



### 3.2.1 - Institution has created an ecosystem for innovations and has initiatives for creation and transfer of knowledge


#### Report of Consultancy Activities

Prof. Timir Baran Jha's laboratory has initiated a consultancy service in the form of chromosomal analysis of Indian lentils and other food crop cultivars. The first such consultancy service was rendered to Mali Agrotech Pvt. Ltd., Ranaghat, Nadia, West Bengal in the form of chromosomal analysis of a cultivar of *Amaranthus cruentus* L. (Laal Saag).



**Photograph of Incubation cell at the College at the Department of Botany**



  
Principal  
Maulana Azad College  
Principal  
Maulana Azad College  
Kolkata  
Govt. of West Bengal



Ref No. ....

Department of Botany  
**MAULANA AZAD COLLEGE**  
B, Rafi Ahmed Kidwai Road,  
Kolkata - 700 013, W.B. (India)

Dated 03.05.2024

## Report of Chromosome Analysis in *Amaranthus cruentus* L.

- **Organization:** MALI Agri-tech Pvt. Ltd., Ranaghat -741201, West Bengal
- **Requirements:** Chromosomal Status of three provided samples of *Amaranthus cruentus* L. Samples I and II are control and sample Mali Lal Saag-321 (Sample III) was their developed product.
- **Samples were received on:** 04.04.2024

According to the literature review, *Amaranthus cruentus* L. has  $2n=34$  very small chromosomes. There are very few research publications available globally on this genus, and some of them are from India. The Indian researchers have used the classical method for chromosome analysis. However, no one from our country has attempted chromosome analysis in *Amaranthus cruentus* L. through EMA-based molecular cytogenetics method.

