Annexure IV

Format for Online Annual/Final Report

1. **Project Title: Consortia Research Platform on Agro-biodiversity "Characterization and Conservation of Agricultural Biodiversity of A & N Islands**
2. Sanction No.:CRP/GCD/2014/1362 dated 07.07.2014
3. Date of Start: April 2015
4. Date of Termination: March 2017
5. Actual Location(Location of research scheme to be carried out) : ICAR-CIARI, Port Blair A & N Islands
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8. Duration of Project: Two Years (2015-2017)
9. Total amount sanctioned: (in case of extension) : Rs. 12.0 lakhs for 2015-16
10. Total amount spent: Rs. 11. 88 lakhs

11. Result of Practical/Scientific Value:

- DUS characterizations of 26 genotypes of rice have been completed during Kharif 2015. The crop nursery was raised in the month of June, 2015 and 25 old seedlings were transplanted at spacing of 20 x 20 cm row to row and plant to plant. Recommended dose of fertilizer (NPK) was applied @ of 90:60:40 kg/ha and data were recorded for 55 characters with time to time.

- A total 57 genetically diverse accessions of different pulses namely, mungbean (*Vigna radiata* L. Wilczek), urdbean (*Vigna mungo* L. Hepper), cowpea (*Vigna unguiculata* L. Walp), horsegram (*Macrotyloma uniflorum*) and pigeonpea (*Cajanus cajan* L.) were collected from North & Middle Andaman districts, while, beachpea (*Vigna marina*) were collected from Car Nicobar and Havelock Islands for characterization and evaluation of novel genetic base of these landraces. A total of 18 local landraces of mungbean, 27 of urdbean, 08 of cowpea, 02 of horsegram were sown for regeneration and DUS characterization. Some promising accessions from the existing collections of indigenous landraces have exhibited wide scale of genetic diversity based on DUS characterization for different morphological and quantitative traits.

- Based on the exploratory survey, distribution of wild and indigenous mango species (*Mangifera andamanica, Mangifera griffithi* and *Mangifera camptosperma)* within the Islands was done for polyembryonic traits. The wild mango species were characterized based on the NBPGR minimal descriptors. Modified *in-situ* approach grafting proved to be the successful propagation method by using *Mangifera indica* as rootstock.

- Three indigenous palms of the Island namely *Areca triandra, Korthalsia lacenosa, Licuala peltata* and *Bentinkia nicobarica* are identified, collected and conserved at CIARI. *Bentinkia nicobarica* is an endangered species and is endemic to the Nicobar group of Islands. The ferns like *Microsorium punctatum, Aslplenium nidus, Lycodium circinatum* and *Tectaria melanocaulon* are collected in the exploratory survey and conserved in the experimental field.

- A total of 3 bacterial wilt resistant brinjal lines have been evaluated in the field. Highest plant height (101 cm) was recorded for check variety (CARI Brinjal1) followed CARI Brinjal 3 (88 cm) other three lines were having almost equal height between (76-78 cm). More number of secondary branches/plant (25.1) was recorded for CARI Brinjal 1 followed by CARI Brinjal 2 (20.3). CARI Brinjal 1 having long and broad leaves while CARI Brinjal 2, 3 and 3 having leaf length range of 8.5 to 9.9 cm. highest average fruit weight 249.5 g was recorded for CARI Brinjal 1 followed by Hybrid and CARI Brinjal 4. The CARI Brinjal 4 having long slender fruits while CARI Brinjal 1, 2 and 3 having oval shape fruits Bacterial wilt disease incident was recorded fortnight interval from 15 days of planting to 60 days. The disease index data revealed that lowest disease index (%) was recorded for CARI Brinjal 1 (4.94%) followed by CARI Brinjal 2 (6.17) and CARI Brinjal 3 (12.17 %). While wilt insistent was quite high 34.57 % in susceptible hybrid check variety. CAR Brinjal 1 and CARI Brinjal were found resistant for bacterial wit while CARI Brinjal 3 and 4 showed moderately resistant against bacterial wilt.
- A total of 17 germplasm of bael (*Aegle marmelos*) has been collected from different areas of Andaman Islands. *In situ* characterization and analysis of fruits for quality parameters is under progress.
- A total of 150 plantlets of *Khoon Phal* (*Haematocarpus validus*) have been regenerated.
- Wild relatives of nutmeg (6 accessions) of *Knema andamanica, Myristica andamanica, Horsfieldia glabra* and piper species (8 accessions) have been collected & documented.
- A total of 23 true mangrove species belonging to 9 family and 13 genera have been documented during the reporting period. The existence of *Pemphis acidula* in the Andaman and Nicobar Islands has been reported after a lapse of 91 years from Sir William Peel Island of Ritchet's Archipelago.
- A total of 38 species of freshwater finfishes were documented from various streams of Andaman, of which six species, including *Barbonymous gonionotus*, *Brachydanio rerio*, *Notopterus notopterus*, *Glossogobius sparsipapillos*, *Acentrogobius cyanomos* and *Gobiopterus sp.* were identified to be new record to the Andaman and Nicobar Islands.
- A total of 69 species of corals belonging to 13 families and 31 genera were documented from Havelock and 44 species belonging to 13 families and 24 genera were documented from North Bay Islands.
- Morphological characterization of the Teressa goat and Nicobari pig has been carried out as per the standard breed descriptor of the NBAGR and the same has been submitted for registration.

