MORPHOLOGICAL AND CYTOLOGICAL STUDIES OF SELECTED PLANTS FROM CRC GARDEN, ALLAHABAD

(2020-21)

Executing Officer

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Scientist-C

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Actual date of start of the project: October 2020

Target: 50 species

Number of worked out species: 52 species (37 genera)

Status of project work: Experimental work completed, Manuscript will be submitted by the end of May.

- **Number of species having 2X chromosome count: 33**
- **Number of species having 4X chromosome count: 14**
- **Number of species having 5X chromosome count : 01**
- **Number of species having 6X chromosome count : 05**
- **Number of species having 2 or more chromosome count: 04**
- **Number of species having 2X, 3X, 6X chromosome count: 02**
- **New chromosome count: 02**
- **Number of worked out tree species: 06 (26 accessions with GPS Data)**

Species	Family	Study pattern	Ob. Ch. No.	Ploidy	Reported Chromosome Number
Achyranthes aspera L. (x=7)	Amaranthaceae	Population basis	42	Hexaploid	36, 42, 48, 70,84,96
Allium trifoliatum Cirillo (x=7)	Amaryllidaceae	Population basis	14	Diploid	14, 21
Aloe vera (L.) Burm. F. (x=7)	Xanthorrhoeaceae	Population basis	14	Diploid	6, 10, 14
Antigonon leptopus hook. & Arn. (x=7)	Polygonaceae	Population basis	42 (New)	Hexaploid	14,40, 44,48
Andrographis paniculata (Burm.f.) Nees (x=25)	Acanthaceae	Population basis	50	Diploid	28, 50
Asparagus racemosus Willd (x=11)	Asparagaceae	Population basis	22	Diploid	20, 22, 40
Azadirachta indica A. Juss. (x=??)	Meliaceae	Individual plant (6)	28	Diploid	28, 30
Basella alba L. (Green) (x=11)	Basellaceae	Individual Plant	44	Tetraploid	44, 48
Basella alba L. (Red) (x=11)	Basellaceae	Individual Plant	44	Tetraploid	22, 44
Bauhinia purpurea L. (x=14)	Leguminosae	Individual Plant (5)	28	Diploid	28
Bauhinia variegata L. (x=14)	Leguminosae	Individual Plant (3)	28	Diploid	28
Boerhavia diffusa L.-Purple (x=26)	Nyctaginaceae	Population basis	52	Diploid	52, 58
Boerhavia diffusa L. -White (x=26)	Nyctaginaceae	Population basis	52	Diploid	52, 58
Caesalpinia pulcherrima (L.) Sw. (x=12)	Leguminosae	Individual Plant (1)	28	Diploid	24,28

Species	Family	Study pattern	Ob. Ch. No.	Ploidy	Reported Chromosome Number
Cassia fistula L. (x=6, 7 ??)	Leguminosae	Individual Plant (3)	26, 28	Tetraploid/Paleopolyploid	24, 26, 28
Chlorophytum comosum (Thunb.) Jacques (x=7,8)	Asparagaceae	Population basis	28	Teteraploid	14,24, 28, 32, 48
C. nepalense (Lindl.) *Baker* (x=7)	Asparagaceae	Population basis	28	Tetraploid	28, 42, 56
C. tuberosum (Roxb.) Baker (x=7)	Asparagaceae	Population basis	28 (New)	Tetraploid	16, 24, 26
Crotalaria spectabilis Roth (x=7)	Leguminosae	Population basis	16	Diploid	16,24
Delphinium ajacis L. (x=8)	Rananculaceae	Population basis	16	Diploid	16, 24
Datura stramonium L. (x=12)	Solanaceae	Population basis	24	Diploid	24
Gymnema sylvestres (Retz.) R. Br. ex Sm. (x=??)	Apocynaceae	Individual Plant	22	Diploid	22
Haworthia limifolia Marloth (x=7)	Xanthorrhoeaceae	Population basis	28	Tetraploid	14,21,28
Helicteres isora L. (x=??)	Malvaceae	Individual Plant(1)	18	Not Clear	18,20,24,38
Justicia simplex D. Don (x=??)	Acanthaceae	Individual plant (1)	18	Diploid (Possibly)	18, 36
*Justicia adhatoda*L. (x=??)	Acanthaceae	Population basis	34	Diploid (Possibly)	34,40,46, 50
Lantana camara L. (x=11)	Verbenaceae	Population basis	44	Tetrapolid	22, 28, 33,34, 36, 44, 55, 66
Lantana montevidensis (Spreng.) Briq. (x=??)	Verbenaceae	Individual plant	48	Diploid	36, 48
Ocimum basilicum L. (x=12)	Lamiaceae	Population basis	72	Hexaploid	48, 52, 54, 56, 72
Oroxylum indicum (L.) Curz. (n=14)	Bignoniaceae	Individual plant (9)	28	Diploid (Possibly)	28, 30, 38