In our studies, we have standardized chromosome preparation from root apical meristems. We took a minimum of 20 randomly selected seeds of each sample for germination and collected healthy roots for chromosome processing.

### Methods applied:

- I) Classical orcein staining method and
- II) Enzymatic Maceration and Air drying (EMA) method, a modern cytogenetic approach

Considering the very small size of the chromosomes and to obtain accurate chromosomal status we have followed the EMA method and Giemsa staining in all three samples. The experiments were repeated many times.

To determine chromosome numbers, we have analysed more than 50 well-scattered cytoplasm-free Giemsa-stained metaphase plates from different root tips in each sample.

Carl Zeiss Axio Scope AI, fitted with CCD camera, Axiovision L. E4 software and Computer was used for chromosome analysis and photography:

**Observation and conclusion:**

- *Amaranthus cruentus* Control I: contains uniformly  $2n=34$  chromosomes (Plate 1, enclosed)
- *Amaranthus cruentus* Control II: contains uniformly  $2n=34$  chromosomes (Plate 2, enclosed)
- *Amaranthus cruentus* sample (III) Mali Lal Saag-321 also contains uniformly  $2n=34$  chromosomes (Plate 3, & 4 enclosed).

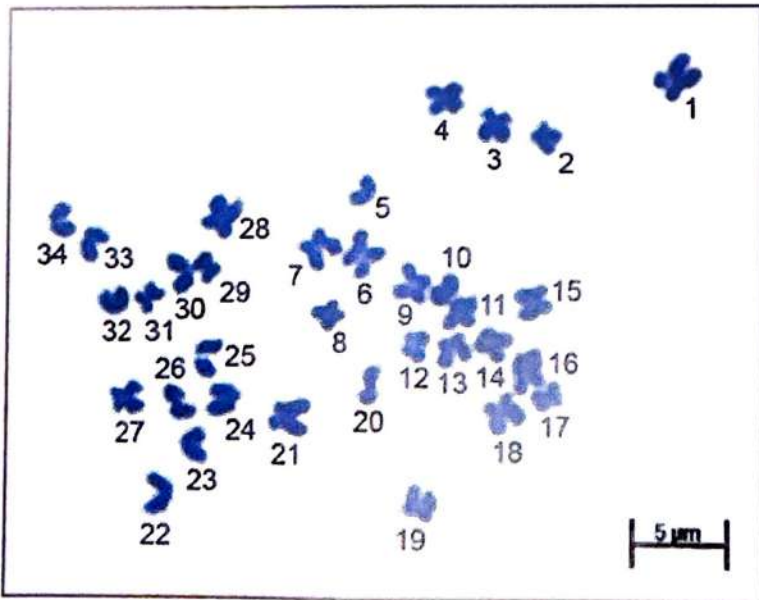
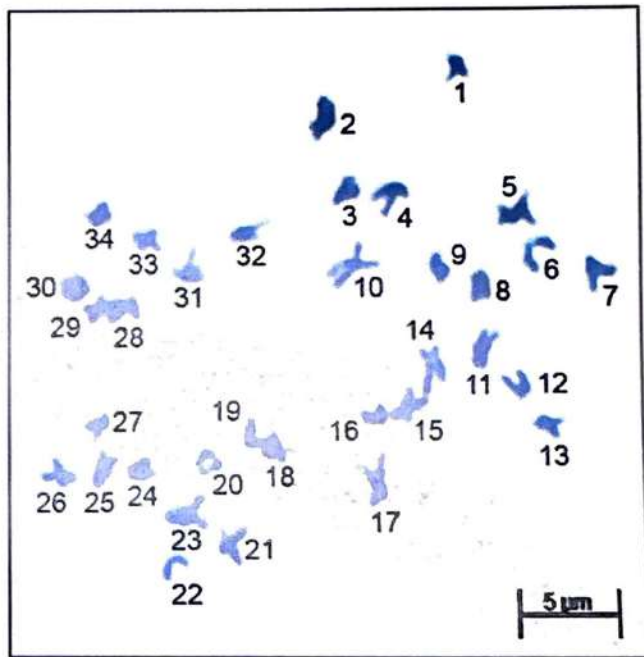
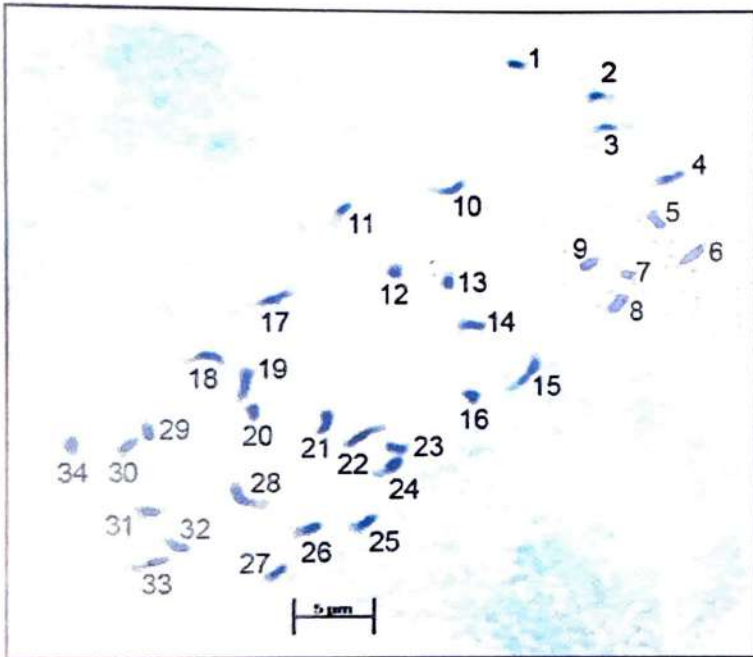
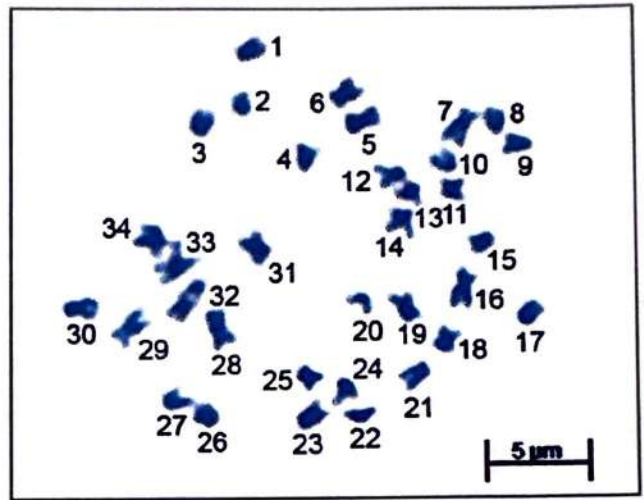
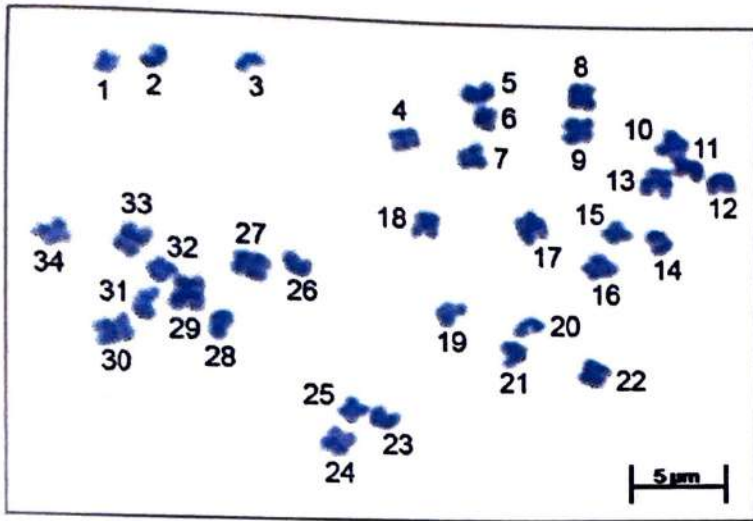
**No variation is found regarding  $2n$  chromosome numbers within the supplied germplasms including Mali Lal Saag-321 obtained from MALI Agri-tech Pvt. Ltd., Ranaghat -741201, West Bengal.**

