

Final Evaluation Report

Your Details	
Full Name	Lalbiakzuala
Project Title	Educating young minds for snakebite management and conservation of snakes in Mizoram, India
Application ID	36737-1
Date of this Report	06/02/2023

1. Indicate the level of achievement of the project's original objectives and include any relevant comments on factors affecting this.

Objective	Not achieved	Partially achieved	Fully achieved	Comments
Educating the youths and frontline/primary health workers on snakebite management through workshops and awareness programmes				The objective was successfully achieved by conducting six technical sessions focussing on the youths and frontline/primary health workers. Training was conducted in the Regional Institute of Paramedical and Nursing Science (RIPANS) and Mizoram Nursing Council, Government of Mizoram with 393 individuals.
Impart proper handling and rescuing skills for the local forest guards				Hands-on training for handling snake and rescuing of threatened individual species was conducted with forest officials in all the targeted protected areas, Dampa Tiger Reserve, Murlen National Park, Tawi Wildlife Sanctuary and Pualreng Wildlife Sanctuary, yielding a total of 104 trained forest personnel. Among them, at least two forest guards from each protected site who showed great level of competence in the training sessions were selected and were assigned in-charge for all upcoming rescue operation in their respective protected areas.
Develop a group of young and enthusiastic volunteers to act as snake rescuers. Create a chain of volunteers comprising of local youths, NGO's and forest department personnel's for rescuing and relocation of snakes				Seeing that the actual cost of a good quality snake rescuing kits is higher than expected and considering the fact that snake rescuing required the combined knowledge on snake identification, proper handling skills and equipment, we were only able to establish a few well trained and equipped local snake rescuers. Despite being only 18 local volunteers, they were competent enough in handling snakes. During the project period the volunteers were able to address several cases of rescue calls and successfully relocate them into proper sites. Several

				nests of king cobra were also rescued from different parts of the state.
Develop a network, comprising media persons for wider circulation of information on snakes and their conservation in the state.				We could create an effective coordination with local media channels and youth wings for creating an atmosphere of compassion and coexistence between snakes and humans and develop knowledge among the local people for proper management and conservation of snakes in the region. The members that joined in the social media groups created for snakebite mitigation and conservation of snakes showed great interest in snake conservation and posted pictures of snakes encountered in their localities for identification on a regular basis.

2. Describe the three most important outcomes of your project.

a). Educating community: For achieving the proposed objective, a total of 21 educational awareness programmes were carried out at different study sites. A total of 2,698 participants from different agencies such as Environment, Forests and Climate Change, Government of Mizoram (File No. A.33024/1/2020-CWLW), local NGOs like Young Mizo Association (YMA), village councils (VCs), local councils (LCs), Mizo Hmeichhe Insuihkhawm Pawl or Mizo Women Association (MHIP), Self-Help Group, Mizo Upa Pawl or Mizo Elder Group (MUP), Health and Family Welfare Department, Government of Mizoram and related Institutions took part in the awareness programmes. Targeted protected areas (Tawi Wildlife Sanctuary, Pualreng Wildlife Sanctuary, Murlen National Park, Dampa Tiger Reserve), and different academic institutes as well as organisations were selected for conducting the programmes namely Government Tanhril High School, Pachhunga University College (PUC), Schools of Earth Science & Life Science, Mizoram University (MZU), Community Reserve Forests (Hmuifang, Reiek, Sailam), International Biodiversity Day (celebrated on the 23rd May 2022 in Mizoram), etc. The importance and ecological role of snakes in the ecosystem especially the agricultural systems, was also highlighted in the programmes. Locals were encouraged to be a part of the local Facebook groups dedicated for identification and conservation of herpetofauna in Mizoram such as “Herpetofauna of Mizoram” available at <https://www.facebook.com/groups/154062979995595>, and “Zoram Rul Chanchin” available at <https://www.facebook.com/groups/Mizoramrul>; a WhatsApp group like “Zo Herps”, as well as a widely reaching local channel like “LPS Special Report (on 20.6.2022 & 27.6.2022)”, and YouTube video (in <https://youtube.com/user/RomaHmar>) created for information and rescue of any snake from the state. General fear about snakes and misidentification of venomous species were minimised through demonstration and handling of live snakes by the experts, and also by teaching a field identification key for the 13 venomous snakes that were found in the region. Medical oriented educational interaction

programmes were also organised at the Nursing Council of Mizoram (NCM) and Regional Institute of Paramedical and Nursing Sciences (RIPANS) prioritising first aid treatment after snakebite and the biological aspects of snake venoms and snakebite mitigation. Posters depicting dos and don'ts after snakebite were also presented to every participant of the awareness programmes such as villagers, school/college/university students, nurses participating from different districts of the state, and forest officials for wider circulation of information.

