



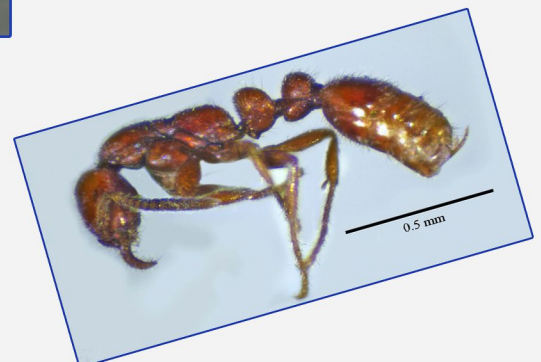
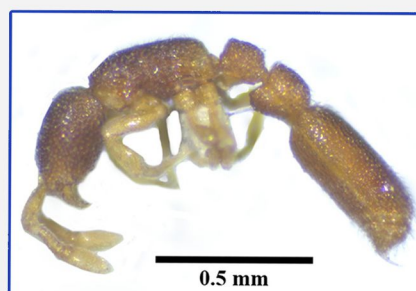
Newsletter 1

Regional Centre for Asian Ant Research
University of Kelaniya
May 2019



INSIDE THIS ISSUE

Background	01
Objectives	01
Message from the Coordinator	01
Resource persons	02
Past and present Research Assistants of the Centre	03
Photographs of International Training Course	04-07
List of Training Course participants	08
Participants' comments	09-10
Volunteers	11
Upcoming events	11
Publications & Acknowledgements	12



Background

Ants (Hymenoptera, Formicidae) being an important biotic component in the environment immensely contribute to ecological processes although several species pose a threat to human health also. The establishment of the Regional Centre for Asian Ant Research, a timely idea of Senior Professor Sunanda Madduma Bandara (the former Vice-Chancellor of University of Kelaniya, Sri Lanka), conducts and facilitates the studies on Ants of Sri Lanka and the Region. Also, dissemination of knowledge relevant to ant studies is done through publications and the training course on ants. The Centre intends to establish and maintain an ant repository, which is an essential resource to facilitate studies on ant diversity and taxonomy. In addition, young ant researchers will be provided with knowledge and practical experience to explore many unknown ant species in the region and the findings of research on ants will be disseminated through international conferences, meetings and publications.

Objectives

- Provision of short-term training courses on field sampling methods and identification of ants to the possible taxonomic levels
- Provision of a service to identify unknown ants
- Provision of library facilities/ information on literature relevant to ant research

Message from the coordinator, Professor R. K. Sriyani Dias

I am happy to publish Newsletter 1 of the Regional Centre for Asian Ant Research, which was established in 2016, summarizing all activities conducted by the Centre during 2016-2019. I will continue to fulfill the objectives of the Centre and am looking forward to continue research collaboration with foreign ant experts in Asia in the future.

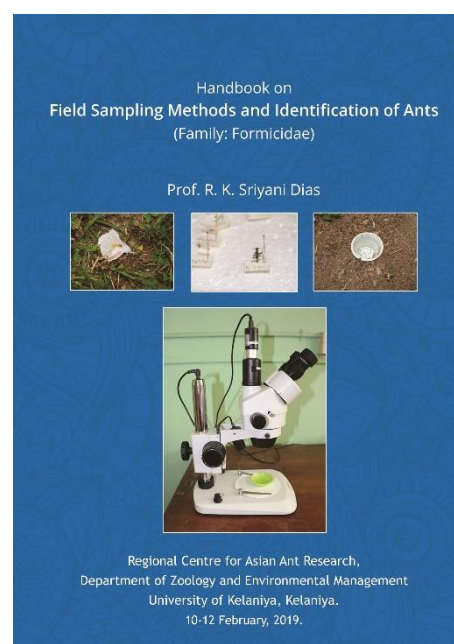
Coordinator and Resource Persons

Prof. R. K. Sriyani Dias (BSc (Zoology (Special), MSc, PhD), Sri Lanka (Coordinator and the Principal Resource Person in 2016, 2017, 2018 and 2019)



