



Ashutosh Kumar Verma

Scientist-B

CRC, BSI, Allahabad

Date of joining: 20th April, 2015



Title of Ph.D thesis: “Cytogenetic variability and improvement in *Catharanthus roseus* (L.) G. Don”.

Supervisor: Prof . RR Singh, Dept. of Botany, University of Lucknow.



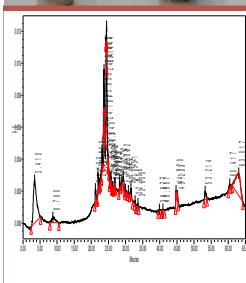
Fellowships/Awards:

•**Research Fellow- CSIR- NBRI, Lucknow (Aug 2005- June, 2006)**

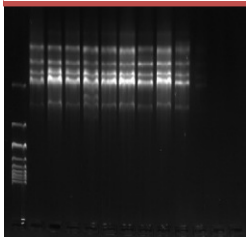
CSIR- CIMAP, Lucknow (June 2006- Nov, 2006)

•**JRF-NET (UGC) - Sep , 2008 – Dec, 2010**

•**SERB-Young Scientist : CSIR- CIMAP & BSI. (Nov 2013- Nov 2016)**



➤ **Honorary degree of “Khrishi Vigyan Gaurav” (2016)** by *Bhartiya Khrishi Anusandhan Samiti & Agriculture Research and Communication Centre, Karnal.*



CYTOLOGICAL INVESTIGATION OF SOME SELECTED ANGIOSPERMS OF AJCBIBG ,

HOWRAH

Work place : CBL, BSI (Duration April 2015- April 2016)

No. of targeted plant species: 5

Achievements:

Cytological work initiated at CBL, BSI, Howrah after lacunae of approx. 20 years.

➤ **Worked out plant species – 9**

Solanum diphyllum L. (2n=24), *Abrus precatorius* L. (2n=22); *Gloriosa superba* L. (2n=22); *Crotalaria spectabilis* Roth (2n=16); *Rungia pectinata* Nees (2n=18), *Plantago ovata* Forsk. (2n=8); *P. psyllium* L. (2n=12); *P. lanceolata* L. (2n=12) and *P. arenaria* Waldst. & Kit (2n=12)

➤ New chromosome count (2n=18) *Rungia pectinata* .

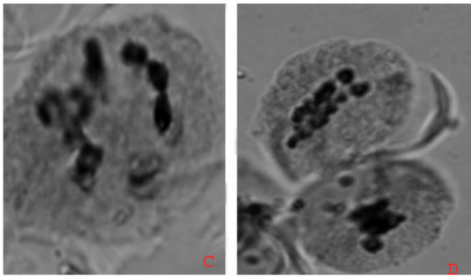
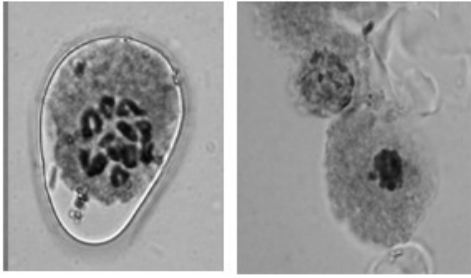
➤ Karyotype data of *Plantago* species.

Other related activities:

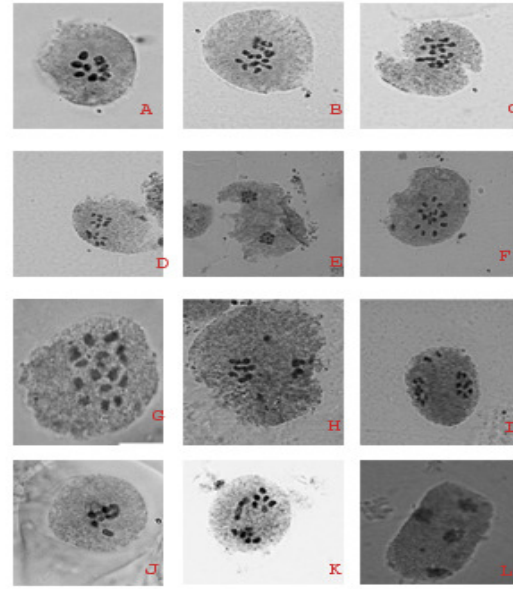
❖ 2297 'Cytological Voucher Specimens' were documented (834 of IBG Plants + 1463 from rest of India).