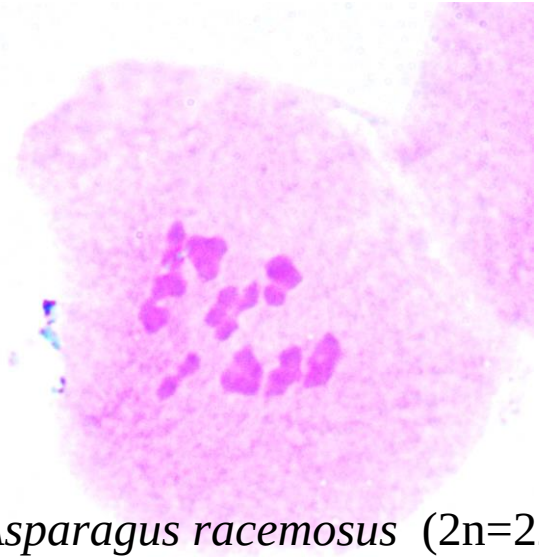
Species	Family	Study pattern	Ob. Ch. No.	Ploidy	Reported Chromosome Number
Papaver rhoeas L. (x=7)	Papaveraceae	Population basis	14	Diploid	14, 18, 21, 28
Phlomoides superba (Royle) Kamelin & Makhm	Lamiaceae	Individual plant (2)	22	Diploid	22
Physalis minima L. (x=12)	Solanaceae	Population basis	48	Tetraploid	24, 48, 72
Pyrostegia venusta (K. Gawl.) Miers.(x=10)	Bignoniaceae	Population basis	50	Pentaploid	30, 60, 50, 80
Rauvolfia serpentina (L.) Benth. ex Kurz (x=11)	Apocynaceae	Population basis	22	Diploid	20, 22, 44
Rauvolfia tetraphylla L. (x=11)	Apocynaceae	Population basis	66	Hexaploid	33, 55, 66, 68, 88
Saraca asoca (Roxb.) Willd.(x=??)	Leguminosae	Individual Plant (1)	24	Diploid	24, 34
Senna alata(L.) Roxb. (x=7)	Leguminosae	Individual plant	28	Tetraploid	24, 28
Senna obtusifolia (L.) H.S. Irwin & Barneby (x=7)	Leguminosae	Population basis	28	Tetraplod	26, 28, 56
Senna tora L. (x=7)	Leguminosae	Population basis	28	Tetraploid	26, 28
Senna sulfurea (Collad.) H. S. Irwin & Barneby (x=7)	Leguminosae	Individual Plant (2)	28	Tetraploid	28, 56
Sansevieria cylindrica Bojer ex Hook (x=??)	Asparagaceae	Individual Plant (3)	28	Diploid	28, 36, 42

Species	Family	Study pattern	Ob. Ch. No.	Ploidy	Reported Chromosome Number
Sansevieria trifasciata Prain (x=??)	Asparagaceae	Individual Plant (3)	**30 (New)**	Diploid	42, 48, 56, 104
Solanum diphyllum L. (x=12)	Solanaceae	Population basis	24	Diploid	24
Solanum nigrum L. (x=12)	Solanaceae	Population basis	24,36, 72	Diploid & Hexaploid	24, 36, 48, 72
Solanum villosum L. (x=12)	Solanaceae	Population basis	24, 72	Diploid	24
Solanum virginianum (x=12)	Solanaceae	Population basis	24	Diploid	24, 36
Tamarindus indica L. (X=??)	Leguminosae	Individual plant (2)	24, 26	Diploid	24, 26, 28
Tinospora sinensis (Lour.) Merr. (x=??)	Minispermaceae	Population basis	26	Diploid	24, 26
Urena lobata L. (x=??)	Malvaceae	Population basis	28	Diploid	28, 56
Uraria picta (Jacq.) DC. (x=??)	Leguminosae	Individual Plant (2)	16	Diploid	16, 22
Withania somnifera(L.) Dunal (x=12)	Solanaceae	Population basis	48	Tetraploid	24, 48, 72