Prof. Dias has been conducting research on diversity and related aspects of ants in Sri Lanka since 1999 and published many research papers and abstracts together with her undergraduate and postgraduate students. Two postgraduate students who worked under her guidance implemented the "Ants of Sri Lanka" website

(<https://science.kln.ac.lk/antDB>) in 2013. Her students worked on *Aneuretus simoni* (Sri Lankan Relict Ant) discovered the species in many habitats in Sri Lanka and studied the biology and ecology of the species also. She organized and co-ordinated the 10th International Conference of ANeT (Network for the study of Asian Ants) held at the University of Kelaniya in October, 2015. The Regional Centre for Asian Ant Research was established at the University of Kelaniya in 2016, with the assistance of former Vice-chancellor. The International Training course on sampling and identification of ants held in 2016-2019 trained 60 national and foreign participants in the field. A handbook on the sampling and identification of ants was prepared and distributed among the participants.



Prof. Seiki Yamane (PhD.), Japan ([Advisor; Resource person in 2016](#))



Emeritus Professor Seiki Yamane is a globally renowned Japanese myrmecologist who worked at Kagoshima University (Faculty of Science, Graduate School of Science and Engineering) from 1st November 1980 to 31st March 2014. Currently, he works on the global ants in his own laboratory in Japan. He published more than 250 research papers and collaborated with many ant researchers in other countries.

Dr. Shahid A. Akbar (Ph.D.), Central Institute of Temperate Horticulture, India ([Resource person in 2018](#))



My area of interest includes ecological, socio-behavioural, evolutionary and biogeographical aspects of ants. Biological invasion by ants also brings a lot of fascination to me. It is one of the leading threats to biodiversity, agriculture and the economy as the mass extinctions by these invaders to the native mesofauna are rampant, but simply going on undocumented and unappreciated. Ant bionomics in an ever-changing contemporary environment requires a regular influx of young people and only this active participation will eventually affect in long term management and conservation programmes. Provided opportunities I would definitely like to pursue in this direction.

Associate Professor Aijaz Wachkoo (PhD.), Department of Zoology, Government Degree College, Shopian – 192303, Jammu and Kashmir, India ([Resource person in 2019](#))



I am interested in taxonomy and morphological evolution of insects with broad interests in the ecology and evolution of biodiversity. Insects of India are unexplored resource with enormous potential advantages that ensure we find something new and exciting, new systems that challenge or validate older hypothesis. So far, I have had the chance to work with ants and hoverflies. I would like to find out more about their respective ecologies and possible underlying evolutionary patterns.

Dr. W. Sudesh Udayakantha (PhD.), Sri Lanka ([Resource person in 2017, 2018 and 2019](#))



My scientific activity mainly concerns Myrmecology. During my B.Sc. and Ph.D., I worked on the taxonomy, ecology and biology of ants in Sri Lanka and I am interested in investigating life history of ant species. I am also interested in studying the ant community structure in different habitats and study of regional and global models of species density of ants (other insects also) considering ecological and biological factors as predictors and which address the questions of where insect richness is distributed and what factors have affected their current distribution.

Mrs. H. A. W. S. Peiris (MPhil.), Sri Lanka ([Resource person in 2019](#))



My area of interest includes how climate change effects on ant diversity and their behavioral patterns. Nowadays climate has changed drastically with increasing temperature of the environment and rainfall patterns. People are struggling with these unexpected climatic changes in their day to day life. Ants are very tiny creatures having a vast diversity. Their role on the environment by decomposing materials, pollination, predation, etc. is immense. But the impact on their life by the climate change is not documented well. Hence, ant investigations need to direct to above area to observe whether there is an impact on ants' life and to start the conservation practices.

