

National Mission on Himalayan Studies (NMHS)

HIMALAYAN RESEARCH FELLOWSHIP

(FORMAT FOR THE HALF YEARLY PROGRESS REPORT)

[Reporting Period: from 1st January, 2018 to 30th June, 2018]

Name of the Institution/ University:	Zoological Survey of India
No. of Himalayan Research/Project Associate:	02
No. of Himalayan Junior/Senior Research/Project Fellows:	10

Himalayan Research Associate

H-RAs Profile Description:

S. No.	Name of RA	Date of Joining	Name of the PI	Qualification
1.	Dr. Abesh Kumar Sanyal	03.06.2016	Dr. Kailash Chandra	Ph.D.
2.	NA	NA	NA	NA
3.	Dr. John Caleb T. D.	01.03.2017	Dr. Kailash Chandra	Ph.D.

Progress Report: To be filled for each HRA in separate row.

RA No.	Research Objectives	Achievements	Addressed Deliverables	Location of Field Site with Details, if any
1.	Number of Long-Term Ecological/ Environmental Monitoring (LTEM) sites establishment Status & distribution of threatened Apollo and other Parnassini butterflies	<ul style="list-style-type: none"> ➤ Two systematic surveys have been carried out in Askot WLS, Singalila National Park (SNP), Neora Valley National Park (NVNP), West Bengal in April - June, 2018. ➤ Altogether, 132 LTEM sites have been established in 5 study areas (except Sikkim) across Himalayan Landscape. ➤ Identification of collected moths (840 Species of moths were identified under 400 genera of 24 	<ul style="list-style-type: none"> • Identification of sites for LTEM. • Habitat-suitability mapping of threatened Himalayan butterflies. • Conservation frameworks development for Himalayan Lepidoptera. 	Askot WLS, Uttarakhand Singalila National Park (SNP), Neora Valley National Park (NVNP), West Bengal

		<p>families).</p> <ul style="list-style-type: none"> ➤ Presented at “1st Himalayan Researchers consortium, 2018”. Organized by National Mission on Himalayan Studies (NMHS) and G. B. Pant National Institute on Sustainable Himalayan Ecosystem (GBPNISHED) at Dehradun. 		
2	<p>Monitoring surveys in historical collection localities</p> <p>Climate-Envelope modeling & Distribution mapping for responses to changing climate</p>	<ul style="list-style-type: none"> ➤ As prominent Historical Collection Localities, Dharamshala, Darjeeling and Sikkim have been identified, where the repeat sampling will be undertaken soon. 	<p><i>Within the reporting period, no H-RA was assigned to this work, as the previous H-RA working against this objective resigned in September, 2017</i></p>	<p>Dharamshala (Himachal Pradesh), Darjeeling (West Bengal), Sikkim</p>
3.	<p>Molecular Phylogenetic Work through DNA Barcoding to resolve species complexes</p>	<ul style="list-style-type: none"> ➤ DNA isolation was carried out for 450 specimens and PCR was performed for 400 specimens. 200 full length sequences were obtained. ➤ Preliminary analyses of the obtained sequences were performed on the BOLD database clustering analysis. ➤ Morphologically identified <i>Abraxas</i> species (103 examples) were used for Mitochondrial COI Sequencing. 51 full length sequences and 43 mini barcodes were obtained. ➤ DNA isolation of the specimens belonging to the genus <i>Psyra</i> is in progress to help resolve the <i>P. debilis</i> complex. ➤ Presented at “1st 	<ul style="list-style-type: none"> • DNA barcode database generation for future molecular and phylogenetic research on Himalayan Lepidoptera 	<p>NA</p>

		Himalayan Researchers consortium, 2018". Organized by National Mission on Himalayan Studies (NMHS) and G. B. Pant National Institute on Sustainable Himalayan Ecosystem (GBPNISHED) at Dehradun.		
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Note: Data, table and figures may be attached as separate source file (.docx, .xls, jpg, .jpeg, .png, .shp, etc.).