❖ Data mining for possible chromosome count of

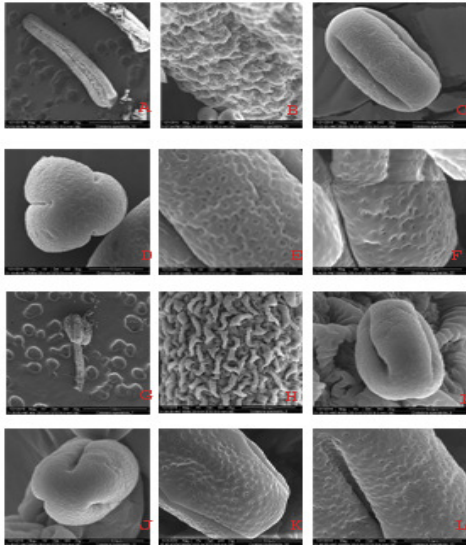
❑ **Published new chromosome count in 60 plant species of IBG . (as per CVS available in CBL)**



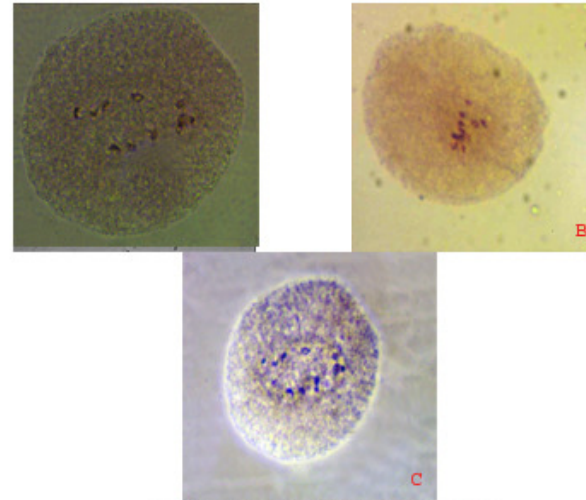
Stages of meiosis in *Solanum diphyllum* ($2n=24$)



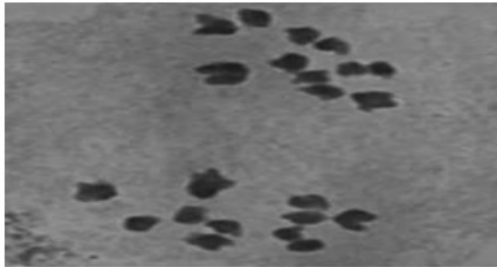
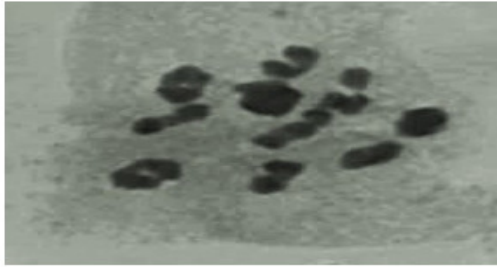
Meiotic stages in *Crotalaria spectabilis*



SEM pictures of anthers of *Crotalaria spectabilis*



Meiotic stages in *abrus precatorius* ($2n=22$)



Meiotic stages in *Gloriosa superba* (2n=22)

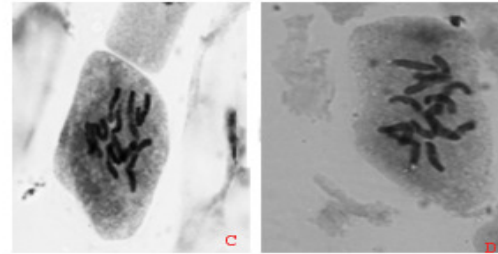
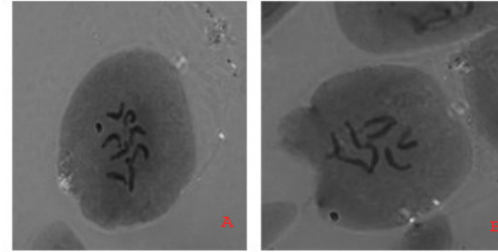


Figure: A&B *Plantago ovata* (2n=8); C&D *P. lanceolata* (2n=12)