Research Collaboration:

We discovered new ant species and published the findings (refer to publications at the end). **Front cover page** shows the ant species discovered through Regional Centre collaboration; *Pristomyrmex sinharaja* (Top right; photo credit: Prof. Seiki Yamane), *Oocerea biroi* (Middle right; photo credit: Dr. Aijaz and Dr. Shahid), *Strumigenys emmae* (Middle) and *Strumigenys membranifera* (Top left) (Photo credit: Dr. Aijaz and Dr. Shahid), *Prionopelta kraepelini* (Bottom left), *Protanilla schoedli* worker (Bottom right)

Past and present Research Assistants of the Centre

Present: Dr. W. Sudesh Udayakantha

Past: Mrs. Kanchana Karunathilaka, Mrs. Nadeesha Gunathilaka, Ms. Nadeeka Madushani, Ms. Achini Gamage, Ms. Madushika Rambukwella, Ms. Wasana Lakmini

Summary of International Training Course on sampling and identification of Ants 2016-2019

The training course included a grouped one-day field sampling session at a selected location (2016-2018: in Watinapaha, Veyangoda; 2019: in Katana), which provided hands-on experience in standard methods for sampling, honey-baiting, pitfall trapping, soil and litter sifting, trapping ants on trees etc. and preservation of ants. One- or two-day laboratory sessions conducted by the resource persons, with the provision of printed handbook and related taxonomic keys on the subject, facilitated the training of participants in mounting and identification of ants in their collection. Several oral presentations were given by the Resource Persons on the related topics. Each participant was awarded a certificate at the end of the programme.



Photographs of the first International training course on the field sampling and identification of ants September 15-16, 2016

Participants: Mr. G. M. Lakho, Mr. N. I. Anas, Ms. M. Hamzah, Mr. S. Udayakantha, Mr. N. Madhumal, Ms. D. Fernando, Mr. P. Perera, Mr. A. Thotagamuwa, Ms. K. Gunathilake, Ms. D. Hemachandra, Ms. P. D. Silva, Ms. A. Premachandra, Ms. K. Dadallage, Ms. A. Narayana, Ms. I. Panamaldeniya, Ms. G. Rathnayake, Ms. S. D. Silva

Technical Assistants: Mr. Harsha Weeraratne

Invitees who attended the certificate awarding session: Vice-chancellor, Prof. Sunanda Madduma Bandara (2016); Prof. G.A.S Mangala Ganehiarachchi (Head, Department of Zoology and Environmental Management)



Photographs of the second International training course on the field sampling and identification of ants April 08 – 09, 2017

Participants: Mr. S. Premadasa, Ms. C. Samanthika, Mr. K. Pathiraja, Dr. Aijas A. Wachkoo, Dr. Shahid A. Akbar, Ms. S. Jayathilaka, Ms. V. Withanage, Ms. D. Madduma, Mr. D. Edirisingha, Ms. S. Wickramasinghe, Ms. D. Ramanayaka, Ms. J. Jayasundara, Ms. I. Udeshika, Ms. J. Magage, Ms. O. Peiris, Ms. P. Wijesinghae, Ms. G. Kandasamy

Invitees who attended the certificate awarding session: Prof. M.J.S. Wijeyaratne (Former Chair, Department of Zoology and Environmental Management), Prof. B. M. Jayawardena (Dean, Faculty of Science), Prof. G.A.S.M. Ganesharachchi (Head, Department of Zoology and Environmental Management)



Photographs of the third International Training Course on the Field Sampling and Identification of Ants on 23rd-25th, February, 2018

Participants: Prof. W. A. Panhwar, Mr. S. Salman, Mr. A. Lodewyke, Mr. A. U. Aberathna, Ms. N. M. Rajakaruna, Ms. D. Rajapaksha, Ms. H. Jayakody, Ms. U. Kalpani, Ms. M. Rabukwella, Ms. Z. Rafeeldeen, Ms. P. Gardiyawasam

Resource Persons, Dr. Shahid A. Akbar and Prof. R. K. Sriyani Dias awarded the certificates.