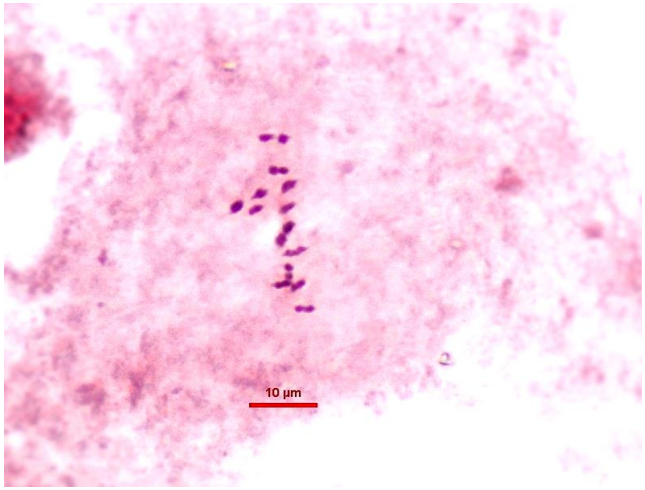
SIGNIFICANCE OF WORK

- Present work will be useful in preparation of '**Chromosome Atlas**' of Botanic Garden of BSI, CRC, Allahabad.

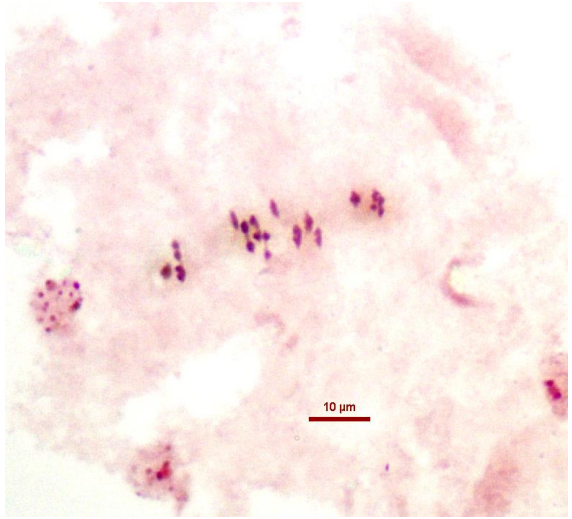
- For tree species and their accessions data on their GPS location also recorded which will be helpful for locating plant with unique genotype in future.



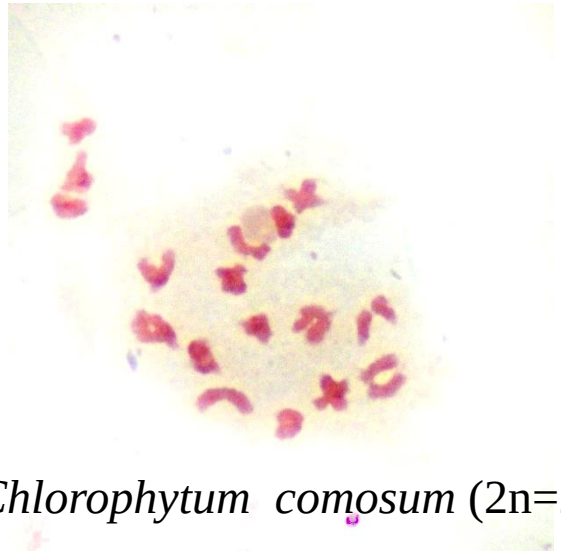
Asparagus racemosus (2n=22)