Himalayan Junior/Senior Research/Project Fellows

H-JRF/H-SRFs Profile Description:

S. No.	Name of JRF/SRF	Date of Joining	Name of the PI	Qualification
1.	Mohd. Ali, HJPF	29.09.2016	Dr. Kailash Chandra	M.Sc
2	Kaushik Mallick, HJPF	06.06.2016	Dr. Kailash Chandra	M.Sc
3.	Uttaran Bandyopadhyay, HJPF	14.06.2016	Dr. Kailash Chandra	M.Sc
4.	Moumita Das, HJPF	08.12.2017	Dr. Kailash Chandra	M.Sc
5.	Kamalika Bhattacharyya, HJPF	14.06.2016	Dr. Kailash Chandra	M.Sc
6.	Subrata Gayen, HJPF	14.06.2016	Dr. Kailash Chandra	M.Sc
7.	Gaurab Nandi Das. HJPF	14.06.2016	Dr. Kailash Chandra	M.Sc
8.	Rushati Dey, HJPF	08.12.2017	Dr. Kailash Chandra	M.Sc
9.	Rahul Ranjan, HJPF	24.02.2017	Dr. Kailash Chandra	M.Sc
10.	Angshuman Raha, HSPF	15.04.2018	Dr. Kailash Chandra	M.Sc

Progress Report: To be filled for each JRF/JPF/SRF/SPF in separate row.

JPF/ SPF No.	Research Objectives	Achievements	Addressed Deliverable	Location of Demonstration/ Study Site with Details
1.	To investigate the differential processes influencing the distribution pattern of Lepidoptera	<ul style="list-style-type: none"> ➤ Processing of collected Lepidoptera from HNP. ➤ Data preparation and analysis for Species diversity of Lepidoptera from among six selected sampling zones of Ladakh Trans-Himalaya ➤ Morpho-taxonomy 	<ul style="list-style-type: none"> • Generation of scientific evidences in the form of reports on Lepidopteran diversity of HNP. • Robust data sets. • Thesis on the 	Hemis National Park, Jammu & Kashmir.

	<p>assemblages (moths and butterflies) of HNP</p> <p>Generation of robust datasets generated through ecological monitoring at habitat level</p>	<p>including genitalia dissection of collected 15 Lepidoptera species.</p> <ul style="list-style-type: none"> ➤ Secondary data entry of butterflies and moth of Trans-Himalayan region of Ladakh Jammu and Kashmir. ➤ Presented at “1st Himalayan Researchers consortium, 2018”. Organized by National Mission on Himalayan Studies (NMHS) and G. B. Pant National Institute on Sustainable Himalayan Ecosystem (GBPNISHED) at Dehradun. 	<p>subject area.</p>	
2.	<p>To investigate the differential processes influencing the Lepidoptera diversity of GHNP</p> <p>Generation of robust datasets generated through ecological monitoring at habitat level</p>	<ul style="list-style-type: none"> ➤ Two field surveys were done in GHNP in the month of April, May and June 2018 (Total 2800 specimens collected). ➤ Photography and identification of Moths collected from GHNP. ➤ Genitalia dissection of 27 Geometrid moth specimens from GHNP. ➤ Presented at “1st Himalayan Researchers consortium, 2018”. Organized by National Mission on Himalayan Studies (NMHS) and G. B. Pant National Institute on Sustainable Himalayan Ecosystem (GBPNISHED) at Dehradun. 	<ul style="list-style-type: none"> • Generation of scientific evidences in the form of reports on Lepidopteran diversity of GHNP. • Robust data sets. • Thesis on the subject area. 	<p>Great Himalayan National Park, Himachal Pradesh</p>
3.	<p>To investigate how diverse are the Lepidopteran assemblages in AWLS</p> <p>Generation of robust datasets generated through ecological</p>	<ul style="list-style-type: none"> ➤ One field survey was done in Askot Wildlife Sanctuary in the month of April. ➤ Photography and identification of Moths collected from Askot Wildlife Sanctuary. ➤ Genitalia dissection of 52 Noctuid moth specimens from Askot Wildlife Sanctuary. 	<ul style="list-style-type: none"> • Generation of scientific evidences in the form of reports on Lepidopteran diversity of AWLS. • Robust data sets. • Thesis on the subject area. 	<p>Askot Wildlife Sanctuary</p>

