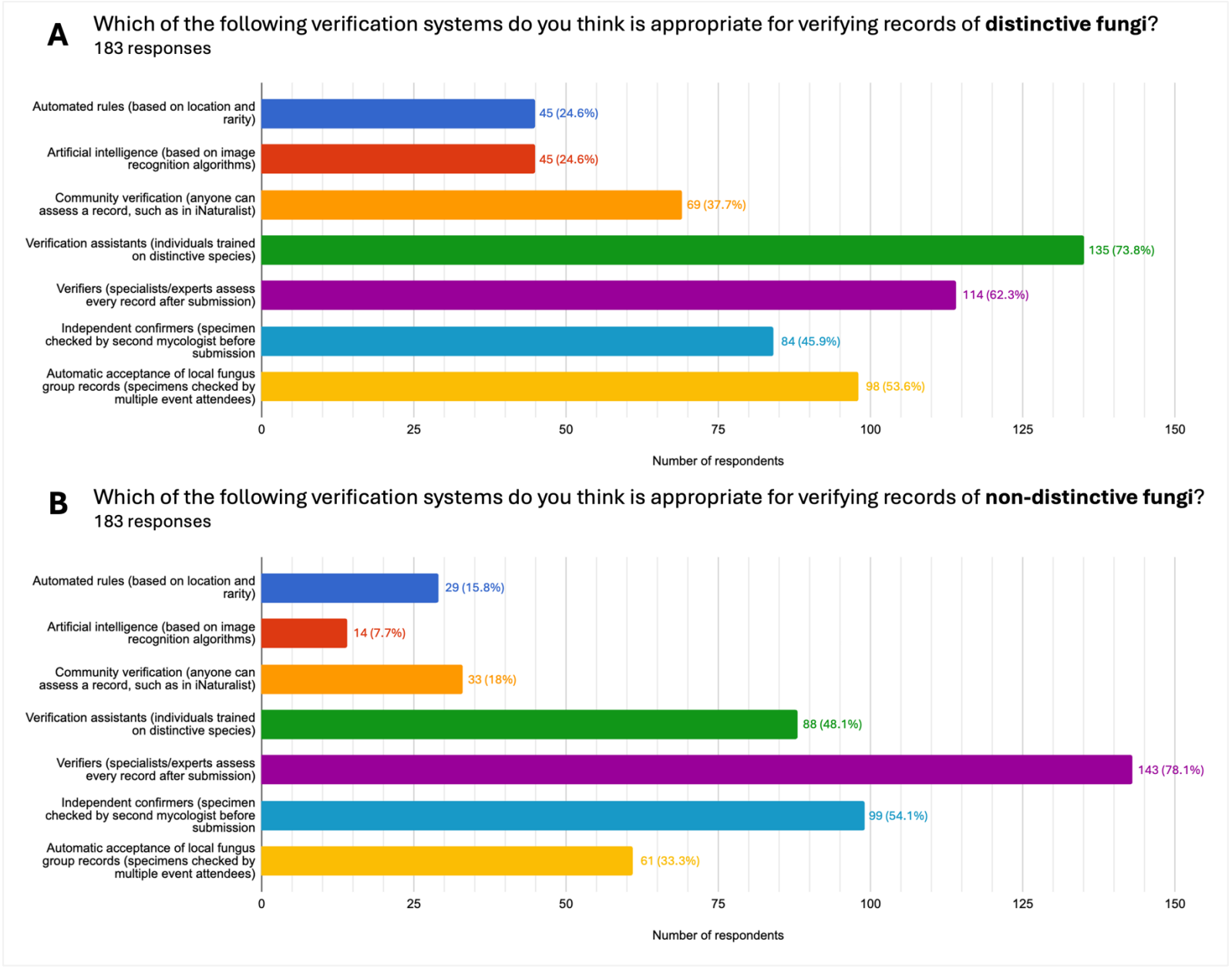

Figure 7: Responses to two questions asking respondents which verification systems they thought were appropriate for identifying distinctive fungi (A) and non-distinctive fungi (B)

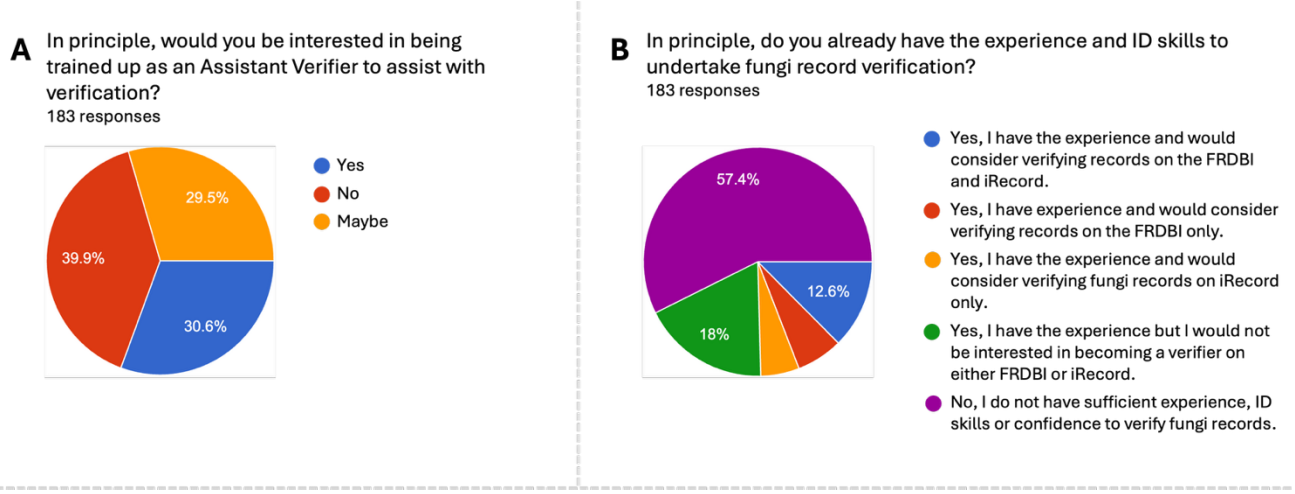

Figure 8: Responses to two questions asking respondents whether they would be interested in (A) being trained up to assist with fungi verification, or (B) leading on fungi verification using their current skillset.