b). Eradication of myths and misconceptions: We could explain the consequences of snakebite and treatment procedure to locals and health care personnel. The importance of treatment time and the consequences of wasting time for seeking anecdotal treatments and not reaching the hospital in time for appropriate treatment were also explained. Since wider classes of audience were present in the awareness programmes, several misconceptions and cultural beliefs related to medicinal usage of snake body parts were discussed during the interaction section with locals. A Powerpoint presentation and artistic illustrations were made to prepare to make the session more engaging and interesting. All presentations were explained in the local dialect i.e., Mizo, for easier understanding by local people. Some of the common beliefs that were discussed during the programmes included use of snake meat (dried, soup, steamed) for treatment of scrub typhus, applying of python body fats to burns and other external wounds, and consumption of gall bladder with bile juice for treatment of diarrhoea and malaria. Bile juice is also used as immune boosters by many tribal communities. Faeces of python was also reported to treat diarrhoea and fever. In other incidence, python spur was known to be used as sedative. All this along with other misconceptions and ritual faiths were discussed through scientific backed evidence during the awareness programmes.

c). Imparting proper handling and rescuing skills: Given that Mizoram is rich in snake diversity, with 67 extant species confirmed so far, confusion between harmless and venomous species is very common, not only among local communities but also among the forest officers and staff. We could use field identification keys for regional venomous snakes and explain the importance of combining precise identification of the snake and proper handling techniques as well as equipment to avoid any potential danger to the rescuer. Project team members and other snake handling/rescuing experts that we outsourced from other institutes and organisations such as Lomonosov Moscow State University (Russia), Bangor University (UK), Wildlife Trust of India (WTI) and Society for Nature Conservation Research and Community Engagement (CONCERN) conducted a demonstration and hands-on training for the proper handling and rescuing skills for both venomous and non-venomous snakes. Snake rescuing kits like hooks, tongs, and baggers sets were provided to forest guards and trained volunteers.

We consider the most significant outcome would be this project being the first of its kind in Mizoram state covering 21 local awareness programmes from five districts (Aizawl, Champhai, Kolasib, Mamit and Saitual Districts). Through the project we were able to create an atmosphere of compassion and coexistence with snakes and develop knowledge among the local people for proper management of snakebite and conservation of snakes in the region. The members that joined in the social groups created showed great interest in snake conservation and posted

pictures of snakes encountered in their localities for identification on a regular basis. Sharing information on first aid for snakebite was a great success as many of the participating nurses were unaware of such information. We have also received several calls for rescue of venomous snakes and their nest from different parts of the state which were previously killed without a second thought. In connection to this project, five king cobra (*Ophiophagus hannah*) were translocated along with six nests and the eggs from anthropogenic activity areas like plantation, jhum cultivation, etc. A total of 112 hatchlings from six clutches were released back in the nearby protected areas under the assistance of Environment, Forest and Climate Change Department, Govt. of Mizoram. A total of 16 monocled cobra (*Naja kaouthia*) were also rescued from human settlements (residential house, godown, garage, homestead garden, etc.) in and around the Aizawl city. Many species of venomous and non-venomous snakes were also rescued and released back in the jungles. Incubation of eggs were also conducted successfully.

3. Explain any unforeseen difficulties that arose during the project and how these were tackled.

Despite the first quarter of the project coinciding with the Covid 19 pandemic and several lockdowns in Mizoram, there has been good coordination between the project team and the local leaders of NGOs, authorities of the institutes, health care workers, and Forest Department of Mizoram Government. So, we have no unforeseen difficulties during the project period and all proposed activities were successfully completed.