*Ajha* 3.05.2024  
Prof. Dr Timir Baran Jha  
Retd. Professor of Botany (WBSSES)  
Maulana Azad College  
Kolkata- 700013  
West Bengal  
Date: 3.05.2024

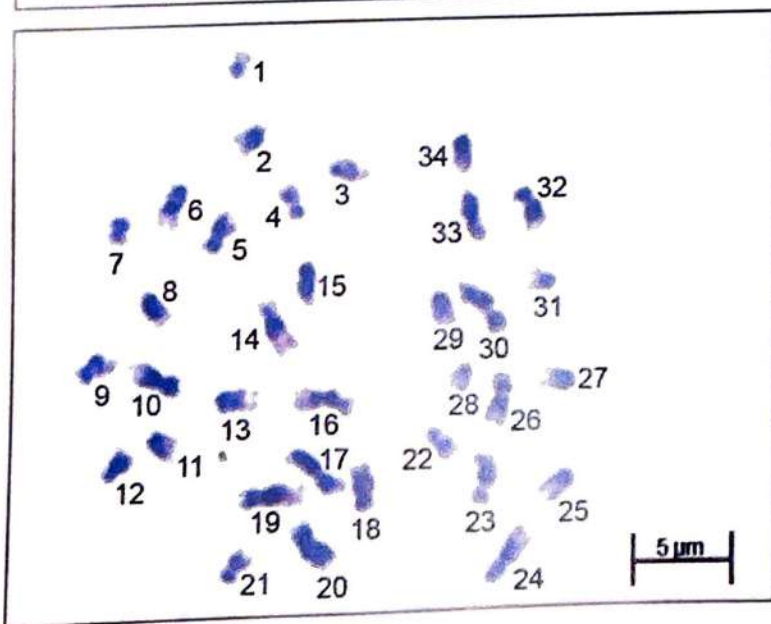
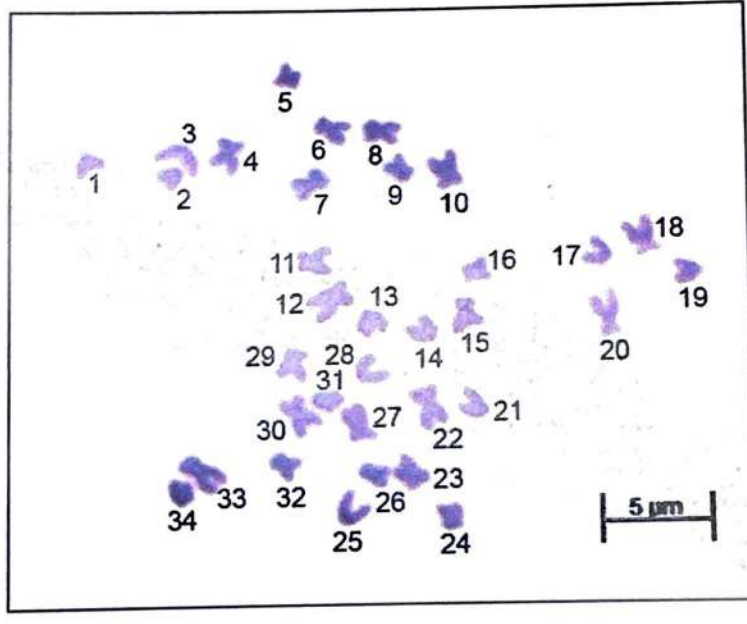
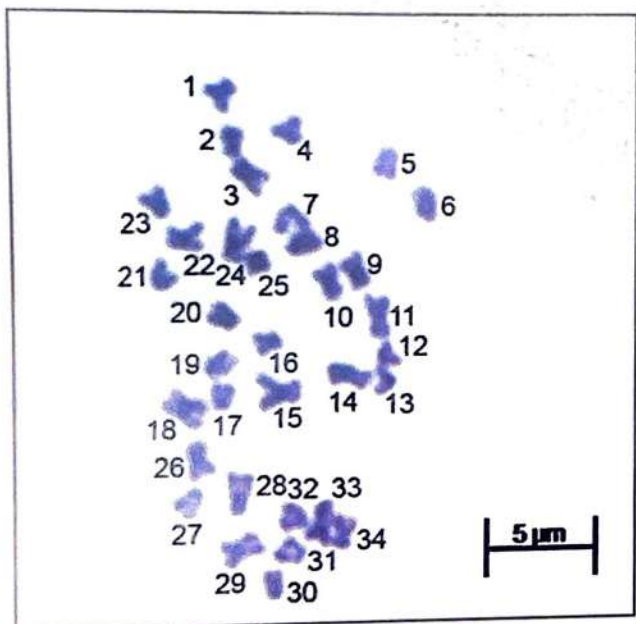
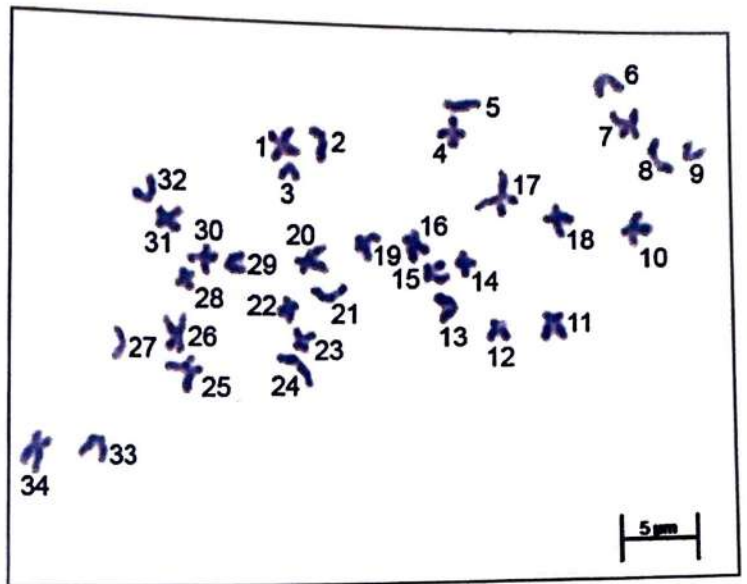
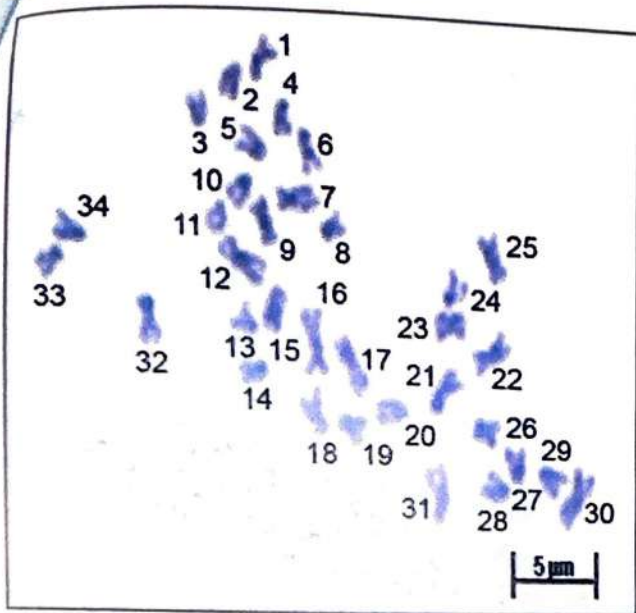
*Dr. Deb* 03.05.2024  
Dr. Debabarata Mukhopadhyay  
Head. Dept. of Botany  
Maulana Azad College  
Kolkata- 700013  
West Bengal

