Destruction of Library Collection by Climate: Mold

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Abstract

Library collection may consist of manuscripts, early printed books, maps and atlases, drawings, photographs, books, periodicals, sound and audiovisual records, and microforms. Each contains some extant of valuable information and needed to maintain its contents because they are gently declining every second by second cause by many reasons such as light, heat, humidity and moisture, dust and dirt, microorganism (fungus), insects and rodents, chemical factors, human factors and natural disasters.Therefore libraries are facing with the challenges of damaging its materials. Although there are several ways to destruct the library collection, this paper emphasis only on climate and its impact on the library collection especially mold cause by climate. As for tropical monsoon climate region the study to be concerned are climate, the effects of that climate on library collection, cause of germinating and growing mold, and the options for modifying the environment. It is one of the most serious sources of damage to library collections as well as for a potential health threat to the people who care for collections. Mold spores can exist everywhere in library on every material but they need three essential factors for the growth and survival such as correct temperature, adequate moisture, and proper nutrients. Libraries need to control these factors that promote the growth and survival of molds. Such a way, library can prevent the library collection from damaging by mold and it can able the library to offer more effective services to the users. In the other words, it can promote the national education level as well as can produce qualified human resources for nations.

Keyword: mold, climate, mold spore, fungus, monsoon climate

Introduction

It is accepted that library plays vital role in development of national education sector because libraryfacilitate the users access to information for knowledge, education, and learning by offering their referral services, information and teaching resources. The main function of the library is to collect require knowledge, process and making them accessible for the users. Library collects any material that bearing knowledge according to the types and its policy.It may consist of manuscripts, early printed books, maps and atlases, drawings, photographs, books and periodicals, sound and audiovisual records, and microforms. Each contains some extant of valuable information and needed to maintain its contents. They are gently decline every second by

second cause by many reasons such as light, heat, humidity and moisture, dust and dirt, microorganism (fungus), insects and rodents, chemical factors, human factors, and natural disasters.It points out that libraries are facing with the challenges of damaging its materials and needed to preserve them. To maintain library collection for the sustainable use of resources, preservation and conservation process is needed to perform within the library. The main theme of preservation activities within the library isto minimize the physical and chemical deterioration of library material.Conservation deals with sustainability of library materialsfor the use of future generations.In this paper, the emphasis is based upon climate and its impact on the library collection especially mold cause by climate.

Climate of Myanmar

Myanmar's climate can be described as tropical monsoon climate. It is characterized by strong monsoon influences, had a considerable amount of sun, a high rate of rainfall, and high humidity. The climate of Myanmar is traditionally divided into three seasons such asthe Cool season (or) cold and dry season, the Hot season (or) hot-dry season and the Rainy season (or) wet season.The Cool season (or) cold and dry season is from November to February, and its average monthly temperatureis between 20°C and 24°C. The Hot season (or) hot-dry season is from March to April andaverage monthly temperatureisbetween 30°C and 35°C. The Rainy season (or) wet season is between May and October and average temperature is between 25°C and 30°C. Annual rainfall in the delta region is approximately 2,500 millimeters (Yangon 2700 mm), while average annual rainfall in the Dry Zone is less than 1,000 millimeters (Mandalay 840 mm), the coastal regions receiving over 5,000 millimeters of rain annually. As a tropical Monsoon climate region, the annual average temperature ranges from 22°C to 27°C year-round. Sunshine is plentiful during the dry season, averaging seven to ten hours a day. During the rainy season, cloudy weather is common and daily sunshine is reduced to an average of three to four hours a day.The highest average rainfall and the highest relative humidity percent are usually occurred between June and September.

Cause of mold development

Mold spores can exist everywhere in the library but no one can see them. They can spread easily and very resistant to external factors. They need right environmental conditions to germinate.They can grow on any organic material offering suitable nutrients, including paper, cloth, wood, and leather (hygroscopic material). When environmental condition is changed, (e.g. increasing temperature, changes of relative humidity percent etc.) mold spores will germinate and grow. They can be categorized by two general types. The first spore can produce rapidly and in large numbers, but have very little resistance to drying, sunlight… etc. They can growth rapidlyand develop the colonies when conditions are favorable. Other spores are much more resistant to unfavorable conditions. These resting spores enable the organism to survive over long periods of adverse conditions. However, regardless of these types, its needs to remove them before flowering stage to avoid mold stains occur. It doesn't means the substrate will not be

damaged, but the damage may be greatly reduced. Four factors are needed for the growth and survival of molds:

1) an organic substrate (host material on which to grow) and
2) correct temperature,
3) adequatemoisture, and
4) proper nutrients

An organic substrate is a host material thatallowsmold to bloom and develop on its body such as paper, cloth, wood and leather.

