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Preservation and Conservation of Palm Leaf Manuscripts at the Library of University of Sri Jayewardenepura

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ABSTRACT

Palm leaf manuscripts are one of the vital types of documents containing the indigenous knowledge of Sri Lanka. Treated and seasoned Palmyra leaf was widely used for writing before paper was utilized as writing material. Ancient people were not hesitant to write down their wealth of local knowledge in these palm leaf manuscripts. Today, there is a threat of extinction for the palm leaf manuscripts. The Library, University of Sri Jayewardenepura has launched a project on the Preservation and Conservation of Palm leaf manuscripts to address this issue. This gigantic task is important in preserving indigenous knowledge for future generations. The project began by collecting and physically conserving the palm leaf manuscripts scattered throughout Sri Lanka. In parallel to the project, we established the Preservation and Conservation unit at the library, intending to preserve rare books in addition to the palm leaf manuscripts. We applied established conservation methods according to the defect type found in manuscripts. After conservation, preservation techniques that suit the local environmental conditions were used. Finally, we digitized the complete set of manuscripts where researchers are allowed to use them according to the established policy.

1. Introduction

The beginning of the documentation of human history goes back to the prehistoric era. People in that era created paintings in the caves where they lived to express themselves. Since then, archaeological evidence for hieroglyphy (*chitraksara*) has been found in Sri Lanka. Evidence for those are black and red wear, and red wear clay tools hieroglyphy (*chitraksara*) found together in places like *Gedige, Anaikottei, Ibbankatuwa, Kantharodai, Kollan Kanatta* and *Pomparippu* (Lagamuwa, 2006). Afterwards, clay tablets, stones and wood were used to write. Due to the difficulty of storing these materials, the leaves of trees were used as an alternative. Palmyra leaves have been widely used to write in Sri Lanka, India and other countries in South Asia. One of history's most widely used document types was the art of palm leaf manuscripts.

It is widely accepted that writing in Sri Lanka became popular upon the arrival of the *Maha Mahinda* Thero. However, chronicles clearly show an art form in Sri Lanka even before the advent of *Maha Mahinda* Thero. The earliest mention of this is that Prince *Vijaya*, after his arrival and the settlement in this country, has sent messengers with gifts and documents to bring a daughter of the King of *Padi* (from India) for his coronation (Sumangala, Dewarakshita & Batuvantudawe, 1994). Further, they state that Prince *Vijaya*, on the eve of his old age, has sent a letter to his brother Prince *Sumitta* informing him to take over the kingdom of Lanka. These facts show that correspondence happened even during Prince *Vijaya's* time.

1.1 History of palm leaf manuscripts

Historical manuscripts reveal information about the past civilization. Ancient manuscripts range from stone and metal carvings and palm leaf manuscripts to paper manuscripts. However, for various reasons, many manuscripts are in the condition of degradation. One of the reasons for the non-

availability of many well-preserved manuscripts is the lack of practising proper conservation methods. Therefore, it is essential to pay attention to preserving valuable historical documents. Therefore, researchers and other scholars pursue restoring and conserving these sources of information (Gandhi & Ponnaivaikko, 2017).

According to Ghosh, Mahajan and Banerjee (2017), recorded knowledge in palm leaf manuscripts could be considered a national heritage. Palm leaf manuscripts were considered one of the primary sources of writing before the advent of paper. Palm leaf manuscripts have existed for years, and preserving these manuscripts are considered vital for retaining age-old knowledge.

There were no correct sources to determine when people started using palm leaves as a writing medium. However, it can be determined that most of the palm leaf manuscripts (95%) found in various institutions were written in the 18th and 19th centuries. There are also books written in the early 20th century. It is rare before the 18th century. There is no evidence to prove that palm leaf manuscripts were written in the *Anuradhapura* and *Polonnaruwa* periods. *Chulla Wagga*, one of the oldest palm leaf manuscripts in Sri Lanka, was written in the 13th century A.D. It is currently on display at the Colombo National Museum (Alahakoon, 2006).

Kotte period was considered the 'golden era' of Sinhala Literature (Wijenayake, 1995). Many chronicles and *Sandeshas* were added to history during this period under the reign of King *Parakramabahu VI*. Some of those chronicals and *Kavyas* were, *Budu Guna Alankaraya* and *Hansa Sandeshaya* by *Weegagama Maithree Thero*, *Saddarmarathnakaraya* by *Wimalakiththi Maha Sthavira*, *Kawsilumina* by King *Parakramabahu II*, *Kawyashekaraya*, *Parawi Sandeshaya*, *Salalihini Sandeshaya* and *Parakumba Siritha* by *Thotagamuwu Sri*

Rahula Thero, *Kokila Sandeshaya* by Dewnuwara *Irugalkulathilaka Thero* (Ilangasinghe, 2003). In addition to the new set of writings, many palm leaf manuscripts were used to copy from the original sets. The manuscripts are found in religion, language, literature, medicine, veterinary medicine, astrology, *yantra mantra*, fiction, customs and ceremonies, law, discontinuities, annals, history, taxes and income, agriculture, state administration, Buddhist education, and world descriptions. Further, there were also many palm leaf manuscripts on various subjects such as music and art (Lagamuwa, 2006).

