

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

(2020-21)

Executing Officer

**Dr. Ashutosh Kr. Verma
Scientist-C
BSI, CRC, Allahabad**

Actual date of start of the project: October 2020

Target: 50 species

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

- **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
<i>Achyranthes aspera</i> L. (x=7)	Amaranthaceae	Population basis	42	Hexaploid	36, 42, 48, 70,84,96
<i>Allium trifoliatum</i> Cirillo (x=7)	Amaryllidaceae	Population basis	14	Diploid	14, 21
<i>Aloe vera</i> (L.) Burm. F. (x=7)	Xanthorrhoeaceae	Population basis	14	Diploid	6, 10, 14
<i>Antigonon leptopus</i> hook. & Arn. (x=7)	Polygonaceae	Population basis	42 (New)	Hexaploid	14,40, 44,48
<i>Andrographis paniculata</i> (Burm.f.) Nees (x=25)	Acanthaceae	Population basis	50	Diploid	28, 50
<i>Asparagus racemosus</i> Willd (x=11)	Asparagaceae	Population basis	22	Diploid	20, 22, 40
<i>Azadirachta indica</i> A. Juss. (x=??)	Meliaceae	Individual plant (6)	28	Diploid	28, 30
<i>Basella alba</i> L. (Green) (x=11)	Basellaceae	Individual Plant	44	Tetraploid	44, 48
<i>Basella alba</i> L. (Red) (x=11)	Basellaceae	Individual Plant	44	Tetraploid	22, 44
<i>Bauhinia purpurea</i> L. (x=14)	Leguminosae	Individual Plant (5)	28	Diploid	28
<i>Bauhinia variegata</i> L. (x=14)	Leguminosae	Individual Plant (3)	28	Diploid	28
<i>Boerhavia diffusa</i> L.-Purple (x=26)	Nyctaginaceae	Population basis	52	Diploid	52, 58
<i>Boerhavia diffusa</i> L. -White (x=26)	Nyctaginaceae	Population basis	52	Diploid	52, 58
<i>Caesalpinia pulcherrima</i> (L.) Sw. (x=12)	Leguminosae	Individual Plant (1)	28	Diploid	24,28

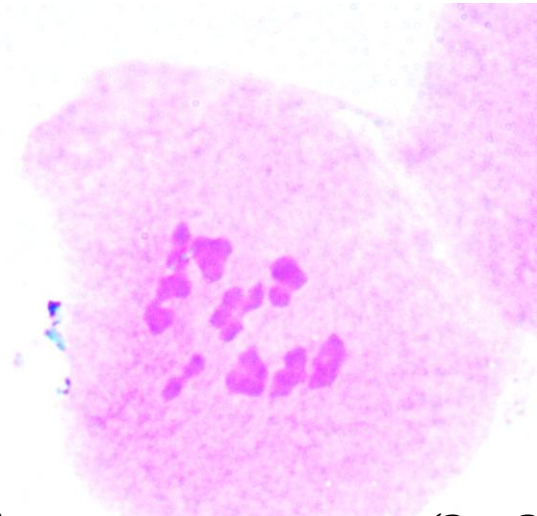
Species	Family	Study pattern	Ob. Ch. No.	Ploidy	Reported Chromosome Number
<i>Cassia fistula</i> L. (x=6, 7 ??)	Leguminosae	Individual Plant (3)	26, 28	Tetraploid/Paleopolyploid	24, 26, 28
<i>Chlorophytum comosum</i> (Thunb.) Jacques (x=7,8)	Asparagaceae	Population basis	28	Teteraploid	14,24, 28, 32, 48
<i>C. nepalense</i> (Lindl.) Baker (x=7)	Asparagaceae	Population basis	28	Tetraploid	28, 42, 56
<i>C. tuberosum</i> (Roxb.) Baker (x=7)	Asparagaceae	Population basis	28 (New)	Tetraploid	16, 24, 26
<i>Crotalaria spectabilis</i> Roth (x=7)	Leguminosae	Population basis	16	Diploid	16,24
<i>Delphinium ajacis</i> L. (x=8)	Ranunculaceae	Population basis	16	Diploid	16, 24
<i>Datura stramonium</i> L. (x=12)	Solanaceae	Population basis	24	Diploid	24
<i>Gymnema sylvestres</i> (Retz.) R. Br. ex Sm. (x=??)	Apocynaceae	Individual Plant	22	Diploid	22
<i>Haworthia limifolia</i> Marloth (x=7)	Xanthorrhoeaceae	Population basis	28	Tetraploid	14,21,28
<i>Helicteres isora</i> L. (x=??)	Malvaceae	Individual Plant(1)	18	Not Clear	18,20,24,38
<i>Justicia simplex</i> D. Don (x=??)	Acanthaceae	Individual plant (1)	18	Diploid (Possibly)	18, 36
<i>Justicia adhatoda</i> L. (x=??)	Acanthaceae	Population basis	34	Diploid (Possibly)	34,40,46, 50
<i>Lantana camara</i> L. (x=11)	Verbenaceae	Population basis	44	Tetrapolid	22, 28, 33,34, 36, 44, 55, 66
<i>Lantana montevidensis</i> (Spreng.) Briq. (x=??)	Verbenaceae	Individual plant	48	Diploid	36, 48
<i>Ocimum basilicum</i> L. (x=12)	Lamiaceae	Population basis	72	Hexaploid	48, 52, 54, 56, 72
<i>Oroxylum indicum</i> (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	
<i>Papaver rhoeas</i> L. (x=7)	Papaveraceae	Population basis	14	Diploid	14, 18, 21, 28	
<i>Phlomoides superba</i> (Royle) Kamelin & Makhm	Lamiaceae	Individual plant (2)	22	Diploid	22	
<i>Physalis minima</i> L. (x=12)	Solanaceae	Population basis	48	Tetraploid	24, 48, 72	
<i>Pyrostegia venusta</i> (K. Gawl.) Miers.(x=10)	Bignoniaceae	Population basis	50	Pentaploid	30, 60, 50, 80	
<i>Rauvolfia serpentina</i> (L.) Benth. ex Kurz (x=11)	Apocynaceae	Population basis	22	Diploid	20, 22, 44	
<i>Rauvolfia tetraphylla</i> L. (x=11)	Apocynaceae	Population basis	66	Hexaploid	33, 55, 66, 68, 88	
<i>Saraca asoca</i> (Roxb.) Willd.(x=??)	Leguminosae	Individual Plant (1)	24	Diploid	24, 34	
<i>Senna alata</i> (L.) Roxb. (x=7)	Leguminosae	Individual plant	28	Tetraploid	24, 28	
<i>Senna obtusifolia</i> (L.) H.S. Irwin & Barneby (x=7)	Leguminosae	Population basis	28	Tetraplod	26, 28, 56	
<i>Senna tora</i> L. (x=7)	Leguminosae	Population basis	28	Tetraploid	26, 28	
<i>Senna sulfurea</i> (Collad.) H. S. Irwin & Barneby (x=7)	Leguminosae	Individual Plant (2)	28	Tetraploid	28, 56	
<i>Sansevieria cylindrica</i> Bojer ex Hook (x=??)	Asparagaceae	Individual Plant (3)	28	Diploid	28, 36, 42	