3.3 Motivations for recording and data flow

The final section of the Fungus Recorder Online Survey asked respondents about their motivations for recording fungi and their thoughts on data flow.

The first question of this section was an open one: 'Why do you personally record fungi?'. Thematic coding of the 183 responses reveals distinct categories of motivations. One of the most popular categories was the motivation to record fungi to contribute to conservation. Specific aims mentioned by respondents in relation to this theme included protecting valuable habitats and sites, creating baseline data for monitoring changes, and providing data to influence policymaking, planning applications and land management decisions. Another popular motivation to record fungi was to contribute to scientific knowledge. Several respondents mentioned the desire to contribute to improving the understanding of fungi species distribution, abundance and taxonomy, for example. Finally, many respondents indicated that they record fungi primarily for personal interest and enjoyment. Several respondents specifically highlighted that the challenge of fungi identification kept them interested and motivated.

The next three questions asked respondents about their preferences for data flow of their personal fungal records. First, respondents were asked, 'how would you like the following organisations to be able to access your records?'. Nine different organisations/stakeholder groups who might potentially utilise fungal records were listed. For each, respondents were directed to choose what level of access they would prefer that organisation to have to their fungal records (from 'no access' to fully accessible 'via publicly accessible datasets'). For all but one of the organisations/stakeholder groups, respondents overwhelmingly preferred full open public access (≥108 respondents chose 'via publicly accessible datasets for these eight organisations) (**Figure 9A**). The exception to the rule was 'businesses', for which respondents were more split, with 84 believing access for these organisations should be 'by permission only whereas 64 believed these organisations should also have full access via publicly accessible databases. Next, respondents were asked which of a list of applications they would like to see their fungal records used for, with 11 options provided. Many of these options proved popular with the majority of respondents. The five most popular uses had >90% approval, and an additional three uses received >75% approval (**Figure 9C**). The only uses with <75% approval were 'conservation status assessments and reviews' (71%) and 'commercial applications' (29.5%). Finally, respondents were asked to identify which single-use was the most important to them – results for this question are shown in **Figure 9C.** Interestingly, 'conservation status assessments and reviews' was the third most popular selection, despite being 10th in the previous question.

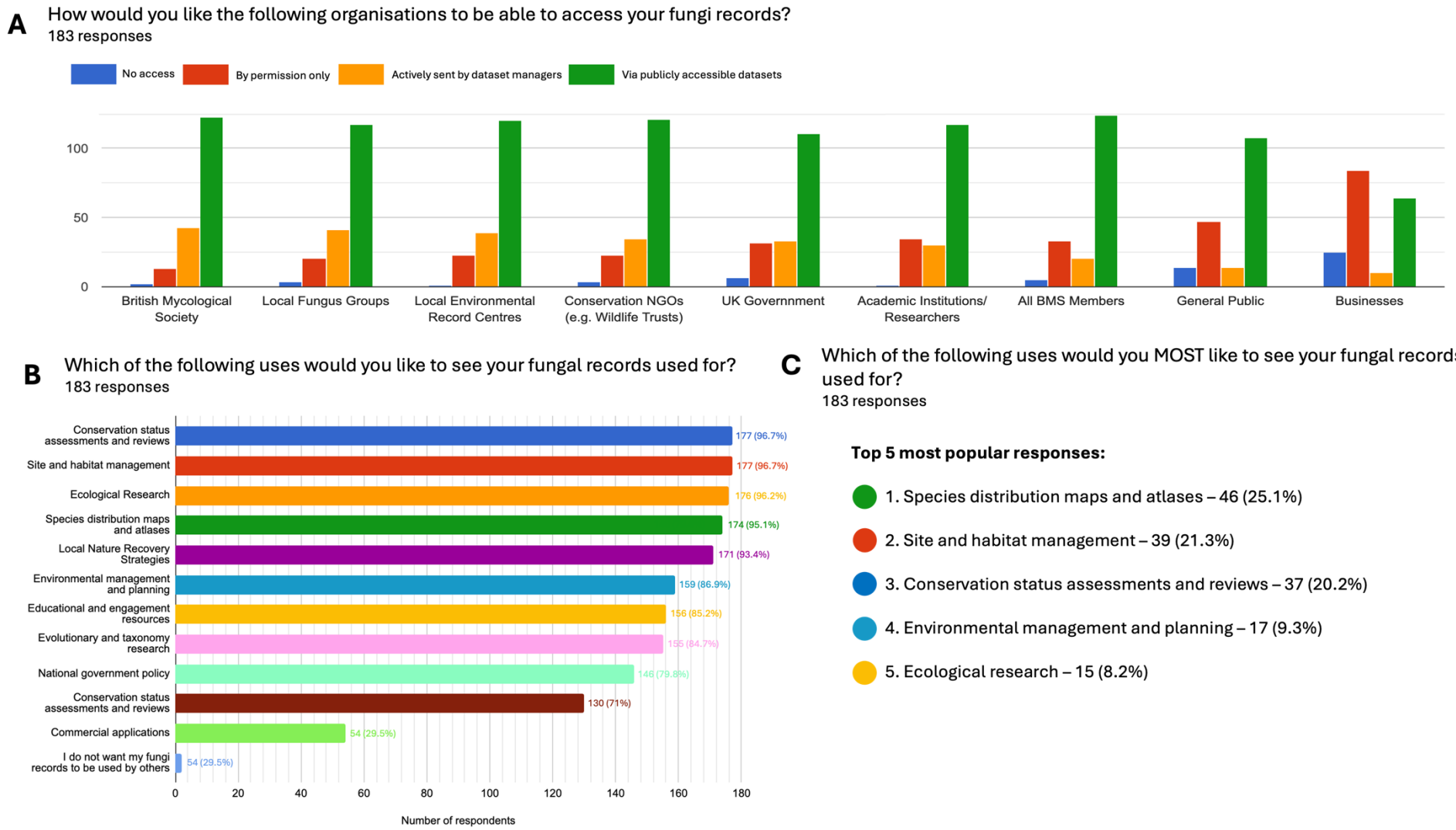

Figure 9: Responses to three questions at the end of the survey asking respondents about their preferred data flow for their fungal records.