Ancient manuscripts in India also depict the glorious history of India. There are about five million manuscripts in India with excellent research value. However, it is believed that there are thousands of scattered unpublished manuscripts all over India. Some manuscripts exist in foreign collections that are no longer accessible to Indian scholars (Gaur & Chakraborty, 2009). However, due to the lack of proper conservation mechanisms for these unpublished manuscripts, an invaluable pool of knowledge is under evere threat of disappearance. Sageer and Fransis (2014) state that many palm leaf manuscripts in the Indian state of Kerala need to be preserved. Further in their study, the factors that affect the deterioration of palm leaf manuscripts are mentioned, and the best option proposed to protect those is digital preservation.

1.2 Type of palm leaf material

There was evidence that the leaves of various trees were used as writing material in the past. For example, there are shreds of evidence on the usage of Sugarcane leaves (*Saccharum officinarum*), Hal leaves (*Vetaria acuminata*) and Wetakeiya leaves (*Pandanus odoratissimus*) as writing materials. In addition, ancient people used palm leaves to write meaningful, advanced and durable writings in various religious, linguistic and royalty fields. Leaves were obtained from three types of palm trees;

- Talipot palm – *Corypha umbraculifera*
- Palmyra palm – *Borassus Flabellifera*
- Lonta palm – *Coryphautan* (Lagamuwa, 2006).

1.3 Preparation of palm leaves and the writing process

The preparation process of palm leaves begins with cutting them to the required size from immature palm leaves and boiling them in water. *Kappettiya* leaves, Pineapple fronds, Papaya nodal and leaves are also added when boiling the leaves. The addition of these materials to palm leaves makes them colourful and flexible. In addition, it helps to protect palm leaves against insect infestation (Lagamuwa, 2006). Next, the leaves are dried for three days in the dew (moisture condensed from the atmosphere) in the moonlight and seasoned by stretching it with a stem of an arecanut tree crosswise. Properly seasoned dried palm leaves are soaked in a water basin for about an hour before writing. The palm leaves are then ironed. These irons use burnt coconut shell charcoal to give the heat. This ironing makes the leaves smooth, and writing on them makes it easier. A "Panhinda" (Stylus) made of steel is used for writing on the palm leaves. Writing on a palm leaf requires the writer to have the necessary skills, training, and patience.

The *Maha Bodhi Vamsa* (Upatiss, 1891) states that there were even permanent posts created for writing in the past. When bringing the sapling of the sacred Sri Maha Bodhi to Sri Lanka by the *Sangamitta* Therani, another seven hundred people with various skills accompanied the Therani.

In awarding positions to the people who accompanied Therani, the *Maha Bodhi Vamsa* states that Prince *Bodhi Gupta* was conferred the title of "*Lanka Jagathi Mahalano*", or writing a post of *Jaya Maha Lanka*. Prince *Sumiththa* was given the title "*Jayamahalano*", an alias writing post of *Jaya Maha*.

1.4 Preservation of palm leaf manuscripts

In the past, leaflets were regularly inspected for safety and smoked with various fragrances and herbs. Especially, palm leaf manuscripts were wrapped in cloths like silk and put in a metal or wooden box. It was customary for our ancients. Similarly, preventive conservation methods were used frequently. Natural herbal insecticide products and materials have been used for this purpose. In the past, the essential safeguards were the use of protective covers (*Kamba*) made of hardwood or metal, ivory, and the safe placement of wooden boxes on shelves and cupboards. Kohomba (*Azadirachta indica*) wood is often used for this purpose as it is also an insect repellent. Later, the conservation of palm leaf manuscripts was done using fumigation and chemical methods. In the present context, digitization is identified as the best solution for preserving palm leaf manuscripts.

According to Sahoo and Basudev (2004), historical documents in libraries, museums and archives are invaluable assets to humankind. Historical documents are considered sources of ancient fiction, manuscripts, and authentic literature. In addition, these manuscripts contain information on national and cultural heritage. Preservation of these manuscripts is, therefore, crucial. In addition to chemical preservation, it has been reported that traditional preservation methods have also been used to preserve these national resources.