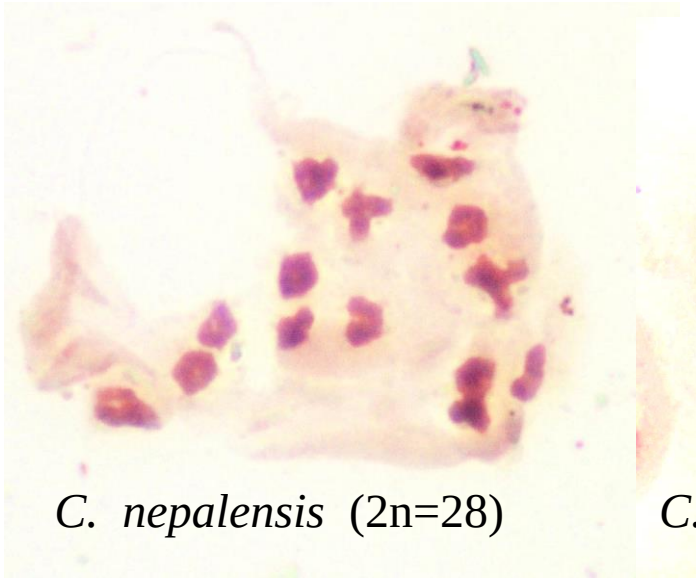
Bauhinia purpurea (2n=28)



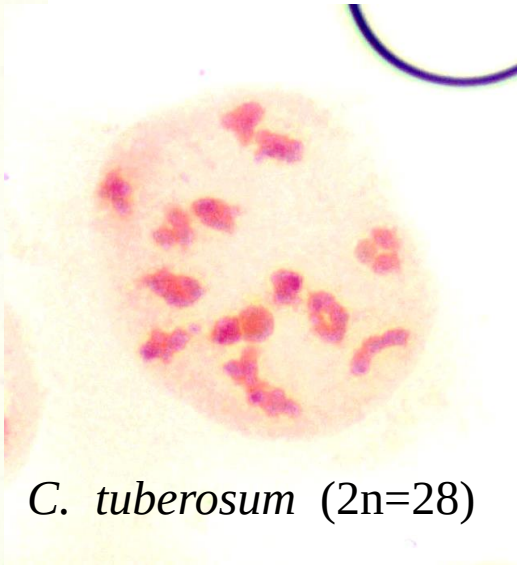
B. variegata (2n=28)



Chlorophytum comosum (2n=28)



C. nepalensis (2n=28)



C. tuberosum (2n=28)

Other achievements

- Documented chromosome count for **415 species (36 genera)** of family Cyperaceae.

- This work will an effort for update of 'Chromosome Atlas' of family Cyperaceae in Indian Context.

- Source of Information: Online database, published research articles, review of literature etc.

Carex - Microsoft Excel

Home | Insert | Page Layout | Formulas | Data | Review | View | Developer

Cut | Copy | Format Painter | Paste | Clipboard

Calibri | 11 | Font

Wrap Text | Merge & Center | Alignment

General | Number

Conditional Formatting | Format as Table | Cell Styles | Styles

Insert | Delete | Format | Cells

AutoSum | Fill | Clear | Sort & Filter | Find & Select | Editing

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	A	B	C	D	E	F	G
1	S.N.	Taxa	Present Name	Geographical distribution	n	2n	Authors
2							
3	1	Carex acutiformis Eh	Carex acutiformis El	W. Himalaya		38,78	38:Reese, G.1952b,Reese, G. 1952b, Al-Bermani, et al (1993),Roalson 2008
4							78:Reese, G.1952b,Dietrich, J. 1964, Dietrich, W.1972,Stoeva, M. P.1992c,Druskovic, L. P.19
5							
6	2	Carex alopecuroides	Carex alopecuroide	E. Himalays		40,62	40:Harling, G.1945, Roalson 2008
7							62:Tanaka, N.1937,Tanaka, N.1938a,Hoshino, T.1981a, Roalson 2008
8	3	Carex alpina Schrank	Carex sempervirens	Vill.			
9							
10	4	Carex alpina Schrank	Carex sempervirens	Vill.			30:Dietrich, 1967,Kupfer, P.1974,Hindakova, M.1978,Lazare, J.-J.1988
11							31:Dietrich, 1967
12							32:Dietrich, 1967,Stoeva, M. P., E. D. Popova & K. G. Uzunova1991,Druskovic, L. P.1995
13							34:Dietrich, 1967,Lazare, J.-J.1988
14							68:Lazare, 1976,Hindakova, M. & J. Majovsky1976
15							
16	5	Carex alsia Raymond	Carex decaulescens	subsp. alsia (Raymond) Kukkonen			
17							
18	6	Carex alta Boott					
19							
20	7	Carex aristata Honck	Carex praecox Schre	Himalaya		58	DIETRICH, w. 1972,Májovský J. et al., 1976,Stoeva, M. P.1985, Rotreklová, O et al 2011
21							
22	8	Carex asraoi D.M.Ver	Carex asraoi D.M.Ve	Nagaland			
23							
24	9	Carex atrata L.	Carex atrata L.			18,26,48,52,	18:Hadac, E. & V. Haskova1956, Roaslon 2008
25							26:Hadac, E. & V. Haskova1956,Roalson 2008