The penultimate question of the survey was open, and asked respondents how they would you feel about their fungal records being made publicly available under an open Creative Commons licence. The NBN Atlas was given as a potential example of such data sharing. To summarise responses, the vast majority of respondents were supportive of and had no objections to their fungal records being made publicly available under an open Creative Commons license. Indeed, many respondents expressed a belief that open accessibility is essential and vital for fungi research and conservation. A few concerns were raised, however. The most common of these was the concern that open record sharing might lead to record misuse by commercial fungi foragers or collectors, leading to the destruction or depletion of sensitive or desirable species. Relatedly, several respondents suggested that the precise location of sensitive, rare, threatened, or commercially important species should be obscured, blurred, redacted, or made available only at a coarser resolution (e.g., 10km or 1km square) to prevent misuse by foragers or those with "ill intentions". Otherwise, a few respondents stressed that they wished to be credited by name for their records and that they wished to retain the rights to their photographs or images. Some respondents suggested that commercial users should have to pay for full data access, with the fees supporting the work of amateur recorders or data-collating organisations like local environmental record centres (LERCs) and national databases.

The final question of the survey was open – inviting general feedback or comments on fungus record verification and data flow in the UK. It is useful to highlight the key themes raised here, as several respondents left insightful and lengthy comments.

- **Verification and Verifiers:** A significant concern from many is the lack of verified records on iRecord and the need for more experts and verifiers to clear the backlog. Some feel verification is problematic without supporting data (e.g. field and microscopy photos), and a system to flag reliable recorders or use automated verification for common species was proposed to help.
- **Data Systems and Centralisation**: There is widespread frustration with the disparate recording systems for fungi, with many advocating for a single, centralised database (e.g. iRecord) for all records, making submission and access easier. Difficulties with FRDBI's user interface and difficulty in bulk uploading records were specifically mentioned.
- **Data Use and Impact**: Users want the data (especially from FRDBI) to be more impactful for site management and planning decisions and to increase the value of the overall dataset by including more records.
- **Recorder Engagement and Ease of Use**: Some respondents find fungal recording intimidating, forms too complicated, and are discouraged by the frequency of unverified records.
- **Sensitive Species and Commercial Use**: As with the previous question, concerns were raised about unsustainable commercial collection of fungi informed by public sharing of fungi records. Suggestions were again raised for adding sensitivity ratings or blurring records for vulnerable or rare species.

3.4 Key findings

- The survey received 183 responses and captured a **well-balanced range of recorder types**, suggesting the findings reflect perspectives from across the community rather than a narrow subset.
- There is a clear recording bias toward **more distinctive and easier-to-identify macrofungi**, such as bracket fungi, while more challenging groups (e.g., resupinates) are recorded less frequently, so actions focusing on the verification of distinctive fungi should have the biggest impact on reducing the verification backlog.
- Survey responses indicate that **fungal records are currently submitted through a wide range of platforms**, with no single dominant route.
- **Human expertise is strongly preferred** over automated systems, particularly for difficult taxa, and artificial intelligence–based identification received **very low approval**, especially for non-distinctive fungi.
- There is clear potential to expand verification capacity: **around 60% of respondents indicated they would either be interested or might be interested in training to assist with record verification,** although **a majority currently feel they lack the necessary experience.**
- Fungal recorders have a wide range of motivations for recording fungi, and there is **no single dominant priority for how they would like their data to be used**.
- There is **strong support for open data sharing** among respondents, but there is a need for education about licences and which uses may constitute commercial use of fungal data.

4 British Mycological Society Consultation Workshop

An in-person consultation workshop was held with BMS members during the BMS Autumn Meeting at Kew Gardens in London on 29th November 2025. The workshop was facilitated by Keiron Brown and attended by 17 individuals, including representatives from the BMS, a range of local fungus groups, the Biological Records Centre (part of the UK Centre for Ecology & Hydrology) and Natural England.

The aim of the workshop was to present initial findings from the Fungus Recorder Online Survey and gather the opinions of BMS members and local fungus group representatives on how BMS should proceed with regards to verifying and sharing FRDBI data. In addition to open discussion, attendees were provided with 'additional notes' sheets that they could complete and submit at the end of the workshop.

4.1 Discussion summary

Photographs: Many FRDBI records do not include photographs, and participants noted that relatively few fungal records could be reliably verified using standard field photographs alone due to the difficulty in identifying most species.

Distinctive Species and Verification Assistants: The concept of distinctive species was called into question by one local fungus group representative, as they felt that verification of fungi species determinations was unlikely to be possible for any species. For example, following rain, even the distinctive Fly Agaric can be confused with other species. This also led to concerns surrounding the use of Verification Assistants in the verification process. Another attendee suggested that all species on the checklist should be categorised according to their ID difficulty (i.e. easy field ID, presence of key field feature, microscope ID, DNA required, highly specialised confirmation required).

Specialist Verifiers: There was broad agreement that specialist verifiers are the most effective approach for verifying fungal records. However, there were concerns about the availability of those with the skills to take on these roles, potentially increasing pressure on already stretched volunteers. Reducing the reliance on specialist verifiers was therefore seen as a key priority, at least for dealing with the backlog of records.

Independent Confirmers: Local Fungus Groups noted that the use of the "Independent Confirmer" field varies between groups, and that guidance from BMS would be needed to ensure consistent data standards. It was suggested that records with an independent confirmer could potentially be treated as verified if certain criteria were met—for example, records of distinctive fungi with an independent confirmer, or records of non-distinctive fungi where the confirmer is considered a trusted fungi authority.