Ghosh (2012) described deterioration types identified in Indian palm leaf manuscripts. They are biological, physical and chemical. Further, Ghosh (2012) mentions that in tropical countries, biological agents cause significant damage to palm leaves manuscripts, and the most critical biological organisms are fungi, bacteria, algae, yeast and protozoa. In addition to Ghosh (2012), Sah (2002) mentions that insect attack is a widely reported problem with palm leaf

manuscripts. Insects such as Cockroaches, Silverfish and Termites damage the manuscripts. Other biological factors that cause physical deterioration are light, heat, moisture, improper handling and neglect of proper storage. Due to these factors, manuscripts can turn yellow and gradually become brittle, breaking even with the slightest touch. It is challenging to distinguish between physical and chemical degradation in palm leaf manuscripts. Physical degradation happens due to light, heat, and humidity.

Ghosh (2012) and Sah (2002) focused their studies on traditional measures used to prevent insect attacks. So the folios were stored in a box made of hardwood, which had insect-resistant properties, such as the Neem (*Kohomba*) tree. It is a common practice in India to wrap manuscripts in a red or yellow cotton cloth and keep various oils and herbs with manuscripts to repel insects. The bark, leaves, seeds and wood of the Margosa and Neem trees have been used for conservation of manuscripts in India. In modern chemical compounds, it can be used as an insecticide solution or as a solvent.

According to Ghosh, Mahajan & Banerjee (2017), traditionally, the manuscripts were often stored in kitchens, where the firewood smoke from hearths helped keep insects away from palm leaf manuscripts. Another method they have stated in their study is giving antiseptic effects to the manuscripts by burying the palm leaves in mud or boiling them in water before writing on them. It helps to create natural protection against insects. They further stated that wrapping in silks protects the manuscripts as the damage from bookworms and similar insects to the silk clothes is minimal.

Agrawal (1984), in his study, stated that palm leaves should not be stored in arid conditions. Various oils such as citronella oil, camphor oil and walnut oil can be used to make palm leaves more flexible. He also mentioned that

seasoning palm leaves is prevalent in South Asian countries such as India, Sri Lanka and Thailand.

International Federation of Library Associations and Institutions (IFLA) (2014) stated that digitizing a unique and rare collection is multifaceted. It is significant to preserve physical, intellectual, and contextual relationships between a single opponent and the collection. Nair (2004) observed that digital conversion allows durable storage and speedy and efficient transmission/retrieval of information in all the analogue formats. There is much information regarding the digital preservation of printed materials, but the digital preservation of palm leaf manuscripts is comparably only a few at present.

Some studies were done in Sri Lanka about the conservation and preservation of palm leaf manuscript collections. Ranasinghe (2015) states that the conservation and preservation of palm leaf manuscripts in Sri Lanka are still not at a reasonable level. Libraries are collecting and preserving palm leaf manuscripts, and there has been no private or public sector support. It has been mentioned that the palm leaf manuscripts are being collected and preserved digitally by the Academic and Research Library of Palm Leaf Manuscripts of the Faculty of Social Sciences of the University of Kelaniya. Further, it was noted that using modern technology, collecting, preserving and accessing them is a national priority, and libraries have a huge role in that process. The Faculty of Social Sciences at the University of Kelaniya has started a digital library project to digitize palm leaf manuscripts (Ranasinghe & Dilruk, 2013). As they mentioned, they have completed digitizing more than a hundred thousand folios. According to Gangabadachchi and Amarasiri (2006), the printed material continues to deteriorate rapidly and thus; digitization is a remedy for these problems and would contribute to

preserving the originals; therefore, reformatted copies could be used.

Alahakoon (2006) published a research paper on identifying the physical problems of palm leaf manuscript collections in Sri Lanka. The study was conducted to find and maintain the most extensive collection of palm leaf manuscripts, deficiencies, and issues related to conservation processes and conservation programs in Sri Lanka. She focussed her study on the palm leaf manuscript collections in the Colombo Museum Library, the library of the University of Peradeniya, and the Department of National Archives. Palm leaf manuscripts are scarce, valuable, and irreplaceable among various libraries and archival materials. Therefore, their conservation would be time-consuming if neglected (Alahakoon, 2006). However, manuscripts made of palm leaves are unique, historically valuable research material whose physical preservation is deemed essential and must be protected more carefully.

Cabral and Ratnabahu (2021) published a new report on the best practices for preserving of palm leaf manuscripts in Sri Lankan Libraries to IFLA. They pointed out traditional oil used in ancient times to preserve palm leaf manuscripts. They are *Madhuka longifolia* seed oil (*Ericales: Sapotaceae*) or *Mee* oil and *Vateria copallifera*, (*Malvales: Dipterocarpaceae*) resin oil or *Dummala* oil. It is believed that by using these oils, the flexibility of the palm leaves can be improved. In addition, it helps to keep away the bacteria, mold and insects, which are harmful to the permanence of the palm leaf manuscripts.

However, there is no documentation process specifically carried out on the preservation and conservation of palm leaf manuscripts in the library of the University of Sri Jayewardenepura in a holistic view from the inception to the present. Hence, it is essential to document the processes carried out under

the preservation and conservation project to help future researchers and interested other librarians to get an idea of the process.