Papers Published:

(i) **Papers published in peer reviewed journal (NAAS rating may be given)**

1. Titus Immanuel, Goutham-Bharathi, M.P., Sneha Sawhnwey, Ragavan, P. and Kiruba Sankar, R., 2016. New record of the pantropical seagrass Halophila decipiens Ostenfeld (Hydrocharitaceae) from the Andaman and Nicobar Islands, India, Botanica Marina, 58: 409-413. (NAAS Rating: 7.4)
2. Immanuel, T., M.P. Goutham-Bharathi & R. Kiruba-Sankar (2016). Halgerda dalanghita Fahey & Gosliner, 1999 (Gastropoda: Nudibranchia: Discodorididae) - a new record for India from the Andaman Islands. Journal of Threatened Taxa 8(3): 8626–8628; http://dx.doi.org/10.11609/jott.2288.8.3.8626-8628 (NAAS rating: 4.72)

(ii) **Papers presented at scientific meetings:**

1. V. Baskaran, K. Abirami and S. Dam Roy.2015. Native ornamental palm biodiversity of Andaman and Nicobar Islands. In: Book of Abstracts, International symposium on biodiversity, Agriculture, Environment and Forestry. Association for the advancement of biodiversity science. Ooty. p.184Manuscripts under preparation:
2. V.Baskaran, K. Abirami, M. Sankaran, V. Damodaran, R. K. Gautam and S. Dam Roy. 2015. Underutilized ornamental biodiversity of Andaman and Nicobar Islands. In: Ravindran et al (Eds), Abstracts and Souvenir, Third International Symposium on Underutilized plant species. Agricultural College and Research Institute, Madurai. p. 172
3. M. Sankaran, K. Abirami, V. Baskaran, T.V.R.S. Sharma, D. B. Singh, C. Murugan and S. Dam Roy. 2015. Genetic resources of underutilized horticultural crops in Bay Islands of India. In: Ravindran et al (Eds), Abstract and Souvenir, Third international symposium on underutilized plant species. Agricultural College and Research Institute, Madurai, pp137-158.

(i) Manuscripts under preparation:

12. Patents and products developed: NIL

13. Detailed Progress Report (to be annexed): **Annexure –I**

14. Signature:

Name:

Designation:

Principal Investigator:

Date Director or Head of Institution/Station:

15. Comments of the Lead Centre Platform Coordinator:

16. Remarks of the SMD:

Annexure – I

Consortia Research Platform on Agro-biodiversity "Characterization and Conservation of Agricultural Biodiversity of A & N Islands

DUS characterization of rice germplasm

A total of 26 genotypes of rice were evaluated in replicated trials for DUS characterization at Bloomsdale Research Farm, Port Blair during *Kharif* 2015. The crop nursery was raised in the month of June, 2015 and 25 old seedlings were transplanted at spacing of 20 x 20 cm row to row and plant to plant. Recommended dose of fertilizer (NPK) was applied @ of 90:60:40 kg/ha and data were recorded for 55 characters with time to time.