FRDBI: The FRDBI is widely regarded as a high-quality dataset because many records originate from local fungus group activities, and other recording systems may require a more rigorous verification protocol. It was agreed that bulk verification options could be considered for historic FRDBI data, and a more detailed verification protocol would need to be developed for new records.

Local Fungus Group Records: However, there was opposition to automatically verifying all local fungus group records, due to differences in expertise, recording practices, and verification approaches between groups (with some FRDBI users entering their personal records as group records). It was agreed that records from local fungus groups with a certainty of 'certain' recorded should be accepted as 'considered correct' and records with a certainty of 'uncertain' should be rejected as 'unable to verify'.

Urgency and Data Quality: A number of local fungus group representatives emphasised the need to do something rather than nothing, and stressed that they felt it was inevitable that the protocol would have flaws and data quality issues could be addressed in the future.

DNA: The inclusion of DNA analysis within FRDBI was discussed, and participants were informed of recent updates to Indicia that enable the FRDBI to better record DNA-relevant fields. It was agreed that verifying records with DNA analysis attached was a separate skill set and would require its own verification protocol.

Data licences: One local fungus group representative requested that BMS decide on a default licence for FRDBI records in consultation with BMS members, but that recorder preference be given through their FRDBI account settings.

Data sharing: There was a general consensus that BMS should be sharing FRDBI data for a range of uses, with one representative stressing the importance of the records undergoing some form of verification before the dataset is shared. Concerns were raised about sensitive species and the potential for foragers to use fungi species occurrence records to locate sites good for foraging. One attendee suggested that this long-held concern may be unfounded and that foragers may already have good knowledge of where such sites are located, and alternative methods of locating them.

4.2 Key findings

- **Reaching a clear consensus** from local fungus groups regarding fungal record verification **is unlikely**, as people have differing views about what is and isn't possible.
- **Greater clarity and consistency are needed** around FRDBI record submissions (such as what constitutes a group record and the use of Independent Confirmers) so that records across different local fungus groups are comparable.
- The FRDBI dataset is valued but requires a clear verification protocol, **including possible bulk verification approaches** for existing records and **more structured procedures** for future submissions.
- A **pragmatic approach to dealing with existing records** could be designed to significantly reduce the verification backlog, considering factors such as species distinctiveness, independent confirmation, certainty and if the record is a local group record or not.
- Local fungus groups and national experts are likely to have **limited availability** to contribute towards fungal record verification within the FRDBI so **verification protocols should prioritise where their input is needed most**.
- BMS should actively **share fungal data** while managing risks around sensitive species.

5 Draft BMS Verification Protocol

5.1 Recommendation 1: ID Difficulty Codes

All checklisted UK species of fungi should be assigned a species ID difficulty code and these should be submitted to the Biological records Centre as a Record Cleaner rule set.

A previous set of ID difficulty codes for Basidiomycetes were produced based on comments by Kew staff writing Species Fungorum and Checklist of British and Irish Basidiomycetes. These codes focus on those species which lack good evidence of being British or are often misidentified (see Table 2 below).

Table 2: Previous British Mycological Society ID difficulty codes for UK fungi.

Code	Description
1	One of the preferred species names
2	Requires microscopic verification in most situations
3	Rarely recorded. Please check full details, including microscopy if needed and consult colleagues.
4	Nomen dubium. See www.basidiochecklist.info for details
5	Caution: not authentically from the British Isles. Please confer with colleagues and preserve specimen.
6	ID difficulty rule not yet available for this species

It is recommended that these codes and their assignments be reviewed and extended to cover all groups of fungi in advance of implementing a verification protocol. Categories should be defined according to ID difficulty, rather than rarity, and should include clear descriptions that provide guidance for verifiers. Table 3 (below) provides a draft set of ID difficulty codes and descriptions based on Record Cleaner rule sets from recording schemes for other taxonomic groups.

Table 3: New system of ID difficulty codes proposed by Keiron Brown.

Code	Description
1	**Distinctive species**: can be identified in the field with a bit of experience. Species which beginners can rapidly learn to identify. Usually identifiable from a photo. Records acceptable from most sources.
2	**Non-distinctive species**: can be identified in the field with care and experience. Requires examination of one or more key features in the field. May be identifiable from a good photo, though a dried specimen may be required. Records acceptable from competent recorders.
3	**Difficult species**: cannot be identified in the field based only on morphology. Requires microscopic examination and/or chemical tests. Not identifiable from field photos. All except very experienced recorders could be expected to provide a dried specimen.
4	**Cryptic species**: cannot be identified using morphology or chemical tests. Requires species confirmation through DNA analysis. All recorders are required to provide evidence of DNA analysis and may also be required to provide a dried specimen.
5	**Ultra-cryptic species**: cannot be identified using conventional methods due to taxonomic uncertainty or because new to the UK. Requires highly specialised confirmation by an expert. All recorders are required to provide evidence of DNA analysis and a dried specimen.
6	ID difficulty rule not yet available for this species

5.2 Recommendation 2: Bulk Verification of Existing Records

A pragmatic approach should be taken to bulk verify existing FRDBI records, clearing a large proportion of the verification backlog and enabling verifiers to focus on new and contentious records.

As a very first step, any remaining records from the original FRDBI database that have not been imported into the current iteration of the FRDBI should be imported as a matter of urgency.

Some FRDBI records have already been subjected to a form of verification in the form of Independent Confirmers or Local Fungus Group recording practices. This information can be used alongside recorder certainty, independent confirmer experience and species distinctiveness to accept records that meet the criteria for 'considered correct' and 'correct' verification statuses, as well as to reject some records through the 'unable to verify' verification status.

FRDBI Verification Protocol 1 (see Figure 2 below) is proposed as a system for dealing with all existing data to clear a large proportion of the verification backlog that exists. It is proposed that this process is carried out automatically by dataset managers, rather than on a record-by-record basis by verifiers or verification assistants.