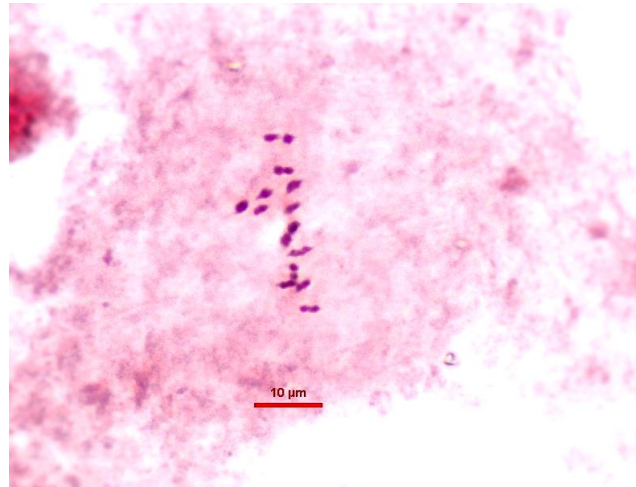
Species	Family	Study pattern	Ob. Ch. No.	Ploidy	Reported Chromosome Number
<i>Sansevieria trifasciata</i> Prain (x=??)	Asparagaceae	Individual Plant (3)	30 (New)	Diploid	42, 48, 56, 104
<i>Solanum diphyllum</i> L. (x=12)	Solanaceae	Population basis	24	Diploid	24
<i>Solanum nigrum</i> L. (x=12)	Solanaceae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

SIGNIFICANCE OF WORK

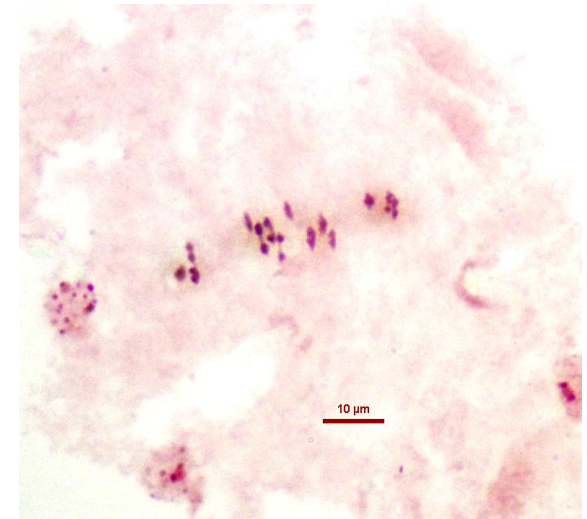
- ❖ Present work will be useful in preparation of '**Chromosome Atlas**' of Botanic Garden of BSI, CRC, Allahabad.
- ❖ For tree species and their accessions data on their GPS location also recorded which will be helpful for locating plant with unique genotype in future.