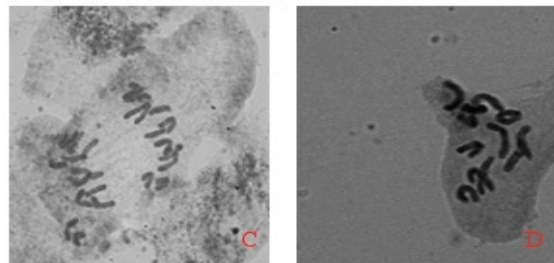
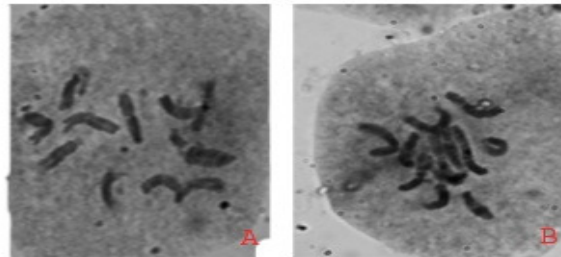


Figure: A&B *Plantago arenaria* (2n=12); C&D *P. psyllium* (2n=12)

Publications:

❖ **Verma AK**, Mallick L, Mishra M, Singh H (2016). A meiotic study in *Solanum diphyllum* L.; an exotic plant in India. *Researches in Environment and Life Sciences*. 9(10): 1270-1271.

❖ **Verma AK**, Mishra M, Mallick L, Bharti KA, Dash SS, Singh H and Singh P (2016). Database on Chromosome counts of Plants of AJCBIBG, Howrah. *NELUMBO* 58: 57-78.

❖ **Verma AK** and Singh S (2016). Anther dimorphism and reductional division in *Crotalaria spectabilis* Roth. *Indian J of Genetics and Plant Breeding*. *Communicated*.

“FLORA OF CHHATTISGARH”

Work place: BSI- CRC, Allahabad Howrah

Project duration : 2016- 18.

Allotted species- 122

Work Done (Taxonomic description of species)

Potamogetonaceae
(6 species)

Eriocaulaceae
(14 species)

Cyperaceae
(48 species)

Endemic to India	Medicinally important
<i>E. parviflorum</i> (Fyson) R. Ansari & N.P. Balakr. <i>E. raipurensis</i> KK Khanna, Mudgal & An. Kumar <i>E. rajendrababui</i> R. Ansari & N.P. Balakr. <i>E. hamiltonianum</i> Mart.	<i>Bulbostylis barbata</i> (Rottb.) C.B. Clarke (<i>Dysentery</i>) <i>Cyperus brevifolius</i> (Rottb.) Endl. ex. Hassk., (<i>diarrhoea</i>) <i>C. kyllingia</i> Endl. (<i>rhizome in fever</i>) <i>C. rotundus</i> L., (<i>Stomach and bowel complaints</i>)

Morphometric studies and linkage among 32 species of *Cyperus* (Ph, LW, BL, BW,SpL, SpW, GL, GW, GNv, Sno,Sti, NL, NW)

Macro Clusters:

1st : 17 spp

Microcluster- 6, 2,2,4,3

2nd : 4 spp

Micro-cluster- 2, 1,1

3rd : 10 spp

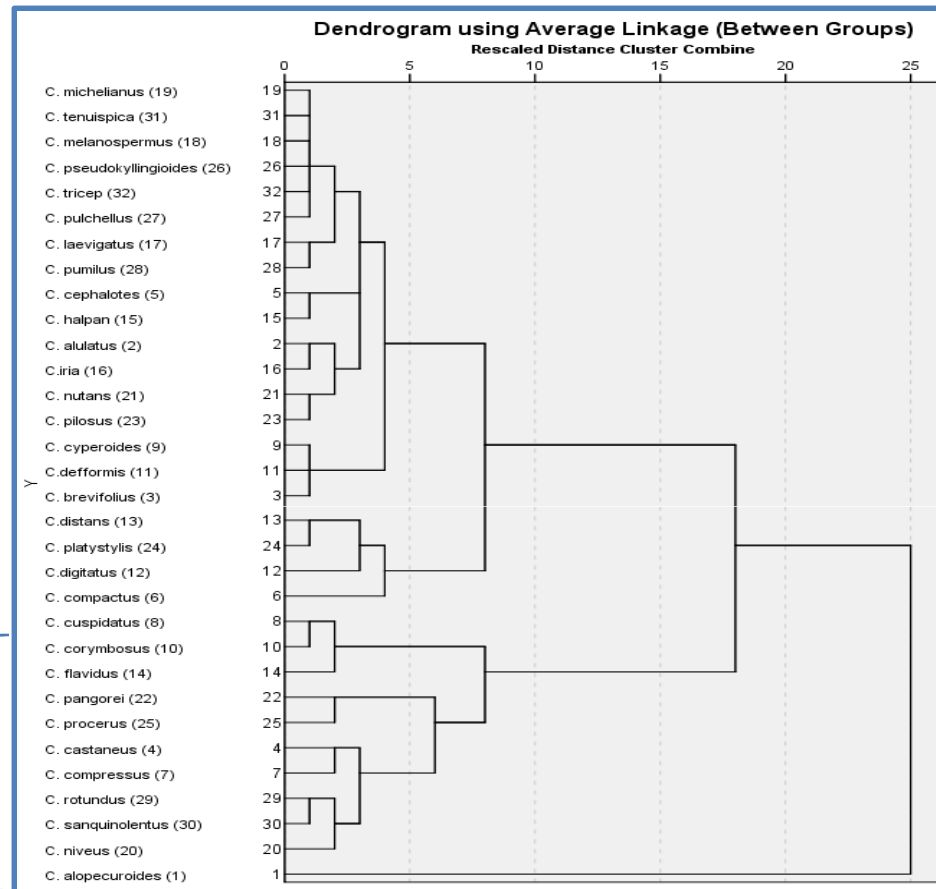
Micro-cluster- 3,2,5

4th : 1 spp

Conclusion:

•Several spp contain linkage distance less/ nearly 1 unit.

•*C. alopecuroides* most distinct spp.



Molecular and biochemical investigations in antidiabetic plant *Gymnema sylvestre* R. Br.

Work place CSIR- CIMAP & BSI (2013-2016)

Collection of different accessions of *G. sylvestre*



Chemical and genetic profiling of accessions (HPLC & ISSR based)



Selection of contrasting accessions with respect of gymnemic acid content.