Data not accepted or rejected through this protocol will remain 'not reviewed' and should be subjected to FRDBI Verification Protocol 2.

Implementing FRDBI Verification Protocol 1 requires the following :

- Categorisation of all UK fungi species into 'distinctive' and 'non-distinctive' species.
- Assessment of which Independent Confirmers listed on records can be considered a 'trusted authority'.
- The ability to filter records by custom FRDBI fields, namely the 'Independent Confirmer' and 'Group ID' fields.

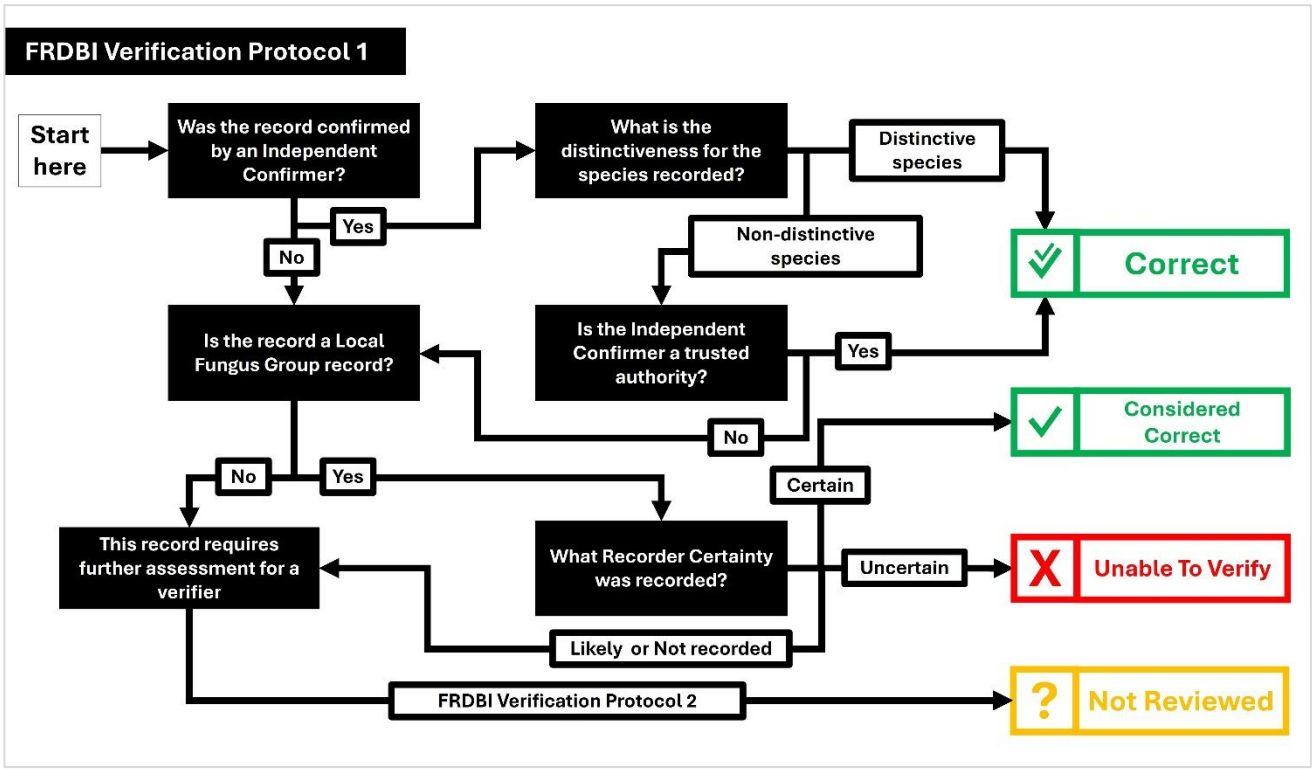

Figure 10: FRDBI Verification Protocol 1, proposed by Keiron Brown.

5.3 Recommendation 3: Design a Species-focused Verification Protocol

A clear set of guidelines should be produced to outline how fungus records within the FRDBI should be assessed by human verifiers, based on factors such as species ID difficulty, recorder experience, supporting evidence and known distribution.

Individual records should be assessed using FRDBI Verification Protocol 2. This protocol will involve verifiers using the evidence provided within a fungus occurrence record submission, species ID difficulty categories, and their knowledge of fungi to determine which verification status is most appropriate to apply or which questions are appropriate to ask the recorder in order to reach a verification decision.

Verifier Step 1: Determine what the evidence threshold is for any given species record using the species ID difficulty categories applied to individual species (see recommendation 1 and Figure 11 below).