Table 1: List of rice germplasm

S. No	Variety	S. No	Variety
1	CARI Dhan 1	14	Maslay
2	CARI Dhan 2	15	White Burma
3	CARI Dhan 3	16	Jaya
4	CARI Dhan 4	17	Khusbuyya
5	CARI Dhan 5	18	Jeera Dhan (Farmer field)
6	CARI Dhan 6	19	Jagnnath
7	CARI Dhan 7	20	Lal Sanno
8	CARI Dhan 8	21	Pagla Jaya
9	CARI Dhan 9	22	GolDhan
10	Nyaw-in	23	Jeera Dhan (Cross)
11	GovidBhog	24	Jeera Dhan (Diglipur)
12	Black Burma	25	Nata Khusbu
13	Silver Jaya	26	Ranchi Dhan

Fig.1 A field view of rice crop at Bloomsdale Research Farm during *Kharif* 2015

Fig.2 Variability for grain colour of rice in Andaman

Table 2: Grain yield and yield attributing traits of rice

S. No.	Genotypes	Plant height (cm)	Tillers/ plant	Panicle length (cm)	Grain yield/plot (gm)
1	CARI Dhan 1	125	6	22.40	450.00
2	CARI Dhan 2	117	5	22.60	233.33
3	CARI Dhan 3	119	5	20.40	350.00
4	CARI Dhan 4	134	6	22.33	383.33
5	CARI Dhan 5	123	5	21.93	450.00
6	CARI Dhan 6	123	7	24.73	566.67
7	CARI Dhan 7	159	8	25.11	616.67
8	CARI Dhan 8	160	6	26.50	266.67
9	CARI Dhan 9	159	5	26.00	216.67
10	Nyaw-in	155	7	25.20	250.00
11	GovidBhog	168	6	23.87	233.33
12	Black Burma	156	5	25.33	216.67
13	Silver Jaya	144	4	25.53	500.00
14	Maslay	103	6	21.00	283.33
15	White Burma	128	6	23.13	333.33
16	Jaya	120	7	23.33	516.67
17	Kusbuyya	171	5	24.27	366.67
18	Jeera Dhan (Farmer field)	177	6	26.13	183.33
19	Jagnnath	157	6	26.87	416.67
20	Lal Sanno	143	5	25.73	250.00
21	Pagla Jaya	111	6	24.80	316.67
22	GolDhan	142	6	25.40	216.67
23	Jeera Dhan (Cross)	176	6	23.73	133.33
24	Jeera Dhan (Diglipur)	161	8	23.67	166.67
25	Nata Khusbu	126	6	25.60	116.67
26	Ranchi Dhan	102	10	25.47	150.00

Evaluation of bacterial wilt registrant varieties of brinjal

Evaluation of bacterial wilt resistant progeny in the field conditions

A total of 3 bacterial wilt resistant brinjal lines were evaluated with 2 checks CARI Brinjal 1 (Resistant check) and hybrid check (Susceptible check). The experiment was planted in CRBD with 3 replications at spacing of 65 X 45 cm row to row and plant to plant and each plot having 27 plants. Recommended agricultural practices were followed and observations were recorded for 7 yield attributing characters. Highest plant height (101 cm) was recorded for check variety (CARI Brinjal1) followed CARI Brinjal 3 (88 cm) other three lines were having almost equal height between (76-78 cm). More number of secondary branches/plant (25.1) were recorded for CARI Brinjal 1 followed by CARI Brinjal 2 (20.3). CARI Brinjal 1 having long and broad leaves while CARI Brinjal 2, 3 and 3 having leaf length range of 8.5 to

9.9 cm. Highest average fruit weight 249.5 g was recorded for CARI Brinjal 1 followed by Hybrid and CARI Brinjal 4. The CARI Brinjal 4 having long slender fruits while CARI Brinjal 1, 2 and 3 having oval shape fruits

Bacterial wilt disease incidence was recorded at fortnightly interval from 15 days of planting to 60 days. The disease index data revealed that lowest disease index (DI in %) was recorded for CARI Brinjal 1 (4.94%) followed by CARI Brinjal 2 (6.17) and CARI Brinjal 3 (12.17 %).The wilt incidence was quite high 34.57 % in susceptible hybrid check variety. CAR Brinjal 1 and CARI Brinjal were found resistant for bacterial wilt while CARI Brinjal 3 and 4 showed moderate resistance against bacterial wilt.