Head & Associate Professor  
Department of Botany  
Maulana Azad College  
Kolkata.-700013





**Figure 1: Five metaphase plates showing  $2n=34$  somatic chromosome numbers in *Amaranthus cruentus* L. sample number Control I.**



**Figure 2: Five metaphase plates showing  $2n=34$  somatic chromosome numbers in *Amaranthus cruentus* L. sample number Control II.**



**Consultancy Certificate issued to the College by Mali Agrotech Pvt. Ltd.**



**Certificate of Acknowledgement**

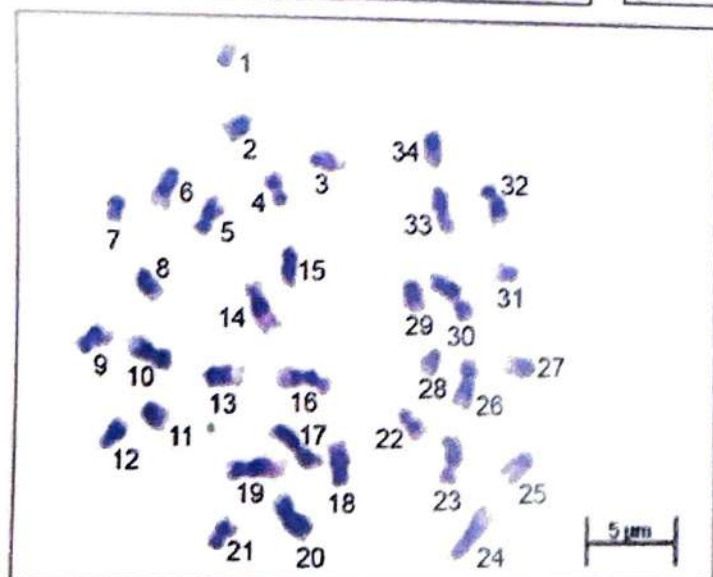
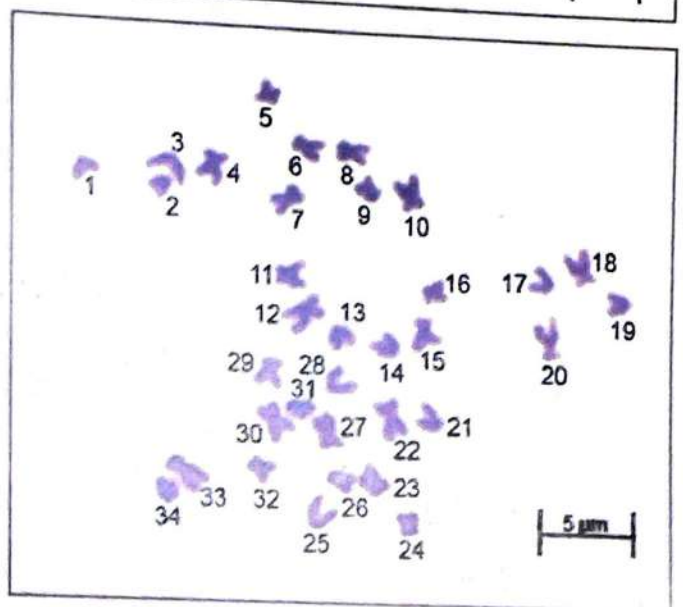
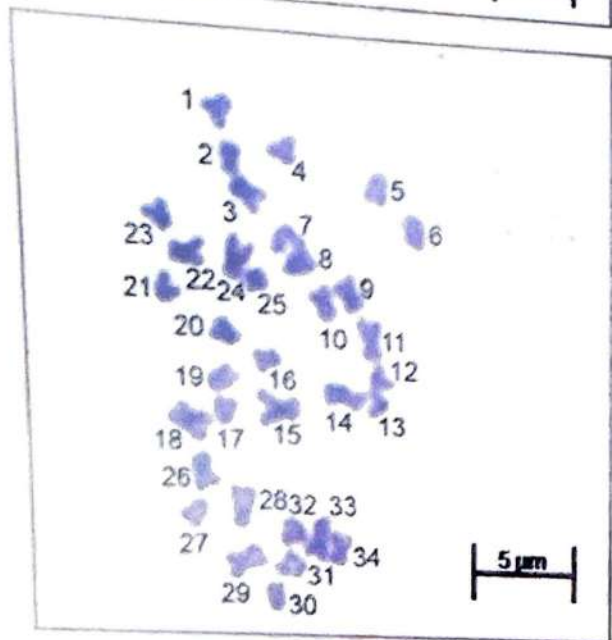
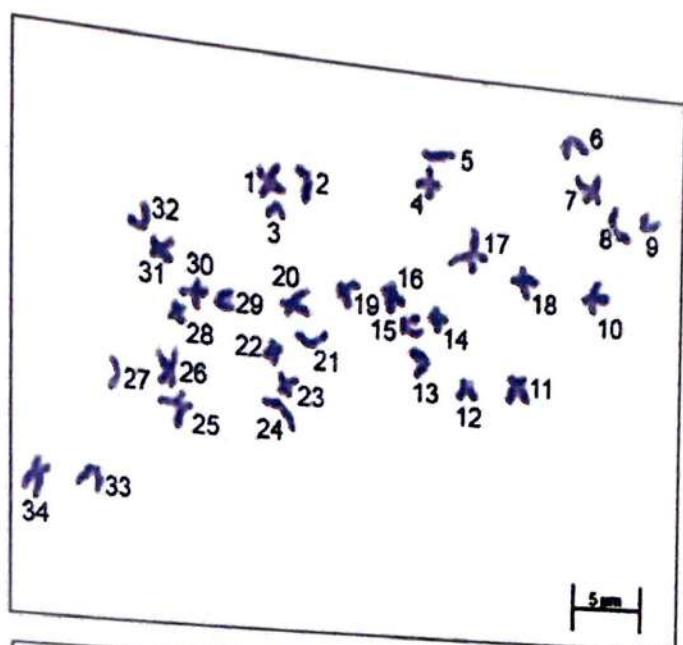
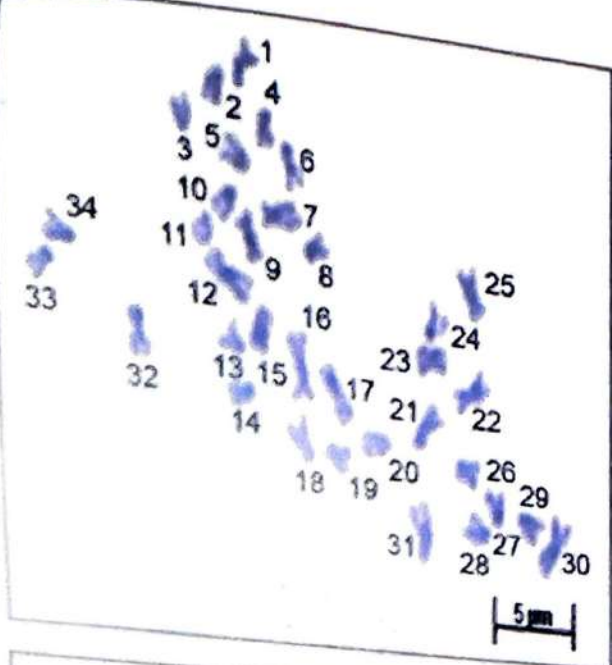
We, on behalf of **Mali Agritech Pvt. Ltd.**, hereby express our sincere gratitude to Prof. Timir Baran Jha , Department of Botany, Moulana Azad College , Kolkata-700013, for successfully analyzing the Chromosome number of our product Amaranthus variety MALI LAL SAAG -321 ( *Amaranthus cruentus* L ) along with a control Amaranthus ( mother ) sample. We sincerely appreciate the work as it will facilitate our concern effort to further develop our product. The work is expected to benefit the Indian Knowledge System database