1.5 Establishment of the Preservation and Conservation Unit of the Library of the University of Sri Jayewardenepura (USJ)

The existing palmleaf manuscript collections in the USJ Library should be preserved as they contain valuable information. According to anecdotal evidence, it is believed that palm leaves used to compose the chronicles during the Kotte period were taken from the palm tree garden that belonged to *Pepiliyane Sunethra Devi Pirivena*, which is the present location of the University of Sri Jayewardenepura. *Sunethra Devi* was the beloved mother of King *Parakramabahu VI*, ruling the country during the Kotte period. Later, *Reverend Medagoda Sumanatissa Thero*, the Chief Incumbent of *Sunethra Devi Pirivena* gifted this land to *Vidyodaya Pirivena*. *Vidyodaya Pirivena* was established in 1873. It was given university status in 1959, naming it as *Vidyodaya University*. Now it is known as the University of Sri Jayewardenepura. The library of the USJ was renamed *Rev. Medagoda Sumanatissa Thero Memorial Library* in gratitude to the Thero in 2017. Due to this unique history, based on some facts with written evidence and some facts from oral tradition, the USJ library has a special responsibility than any other institution on the island to conserve this valuable knowledge written on palm leaf manuscripts for future use of the researchers.

We started the project on preserving our indigenous knowledge for future generations in 2018 at the USJ library. This project was established under the vision of the then Vice-Chancellor of the University of Sri Jayewardenepura, Senior Professor Sampath Amaratunga identifying this project as a national requirement. When starting the project, the library had 20 palm leaf manuscripts and another 12, which were copied from other manuscripts. The source of

these manuscripts was not known. For some reason, it has been named "James De Alwis Collection" in the past. No record was found regarding this collection's acquired date or the source. The main objective of the project was to collect palm leaf manuscripts scattered in various places in Sri Lanka and to preserve them for the use of future generations.

As the initial step, a unit was established to preserve and conserve library material when perceived as a national requirement to preserve our cultural heritage. The final step would be digitizing identifying palm leaf manuscripts to be accessible to readers. In between these two ends, there were many processes, including conducting awareness programmes, collecting manuscripts from various places on the island, the appreciation process of the donors, cost determination, cleaning, reading, categorizing, inventorying, cataloguing and digitization of palm leaf manuscripts. The formation of a few committees and preparing policy documents were essential tasks. The challenges were in human capital, infrastructure, funds and technology.

The Library Committee of USJ decided that the collection building of palm leaf manuscripts should be done by advertising in the media. Accordingly, newspaper advertisements were published asking those interested in providing palm leaf manuscripts to contact us. One such advertisement is given in Annexure 1. However, we received very few responses through the newspaper advertisements. Then the Library Committee decided to post television advertisements. The advertisement was published in the 'News Bar' during the news broadcast on two leading television channels in Sri Lanka. This advertisement was aired for about a month and was cost-free. As a result, we received many responses from various places in the island expressing their willingness to provide palm leaf manuscripts to the library of USJ. In addition, some palm leaf manuscript owners

were generous enough to donate their palm leaf manuscripts to us, which they possessed for generations.

Under the leadership of the Librarian, the library staff made arrangements to collect palm leaf manuscripts from various places in the island. Required documents, for example, the consent letters from the owners of manuscripts when transferring the ownership temporary or permanently to the university, physical details of manuscripts recording forms (number of folios, their length and width) were prepared. Priority was given to collecting the manuscripts which were donations.



Following those, the other manuscripts were purchased. Most of the owners handed over the manuscripts to the library without hesitation to value those manuscripts, trusting the university.

The committee appointed to value the manuscripts considered several facts such as the rareness or the uniqueness, physical condition, contents and the year or the period of writing in deciding a value for a manuscript. In addition, an appreciation ceremony was organized to recognize the donors of palm leaf manuscripts. Some photographs of the ceremony are depicted in Figure 1.



Figure 1. Appreciation ceremony held on 07th March 2019 for the donours of palm leaf manuscripts

There are very few reports on how the ancient palm leaf manuscripts were spread throughout Sri Lanka. However, as recorded in the literature, a few institutions have implemented to conserve and preserve palm leaf manuscripts in the country.

This study focuses on the palm leaf manuscripts in possession of the USJ. We hope to identify the practical implications of preserving and conserving them.

For this purpose, creating a database (Digital Repository) of bibliographical details about palm leaf manuscripts, including digital images, would enable researchers to quickly and conveniently obtain information.

1.6 Objectives

The study's main objective is to find methods to preserve and conserve our indigenous knowledge for future generations. In order to fulfil this primary objective, the following sub-objectives are identified.