Varieties	**Plant height (cm)**	**No. of primary Branches**	**No. of secondary branches**	**Leaf length (cm)**	**Leaf width (cm)**	**Fruit length (cm)**	**Fruit width (cm)**	**Average fruit weight (g)**
CIARI Brinjal 2	77	5.0	20.3	8.5	8.5	12.5	5.65	88.8
CIARI Brinjal 3	88	4.3	15.5	9.9	9.9	9.752	5.88	92.6
CIARI Brinjal 4	78	3.7	14.5	9.4	9.4	15.7	4.57	102.3
CIARI Brinjal 1 (R)	101	4.3	25.1	12.8	12.8	12.3	8.55	249.5
Hybrid (S)	76	4.9	19.1	10.2	10.2	10.9	7.43	115.5
Mean	**84**	**4.4**	**18.9**	**10.2**	**10.2**	**12.20**	**6.42**	**129.7**
C.D.	**3.07**	**0.44**	**2.62**	**0.75**	**0.75**	**0.70**	**2.31**	**92.8**
C.V.	**2.05**	**5.57**	**7.94**	**3.77**	**3.77**	**3.10**	**6.20**	**8.6**

Table: Bacterial wilt disease incidence (%)

Varieties	**No. of infected plants**				**Total**	**DI (%)**	**Category**
	15 days	**30 days**	**45 days**	**60 Days**			
CIARI Brinjal 2	3	1	0	1	5	6.17	R
CIARI Brinjal 3	7	1	1	1	10	12.35	MR
CIARI Brinjal 4	7	4	1	1	13	16.05	MR
CIARI Brinjal 1 (Resistant Check)	1	1	0	2	4	4.94	R
Hybrid VNR 318 (Susceptible Check)	14	6	4	4	28	34.57	S

Fig.: A Field view of Bacterial wilt resistant brinjal lines at Bloomsdale Farm.

Fig.: Variability in fruit shape and colour among wilt resistant brinjal lines

Characterization of pulses

Andaman and Nicobar Islands agriculture has come a long way in this important sector though the land available for growing pulses is very limited and restricted. It has only 12163 hectares of land mostly low lying flat, which is best, suited for field crops. Considerably a large area of about 3000 ha which is almost one fourth area of the available for field crops is affected by sea water intrusion. The climatic conditions of Andaman and Nicobar Islands favour the cultivation of rice from May to December. The period from January to April is almost dry and rain free with the exception of limited mild showers. Among post rice crops, pulses are usually grown during December to April under rainfed conditions. The cultivation of pulses in these islands is occupies limited area approximately 2610 ha (5.70 % of total cultivated area and 15.88 % of the total cropped area) and mostly occupied by the farm saved seeds and/or farmers variety/ landraces. During the period of Rabi 2015-16 farmers' variety/ landraces of mungbean (18 Numbers), urdbean (27 Numbers), cowpea (08 Numbers), pigeonpea (05 numbers) and horse gram (02) were collected through exploration trips from different parts of the North, Middle & South Andaman group of Islands, while and beachpea (02) numbers were collected from Car Nicobar and Havelock Islands.

Farmer's varieties and/or landraces of 18 mungbean, 27 urdbean and 08 cowpea were used for the regeneration of the collected accession for further evaluation and characterization on the basis of DUS parameters while Beachpea (*Vigna marina*) were sown for regeneration and molecular characterization in Augmented Block Design at Research Farm, Garacharma and Bloomsdale during Rabi 2015-16. Seeds of each accession were sown in a double row of 3 m length with spacing of 10 cm plant to plant and 35 cm inter row distance. Cultural practices were performed as per the recommended package and practices of AICRP on MULLaRP. The superior genotypes/ lines were selected for further evaluation and breeding programme.