Photographs of the fourth International Training Course on the Field Sampling and Identification of Ants on 10th-12th February, 2019

Participants: Mr. A. Sivasingham, Mr. A. Thillainathan, Dr. R. Ganeswaran, Mr. A. Tharsan, Ms. A. Ganeshwaran-athan, Ms. N. Sivarasa, Ms. A. Yogalingam, Ms. V. Kiriella, Ms. S. Lakmali, Ms. V. Aramphamoorthy, Ms. P. T. Dayawansha, Mr. C. P. Mario, Mr. R. J. Perera, Ms. A. C. Pavithri, Ms. W.P. K. A. Dilhani

Foreign Resource person, Associate Professor Aijaz A. Wachkoo, and Prof. R. K. Sriyani Dias awarded the certificates.

Participants of International training course on the field sampling and identification of ants held at University of Kelaniya, Kelaniya, Sri Lanka:

15-16 September, 2016

Participant's name	Country
1. Mr. Ghulam Mujtaba Lakho	Pakistan
2. Mr. Noor Izwan Anas	Malaysia
3. Ms. Munirah Hamzah	Malaysia
4. Mr. Sudesh Udayakantha	Sri Lanka
5. Mr. Naveen Madhumal	Sri Lanka
6. Ms. Dinushi Fernando	Sri Lanka
7. Mr. Paramika Perera	Sri Lanka
8. Mr. Agasthya Thotagamuwa	Sri Lanka
9. Ms. Kawshalya Gunathilake	Sri Lanka
10. Ms. Deepika Hemachandra	Sri Lanka
11. Ms. Prabuddhika De Silva	Sri Lanka
12. Ms. Asha Premachandra	Sri Lanka
13. Ms. Kalani Dadallage	Sri Lanka
14. Ms. Arunodani Narayana	Sri Lanka
15. Ms. Isanka Panamaldeniya	Sri Lanka
16. Ms. Geethika Rathnayake	Sri Lanka
17. Ms. Samanmali De Silva	Sri Lanka

08-09 April, 2017

Participant's name	Country
1. Mr. Sajith Premadasa	Sri Lanka
2. Ms. Chandi Samanthika	Sri Lanka
3. Mr. Kanchaka Pathiraja	Sri Lanka
4. Dr. Aijaz Wachkoo	India
5. Dr. Shahid Ali Akbar	India
6. Mr. Tharaka Wijerathna	Sri Lanka
7. Ms. Shashikala Jayathilaka	Sri Lanka
8. Ms. Vasana Withanage	Sri Lanka
9. Ms. Damindi Madduma	Sri Lanka
10. Mr. Dimuthu Edirisingha	Sri Lanka
11. Ms. Sulakkhana Wickramasinghe	Sri Lanka
12. Ms. Dulani Ramanayaka	Sri Lanka
13. Ms. Jayamini Jayasundara	Sri Lanka
14. Ms. Ishari Udesika	Sri Lanka
15. Ms. Janadhi Magage	Sri Lanka
16. Ms. Oshani Peiris	Sri Lanka
17. Ms. Piumi Wijesinghe	Sri Lanka

23-25 February, 2018

Participant's name	Country
1. Prof. Waheed Ali Panhwar	Pakistan
2. Mr. Shehzad Salman.	Pakistan
3. Mr. Anthony Lodewyke.	Sri Lanka
4. Mr. Asanka Udaya Aberathna.	Sri Lanka
5. Ms. Nalika Manel Rajakaruna	Sri Lanka
6. Ms. Dulka Rajapaksha.	Sri Lanka
7. Ms. Hashini Jayakody.	Sri Lanka
8. Ms. Upeksha Kalpani	Sri Lanka
9. Ms. Madushika Rabukwella	Sri Lanka
10. Ms. Zaithum Rafeeldeen	Sri Lanka
11. Ps. Pumudi Gardiyawasam	Sri Lanka