**Mali Agri Tech Pvt. Ltd.**

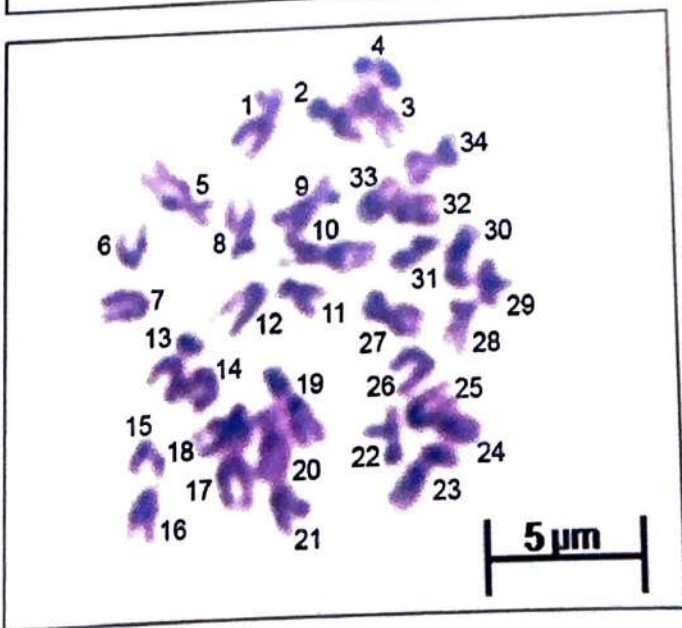
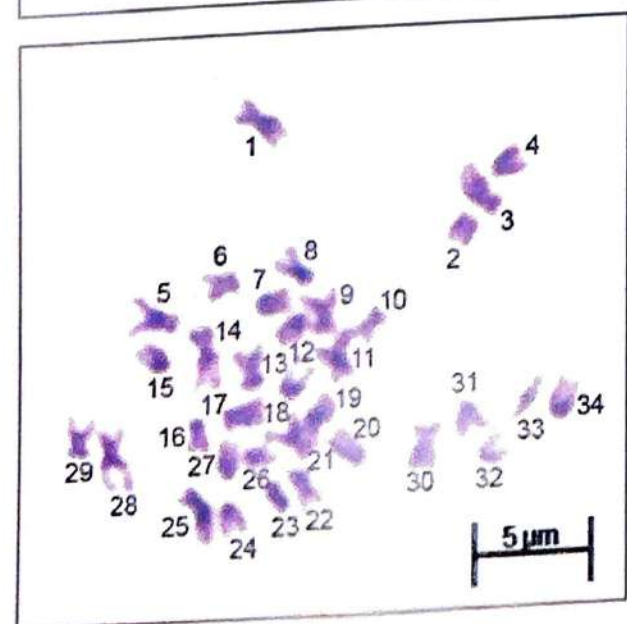
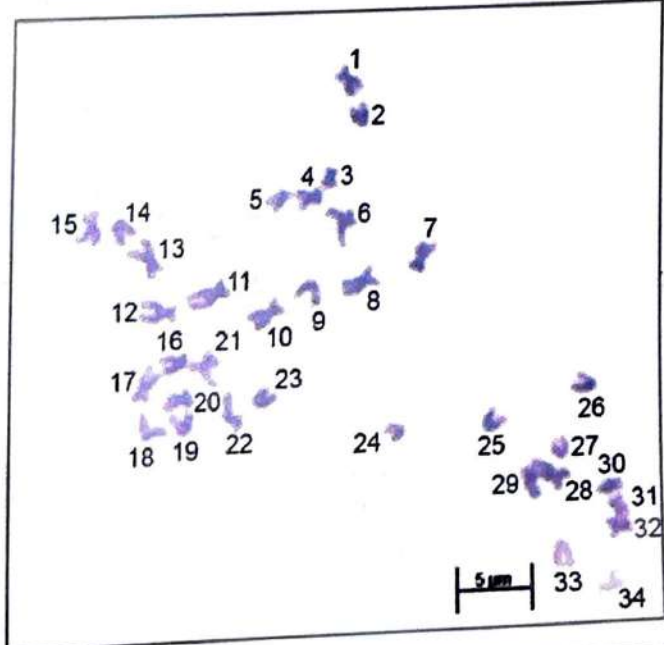
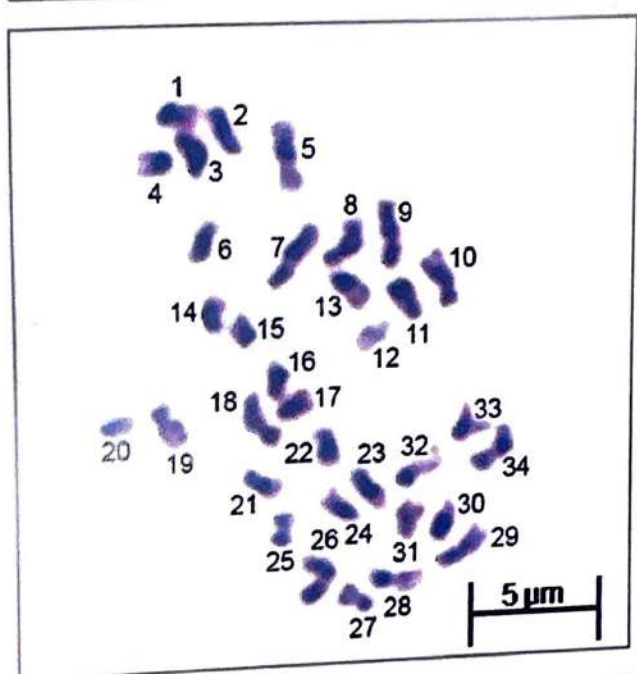
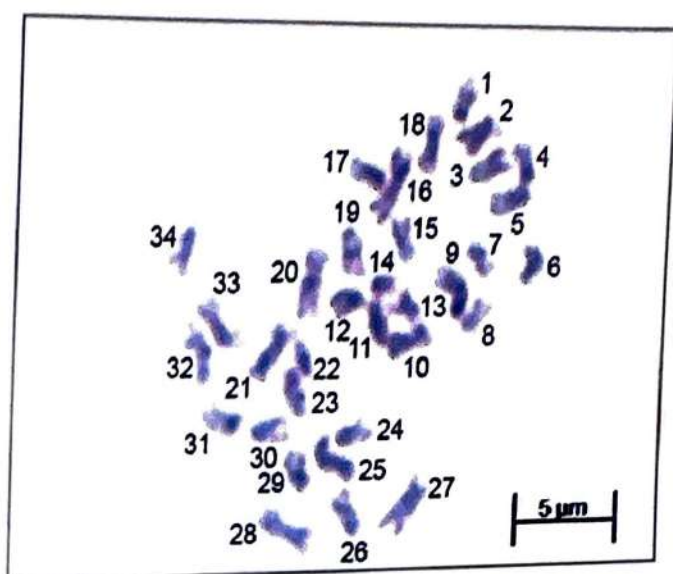
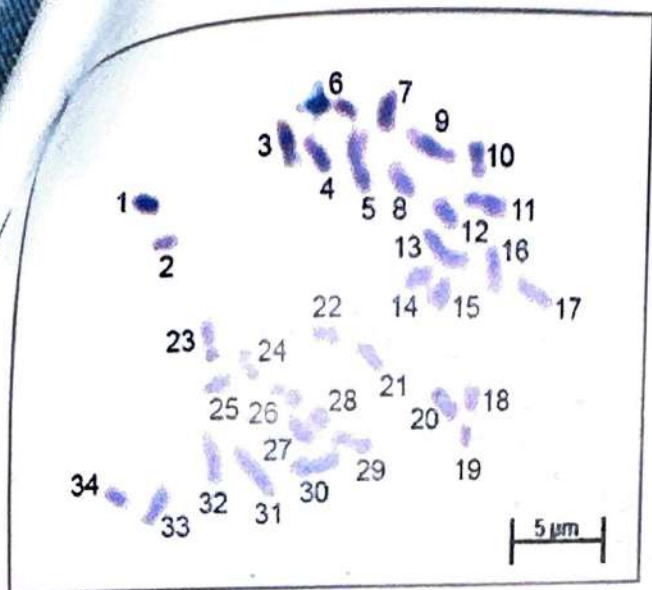
*[Signature]*  
**Breeder**

*[Signature]*  
Principal  
Maulana Azad College  
Principal  
Maulana Azad College  
Kolkata  
Govt. of West Bengal



