Application of Risk Assessment in Integrated Pest Management for Libraries

Authors: Wu Rong

Date: 2023-10-13T00:00:00+00:00

Abstract

The user wants me to translate a Chinese academic text about a risk assessment system for library collections to

Full Text

4.2 Practical Application of Risk Rating

The risk rating based on collection value and pest/mould susceptibility serves as a reference indicator for measuring whether the environmental risk level faced by collections is appropriate, helping to formulate more refined risk management strategies. Unlike risk identification, which follows a checklist approach, risk rating is more abstract in practical application. Therefore, this section focuses on its process and uses application examples to facilitate understanding.

Table 7 Collection and Environment Pest Risk Rating Comparison Table

Collection Risk Rating (Please rate value and pest susceptibility based on previous content and actual conditions) (Value × Susceptibility)	Minimum Environment Pest Risk Requirement
Precious cultural relics × pest-susceptible (ancient books) / Precious collections × susceptible (rubbings)	Low risk
Precious cultural relics × relatively non-susceptible (Republic of China archives) / Ordinary collections × susceptible (modern Chinese paintings)	Low-medium risk
Precious collections × relatively non-susceptible (Republic of China photos) / Ordinary collections × relatively non-susceptible (open-shelf magazines)	Medium risk

Table 8 Collection and Environment Mould Risk Rating Comparison Table

Collection Risk Rating (Please rate value and mould susceptibility based on previous content and actual conditions) (Value × Susceptibility)	Minimum Environment Mould Risk Requirement
Precious cultural relics × mould-susceptible (incunabula) / Precious collections × susceptible (reproduced rare books)	Low risk
Precious cultural relics × relatively non-susceptible (ancient books) / Ordinary collections × susceptible (lacquered cloth bound volumes)	Low-medium risk
Precious collections × relatively non-susceptible (rubbings) / Ordinary collections × relatively non-susceptible (open-shelf magazines)	Medium risk

Tables 7 and 8 provide comparison standards for collection and environment pest and mould risk ratings. The collection examples in parentheses are based on Shanghai Library' s actual holdings and are for reference only; they should not be applied directly. In practical risk rating application, institutions should fully consider their own collection characteristics and preservation needs, appropriately adjusting and optimizing collection categories to establish more feasible risk rating tables.

In practical application, the first step is determining collection risk rating (Value × Susceptibility). The second step is determining the corresponding collection environment risk rating. The third step is confirming whether the environment rating meets the minimum requirement corresponding to the collection rating. For example, a precious collection susceptible to pests rated as Ba should be stored in a low-risk environment; an Ab collection requires at least a low-medium risk environment; and a Cb collection can be stored in a medium-risk stack or reading room environment. Non-susceptible c/ category collections need not consider pest/mould issues and may skip environment risk rating.

The practice of rating various stack areas at Shanghai Library represents the first application of this new method. Using the First Rare Book Stack and a floor of the general stack as examples, the rating process and results are as follows:

(1) Determine Collection Risk Rating

- **First Rare Book Stack:** Based on the precious value (A) and characteristics of being susceptible to insects (a) but not mould ( ), collection risk ratings are Aa and A .
- **General Stack Floor:** Main collection type is Western-language periodical

bound volumes with lacquered cloth covers—ordinary collections (C), not susceptible to insects (b), but susceptible to mould ( ). Collection risk ratings are Cb and C .

(2) Determine Corresponding Collection Environment Risk Rating

- **First Rare Book Stack:** According to the collection environment pest and mould risk rating tables (Tables 5 and 6), no scoring items were identified during the rare book stack environment assessment, resulting in a score of 0—both pest and mould ratings are low risk.
- **General Stack Floor:** According to the environment risk rating tables, pest risk scoring items include: moderate trap captures (0.5), corner insect bodies (1), slightly high relative humidity (1), insufficient airtightness (1), internal miscellaneous items (0.5), and no quarantine inspection procedures (1), totaling 5 points—rated as medium pest risk. Mould scoring items include: outbreak within three years (1.5), mould on collections under AC outlets (2), long-term static dust accumulation (1), direct contact between collection tops and upper shelves (0.5), and slightly high relative humidity (2.5), totaling 7.5 points—rated as high mould risk.

(3) Compare Rating Results

- **First Rare Book Stack:** Environment rating results of "low risk" for both pests and mould meet the minimum risk rating requirements for Aa and A collections (Tables 7 and 8); current conditions should be maintained.
- **General Stack Floor:** The environment is rated as medium pest risk, meeting the environmental requirement for Cb-rated collections. However, the high mould risk rating fails to meet the "low-medium risk" requirement for C -rated collections, requiring prompt action to prevent large-scale mould damage.