Transcriptome analysis of contrasting accessions



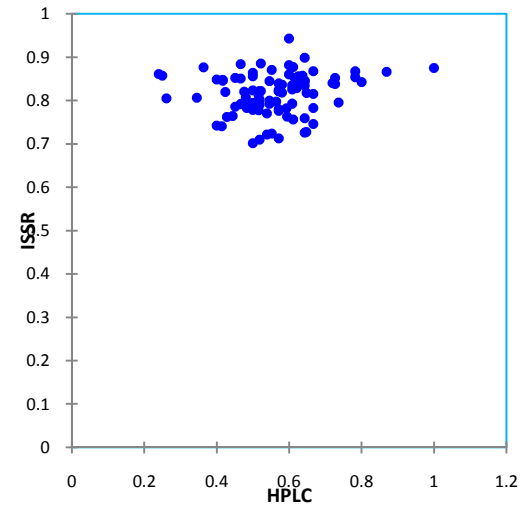
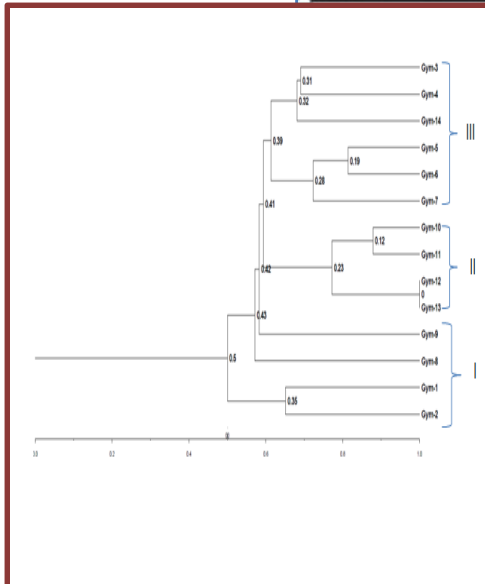
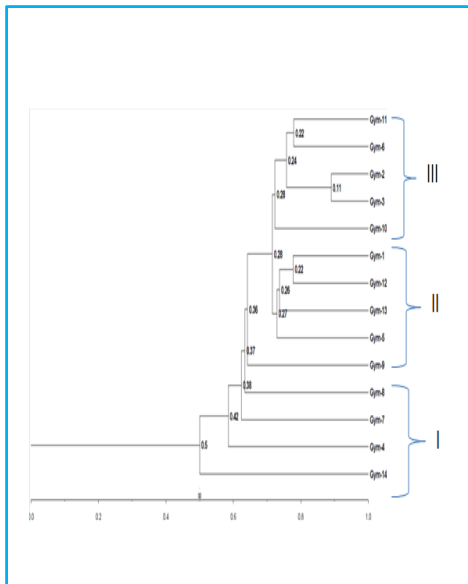
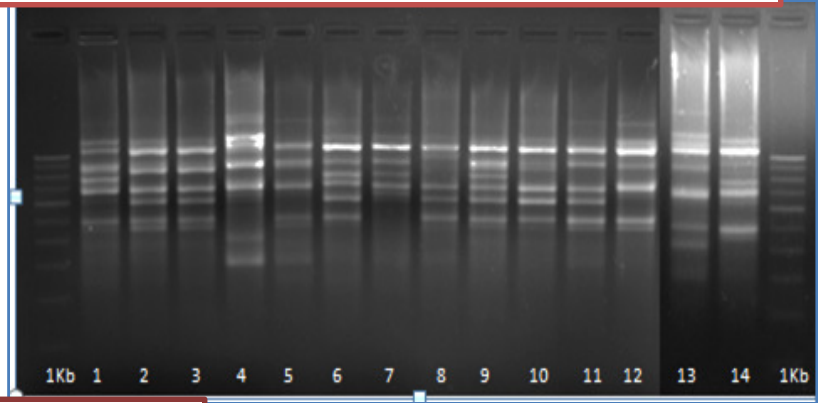
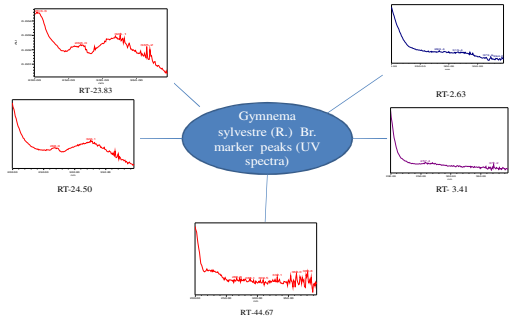
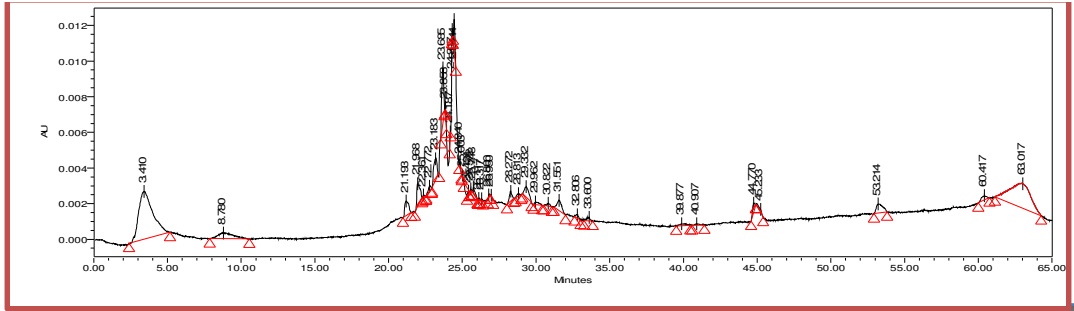
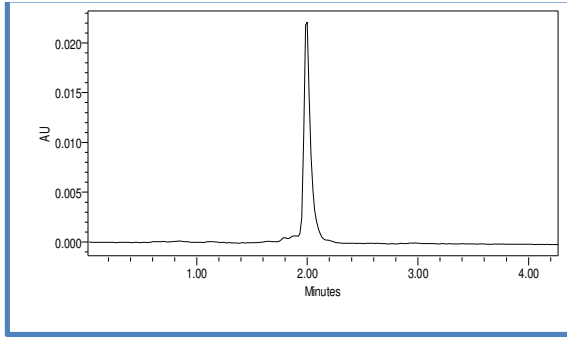
Transcriptome analysis of contrasting accessions

Results/outcome:

- Genetic and chemical fingerprints of all collected accessions.
- Differential transcriptome of contrasting accessions.

Major achievements:

- ❖ Developed a cytological marker system for identification of high gymnemic acid yielding accessions of *Gymnema sylvestre*.
- ❖ Identified five unknown universal type peaks (RT-2.63, 3.41, 23.83, 24.50, and 44.67) could be helpful in identification of *G. sylvestre* based various herbal preparations.



