

# **Training Course of Microbial Resources Information Management and Utilization for Developing Countries**

## **RRISL Culture Collection**

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**RUBBER RESEARCH INSTITUTE  
OF SRI LANKA**



**Rubber Research Institute of Sri Lanka is the oldest research institute on rubber in the world and is the nodal agency in Sri Lanka with the statutory responsibility for research and development on all aspects of rubber cultivation and processing for the benefit of the rubber industry. Plant Pathology & Microbiology Department is the centre for planning, implementation and management of research on all aspects of the maladies of rubber plantations in Sri Lanka, aspects**

**on microbiological applications and also the improvement of beneficial microflora.**

## **ABSTRACT**

The knowledge on the maintenance of a culture collection in our country could be improved as currently there is no such ongoing programme in Sri Lanka. The data we currently have our hands was uploaded, but there are more data that needs a little bit of refining. It will take time and funds are needed as a researcher needs to give the full time concentration on this. Hence further assistance / collaboration is expected from WDCM or UNESCO. Training several officers in the technical aspects viz. storage of cultures, and other molecular biological work is needed. Furthermore collaboration is needed for the sequencing of some fungal strains as we have not identified the fungal strains up to the species or subspecies level.

**Key words:** RRISL, Culture collection, fungi

## **Introduction of the Culture Collection - RRISL**

Rubber tree as any other agricultural crop is subjected to various diseases.

Many economically important diseases are caused by fungal pathogens. The checklist documents 60 fungi, one virus, a nematode and an alga as the disease causing agents in Sri Lanka. Presently, around 25 diseases are in existence in the rubber plantations and nurseries. Almost all the fungal diseases have been well studied and the isolations have been made.

<b>Disease</b>	<b><i>Causal organism</i></b>	<b>Type of organism</b>
Powdery Mildew	<i>Oidium heveae</i> Steinm.	Fungus
Colletotrichum leaf disease	<i>Colletotrichum gloeosporioides</i>	Fungus
Corynespora leaf fall disease	<i>Corynespora cassiicola</i>	Fungus
Abnormal Leaf Fall	<i>Phytophthora</i> spp.	Fungus
Bird's Eye Spots	<i>Drechslera heveae</i>	Fungus
Target Leaf Spots	<i>Thanatephorus cucumeris</i>	Fungus
Ustulina stem rot	<i>Ustulina deusta</i>	Fungus
Pink Disease	<i>Corticium salmonicolor</i>	Fungus
Patch canker disease	<i>Pythium</i> spp.	Fungus
White Root disease	<i>Rigidoporus microporus</i>	Fungus

Brown Root disease	<i>Phellinus noxius</i>	Fungus
Black Root disease	<i>Xylaria thwatsii</i>	Fungus
Nodules on leaves	<i>Aschersonia</i> sp.	Fungus
Sooty moulds	<i>Meliola</i> sp.	Fungus
Curvularia Leaf spot disease	<i>Curvularia</i> sp.	Fungus
Cylindrocladium leaf spots	<i>Cylindrocladium quinqueseptatum</i>	Fungus
Botryodiplodia gumosis	<i>Botryodiplodia theobromae</i>	Fungus
Fusarium wilt	<i>Fusarium</i> sp.	Fungus
Leaf spots	<i>Phomopsis</i> sp.	Fungus
Collar rot (Patch canker disease)	<i>Pythium</i> sp.	Fungus
Foot Canker	<i>Nattrassia mangiferae</i>	Fungus
Collar and hypocotyl rot	<i>Sclerotium rolfsii</i>	Fungus
Geotrichum associations	<i>Geotrichum</i> spp.	Fungus

The cultures from the above symptomatic plants and some biological controlling agents are being maintained at the laboratories of RRISL

(Table 2).