10-12 February, 2019

Participant's name	Country
1. Mr. Arthiyan Sivasingham	Sri Lanka
2. Dr. Rajendramani Gnaneswaran	Sri Lanka
3. Mr. Annathurai Tharsan	Sri Lanka
4. Ms. Anitha Ganeshwaran-athan	Sri Lanka
5. Ms. Nitharany Sivarasa	Sri Lanka
6. Ms. Arani Yogalingam	Sri Lanka
7. Ms. Vihara Kiriella	Sri Lanka
8. Ms. Shanika Lakmali	Sri Lanka
9. Ms. Vithusha Aramphamoorthy	Sri Lanka
10. Ms. Prabha Thenuwari	Sri Lanka
Dayawansa	
11. Mr. Christpin Pujitha Mario	Sri Lanka
12. Mr. Romesh Jayashan Perera	Sri Lanka
13. Ms. Agampodi Chethana Pavithri	Sri Lanka
14. Ms. W.P. Kumudu Ayesha Dilhani	Sri Lanka

Comments of some participants

Mr. Shehzad Salman

Participation in this course was very beneficial for me. It let me learn a lot about ants of Sri Lanka, which lies in Oriental region. So, I was not familiar to many genera found here, which were absent in Arabian Palaearctic region. This training course will help me a lot when I will study ants of Pakistan. In regard to geography, I liked Sri Lanka so much and I as happy as I am in Pakistan. I thank to Prof. R.K.S. Dias, organizers of this course as well as all the participants for blessing me this opportunity. Special thanks to all who are directly or indirectly helped me during this wonderful event.

International training course on field sampling and identification of ants, April 08 – 09, 2017 – University of Kelaniya, Kelaniya, Sri Lanka.

Name: Dr. Aijaz Ahmad Wadood

Your Comments: The workshop was a great success providing first hand experience of collecting ants, their preservation and identification. Workshop was very well organised with all the required facilities. Participation of young students was most beautiful and very well directed step towards safeguarding our vanishing biodiversity.

These kind of workshops should be organised frequently. I strongly believe biodiversity of Sri Lanka is amazing treasure and should be studied on priority.

Aijaz Ahmad Wadood
21/04/2019

International training course on field sampling and identification of ants, April 08 – 09, 2017 – University of Kelaniya, Kelaniya, Sri Lanka.

Name: Dr. SHAHID ALI AKBAR / Young Scientist DST/SERB

Your Comments:

THE TRAINING COURSE ON FIELD SAMPLING AND IDENTIFICATION OF ANTS WAS WELL MANAGED. IT WAS GREAT EXPERIENCE WORKING WITH ANTS OF SRI LANKA WHICH ARE DIVERSE WITH MANY UN-EXPLORED. IT WOULD HAVE BEEN MUCH BETTER TO HAVE THE WORKSHOP SCHEDULED FOR AT LEAST ONE WEEK. ALL THE PEOPLE INVOLVED WERE VERY MUCH INTERESTED AND SUPPORTIVE.

(03) Mr. Noor Izwan ; Malaysia

It is my biggest opportunity to learn more on ants especially from expert taxonomy 'Prof. Sibi Gunaratne'. The course is very good and was supported to join by many other people that are love on ants. One training is expected to be done to increase the knowledge on ants systematics and taxonomy around Asia.

Thank you

(04) Mr. Agasthya Thotagamuwala; Sri Lanka
(University of Colombo)

First of all I must thank Prof. Dias for organizing such a great opportunity for interested students. The course is highly motivating and the other workshop I've attended. The workshop I think is excellent for students to learn the basic techniques of field collection and identification. The workshop provides a hands-on experience to all participants which is very good and useful. I wish Prof. Dias at the best and to organize such workshops every year and the only suggestion I have is to increase the number of days of the workshop. All the best!

Thank you
Agasthya Thotagamuwala

2019 / February / 12

This workshop was very useful. I knew a lot of things about ant handling method, mounting method are known very well. I enjoyed that workshop. I could improve my knowledge. Thank you for all.