	monitoring at habitat level	<ul style="list-style-type: none"> ➤ Collection data entry in BOLD format of 4000 Lepidoptera specimens done which were from Askot Wildlife Sanctuary. ➤ Stretching of 200 Lepidoptera specimens collected from Askot Wildlife Sanctuary. ➤ Participated in “Workshop on Economic and Ecological Impacts of Invasive Alien Species”. Organized by Indian Statistical Institute, Kolkata in 2018. ➤ Presented at “1st Himalayan Researchers consortium, 2018”. Organized by National Mission on Himalayan Studies (NMHS) and G. B. Pant National Institute on Sustainable Himalayan Ecosystem (GBPNISHED) at Dehradun. 		
4.	To investigate the differential processes influencing the Lepidoptera diversity of KBR Generation of robust datasets generated through ecological monitoring at habitat level	<ul style="list-style-type: none"> ➤ Processing samples for molecular taxonomy. ➤ DNA isolation of 200 samples ➤ Processing 150 samples for sequencing. 	<ul style="list-style-type: none"> • Generation of scientific evidences in the form of reports on Lepidopteran diversity of KBR. • Robust data sets. • Thesis on the subject area 	Singalila National Park (SNP), Neora Valley National Park (NVNP), West Bengal
5.	To investigate the differential processes influencing the Lepidoptera diversity of SNP Generation of	<ul style="list-style-type: none"> ➤ Sampling at SNP during May 2018: SNP: 1800 specimen collected and identified to 150 morphospecies of moths and butterflies. ➤ Sampling at NVNP during July 2018: NVNP: 830 specimens collected and 	<ul style="list-style-type: none"> • Generation of scientific evidences in the form of reports on Lepidopteran diversity of SNP • Robust data sets • Thesis on the subject area 	Singalila National Park (SNP), Neora Valley National Park (NVNP), West Bengal

	robust datasets generated through ecological monitoring at habitat level	<p>identified to 80 morphospecies of moths.</p> <ul style="list-style-type: none"> ➤ Identified total of 125 species of moths from SNP and NVNP; ➤ Presented at “1st Himalayan Researchers consortium, 2018”. Organized by National Mission on Himalayan Studies (NMHS) and G. B. Pant National Institute on Sustainable Himalayan Ecosystem (GBPNISHED) at Dehradun. 		
6.	<p>To access the differential processes influencing the distribution pattern of Lepidoptera assemblages of moths from DDBR</p> <p>Generation of robust datasets generated through ecological monitoring at habitat level</p>	<ul style="list-style-type: none"> ➤ One systematic survey was undertaken during March-June 2018. ➤ We obtained above 700 morpho-species of Lepidoptera over the field period. ➤ All collected specimens have been stretched and documented. Photographic documentation is in process. The processed data has been gathered in Excel Workbook (BOLD format) and genitalia base identification is in process. ➤ Presented at “1st Himalayan Researchers consortium, 2018”. Organized by National Mission on Himalayan Studies (NMHS) and G. B. Pant National Institute on Sustainable Himalayan Ecosystem (GBPNISHED) at Dehradun. 	<ul style="list-style-type: none"> • Generation of scientific evidences in the form of taxonomic inventories on Lepidopteran diversity of DDBR. • Spatio-temporal relationships and biogeographic affinity of moths in relation to DDBR. • Thesis on the subject area. 	Dihang Dibang Biosphere Reserve, Arunachal Pradesh
7.	To investigate the differential processes influencing the distribution pattern of	<ul style="list-style-type: none"> ➤ Butterfly inventory surveys were undertaken during March to April, 2018 in DDBR; May, 2018 in SNP and June to July, 2018 in AWLS. 	<ul style="list-style-type: none"> • Specimens sorted, stretched and tagged for further taxonomic study • Literature Review for Himalayan Butterfly 	Dihang Dibang Biosphere Reserve, Arunachal Pradesh; Singalila