4. Describe the involvement of local communities and how they have benefitted from the project.

Through this project, we established a good coordination with local communities, forest officials and health care workers, and received great appreciation from different sections of the society like farmers, youth, schoolteachers and students, forest officials, medical personnels, etc. All the participants are also invited to join the social groups created for information sharing in connection to snakebites and snake conservation. Sharing information on first aid for snakebite was a great success as many of the participating nurses were unaware of such information. We have also received several calls for rescue of venomous snakes and their nests from different parts of the state, animals which were previously killed without a second thought. We are positive that discussing several misconceptions about traditional snakebite treatments, usage of anecdotal alternate medicine and the consequences for delayed in administration of proper medical treatment would eventually change the attitudes in the management of snakebite victims and decrease mortality within the covered area so far. Moreover, clarifying the potential impact of large scale ethno-medicinal usage of snakes upon their populations, and explaining the ecological role of snakes in the ecosystem, especially for the livelihood of farmers, would make a considerable change in attitude towards snakes and the environment by and large.

5. Are there any plans to continue this work?

We are planning to continue this work by implementing the similar strategy yet improving our activities from the experience we gathered so far. We also plan to cover the remaining protected areas of the state that are not yet included in the current project such as Lengteng Wildlife Sanctuary, Phawngpui National Park, Ngengpui Wildlife Sanctuary, Khawnglung Wildlife Sanctuary, Thorangtlang Wildlife Sanctuary, and Tokalo Wildlife Sanctuary.

6. How do you plan to share the results of your work with others?

The outcome of the project was shared to the Ministry of Environment, Forest and Climate Change sponsored Environmental Information System (ENVIS) that is hosted by the Mizoram Pollution Control Board to be published in their National level ENVIS bulletin. Also, interviews were broadcast in the local daily news Channels such as Zonet News, DD Aizawl, LPS news and LSP special report and articles written in local language were published in regional newspaper namely Vanlaini, Frontier Dispatch, etc.

7. Looking ahead, what do you feel are the important next steps?

There are three important points that warrant further work:

1. Snakebite management: Through this project, we could show that, although WHO has provided the more updated guidelines for treatment of snakebite envenomation, the old medical practices on snakebite treatments, for instance, applying tourniquets, is still followed in the nursing institutes of Mizoram, and even certain medical doctors held trust in cutting the bite area for letting out the venom from the bloodstream. This clearly suggest the need of more technical training on snakebite management especially amongst medical personnel.

2. Snake rescuing: We are convinced that snakebite is not largely considered as a form of human-wildlife conflict, and the state's forest staff are lacking special training or appropriate equipment to effectively deal with snake conflict situations. In this project we are covering only a handful of the different forest divisions and staff in Mizoram; consequently, much wider coverage is necessary.

3. Conservation: The local community (Mizo) has a deep-rooted fear of snakes such that both venomous and non-venomous snakes are similarly treated as deadly animals to humans when encountered. Among the several deadly venomous snakes, it is plausible that king cobra is still considered the most fearsome and legendary snake in the local society such that killing the snake is not contemplated as a disgraceful act these days despite it is currently considered Vulnerable in the IUCN Red List of Threatened Species, and Schedule I in the Wildlife Protection Amendment Act (WPA) of India, 2022. Sightings of freshly killed king cobras and other large to medium sized snakes found in the region [e.g. Burmese python (IUCN: vulnerable; WPA: Schedule I), cave racer (IUCN: vulnerable; WPA: Schedule I), Indochinese rat snake (IUCN: near threatened; WPA: Schedule II), monocled cobra (IUCN: least concern; WPA: Schedule I), checkered keelback (IUCN: least concern;

WPA: Schedule I), greater black krait (IUCN: least concern; WPA: Schedule II), banded krait (IUCN: least concern; WPA: Schedule II), copper-head trinket snakes (IUCN: least concern; WPA: Schedule II), etc.] are not uncommon especially in agricultural or plantation sites. Occasionally they are seen dead on roads and in residential areas adjacent to forested areas possibly due to searching of potential prey items. Killings of king cobras in their natural breeding sites that are far from human residential areas must be attributable to the general fear of snakes. This work likely provides a glimpse of the human-king cobra conflicts and the need for a more effective and long-term conservation-oriented action plan in the focus area. Yet, the conservation management action plans must be feasibly aided by the intervention of intensive awareness campaigns with local communities in appraising the ecological importance of the native snake species and their habitats.