Ex- situ conservation:

- **Seventeen (17)** accessions of *G. sylvestre* introduced in AJCBIBG and **3** in CBL, Howrah.
- Thirty (30) accessions introduced in field gene bank of CSIR- CIMAP, Lucknow in the first phase of project.

Publications:

Verma AK, Mallick L, Bharti KA, Mishra M, Singh H (2015) Effect of temperature and relative humidity on gymnemic acid content in *Gymnema sylvestre* (R) Br. *Bhartiya Krishi Anusandhan Patrika*. 30(4), 214-216.

Verma AK, and Dhawan SS. (2017) Chromosomal fragmentation a possible marker for the selection of high active principle yielding accessions of *Gymnema sylvestre* R. Br. *Pharmacognosy Magazine*. **Accepted**

Pharmacogn. Mag.
A multifaceted peer reviewed journal in the field of Pharmacognosy and Natural Products
www.phcog.com | www.phcog.net

ORIGINAL ARTICLE

Genetic and Chemical Profiling of *Gymnema sylvestre* Accessions from Central India: Its Implication for Quality Control and Therapeutic Potential of Plant

Ashutosh Kumar Verma, Sunita Singh Dhawan¹, Seema Singh², Kumar Avinash Bharati³, Jyotsana⁴

Central Botanical Laboratory, Botanical Survey of India, AJC Bose Indian Botanic Garden, Howrah, West Bengal, India, ¹Plant Biotechnology Division, CSIR – Central Institute of Medicinal and Aromatic Plants, Lucknow, India, ²Plant Genetics Unit, Department of Botany, University of Lucknow, Lucknow, Uttar Pradesh, India, ³Central National Herbarium, Botanical Survey of India, AJC Bose Indian Botanic Garden, Howrah, West Bengal, India, ⁴Analytical Chemistry Division, CSIR – Central Institute of Medicinal and Aromatic Plants, Lucknow, Uttar Pradesh, India

>Master_Control_1

```
ATGCAAGCTCCCTCAATTCCAAACTTCTCTCGGATCTTTCCTCGGGTGGCAACTTGACAGCAGAAAGGGAAGA
TGCAAACAGGAATGAAGTCACCAACACCACATTCGTGTCCCTCAACACTGGCCTTCTGGAAAGCGATCTGGCA
TGGGCCCGCAGAAGTAGCTTACTAAGAGGACTTTAACGTCAGAGAAGCAATCCAAAAGACCAGTATCCCAG
```

>Master_Control_2

```
CAAACAATGGTTTGTCTTAAAATGTTTGATATCTTTGTCCGAAAATATGAAAATTAATTGATGAAGAATAATT
AATAAATATATATAAATTGTAATAATTAACGATAAATTAAGTACGTACATCTCGGGATACTTGAATGCCTTG
GGCACCTTAAGACGATCAGGGGTGGTTGCAGGTTTGCAGCAGCAGACATCTTTTCGATATTCTTGAGAAATGG
GTTTTGTTGGAGTTGTATTTTCGTTTTCTTGAGTAATTATGGTACTAGGCGTTGCCTGTGGTGGGGGTGTTTC
CTGAATTTTCTCCATTGAACTTCTTTTAATGCAAACCTTGATTATTTCTCTATATAGTTTTTTATTAAAATGA
TATTGTTTCGGTCAGACGAATTGAATTCCACAATTGGCAGAAAGAG
```

Publications/Projects

	CSIR/LU	BSI	Total
SCI journal	3 (1 st & Corr.)	2 (1 st & Corr.)	5
Non-SCI journal (NAAS)	7 (3 with 1 st & Corr.)	4 (2 with 1 st & Corr.)	11
Books	1	--	1
Projects	1	2	3

ADMINISTRATIVE DUTIES CARRIED OUT

Nature of administrative duty	Work place	Tenure
Rajbhasha Adhikari	CBL, BSI, Howrah	April, 2015-April, 2016
DDO (In the absence of regular DDO)	CBL, BSI, Howrah	15 th July- 14 th Sep, 2015 11 th Feb- 21 st Feb, 2016 17 th March- 31 st March, 2016
Store Officer	CRC, BSI, Allahabad	From 27 th July , 2016- continue
Office In-charge	CRC, BSI, Allahabad	14 th July, 2016

Future plans

**Floristic diversity of Amangarh Tiger Reserve, Bijnor,
Uttar Pradesh**

**Cyto-taxonomical studies in some selected taxa of
Indian subtribe Cassiniai**



Thank you