Collection, conservation and regeneration of Mango in Andaman and Nicobar Islands

Characterization of Wild mango species

Exploratory surveys were carried out at Andaman and Nicobar islands to locate the genetic diversity and distribution of wild and indigenous mango species within the Islands. The indigenous mango species like *Mangifera andamanica*, *Mangifera griffithi* and *Mangifera camptosperma* were found to be distributed in specific locations. *Mangifera andamanica* was identified in the Chouldhari. *Mangifera camptosperma* was identified in Brichgunj. Earlier *Mangifera griffithi* distribution was reported only in two places of the Island namely Mt. Harriet and Shoal Bay. For the first time *Mangifera griffithi* has been identified in Chouldhari (Single tree) and four trees in Nancowry Island based on the taxonomical keys. The wild mango species were characterized based on the NBPGR minimal descriptors. Modified *in-situ* approach grafting proved to be the successful propagation method in the Island by using *Mangifera indica* as rootstock. The successful grafted saplings are conserved in the CIARI experimental farm.

Mangifera griffithi

Mangifera camptosperma



Mangifera griffithi *Mangifera andamanica* *Mangifera camptosperma*

Plate : Successful grafts of wild mango species of the Islands

Promising genotypes of *Mangifera indica* in the Islands

The polyembryonic genotpypes of mango are widely distributed in the Island due to the coastal climatic condition. About 16 polyembryonic genotypes were collected and conserved during the exploratory surveys in the Andaman group of Islands. The DUS characters of these genotypes were recorded based on the minimal descriptors of NBPGR.The identified blue mango in the Neil Island is characterized with DUS descriptors and the regeneration of the species done through *in-situ* modified approach grafting and air layering. The Neil mango was identified as polyembryonic mango genotype.



Polyembryonic nature of blue mango **Air layering successful in blue mango**

Collection, conservation and regeneration of ornamental biodiversity in the Island

The indigenous palms and fern biodiversity of the Island are explored under this project. A wide biodiversity exists in the palm and fern distribution in the Island. Three indigenous palms of the Island namely *Areca triandra, Korthalsia lacenosa, Licuala peltata* and *Bentinkia nicobarica* are identified, collected and conserved at CIARI. *Bentinkia nicobarica* is an endangered species and is endemic to the Nicobar group of Islands. Other palm species which are identified are *Caryota mitis, Pinanga andamanensis, Daemonorops kurzianus* and *Calamus andamanicus.*The ferns like *Microsorium punctatum, Aslplenium nidus, Lycodium circinatum* and *Tectaria melanocaulon* are collected in the exploratory survey and conserved in the experimental field.

Bentinkia nicobarica

Pinanga andamanensis

Licuala peltata

Areca triandra

Daemenorps kurzianus

Korthalasia laciniosa

Collection, Characterization and Documentation of *Piper* Species and Wild Nutmeg Species from Andaman and Nicobar Islands

***Piper* species**

Piper is an important genus with a number of economically important species. Some species are commercially used as spice, while others are being used in the preparation of medicines, as rootstock or in crop improvement programmes. Explorations were made in various parts of the Islands for collection of different species. Eight collections were made both within and among the species, planted under polyhouse condition for recording morphological parameters (Table .....). Samples of the collections were sent for confirmation of their botanical identity. Plantlets of all the collections are being multiplied for carrying out further studies.

Wild nutmeg species

Considerable diversity has been reported in the wild nutmeg species in the Islands. Endemic species including those belonging to genera *Horsfieldia*, *Myristica* and *Knema* are found distributed in various parts of the islands. Three species *viz*. *H. glabra*, *M. andamanica* and *K. andamanica* have been collected (Plate .....) and planted in the field for carrying out further studies. Documentation work on different species is in progress.