8. Did you use The Rufford Foundation logo in any materials produced in relation to this project? Did the Foundation receive any publicity during the course of your work?

The Rufford Foundation logo was used in all material produced in relation to the project such as public information brochures on snakebite management and deadly venomous snakes of Mizoram, banners, t-shirts, caps, and any information documents.

9. Provide a full list of all the members of your team and their role in the project.

Project team members and their roles:

Mr. Lalbiakzuala (Team leader): Project handling and management, logistics, public engagement, arrangement of educational kits and activities.

Prof. H.T. Lalremsanga: Overall support, establishing coordination with the state's Government authorities of Forest and Health departments.

Dr. Sushanto Gouda: Overall support, outsourcing snake handling and snakebite mitigation experts from national level.

Mr. Vishal Santra: Overall support, arrangement of educational kits, demonstration, outsourcing snake handling and snakebite mitigation experts from international level.

10. Any other comments?

Various activities and achievements obtained in connection to the project are highlighted in the following table and figures:

Table: Detail of the various activities conducted in Mizoram during the tenure of the project.

Sl. No.	Date	Type of Activity	Site/Place	No. Participants	Type of Audience
1	05/04/22	Awareness	Government Tanhril High School, Aizawl District	55	High School Students
2	30/05/22	Awareness cum Training	Murlen National Park, Champhai District	90	Locals, Students & Forest Guards
3	16/05/22	Hands-on Training	Tawi Wildlife Sanctuary, Saitual District	15	Forest Guards
4	16/05/22	Awareness	Hualtu village, Tawi Wildlife Sanctuary, Saitual District	114	Locals and Forest Guards
5	23/05/22	Awareness	Pachhunga University College (PUC), Aizawl District	21	PhD & MSc (Zoology) students
6	23/05/22	Awareness	College of Veterinary and Animal Husbandry, Selesih, Aizawl District	126	Students & Faculties
7	23/05/22	Awareness	Regional Institute of Paramedical and Nursing Sciences (RIPANS)	93	BSc (Nursing) Students & Faculty
8	03/06/22	Awareness	Department of Zoology, Mizoram University (MZU), Aizawl District	36	PhD & MSc (Zoology) Students & Faculty
9	13/06/22	Awareness	Govt. Reiek Middle School, Reiek, Mamit District	54	Students, Teachers & Local NGOs
10	14/06/22	Awareness	School of Life Sciences, MZU, Aizawl District	30	PhD (Life Sciences) Students
11	16/06/22	Hands-on Training	Teirei Range, Dampa Tiger Reserve, Mamit District	25	Forest Guards
12	17/06/22	Awareness cum Training	Lallen High School, Phuldungrei Range, Dampa Tiger Reserve, Mamit District	62	Locals, Students & Forest Guards
13	22/06/22	Awareness	Eco Club, MZU, Aizawl District	54	PhD (Earth Sciences) Students & Faculty
14	23/06/22	Awareness cum Training	Sailam Village, Aizawl District	46	Students & NGOs
15	25/06/22	Awareness	Hmuifang Community Reserve Forest, Aizawl District	36	Students & NGOs

16	30/06/22	Five series of Training for in-service nurses	Mizoram Nursing Council, New Secretariat, Aizawl District	300	Nurses from Government & Private Hospitals
17	1-28 Jul 22	Awareness	Govt. Saitual College, Saitual District	203	Students & Faculties
18	31/07/22	Awareness cum Training	Durtlang Locality, Aizawl District	76	Locals and NGOs
19	04/08/22	Awareness cum Training	North Hlumen village, Pualreng Wildlife Sanctuary, Kolasib District	63	Forest staffs, Locals & NGOs
20	12/08/22	Awareness	Living Water School, Aizawl District	891	Students & Teachers
21	22/09/22	Awareness	Govt. Mamit College, Mamit District	308	Students & Faculties