- a) Identify the types of deterioration on palm leaf manuscripts.
- b) Find methods of rectifying the deterioration according to deterioration categories.
- c) Explore the challenges in capturing the contents to make manuscripts complete.
- d) Propose the metadata creation and digitization methods of the contents.

- e) Formulate an access policy for palm leaf manuscripts for the researchers.

Through this study, it is expected to preserve, conserve, and make the palm leaf manuscript collection available for researchers. Most of these manuscripts are unpublished materials relating to the history and culture of Sri Lanka. Our library has collected the scattered manuscripts on the island to conserve and preserve. It is also expected to add value to the existing library resources and enhance the information services of the USJ library.

2. Materials and Methods

The collection of palm leaf manuscripts at the USJ library has been built from donations of personal collections and the rare palm leaf manuscripts purchased from individuals and institutions. Currently, the library has a collection of 543 palm leaf manuscripts, out of which 240 palm leaf manuscripts have been

preserved. These preserved palm leaf manuscripts were used as a sample for this research. In order to identify the defect categories, we manually inspected each folio of a manuscript and recorded it. This process is experimental, including observations. The conservation and preservation project was initiated to perform physical and digital conservation of manuscripts. Conservation remedies were applied to the palm leaf manuscripts upon identifying the type of deterioration. A database was created using DSpace open-source software as a method of digital conservation of palm leaf manuscripts.

3. Results and Discussion

Table 1 shows the source and the details of the manuscripts we obtained as donations. Details of the purchased collections are given in Table 2.

Table 1. Palm leaf manuscripts collected through donations

No	Name of the Collection	Source/Donor	Number of Palm Leaf Manuscripts
01.	<i>Udathalawinna Walauwa</i> (Kandy)	Mr. M.C.P. Samarawikrama Muhandiram	19
02.	Prof. Chandra Wikramagamage	Prof.Chandra Wikramagamage	01
01.	Pasyala	Mr. K. W. C. J. Siriwardana	188
02.	Kandy	Mr. S. V. Nagodawithana	01
03.	Kadawatha(Mahara)	Mr. G. Herath	01
04.	Embilipitiya	Mr. R. I. Edirisingha	01
05.	Kaduwela II	Mr. D. P. Rajapaksha	13
06.	Kaduwela I	Mr. T. N. S. Warnasingha	01
07.	Pannipitiya (Mahalwarawa)	Mr. K. G. N. Ginadasa	07
08.	Kegalle (Hapuwita)	Mrs. C. Kanthi	29
09.	Akuressa (Palatuwa)	Mr. J. Gunawathi	04
10.	Naththandiya (Paluwelgala)	Mr. L. Narendrasingha	03
11.	Katugasthota (Uduwawala)	Mr. S. Ilangakon	35
12.	Kekirawa I	Mr. R. M. S. Rajapaksha	01
13.	Kekirawa II	Mr. R. D. Gunadasa	08
14.	Bandarawela (Helahalpe)	Mr. G. M. W. Bandara	69
15.	Diyathalawa (Ellegama)	Mr. A. Nishshanka	23
16.	Arakagoda	Mr. K. K. Rupasiri	02

Table 2. Palm leaf manuscripts collected through purchasing

No	Name of the Collection	Source	Number of Palm Leaf Manuscripts
01.	Medawachchiya (Thamarahalmillewa)	Mr. G. Kumaradasa	110
02.	Walapane (Yobuwelthenna)	Mr. J. Wijekon	06
03.	Kirinda - Puhulwella (Dammullagoda)	Mr. H. S. Romiyel	05
04.	Beliaththa (Mahahilla)	Mr. K. Liyanage	01
05.	Ahangama (Galgoda)	Mr. M. D. P. Gunawardana	01
06.	Mathale	Mr. B. H. G. Piyathissa	02

Table 3. Copied palm leaf manuscripts

No	Name of the Collection	Number of Palm Leaf Manuscripts
01.	James De Alwis Collection	12

According to Figure 2, 75% of the total palm leaf manuscript collection consists of donations, while 23% were purchased. Only 2% of the collection was made up of photocopies of palm leaf manuscripts; hence they do not fall into the category of original manuscripts.

Palm leaf manuscripts are made from leaves that contain natural organic matter, and therefore, they are naturally susceptible to damage. Therefore, upon inspection, it was clear that this collection should be treated

quickly to avoid further deterioration. Generally, physical, biological, human negligence, natural disasters (floods, hurricanes, and tsunamis), and chemical agents caused due to light, heat, moisture, fire, fungi, insects and air pollution are the causes of deterioration. Out of the 543 palm leaf manuscripts in the library, 44% have been preserved, and the deterioration types have been identified. For example, our collection contains palm leaf manuscripts damaged by the tsunami in 2004 (Figure 3).