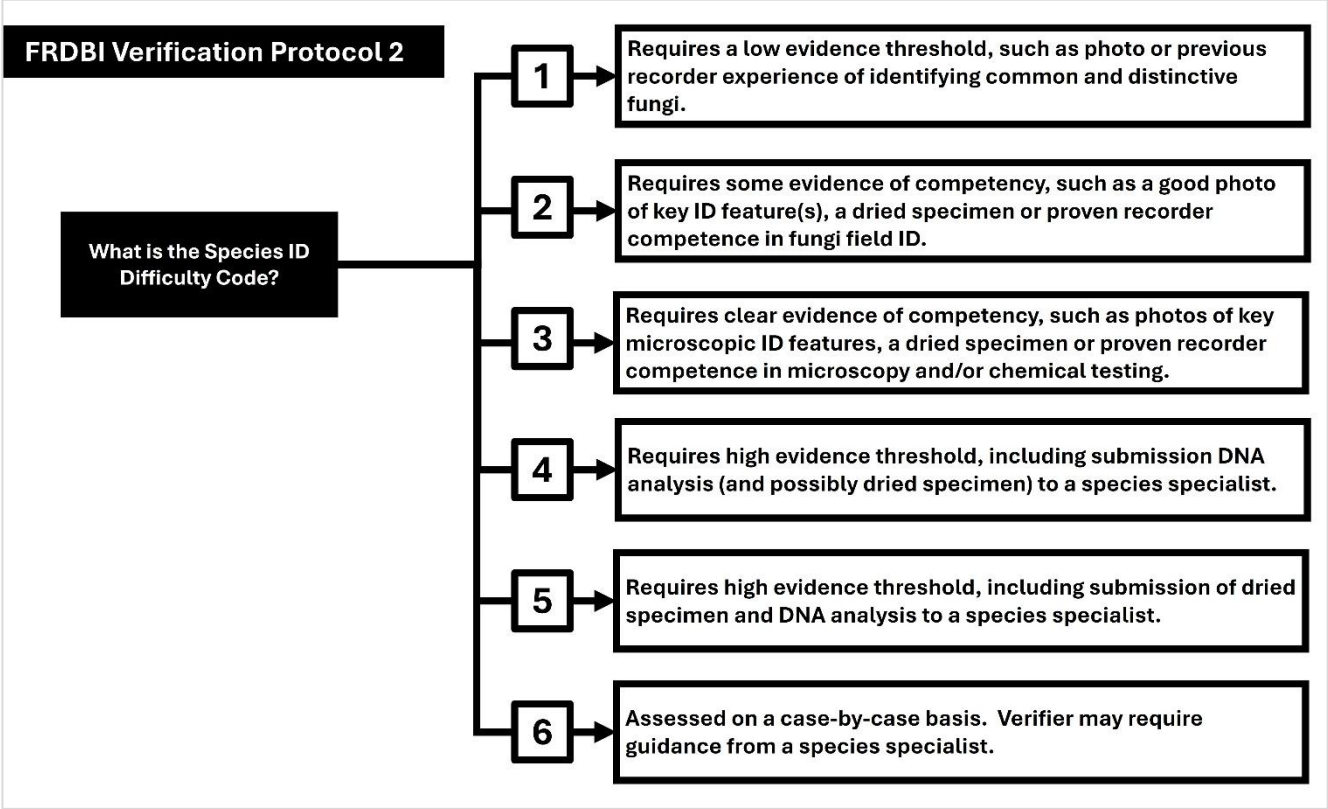

Figure 11: FRDBI Verification Protocol 2, proposed by Keiron Brown.

Verifier Step 2: Assess the data (including any photos or DNA analysis) within the record to ascertain if the record can be accepted, needs to be rejected or if it is necessary to query the record with the recorder and gather further info or request a specimen.

Clear guidance should be created by BMS through consultation with experienced recorders and local fungus groups. This guidance should encourage verifiers to take a holistic approach to verification and consider factors such as species distributions, certainty, rarity, recorder experience, ID difficulty, and ID methods (see Recommendation 5), e.g.,

- If a photo is present and the species is a distinctive species, the verifier may be able to identify the species from the photo and accept the record as 'Correct'.
- If the species is non-distinctive but the recorder has sufficient , the verifier may be able to accept the record as 'Considered correct'.
- If the record is outside of the known range (for example, a vice county or country first), the verifier may query the record and even require a second opinion (via a suitable photo or dried specimen) regardless of the distinctiveness of the species or experience of the recorder.

5.4 Recommendation 4: Set Up A Verifier Network

A network of local and national verifiers should be recruited and trained to assess incoming records and existing FRDBI records via FRDBI Verification Protocol 2.

Recording schemes for other taxa vary in how verifiers are assigned to deal with records.

- **Smaller schemes**, such as many invertebrate recording schemes, often have a single specialist or a small team of specialists (usually national recorders) who verify all UK records at a national level. Although this approach provides national coverage, these systems are heavily reliant on a small number of individuals (or even a single person) and are therefore prone to delays in assessment, the development of backlogs, and the risk of becoming moribund.

- **Larger recording schemes**, such as those for butterflies, mammals and vascular plants, have established a more localised approach to verification. County or vice-county recorders often act as verifiers for records within their designated areas. These systems are less reliant on individuals, as local groups are able to appoint or reappoint verifiers and provide support where necessary. However, maintaining consistency in standards and coverage across the UK can be more difficult, particularly in areas where there is no active local group.

- **Verification assistants** can be used to reduce the growing pressure on county and national recorders resulting from the annually increasing number of records submitted to recording platforms. Verification assistants do not necessarily require in-depth knowledge of a species group and are assigned records that are considered 'easy to verify' (for example, photo records of distinctive species). Due to the limited number of photo records within the FRDBI, however, this option is likely to have only a limited impact on record verification within this system.

- **Additional verification systems** may also exist for records that require further consideration, such as rarities (e.g. British Birds Rarities Committee), migrants (e.g. Migrant Dragonflies Project), or particular taxonomic groups (e.g. the Crambidae and Pyralidae Recording Scheme).

Considering approaches used for other taxa, it is recommended that the BMS adopt a **hybrid approach** to record verification by creating the following verification roles. All verifiers should be provided with BMS guidance on assessing records and communicating with recorders to ensure consistency across groups and verifiers.

Local Verifiers: Assigned by local fungus groups to check records submitted to the FRDBI within the geographic area covered by their group. Local verifiers are encouraged to defer verification of records belonging to particularly difficult groups to taxonomic verifiers (or seek their guidance) where a relevant taxonomic verifier exists.

Country Verifiers: Assigned by BMS to support the group verifier network by verifying data at a country level (i.e. England, Scotland, Wales and Northern Ireland). Their efforts should focus primarily on records submitted in areas not covered by an active Local Verifier.

Taxonomic Verifiers: Assigned by BMS to review records belonging to specific taxonomic groups at a UK scale. A concerted effort should be made to recruit taxonomic verifiers for particularly challenging groups (such as ascomycetes, resupinates, and rusts, smuts and mildews). Taxonomic verifiers may review records previously assessed under FRDBI Verification Protocol 1 or by group or country verifiers and assign a revised verification status where appropriate.