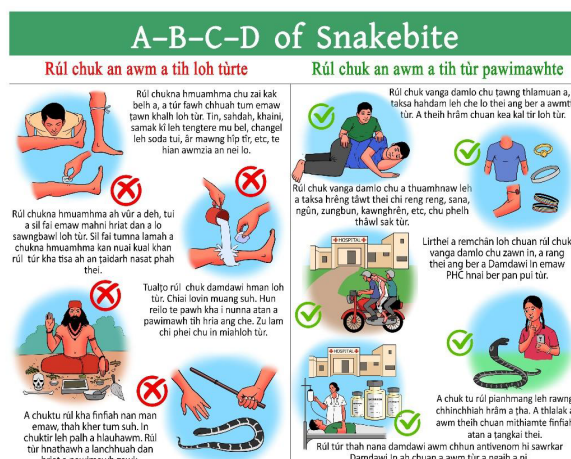


Figure 1: Educational kit depicting 13 deadly venomous snakes found in Mizoram, India. Figure 2: Educational kit depicting Do's and Don'ts for snakebites in local language.



Figure 3: Campaign kits. (A) T-shirts and caps with IHS logo; (B) & (D) Campaign posters; (C) Snake tongs for rescue; (E) Posters displayed in the public restaurant, Khumtung village, and (F) Posters distributed among locals at Khawlian village.



Figure 4: Campaigns, hands on training and distribution of kits. (A) to (D) Murlen NP; (E) to (L) Tawi WS; (M) RIPANS; (N) & (O) Pachhunga University College; (P) Lallen (Q) & (R) Teirei.



Figure 5: Campaigns, hands on training and distribution of kits. (A) Govt. Saitual College; (B) Ranger Officer, Mr. Thanmawia received snake rescue kit; (C) Govt. Tanhril High School; (D) Hmuifang village; (E) to (H) Reiek village.



Figure 6: Campaigns, hands on training and distribution of kits. (A) to (C) Department of Zoology, MZU; (D) Department of Environmental Science, MZU; (E) & (F) School of Life Sciences, MZU (G) to (I) Govt. Tanhril High School.



Figure 7: Campaigns, hands on training and distribution of kits. (A) to (D) Durtlang village; (E) to (G) Pualreng WS; (H) Samthang village.



Figure 8: Campaigns, hands on training and distribution of kits. (A) College of Veterinary Sciences & Animal Husbandry, Selesih; (B) International Biodiversity Day at Department of Education, MZU; (C) to (E) RIPANS, Aizawl; (F) to (H) Nursing Council, New Secretariat, Aizawl.