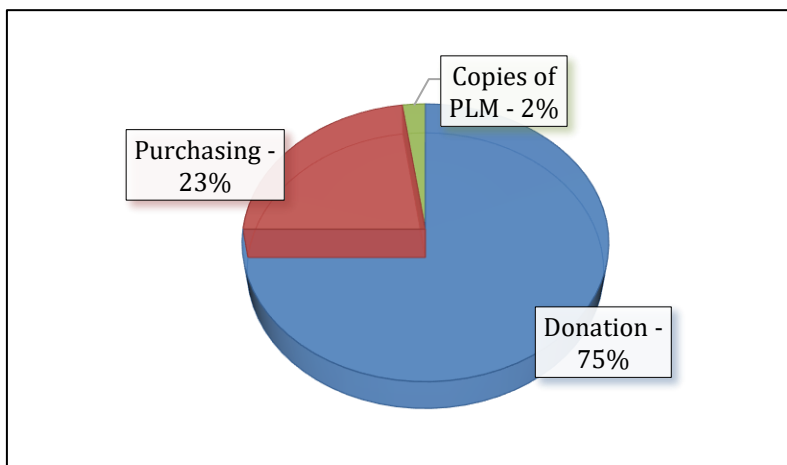


Figure 2. Ways of collection building



Figure 3. Some of the palm leaf manuscripts damaged by the tsunami in 2004

These manuscripts were contaminated with dry salt layers for more than 12 years when we received them. We took immediate measures to remove the salt residue of these palm leaf manuscripts. The salt layer of the palm leaf manuscripts was removed slowly, and they were physically conserved. The folios on these palm leaf manuscripts were stuck together because of the seawater. Therefore, they were first separated into folios. Stuck folios were kept in a tray of water at a temperature of 60°C for about half an hour, and with the help of a spatula and a soft wet brush, the folios were separated. Separated folios were dried in a closed area. Then the removal of dust in folios and

Kambas (Cover boards) was carried out using a soft brush. The folios were cleaned using a 50% strength alcohol solution (isopropyl alcohol) and allowed to dry at room temperature. Resin oil (dummela oil) mixed with charcoal powder was applied to dried folios. This application was made using clean cotton clothes. Charcoal powder made out of *Trema Orientalis* (*Rosales: Cannabaceae*) (*Gaduba* in Sinhala) tree was purchased to use in this process.

Besides, the collection contains palm leaf manuscripts damaged by insects like silverfish and mice (Figure 4).



Figure 4. Palm leaf manuscripts damaged by mice

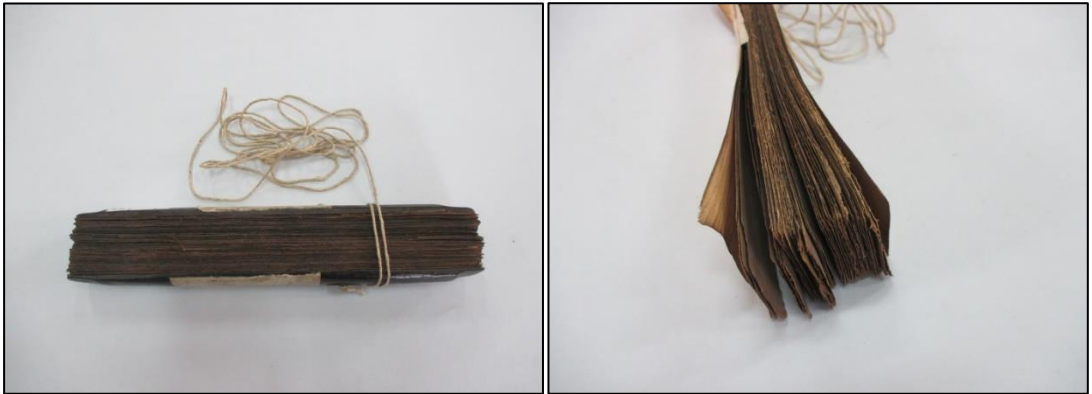


Figure 5. Manuscripts turning to black or brown due to oxidation



Figure 6. Palm leaf manuscripts damaged by fungi

When treating insect-bitten palm leaf manuscripts, removing dust and cleaning were done as explained earlier. Then, damaged folios were repaired, and holes were filled with acid-free Japanese tissue and handmade papers with CMC (Carboxymethyl cellulose or cellulose gum) or binder glue. After that, the repaired folios were trimmed to get a neat finish. Finally, resin (Dummala) oil and charcoal powder mixture was applied. It was observed that some manuscripts lose their colour, turning them black or brown from the original colour. As shown in Figure 5, in some manuscripts, only the segments near the edges are faded. The leading cause for this desecration may be the oxidation of green matter.

Despite all the restraints, the edges of the palm leaves are particularly affected and

brittle. The cause of such instability may be due to acidity. Another possible reason is that the palm leaves are hygroscopic and have a weak resistance to wear and tear. These manuscripts were cleaned using the alcohol solution. After trimming all the repaired folios, the resin oil and charcoal mixture was applied using cotton clothes.