5.5 Recommendation 5: Take A Holistic Approach To Verification

Verifiers should be provided with guidance on how to consider all the data within a record alongside external factors such as the likelihood of the record being correct and the potential impact of the record on our understanding of a species.

There are many factors in addition to species identification difficulty to consider when assessing a record and applying a verification status, including the following considerations:

Recorder Confidence: Has the recorder provided a level of their certainty? Evidence should always be required where the recorder was uncertain.

Recorder Experience: Does the recorder have sufficient experience to reliably determine this species? More evidence may be required the first time a recorder submits records for non-distinctive and difficult species. 'Trusted' recorders may have many of their records verified as 'considered correct' where appropriate.

Independent Confirmer: Is an Independent Confirmer listed on the record or within the comments fields? For distinctive species, all records with a second opinion may be accepted. For non-distinctive and difficult species, it may be necessary to establish the experience level of the Independent Confirmer.

Identification Method: Was an acceptable identification resource used? Was the ID method appropriate for the accurate identification of the species?

Species Distribution: Is the record within the known range for a species? Records outside of the known distribution alter our knowledge about our species and therefore require a higher evidence threshold for acceptance. A vice county first should be accompanied by a dried specimen and/or DNA, and country firsts may also require verification by a species specialist.

Rarity: How common (or rare) is the species? Individual records of Nationally Scarce species can have a significant influence on what we know about a species due to the lower numbers of pre-existing records and may therefore have a higher evidence threshold for acceptance. Conversely, common and widespread species may have lower evidence thresholds for acceptance (particularly for distinctive species).

Photographs: Photographic evidence can be used to assist verifiers and build confidence in the record. Fruiting body images may help verifiers confirm the most distinctive species and allow for some records to be accepted as 'correct'. Macrophotography and photos taken down the microscope can be used to provide evidence of features not visible to the naked eye, and may be used in place of a specimen for some species to also reach a 'correct' verification status. However, even photos that do not confirm the species can still be useful for establishing if the species determination was plausible and contribute towards a 'considered correct' status. Likewise, photos can also indicate where recorders may have got an identification wrong, even if the true species cannot be established.

DNA Analysis: DNA is becoming increasingly important within the field of mycology, with cryptic and ultra-cryptic species requiring this as standard. The FRDBI has been updated to include DNA-relevant fields. Verification of DNA records requires a specific skill set, and BMS will need to provide guidance on how to assess DNA records.

Other aspects of the record: Consider if the other aspects of the record make sense, such as substrate, morph, associated organism, broad habitat and any notes or comments.

5.6 Recommendation 6: Implement An Open Data Policy

BMS should publish an open data policy outlining how fungal records submitted through the FRDBI can be accessed through the NBN Atlas, including guidance for recorders on choosing an appropriate licence for their records and photographs.

It was clear from the results of the Fungus Recorder Online Survey that there is strong support for open data sharing, and it is recommended that BMS consider implementing the following within an Open Data Policy for the FRDBI.

Default Open Licence: A default open licence, such as a Creative Commons Attribution licence (CC BY) should be considered for the default licence for new FRDBI accounts. Existing users could be emailed with instructions on how to update their licence settings.

Licence Clarity: This consultation has shown that there is a mismatch between how accessible fungi recorders would like their records to be for a range of uses and their understanding of the restrictions placed on records assigned a non-commercial licence.

- The licences should also be re-ordered from the least restrictive licence (CC0) at the top to the most restrictive (AAR) at the bottom of the list.
- The account settings page currently links to the individual licences, but this does not give any specific context regarding the use of biological records. Example restrictions of how fungus records may be used for each licence could be included on this page. E.g.
    - CC BY: Available for all uses provided appropriate attribution is given.
    - CC BY-NC: Not available for any commercial use, such as use by some Local Environmental Records Centres or in commercial ecology consultancy reports.
    - ARR: Not available for use.

Data Flow Pathway: Establish a regular data flow pathway that shares verified FRDBI records with the NBN Atlas on a regular basis, keeping the data flow pathway as simple and linear as possible (see Figure 12).

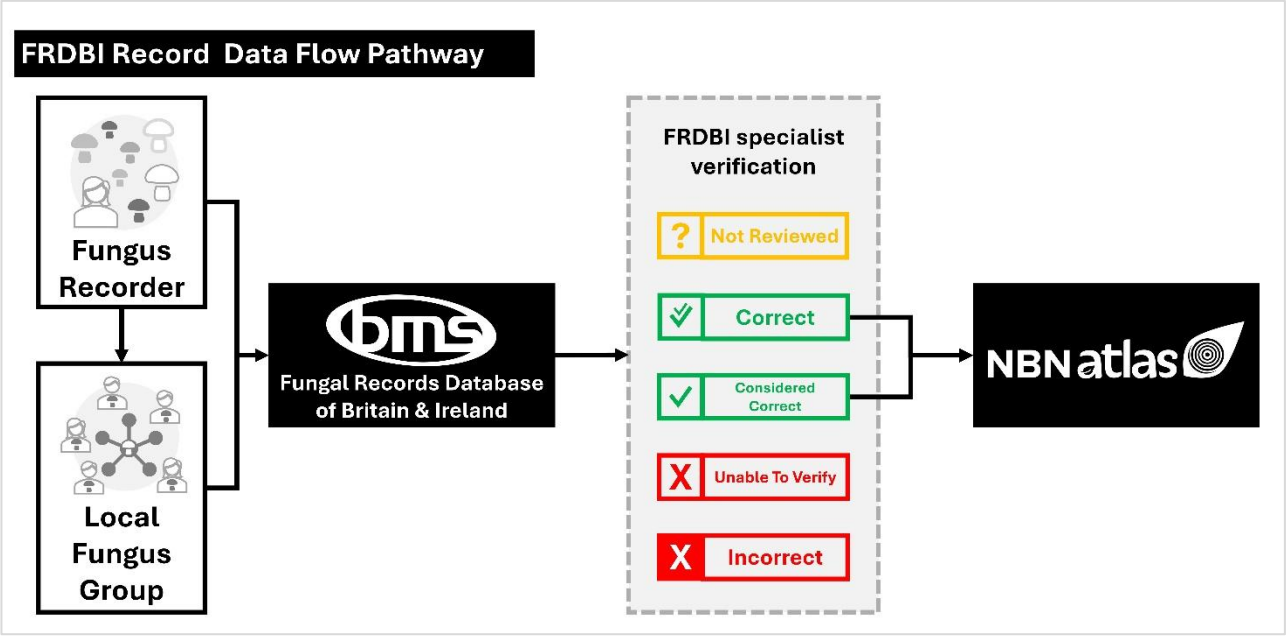

Figure 12: FRDBI Data Flow Pathway, proposed by Keiron Brown.