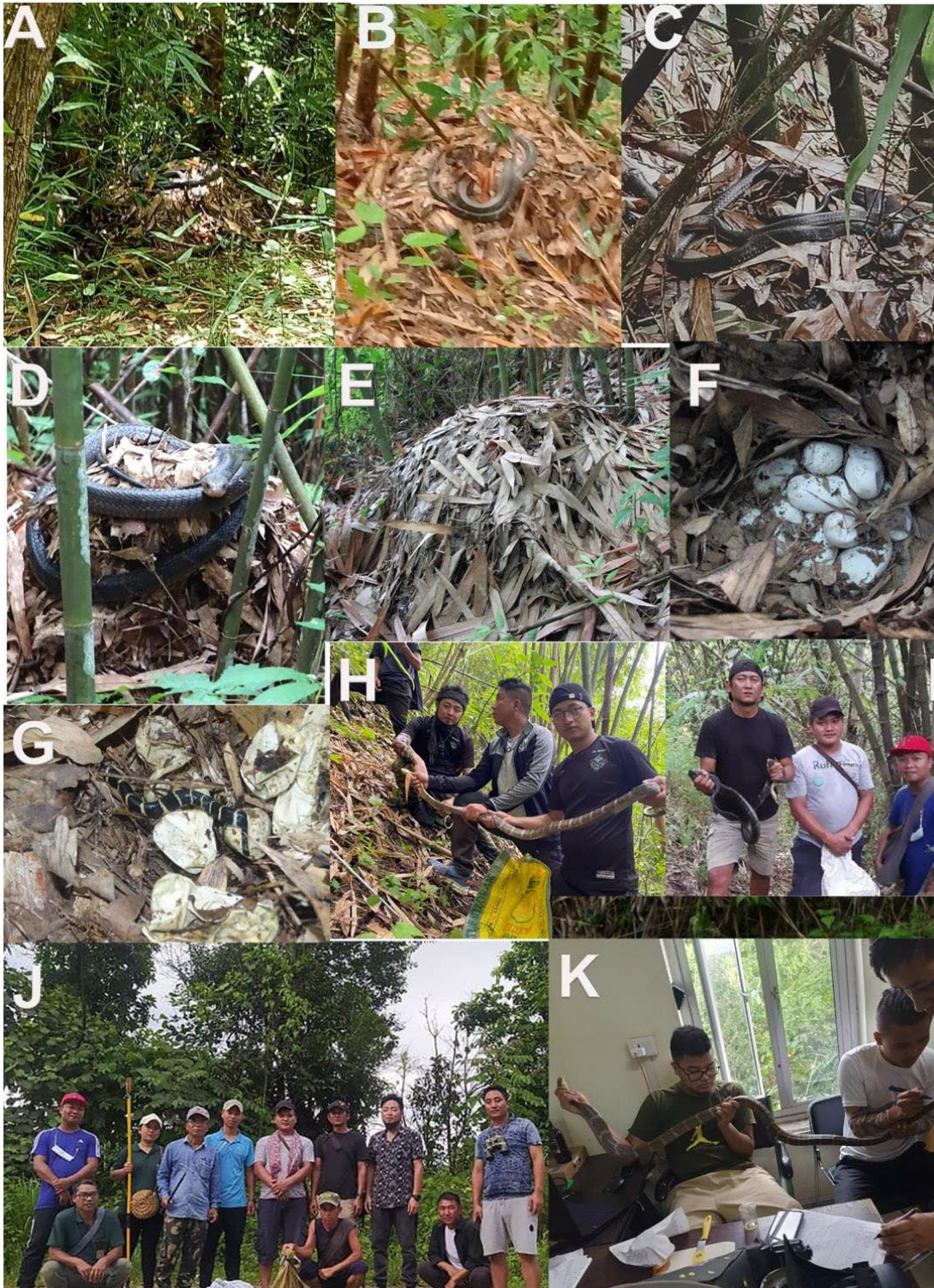


Figure 9: King Cobra rescue and conservation. (A) Khuangthing village, Champhai District; (B) Phulpui village, Aizawl District; (C) Khumtung village, Serchhip district; (D) Maumual, Aizawl; (E) Khawzawl I, Khawzawl District; (F) & (G) Incubation of eggs in Animal House, MZU for release; (H) Adult female King cobra rescued from Khumtung; (I) & (J) Rescued eggs and nests at Khawzawl for translocation; (K) Examining adult in the Laboratory of Developmental Biology & Herpetology, Department of Zoology, MZU.