Temperatures can be divided by three states: low temperature, correct temperature and above temperature. Most of mold spores cannot growth occur in the state of low and above temperature. Favorable temperature or correct temperature for mold is ranging from 59° to 95° F (15° to 35° C)

Humidity is the number one condition for the growth of mold. It is the moisture in still, quiet air that allows mold spores to grow and spread.As relative humidity increases, hygroscopic materialsabsorb water to reach equilibrium with the surrounding environment. When the relative humidity reaches or exceeds 70-75 percent, mold is active and will grow within 24-48 hours.The mold can get moisture from two sources to develop. The first one is the air surrounding the item and the second one is the moisture held by the item itself.

Most of the molds are known cellulose destroyers. Its means they use the cellulose fiber as a nutrient.Other molds that do not actually consume cellulose may danger paper by weakening the fibre bonding as they feed on other materials in the paper.

Prevention of mold

Mold spores, existedon library materials in library,need three essential environmental factors for the growth and survival such as correct temperature, adequate moisture, and proper nutrients. To avoid damaging library materials, library needs to control these factors that promote the growth and survival of molds.

High temperatures, poor air circulation, dim or no light, and accumulated soiling assist and accelerate the growth of mold once it has germinated, but only high relative humidity of the environment and moisture contents of the substrate can initiate and sustain mold growth.The best ways to prolong the useful life of library materials, environmental condition should be-

- low light levels
- steady relative humidity (around 55 %) (ranging from 45 to 60 %)
- steady temperature (around 21° C)
- good air circulation,
- elimination of airborne pollution
- control of biological enemies

- improved handling techniques
- correct storage techniques[1]

Cleaning mold

If it is suspected that the library collection has a mold outbreak, human safety and proper personal protective equipment should always be the first priority. Because Fungicides and fumigants powerfulenough to achieve a 99% mortality for fungi and also to be toxic tohuman as well.After establishing personal safety of all people involved in the effort, first response procedures are focus on locating the humidity source, lowering the humidity, and isolating affected materials.

When facing with moldy item, it is important to know that mold is alive or dead. At first gently stroke it in secure place. If mold is smudges, it is alive. If mold is dry and powdery, it is dead. It is best to clean away mold as soon as possible so that stains are not formed. Mold stains are difficult to remove. It is suggested that avoid using chemical to destroy mold as possible. If mold is alive, dry it first for an hour. Then gently brush it. Do not brushes the mold beforedry them. Brushing before drying can cause to push into surface of item and difficult to remove. If mold is dry and powdery, it needs to remove it. After equipping the human safety and proper personal protective equipment, take them outside of in the breeze and gently stroke with suitable brush. If the mold outbreak area is very large and mold is alive it need to use the means of fungicides and fumigants

There are two considerable factors for the use of fungicides and fumigants. The first one is that all biocides are chemically reactive, (i.e. they affect on materials some extent)andthe second one is that the biocides have some level of mammalian toxicity.

The term fungicide is limited to those biocides in a liquid medium applied directly to the surface of an affected item. The application may be intended either to prevent the growth of mold, or to kill the mold once growth has begun.

The idea of fumigation is appealing to most librarians andarchivists. It does not involve the treatment of individual items andis therefore not costly in terms of staff time. Large numbers of itemscan be treated at one time, in either fumigation chambers or by sealingareas of the building and fumigating entire collections.Fumigation may be carried out in various ways, using a variety offumigants such as Thymol, Orthophenyl Phenol, Sulfuryl Fluoride, Methyl Bromide, Ethylene Oxide...etc. some better than others, but all hazardous. If fumigation isnecessary, it should be carried out by licensed professionals wheneverpossible.

Once collections have been isolated it is important that follow-up procedures for cleaning storage furniture and room surfaces be completed to preventing a new mold bloom.

[1] Helen Price, Stopping the rot: a handbook of preservative conservation for local studies collections. 2d. ed. Sydney: Australian library and Information Association, 1989.

- Thoroughly clean the entire affected area, including all floors, work surfaces, and shelves

- Monitor all affected materials on a regular schedule to check for renewed mold growth or after effects of treatment or cleaning.

- Monitor the environment in the affected area regularly. Be sure housekeeping and air circulation remain adequate. Ensure that there are no active leaks.

- Relocate materials that were stored in unstable areas such as along outside walls or in damp basements.

- Undertake necessary repairs of faulty equipment and upgrades to the physical plant to prevent recurrence[2].

Conclusion

Mold can damaged library materials and also poisonous to the people. Therefore, the procedure of mold cleaning is done carefully and it can cost in terms of staff time and budget to remove them. Therefore the best way is preventing them from germination by controlling environmental condition.

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