	<p>Lepidoptera assemblages (moths and butterflies) of DDBR</p> <p>Generation of robust datasets generated through ecological monitoring at habitat level</p>	<ul style="list-style-type: none"> ➤ Processing of collected Butterfly from Western, Central and Eastern Himalaya. ➤ Identification of collected butterfly samples. ➤ Genitalia dissection of collected butterflies from HNP (28 specimens). ➤ Presented at “1st Himalayan Researchers consortium, 2018”. Organized by National Mission on Himalayan Studies (NMHS) and G. B. Pant National Institute on Sustainable Himalayan Ecosystem (GBPNISHED) at Dehradun. 	<ul style="list-style-type: none"> • Generation of scientific evidences in the form of reports on Lepidopteran diversity of DDBR, AWLS • Robust data sets 	<p>National Park, West Bengal and Askot Wildlife Sanctuary, Uttarakhand</p>
8.	<p>Study of Molecular Taxonomy</p>	<ul style="list-style-type: none"> ➤ Sub-sampling of legs from the Lepidoptera specimens collected from DDBR and identified specimens of Arctiinae subfamily was done with proper labeling for downstream work with DNA. ➤ DNA isolation is in progress for more than 600 specimens so far from the three study sites and identified Lepidoptera specimens. ➤ Followed by DNA isolation, PCR of the targeted COI gene segment for the samples have been continuing in large scale. ➤ DNA sequencing has been done for 292 samples. ➤ Mini barcodes for fragmented DNA was generated using primer pair 	<ul style="list-style-type: none"> • Report on status of molecular taxonomy 	<p>Sub-sampling of legs of Lepidoptera samples from Neora Valley NP, Askot WLS and DDBR along with identified specimens of Erebidae family.</p>

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9.	Morphology Based Taxonomy	<ul style="list-style-type: none"> ➤ Field survey has been conducted at the Dihang Dibang Biosphere Reserve (Arunachal Pradesh). ➤ All the collected specimens of Lepidoptera have been stretched and sorted out for the morphological identification. ➤ Sorting up to subfamily level has been done. ➤ 80 examples have been identified up to genus level from the family Noctuidae, Geometridae, Pyralidae and Lamentridae. ➤ Morphological identification of all the <i>Abaxas</i> examples up to species level is in progress. ➤ One species of the subfamily Acronictiinae (Noctuidae: Lepidoptera) was recorded for the first time from India. 	<ul style="list-style-type: none"> • Report on status of morpho- taxonomy. 	Dihang Dibang Biosphere Reserve, (Arunachal Pradesh)
10.	Modelling on GIS-framework and Data Compilation Comparison of robust data sets generated through ecological monitoring	<ul style="list-style-type: none"> ➤ Validation and locality update of Himalayan Moth species from secondary literature. ➤ Validation and locality update of Himalayan Butterfly species from secondary literature. ➤ Richness grid maps preparation of moth species collected from secondary sources. ➤ Identification of Collected specimens of Family Notodontidae (17 species), Noctuidae (11 species), Sphingidae (26 species) from different Himalayan Landscapes. ➤ Presented at “1st Himalayan Researchers consortium, 2018”. Organized by National Mission on Himalayan Studies (NMHS) and G. B. Pant National Institute on 	<ul style="list-style-type: none"> • Robust database on species/ habitats • Strategy for conservation 	NA

		Sustainable Himalayan Ecosystem (GBPNISHED) at Dehradun.		
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Note: Data, table and figures may be attached as separate source file (.docx, .xls, .jpg, .jpeg, .png, .shp, etc.).

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Report (hard copy) should be submitted to:

The Nodal Officer, NMHS-PMU

G.B. Pant National Institute of Himalayan Environment and Sustainable Development (GBPNIHESD)
Kosi-Katarmal 263 643, Almora, Uttarakhand

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