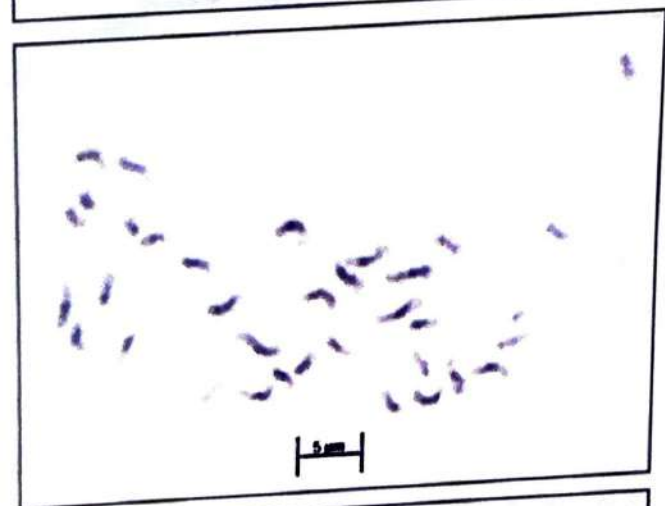
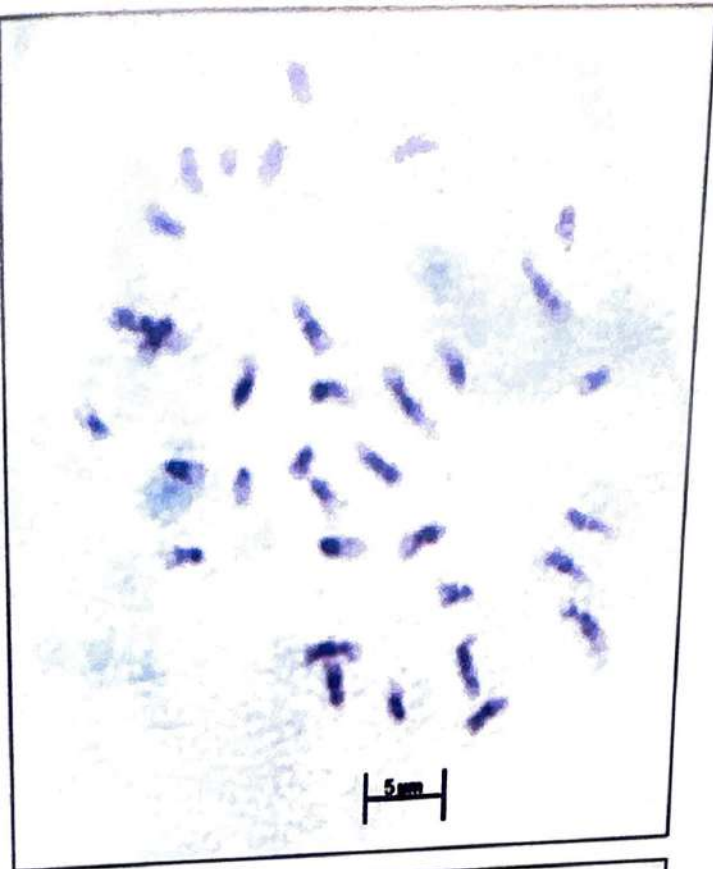


**Figure 2: Five metaphase plates showing  $Zn=34$  somatic chromosome numbers in *Amaranthus cruentus* L. sample number Control II.**



**Figure 3: Six metaphase plates showing  $2n=34$  somatic chromosome numbers in *Amaranthus cruentus* L. sample Mali Lal Saag- 321**





metaphase plates showing  $2n=34$  somatic chromosome  
*Anthus cruentus* L. sample Mali Lal Saag- 321.

## Chromosome report

From: Timir Baran Jha (tbjha2000@yahoo.co.in)  
To: veg@maliseeds.com  
Date: Friday, 3 May, 2024 at 11:04 am IST

Dear Goutam Babu,

You can recall that samples were delivered on 04.04.24 and I completed my work within one month. The material was challenging but gives me pleasure to conduct its chromosome analysis. You can see the size of the chromosomes and your work has adopted the modern cytogenetics method for the first time in India in this species. Please try to make yourself available on the 10th to collect your hard copy report as desired by our Principal. Please acknowledge the soft copy of the report.


regards  
Timir baran Jha

Prof. Dr. Timir B. Jha  
Prof. of Botany, Retd. WBSSES  
Dept. of Botany,  
Maulana Azad College  
Kolkata-13, W.Bengal, India  
9432184468

ORCID ID: 0000-0003-0900-8167

Scopus ID: [7004243911](#)

Publons ID: [J-4138-2013](#)

 Report on A cruentus Chromosome Analysis 3.5.24.pdf  
1MB

Re: About testing of Chromosome no ( Amaranthus Mali Lal Saag -321 )

Yahoo/Inbox

**Veg Maliseeds**

**From:** veg@maliseeds.com

**To:** Timir Baran Jha

Tue, 23 Apr at 6:58 pm

Sir,

This is to inform you that we have already transferred Rs 20,000.00 in your favour of you through NEFT vide No: INF/NEFT/036036082711/SBIN0001723/ CHROMOSOME/ PRINCIPAL MAULANA.

Kindly acknowledge the receipt of the same.

Thanks & regards,  
Gautam Chakraborty  
Breeder  
Mali Agritech Pvt. Ltd  
80/1, Subhas Avenue  
Ranaghat-741201, Nodia  
West Bengal, India  
Phone .7605881526  
E-mail v [veg@maliseeds.com](mailto:veg@maliseeds.com)



bank details

From: Timir Baran Jha (tbjha2000@yahoo.co.in)  
To: veg@maliseeds.com  
Cc: maulanaazadcollegekolkata@gmail.com  
Date: Friday, 19 April, 2024 at 07:59 pm IST

Dear Dr. Chakraborty,

As advised by the Principal, I am providing you with the following College bank details for the transfer of 'Chromosome analysis charges for three samples'

Name of the account holder: Principal Maulana Azad College Miscellaneous

S/B Account Number: 30015241652

Name of the Bank: State Bank of India

Name of Branch: Wellesley Park (Kolkata)

IFSC: SBIN0001723

Best wishes  
Timir baran Jha

Prof. Dr. Timir B. Jha  
Prof. of Botany, Retd. WBSES  
Dept. of Botany,  
Maulana Azad College  
Kolkata-13, W Bengal, India  
3432184468

ORCID ID: 0000-0003-0900-8167

Scopus ID: [7004243911](#)

Publons ID: [J-4138-2013](#)

Re: Fw: About testing of Chromosome no ( Amaranthus Mali Lal Saag -321 )

From: Debabrata Mukhopadhyay (dmukhopadhyaykalyani@gmail.com)

To: tbjha2000@yahoo.co.in

Cc: maulanaazadcollegekolkata@gmail.com

Date: Wednesday, 24 April, 2024 at 07:18 am IST

Thank you Sir for the information

On Tue, 23 Apr, 2024, 20:40 Timir Baran Jha, <tbjha2000@yahoo.co.in> wrote:

Veg Mali Seeds has transferred the amount to the suggested account of the Principal. This is for your kind information.

regards  
Timir baran Jha

Prof. Dr. Timir B. Jha  
Prof. of Botany, Retd. WBSES  
Dept. of Botany,  
Maulana Azad College  
Kolkata-13, W. Bengal, India  
9432184468

ORCID ID: 0000-0003-0900-8167

Scopus ID: 7004243911

Publons ID: J-4138-2013

----- Forwarded message -----

From: Veg Maliseeds <veg@maliseeds.com>  
To: Timir Baran Jha <tbjha2000@yahoo.co.in>  
Sent: Tuesday, 23 April, 2024 at 06:58:37 pm IST  
Subject: Re: About testing of Chromosome no ( Amaranthus Mali Lal Saag -321 )

Sir,  
This is to inform you that we have already transferred Rs 20,000.00 in favour of you through NEFT vide No: INF/NEFT/036036082711/SBIN0001723/ CHROMOSOME/ PRINCIPAL MAULAN.