- It is very useful because of,
- we used our theory knowledge in practically in scientific manner
 - very effective
 - learnt lots of new things, methods & uses.
 - got new experiences how to do our scientific works (sampling, handling, mounting, labelling, identification, confirmation) in proper way.
 - we had very good chances to do everything in our hands under the very good demonstration & guide.
 - It was not stressful, and it increased our interest too much for doing work hard.
 - much more like to continue our works by these experiments & share with others & our juniors also.
 - we got too much food & refreshments & caring for us.
 - we are grateful all of you and we are very happy to join with this.
 - share & give such workshops whenever you have possibilities in every year.
- End of work —

(01) Mr. Ghulam Mujtaba Lakho ; Pakistan

I am very happy to be here as like as my second home, the people are very kind and helpful, this is my first trip and found excellent teaching skills to specially professor Dias. all the staff and students are very cooperative. I will never forget this beautiful occasion and got lots of skills of collection, dry mounting and identification of Ants, I whole the occasion is excellent. I am also very much grateful paying us scholarship for this programme. Thanks you very much Vice Chancellor Kelaniya University, Professor S.K. Dias, Sudesh, Sanjana, parametku all other staff and all students.

Ghulam
16/9/16

(02) Ms. Munirah Hamzah ; Malaysia

I'm really happy to be here in Sri Lanka and joining the training course. It was my first time joining the training course in the field that I like. There're many new things that I learnt from this course which have different in the techniques used. I enjoyed being here learning knowledge about ants that can improve my skills in the field. We shared a lot of knowledge about ants with Prof. Sriyani Dias, Prof. Yamane, Mr. Ghulam and Sanjana. It was a great experience and opportunities to be here. Joining this course have made me want to continue my studies to the next level in the future. Meeting with the expert made me realize that I am not alone in this field and I have many expert to be contacted in the future. If I have any problems in the identification meeting experts was a biggest opportunity for me to be able to talk about ants in my life. Thank you to Kelaniya University for this opportunity and Prof. Sriyani Dias for accepting my request to join the training course. I am just a master coursework student who is really interest in ants. Thank you so much. Glad to be here in Sri Lanka and joining the training course.

16/9/2016 11:55 a.m

MUNIRAH HAMZAH

At the first place we are very grateful for giving us such a valuable opportunity by selecting us to go for the workshop. I'm really thankful to you that you have given us the chance. As well for three days we have learned so many new things.

This was a well planned training programme. As we learn from very basics of ant sampling to mounting identification levels as well. Whole programme was well organized, & it was really pleasant experience with all who have helped us with many kindness.

We had a knowledge on ant mounting & identification, & Madam, Sir Thank you for helping us with that much of tolerance as we were beginners. At the end of each day I felt so confident level. At the end of each day I felt so confident that I've learned something new today. So that makes me so happy. And as all the learning aids were given process were smooth & interesting in learning.

We met new members & communicated with them well & it was get another experience.

Finally thank you, organizing committee who have arranged all the foods & beverages, Sir, Madam, who were giving us this rare opportunity. And I wish you all the best of luck for carry on this kind of workshops & reaches more & more.

Dr. Waheed Panhwar, Pakistan

It's my honour to be part of the training on "Field Sampling method and identification of Ants" held at Regional Centre for Ant Research Department of Zoology, Environmental Management University of Kelaniya by great Scientist Prof. R.K. SRIYANI DIAS. I have learnt a lot of thing identification of ants and sampling methodology of ants including a lecture on DNA barcodes of Ants by Dr. Aijaz. The training was well arranged and systematically organised. Dr. Shahid and Mr. Sudesh gave me a good knowledge to separate subfamilies of the ants. I am highly thankful to Prof. R.K. of Sriyani Dias, Dr. Shahid, Dr. Aijaz, Mr. Sudesh for contributing a brick to knowledge of Ants in my life. I am highly thankful to organising committee. I don't how can I pay thanks to Prof. R.K. Sriyani Dias and Sudesh for their positive, loving, caring attitude and support at every step of this training. Such type of training can learn new vistas in young researchers can learn new vistas in this field. Thanks for every thing.