Plate : Collections of *Horsfieldia glabra, M. andamanica* and *Knema andamanica*

Table : Morphological parameters of *Piper* species collected from Andaman and Nicobar Islands

Germplasm code	Place of collection	Leaf length (cm)	Leaf width (cm)	Fresh wt. of leaf (g)	Petiole length (cm)	Petiole width (mm)	Petiole thickness (mm)	Petiole wt. (g)
CIARI PR 02 (*P. colubrinum*)	Kalipur, N. Andaman	17.73	8.40	1.99	1.26	2.46	2.69	0.083
CIARI PR 03 (*P. colubrinum*)	Sippighat, S. Andaman	18.29	9.53	3.30	1.65	3.18	3.16	0.231
CIARI PR 04 (*P. betle*)	Sippighat, S. Andaman	9.15	8.41	1.23	6.32	3.33	2.43	0.426
CIARI PR 05 (*Piper* sp.)	Sippighat, S. Andaman	11.20	9.65	1.44	4.08	4.76	1.91	0.222
CIARI PR 06 (*Piper* sp.)	Kalipur, N. Andaman	10.66	9.71	1.14	4.35	4.34	1.72	0.197
CIARI PR 07 (*Piper* sp.)	Vegetable Market, Diglipur, N. Andaman	14.20	11.93	1.83	4.40	4.77	1.96	0.219
CIARI PR 08 (*Piper* sp.)	Govindpuram 3, N. Andaman	10.51	9.23	1.17	3.82	4.24	1.64	0.160
CIARI PR 10 (*Piper* sp.)	Badam Nallah, N. Andaman	10.46	9.07	1.05	3.56	3.95	1.53	0.127

Exploration, Collection and Characterization of Bael Diversity in Andaman and Nicobar Islands

Bael (*Aegle marmelos*) is one of the important fruit crops, possessing plethora of medicinal properties in it. Fruits are commonly consumed by local people in the form of fresh fruits or made into juice. Being seedling progenies considerable diversity is noticed in the available populations in the Islands. In order to identify superior types, explorations were carried out in South Andaman and North and Middle Andaman districts of the Islands. Twenty four types were identified based on morphological parameters of the tree, leaves and fruits from different areas such as Kalipur, Durgapur, Kalighat, Ramnagar No. 1, Ramnagar No. 2, R.K. Gram, Govindpur No. 3, Badam Nallah, Basantipur, Chitrakoot, Panchawati, Nimbutala and Kodiyaghat. Considerable diversity was observed for fruit size and shape. A type with octagonal shape was also observed in the collections. Leaves and mature fruits (wherever available) were collected and are being analysed for various parameters based on DUS guidelines for the crop.

Plate : Variations in fruit size and shape amongst the bael collections (left) and a type showing octagonal fruit shape (right)

Characterization of Teressa goat

These are found in Teressa Island and Bambooka Island. Scarce population of these goats is available Nicobar Island, Nancowry Island. These goats are reared by triabl community in Nicobari and are a source of meat for them. Age at sexual maturity is about 9 months. Body weight at 4 years is about 60-65 kg. Average milk yield may go up to 1 lit/day. First kidding is 12-13 months.

These goats are tall, sturdy, brownish or dark tan or black or white in colour with white and black patches. Black hairs on dorsal midline up to the tail. Black colored muzzle, eyelids and hoofs. Peculiar white patch/line starting from inner canthus of both eyes or from eye brows and extending up to nostrils or mouth. Height ranges from 24 to 27 inches. Head length of male and female is 8.86±0.10 and 7.5±0.27 inches. Tail is medium to long. Large horn with flat base. Erected ears directing downwards. Teressa goats are considered as an indigenous goat breed / germplasm belonging to this island territory.