After completing the rating process, if collection environment risk ratings are found to be non-compliant, timely measures should be taken to reduce environmental risk levels based on rating results. If resources are limited and multiple non-compliant environments cannot be improved simultaneously, priority should be given to intervening in environments housing collections with higher risk ratings (i.e., more valuable and more susceptible to pests/mould).

Collection risk rating depends only on collection properties, while collection environment risk rating can be improved through various measures. Therefore, regular updates to collection environment risk ratings are necessary to ensure rating effectiveness. By integrating location, time, and rating results, libraries can clearly display risk parameter change trends for different collection areas over time, helping identify systematic and long-term issues and distinguish them from seasonal variations [13].

This paper explores and applies risk identification and rating within the risk assessment system to provide methodological support for IPM in libraries, aiming to fill the gap in domestic research and practice on pest risk assessment for library collections, offering practical guidance. It is hoped that this will help protect and manage library collections, enhance pest prevention awareness

among relevant practitioners, and promote the development of document preservation work. This risk assessment method also has certain universality and can provide reference for other institutions with similar problems.

However, this study has some limitations and shortcomings, mainly in two aspects: the specific application of risk assessment is not yet fully developed and requires improvement; and risk identification and rating standards may be subject to subjectivity and randomness during specific operations, needing further clarification and standardization. Therefore, future work requires more empirical research, collecting and analyzing problems and challenges encountered during application to improve the universality and reliability of the risk assessment method, while continuing to refine risk factor classification and weighting to enhance assessment objectivity and scientific validity.

[1] Querner P. Insect pests and Integrated Pest Management in museums, libraries and historic buildings[J]. Insects, 2015, 6(2): 595-607.
[2] Ryder, S., Pinniger, D. The history of Integrated Pest Management (IPM) at the Natural History Museum, London [C]//Proceedings of 2021: A Pest Odyssey, The Next Generation. London: Institute of Conservation, 2021: 233-234.
[3] Ryder S, Mendez A. Using risk zones in museums as part of an IPM programme [J]. Studies in Conservation, 2019,(04):203-207.
[4] Muramoto Satoko. Preservation Environment Control Plan for the National Diet Library of Japan—Focusing on Results in Integrated Pest Management (IPM) [C]//Proceedings of the International Symposium on Natural Factors and Document Preservation. Beijing: National Library of China Publishing House, 2011:72-79.
[5] Adcock, EP. IFLA principles for the care and handling of library material [EB/OL] . [2023-08-07] .http://archive.ifla.org/VI/4/news/pchlm.pdf, 1998.
[6] AMNH. Risk assessment[EB/OL].[2023-08-9].https://www.amnh.org/research/science-conservation/preventive-conservation/risk-assessment.
[7] China Northwest Architectural Design and Research Institute. Code for Design of Library Buildings JGJ38-99[S]. Beijing: China Architecture & Building Press, 1999:42-57.
[8] State Archives Administration of China. Notice of the General Office of the State Archives Administration on Issuing the "Archives Safety Risk Assessment Indicator System"[EB/OL].[2023-01-16].http://www.saac.gov.cn/daj/tzgg/201902/fd66636dbe7c4a2a8ef7fdf6f3
[9] Standardization Administration of China. Classification of Special Collections of Chinese Ancient Books Part 1: Ancient Books: GB/T 31076.1-2014[S]. Beijing: Standards Press of China, 2014:7.
[10] Margaret Child. Preservation assessment and planning[EB/OL].[2023-3-9].https://www.nedcc.org/free-resources/preservation-leaflets/1.-planning-and-prioritizing/1.2-preservation-assessment-and-planning
[11]BROWN SK, COLE I, DANIEL V, KING S, PEARSON C. Guidelines for environmental control in cultural institutions [R]. Canberra: Heritage Collections Council, 2002.
[12] Lin Ming, Zhou Yi, Zhang Jing. Document Preservation and Restora-

tion[M]. Guangzhou: Sun Yat-sen University Press, 2012:32-54.
[13] Paul Garside, Karen Bradford, Sarah Hamlyn, Ma Ruiwen. Application of "Portfolio Reporting" in Preventive Conservation at the British Library[J]. Chinese Museum, 2021, (S2):212-216.

Author Biography:
Wu Rong, undergraduate degree, Librarian, member of the Document Preservation Group at Shanghai Library. Primary research interests include document preservation and Integrated Pest Management.

Work Unit: Shanghai Library
Postal Code: 200031
Correspondence Address: Shanghai Library Collection Preservation Center, 1555 Middle Huaihai Road, Xuhui District, Shanghai
Mobile: 17621537695
Telephone: 021-64378989
Email: rongwu@libnet.sh.cn
QQ: 1728195276

Note: Figure translations are in progress. See original paper for figures.