Kindly acknowledge the receipt of the same.

Thanks & regards,  
Gautam Chakraborty  
Breeder  
Mali Agritech Pvt. Ltd  
80/1, Subhas Avenue  
Ranaghat-741201, Nodia  
West Bengal, India  
Phone :7605881526  
E-mail: veg@maliseeds.com

On Fri, Apr 19, 2024 at 7:34 PM Timir Baran Jha <tbjha2000@yahoo.co.in> wrote:

Dear Dr. Chakraborty,  
I hope you're doing well. I am writing to inform you that chromosome number analysis in your three samples is progressing satisfactorily. Chromosomes are too small and it is a difficult

Principal  
Maulana Azad College  
Principal  
Maulana Azad College  
Kolkata  
Govt. of West Bengal

Subject: About testing of Chromosome no ( Amaranthus Mali Lal Saag -321 )

From: Timir Baran Jha (tbjha2000@yahoo.co.in)  
To: veg@maliseeds.com  
Cc: dmukhopadhyaykalyani@gmail.com  
Date: Friday, 19 April, 2024 at 07:33 pm IST

Dear Dr. Chakroborty,  
I hope you're doing well. I am writing to inform you that chromosome number analysis in your three samples is progressing satisfactorily. Chromosomes are too small and it is a difficult material. Methods of chromosome preparation have been standardized in two samples. Hope to complete another sample within the next two weeks. Now I am in a position to request you transfer Rs.20,000/- ( Twenty thousand only, for three samples ) to the account given to you by the Head, Dept. of Botany and The Principal Maulana Azad College as early as possible. I will be happy if you can visit Maulana next week (preferably Thursday) for a discussion about the report you require. Please acknowledge the mail and inform me of the money transfer.

best wishes

Timir baran Jha

Prof. Dr. Timir B. Jha  
Prof. of Botany, Rctd. WBSFS  
Dept. of Botany,  
Maulana Azad College  
Kolkata-13, W.Bengal, India  
9432184468

ORCID ID: 0000-0003-0900-8167

Scopus ID: [7004243911](#)

Publont ID: [J-4138-2013](#)

On Monday, 4 March, 2024 at 04:20:21 pm IST, Veg Maliseeds <veg@maliseeds.com> wrote:

Sir,  
Please find attached herewith the permission letter for knowing chromosome no of our product Amaranthus variety Mali Lal Saag -321.

kindly acknowledge the receipt of the same & do the needful.

Thanks & regards,

Gautam Chakraborty  
Breeder  
Mali Agritech Pvt. Ltd  
80/1, Subhas Avenue  
Ranaghat-741201, Nodia  
West Bengal, India  
Phone :7605881526  
E-mail: [veg@maliseeds.com](mailto:veg@maliseeds.com)



Date :04.04.2024

To,

Prof. Dr. Timir B. Jha  
Prof. of Botany, Retd. WBSES  
Dept. of Botany,  
Maulana Azad College  
Kolkata-13, W.Bengal, India  
9432184468

Subject : Submission 3 pkt Amaranthus seeds ( 1 pkt Treaded + 2 pkt Control ) for testing  
Chromosome No. of our product Amaranthus variety Mali Lal Saag -321 (Amaranthus cruentus L ).

Sir,

Please find attached 3 pkt ( 1 pkt treated + 2 pkt control ) for above mentioned subject test.  
Kindly acknowledge the receipt of the same.

Thanks & regards,

Gautam Chakraborty

Breeder

Mali Agritech Pvt. Ltd

80/1, Subhas Avenue

Ranaghat-741201

Nodia, West Bengal

Phone :7605881526

E-mail:veg@maliseeds.com

\*\*Attached 3 pkt.



Department of Botany  
**MAULANA AZAD COLLEGE**  
8, Rafi Ahmed Kidwai Road,  
Kolkata - 700 013. W.B. (India)

Ref. No. ....

Dated 6/3/2024

Department of Botany  
Maulana Azad College, Kolkata

Resolution of the emergency meeting held on 06.03.2024.

It has been resolved unanimously that the Department of Botany welcomes the proposal of Mali Agri-tech Pvt. Ltd. 80/1 Subhas Avenue, Ranaghat, Nadia, West Bengal, 741201 to check the chromosome numbers of mother and newly developed (as claimed by Mali Agri-tech Pvt. Ltd.) *Amaranthus cruentus* Mali Lal saag-321.

The Department of Botany appreciates Dr Timir Baran Jha, Ex Professor in WBSES and Honorary teacher of Maulana Azad College, for conducting chromosomal research of a variety of plants. Prof Jha is the right person to perform such academic work. The aforesaid farm has contacted with Prof Jha and the Department request him to proceed for the work.

The meeting of the Departmental Council also resolved unanimously that cost for conducting the work has to be borne by Mali Agri-tech Pvt. Ltd. 80/1 Subhas Avenue, Ranaghat, Nadia, West Bengal. Prof Jha will decide the amount needed for the assignment, which will be utilized for maintenance of equipment and purchase of chemicals, stains etc.

The amount to be deposited in the following account No :

Name of account holder: Principal Maulana Azad College, Miscellaneous

S/B Account Number: 30015241652

Name of Bank: State Bank of India

Name of Branch: Wellesley Park (Kolkata)

IFSC: SBIN0001723

*WH*

Head, Department Of Botany

Dr. Debabrata Mukhopadhyay  
WBES  
Associate Professor & Head  
Department of Botany  
Maulana Azad College  
8, Rafi Ahmed Kidwai Road, Kolkata-13

*Attested*

*WH*  
*19/4/24*

Head & Associate Professor  
Department of Botany  
Maulana Azad College  
Kolkata.-700013



# Agri-tech Pvt. Ltd.

FOR QUALITY SEED

Date :04.03.2024

To,

Dr. Subhasis Dutta

Principal

Maulana Azad College

Kolkata

Subject: Permission letter for knowing **Chromosomal status** of our newly developed product Amaranthus variety Mali Lal Saag -321 (Amaranthus cruentus L ) from your Institution .

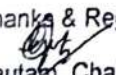
Sir,

This is context of above.

This is to inform you that we have developed our new product of Amaranthus cruentus L Mali Lal Saag -321 and want to check the chromosome numbers of mother and newly developed plants. For that purpose We have a verbal discussion with Dr. Timir Baran Jha , Retd. Prof. of Botany, associated with the Dept. of Botany, Maulana Azad College, Kolkata and carrying out plant chromosomal research for a long time. He has advised us to obtain an official permission from your end in this matter. This is also for your kind information that we are ready to provide charges required for this work.