Plate : Adult Teressa goat male and female

Table : Production and reproduction performance of Teressa goat

Parameters	Male	Female
Birth weight (kg)	1.40 ±0.07	1.22 ± 0.07
Weaning/3 months (kg)	7.61 ±0.11	6.58 ± 0.11
6 months (kg)	14.46 ± 0.26	12.84 ± 0.26
1 year (kg)	23.54 ± 0.31	19.49 ± 0.35
Adult (6 teeth)(kg)	39.85± 1.03	31.94 ± 0.71
Weight at 1st kidding (kg)	-	22.2 ± 0.38
Age at first Mating (days)	-	224.07 ± 3.62
Age at first estrous (days)	-	198.95 ± 3.07
Age at First Kidding (days)	-	374.93 ± 3.66
Kidding Interval (days)	-	233.1 ± 3.08
Service Period (days)	-	82.9 ± 3.07
Litter size (nos)	-	1.56 ± 0.049
lifetime no. of Kidding	-	6.19 ± 0.149

Characterization of Nicobar pig

Nicobari pigs (*Sus scorofa nicobaricus*) are indigenous pigs of Nicobar Islands and are reared by Nicoabri tribes since time immemorial. They are sturdy and short with long body and red-brown, black, grey, brown, blakish brown and fawn skin colour. Marked bristle crest (mane) on the back of the pig extending from mid head/shoulder to base of the tail. Facial profile varied from flat to concave. Slightly downward arch/ curvature of the low back. Short neck with very large jowl. Characteristic feature of the tail is having no curling. They are fast runner. Evolved and thriving under plantation based low input production system of the Nicobari tribes.

Plate : Adult Nicobari pig male and female

Table : Production and reproduction performance of Nicobari pig

Parameters	Male	Female
Birth weight (kg)	0.62 ± 0.02	0.61 ± 0.02
1 months (kg)	2.60± 0.07	2.26 ± 0.06
3 months (kg)	15.82 ± 0.17	14.54 ± 0.19
6 months (kg)	28.39 ± 0.29	26.47 ± 0.22
1 year (kg)	43.12± 0.74	38.84 ± 0.68
slaughter(kg)	69.17± 3.28	75.69 ± 1.19
1st furrowing(kg)	-	38.95±0.71
Age at first mating (Days)	-	188.07± 2.40
Age at first estrous (days)	-	173.56± 2.90
Oestrous Cycle duration (days)	-	21.01± 0.20
Oestrous duration (hours)	-	88.56±3.57
Age at first furrowing (days)	-	319.19± 4.24
Furrowing interval (days)	-	242.4± 4.83
Litter size at furrowing (nos)	-	7.19± 0.18
Litter size at weaning (kg)	-	5.42± 0.13
lifetime no. of furrowing(nos)	-	8.57± 0.18
Productive life span (years)	-	5.99± 0.13

Collection & Characterization of Fish diversity

The pantropical sea grass, *Halophila decipiens* (Hydrocharitaceae), a new record to the Andaman and Nicobar Islands, was reported from two locations *viz.*, Scissostris Bay, Port Blair at 6–7 m deep and Neil Island at 10–12 m deep. The present report is an addition to the existing 10 sea grass species from the Islands and this species could have been overlooked due to its habitat in deeper water.

Four species of marine finfishes, including *Sphyraena iburiensis*, *Nemipterus marginatus*, *Nemipterus nematophorus*, *Platycephalus ragadius* and one species of lobster, *Thenus unimaculatus* were identified and documented under new location record for the Andaman and Nicobar Island. *Halgerda dalanghita* Fahey & Gosliner, 1999, a discodoridid nudibranch was reported from Havelock Island of Ritchie's Archipelago representing a new addition to the Opisthobranch fauna of India. The present record extends the known geographical distribution of *H. dalanghita* and this is the sixth species representing the genus *Halgerda* in India.

Recent explorations in the inland fresh water streams of Andaman resulted in the discovery and description of a new species of freshwater prawn belonging to the genus Macrobrachium Bate, 1868 (Decapoda: Palaemonidae). The new species – *Macrobrachium minispinata* has been named, due to the presence of large number of very minute, closely set spinules on entire second cheliped. The species is described from the stream at South Andaman. The Holotype (CMFRI/MBM-ED.2.2.1.10) and Allotype (CMFRI/MBM-ED.2.2.1.10.1) specimens were submitted in the Marine Biodiversity Museum of ICAR-Central Marine Fisheries Research Institute, Cochin, Kerala.

Also, a total of 38 species of freshwater finfishes were documented from various streams of Andaman, of which six species, including *Barbonymous gonionotus*, *Brachydanio rerio*, *Notopterus notopterus*, *Glossogobius sparsipapillos*, *Acentrogobius cyanomos* and *Gobiopterus sp.* were identified to be new record to the Andaman and Nicobar Islands.