Table 2

Genus_Name	Species_Epithet	Author	Date_of_Isolation	Placeof_Isolation
<i>Colletotrichum</i>	<i>C. acutatum</i>	T.H.P.S.Fernando	1997	Kalutara, Sri Lanka
<i>Colletotrichum</i>	<i>C. acutatum</i>	C.K. Jayasinghe	1998	Kalutara, Sri Lanka
<i>Colletotrichum</i>	<i>C. acutatum</i>	T.H.P.S.Fernando	1997	Ratnapura, Sri Lanka
<i>Colletotrichum</i>	<i>C. acutatum</i>	T.H.P.S.Fernando	1998	Avissawella, Sri Lanka
<i>Colletotrichum</i>	<i>C. acutatum</i>	C.K. Jayasinghe	1998	Avissawella, Sri Lanka
<i>Colletotrichum</i>	<i>C. gloeosporioides</i>	C.K. Jayasinghe	1996	Kalutara, Sri Lanka
<i>Colletotrichum</i>	<i>C. gloeosporioides</i>	C.K. Jayasinghe	1997	Kalutara, Sri Lanka
<i>Colletotrichum</i>	<i>C. gloeosporioides</i>	C.K. Jayasinghe	1998	Ratnapura, Sri Lanka
<i>Colletotrichum</i>	<i>C. gloeosporioides</i>	T.H.P.S.Fernando	1997	Avissawella, Sri Lanka
<i>Colletotrichum</i>	<i>C. gloeosporioides</i>	T.H.P.S.Fernando	1997	Kalutara, Sri Lanka
<i>Corynespora</i>	<i>C. cassiicola</i>	W.P.K. Silva	2000	Ratnapura, Sri Lanka
<i>Corynespora</i>	<i>C. cassiicola</i>	W.P.K. Silva	2000	Kalutara, Sri Lanka
<i>Corynespora</i>	<i>C. cassiicola</i>	T.H.P.S.Fernando	2000	Ratnapura, Sri Lanka
<i>Corynespora</i>	<i>C. cassiicola</i>	T.H.P.S.Fernando	2000	Kalutara, Sri Lanka
<i>Corynespora</i>	<i>C. cassiicola</i>	T.H.P.S.Fernando	2005	Ratnapura, Sri Lanka
<i>Drechslera</i>	<i>D. heveae</i>	T.H.P.S.Fernando	1995	Kalutara, Sri Lanka
<i>Drechslera</i>	<i>D. heveae</i>	T.H.P.S.Fernando	1995	Kalutara, Sri Lanka
<i>Phytophthora</i>	<i>not identified</i>	AHR Jayaratne	1994	Kalutara, Sri Lanka
<i>Phytophthora</i>	<i>not identified</i>	AHR Jayaratne	1994	Kalutara, Sri Lanka
<i>Phytophthora</i>	<i>not identified</i>	MKR Silva	2013	Ratnapura, Sri Lanka
<i>Phytophthora</i>	<i>not identified</i>	MKR Silva	2013	Kalutara, Sri Lanka
<i>Phytophthora</i>	<i>not identified</i>	MKR Silva	2013	Kalutara, Sri Lanka
<i>Rigidoporus</i>	<i>microporus</i>	T.H.P.S.Fernando	2000	Kalutara, Sri Lanka
<i>Rigidoporus</i>	<i>microporus</i>	T.H.P.S.Fernando	2000	Ratnapura Sri Lanka
<i>Rigidoporus</i>	<i>microporus</i>	T.H.P.S.Fernando	2000	Kalutara, Sri Lanka
<i>Rigidoporus</i>	<i>microporus</i>	T.H.P.S.Fernando	2000	Galle Sri Lanka
<i>Rigidoporus</i>	<i>microporus</i>	T.H.P.S.Fernando	2000	Avissawella, Sri Lanka
<i>Ustulina</i>	<i>deusta</i>	KE Jayasuriya	2013	Kalutara, Sri Lanka
<i>Ustulina</i>	<i>deusta</i>	MKR Silva	2013	Kalutara, Sri Lanka
<i>Phellinus</i>	<i>noxius</i>	MKR Silva	2012	Kalutara, Sri Lanka
<i>Phellinus</i>	<i>noxius</i>	MKR Silva	2012	Kalutara, Sri Lanka
<i>Phellinus</i>	<i>noxius</i>	MKR Silva	2012	Kalutara, Sri Lanka
<i>Phellinus</i>	<i>noxius</i>	MKR Silva	2012	Kalutara, Sri Lanka
<i>Phellinus</i>	<i>noxius</i>	MKR Silva	2012	Kalutara, Sri Lanka
<i>Fusarium</i>		T.H.P.S.Fernando	1995	Kalutara, Sri Lanka
<i>Fusarium</i>		T.H.P.S.Fernando	2000	Kalutara, Sri Lanka

<i>Fusarium</i>		T.H.P.S.Fernando	2000	Kalutara, Sri Lanka
<i>Fusarium</i>		T.H.P.S.Fernando	2000	Ratnapura, Sri Lanka
<i>Fusarium</i>		T.H.P.S.Fernando	2005	Ratnapura, Sri Lanka
<i>Nattrassia</i>	<i>mangiferae</i>	W.P.K. Silva	2002	Meerigama, Sri Lanka
<i>Nattrassia</i>	<i>mangiferae</i>	W.P.K. Silva	2002	Meerigama, Sri Lanka
<i>Trichoderma</i>		KE Jayasuriya	2000	Ratnapura, Sri Lanka
<i>Trichoderma</i>		KE Jayasuriya	2000	Ratnapura, Sri Lanka
<i>Trichoderma</i>		T.H.P.S.Fernando	2012	Kalutara, Sri Lanka
<i>Trichoderma</i>		T.H.P.S.Fernando	2012	Kalutara, Sri Lanka
<i>Trichoderma</i>		T.H.P.S.Fernando	2012	Kalutara, Sri Lanka
<i>Aspergillus</i>		T.H.P.S.Fernando	2012	Kalutara, Sri Lanka
<i>Aspergillus</i>		T.H.P.S.Fernando	2012	Kalutara, Sri Lanka
<i>Aspergillus</i>		T.H.P.S.Fernando	2012	Kalutara, Sri Lanka
<i>Pennicilium</i>		T.H.P.S.Fernando	2012	Kalutara, Sri Lanka
<i>Pennicilium</i>		T.H.P.S.Fernando	2012	Kalutara, Sri Lanka
<i>Botrodiploidea</i>	<i>theobromae</i>	T.H.P.S.Fernando	2012	Kalutara, Sri Lanka
<i>Botrodiploidea</i>	<i>theobromae</i>	T.H.P.S.Fernando	2013	Kalutara, Sri Lanka
<i>Botrodiploidea</i>	<i>theobromae</i>	T.H.P.S.Fernando	2013	Kalutara, Sri Lanka
<i>Botrodiploidea</i>	<i>theobromae</i>	T.H.P.S.Fernando	2013	Kalutara, Sri Lanka
<i>Botrodiploidea</i>	<i>theobromae</i>	T.H.P.S.Fernando	2013	Kalutara, Sri Lanka
<i>Geotrichum</i>		T.H.P.S.Fernando	2012	Daraniyagala, Sri Lanka
<i>Xylaria</i>	<i>thwatsii</i>	T.H.P.S.Fernando	1991	Rambukkana, Sri Lanka