Hope you will kindly provide us necessary permission to carry out the work in the laboratory of Dr. Jha under the Dept. of Botany.

Thanks & Regards,

  
Gautam Chakraborty

Breeder

Mali Agritech Pvt. Ltd

80/1, Subhas Avenue

Ranaghat-741201, Nodia

West Bengal, India

Phone :7605881526

E-mail:veg@maliseeds.com





GOVERNMENT OF WEST BENGAL  
OFFICE OF THE PRINCIPAL  
*Maulana Azad College*



8, RAFI AHMED KIDWAI ROAD, KOLKATA 700013, INDIA  
Phone: 033 2249-3737/2226-7814 e-mail: maulanaazadcollegekolkata@gmail.com  
Website: <https://maulanaazadcollegekolkata.ac.in>

**A report on the 3 day “Mushroom Cultivation Workshop for entrepreneurs”**

**Organized by**

**Department of Botany, Maulana Azad College**

**Report**

An initiative taken by the Department of Botany, Maulana Azad College, to encourage the students to earn their own money by mushroom cultivation. The cultivation method is very simple. Cost of production and labor demand is low. Mushroom being a superfood its demand in the local market is high. Mushrooms also have high medicinal importance.

The course was meticulously designed to include various technologies used in mushroom cultivation to get optimum yield during mass production. The workshop also taught marketing skills to the learners.

**Number of participants: 15**

**Date of the program: 02/02/23 to 04/02/23**

**Venue: Department of Botany**

**Notice of the event**

Maulana Azad College  
8, Rafi Ahmed Kidwai Road  
Kolkata-700013

Notice:

Department of Botany is going to organize a workshop on “Mushroom cultivation for entrepreneurs” from 02/02/23 to 04/02/23 for Semester 5 students of the college interested in entrepreneurship. Head of the departments are requested to collect the names of the interested students and submit to Dr Naim Uddin Assistant Professor, Department of Botany by 25<sup>th</sup> January 2023.

Certificate will be issued to the participants.

Dr. Debabrata Mukhopadhyay  
Associate Professor & Head  
Department of Botany  
Maulana Azad College  
8, Rafi Ahmed Kidwai Road, Kolkata-13

Principal  
Maulana Azad College  
Kolkata

Principal  
Maulana Azad College  
Kolkata  
Govt. of West Bengal

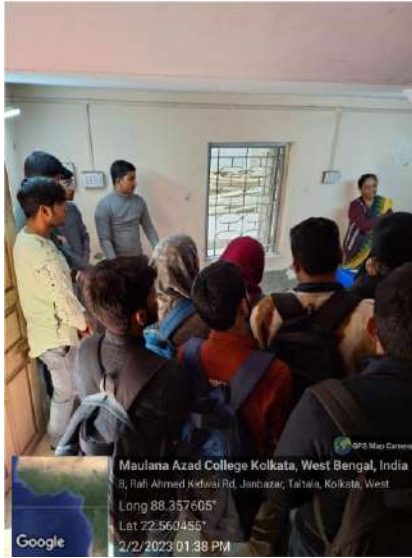


GOVERNMENT OF WEST BENGAL  
OFFICE OF THE PRINCIPAL  
*Maulana Azad College*



8, RAFI AHMED KIDWAI ROAD, KOLKATA 700013, INDIA  
Phone: 033 2249-3737/2226-7814 e-mail: maulanaazadcollegekolkata@gmail.com  
Website: <https://maulanaazadcollegekolkata.ac.in>

**Photographs of the event showing faculty members explaining to students the different phases of mushroom growth and packaging:**



  
Principal  
Maulana Azad College  
Kolkata




GOVERNMENT OF WEST BENGAL  
OFFICE OF THE PRINCIPAL  
**Maulana Azad College**



8, RAFI AHMED KIDWAI ROAD, KOLKATA 700013, INDIA  
Phone: 033 2249-3737/2226-7814 e-mail: maulanaazadcollegekolkata@gmail.com  
Website: <https://maulanaazadcollegekolkata.ac.in>

**Copy of the Certificate given to the participants**

	<p><b>Maulana Azad College</b> 8, Rafi Ahmed Kidwai Rd, Taltala, Kolkata West Bengal 700013 (NAAC accredited 'A' grade and DBT Star Status College)</p>	
<b>CERTIFICATE OF PARTICIPATION</b>		
<p>This is to certify that, <b>Swapnamoy Das</b> of <b>Department of Botany , Semester 5</b> has actively participated in the workshop on “<b>Mushroom cultivation for entrepreneurs</b>” held during the period from <b>2nd February, 2023</b> to <b>4th February, 2023</b> organised by <b>Department of Botany .</b></p>		
 Dr. Subhasis Dutta Principal Maulana Azad College		 Dr Debabrata Mukhopadhyay Associate Professor & Head Department of Botany Maulana Azad College

  
Principal  
Maulana Azad College  
Kolkata





GOVERNMENT OF WEST BENGAL  
OFFICE OF THE PRINCIPAL  
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Phone: 033 2249-3737/2226-7814 e-mail: maulanaazadcollegerkolkata@gmail.com  
Website: <https://maulanaazadcollegerkolkata.ac.in>

**Attendance of the workshop**

**Day 1:**

Workshop on Mushroom Cultivation Technology for Entrepreneurs

Students present	Attendance	02.02.23
1. Sonampi Dawson		
2. Bibhavi Mondal		
3. Anukta Goswami		
4. Riya Chakraborty		
5. Md. Ghulam Samadani		
6. Lakshmi Das		
7. Swapnamoy Das		
8. Nilavo Roy		
9. Sagnik Bej		
10. Subel SK		
11. Samudra Mitra		
12. Shrestha Sapathi		
13. Sankhajit Ghosh		
14. Musum Yekhan		
15. Anmol Chhara		

**Day 2:**

Workshop On Mushroom Cultivation for Entrepreneurs

Students present: 03.02.2023

1. Bibhavi Mondal
2. Lakshmi Das
3. Md. Ghulam Samadani
4. Sonampi Dawson
5. Swapnamoy Das
6. Anukta Goswami
7. Riya Chakraborty
8. Nilavo Roy
9. Sagnik Bej
10. Samudra Mitra
11. Subel SK
12. Sankhajit Ghosh
13. Musum Yekhan
14. Shrestha Sapathi
15. Anmol Chhara

**Day 3:**

Mushroom Cultivation Workshop

Student Present 04.02.2023

1. Swapnamoy Das
2. Sonampi Dawson
3. Lakshmi Das
4. Anukta Goswami
5. Bibhavi Mondal
6. Md. Ghulam Samadani
7. Riya Chakraborty
8. Sagnik Bej
9. Nilavo Roy
10. Sankhajit Ghosh
11. Musum Yekhan
12. Samudra Mitra
13. Subel SK
14. Shrestha Sapathi
15. Anmol Chhara

  
Principal  
Maulana Azad College  
Kolkata