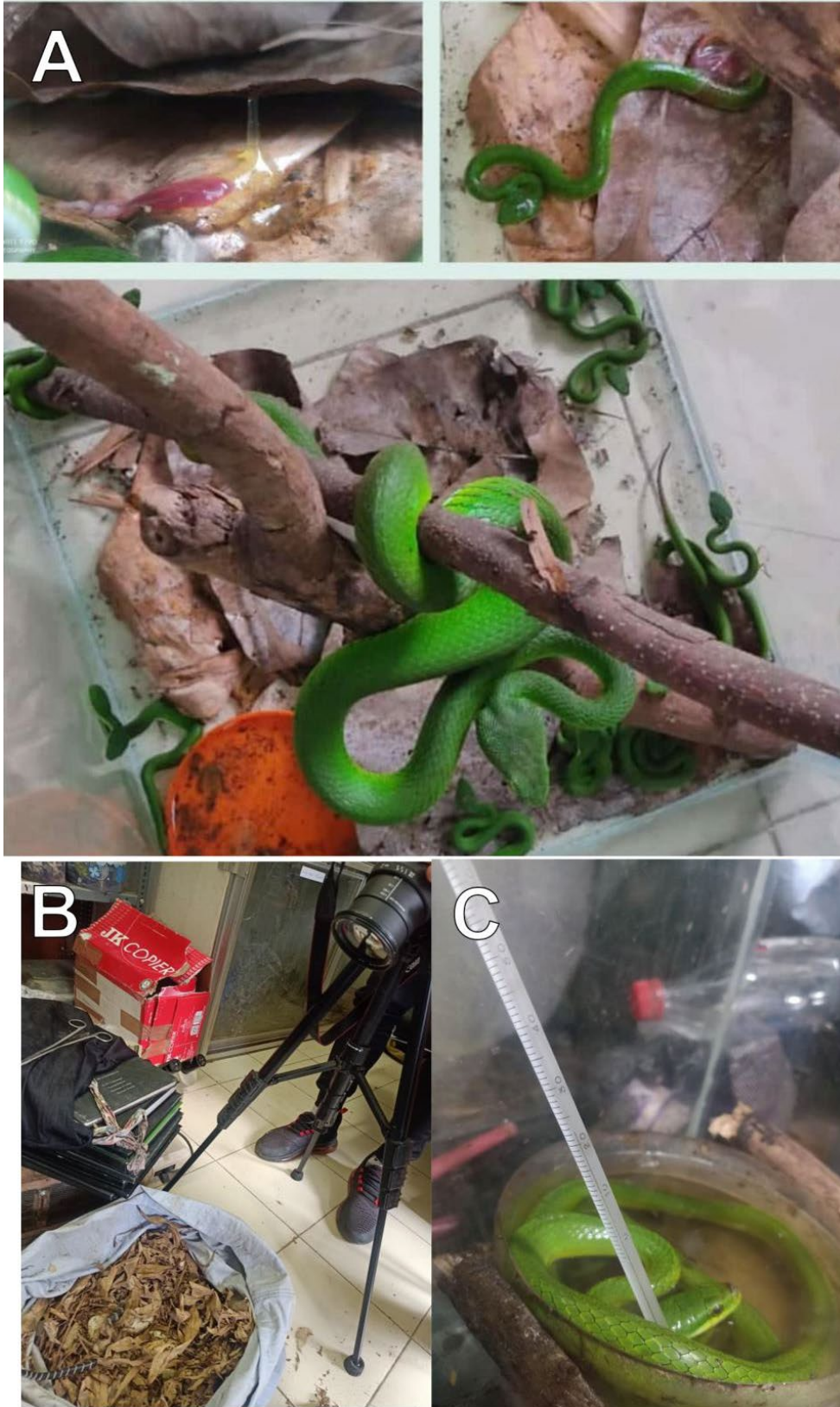


Figure 10: (A) A female red-tailed bamboo pitviper (*Trimeresurus erythrurus*) giving birth to five neonates, (B) Monitoring of King cobra eggs and (C) Green trinket snake (*Gonyosoma prasinum*) in the Laboratory of Developmental Biology & Herpetology, Department of Zoology, MZU.