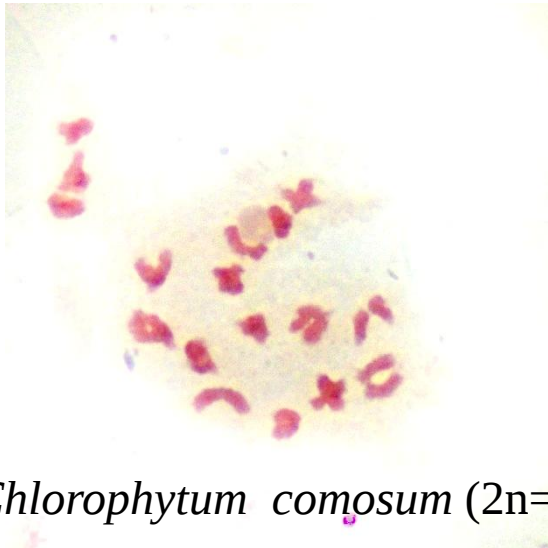
Asparagus racemosus ($2n=22$)



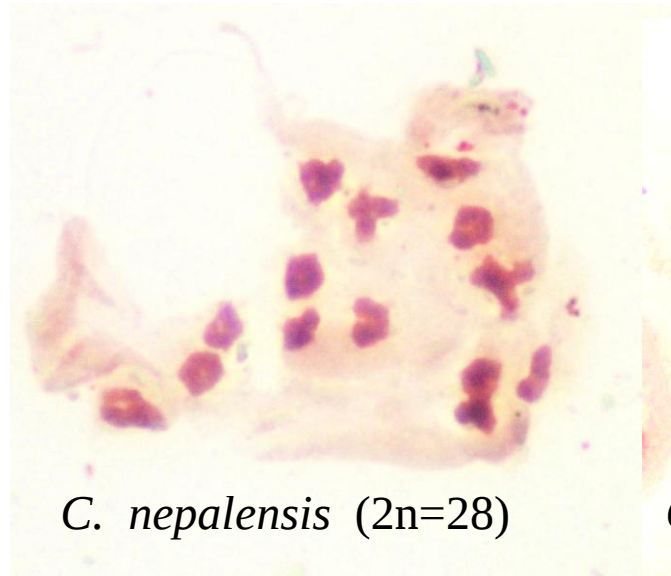
Bauhinia purpurea ($2n=28$)



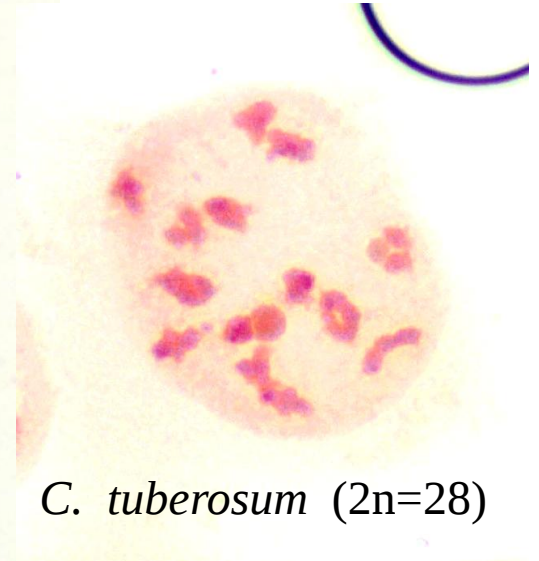
B. variegata ($2n=28$)



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

HomeInsertPage LayoutFormulasDataReviewViewDeveloper

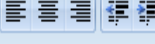
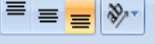
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Conditional Formatting as Table Styles



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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 E	W. Himalaya		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 alopecuroides 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.Ve	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

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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	-



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Contents lists available at [ScienceDirect](http://www.sciencedirect.com)

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. Srivastava², O.N. Maurya³, R.S. Chuhan⁴, R. Lahiri⁵

DOI: 10.18811/ijpen.v6i04.00

ABSTRACT



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*}, Jyotshana², A.K. Verma³, Karuna Shanker², R.K. Lal¹



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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*} ✉, JYOTSHANA², A.K. VERMA³, KARUNA SHANKER² AND RAJ KISHORI LAL¹

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 27 th July , 2018
GeM related duties	CRC, BSI, Allahabad	From December, 2018
Member of Auction Committee, Purchase Committee etc.	CRC, BSI, Allahabad	-----



Thank you