Documentation

A total of 23 true mangrove species belonging to 9 family and 13 genera have been documented during the reporting period. Maximum species was recorded from Middle Andaman, Rangat (18) followed by South Andaman (15), Richet archipelago (14), North Andaman (14), Mayabunder (9) and little Andaman (7). The existence of *Pemphis acidula* (Fig 1) in the Andaman and Nicobar Islands has been reported after a lapse of 91 years from Sir William Peel Island of Ritchet's Archipelago.

Coral biodiversity surveys were conducted at Havelock Island, Ritchet's Archipelago through snorkelling and North Bay, South Andaman through snorkelling and SCUBA diving. A total of 69 species belonging to 13 families and 31 genera were documented from Havelock and 44 species belonging to 13 families and 24 genera were documented from North Bay.

Table : List of true mangrove species documented during the reporting period

Family	*Genus*	*Species*
Avicenniacae	*Avicennia*	*Avicennia marina*
		Avicennia officinalis
Myrsinaceae	*Aegiceras*	*Aegiceras corniculatum*
Rhizophoraceae	*Bruguiera*	*Bruguiera cylindrica*

		Bruguiera gymnorhiza
		Bruguiera parviflora
	Ceriops	*Ceriops tagal*
	Rhizophora	*Rhizophora apiculata*
		Rhizophora mucronata
		Rhizophora stylosa
		Rhizophora hybrids
Euphorbiaceae	*Excoecaria*	*Excoecaria agallocha*
Combretaceae	*Lumnitzera*	*Lumnitzera littorea*
		Lumnitzera racemosa
Arecaceae	*Phoenix*	*Phoenix paludosa*
Rubiaceae	*Scyphipora*	*Scyphipora hydrophyllacea*
Lythraceae	*Pemphis*	*Pemphis acidula*
	Sonneratia	*Sonneratia alba*
		Sonneratia griffithii
		Sonneratia ovata
Malvaceae	*Heritiera*	*Heritiera littoralis*
	Xylocarpus	*Xylocarpus granatum*
		Xylocarpus moluccensis

Fig. Pemphis acidula tree and inflorescence (inset)

Fig. Halophila decipiens

Fig. Halgerda dalanghita Fahey & Gosliner, 1999

Fig. *Macrobrachium minispinata sp*. nov. - Holotype male 71.5 mm total length; allotype berried female 96.5 mm, collected from South Andaman.

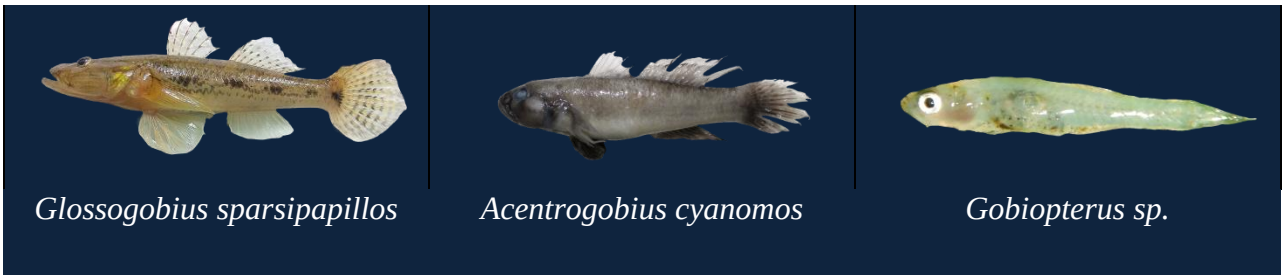

Fig. New records of freshwater finfishes from the Andaman and Nicobar Islands.

Regeneration

Regeneration of *Rhizophora apiculata* will be attempted at two sites in Middle Andaman. Brood stock management of Skunk anemone fish, *Amphirion akallopsis* is being carried out at Marine Research Laboratory, Marine Hill. Captive breeding of this species has been standardised and after successful larval rearing, ranching will be done at North Bay.