Sheet1 | Sheet2 | Sheet3

Ready

100%

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Ex-situ conservation

- Field tour: 01

- Collected germplasm : 09 species

Acacia catechu (L.f.) Willd., *Careya arborea Roxb.*, *Commiphora wightii* (Arn.) Bhandari, *Cordia macleodii* Hook.f. & Thomson, *Gymnema sylvestre* (Retz.) R. Br. ex. Sm., *Plumbago zeylanica* L., *Prosopis cineraria* (L.) Druce, *Radermachera xylocarpa* (Roxb.) Roxb. ex K.Schum., *Sarcostemma brevistigma* Wight & Arn

Publications (2020-21)

		Total
SCI journal	03	IF: **9.038** **2.606**
Non-SCI journal (NAAS)	01	4.11
Non-SCI journal	01	Published from University of Latvia
Total	05	-

Contents lists available at ScienceDirect

Journal of Hazardous Materials

journal homepage: www.elsevier.com/locate/jhazmat

Arsenic-induced differential expression of oxidative stress and secondary metabolite content in two genotypes of *Andrographis paniculata*

Paurabi Das [a,f], Puja Khare [a,f,*], Raghavendra Pratap Singh [a], Vineet Yadav [a,f], Pratibha Tripathi [a], Anuj Kumar [a], Versha Pandey [a], Pooja Gaur [b,f], Asha Singh [a], Ram Das [b], Channayya Hiremath [c,f], Ashutosh Kumar Verma [d], Ashutosh K. Shukla [e,f], Karuna Shanker [b,f]

RESEARCH ARTICLE

Realization of Paleopolyploidy through Cytogenetic and Phylogenetic Characterization of Ten Species of *Senna* Mill., Fabaceae-Caesalpinioideae

A.K. Verma[1]*, S. Srivastava[2], O.N. Maurya[3], R.S. Chuhan[4], R. Lahiri[5]

DOI: 10.18811/ijpen.v6i04.00

Journal of Plant and Environment

ABSTRACT

Journal of Drug Delivery Science and Technology 57 (2020) 101734

Contents lists available at ScienceDirect

Journal of Drug Delivery Science and Technology

journal homepage: www.elsevier.com/locate/jddst

Nanoemulsion preconcentrate of a pentacyclic triterpene for improved oral efficacy: Formulation design and *in-vivo* antimalarial activity

Jyotshna[a], Amit Chand Gupta[a], Dnyaneshwar U. Bawankule[a], Ashutosh Kumar Verma[b], Karuna Shanker[a,*]

Environmental and Experimental Biology (2020) 18: 161–168
http://doi.org/10.22364/eeb.18.16

Original Paper

Diallel analysis of seven promising genotypes of opium poppy for assessment of their combining ability and efficacy in future genetic improvement programmes

Rashmi Lahiri[1]*, Jyotshana[2], A.K. Verma[3], Karuna Shanker[2], R.K. Lal[1]

Environmental and Experimental Biology

ISSN 2255-9582

UNIVERSITY OF LATVIA

Trends Phytochem. Res. 4(1) 2020 25-36

Trends in Phytochemical Research (TPR)

Journal Homepage: http://tpr.iau-shahrood.ac.ir

Original Research Article

Inheritance pattern and association study of agronomical traits in 47 elite accessions/ genotypes of Opium poppy (*Papaver somniferum* L.)

Rashmi Lahiri[1*] ✉, Jyotshana[2], A.K. Verma[3], Karuna Shanker[2] And Raj Kishori Lal[1]

ADMINISTRATIVE DUTIES CARRIED OUT

Nature of administrative duty	Work place	Tenure
DDO (Regular)	BSI, CRC, Allahabd Howrah	From December 2017-Continue
In-charge of Computer & SEM facility	CRC, BSI, Allahabad	From 27th July , 2018
GeM related duties	CRC, BSI, Allahabad	From December, 2018
Member of Auction Committee, Purchase Committee etc.	CRC, BSI, Allahabad	------


Thank you