## **Benefits from the training courses**

- The training course helped immensely to fill our gaps of knowledge in terms of data management and sharing of resources from Sri Lanka. Because this is the first time Sri Lanka registered in this programme.
- This training course gave us the opportunity to improve our knowledge on microbial culture collection and taxonomic experiment skills, learn about the development trend and technical advancement in the field of microbiological informatics, learn to

manipulate microbial resource databases and their management platforms, and master other informational technique as well.

- This training provided us to make our contacts with the Chinese resource personnel in the above disciplines and in the future we will be able to apply the things in our countries and also we will be able share their knowledge.
- This gave us a good opportunity to take many taxonomists and microbiologists to a single flat form sharing their own experiences and discussing the drawbacks we face in our day today research work.
- Above all with regard to my country Sri Lanka, We had no knowledge in the discipline of maintaining a culture collection to serve the above purposes, So the exposure I have got will help immensely for me to establish, organize and to maintain a good culture collection as my country is rich in microbial resources.

WDCM will be pleased to cover the costs of your round trip air tickets and accommodation during the training course in Beijing.

We look forward to hearing you favorable acceptance to this invitation.

Please feel free to contact us for any further information.

## **Suggestion on WDCM work**

Culture collections are not self-sustaining because large portions of most collections are rarely requested, even though they deserve preservation in the interests of science. Hence WDCM has more opportunities, when we join their global catalogue to go for a collaborative grant and assist the supporting developing countries to maintain their work at least for a certain period of time.

## **Comments or suggestion on the training courses**

### **The training programme**

- The training programme gave a clear picture on the database management. At the same time to give a practical experience in culture maintenance and related other research works would have given more value to the training programme.
- New demands are being placed on handling of culture collections. As new technologies emerge, new methods of characterizing methods will be required for both scientific and legal purposes. Changes in the data processing environment of course we have got a clear picture. But as supervisory personnel, it is very important for us to have a better knowledge on these new equipments and techniques as many of the developing countries are still behind the scene.



## **Suggestion on further cooperation between WDCM and my collections RRISL**

Microbial community plays a critical role in the rubber plantations, especially the richness of micro-organisms that are involved as natural rubber plantations are ranked as one of the most environmental friendly agro-forestry crop. Presently, I have given information of around 18 fungal genus, for what we are sure. Under each genus we have approximately hundred different strains. But the cultures were not raised in view of maintaining a culture collection to serve the purposes of WDCM which also seems to be an organized way to handle a culture collection. Throughout this training I have gained sufficient experience and improved my knowledge to initiate my work once I am in Sri Lanka. Hence further cooperation is expected from WDCM to raise the possible cultures, to rejuvenate them, test the viability levels, to summarize the existing data in to a single worksheet and also to submit the data to the WDCM. Furthermore collaboration is needed for the sequencing of some fungal strains as we have not identified the fungal strains up to the species or subspecies level.

<b>Proposal</b>	<b>Sri Lankan Rs.</b>	<b>Approx. RMB</b>
Occupying one Temporary Research Officer – to work full time on culture collection for a period of one year 35,000 SLR X 12	420000.00	20,000.00
Training Research & Technical staff (4 no. ) on the involved work. Especially on the improvement of the knowledge on culture maintenance and storage purposes.  <b>Research Officer – one</b> <b>Technical Officers – 02</b> (Culture collection work) <b>Technical Officers – 01</b> (IT knowledge)	Research Officer – 01	

<p>Furthermore collaboration is needed for the sequencing of some fungal strains as we have not identified the fungal strains up to the species or subspecies level.</p>		

- To assist us to organize one training programme in Sri Lanka to organize a national culture collection center.

On agreement, we will be able to forward a detailed work programme.

## **Acknowledgements**

I owe a sense of gratitude to the organizers of the training programme, WDCM and UNESCO for giving us an opportunity to attend this and improve ourselves which will enable us to improve the culture collections in our countries.