Further, fungi have been observed in grey-black colonies in certain manuscripts. Unlike insect bites, fungal attacks have been detected on the entire leaf structure in this archive (Figure 6). While insects migrate from one infested collection to another or from surrounding areas, sometimes the Kamba themselves could be the source of insect infestation. The symptoms of insect attack on palm leaves are the presence of neat, pinhead-sized holes, irregularly eaten

edges, the presence of larvae which eat the leafy matter forming channels in such a way that a paper-thin surface remains intact on one side of the folio.

Apart from the dust, indirect fungi are found in the glue used in palm leaf manuscripts. As a treatment, thymol fumigation and the conservation process were carried out.



Figure 7. Storing of conserved palm leaf manuscripts

If we do not take immediate action to restore the damaged palm leaf manuscripts, the contents may not be readable. As a nation, we may face a situation to suffer due to the loss of our indigenous knowledge, which adversely affects the decision-making process of the present and future generations. Therefore, we had to find knowledgeable and skilled persons to preserve and conserve palm leaf manuscripts, especially those who know how to read the contents of the palm leaf manuscripts and categorize them into subjects.

The palm leaf manuscripts obtained by the library were first projected for physical preservation and digital conservation. After this conservation process, manuscripts were housed in a suitable environment for their longevity. Storage units of palm leaf manuscripts at the USJ library are shown in Figure 7.

After conserving, the palm leaf manuscripts were identified and categorized. Our collection of palm leaf manuscripts consists of various subjects such as Buddhism, Indigenous Medicine, Veterinary Science,

Rituals (Shanthikarma), Astrology, History and Language. These are written in Sinhala, Pali and Sanskrit. In addition, some palm leaf manuscripts were written both in Sinhala and Sanskrit. These palm leaf manuscripts date back to the 18th and 19th centuries A.D. Most palm leaf manuscripts are about indigenous medicine. Further, the library also has old manuscripts on Buddhism, such as Saddharmaratnawaliya, addharmalankaraya, Manorathapurana, Buddhavandanawa and Gihiritha.

Rare palm leaf manuscripts are available in our collection, such as Besajjamanjusawa, Besajjamanjusa Sannaya, and Saraswathi Niganduwa (drugs recipes) of indigenous medicine. These manuscripts are on medication and prescriptions for various diseases. It is assumed that specific prescriptions are for the illnesses which are considered could not be cured in the present day. Manorathapuraniya is a commentary (Atuwawa) for the Anguttara sect of the Tripitaka Suthra Pitakaya containing Buddhism (19th century A.D.). Dammapadatta is a written version of the story and contains about 300 stories and belongs to the early 19th century.

Besajjamanjusa Sannaya contains the therapeutic prescription for monks in Sanskrit (19th century A.D.). Saraswathi Niganduwa written in Sanskrit and Sinhala consists of verses. It belongs to the 19th century and contains information on trees, flowers, plants, spices and fruits.

Some manuscripts on medicines for treating various diseases like fever, children's worms' pain (ringworm), toothache, boils, stomachache, cough, strangulation, diarrhoea, rickets, hypochondria, catarrh, headache and skin diseases. In addition, the collection also contains palm leaf manuscripts on Shanthikarma (Rituals) to cure specific ailments such as the fear of inhumanity. Since this indigenous knowledge is valuable in the present context, preserving palm leaf manuscripts is pivotal.

After categorizing palm leaf manuscripts according to their subjects, folios were scanned. A database was created using DSpace open source software to develop the digital library on palm leaf manuscripts. It is linked to the library's digital repository, Scholar Bank (Figure 8). The bibliographic details of the palm leaf manuscripts were

initially entered into the palm leaf register, and the metadata was entered into the database. After completing the database, the bibliographic data will be linked to the library's Online Public Access Catalogue (OPAC). Users interested in getting details on these manuscripts can obtain bibliographic details of the palm leaf manuscripts via the OPAC. It is expected to build a mechanism for interested researchers to read the palm leaf manuscripts in the library. Upon proper authorization, researchers can access scanned copies of palm leaf manuscripts. A policy document was also prepared for the users' rules and regulations in accessing the palm leaf manuscripts.

We digitize complete sets of palm leaf manuscripts. It is a challenge to make complete sets out of the mixed lot. Most researchers can use these manuscripts only if they are translated into modern languages.

Hence, experts to read different languages written in manuscripts are required. Digitizing as an image would not help researchers to search. Hence we must work collaboratively with IT staff to make them searchable.