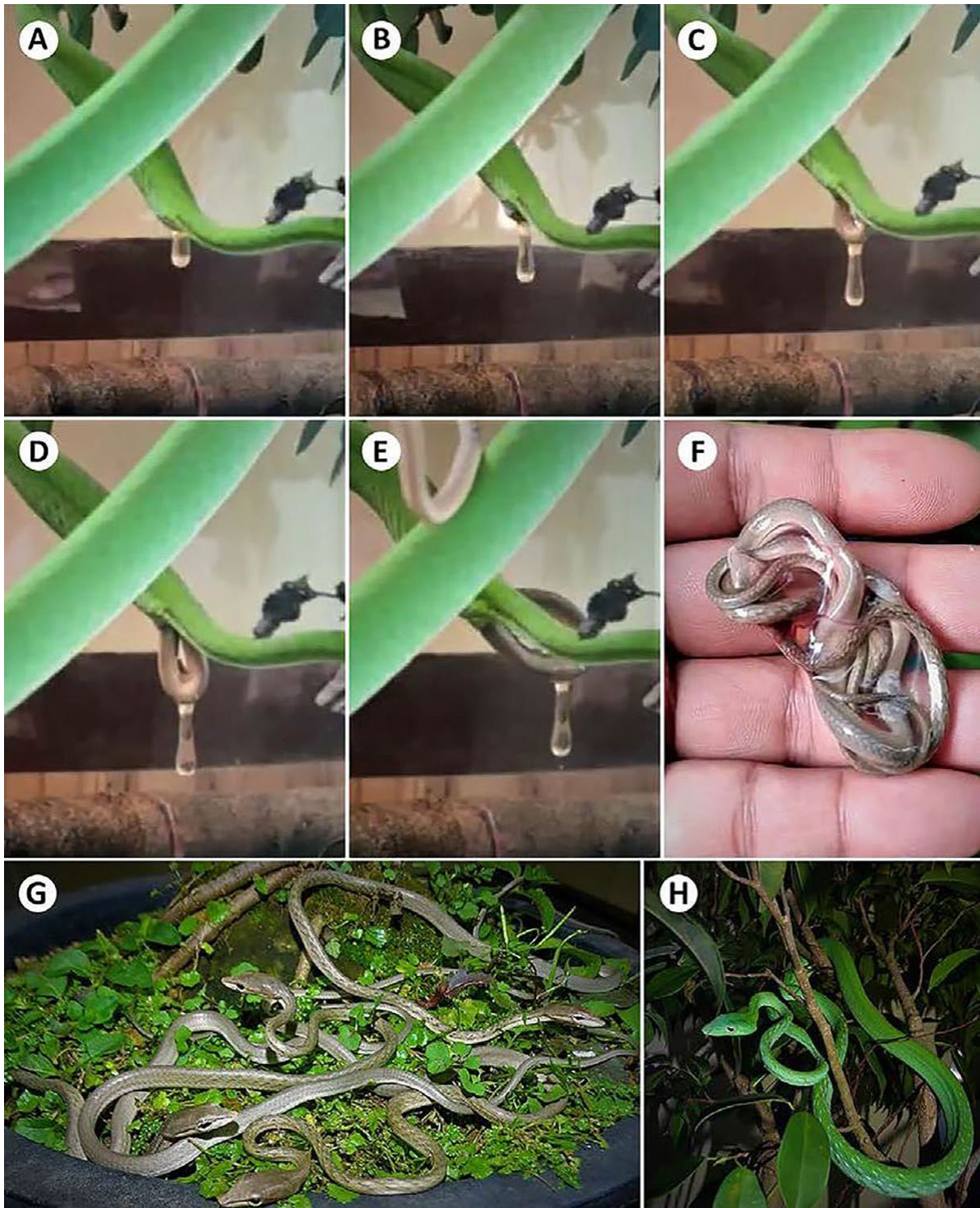


Figure 11: A female *Ahaetulla prasina* giving birth in captivity and the colouration of the neonates – (A) to (E) A neonate emerging from the female; (F) A neonate still within the amniotic sac; (G) Four greyish neonates before they were released back into the wild; (H) The female parent *A. prasina* prior to parturition (Lalremsanga et al., 2022).



Figure 12: Conservation of *Ophiophagus hannah* in Mizoram, north-east India; (A) Deserted nest at Thenzawl IV; (B) Deserted hatchlings uncovered inside the nest at Chhingchhip; (C) Completely destroyed nest and eggs with the freshly killed female from Tlangsam; (D) Female coiling above its nest in Dampa Tiger Reserve; (E) Hatching from incubated eggs, F. Releasing hatchlings at Zongaw Reserved Forests (Biakzuala et al., 2022).

During the tenure of the project, there are some victims who got envenomated by *Naja kaouthia* (Figure 13A), *Trimeresurus erythrurus* (Figure 13B), and *Ovophis monticola* (Figure 13C), and were benefitted from our awareness programme for their recovery (Figure 13). These victims completely recovered after following our advice for proper medical procedures.



Figure 13: Completely recovered snakebite victims in Mizoram envenomated by *Naja kaouthia* on 31st October 2022 at Khuangthing village (A); envenomated by *Trimeresurus erythrurus* on 6th May 2022 at Bethlehem vengthlang locality (B); envenomated by *Ovophis monticola* on 30th May 2022 at Neihdawn village. All the images are provided after obtaining a prior consent to publish from each victim.

During this project work, we discovered a new species of a non-venomous snake *Herpetoreas murlen* from one of the targeted protected areas i.e. Murlen National

Park. The paper was published in *Salamandra*, a journal published by the German Society for Herpetology and Terrarium Studies. Moreover, we published a total of 11 papers in the international peer reviewed journals featuring The Rufford Foundation in the acknowledgement section (the team members of the project are indicated in bold):

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