W. Panhwar
2018

First of all Thank you very much for this valuable opportunity and selected us for this training program.

We have learned lot of thing from during these three days. As this is our first experience of working with ants, we had learned all the sampling methods, techniques of classifying ants up to species level and how to mounting a specimen.

The training programme was well organized and it was really very pleasant experience for all of us.

Dear Sir, Madam, Sir, we are very grateful to you for your kindness, because as we are beginners all of you work hard to teach us the techniques, correctly and well.

All the refreshments and food were at their optimum level. Everyday we achieved new experiences and progress.

So again I would like to convey my gratitude to Madam and all the staff for your kindness and the support we wish you all the best for your every work.

Volunteers who supported in many ways:

2016

Ms. Nishani Moragoda

2018

Mr. WPSP Premadasa

Mr. SPKSS Pathiraja

Ms. ALC Samanthika

Ms. Vasana Lakmini

Ms. Thilini

Ms. Ashani

2017

Mr. Sathira Marasingha

Ms. Ashani Liyanage

2019

Mr. WPSP Premadasa

Mr. SPKSS Pathiraja

Ms. JAHC Jayakody

Upcoming events in 2019

1. An outreach activity on “Medically Important Ants in Sri Lanka” will be held at a selected school in Gampaha District.
2. The survey of Sri Lankan Relict Ant (*Aneuretus simoni* Emery, 1893) at the Forest Reserves in Nuwara Eliya District will be conducted after receiving the permission from relevant authorities.
3. The fifth “International Training course on the Field sampling and Identification of Ants” will be held in Bangkok, Thailand in parallel to the 12th ANeT conference.

Announcement on the next International Training Course on ant identification:

12th ANeT meeting 2019 for Myrmecologists

The 12th International Conference of ANeT (Network for the study of Asian Ants) is scheduled to be held during 11 - 15 November, 2019 at Faculty of Forestry, Kasetsart University, Bangkok, Thailand (as announced by Prof. Decha Wiwatvitaya). The next training course will be held at the same place on a scheduled day.



Publications through Regional Centre collaboration:

Full papers:

1. R. K. S. Dias, W. S. Udayakantha, A. A. Wachkoo, S. A. Akbar. 2019. New Records of Ants (Hymenoptera: Formicidae) from Sri Lanka, Including four tramp species. *Sociobiology* 65 (3): 449-455.
2. Dias, R. K. S., Yamane, Sk., Akbar, S. A., Peiris, H. A. W. S. and Wachkoo, A. A. (2018). Discovery of the worker caste of *Protanilla schoedli* Baroni Urbani & De Andrade (Formicidae: Leptanillinae) in Sri Lanka, *Oriental Insects*, DOI: 10.1080/00305316.2018.1476273
3. Yamane, Sk. and Dias, R. K. S., 2016. New species of the *Pristomyrmex profundus* Wang group from the Oriental Region (Hymenoptera: Formicidae: Myrmicinae). *Euroasian Entomological Journal*, 15(1): 188- 193.

Abstract:

1. Dias, R. K. S., Wackhoo, A. A. and Akbar S. A., 2017. New records of ant tax (Hymenoptera: Formicidae) in four subfamilies from Sri Lanka (Abstract). Proceedings of International Research Symposium on pure and Applied Sciences, Faculty of science, University of Kelaniya, Sri Lanka: 31.

Handbook for the training course:

1. Dias, R. K. S., 2018. Handbook on Field Sampling Methods and Identification of Ants (Family: Formicidae). Regional Centre for Ant Research Department of Zoology and Environment Management, University of Kelaniya. 30 p.

Acknowledgements

Many thanks for the provision of financial support by the University of Kelaniya for purchasing equipment and consumables, travelling expenses of foreign participants in 2016-2018 and all foreign Resource Persons and all activities conducted by the Regional Centre for Asian Ant research. Mr Krishan Rajapaksa of Department of Zoology and Environmental Management is thanked for his assistance in designing the front cover page.