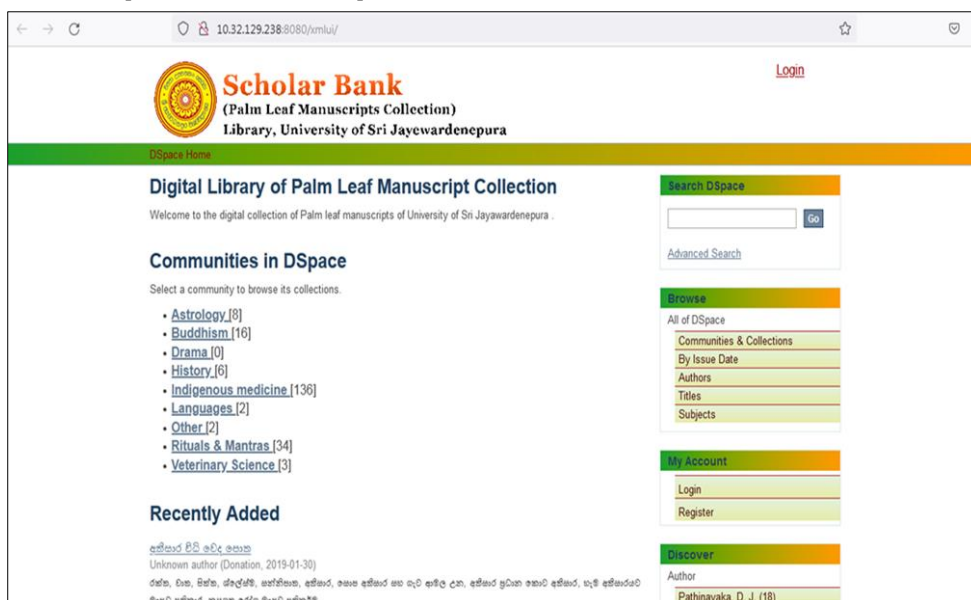


Figure 8. Scholar Bank

4. Conclusion and Recommendation

The project on preserving and conserving palm leaf manuscripts at the USJ library plans to collect the scattered manuscripts throughout the island, conserve, preserve, and make them available for researchers. These manuscripts are unpublished materials relating to the history and culture of Sri Lanka. The USJ library has made efforts to preserve palm leaf manuscripts as the process gives a lasting impression of its deep-rooted knowledge system, which was available in our country. Therefore, especially in the Sri Lankan community, palm leaf manuscripts are considered a valuable cultural heritage, and the manuscripts are helpful to study and research in various fields to support the country's national development.

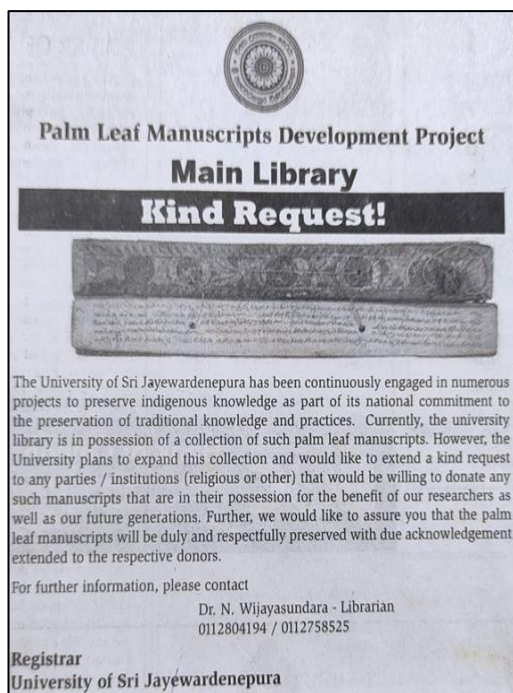
The palm leaf manuscript collection at the USJ library was digitized to ensure the original palm leaf manuscript's safety and longevity. Researchers who read the contents may use the digitized copy for research purposes. It is challenging to read and translate the palm leaf manuscripts into modern languages and make the scanned copies searchable text. The process is time-consuming, and this project will run for many years. However, it is worth working on this task to disseminate our documented indigenous knowledge. Preserving these manuscripts will help pass on our wealth of knowledge to future generations.

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Annexure: Extract copy from Newspaper advertisements (Sunday Observer, October 28, 2018)



**Palm Leaf Manuscripts Development Project
Main Library**

Kind Request!

The University of Sri Jayewardenepura has been continuously engaged in numerous projects to preserve indigenous knowledge as part of its national commitment to the preservation of traditional knowledge and practices. Currently, the university library is in possession of a collection of such palm leaf manuscripts. However, the University plans to expand this collection and would like to extend a kind request to any parties / institutions (religious or other) that would be willing to donate any such manuscripts that are in their possession for the benefit of our researchers as well as our future generations. Further, we would like to assure you that the palm leaf manuscripts will be duly and respectfully preserved with due acknowledgement extended to the respective donors.

For further information, please contact
Dr. N. Wijayasundara - Librarian
0112804194 / 0112758525

Registrar
University of Sri Jayewardenepura