5.7 Recommendation 7: Looking To The Future

BMS should consider 'what comes next' and think about how FRDBI and other fungal datasets could be enhanced and used more widely.

FRDBI Verification: Records assessed through FRDBI Verification Protocol 1 may be reassessed using FRDBI Verification Protocol 2, particularly records of rare species or species outside of their known range.

iNaturalist and iRecord Fungus Records: FRDBI Verification Protocol 2 could be applied by willing Local Verifiers and Taxonomic Verifiers to fungus records within iRecord (including iNaturalist fungus records that have reached 'research grade' status and therefore transferred across to iRecord). Like the proposed FRDBI Data Flow Pathway and current CATE2 data flow pathway (as of March 2026), accepted records could be forwarded on to the NBN Atlas (see Figure 13).

Verification Assistants: iRecord and iNaturalist data often have photographs contained within fungus records. Verification Assistants can be trained to assess records of the most distinctive and commonly recorded species, such as Chicken of the Woods (*Laetiporus sulphureus*) and Fly agaric (*Amanita muscaria*) and assigned records of these species on iRecord that have associated photographs. Where an identification can't be confidently reached, records would be deferred to a Local Verifier or Taxonomic Verifier. Training could be through a suitable online training course.

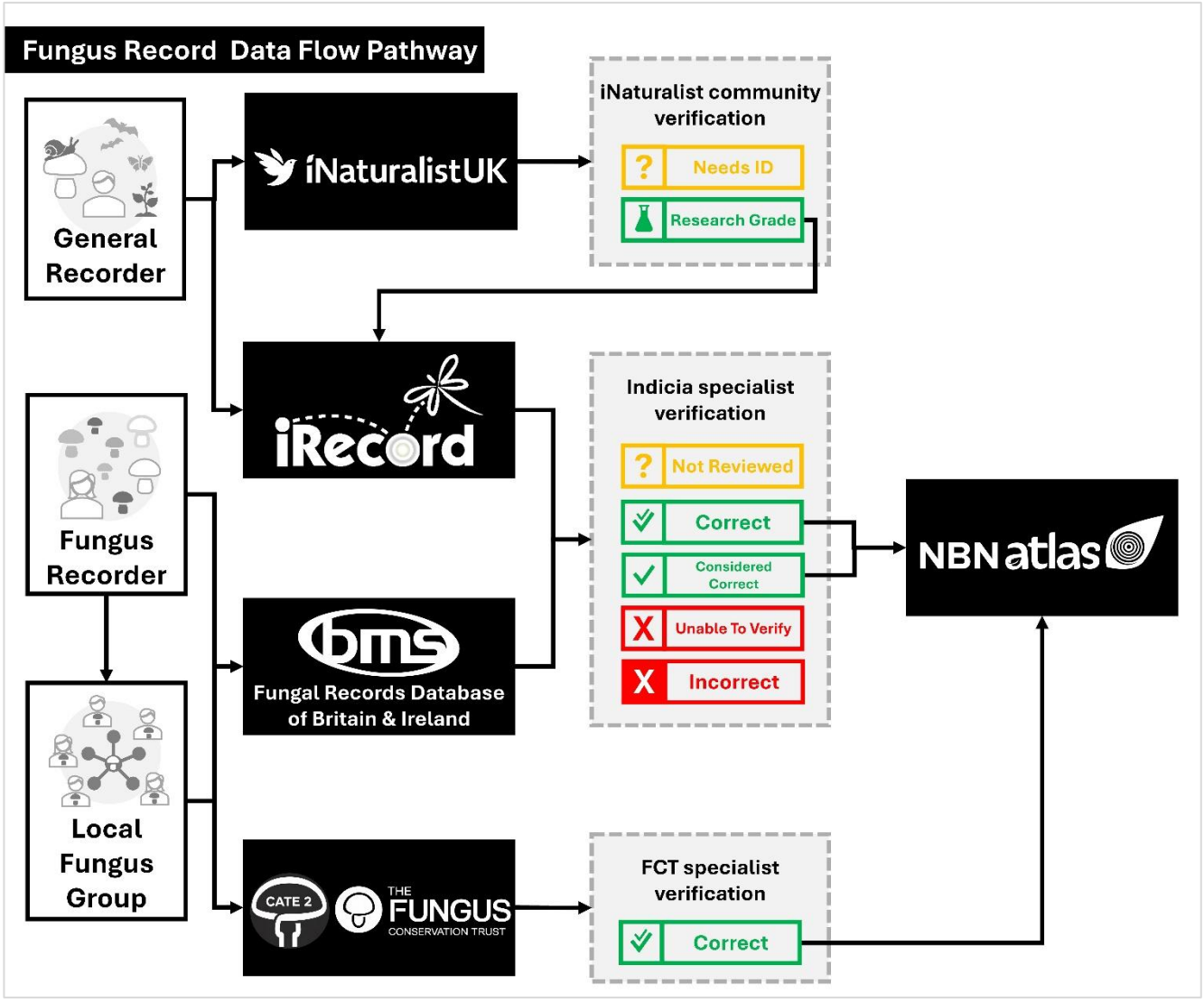

Figure 13: Fungus Records Data Flow pathway, proposed by Keiron Brown.

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